CONTENTS

ANNEX

9 *MARINE ECOLOGY ASSESSMENT*

9.1 *INTRODUCTION*

This section of the report presents the findings of the marine ecological impact assessment associated with the construction and operation of an LNG terminal on the South Soko Island, the associated submarine pipeline connection to the Black Point Power Station and the water main and cable circuit to Shek Pik. It summarises baseline information gathered from the literature review and ecological surveys on the marine ecological resources at South Soko, Black Point and Shek Pik. The methodologies and results of the literature review and baseline surveys are presented in *Annex 9*.

9.2 *LEGISLATIVE REQUIREMENTS AND EVALUATION CRITERIA*

The criteria for evaluating marine ecological impacts are laid out in the *EIAO-TM* as well as the Study Brief (No. ESB-126/2005). *Annex 16* of the *EIAO-TM* sets out the general approach and methodology for the assessment of marine ecological impacts arising from a project or proposal. This assessment allows a complete and objective identification, prediction and evaluation of the potential marine ecological impacts. *Annex 8* of the *EIAO-TM* recommends the criteria that can be used for evaluating marine ecological impacts.

Legislative requirements and evaluation criteria relevant to the study for the protection of species and habitats of marine ecological importance are summarised below. The details on each are presented in *Annex 9*.

1. *Marine Parks Ordinance (Cap 476);*
2. *Wild Animals Protection Ordinance (Cap 170);*
3. *Protection of Endangered Species of Animals and Plants Ordinance (Cap 586);*
4. *Town Planning Ordinance (Cap 131);*
5. *Hong Kong Planning Standards and Guidelines Chapter 10 (HKPSG);*
6. *The Technical Memorandum on Environmental Impact Assessment Process under the Environmental Impact Assessment Ordinance (EIAOTM);*
7. *United Nations Convention on Biodiversity (1992);*
8. *Convention on Wetlands of International Importance Especially as Waterfowl Habitat (the Ramsar Convention); and,*
9. *PRC Regulations and Guidelines.*

10. *City University of Hong Kong (2001). Agreement No. CE 62/98, Consultancy Study on Fisheries and Marine Ecological Criteria for Impact Assessment, AFCD, Final Report July 2001.*

9.3 EXISTING CONDITIONS

The marine ecological habitats in the immediate vicinity of the South Soko Island have undergone some anthropogenic disturbance through reclamations in Sai Wan and Tung Wan as a result of the site formation for the Detention Centre (now decommissioned). Even before this facility was built, the village developments at Ha Tsuen and Sheung Tsuen (both now abandoned) had resulted in some reclamation over the previous coastline, in the form of piers and seawalls. To the east of the South Soko Island lies the active mud disposal ground at South Cheung Chau (approximately 6 km from the terminal) and to the west a former marine sand borrow area (approximately 1.3 km from the terminal) which remains as a gazetted sand dredging and mud disposal area. The Hong Kong Government has recently constructed a jetty and low level radioactive waste store within a bay on North Soko Island (Siu A Chau).

The waters and coastal areas of Southwest Lantau including the Soko Island group, which are located away from the major population centres of Hong Kong, have been considered by some academics, government and green groups to be a general area of high ecological value including from a marine perspective. Recently gathered information on the West Lantau area would also indicate high ecological value.

9.3.1 *Summary of Baseline Conditions*

The findings of the literature review and field surveys and, an evaluation of the ecological importance of marine resources within the Study Area are summarised in the following section. The details are presented in full in *Annex 9*. The ecological resources and importance of marine habitats, in particular the South Soko Island's various habitats and organisms, have been characterised with reference to the available literature, comprehensive seasonal field surveys, comparisons with other similar habitats in Hong Kong and the criteria presented in *Annexes 8* and *16* of the *Technical Memorandum on Environmental Impact Assessment Process under the Environmental Impact Assessment Ordinance (EIAO-TM)*.

Due to the limited literature available for some components of the marine environment, field surveys were necessary to fill the information gaps identified for the baseline conditions of the habitats. Detailed and comprehensive seasonal surveys were conducted examining the major habitats and species surrounding the South Soko Island and the pipeline, cable and watermain alignments. The baseline surveys have included both the dry and wet seasons. The findings of the field surveys are presented in *Annex 9*.

Dolphins and Porpoises

The key finding of the literature review was the recorded presence in the waters in southern Lantau of both of Hong Kong's resident marine mammal species, the Indo-Pacific Humpback Dolphin *Sousa chinensis* and the Finless Porpoise *Neophocaena phocaenoides*.

For this EIA, an extensive programme of vessel-based surveys has been conducted to supplement data available from ongoing long-term AFCD monitoring. In accordance with the requirements of the Study Brief, the surveys have been conducted on a monthly basis covering the period October through May. Since this EIA study commenced in July, surveys were also conducted during July, August and September. These surveys have provided a detailed overview of dolphin utilisation of Hong Kong western waters spanning Southwest Lantau, West Lantau, Northwest Lantau and Deep Bay areas. During the field surveys, dolphins were observed throughout the surveyed areas except directly south of the Sha Chau and Lung Kwu Chau Marine Park and at the very northern end of the Deep Bay survey area.

The survey data gathered (July 2005 to May 2006) has indicated that Deep Bay has relatively low densities (0.08 - 0.23 dolphins km^{-2}) and a low abundance (<10 dolphins). West Lantau had higher dolphin densities (1.71 - 2.81 dolphins km^{-2}) and a higher abundance (47 – 78 depending on the season) of dolphins. It was evident that dolphins use this area as a part of their habitat in all seasons. Southwest Lantau had lower levels of dolphin density (0.10 - 0.44 dolphins km^{-2}) and abundance (6 - 29 dolphins depending on the season) than West Lantau but was higher than Deep Bay. Northwest Lantau had lower levels of dolphin density (0.57-0.94) compared to West Lantau but similar abundance (49-82). Northwest Lantau had higher levels of dolphin density and abundance than Deep Bay and Southwest Lantau.

Finless Porpoises were only seen in Southwest Lantau and estimates of abundance (0 - 15 porpoises depending on the season) and density (<0.01 - 0.17 porpoises km^{-2}) were low. Other areas of Hong Kong such as key habitats at Lamma and Po Toi support considerably higher densities (Lamma: 0.02 - 0.52 porpoises km^{-2}, Po Toi; 0.02 - 0.17 porpoises km^{-2}) and abundance (Lamma: 4 - 90 porpoises, Po Toi: 4 - 32 porpoises) of these animals [(1)].

Within all of the marine areas of Hong Kong, the marine waters Southwest of Lantau Island (including the Soko Islands area) are the region where the Indo-Pacific Humpback Dolphin and Finless Porpoise significantly overlap in distribution. It appears that most other areas are utilized by one or the other species. Thus, those areas that are strongly influenced by the Pearl River outflow (Deep Bay, West Lantau, Northwest Lantau, and Northeast Lantau) appear to offer suitable conditions for the Indo-Pacific Humpback Dolphins,

(1) Jefferson TA, Hung S, Law L, Torey M, Tregenza N. 2002. Distribution and abundance of finless porpoises in Hong Kong and adjacent waters of China. *The Raffles Bulletin of Zoology* Supplement 10:43-55.

which feed mostly on estuarine fish (Jefferson 2000) (1). Those areas that are more marine-influenced (Southeast Lantau, Lamma, Po Toi, and the eastern waters) are used nearly exclusively by Finless Porpoises (Jefferson et al. 2002) (2).

Subtidal Hard Bottom Habitats

For this EIA a comprehensive series of dive surveys were conducted on South Soko and its environs. The dive surveys at South Soko yielded similar results to those reported previously by BCL (3) in that hard corals were in low abundance and diversity. In total, fifteen hard coral species and four octocoral species, were recorded within the Study Area (*Annex 9*). The majority were common faviids, poritids and siderasteriids, with three predominant species – *Oulastrea crispata, Psammocora* sp. and the ahermatypic cup coral *Balanophyllia* sp. Corals occurred in extremely low abundance and percentage cover estimates ranged from 1 - 5%. Of the live corals recorded, many were highly damaged and bioeroded by macroborers and barnacles. Consequently, the majority of colonies exhibited partial mortality. The corals recorded are all common Hong Kong species with the exception of the relatively little known hard coral, the False Pillow Coral *Pseudosiderastrea tayami* which was recorded on the southern coast of the South Soko Island.

Subtidal Soft Bottom Habitats

Literature was reviewed as part of the EIA which indicated that field sampling would be necessary due to the lack of comprehensive data in the Project Area. Consequently, for this EIA a comprehensive series of benthic surveys were conducted around South Soko and along the gas pipeline route. A total of 96 grab samples were taken from 16 sites during both the wet and dry seasons: 8 of the sites (48 grabs) were located close to South Soko Island; 6 of the sites (36 grabs) were located along the submarine pipeline alignment; and 2 of the sites (12 grabs) were located off Black Point. In both seasons, benthic assemblages were dominated by polychaete worms, except off Black Point were bivalves were recorded in higher numbers. In terms of diversity and abundance, benthic communities at the sites were similar to other locations reported in Hong Kong. At sites close to the South Soko Island, the level of diversity and biomass was generally higher than the Hong Kong average reported from the literature. In addition, a low number of amphioxus *Branchiostoma belcheri* (4) were recorded in Tung Wan on the east coast of South Soko Island. This area was previously disturbed during reclamation associated with construction of a Detention Centre in the late 1980's. The presence of this species therefore

(1) Jefferson, T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. Wildlife Monographs 144:65 pp.

(2) Jefferson, T. A., S. K. Hung, L. Law, M. Torey and N. Tregenza. 2002. Distribution and abundance of finless porpoises in Hong Kong and adjacent waters of China. Raffles Bulletin of Zoology Supplement 10:43-55.

(3) Binnie Consultants Limited. 1997. Coastal Ecology Studies – Soko Islands (Qualitative Survey). Final Report to GEO, Civil Engineering Department.

(4) The species is also a Class II protected species in Mainland China.

indicates that it survived the disturbance or was able to recolonise the bay in the intervening years.

Two species of Horseshoe Crab (*Tachypleus tridentatus* and *Carcinoscorpius rotundicauda*) have been recorded in Hong Kong waters. In Hong Kong, the intertidal sand/sandy-mud flats at Shui Hau and San Tau, on Lantau Island, the mud flats at Pak Nai, in Deep Bay have recorded juveniles of both species, whereas, adult horseshoe crabs are occasionally fished from the subtidal mud along the northwest coast to the Lantau Island, including Tai O, Yi O, Sham Wat Wan, Sha Lo Wan and Tung Chung Bay. All of the horseshoe crab breeding grounds are located far away from the LNG terminal (at least 13 km), proposed gas pipeline (at least 2 km), submarine cable and watermain (at least 11 km).

Intertidal Hard Bottom Habitats

Quantitative transect surveys and spot checks were conducted on natural rocky shore and artificial seawalls on the west, east and south coasts of South Soko Island. Rocky shore species were common and widespread and no species of note were recorded. At South Soko, assemblages with the highest diversity were recorded on the south coast of the island. In comparison to records of other shores in Hong Kong reported in the literature, the diversity of intertidal biota at South Soko, was similar.

Intertidal Soft Bottom Habitats

The sandy shores at South Soko and Shek Pik supported very low species diversity in the dry and wet season, which is a typical feature of mobile sandy shores with unstable substrates.

The details of all of the baseline surveys conducted for this EIA are summarised in *Table 9.1*.

Table 9.1 Marine Ecology Baseline Surveys

Survey Type	Methodology	Date
Intertidal Assemblages at South Soko	Rocky shore/ artificial shoreline Quantitative (belt transects at 7 locations) survey, three 100 m belt transects (at high, mid and low intertidal zones) for each location, covered both wet and dry seasons. Sandy Shore Quantitative (line transects at two locations) survey, 50 x 50 x 50cm core at three points (high, mid and low intertidal zones) along each of the transects, covered both wet and dry seasons.	8 & 9 March, 28 & 29 July, 14 September 2004, 29 & 30 September 2005 and 27 January 2006
Intertidal Assemblages at Shek Pik	Rocky shore/ artificial shoreline Quantitative (belt transects at 1 locations) survey, three 100 m belt transects (at high, mid and low intertidal zones) covered both wet and dry seasons. Sandy Shore Quantitative (line transects at 3 locations) survey, 50 x 50 x 50cm core at three points (high, mid and low intertidal zones) along each of the transects, covered both wet and dry seasons.	30 August 2005 & 14 March 2006
Subtidal Benthic Assemblages	Quantitative grab sampling survey; covered both wet and dry seasons. Six stations sampled in each of 10 locations, covering the reclamation area, approach channel and turning circle, and along the pipeline corridor.	25 & 26 February, 5 & 6 July, 9 September, 8 November 2004, 23 September 2005 and 13 December 2005.
Subtidal Hard Bottom Habitat (Coral)	Quantitative (Rapid Ecological Assessment (REA) technique, a total of twenty three 100 m transects at 15 locations) and qualitative (recorded within Study Area and areas in the vicinity, 3 locations); covered wet season.	9 & 15 May 2004, 29,30 September & 3 October 2005.
Marine Mammals	Land-based visual survey during daytime, 5 days per month and 6 hours per day, covered four seasons and 12 months.	13, 14, 21, 23 & 26 February, 8, 9, 10, 17 & 18 March, 16, 19, 20, 21 & 26 April, 10, 12, 14, 19 & 25 May, 10, 14, 17, 18 & 28 June 2004, 23, 26, 27, 28 & 29 July 2004, 25, 26, 27, 30 & 31 August, 6, 7, 13, 14 & 22 September 2004, 27, 28, 29, 30 & 31 October 2004, 16, 17, 24, 25 & 26 November 2004, 16, 21, 28, 30 & 31 December 2004, 10, 12, 14, 17 & 28 January 2005

Survey Type	Methodology	Date
	Quantitative vessel based survey using line transect methods spanning Hong Kong western waters (Deep Bay, Southwest Lantau, Northwest Lantau and West Lantau) 6 days per month	18, 19, 20, 21, 22, 25, 26, 27 July 2005, 3, 4, 5,15,24 & 25 August 2005, 5,7,15, 16 & 20 September 2005, 5, 6, 7, 17, 18 & 19 October 2005, 22, 24, 25, 28, 29 & 30 November 2005, 6,7,8 & 22 December 2005, 13, 16, 17, 19, 20 & 24 January 2006, 1, 2, 3, 7, 8 & 9 February 2006, 17, 23, 28, 29, 31 March 2006, 3, 6, 18, 25, 26, 27 April 2006, 2, 4, 8, 9, 10, 11 May 2006.

9.3.2 *Ecological Importance*

The waters and coastal areas of Southwest Lantau including the Soko Island group, which are located away from the major population centres of Hong Kong, have been considered by some academics, government and green groups to be a general area of high ecological value including from a marine perspective. As discussed in *Section 9.3.1* both dolphins and porpoises are sighted in the waters of Southwest Lantau, although typically at different times of the year.

There have been a variety of studies, which have investigated the marine ecology of Southwest Lantau waters and as a result of these, in particular the AFCD-commissioned Marine Park feasibility study (1), both the coastal waters off Southwest Lantau Island and the waters around the Soko Island Group have been proposed for designation as Marine Parks. Recently gathered information on the West Lantau area would also indicate high ecological value. It is important to note that there are significant spatial variations in the ecological characteristics within this large area. To provide information of key relevance to the marine ecological assessment, the ecological importance of habitats presented in this baseline was therefore primarily focused on the vicinity of the works areas of the proposed Project.

The ecological importance of the habitats was determined with reference to the following:

- Literature review findings;
- Findings of the field surveys;
- Comparison with other outlying islands in Hong Kong, as well as South Lantau; and,
- *Annexes 8* and *16* of the *EIAO TM*.

(1) HKIEd 1999. Study on the Suitability of South West Lantau to be Established as Marine Park. Submitted to AFCD.

The ecological importance of the marine habitats and their locations relative to the LNG terminal layout are summarised in *Table 9.2*. The key findings are presented below

- **Areas to be Reclaimed:** The information on marine ecological resources presented in this report has not identified any habitats within the reclamation areas that are of high ecological importance.

- **Inshore Marine Waters of South Soko Island:** The marine waters around the South Soko Island, were regarded as an area of moderate-level use for both dolphins and porpoises. However, the number of dolphins and porpoises using the waters around South Soko, particularly in waters adjacent to the proposed terminal site, is relatively low in comparison to other areas in Hong Kong, such as South Lamma for *Neophocaena phocaenoides* and West and Northwest Lantau for *Sousa chinensis*. Neither *Neophocaena phocaenoides* nor *Sousa chinensis* has been sighted within the proposed reclamation areas and the waters within Tung Wan and Sai Wan appear to be infrequently utilised by both species.

- **Marine waters of the Proposed Pipeline Corridor:** The waters along or in proximity to the proposed submarine pipeline corridor have higher numbers of sightings of *Sousa chinensis* and few, if any, sightings of *Neophocaena phocaenoides*. Along the submarine pipeline corridor, the waters around West Lantau have been classified as *Sousa chinensis* habitat and have the highest density of sightings recorded in Hong Kong.

The ecological importance of the marine habitats and their locations relative to the LNG terminal layout are summarised in *Table 9.2*.

Table 9.2 Ecological Importance of the Marine Habitats in the Vicinity of the Works Areas

Habitat	Ecological Importance
Natural Rocky Shore	Medium at South Soko, Low at Black Point and Shek Pik
Artificial Shoreline	Low at South Soko, Black Point and Shek Pik
Sandy Shore	Low at South Soko, except Medium for Pak Tso Wan. Low at Shek Pik.
Subtidal Hard Surface Habitat along Natural Rocky Shore	Low except Low to Medium at sites with *Pseudosiderastrea tayami* on south coast of South Soko

Habitat	Ecological Importance
Subtidal Hard Surface Habitat along Artificial shoreline	Low
Subtidal Soft Bottom Habitats at South Soko	Low to Medium, except Medium for Tung Wan where amphioxus was reported.
Subtidal Soft Bottom Habitats along the Corridor of the Proposed Submarine Natural Gas Pipeline	Low
Marine Waters at Tung Wan and Sai Wan of South Soko	Low for *Sousa chinensis*, Medium for *Neophocaena phocaenoides*.
Marine Waters at the southeast of South Soko Island at the location of the LNG jetty	Low for both *Sousa chinensis* and *Neophocaena phocaenoides*.
Marine Waters along the Corridor of the Proposed water main and submarine cable circuit	Medium for both *Sousa chinensis,* Low for *Neophocaena phocaenoides*.
Marine Waters along the Corridor of the Proposed Submarine Natural Gas Pipeline	Medium for both *Sousa chinensis* and *Neophocaena phocaenoides* west of South Soko. Medium in southwest Lantau for *Sousa chinensis*, Low for *Neophocaena phocaenoides*. High in west and northwest Lantau only for *Sousa chinensis*. Low at Black Point landing area only for *Sousa chinensis*.

9.3.3 *Marine Ecological Sensitive Receivers*

The construction and operation phases of the proposed LNG terminal and the installation of the submarine gas pipeline, water main and power cable have the potential to affect marine ecological Sensitive Receivers (SRs). The marine ecological SRs have been identified in accordance with the *EIAO-TM* criteria and are consistent with the ones identified in the Water Quality Assessment (*Section 6*):

- Marine Parks;
- Seagrass Beds, Mangroves, Intertidal Mudflats and Horseshoe Crabs; and
- Chinese White Dolphin Protection Zone in Mainland China.

The marine ecological SRs and their distance from the LNG terminal site, connecting pipeline and utilities (power cable and water mains) are listed in *Table 9.3* and their location is shown in *Figure 6.4* (see *Section 6*).

Table 9.3 Approximate Shortest Distance to Marine Ecological Sensitive Receivers (SRs) around Proposed LNG Terminal at South Soko and Submarine Pipeline Section from South Soko to Black Point

Sensitive Receiver	**Name**	**ID**	**Distance (km) from SR to**			
			LNG terminal	**Water Mains**	**Cable**	**Pipeline**
Seagrass Beds	Pak Nai	SR2	> 10	> 10	> 10	5.1
	Tung Chung Bay	SR39	>10	7.8	7.8	6.6
Marine Parks	Designated Sha Chau and Lung Kwu Chau	SR6a-d	> 10	> 10	> 10	< 1
Potential Marine Parks	Proposed Fan Lau Marine Park	MP19a-19c	>5	3.9	3	< 1
	Proposed Soko Island Marine Park	various	within	within	within	within
Intertidal Mudflats	Pak Nai	SR1	> 10	> 10	> 10	1.7
	Tai O	SR12	> 10	5.7	5.7	1.9
	Yi O	SR14	>10	5.6	5.1	1.7
	Shui Hau Wan	SR33	6.6	2.85	2.1	5.9
Mangroves	Pak Nai	SR2	> 10	> 10	> 10	5.1
	Tung Chung Bay	SR39	>10	7.8	7.8	6.6
	Fan Lau Tung Wan	SR15b	7.05	3.9	3	1.89
Horseshoe Crab Nursery Grounds	Pak Nai	SR1	> 10	> 10	> 10	1.7
	Sham Wat Wan	SR10	> 10	6.9	6.9	2.3
	Tai O	SR12	> 10	5.7	5.7	1.9
	Yi O	SR14	>10	5.6	5.1	1.6
	Sha Lo Wan	SR18	> 10	7.65	7.65	3.1
	Tong Fuk Miu Wan	SR33	6.6	2.85	2.1	5.9
	Tung Chung Bay	SR39	> 10	7.8	7.8	6.6
Protection Zone	Chinese White Dolphin Protection Zone in Mainland Waters	SR11	>10	>10	>10	4.2
		SR11a	>10	9.15	8.25	1.9
		SR11b	9.15	7.2	6.45	1.9

Sensitive Receiver	Name	ID	Distance (km) from SR to			
			LNG terminal	Water Mains	Cable	Pipeline
Subtidal Hard Bottom Habitat (coral)	Southern side of South Soko	SR31	0.370	1.9	1.9	1.9

9.4 *ASSESSMENT METHODOLOGY*

A desktop literature review and supporting field surveys (summarized in *Section 9.3* and detailed in full in *Annex 9*) were conducted in order to establish the ecological profile of the area within and surrounding the Study Area. The importance of potentially impacted ecological resources identified within the Study Area was assessed using the methodology defined in the *EIAO-TM*. The potential impacts due to the construction and operation of the terminal and associated developments were then assessed (following the *EIAO-TM Annex 16* guidelines) and the impacts evaluated (based on the criteria in *EIAO-TM Annex 8*).

9.5 *POTENTIAL SOURCES OF IMPACT ON MARINE ECOLOGICAL RESOURCES*

9.5.1 *Construction Phase*

Potential impacts to marine ecological resources arising from the construction works may be divided into those due to direct disturbances to the habitat and those due to perturbations to key water quality parameters. Potential impacts to marine mammals are discussed in *Section 9.7*. Impacts due to construction wastewater discharge on marine ecology and marine mammals would not be expected as it should satisfy the requirement of *WPCO-TM* effluent discharge standard (details refer to *Part 2 Section 6.6.7*). As discussed in *Part 2 Section 6.6.9*, minor water quality impacts will be expected due to vessel discharges during construction, and therefore impacts on marine ecology and marine mammals will not consider as a concern. Impacts associated with the proposed LNG terminal are divided into those occurring during:

- Dredging, reclamation and seawall modifications for the proposed LNG terminal, including dredging seawall trenches, filling with sand and suitable fill and dredging for the seawater intake and outfall pipes;
- Dredging for the approach channel and turning basin;
- Construction of the jetty;
- Submarine gas pipeline installation;
- Watermain and cable installation; and,
- Relocation of the public access pier.

Dredging, Reclamation and Seawall Modifications for the Terminal

Along the line of the seawalls the existing marine sediments will be dredged to provide suitable foundations covering an area of approximately 1.1 ha. After completion of the seawall, the muds within the reclamation sites will be partially dredged and then filled using sand and/or public fill.

It should be noted that the reclamation works at South Soko for the LNG terminal are of relatively small scale and it is expected to be approximately 0.6 ha. Impacts to the marine ecological resources potentially arising from dredging and reclamation at South Soko are summarised in *Table 9.4* and discussed in further detail below.

Table 9.4 Summary of Potential Construction Phase Impacts associated with Dredging and Reclamation for the LNG terminal at South Soko

Nature of Impact	Marine Habitat Affected	Location	Potential Impact
Habitat Loss	Subtidal Soft Bottom Habitat	Sai Wan	Permanent loss of approximately 0.6 ha of seabed due to reclamation and along 150m long margin of seawall modification works
		Tung Wan	Permanent loss of seabed at the margin of 465 m long seawall modification works
	Subtidal Hard Bottom Habitat	Sai Wan	Permanent loss of approximately 190 m of subtidal artificial seawall coastline inside the reclamation area, and along 150 m long margin of seawall modification works
		Tung Wan	Permanent loss of approximately 245 m subtidal natural rocky and 220 m artificial seawall coastline covering 1.1 ha
	Intertidal Natural Rocky Shore	Tung Wan	Permanent loss of approximately 245 m natural rocky shore
	Intertidal Artificial Shore	Sai Wan	Permanent loss of approximately 190 m of artificial shore inside the reclamation area, and along 150 m long margin of seawall modification works
		Tung Wan	Permanent loss of approximately 220 m of artificial shore
	Intertidal Sandy Shore	Sai Wan	Permanent loss of approximately 35 m of sandy shore
Short term Changes in Water Quality	Subtidal Soft Bottom Habitat	Sai Wan	Potential smothering and burial of benthic organisms during dredging
		Tung Wan	Potential smothering and burial of benthic organisms during dredging
	Subtidal Hard Bottom Habitat	Sai Wan	Potential water quality impacts on subtidal organisms
		Tung Wan	Potential water quality impacts on subtidal organisms
	Intertidal Natural Rocky Shore	Sai Wan	Potential water quality impacts on intertidal organisms

Nature of Impact	Marine Habitat Affected	Location	Potential Impact
		Tung Wan	Potential water quality impacts on intertidal organisms
	Intertidal Sandy Shore	Sai Wan (including Pak Tso Wan)	Potential water quality impacts on intertidal organisms
		Tung Wan	Potential water quality impacts on intertidal organisms

<u>Habitat Loss</u>

The Project will involve the direct loss and temporary disturbance of marine habitats.

Subtidal Soft Bottom Habitats

Within the reclamation footprint in Sai Wan, impacts will be due to the smothering and burial of organisms during filling, or removal of organisms during dredging. Dredging would also be required for forming the foundations during seawall modification works, which may also directly affect the margins of seabed at the base of existing seawalls and rocky shore. These impacts are an unavoidable consequence of the project and would occur during dredging and filling operations associated with the reclamation works for the terminal.

Findings from a literature review, supplemented by focussed field surveys, indicate that the benthic assemblage within, and in the vicinity of, the reclamation were dominated by polychaetes and characterised by similar species diversity and dry season biomass as elsewhere in Hong Kong. The wet and dry season biomass of the benthic assemblage at South Soko was comparatively higher than most of the areas in Southern Waters, except Hei Ling Chau, but lower than that of North-western Hong Kong Waters. All of the species recorded occur frequently in Hong Kong and no rare species were observed, with the exception of the amphioxus *Branchiostoma belcheri* in Tung Wan. This species has been recorded at several sites in Hong Kong's eastern waters. It occurred in low numbers in Tung Wan on the east side of South Soko. As a result of the presence of this species, the assemblages at Tung Wan were regarded as being of medium ecological value. All other areas were regarded as being of low - medium ecological value.

Branchiostoma belcheri is recognised as a species of high conservation interest in the region. As a result of its presence in Tung Wan, the LNG terminal layout was modified as part of the design process so as to largely avoid all permanent loss of subtidal soft bottom habitat in this bay (see *Part 2 Section 2 – Consideration of South Soko Terminal Alternatives* for details). Potential permanent loss of soft bottom habitat would be limited to only the margins of seawall modification works. These works would involve modifications to existing areas of subtidal hard bottom habitats which are habitats which are not considered important to *Branchiostoma*. Permanent subtidal soft bottom habitat loss in Tung Wan, would therefore be confined to a thin strip near the base of the existing sloping armour rock shoreline. According to the limited information available from the literature review on the ecology of amphioxus, it was reported that this species (*Branchiostoma*) prefers deeper waters of between 5 – 8 m depth. The potential loss of shallower areas at the margin of the seawall slopes therefore may not be as important habitat for *Branchiostoma* than the deeper areas of the bay. In conclusion, permanent loss of subtidal soft bottom habitat in Tung Wan, has almost entirely been avoided at the design stage of the LNG terminal and is therefore not expected to have unacceptable impacts on amphioxus (*Branchiostoma*).

Subtidal Hard Surface Habitats

Reclamation in Sai Wan bay will result is loss of approximately 190 m of subtidal artificial seawall coast covering an area of approximately 0.6 ha. Based on underwater dive survey findings, reclamation along this section would result in the loss of sparse, isolated and scattered colonies of one hard and one gorgonian seawhip coral species, which are common and widespread in Hong Kong.

Seawall modification works in Tung Wan will result in the loss of approximately 220 m of subtidal artificial seawall and approximately 245 m of subtidal habitat along natural rocky coastline in all covering a total area of approximately 1.1 ha. No corals were found on the artificial seawall in this bay during dive surveys. Along the natural rocky shore, seawall modification works would result in the loss of a sparse and scattered, low cover and low diversity (7 species) assemblage of common hard corals of low ecological value. Owing to their scarcity and limited ecological value, the loss of these corals, which are well represented in coral communities across Hong Kong, is not considered to be unacceptable.

The assemblages on hard bottom habitat within the South Soko reclamation area and seawall modification works area will be lost through the burial of organisms present there. These impacts are an unavoidable consequence of the Project and would occur during dredging and filling operations associated within the reclamation works and during works to modify seawalls.

Rubble mound and/or armour rock/concrete armour seawalls will be used mostly along the reclamations and will provide approximately 280 m of habitat at Sai Wan and approximately 360 m at Tung Wan for subtidal organisms to colonise. It has been demonstrated that marine organisms have recolonised such seawalls after construction [(1) (2)]. It is anticipated that similar assemblages will settle on and recolonise the newly constructed seawalls, as

(1) Binnie Consultants Limited. 1997. Chek Lap Kok Qualitative Survey Final Report, for the Geotechnical Engineering Office, Civil Engineering Department.

(2) Binnie Consultants Limited. 1996. Coral Growth at High Island Dam, for the Geotechnical Engineering Office, Civil Engineering Department.

environmental conditions of that area would be similar to the existing conditions that have allowed the growth of subtidal organisms.

Intertidal Habitats - Rocky Shores, Sandy Shore and Artificial Shorelines

The revised engineering layout for the terminal has reduced impacts on natural intertidal habitats by ensuring that the reclamation will be along existing artificial seawall shoreline, thereby reducing the loss of natural intertidal habitats. However, a loss of a small amount of natural intertidal habitat would be inevitable due to the seawall modification works.

Loss of natural intertidal habitat will occur at Tung Wan with the loss of approximately 245 m of medium ecological value natural rocky shore. In addition, part (35 m) of the sandy shore at Sai Wan, which has low ecological value, will also be lost. The sandy beach at Pak Tso Wan which was reported as "important" (1), is of medium ecological value and will not be directly affected by the development.

As stated above, most of the intertidal habitat loss at South Soko will affect the artificial coastline. At Sai Wan and Tung Wan, approximately 340 m and 220 m of low ecological value artificial shoreline will be lost, respectively.

These intertidal habitats will be replaced by artificial seawalls. The artificial seawalls can, over time, support similar assemblages of intertidal fauna and flora. Organisms present on intertidal shores in Hong Kong rely on larval settlement for recruitment. Assuming that there is a regular supply of larvae brought to the area, recolonisation of new seawalls will occur. The design of the seawall is important in determining the extent to which the community re-establishes post reclamation. The more heterogeneous the seawall, the more diverse a community the habitat can support.

Although the seawall modification works will result in the loss of approximately 280 m of natural intertidal habitats (approximately 245 m of rocky shore and 35 m of sandy shore), the severity of the impact is reduced by the provision of sloping ecologically enhancing seawalls (approximately 360 m at Tung Wan and 90 m at Sai Wan). The sloping seawalls are all expected to be of rubble mound/rock or concrete armour design.

<u>Changes in Water Quality</u>

Suspended Sediment

The construction of the reclamations for the terminal will involve dredging of the sediments within the reclamation site and along the line of the seawalls and filling of the reclamations using sand and public fill. The modelling

(1) Shin P.K.S. & Cheung S.G. 2004. A Study of Soft Shore Habitats in Hong Kong for Conservation and Education Purposes: Revised Final Report.

works have analysed SS dispersion from dredging of the reclamation site in the case that some marine muds have to be removed (*Part 2 Section 3*).

Subtidal Soft Benthos: The subtidal soft benthos in and around the proposed terminal is considered to be of low-medium ecological value in Sai Wan and medium ecological value in Tung Wan. Sessile organisms will be susceptible to the effects of increased sediment loads through smothering and burial. Sediment may be deposited on the seabed outside the reclamation sites during dredging and backfilling (following the dispersion of sediment) and post-placement (through erosion and wave-induced re-suspension). Impacts to benthic assemblages immediately outside of the reclamation site are expected to occur temporarily while works are underway. The effects of sedimentation on organisms will also depend on other factors, such as an organism's tolerance, growth orientation of sessile organisms and water movement.

Based on the water quality modelling results (*Part 2 Section 6*), sediment dispersion associated with the reclamation works for the LNG terminal in Sai Wan as well as seawall modification in Sai Wan and Tung Wan is expected to be small. Sediment will be deposited within a short distance of the dredging and filling works. Owing to the localized extent and low severity of sedimentation associated with the reclamation and seawall modification works, indirect impacts on benthic communities in the vicinity of works in Sai Wan are anticipated to be of low severity and localized. Based on the assumption that eventually the affected areas will be recolonised by fauna typical of the area, then the temporary loss of these low-medium and medium ecological value assemblages is not considered to be unacceptable. It is also important to note that Tung Wan was previously the site of reclamation during construction of the Detention Centre on the island between 1989 -1991. It is noted therefore that *Branchiostoma* either survived the impact from these reclamation works or was capable of recolonisation of the bay following cessation of works. It is therefore reasonable to expect that *Branchiostoma* individuals will be able to recolonise the bay following completion of dredging and seawall modification works. The indirect impacts associated with temporary short term changes to water quality are therefore considered to be acceptable.

Subtidal Hard Surface Habitats: Soft corals and hard corals can be injured by both high suspended sediment concentrations and high deposition rates. Damage (sublethal effects) or mortality (lethal effects) can result from a reduction in light penetration which kills the photosynthesising symbiotic algae associated with the hard corals, and also from the deposition of sediment onto the coral's surface which physically blocks the respiratory and feeding apparatus. Since there were no coral assemblages (include soft corals, gorgonians, black corals and hard corals) of ecological interest found in the areas to be affected, adverse impacts are not predicted to occur.

Intertidal Habitats: Intertidal habitats within the Study Area which may be affected by the reclamation and dredging activities associated with the LNG terminal include the natural rocky shores and sandy beaches located at Sai Wan (including Pak Tso Wan) and Tung Wan. Sediment dispersion modelling results predict that the SS elevations due to dredging for the reclamation will be short-term and, in general, will be confined to the proposed works area. It is expected that unacceptable impacts to the intertidal assemblages on South Soko arising from elevated SS levels will not occur. (Please refer to *Fisheries Impact Assessment – Part 2 Section 10* for assessment of impacts on fish fry reported at Pak Tso Wan).

Dissolved Oxygen

The relationships between SS and DO are complex, with increased SS in the water column combining with a number of other factors to reduce DO concentrations in the water column. Elevated SS (and turbidity) reduces light penetration, which may lower the rate of photosynthesis by phytoplankton (microscopic algae) and thus lowers the rate of oxygen production in the water column. Eggs and larvae of fish are most susceptible to harm due to low oxygen levels because these stages of development have a high metabolic rate and hence oxygen demand. Sessile organisms are also more likely to be affected if low oxygen conditions arise as they cannot move away from affected area (unlike mobile species such as fish). With reference to the water quality modelling results (see *Part 2 Section 6*), it is expected that unacceptable impacts to marine ecological habitats and populations present in the vicinity of the reclamation site in Sai Wan, would not occur since the dredging would only generate temporary and localised elevations of SS and not significant depletions of DO.

Nutrients

The rate of algal growth is mediated by nutrient supply. If high levels of nutrients (total inorganic nitrogen - TIN and ammonia) in seawater occur, this can induce rapid phytoplankton growth, which, if conditions are favourable, may result an algal bloom. An intense bloom of algae can lead to sharp increases in DO levels in surface water. However, at night and when these algae die there is usually a sharp decrease in the levels of dissolved oxygen in the water, as dead algae fall through the water column and decompose on the bottom. Anoxic conditions may result if DO concentrations are already low or are not replenished. This may result in mortality to marine organisms due to oxygen deprivation.

The modelling results have indicated that dredging would generate low level SS elevation in a localised area close to the works. With reference to the water quality modelling results (see *Part 2 Section 6*), nutrient levels would not increase appreciably from background conditions during the reclamation and dredging operations. Algal blooms and unacceptable impacts to the marine ecological habitats and populations present in the vicinity of the terminal and dredging areas are not expected to arise due to the works.

Dredging for the Approach Channel and Turning Basin

Dredging for the approach channel and turning basin will be scheduled after the completion of the dredging under the seawall and with similar timing as the filling of the reclamations using sand and public fill. These activities will cause minimal perturbations to water quality. Impacts to the marine ecological resources potentially arising from the dredging activities off the south of South Soko are introduced in *Table 9.5*, followed by the assessment below.

Table 9.5 Summary of Potential Construction Phase Impacts associated with Dredging for the Approach Channel and Turning Basin at South Soko

Nature of Impact	Marine Habitat Affected	Location	Potential Impact
Habitat Loss	Subtidal Soft Bottom Habitat	Off the south coast of South Soko	Temporary disturbance of approximately 52 ha of seabed
Change in Water Quality	Subtidal Soft Bottom Habitat	Off the south coast of South Soko	Potential smothering and burial of benthic organisms
	Subtidal Hard Bottom Habitat	Off the south coast of South Soko	Potential water quality impacts on isolated coral colonies in particular False Pillow Corals
	Intertidal Natural Rocky Shore	South coast of South Soko	Potential water quality impacts on intertidal organisms

Habitat Loss

The area within the boundary of the proposed turning basin and approach channel is approximately 51.5 ha. Dredging will be only required for those areas with a water depth less than 15 m. This direct impact on the subtidal soft bottom habitat will be temporary in nature and the disturbed seabed will be available for recolonisation by benthic fauna after the removal of sediment. For these reasons as well as the low-medium ecological value of this habitat, the severity of the impact is anticipated to be acceptable. During the EIA process, the area required to be dredged was substantially reduced from 150 ha to 52 ha through relocation of the jetty to the south side of South Soko in the engineering designs. As a result of relocating the jetty, the dredging quantity for the approach channel and turning basin has been reduced to approximately 1.07 Mm^3 from 3.1 Mm^3. Intertidal and subtidal hard surface habitats will not be directly affected by the dredging works.

Changes in Water Quality

Suspended Solids

Subtidal Soft Benthos: Water quality modelling results indicated that the extent of the sediment plume is localised to the works areas and would be compliant with the assessment criteria. Mean depth averaged SS levels of > 10 mg L^{-1} in the absence of mitigation measures would be generally confined to the works area in both the dry and wet seasons (*see Part 2 Section 6*). The elevated concentrations are expected to persist for a short duration. The affected areas will be recolonised by fauna typical of the area and hence the temporary loss of these low-medium ecological value assemblages is deemed acceptable.

Subtidal Hard Surface Habitats: Dive surveys recorded a sparse cover (<approximately 1-5% cover) of scattered hard coral colonies along the south coast of South Soko, which are of low ecological value. The corals found along this coast are common species which are well represented in coral communities across Hong Kong, with the exception of a little known, recently discovered species called *Pseudosiderastrea tayami* (see *Annex 9*). Based on the surveys that have been conducted to date in Hong Kong this species has only been reported from one other site in Hong Kong at Lamma Island. The subtidal hard bottom habitat sites where this species was found at South Soko are considered to be of low-medium ecological value. Although this species exhibits a high tolerance to sedimentation [(1)], based on the assessment criteria suitable for use in turbid western waters, elevations in SS levels above 10mg L^{-1} or sedimentation rates over 200 g m^2 day^{-1} due to dredging works have the potential to affect the physiology of the coral.

The results of the water quality modelling of elevations in SS under different conservative unmitigated works scenarios have been analysed and are presented in *Table 6.13*. Under scenarios which model the effects of unmitigated dredging of the turning basin and approach channel, it was predicted that areas with isolated colonies of *Pseudosiderastrea tayami* would experience relatively small exceedances in SS levels, mainly in the dry season. Water quality modelling of these worse-case unmitigated scenarios also predicted exceedances of the sedimentation tolerance criterion, mainly in the wet season (refer to *Table 6.30*).

Deployment of silt curtains has therefore been recommended to reduce the dispersion of sediment from the dredging works. Typically, silt curtains can reduce sediment levels outside the works area by 75%. With this mitigation measure in place, the area with *Pseudosiderastrea tayami* is not expected to experience elevations in SS levels or sedimentation rates above critical values. Consequently, impacts to the colonies of *Pseudosiderastrea tayami* are not expected to be unacceptable following the implementation of the proposed silt curtain mitigation.

Intertidal Habitats: Intertidal habitats that may be indirectly affected by the dredging activities are the natural rocky shores at the south coast of South Soko. The SS elevations are anticipated to be transient and confined to proposed works areas. No unacceptable impacts to these intertidal assemblages arising from elevated SS levels are likely to occur.

(1) Dr D McCorry *pers comm.*

Dissolved Oxygen

Depletions of DO as a result of dredging activities are expected to be low and compliant with the relevant WQOs due to the relatively low SS elevation. It is thus expected that unacceptable impacts to the marine ecological habitats and populations present in the vicinity of the dredging areas will not occur.

Nutrients

The levels of nutrients are not expected to increase appreciably from background conditions during the reclamation and dredging operations. Algal blooms are not expected to arise as a consequence of the works and unacceptable impacts to the marine ecological habitats and populations present in the vicinity of the terminal and dredging areas are not expected.

Construction of the Jetty

Construction of the jetty on the south coast of South Soko is scheduled after completion of dredging works for the approach channel and turning basin. The jetty would be constructed using piling construction methods. Water quality impacts associated with piling are negligible and would not impact marine ecological resources. Impacts with the potential to arise due to the construction of the jetty are introduced in *Table 9.6* and discussed below.

Table 9.6 Summary of Potential Construction Phase Impacts associated with Jetty Construction at South Soko

Nature of Impact	Marine Habitat Affected	Location	Potential Impact
Habitat Loss	Intertidal Hard Bottom Habitat	South coast of South Soko	Disturbance of approximately 20m of natural rocky shore
	Subtidal Soft Bottom Habitat	Off the south coast of South Soko	Disturbance to a small area of seabed under the jetty
	Subtidal Hard Bottom Habitat	Off the south coast of South Soko	Permanent loss of approximately 20m of natural rocky shore coastline

<u>Habitat Loss</u>

Intertidal Hard Bottom Habitat

Construction of the jetty on the south coast of South Soko will result in minor disturbance to a small stretch (approximately 20 m) of natural rocky shore, which is regarded as having medium ecological value. Direct impacts on this small stretch of coastline will be very minor since the trestle will be elevated above the shore.

Subtidal Hard Bottom Habitat

Dive surveys along the coastal stretch where the jetty would be constructed indicated the presence of a sparse cover of scattered colonies of 6 hard coral species. Works on subtidal hard bottom habitat may result in the minor loss of a small number of coral colonies in a small section of coastline (< 20 m). Owing to the low ecological value of this habitat and because the majority of the corals are common species which are well represented in coral communities across Hong Kong, small scale loss of isolated coral colonies would be an unavoidable consequence of the Project and would not be deemed unacceptable. It should be noted that the False Pillow Coral was not recorded in the works area for the jetty and thus no impacts are expected to this coral as a result of the construction of the LNG jetty.

Submarine Gas Pipeline Installation

Potential impacts to marine ecological resources arising from the gas pipeline installation may be divided into those due to direct disturbances to that habitat and those due to perturbations to key water quality parameters. The submarine gas pipeline installation works will involve grab dredging and trailing suction hopper dredging (TSHD) works (refer to *Annex 6A – Part 2 Section 3.4.6* for details). The adoption of dredging works instead of jetting techniques was recommended as an alternative construction method to reduce water quality and associated marine ecological impacts (refer to *Part 2 – Section 2.2.5*). A summary of potential impacts associated with the gas pipeline is presented in *Table 9.7.* The alignment of the gas pipeline is presented in *Figure 9.2* of *Annex 9*.

Table 9.7 Summary of Potential Construction Phase Impacts associated with Gas Pipeline Installation from South Soko to Black Point

Nature of Impact	Marine Habitat Affected	Location	Potential Impact
Direct Impacts	Intertidal Hard Bottom Habitat	Sai Wan	Temporary loss of approximately 5m of artificial shore at pipeline landing
		Black Point	Temporary loss of approximately 5m of artificial shore at pipeline landing, loss of 100m of artificial shore due to reclamation for Gas Receiving Station
	Subtidal Soft Bottom Habitat	Sai Wan to Black Point	Temporary loss of 76.5 ha seabed along the approximately 38 km pipeline route: TSHD trenches: 1km x 29m, 4km x 5.8m, 19.5km x 28m Grab dredged trenches: 9.8km x 5.8m, 3.5km x 28m, 0.5km x 24m

Nature of Impact	Marine Habitat Affected	Location	Potential Impact
		Black Point	Permanent loss of approximately 0.5 ha of seabed due to the reclamation for the Gas Receiving Station
	Subtidal Hard Bottom Habitat	Sai Wan	Temporary loss of approximately 5m of artificial shore at pipeline landing
		Black Point	Temporary loss of approximately 5m of artificial shore at pipeline landing and loss of 100m of artificial coastline due to reclamation
Short term Changes in Water Quality	Subtidal Soft Bottom Habitat	Sai Wan to Black Point	Potential deposition of sediment onto the seabed affecting benthic organisms
	Subtidal Hard Bottom Habitat	Sai Wan bay	Potential water quality impacts on subtidal organisms
	Intertidal Hard Bottom Habitat	Sai Wan bay	Potential water quality impacts on intertidal organisms on rocky and artificial shores
		Black Point	Potential water quality impacts on intertidal organisms on Black Point artificial shores
	Intertidal Sandy Shore	Sai Wan bay (including Pak Tso Wan)	Potential water quality impacts on intertidal organisms

Direct Impacts

No long term direct impacts are expected to occur due to the installation of the gas pipeline. Short term impacts are predicted to occur as a result of the dredging operations associated with the burial of the pipeline.

Subtidal Soft Bottom Habitats

Short term impacts are predicted to occur as a result of dredging operations associated with the deployment of the pipeline, although once these operations have ceased marine ecological resources in the affected areas are expected to return due to the recolonisation of the seabed by benthic fauna. The width of dredged area has been reduced where practical. The width of the dredged trench is approximately 5.8 - 29 m wide. The pipeline (approximately 30 inches in diameter) will be laid in soft seabed habitats that are regarded to be of generally low ecological value. Following installation, the pipeline will be protected by rock armour in certain sections (refer to *Part 2 Section 3* for complete details).

Rock armour is necessary to achieve adequate protection against anchor drop and drag for the gas pipeline. The vessel for rock armour placement will manoeuvre to the designated areas where the rocks will be placed. A barge will transport rocks from the quarry to the material storage barge.

Rock dumping is based on the use of typical Hong Kong Derrick Lighters (1,800 – 3,000T) configured to place rocks using grabs (as experienced on the installation of the twin gas pipelines from Shenzhen to Tai Po for Towngas). These units have the capability to place 2,400/3,600 T/day of graded rock. It is possible that the Contractor may elect to utilize specialized side-dump equipment for some of the deeper water areas (e.g. areas with Type 3A and 3B protection – see *Section 3* for explanation of these types of protection). It is also likely that the Contractor will manipulate the numbers of units working in any area depending on the equipment available at any time and on its actual progress vs. planned. The expected overall duration of rock armour placement on the gas pipeline is around 200 days.

Natural back-filling of marine sediment over the rock armour will occur and is expected to be quickly recolonised by benthic organisms. Water quality impacts from these works are not expected as the fines content of the armour rock material is low.

Intertidal Habitats

The submarine pipeline will launch from the reclamation area at South Soko and land at the area reclaimed for the Gas Receiving Station (GRS) at Black Point. Consequently, no direct impacts are expected to natural intertidal habitats. The GRS at Black Point would be constructed on reclaimed land and, as a result, approximately 100m of artificial shoreline would be replaced with approximately 250m of the same habitat. It would be expected that this coastline would be recolonized by similar species.

Subtidal Hard Surface Habitats

The submarine pipeline will be launched from recently reclaimed shoreline at South Soko and hence will not affect any marine life as they would not have colonised the new seawall in such a short period of time. The situation will be similar at Black Point where the pipeline will land at the new reclamation for the GRS.

<u>Changes in Water Quality</u>

Impacts to marine ecological resources arising from changes in water quality during the construction phase include sediment release associated with the dredging works. Potential impacts to water quality from sediment release are listed below:

- increased concentrations of suspended solids (SS);
- a resulting decrease in DO concentrations; and,
- an increase in nutrient concentrations in the water column.

Suspended Solids

Subtidal Soft Benthos: The subtidal soft benthos along the route of the gas pipeline is considered to be of low ecological value. These organisms may be susceptible to the effects of increased sediment deposition. Impacts to benthic assemblages immediately outside of the pipeline trenches are expected to occur temporarily as the modelling results indicate that as the pipeline construction works result in short-term elevations of SS in each particular location. The habitats affected along the route are expected to be generally confined to the works corridor since suspended sediments entering the water column will not be subject to a high degree of lateral dispersion (refer to *Part 2 Section 6*).

The TSHD will not be permitted to overflow during dredging and hence water quality impacts will be well controlled. Along the West Lantau and South Lantau section of the pipeline, the daily maximum contour plots (*Part 2 Section 6 Figure 6.12*), show that the sediment plume (maximum depth-averaged of > 5 mg L^{-1}) is not expected to extend to more than 200 m from the centreline of the gas pipeline alignment during the TSHD works (refer to *Part 2 Section 6*). These elevations will be short-term as TSHD dredging operations will only operate on a 12 hour per day basis and during this period will only dredge for about 40-45 minutes within every 2-3 hours due to the need to move off site to dispose of the dredged sediment.

In terms of the potential impact on subtidal soft benthos inside the Sha Chau and Lung Kwu Chau Marine Park, the daily maximum contour plots (*Part 2 Section 6 Figure 6.11*), it is expected that the sediment plume will spread just inside the boundary of the marine park (refer to *Part 2 Section 6*). However, with cage type silt curtains in place, there are not expected to be exceedances of the WQO for SS at the boundary of the Marine Park, and hence, adverse impacts to benthic assemblages within the Sha Chau and Lung Kwu Chau Marine Park are not expected.

As all the areas affected are frequently disturbed by demersal trawling and high SS laden discharges from the Pearl River, the organisms present are considered to be adapted to seabed disturbances. As the affected areas will be recolonised by fauna typical of the area, the temporary loss of these low ecological value assemblages is deemed acceptable.

Subtidal Hard Surface Habitats: Dive surveys on the west coast of South Soko and elsewhere around the island indicated there are no coral assemblages (including soft corals, gorgonians, black corals and hard corals) of particular ecological value on these coasts. Surveys at Sai Wan indicated corals were virtually absent and occurred as isolated individuals. Similarly, there are no records of notable coral communities at West Lantau, Sha Chau, Lung Kwu Chau and Black Point, which experience marginal conditions for coral growth due to reduced salinity and turbid estuarine conditions. Consequently, adverse impacts are not predicted to occur.

Intertidal Habitats: With reference to the water quality modelling predictions, elevations in SS as a consequence of the gas pipeline installation works would not result in exceedances at intertidal habitats at South Soko, West Lantau, Lung Kwu Chau, Sha Chau or Black Point. Unacceptable impacts to these intertidal assemblages arising from elevated SS levels will not occur.

Marine Mammals: Dolphins and Porpoises are air breathing and therefore SS in the water column has no effect on their respiratory surfaces. Impacts to marine mammals are discussed in *Part 2 Section 9.7*.

Dissolved Oxygen

Depletions of DO as a result of the dredging activities have been predicted to be undetectable and compliant with the relevant WQOs**.** It is thus expected that unacceptable impacts to the marine ecological habitats and populations present in the vicinity of the pipeline alignment, including marine mammal habitats and the existing Marine Park, are not expected to occur.

Nutrients

Given that SS elevations are short term and restricted to the pipeline route, it is not expected that unacceptable impacts to the marine ecological habitats and populations present in the vicinity of the pipeline alignment, including marine mammal habitats and the existing marine park will occur as a result of nutrient releases.

Watermain and Cable Installation from South Soko to Shek Pik

The Project requires the installation of the watermain and cable between Sai Wan, South Soko and Shek Pik. Installation of the cable circuit will be conducted largely using jetting, while installation of the watermain will involve a combination of jetting and dredging. Potential impacts arising from these works would be direct loss or disturbance of marine habitats and impacts due to changes in water quality. Potential impacts associated with these works are presented in *Table 9.8* and discussed below.

Table 9.8 Summary of Potential Construction Phase Impacts associated with Watermain and Cable Circuit Installation from South Soko to Shek Pik

Nature of Impact	Marine Habitat Affected	Location	Potential Impact
Direct Impacts	Intertidal Hard Bottom Habitat	Sai Wan	Temporary loss of approximately 30m of artificial shore at pipeline landing
	Intertidal Soft Bottom Habitat	Shek Pik	Temporary loss of approximately 30m of sandy shore at water main and cable landing
	Subtidal Soft Bottom Habitat	Sai Wan to Shek Pik	Temporary loss of seabed along approximately 8 km cable route and approximately 7.5 km watermain.
	Subtidal Hard Bottom Habitat	Sai Wan	Temporary loss of approximately 30m of artificial shore at the watermain and cable landings

Nature of Impact	Marine Habitat Affected	Location	Potential Impact
Change in Water Quality	Subtidal Soft Bottom Habitat	Sai Wan to Shek Pik	Potential deposition of sediment onto the seabed affecting benthic organisms
	Subtidal Hard Bottom Habitat	Sai Wan bay	Potential water quality impacts on subtidal organisms
	Intertidal Hard Bottom Habitat	Sai Wan bay	Potential water quality impacts on intertidal organisms on rocky and artificial shores
		Shek Pik	Potential water quality impacts on intertidal organisms on Black Point artificial shores
	Intertidal Sandy Shore	Sai Wan bay (including Pak Tso Wan)	Potential water quality impacts on intertidal organisms

Direct Impacts

Subtidal Soft Bottom Habitats: Short term disturbance and habitat loss are predicted to occur as a result of the jetting and dredging operations associated with the deployment of the water main and cable, although once these operations have ceased marine ecological resources in the affected areas are expected to return due to recolonisation of the seabed by benthic fauna. Owing to the relatively low ecological value of this habitat and that the disturbed area will be recolonised by similar species, the temporary loss of benthic fauna along the approximately 8 km cable route and 7.5 km watermain route would not result in unacceptable impacts. It is noted that approximately 30% of the watermain and cable routes pass through an area that has previously been disturbed through dredging (West Soko Marine Borrow Area).

Intertidal Habitats: The cable and watermain will land at an artificial seawall habitat at Sai Wan, South Soko. Since the artificial seawall is of low ecological value, impacts on a short section of the shore would not be of concern. At Shek Pik, the water main and cable would land on a sandy shore habitat. Works in this area would result in the temporary loss of intertidal habitat. Surveys at this shore indicate this shore is of low ecological value and due to the very small stretch affected, impacts are considered acceptable.

Subtidal Hard Bottom Habitats: Temporary loss of subtidal hard bottom habitat on the newly constructed artificial seawall at the watermain and cable landing at Sai Wan, South Soko, would not be considered to be an adverse impact due to the low ecological value of this habitat and small scale of the works.

Change in Water Quality

Suspended Sediment

Subtidal Soft Bottom Habitats: The subtidal soft bottom habitat along the watermain and cable routes is regarded as having low ecological value.

Jetting and dredging works may result in the deposition of sediment onto the seabed affecting benthic organisms adjacent to the utility trenches. With reference to the water quality modelling results, suspended sediments entering the water column due to jetting are predominantly confined to the bed layer and are not subject to a high degree of lateral dispersion. Impacts on the benthic organisms would be temporary and localised in extent. Given that the subtidal soft bottom habitat along the watermain and cable routes is regarded as having low ecological value, direct impacts on this habitat are considered acceptable.

Subtidal Hard Bottom Habitats: Surveys indicated that the artificial seawall and natural rocky coasts at Sai Wan are of low ecological value. Elevations in sediment levels due to works at these areas would not be regarded as unacceptable.

Intertidal Habitats: In Sai Wan the artificial shore and sandy shore are considered to be of low ecological value, whereas the sandy shore at Pak Tso Wan and the natural rocky shore are considered to be of medium ecological value. The rocky shore and sandy shore at Shek Pik are regarded as having low ecological value. Dispersal of sediment from jetting and dredging works is not expected to result in adverse impacts. The SS elevation at Pak Tso Wan found to marginally exceed the WQO during the watermain jetting close to Pak Tso Wan (refer to *Part 2 Section 6* in details) is not expected to cause adverse impacts to ecological resources.

Public Access Pier

In order to provide access for the relocated Tin Hau Temple at the west of Pak Tso Wan, a public access pier (approximately 30 m long and 3 m wide) will be constructed. The potential impacts on the marine ecological resources due to the construction and operation of the public access pier are expected to be low due to the limited footprint area.

The pier will be of block work design consisting of concrete jetty connected to the shore by a walkway set on precast concrete pier supports. No dredging or piling works are required for the pier construction. Direct impacts from the pier would be limited to small scale permanent loss of low ecological value subtidal hard and soft bottom due to construction of the jetty and pier supports. Loss of medium ecological value intertidal habitat would be minimal due to the narrow width and elevated design of the walkway. On completion, the jetty and pier supports will provide suitable hard surfaces for recolonisation by similar assemblages of marine organisms.

Water quality impacts associated with the pier construction works would be negligible and therefore associated indirect impacts to marine ecology are not expected.

Hydrotest Water

The potential additive to the hydrotest water for the LNG tanks will be low concentration of chlorine (0.05 mgL^{-1}) and for the pipeline will be non-toxic oxygen scavenger (used to consume all oxygen in the water) and/or antifoulant. The impacts on marine ecology due to the discharge of hydrotest water with antifoulant and chlorine are similar to the cooled water discharge and were addressed in the following section (*Section 9.5.2*). The discharge of oxygen scavenger (if used for pipeline) will only last for about 2 days and the dilution achievement would be obtained less than 1 km from the outfall, and therefore impacts on marine ecology will not be a significant concern.

9.5.2 Operation Phase

Hydrodynamic Regime

The reclamation for the LNG terminal will create a minor change in the shape of the existing coastline. If this causes significant change in the hydrodynamic regime of the surrounding waters, there would be potential for impacts on marine ecological resources to occur. Impacts of this nature could lead to increased seabed current speeds which may cause seabed scour thus impacting subtidal assemblages, or conversely the current speeds may drop, affecting flushing and water exchange of an area. Inadequate flushing could lead to a reduction in dissolved oxygen (DO), an increase in nutrient levels and consequent impacts to marine ecological resources.

The effects of changes in coastal configuration on the current velocities have been assessed (see *Part 2 Section 6*). Owing to the small scale of the reclamation, which is generally confined to a narrow strip along the existing shoreline, no significant changes in the hydrodynamic regime around the South Soko Island were predicted. Consequently, no operational phase impacts on marine ecological resources due to changes in the hydrodynamic regime are expected.

Maintenance Dredging

To the extent practical, the selection of the fairway transit and approach channel for the LNG carrier was based on the availability of the required charted water depth. The intent was to reduce the dredging quantities and hence potential impacts to water quality. The difference in water depth between the dredged channel and areas in the vicinity are thus reduced, and consequently the maintenance dredging will be reduced down to less than once in ten years and restricted to specific small areas. Dredging works associated with maintenance of the approach channel and turning basis are expected to be of a lower magnitude than those associated with the construction phase dredging requirements discussed above. As no unacceptable adverse impacts to water quality have been predicted to occur as a result of construction phase dredging, it can be expected that no unacceptable adverse impacts to marine ecological resources would occur through maintenance dredging.

Discharge of Cooled Water

Cooled Water - Temperature

Cooled water with a decreased temperature of approximately -12.5°C from ambient will be discharged at the seawater outfall, which is located at the sea bed on the south coast of South Soko Island. The flow rate of the discharge is equivalent to 18,000 m^3 hr^{-1} (peak flow). The discharge will be compliant with the WQO (*Part 2 Section 6*). The potential impacts of this discharge are principally related to the ecological effects in a zone of reduced temperature near the point of discharge. Impacts will be limited to a relatively small area in the bottom layer of the water column (*Part 2 Section 6*). The results from the cooled water discharge modelling obtained for both the wet and dry seasons have shown that the temperature change is predicted to be confined to the bottom layer with little or no impact to the surface layer.

As such impacts within the intertidal zone will not be expected as there is little or no impact to the surface layer of the water column (intertidal zone). In deeper water or the subtidal zone, impacts to the benthos are expected to be minor as the extent of the affected area is small.

Cooled Water - Antifoulants

There are considerable operational and ecological issues caused by organisms within, and passing through industrial water systems and, these problems can be costly [(1)]. Mussels, oysters and other marine organisms growing within cooled water circuits have resulted in losses in thermal efficiency and even total shutdowns. To counteract settling and actively growing fouling organisms, cooled water circuits are usually dosed with antifoulants (typically chlorine in the form of sodium hypochlorite). The discharge of the resulting (chlorinated) effluents may in turn have effects on the habitat beyond the outfall.

The effluent from the cooled water system will contain traces of antifoulant at a concentration of approximately 0.3 mg L^{-1}, which is below the EPD's [(2)] statutory limit of 1.0 mg L^{-1}.

Values for observed toxic effects of chlorine are available from the literature and can be used for reference purposes (*Table 9.9*). For the majority of organisms the toxicity of residual free chlorine depends on the concentration

(1) Langford TE. 1983. Electricity generation and the ecology of natural waters. Liverpool University Press.

(2) Technical Memorandum Standards for Effluents Discharged from Drainage an Sewerage Systems, Inland and Coastal Waters, Water Pollution Control Ordinance, Cap 358.

and exposure time. Short exposure to high concentrations often leads to lethal effects as do long term exposures to low concentrations (1).

Table 9.9 ***Toxic Responses of Marine Organisms to Residual Free Chlorine in Discharges (2)***

Organism	Toxic Responses	Cl (mg L^{-1})
Phytoplankton	Photosynthesis of marine phytoplankton depressed by 70-80%	0.02-0.04
Zooplankton	Short term exposure has led to rapid but temporary responses demonstrated through depression in metabolic rate and reproductive activity.	0.01
Oyster Larvae (*Ostrea edulis*)	Tolerant of short term exposure with no demonstrated toxic response.	0.2-0.5
Barnacle Larvae (*Elminius modestus*)	Tolerant of short term exposure with no demonstrated toxic response.	0.2-0.5
Lobster Larvae (*Homarus americanus*)	Respiration rate increased after 60 minute exposure to 0.1 mg L^{-1} and after 30 minute exposure to 0.1 mg L^{-1}.	0.01 0.1

Concentrations of residual chlorine typically diminish rapidly with time and distance from the discharge point (3). The modelling exercises conducted for the water quality assessment (reported in *Part 2 Section 6*) indicate that residual chlorine concentrations exceeding 0.01 mg L^{-1} are only likely to occur within 300m of the outfall and are mainly confined to the bed layer of the water column. These predicted increases do not exceed tolerance thresholds established in the literature (0.02 mg L^{-1}) and are in accordance with those levels recommended in previous studies in Hong Kong (0.01 mg L^{-1}). As a result, impacts to marine ecology as a result of potential concentrations of residual chlorine are not expected to occur.

Impingement and Entrainment of Fauna in the Seawater System

In order to provide water for regasification of LNG, seawater will be extracted from the eastern bay of Tung Wan via a submarine intake. The intake will extend approximately 300 m from the pumphouse to the offshore intake heads. The intake from the tower would be placed at an approximate depth of between -1 mPD to –3mPD.

There is a potential for impingement and subsequent entrainment of marine organisms in the intake system. This affects different groups of animals to differing degrees. Smaller pelagic species are the most vulnerable, while burrowing animals are rarely impinged, and large pelagic species are usually strong enough to avoid the intake stream.

(1) Redrawn after Mattice and Zittel. 1976. Site Specific Evaluation of Power Plant Chlorination. *Journal of Water Pollution Control*, 48:(10) 2284-2308.

(2) Information gathered from references contained in Langford TE. 1983. Electricity Generation and the Ecology of Natural Waters

(3) Mattice JS & Zittel HE. 1976. Site specific evaluation of power plant chlorination. Journal of Water Pollution Control. 48 (10): 2284 - 2308.

Not all animals that impinge on the system will be entrained within it. Screening of water intakes will prevent the entrainment of all but the smallest organisms. Impinged animals may suffer mechanical and physiological stress, but evidence from power station cooling systems suggest that this is not a significant source of mortality (1).

Entrained animals may be subject to additional thermal stresses and mortality is relatively high. However, these will typically be confined to plankton, which have an extremely high natural mortality. Extensive research shows that the mortality of plankton in seawater systems does not give rise to a significant impact (2) (3).

An assessment of impacts associated with impingement and entrainment of marine organisms is presented in the *Fisheries Impact Assessment* (*Part 2 Section 10*). It was concluded that impacts associated with operation of the water intake would not cause unacceptable impacts on fisheries resources. Operation of the water intake would not be expected to result in unacceptable impacts on marine ecological resources.

Submarine Gas Pipeline

The pipeline is designed to be maintenance free but should it require inspection this will be done using a remotely operated intelligent pipe inspection gauge (PIG). This type of inspection will be within the pipeline. Consequently, there will be no need to disturb the seabed during inspection and therefore marine ecology will not be affected.

Accidental Spillage of LNG

An accidental LNG release would be vaporized quickly into the atmosphere and would not be expected to impact water or sediment quality and hence would not be expected to impact marine ecology. If spilled onto the LNG terminal platform or into the ocean (LNG is less dense than water), LNG would boil rapidly (due to exposure to higher ambient temperatures). Because of the material's density and turbulence created by the rapid boiling, an LNG spill would vaporize rapidly, leaving no environmental residue. Any accidental LNG spill would therefore be of short duration, reversible and have no discernable impacts to either primary or secondary production and will occur within a limited and transient mixing zone.

Modelling of an accidental spill at the unloading berth has been conducted and the results are presented in *Section 6*. The results indicate that a spill size of 30m radius on the surface of the water would evaporate within 120 seconds and leave no environmental residue. As the spill would occur on the ocean,

(1) Majewski W. & Miller D.C. 1979. Predicting effects of power plant once-through cooling on aquatic systems. UNESCO.

(2) *Ibid*.

(3) Turnpenny A.W.H. 1988. *Fish impingement at estuarine power stations and its significance to commercial fishing*. Journal of Fish Biology, **33**, 103-110.

which has a very large capacity to buffer temperature changes, only short term cooling would occur at the sea surface.

It is worth noting that there is a sump at the berth large enough to capture and manage a major spill from the unloading lines and contain it on the site. Other leaks at the terminal are designed to be routed to containment basins for evaporation and treatment and would not reach the sea. It should also be noted that the LNG terminal has an emergency shutdown system (PERC) that continuously monitors the mooring system and motions of the unloading arms during unloading. If the ship were to break from its mooring, the LNG transfer would shutdown instantly without loss of cargo. A leak from the unloading arms has a frequency of 4 x10^{-3} per year, while a full rupture has a frequency of 4 x10^{-5} per year (for details refer to *Part 2 - Section 13.5*). Owing to the extremely low likelihood of an accidental LNG spill and because there is no possibility for any spilt LNG to impact water or sediment, impacts to marine ecological resources are not expected.

This LNG leakage issue is further discussed in *Part 2 Section 6 – Water Quality* and *Part 2 Section 13 Quantitative Risk Assessment* (in particular the consequential fire hazard). The assessment presented in *Part 2 Section 13 Quantitative Risk Assessment* indicates the fire hazard risk during the operation phase of the LNG terminal is, to all intensive purposes, non-existent. Hence for credible LNG spill scenarios identified under *Study Brief Clause 3.4.9*, the potential for marine mammals to be injured from this type of occurrence is extremely low.

Accidental Spill of Fuel from LNG Carrier

It is considered that a spillage of fuel is highly unlikely (details refer to *Part 2 Section 6.7.8*), therefore potential risk on the Finless Porpoise and Chinese White Dolphins due to accidental spill of fuel is expected to be low.

9.6 *EVALUATION OF THE IMPACTS TO MARINE ECOLOGICAL RESOURCES*

The following section discusses and evaluates the significance of the impacts to marine ecological resources identified in the previous section. Based upon the information presented above, the significance of the marine ecological impacts associated with the construction and operation of the LNG terminal have been evaluated in accordance with the *EIAO-TM (Annex 8, Table 1)*, as follows.

- *Habitat Quality*: Impacts are predicted to occur to the low and medium quality coastal habitats (intertidal and subtidal) and benthic habitats identified during the field surveys within the reclamation site, seawall modification areas and along the pipeline, watermain and cable routes. To avoid permanent loss of habitat where amphioxus (a species of high conservation interest) was recorded, the LNG terminal layout was modified during the design process so no reclamation works will occur in

Tung Wan. Water quality impacts and associated impacts to marine ecological resources of the Sha Chau and Lung Kwu Chau Marine Park have also been largely avoided through selection of grab dredging rather than jetting method for trench excavation for the submarine pipeline. Operational phase discharges from the terminal are not expected to impact any habitats of high ecological value.

- *Species:* Organisms of ecological interest were colonies of False Pillow coral, *Pseudosiderastrea tayami* on the south coast of South Soko and the amphioxus *Branchiostoma belcheri* recorded from Tung Wan. With implementation of the recommended mitigation measures to control water quality impacts and taking into account the small scale effects, impacts to these species are not expected to be unacceptable. Operational phase discharges from the terminal are not expected to impact these species.

- *Size:* The size of the reclamation site at South Soko is approximately 0.6 ha with 1.1 ha of seawall modifications which cover approximately 560 m of artificial shoreline, approximately 245 m of natural rocky shore and 35 m of sandy shore located at Tung Wan and Sai Wan. 20 m of natural rocky shore would be affected at the landing site of the trestle that leads from the LNG jetty. The low and medium ecological value intertidal habitats and low ecological value subtidal hard surface and low-medium and medium benthic assemblages within the terminal footprint will be directly impacted. The low - medium ecological value benthic assemblages within an approximate area of 52 ha of the turning basin and approach channel will be lost during dredging but are expected to become re-established within a year (see *Reversibility*). The total length of the gas pipeline is approximately 38 km, running across North-western, West and Southern Lantau waters. The width of dredged trenches ranges from approximately 6 to 29 m. The low ecological value benthic assemblages within the pipeline dredging areas (approximately 38 km) will be directly affected, but expected to recolonise following cessation of works, as well as a small area of low ecological value habitat (artificial seawall) at the Black Point landing point. Reclamation of the Gas Receiving Station at Black Point will result in direct loss of approximately 0.5 ha of low ecological value benthic assemblages and 100 m of low value ecological shore (artificial seawall). Installation of a 7.5 km watermain and 8 km cable from South Soko to Shek Pik will have direct impacts on low ecological benthic assemblages and short stretches of low ecological value artificial and sandy shores at the landing points, which are expected to be recolonised.

- *Duration:* The reclamation works are predicted to last for approximately 7 months and the dredging for the turning basin and approach channel approximately 4 months. The works operations for dredging works along the gas pipeline alignment in the various locations are predicted to last for about 3 months. Dredging and jetting for the watermain is expected to take 4 months each, whilst jetting for cable installation is expected to take less than 3 months. Increases in SS concentrations in the vicinity of sensitive receivers are expected to be low and temporary, and generally within environmentally acceptable limits (as defined by the WQO). Piling works for the jetty are expected to take approximately 9 months for bored piling and 4-6 months for percussive piling. Operational phase discharges will continue during the life of the LNG terminal but are not predicted to cause adverse impacts to marine ecological resources as the discharges disperse rapidly and do not affect high ecological value habitats.

- *Reversibility:* Impacts to the benthic assemblages inhabiting the soft bottom habitats along the alignments of the submarine utilities and dredged areas are expected to be relatively short term and recolonisation of the sediments is expected to occur. Similarly, the low ecological value assemblages present on the artificial seawalls can be expected to recolonise the seawalls once they are reinstated.

- *Magnitude:* No unacceptable impacts to ecologically sensitive habitats have been predicted to occur. The impacts to the ecologically sensitive habitats defined in this assessment will be of low magnitude during the jetting and dredging operations associated with the reclamation, turning circle and approach channel, and the laying of the gas pipeline, watermain and cable. Operational phase impacts are not expected to cause adverse impacts and are considered to be of low magnitude.

The impact assessment indicates that no unacceptable adverse impacts to marine ecology are expected to occur. Furthermore, any predicted changes to water quality, and hence surrounding marine habitats, are as a result of applying specific mitigation measures likely to be localised to the works area, to be of short duration, to be reversible and will occur within a limited and transient mixing zone.

Although soft bottom habitat will be temporarily lost, it has been demonstrated through long term monitoring of previously dredged areas and existing Contaminated Mud Pits in the East of Sha Chau area that marine organisms have recolonised the areas following the completion of the works (1). As such, it is anticipated that subtidal assemblages influenced by dredging and jetting will settle on and recolonise the seabed returning it to the former conditions.

The previous discussion has indicated that the loss of intertidal and subtidal assemblages within the Study Area is expected to be compensated through the provision of seawalls that provide adequate surfaces for colonisation once reclamation works have been completed (810 m of rubble mound and/or concrete armour seawalls, ie 560 m at South Soko and 250 m at Black Point).

(1) Qian PY, Qiu JW, Kennish R and Reid C. 2003. Recolonization of benthic infauna subsequent to capping of contaminated dredged material in East Sha Chau, Hong Kong. Estuarine, Coastal and Shelf Science 56: 819-831.

In order to assist in rehabilitating the area after reclamation, a rubble mound or concrete armour rock design has been adopted, where practical, for the construction of the seawalls. It has been demonstrated that marine organisms have recolonised seawalls of these types (1). It is anticipated that intertidal and subtidal assemblages similar to those recorded in the field surveys, will settle on and recolonise the newly constructed seawalls of the reclamation.

Impacts to marine ecological resources during operation of the terminal are predicted to be within environmentally acceptable levels through appropriate design of the seawater outfall system (as discussed in *Part 2 Section 6 - Water Quality*).

9.7 POTENTIAL SOURCES OF IMPACTS ON MARINE MAMMALS

The Indo-Pacific Humpback Dolphin (*Sousa chinensis*) occurs in waters from Deep Bay to Southwest Lantau. The Finless Porpoise (*Neophocaena phocaenoides*) has only been recorded in the Study Area in Southwest Lantau waters. Differences in their distribution, seasonality, density, abundance and other details are presented in *Annex 9*. Owing to the potential for both of Hong Kong's resident marine mammals to be present in the vicinity of the project area, potential impacts on these animals has been highlighted as an assessment requirement in the EIAO Study Brief (*Clause 3.4.5.5*).

In this section of the report, the potential for impacts associated with various marine works and activities involved in the proposed project are examined in detail to provide an assessment of the significance of the effects on these animals. The significance of a potential impact from works or activities on marine mammals can be determined by examining the consequences of the impact on the affected animals. This is related to the source, nature, magnitude and duration of the impact, the level of exposure to the impact in terms of the number (and lifestage) of affected animals and their response to an impact.

The consequences of an impact on these marine mammals have the potential to range from behavioural changes of individual animals through to population level effects (2) (3) (4). The potential consequences of impacts on marine mammals are as follows:

(1) Binnie Consultants Ltd. 1997. Chek Lap Kok Qualitative Survey Final Report. For the Geotechnical Engineering Office, Civil Engineering Department, December 1997.

(2) National Research Council (2005) *Marine Mammal Populations and Ocean Noise: Determining When Noise Causes Biologically Significant Effects*. National Academies Press. Washington DC. 126p.

(3) Wursig B, Greene CR, Jefferson TA. 2000. Development of an air bubble curtain to reduce underwater noise of percussive piling. Marine Environmental Research 49, 79-93.

(4) Greene CR, Moore SE. 1995. Man-made noise. In: Marine Mammals and Noise. (Eds. Richardson WJ, Greene CR, Malme CI and Thomson DH). Academic Press. London, pp. 101-158.

- **Behavioural changes:** Affected individual animals may change travelling speed, dive times, avoid areas, change travel direction to evade vessels, change vocalisation due to acoustic interference, reduce resting, socialising and mother-calf nursing. Provided that disturbances leading to behavioural changes are temporary and localised, disturbances causing behavioural changes would generally not be considered significant (i.e. effects would be of short duration, normal activities will resume with no appreciable effect on fitness or vital rates).

- **Life function immediately affected:** Avoidance of affected areas may diminish individual animals' feeding activity. Loss of a marine area to reclamation will permanently eliminate a foraging area. Similarly, disturbance/loss of prey resources due to water quality impacts may diminish available feeding opportunities in the vicinity of works. Interference with echolocation through underwater noise could also affect feeding. Provided that disturbances are temporary and localised or permanent losses of habitat represent a small portion of available habitat, impacts would generally not be considered to have significant effect on marine mammals (ie effect would be short term and therefore have no appreciable effect on fitness or vital rates).

- **Fitness and Vital Rates:** If works cause widespread and prolonged adverse impacts, with limited or no alternative habitat available for animals to use, fitness and vital rates will be affected including growth rates, reproduction rates and survival rates (life-stage specific). In the same way, any works or activity likely to result in injury or mortality of marine mammals would self-evidently affect survival rates. Activities causing impacts on fitness and vital rates would be considered significant (i.e. if effects are long-term or inescapable, they will diminish the health and survival of individuals).

- **Population effect:** Impacts on the fitness and survival of individuals have the potential to, for instance, affect population growth rates and population structure. Impacts resulting in population effects would be considered significant (i.e if effects are long term and detrimental to the population as a whole).

It is noted that the potential impacts of dredging activities in Hong Kong on dolphins have not been addressed through focused scientific studies. However, marine mammal researchers have observed humpback dolphins in Hong Kong around dredging activities a number of times, and areas in which dredging occurs (such as the Contaminated Mud Pit areas at East of Sha Chau) have not been abandoned by dolphins. The observations by the researchers appear to show that the dolphins have short-term, avoidance of the immediate works areas of dredging activities (on the order of movements of several hundreds or thousands of meters). Minimizing both the duration of marine construction and the area of marine concurrent anthropogenic activity will ensure that any short-term behavioural disturbance is limited and not detrimental to conservation. Due to the very slow vessel speeds there is no prior evidence that dolphins have ever been injured by dredging activity.

It is noted that some marine construction works such as dredging works will, in some areas for specific activities, take place over 12 hours. This scheduling measure has been adopted as marine mammal exclusion zone will be used during dredging works in along the gas pipeline route and for the approach channel and turning circle at South Soko. Such exclusion zones are most effectively enforced during daylight hours and hence dredging works along the pipeline route and for the approach channel and turning circle in South Soko have been scheduled to take place over 12 hours during daylight.

For safety reasons, grab dredgers will operate 24 hours on the pipeline section which crosses the Urmston Road channel off Black Point. It is important to minimise the duration of works in these areas to prevent risk to vessels and high speed ferries in this busy channel. It is not expected that night time dredging along this short section of the route will have any significant impact on marine mammals. Although some species of dolphins have very clearcut differences in their activities at night vs. daytime most coastal dolphins appear to have similar activity levels throughout the day. It is expected that their behavioural changes are more likely to be affected by tidally induced changes in the abundance and distribution of prey species than day / night effects.

9.7.1 *Construction Phase*

As discussed previously, works for the proposed LNG terminal will involve:

- Dredging and reclamation for the proposed LNG terminal, including dredging seawall trenches, filling with sand and suitable fill and dredging for the seawater intake and outfall pipes;
- Dredging for the approach channel and turning basin;
- Construction of the jetty;
- Submarine gas pipeline installation;
- Watermain and cable installation; and,
- Relocation of the public access pier.

The following sections provide an assessment of potential impacts associated with these works and activities and effects on these animals.

Reclamation Works - Habitat Loss

The LNG terminal requires approximately 0.6 ha of reclamation in Sai Wan and 1.1 ha of seawall modification works in both Sai Wan and Tung Wan. Given that the seawall modification works are at the shoreline the main works at the terminal will be the permanent loss of approximately 0.6 ha of sea area and hence the potential permanent loss of a very small area of marine mammal habitat. It is noted from *Part 2 Section 2* of this EIA report that the size of the reclamation has been reduced from approximately 13 ha through the substantial modification of the engineering layout of the terminal which has consequently reduced the loss of marine mammal habitat.

The physical loss of habitat due to reclamation works for the Project could potentially affect some individuals of Indo-Pacific Humpback Dolphin, *Sousa chinensis,* and the Finless Porpoise, *Neophocaena phocaenoides,* that utilise the South Soko waters. Humpback dolphins are sighted throughout the year around South Soko, whereas Porpoises are mainly restricted to winter and spring.

Based on the vessel-based and land-based survey findings, as well as AFCD monitoring records, neither species has been sighted regularly in waters immediately next to the existing coast where the proposed reclamations would occur. Although both species have been recorded in the waters around South Soko, it appears that the waters in Sai Wan are little utilised. The affected areas, primarily along artificial shoreline, are not used as an important foraging area or an area where mother-calf pairs are frequently sighted. For this reason, the relatively small scale loss of approximately 0.6 ha of open waters in Sai Wan is not expected to be significant for marine mammal populations. The loss of these open waters, which area adjacent to artificial shoreline, would represent a very minor loss of marine habitat in the context of the size of marine areas in the range of these animals. Provided the recommended mitigation measures are followed during construction, no unacceptable adverse impacts on dolphin and porpoise individuals that utilise South Soko waters are anticipated.

Information from the fisheries impact assessment (*Part 2 Section 10*) indicates that the permanently loss of small area of the marine habitat due to reclamation are not predicted to adversely impact fisheries resources. As a consequence, impacts to marine mammals through the loss of small area of feeding ground (the fisheries resources in the marine habitat serve as marine mammal's food prey) are not predicted to be significant.

Direct impacts due to gas pipeline laying, water mains and cable laying to the Indo-Pacific Humpback Dolphin and Finless Porpoise habitats in North-western, West and South Lantau are not expected to be severe as the pipeline construction works would not cause any permanent loss of the marine water habitats in the area (other than the a very small reclamation for the GRS at Black Point).

In Hong Kong, there is a lot of experience of pipeline impact assessment and the present Project would be the seventh similar pipeline to be installed or permitted (*Table 9.10*). These projects have all been installed or permitted in areas of high ecological importance and this Project has made reference to the construction methodology and mitigation measures.

*Table 9.10 Summary of Previous Pipeline Projects in Areas of High Ecological Importance**

Pipeline	Date	Length	Passes through / close to Sensitive Habitat				
			Marine Reserve	Marine Park	CWD	FP	Corals
Towngas Shenzhen - Tai Po	2005	~45km		Yes			Yes
Towngas Tai Lam - Lantau	1996	~5km			Yes		
HEC Shenzhen - Lamma	2005	~90km	Yes	Yes		Yes	Yes
AAHK PAFF - Sha Chau	2006/7	~8km		Yes	Yes		
AAHK Sha Chau - Airport	1996	~10km		Yes	Yes		
CLP Yacheng - Black Point	1995	~75km		Yes	Yes	Yes	

* CWD – Chinese White Dolphin, FP – Finless Porpoise

The nature of works for the proposed pipeline for this proposed project is the same as these previously approved projects, which with appropriate mitigation and EM&A requirements, were deemed environmentally acceptable.

Potential Impacts from Works Vessels (all marine works)

Increased marine traffic: There are two key ways increased vessel traffic has the potential to impact marine mammals. Firstly, vessel movements may potentially increase physical risks to dolphins. In Hong Kong, there have been instances of dolphins and porpoises having been killed or injured by vessel collisions and it is thought that this risk is mainly attributed to high-speed vessels such as ferries. Secondly, the physical presence of works vessels due to construction may cause short-term avoidance of the area where works vessels are operating. It is therefore important to minimize the duration of marine works such as dredging and where practicable, the amount of concurrent vessel activity to limit any short-term displacement.

The inshore waters surrounding the project area at South Soko do not support high densities of dolphins or porpoises. Similarly, the majority of the routes of the watermain and cable do not traverse areas with high dolphin or porpoise sightings densities. Along the submarine gas pipeline route, West Lantau has the highest densities of dolphins in comparison to other areas in Hong Kong (Dolphin density = 0.67 ± 0.51 km^2) and also higher densities of young dolphins (Unspotted Calves and Unspotted Juveniles). The encounter rate of mother and calves at West Lantau is the highest compared with (7.1 per 100 km of survey effort) other areas of Hong Kong (1). Dolphins have been observed feeding in West Lantau waters, and are often seen surfacing with

(1) Hung, S.K.Y. 2006. Monitoring of the Chinese White Dolphins (*Sousa chinensis*) in Hong Kong waters – Data collection. Final Report. Unpublished report submitted to the Hong Kong Agriculture, Fisheries and Conservation Department.

mud on their bodies, indicating that they have been feeding on demersal fish. It is noted that the dolphins also feed in other areas of Hong Kong waters and the Pearl River Estuary and do not feed exclusively in West Lantau. Unlike some other marine mammal species, the Indo-Pacific Humpback Dolphin does not have a specific and confined nursery area and mother-calf pairs have been spotted in the baseline surveys and in AFCD's surveys throughout the animals' range including the Pearl River Delta. The limited data collected to date suggests that dolphin calving occurs throughout the year with higher frequency between March and August [(1)].

The *EIAO-TM* specifies the priorities for addressing ecological impacts is avoidance and minimization. This philosophy has been observed in designing the marine works construction programme. There is a consensus among the leading local marine mammal specialists that reducing the duration of marine works is the most effective approach to reduce impacts on marine mammals. Grab dredging and TSHD have been used extensively in Hong Kong and there is no evidence of significant residual impacts on marine mammals due to these techniques. With a shorter works programme, any marine mammals that have avoided the vicinity of the works areas can return to the area sooner.

Given the importance of minimizing the duration of the construction works, the potential impact control measures were reviewed to ensure that they would not be potentially detrimental to the population, and consistent with both marine mammal specialist opinion and the *EIAO-TM*. For example, closed working periods for pipeline construction activity could potentially cause either significant extension of the overall duration of works or intensification of works to meet the required construction schedule, both of which would be potentially detrimental to marine mammal populations.

The risk of vessel strike by works vessels on dolphins and porpoises arising due to increased vessel traffic associated with the marine construction works, is considered to be very small as work vessels would be slow moving. For instance, works vessels such as dredgers must necessarily move at slow speed as they perform works on the seabed. By comparison, their rate of movement would be considerably less than fishing vessels and other craft which regularly traverse the Study Area. As construction vessels move slowly, they would not pose a significant collision risk to dolphins or porpoises including young animals. Furthermore, to err on the side of caution, vessel strike will also be managed through a series of precautionary measures (see *Part 2 – Sections 9.9.2* and *9.10* for details).

Along the gas pipeline route between South Soko and Black Point which passes through the relatively high dolphin density area of West Lantau, a number of other vessels, including tugs for the anchor lines, may be involved

(1) Jefferson, T. A. (ed.). 2005. Monitoring of Indo-Pacific humpback dolphins (*Sousa chinensis*) in Hong Kong waters – data analysis: final report. Unpublished report submitted to the Hong Kong Agriculture, Fisheries and Conservation Department

during the gas pipeline installation activities in addition to the works vessels such as pipeline lay barge, dredging plant and vessels for armour rock placement. Between Sai Wan and across West Lantau waters, trenches will be dredged by TSHD. It should be noted that the vessel would be active on site for a period of only about 40 – 45 minutes every 2 – 3 hours and therefore have a much lower presence in the area than other works vessels. It is also important to note the TSHD will not be permitted to overflow during dredging and hence water quality impacts will be well controlled. In line with the philosophy presented above, TSHD was adopted to reduce the duration of works in these waters, thus potentially avoiding unnecessary prolonged exposure to works.

Across Northwest Lantau waters, the remainder of the trench will be excavated by grab dredgers operating 12 hours per day. A number of grab dredgers would be operating concurrently in order to reduce the duration of works in different works area (see *Section 6-Annex 6A* for details). The movements of these and all other works vessels will be maintained to the specific works areas, and given the implementation of the rules for vessel operation (*Part 2 Section 9.9.2*), adverse impacts on marine mammals due to increased marine traffic and their works activities are not expected. Following dredging, the submarine pipeline will be laid from barges into the trenches on the seabed, and therefore will not cause an underwater obstruction to marine mammals. It should also be noted that the duration of the various activities is short as pipe laying would be expected to occur for a couple of weeks in the West Lantau area.

Similarly vessels involved in armour protection placement will proceed along the pipeline in a specific area and their activities are not expected to impact marine mammals. The placement of rock armour is not expected to cause impacts to water quality or marine ecological resources as the vessel will comply with the speed limitations and the backfill material will have a low fines content. Similar to the dredging works, noise generated by armour rock placement is not expected to acoustically interfere significantly with dolphins or porpoises. As the armour rocks will be placed directly on top of the pipe which is located at the bottom of the dredged trench, it is not expected to pose a collision risk to dolphins or porpoises.

It should be noted that many similar pipelines have been installed or permitted in Hong Kong with similar post construction protection using armour rock including HEC Shenzhen to Lamma pipeline, AAHK PAFF pipeline and Towngas Shenzhen to Tai Po pipeline, in which some of the pipeline sections pass through marine mammal habitats, ie South Lamma, Po Toi and the Sha Chau Lung Kwu Chau Marine Park. Consequently, placement of rock armour on the gas pipeline is not expected to cause impacts to marine mammals.

The inshore waters surrounding the project area at South Soko have very low densities of dolphins or porpoises. Similarly, the majority of the routes of the watermain and cable traverse areas with relatively low dolphin or porpoise densities (see *Annex 9 – Figures 9.38* and *9.39*). Any effect of the physical presence of works vessels in these works areas on dolphins and porpoises would be limited to temporary behavioural disturbance of a small number of animals. It would be expected that these animals may avoid the vicinity of the works areas whilst works vessels are in operation. The dolphin monitoring data show few sightings from the affected area indicating that these waters are little utilised. These disturbances would not be expected to have a biologically significant impact on the affected animals. As detailed in *Part 2 –Annex 9 – Baseline Marine Ecological Resources*, photo-identification of individual dolphins has shown these animals have extensive home ranges typically of more than 100 km^2 and perform their main functions (feeding, socialising, breeding) throughout their home ranges.

Similarly, along the submarine gas pipeline route, if and when encounters between works vessels and dolphins occur, effects would be limited to temporary behavioural disturbance (ie swimming avoidance of vessels), which would not be expected to have biologically significant consequences. It can also be noted that separation of calves from their mothers is highly improbable. Whole scale changes to dolphin's behaviour are highly improbable during the pipeline installation works. Mothers and calves are in constant communication with each other, and it is extremely unlikely that there be a separation between the two because of the proposed works. The marine mammal impact assessment has indicated that there is little risk of the gas pipeline installation works causing either physical harm or water quality related impacts to dolphin mothers and their calves. The submarine gas pipeline programme was reviewed and it became apparent that the dredging works for the submarine gas pipeline could be scheduled to take place during the period September through February. Consequently, the preferred programme for the Project has adopted this scheduling measure for the entire length of dredging for pipeline installation.

It is noted from the sightings information that younger dolphins, especially in West Lantau, stay inshore which is away from the alignment of the submarine gas pipeline (*Annex 9 – Figures 9.29-9.31*).

This assumption that the presence of works vessels would not adversely impact marine mammals is consistent with other EIA and environmental monitoring studies in Hong Kong. Contaminated mud disposal facilities have been in operation in the East of Sha Chau area for over ten years. Data available on the use of the waters do not appear to indicate that the operations of these facilities are resulting in avoidance behaviour by dolphins (1). Similarly, construction of a blockwork jetty and dredging at Lung Kwu Chau inside Lung Kwu Chau and Sha Chau Marine Park have not significantly affected dolphin utilisation in this area. Dolphins were observed in

(1) ERM. 2002. Environmental Monitoring and audit for Contaminated Mud Pit IV at East Sha Chau. Report for the Civil Engineering Department.

proximity to major reclamation works at Penny's Bay [(1)]. Waters near Po Toi also remain high utilisation areas for Finless Porpoise in spite of extensive sand extraction works nearby [(2)].

Underwater sound: Construction works including dredging and backfilling activities as well as jetting for the submarine utility (gas pipeline, water main and cable) installation can result in a minor and short term increase in underwater sound from marine vessels which may potentially affect Indo-Pacific Humpback Dolphin and Finless Porpoise. Effects from pile driving are considered in a later section.

The proposed gas pipeline route passes close to the western boundary but does not enter the Marine Park. In the West Lantau section of the pipeline route (outside of the Proposed Marine Park at Fan Lau) the main works will involve pre-trenching (ie dredging). According to the project description, the works activities proposed off West Lantau would be of relatively short approximately 24 - 48 days.

Small cetaceans are acoustically sensitive at certain frequencies, and sound is important to their behavioural activities. Most dolphins can hear within the range of 1 to 150 kHz, though the peak for a variety of species is between 8 and 90 kHz [(3)]. Indo-Pacific Humpback dolphins have been reported to use five categories of vocalisation associated with different activities[(4)]. These animals use high frequency broad-band clicks in the range of 8 kHz to > 22 kHz during foraging. During both foraging and socialising, burst pulse sounds of barks and quacks in the frequency range of 0.6 kHz to >22 kHz are used. Low frequency narrow band grunt vocalisations in the range of 0.5 kHz to 2.6 kHz are also used during socialising activity. Dolphins also have whistle vocalisations in a wide frequency from 0.9 kHz to 22 kHz. Finless porpoises, vocalise at much higher frequencies than humpback dolphins. Finless porpoises produce high frequency ultrasonic narrowband clicks at a peak frequency of 142 kHz, which are inaudible to the human ear [(5)]. Dredging and large vessel traffic generally results in low frequency noise, typically in the range of 0.02 to 1 kHz [(6)], which is below the peak range of 8 - 90 kHz and 142 kHz reported for dolphins and porpoises respectively. For this reason, noise generated by dredging, jetting and pipe laying and cable laying operations is not expected to acoustically interfere significantly with dolphins or porpoises.

(1) Maunsell 2003. Environmental Monitoring and Audit for Penny's Bay Reclamation Stage 2. Report for the Civil Engineering Department.

(2) Maunsell 2002. Environmental Monitoring and Audit for Penny's Bay Reclamation Stage 1 Marine Borrow Area at West Po Toi. Report for the Civil Engineering Department.

(3) Richardson et al. 1995. Marine Mammals and Noise. Academic Press.

(4) Van Parijs SM & Corkeron PJ (2001) Vocalizations and behaviour of Pacific Humpback Dolphins *Sousa chinensis*. Ethology 107: 701-716.

(5) Goold JC & Jefferson TA (2002) Acoustic signals from free-ranging finless porpoises (*Neophocaena phocaenoides*) in waters around Hong Kong. *The Raffles Bulletin of Zoology* Supplement 10:131-139.

(6) *Ibid.*

Water Quality Impacts

High SS levels do not have a direct impact on dolphins. Indo-Pacific Humpback Dolphins have evolved to inhabit areas near the mouth of rivers and are therefore well-adapted for hunting in turbid waters owing to their use of echolocation rather than visual information. In addition, dolphins are air breathing and therefore SS in the water column has no effect on their respiratory surfaces. Impacts may occur to these mammals as an indirect result of increased SS levels. The Indo-Pacific Humpback Dolphin is thought to be an opportunistic feeder with the most important prey species being demersal fish (such as croakers, Sciaenidae) as well as several pelagic groups (engraulids, clupeids and trichiurids).

The Finless Porpoise is also thought to be an opportunistic feeder with known prey including crustaceans (shrimps and prawns), cephalopods (squid and octopus) and small pelagic fish of low commercial value (anchovies, croakers and sardines). These two species of marine mammals could potentially be affected if there are any significant changes in key water quality parameters arising from the development that affect fisheries resources.

Information from the fisheries impact assessment (*Part 2 Section 10*) indicates that indirect impacts are not predicted to adversely impact fisheries resources from the various marine works. Potential water quality impacts associated with dredging and jetting activities for all marine works were predicted to be compliant with fisheries assessment criterion and sediment plumes would only affect a localized area close the works for a short period of time as the dredgers/jetting machine passes through the area. It should be noted that the two resident marine mammal species, in particular the Indo-Pacific Humpback Dolphin, and their prey species are naturally exposed to high levels of suspended solids in the Pearl River Estuary (see *Part 2 Section 6* for a discussion of how SS levels fluctuate greatly in this part of Hong Kong) [(1)].

The basis for this assessment are water quality modelling predictions presented in *Part 2 – Section 6*. While contour plots of water quality parameters were used to determine the extent and severity of impacts close to the works areas, which is the most important information for determining impacts on marine mammal habitat, reference was also made to a variety of assessment points for various water sensitive receivers that are distributed at various points across marine mammal habitat including SR1, SR4, SR6a-e, SR8, SR10, SR11, SR11a-b, SR12, SR14, SR15a-b, SR16b, SR24 and SR27 (see *Figure 6.4* in Part *2 – Section 6*).

Of the proposed marine works associated with the Project, dredging in West Lantau, which is a marine mammal habitat of high ecological importance, was identified as a major issue for examination in the assessment. West Lantau is the area with the highest density of dolphins and young animals compared to

(1) Data from EPD Water Quality Monitoring in 2003 at Station NM8 of the North Western Water Control Zone.

any other area in Hong Kong. Along the West Lantau section of the pipeline, the daily maximum contour plots (*Part 2 Section 6 Figure 6.12*), show that the sediment plume (maximum depth-averaged of > 5 mg L^{-1}) are not expected to extend to more than 200 m from the centreline of the gas pipeline alignment during the trailing suction hopper dredging works (refer to *Part 2 Section 6*). These elevations will be short-term as TSHD dredging operations will only operate on a 12 hour per day basis and during this period will only dredge for about 45 minutes within every 2-3 hours due to the need to move off site to dispose the dredged sediment.

In terms of the potential impacts on marine mammal habitat inside the Sha Chau and Lung Kwu Chau Marine Park, the daily maximum contour plots (*Part 2 Section 6 Figure 6.11*), show that the sediment plume (maximum depth-averaged of > 5 mg L^{-1}) is not expected to extend to more than 50 m inside the Marine Park during grab dredging works (refer to *Part 2 Section 6*). Owing to the proximity of the works to the western boundary of the Marine Park, the water quality assessment has recommended deployment of cage type silt curtains as a preventative measure to restrict SS entering the Marine Park waters. With silt curtains in place, there are not expected to be exceedances of the WQO for SS inside the Marine Park. Adverse impacts to marine mammal habitat within the Sha Chau and Lung Kwu Chau Marine Park are therefore not expected.

Other EIA Studies that have addressed impacts due to elevated SS have drawn similar conclusions. For instance, a previously approved EIA study for the Permanent Aviation Fuel Facility (PAFF) (EIA-077/2002) [(1)] stated that: "*There is no reason to assume that suspended solid releases during pipeline construction will have an impact on dolphins*." Based on the assessment above and other experience of the effect of suspended sediment on marine mammals, elevations in SS associated with the reclamation works for the LNG terminal are not anticipated to adversely impact dolphins or porpoises.

The above analysis is supported by experience with ongoing projects in Hong Kong. Contaminated mud disposal facilities have been in operation in the East of Sha Chau area for over ten years. Data available on the use of the waters do not appear to indicate that the operations of these facilities are resulting in avoidance behaviour by dolphins.

Contaminant Release and Bioaccumulation

Another potential impact on marine mammals associated with disturbance of bottom sediment that require assessment in accordance with *Clause 3.4.5.5* of the Study Brief, are potential bioaccumulation of released contaminants. The potential for release of contaminants from dredged sediments has been assessed in *Part 2 Section 6*, whereas, a comprehensive set of data on the quality of marine sediment is provided in *Part 2 Section 7 – Waste Management*.

(1) Mouchel Asia Limited. 2002. EIA for Permanent Aviation Fuel Facility for Hong Kong International Airport, prepared for Hong Kong Airport Authority.

Within these sections it is concluded that a number of samples from West Lantau contained levels of arsenic in excess of the Lower Chemical Exceedance Level (LCEL) but below the Upper Chemical Exceedance Level (UCEL), ie Category M. Further biological testing has led to the conclusion that these sediments would require Type 2 disposal, ie at a confined marine disposal site such as that at East of Sha Chau. This disposal site is permitted for sediments of this nature and is the subject of an extensive monitoring programme which has been ongoing for several years.

It is noted that one sample exceeded the LCEL for Silver, one exceeded the UCEL for Lead and one exceeded the LCEL/UCEL for Nickel. All other samples for Lead, Silver and Nickel were within the LCEL. No organochlorine exceeded their threshold level and all other related exceedances were solely attributable to Arsenic. Given that virtually all of the exceedances were related to Arsenic this is the only contaminant discussed below as the others can be confirmed to be present at low levels in sediments within the Project's various dredging areas.

It is highly likely that the elevated levels of arsenic in the West Lantau area are derived from natural sources and are not present as a result of human activity. *The Geochemical Atlas of Hong Kong* published by the Civil Engineering Department (CED) shows anomalously high arsenic concentrations along the southwestern coastline of Lantau and states that these concentrations are a consequence of the local geology. Arsenic concentrations in this area are amongst the highest recorded in the SAR.

In terms of the potential for impacts to occur to marine mammals, a recent EIA conducted on the continuation of the disposal of highly contaminated marine muds into dedicated mud pits in the East of Sha Chau area provides the best available information on bioaccumulation in marine mammals in Hong Kong [(1)].

The assessment, which was based on bio-concentration factors and metal concentrations in local fish and shellfish species, also provided a comparison between the risks to dolphins in areas where Category H marine sediments would be dredged / disposed and those areas considered being uncontaminated. Exposure pathways were assumed to be consumption of contaminated food by dolphins that utilise waters in the vicinity of the disposal ground, and in an area representative of background conditions.

The result of this detailed risk assessment, which has been approved under the *EIAO*, concluded that elevated levels of Arsenic in dredged marine sediments do not pose an adverse risk to the Indo-Pacific Humpback dolphins from coastal waters near Hong Kong.

Concentrations of Arsenic are low (compared to concentrations in potential prey) in liver and kidney of most cetaceans, including Indo-Pacific Humpback

(1) ERM - Hong Kong, Ltd (2005) Op cit.

Dolphins. The highest concentration of Arsenic measured in Indo-Pacific Humpback Dolphin liver is 12.9 mg kg^{-1} dry wt [(1)]. The highest Arsenic concentration measured in other cetaceans was in the liver of a narwal, *Monodon monoceros*, from Greenland (49 mg kg^{-1}) [(2)]. Concentrations of Arsenic in cetacean tissues usually are lower than those in their prey [(3) (4)]. Most of the Arsenic in dolphin prey is in organic forms, particularly arsenobetaine, which is excreted unmetabolized in the urine by most mammals and poses little threat to their livelihood.

From the results discussed above, it is considered important to note two key features:

- The assessment was based on highly contaminated mud, ie Category H. Extensive monitoring of sediment quality in the West Lantau area has been documented in *Part 2 Section 7 – Waste Management*, specifically in *Table 7.6*. The suite of analytes has included a range of organic compounds specified in the relevant Technical Circular (ETWBTC No. 34/2002) and 12 chlorinated pesticides. For all samples taken from the West Lantau area, reported concentrations of these substances were below the reporting limits.

- Organochlorines were not found to be at levels that were considered to result in systemic toxicity to the exposed dolphins. It is noted that it has been proposed in the literature that first born calves may be at risk from organochlorine compounds passed to the offspring during nursing, however, this has yet to be confirmed and is not known to be a factor impacting the mortality rates of marine mammal calves in Hong Kong. Nevertheless, the low concentrations organic contaminants are not expected to pose any significant threat to marine mammals in West Lantau as a result of pipeline installation works.

Therefore, as unacceptable water quality impacts due to the potential release of heavy metals and micro-organic pollutants from the dredged sediment are not expected to occur, impacts on marine mammals due to bioaccumulation of released contaminants from dredged sediments are also not expected to occur.

Potential Impacts from Piling Works

Underwater sound: Marine piling works will be required to construct the jetty on the south side of the South Soko Island. Certain piling activities are known to generate high intensity underwater sounds, which due to the

(1) Parsons ECM (1999) Trace element concentrations in tissues of cetaceans from Hong Kong's territorial waters. Environmental Conservation 26:30-40.

(2) Dietz, R. F. Riget, and P. Johansen. 1996. Lead, cadmium, mercury and selenium in Greenland marine animals. Sci. Tot. Environ. 186:67-93.

(3) Neff, J.M. 1997 Ecotoxicology of arsenic in the marine environment. Environmental Toxicology and Chemistry 16:917-927.

(4) Parsons ECM (1999) Trace element concentrations in tissues of cetaceans from Hong Kong's territorial waters. Environmental Conservation 26:30-40.

potential presence of dolphins and porpoises in the vicinity of works, requires assessment. Based on the findings of the detailed design works a decision will be made as to whether bored, driven (percussive) or a combination of both will be used to construct the jetty and pipeline trestle. No underwater blasting is required. Details on the differences between bored and percussive piling are presented below.

Bored piling: The pile installation of the main jetty may be carried out by bored piling works. This involves the sinking of a casing down to almost the rock head level with underwater excavation of the soil by a grab and the top layer of rock using a reverse circulation drilling rig (RCD). Noise created by the bored piling method tends to be a less intensive continuous noise, rather than the pulsed high power sounds emitted through percussive piling and is expected to be similar to that associated with dredging.

Bored piling is less disruptive to dolphins than percussive piling [1]. Dolphins are known to habituate to low-level sounds such as those produced through bored piling [2].

Percussive piling: The trestle foundations will consist of circular piles installed by the percussive method using piling barge with hydraulic hammer. As detailed in *Part 2 Section 3*, the equipment for percussive piling works used in Hong Kong is typically fitted with a bubble jacket for reducing underwater sound propagation. Although, percussive piling will produce high-intensity underwater sound, the progress of piling works is quicker than bored piling. It is expected it would take approximately 4 months to complete the piling for the approximately 240 m long trestle. Sound from percussive piling activities will be transmitted to the water via both structure-borne and air-borne sound pathways. Structure-borne vibrations from the percussive hammer will be re-radiated as sound into the water via the piles, the rock substrata and the piling rig to the barge. The air-borne sound pathway consists of sound propagation from the percussive hammer and the piles through the air and into the water. The sound transmitted to the water via the air-borne sound path is not expected to be significant as a large proportion of this sound will be reflected at the water and air interface and therefore not penetrate the water.

As discussed previously, humpback dolphins use frequencies ranging from 0.5 kHz to >22kHz [3]. Finless porpoises, on the other hand, use higher ultrasonic frequencies at a peak of 142 kHz [4]. Activities such as percussive piling have their highest energy at lower frequencies from about 20 Hz to 1

(1) Wursig B, Greene CR, Jefferson TA. 2000. Development of an air bubble curtain to reduce underwater noise of percussive piling. Marine Environmental Research 49, 79-93.

(2) Greene CR, Moore SE. 1995. Man-made noise. In: *Marine Mammals and Noise*. (Eds. Richardson WJ, Greene CR, Malme CI and Thomson DH). Academic Press. London, pp. 101-158.

(3) Van Parijs SM & Corkeron PJ. 2001. Vocalizations and behaviour of Pacific Humpback Dolphins *Sousa chinensis*. *Ethology* 107: 701-716.

(4) Goold JC & Jefferson TA. 2002. Acoustic signals from free-ranging finless porpoises (*Neophocaena phocaenoides*) in waters around Hong Kong. *The Raffles Bulletin of Zoology* Supplement 10:131-139.

kHz, and whilst smaller cetaceans (~ 3 - 4 m in length) are not known to be highly sensitive to sounds below 1 kHz they can hear in some of this range (peak range of 8 - 90 kHz reported for dolphins). Cetaceans are animals that rely on acoustic information to communicate and to explore their environment. Therefore, sound that disrupts communication or echolocation channels could have a potential impact. The reactions from impacted cetaceans can range from brief interruption of normal activities to short- or long-term displacement from noisy areas.

Percussive piling will produce some high-intensity underwater sound, particularly through the structure-borne noise pathway. Experience of percussive piling in Hong Kong indicates that this type of piling may result in temporary avoidance of the affected area by individual animals. Although it appeared that dolphins avoided the area around Sha Chau during the construction of an aviation fuel receiving facility, they returned on cessation of construction activities, suggesting that disturbance impacts are transient and only present during the construction phase (1). It is noted that this avoidance behaviour only has the potential to affect the very small number of individuals that have been sighted in the waters south of South Soko Island and would not be expected to significantly affect the population as a whole. Sightings density information for the Humpback Dolphins and Porpoises indicates that these species have not been frequently sighted immediately off the coast where the proposed jetty would be located. The survey data, including that from AFCD's long term monitoring programme, has not indicated that either of these marine mammals utilise the habitat in the area of the jetty at the southeast of the South Soko Island for critical functions (ie breeding or raising calves).

As noted previously, in line with common local practice, the percussive piling equipment used in Hong Kong is typically fitted with a bubble jacket or bubble curtains. This feature of the percussive piling equipment is beneficial in reducing underwater sound propagation from the works site.

Bubble curtains have been reported to be effective at reducing transmission of underwater sound generated during pile driving. A study (2) conducted during the construction of the Aviation Fuel Receiving Facility on Sha Chau reported sound level reduction by 3 to 5 dB in the overall broadband range. The largest sound attenuation was between 1.6 to 6.4 KHz where a reduction of 15 to 20 dB was recorded.

The size of the disturbed area will be small in the context of the size of the range of these animals. Given the low density of dolphins and finless porpoises in South Soko, it is expected that any disturbance impacts would affect individual animals representing a very small portion of the overall

(1) Wursig B, Greene CR, Jefferson TA 200. *ibid.*

(2) Wursig B, Greene CR, Jefferson TA 200. *ibid.*

cetacean population. By additionally employing a bubble jacket/curtain to reduce the generation of high-intensity impulsive sounds, and taking account previous experience of reaction of marine mammals to marine works, underwater construction noise associated with the piling works is not expected to give rise to unacceptable adverse impacts. Any effect of underwater sound caused by piling works would be limited to behavioural disturbance impacts on affected dolphins, and there may be some avoidance of the waters in close proximity to the works. These impacts are not likely to cause biologically significant impacts on affected animals.

9.7.2 *Operation Phase*

Vessel Traffic

Tugs will be used to manoeuvre the LNG carrier until moored along side the jetty. Owing to the slow approach speed and slow manoeuvring of the LNG carrier under tug control, it is not expected that there would be a significant risk of carrier/tug collision (boat strike) with either dolphins or porpoises. Sightings density information for the Humpback Dolphins and Porpoises indicates that these species have not been frequently sighted immediately off the coast where the proposed jetty would be located and consequently operational phase vessel traffic is not expected to cause unacceptable risk of impacts to either species.

Impacts from accidental LNG and fuel spills have been addressed in *Section 9.5.2*.

9.8 *EVALUATION OF THE IMPACTS TO MARINE MAMMALS*

The following section discusses and evaluates the significance of the impacts to marine mammals identified in the previous section. Based upon the information presented above, the significance of the marine mammal impacts associated with the construction and operation of the LNG terminal have been evaluated in accordance with the *EIAO-TM (Annex 8, Table 1)*, as follows.

- *Habitat Quality*:
  - Reclamation Area: The reclamation works will affect approximately 0.6 ha of marine waters where few sightings of the Indo-Pacific Humpback Dolphin and Finless Porpoise have been recorded at South Soko and a small area at Black Point for the GRS where few sightings of the Indo-Pacific Humpback Dolphin have been made. The marine waters in both of these locations have been disturbed through reclamation in the past and are not considered to represent key habitat for either species.
  - Approach Channel and Turning Circle: The approach channel and turning circle are located south of the South Soko Island in

an area where sightings of Indo-Pacific Humpback Dolphins are low and Finless Porpoises are present only in low numbers in winter and spring. Significant impacts due to the dredging works are not predicted to occur to these species, as water quality perturbations are predicted to be transient, localised and generally compliant with the WQO.

  - Submarine Gas Pipeline: The submarine gas pipeline passes through areas of high dolphin sightings in West and Northwest Lantau. However with implementation of appropriate mitigation and additional precautionary measures (*Section 9.9*), the installation of the submarine gas pipeline would not result in unacceptable impacts to marine mammals along its route.

  - Submarine Watermain and Cable: The submarine watermain and cable pass through areas of moderate dolphin and porpoise sightings in Southwest Lantau. The installation of these utilities would not be expected to result in unacceptable impacts to marine mammals along their route.

  - LNG Receiving Jetty: The jetty is located on the southern shore of the South Soko Island in an area where sightings of Indo-Pacific Humpback Dolphins are low and Finless Porpoises are present only in low numbers in winter and spring.

  - Operational Phase Discharges: The outfall is located on the southern shore of the South Soko Island in an area where sightings of Indo-Pacific Humpback Dolphins are low and Finless Porpoises are present only in low numbers in winter and spring.

- *Species:* Organisms of ecological interest reported from the literature and field surveys include the Indo-Pacific Humpback Dolphin and Finless Porpoise. Significant impacts due to the marine works are not predicted to occur to these species as water quality perturbations are predicted to be transient, localised and generally compliant with the WQO. Impacts on these marine mammal species due to disturbance and noise from increased marine traffic in any of the works areas are not expected to be significant. Indirect, temporary disturbance to marine mammals are not expected during marine piling works as construction methodologies have been designed to reduce underwater sounds. Operational phase discharges from the terminal or marine vessel movements are not expected to impact the limited number of marine mammals present in the area of the LNG terminal.

- *Size:* The reclamation works will affect approximately 0.6 ha of marine waters where few sightings of the Indo-Pacific Humpback Dolphin and Finless Porpoise have been recorded. The marine waters where the reclamation works will take place have been disturbed through reclamation in the past and are not considered to represent key habitat for either species. The total length of the gas pipeline is approximately 38 km, running across Northwest, West and Southwest Lantau waters. The width of the dredged trench ranges from about 6 to 29 m. The nature and scale of pipeline installation works is comparable to other pipeline projects in Hong Kong which were deemed acceptable to construct in habitats of Indo-Pacific Humpback Dolphin inside the Sha Chau and Lung Kwu Chau Marine Park and habitat for finless porpoises in Mirs Bay, Lamma and Po Toi waters. Experience from these projects indicates that with appropriate mitigation and monitoring, marine mammals are not likely to be adversely affected by such works.

- *Duration:* The reclamation works are predicted to last for approximately 5-7 months and the dredging for the turning basin and approach channel approximately 4 months. The dredging works operations along the gas pipeline alignment are predicted to last for about 3 months. Dredging and jetting for the watermain is expected to take 4 months each, whilst jetting for cable installation is expected to take less than 3 months. Increases in SS concentrations in the vicinity of sensitive receivers are expected to be low and temporary, and generally within environmentally acceptable limits (as defined by WQO and marine ecological assessment criteria). Piling works for the jetty are expected to take approximately 9 months for bored piling and 4 months for percussive piling. The underwater sounds emanating from the percussive piling works will be dampened through the use of a bubble jacket. Operational phase discharges will continue during the life of the LNG terminal but are not predicted to cause adverse impacts to marine mammals as the discharges disperse rapidly and only affect an area close to the LNG jetty where low sightings of marine mammals occur.

- *Reversibility:* The only permanent impacts at South Soko to marine mammals are likely to be from the reclamation works and seawall modification works that will affect approximately 0.6 ha of marine waters where few sightings of the Indo-Pacific Humpback Dolphin and Finless Porpoise have been recorded. A small area at Black Point will be reclaimed for the GRS and this affects an area where very few sightings of the Indo-Pacific Humpback Dolphin have been made.

- *Magnitude:* No unacceptable impacts to ecologically sensitive habitats have been predicted to occur. The impacts to the ecologically sensitive habitats defined in this assessment are considered to be of low magnitude during the jetting and/or dredging operations associated with the reclamation, turning circle and approach channel, and the laying of the gas pipeline, watermain and cable. Operational phase impacts are not expected to cause adverse impacts and are considered to be of low magnitude.

The impact assessment indicates that with adoption of appropriate mitigation and precautionary measures, no unacceptable adverse impacts to marine mammals are expected to occur.

Impacts to marine mammals during operation of the terminal are predicted to be within environmentally acceptable levels through appropriate design of the seawater outfall system (as discussed in *Part 2 Section 6 - Water Quality*).

9.9 MITIGATION MEASURES

9.9.1 General

In accordance with the guidelines in the *EIAO-TM* on marine ecology impact assessment, the general policy for mitigating impacts to marine ecological resources, in order of priority, are:

- **Avoidance:** Potential impacts should be avoided to the maximum extent practicable by adopting suitable alternatives;
- **Minimisation:** Unavoidable impacts should be minimised by taking appropriate and practicable measures such as constraints on the intensity of works operations (eg dredging rates) or timing of works operations; and
- **Compensation:** The loss of important species and habitats may be provided for elsewhere as compensation. Enhancement and other conservation measures should always be considered whenever possible.

To summarize, this initial assessment of impacts demonstrates that impacts have largely been *avoided* during the construction and operation of the South Soko terminal, particularly to the key ecological sensitive receivers (marine mammals), through the following measures:

- **Avoid Direct and Indirect Impacts to Ecologically Sensitive Habitats:** The site for the South Soko LNG terminal has been selected based on a review of alternative locations (*Part 1, Section 5)* and has avoided the majority of key habitats for the Indo-Pacific Humpback Dolphin (including Sha Chau and Lung Kwu Chau Marine Park, Peaked Hill Island, West Lantau) and Finless Porpoise (South Lantau and South Lamma), and many areas of high marine mammal sighting density (*Figures 9.3 & 9.4– Annex 9*). Alternative construction methods for pipeline construction were compared and the selected preferred mitigated technique avoids indirect water quality impacts to marine habitats of Sha Chau and Lung Kwu Chau Marine Park (*Part 2 Sections 2 & 6*). The terminal location has been selected on previously disturbed areas (former Detention Centre lined with an artificial shoreline) and a small reclamation of less than approximately 0.6 ha confined to Sai Wan to avoid direct impacts to ecologically sensitive habitats [1] The jetty is also located in an area of comparatively low sightings of marine mammals. The dispersion of sediment from dredging and filling does not affect the receivers at levels of concern, with the exception of a site with a notable coral which will be protected by silt curtains (see *Part 2 Section 6*) and monitored. With the silt curtain in place, the coral is not expected to experience increases in sedimentation that would cause adverse impacts.

- **Pipeline Alignment:** A number of alternative pipeline routes were studied (*Part 2, Section 2*) and the preferred alignment is at a sufficient distance from ecologically sensitive habitats such as the Potential Marine Park at Southwest Lantau [2], so that the transient [3] elevation of suspended sediment concentrations from the installation works does not affect the receivers at levels of concern. The alignment also reduces the length of the pipeline within the dolphin habitat at West Lantau and avoids the proposed Southwest Lantau Marine Park.

- **Installation Equipment**: The use of dredging along the route of the gas pipeline will reduce the severity of perturbations to water quality and hence allow compliance with the impact assessment criteria at sensitive receivers. The careful selection of installation equipment will help avoid impacts to sensitive ecological receivers and marine mammals.

- **Adoption of Acceptable Working Rates**: The modelling work has demonstrated that the selected working rates for dredging and jetting works will not cause unacceptable impacts to the receiving water quality. Consequently, unacceptable indirect impacts to marine ecological resources have been avoided.

- **Design Process - Reduction in Reclamation Areas:** Reclamation impacts have been substantially reduced in the design process from approximately 13 ha through to the adoption of one small reclamation area at South Soko Island totalling approximately 0.6 ha. Consequently loss of natural coastline has been reduced.

- **Design Process – Relocation of LNG jetty from in Sai Wan to the South coast of South Soko:** By locating the LNG jetty along the south coast of South Soko Island dredging volumes have been substantially reduced from more than 5 Mm^3 to less than 1.5 Mm^3 at the terminal and consequently impacts to marine ecological resources have been reduced. This design revision is consistent with *Clause 3.3.4* of the Study Brief

(1) Particularly at the north and southwest of the island where a higher marine mammal sighting density has been reported, see (*Annex 9*).

(2) Dolphins are ecological sensitive receivers, which are adapted to feed in turbid estuarine waters and would not be affected by elevated sedimentation levels.

(3) While installation works for the gas pipeline along the 38 km route would take 6 months, works proceeding along individual sections of the route would give rise to short term and transient impacts on habitats.

which requests that impacts are avoided / reduced where practicable to the sensitive area between the two Soko Islands.

9.9.2 *Specific Measures for Marine Mammals*

Measures to mitigate the impact of the construction and operation of the terminal have been developed in consultation with local and international marine mammal experts. The following recommendations will be adopted to reduce potential construction and operation impacts on dolphins and porpoises:

- All vessel operators working on the Project construction or operation will be given a briefing, alerting them to the possible presence of dolphins and porpoises in the area, and guidelines for safe vessel operations in the presence of cetaceans. If high speed vessels are used, they will be required to slow to 10 knots when passing through a high density dolphin area (west Lantau, Sha Chau and Lung Kwu Chau, north and southwest of South Soko). With implementation of this measure, the chance of boat strike resulting in physical injury or mortality of marine mammals will be extremely unlikely. Similarly, by observing the guidelines, vessels will be operated in an appropriate manner so that marine mammals will not be subjected to undue disturbance or harassed;

- The vessel operators will be required to use predefined and regular routes, as these will become known to dolphins and porpoises using these waters. This measure will further serve to reduce disturbance to marine mammals due to vessel movements;

- The vessel operators will be required to control and manage all effluent from vessels. This measure will serve to prevent avoidable water quality impacts in marine mammal habitat;

- A policy of no dumping of rubbish, food, oil, or chemicals will be strictly enforced. This will also be covered in the contractor briefings. While this measure is already a requirement of law, it is considered appropriate to make sure it is observed so as to prevent avoidable water quality impacts in marine mammal habitat;

- The effects of construction of the Projects on the water quality of the area will be reduced as described in the Water Quality section. These measures will serve to ensure water quality impacts in marine mammal habitat are compliant with the relevant water quality standards as set out in statutory Water Quality Objectives.

Periodic re-assessment of mitigation measures for marine mammals and their effectiveness will be undertaken.

9.10 *ADDITIONAL (PRECAUTIONARY) MEASURES FOR MARINE MAMMALS*

In accordance with the requirements of *Clause 3.4.5.5 (vii)* of the Study Brief, precautionary measures have been identified to assist the protection of marine mammals. During piling works for the jetty construction, the following additional measures will be adopted:

- To reduce underwater sound levels associated with percussive piling, the following steps will be taken:
  - Quieter hydraulic hammers should be used instead of the noisier diesel hammers;
  - Acoustic decoupling of noisy equipment on work barges should be undertaken.
- Additional practices are recommended during percussive piling including:
  - Instigate 'ramping-up' of the piling hammer to gradually increase the level of underwater sound generation;
  - Activities will be continuous without short-breaks and avoiding sudden random loud sound emissions.
- An exclusion zone of 500 m radius will be scanned around the work area for at least 30 minutes prior to the start of piling from the barge or an elevated observation point on land. If cetaceans are observed in the exclusion zone, piling will be delayed until they have left the area. This measure will ensure the area in the vicinity of the piling is clear of marine mammals prior to the commencement of works and will serve to reduce any disturbance to marine mammals;
- When dolphins/ porpoises are spotted by qualified personnel within the exclusion zone, construction works will cease and will not resume until the observer confirms that the zone has been continuously clear of dolphins/ porpoises for a period of 30 minutes. This measure will ensure the area in the vicinity of the piling is clear of marine mammals during works and will serve to reduce any disturbance to marine mammals;
- Consistent with standard Hong Kong practice, the percussive pile driving will be restricted to a daily maximum of 12 hours with daylight operations avoiding generation of underwater sounds at night time; and,

Percussive pile driving will not be conducted during the peak calving season of the Finless Porpoise, ie October through January [(1)].

(1) Avoidance of the calving season at South Soko for the Indo-Pacific Humpback Dolphin is not required as there have been very few sightings of calves around South Soko or in the works areas at South Soko (*Annex 9 - Figure 9.31*).

After discussion with project stakeholders including the Government of the Hong Kong SAR on potential additional construction restrictions, during the dredging works for the pipeline (aside from in the Urmston road) and the LNG carrier approach channel and turning circle, the following additional measures will be adopted:

- A marine mammal exclusion zone within a radius of 250 m from dredgers will be implemented during the construction phase. Qualified observer(s) will scan an exclusion zone of 250 m radius around the work area for at least 30 minutes prior to the start of dredging. If cetaceans are observed in the exclusion zone, dredging will be delayed until they have left the area. This measure will ensure the area in the vicinity of the dredging work is clear of marine mammals prior to the commencement of works and will serve to reduce any disturbance to marine mammals. As per previous practice in Hong Kong, should cetaceans move into the dredging area during dredging, it is considered that cetaceans will have acclimatised themselves to the works therefore cessation of dredging is not required [(1)].

- Dredging work along the entire pipeline route will not be conducted during the peak calving season of the Indo-Pacific Humpback Dolphin, ie March through August.

- Except the pipeline section along Urmston Road (waters of busy marine traffic), dredging works for the pipeline will be restricted to a daily maximum of 12 hours with daylight operations. Because of marine traffic constraints, grab dredgers may need to operate 24 hours on the pipeline section which crosses the Urmston Road channel off Black Point enabling completion in the shortest possible time.

- Dredging works for the approach channel and turning circle (*Annex 9 - Figures 9.38 - 9.39*) will be restricted to a daily maximum of 12 hours with daylight operations and will avoid the peak calving period for the Finless Porpoise, ie October through January.

9.11 *RESIDUAL ENVIRONMENTAL IMPACTS*

Taking into consideration the ecological value of the habitats discussed in the previous sections and the resultant mitigation and precautionary measures, residual impacts occurring as a result of the proposed terminal have been determined and are as follows:

- The loss of approximately 410 m of artificial shoreline covering approximately 1.1 ha, approximately 265 m of natural rocky shore and approximately 35 m of sandy shore which are of low to medium

(1) This precautionary measure is consistent with conditions for grab dredging works inside the Sha Chau and Lung Kwu Chau Marine Park included in the issued Environmental Permit for the Permanent Aviation Fuel Facility for Hong Kong International Airport project.

ecological value. The residual impact is considered to be acceptable, as the loss of these habitats will be compensated by the provision of approximately 650 m of sloping rubble mound/rock or concrete armour seawalls that have been demonstrated to become recolonised by assemblages of a similar nature after construction.

- The loss of approximately 0.6 ha of subtidal soft bottom assemblages within the reclamation site at South Soko and 0.5 ha at Black Point for the GRS. The residual impact is considered to be acceptable as the habitats are of low ecological concern and small in size and supports comparatively low sightings of marine mammals.
- The residual impacts occurring as a result of the installation of the submarine utilities are the loss of the low ecological value subtidal assemblages present within the jetting/dredging areas and the loss of those at the landing points.
- The benthic habitats within the approach channel and turning circle will be lost during dredging during the construction phase and, to a much lesser extent, during maintenance dredging, but will recolonise over time. The residual impacts are considered to be acceptable as the habitats are of low ecological value and because infaunal organisms and epibenthic fauna are expected to recolonise the sediments after the pipeline has been laid.
- Maintenance dredging of small specific areas of the approach channel and turning circle is expected to be required once every 10 years. Since the impact to water quality is expected to be compliant with applicable standards (refer to *Part 2 Section 6.7.2*), the residual impact associated with maintenance dredging is considered to be acceptable.
- With implementation of all mitigation measures, there will be water quality objectives (WQO) exceedances for suspended solids in the mixing zone surrounding dredging and jetting works. Mixing zones, which are inevitable when dredging or jetting occurs, will only persist during the works and in terms of the residual impact effects are considered short-lived and minor. They will not cause long term environmental impacts. Two identified marine ecological water quality sensitive receivers would experience exceedances of the WQO inside waters defined as the mixing zone. An assessment of these residual impacts on these ecological sensitive receivers is presented in *Table 9.11* and it is concluded that neither residual impact would have long term serious environmental implications.
- The temporary disturbance and displacement of dolphins is expected to occur during the marine works activities. Given that the closed periods and daylight operations have been specified for dredging activities in the more sensitive areas it is expected that the above impacts will be temporary and of relatively short duration making them not unacceptable.

Table 9.11 Residual Impact Assessment of Water Quality Impacts on Sensitive Marine Ecological Resources and Areas

Evaluation Criteria	Sensitive Marine Ecological Resources and Areas	
	Pak Tso Wan Sandy Shore (Fish fry nursery habitat)	**Marine Mammal habitat in West Lantau**
Effects on public health and health of biota or risk to life	Water quality exceedance is not expected to adversely effect fish fry (refer to *Part 2 – Section 10*). This is because fish fry have tolerance to SS levels up to 50 mg L^{-1} which is significantly higher than the WQO allowable elevation or the value predicted.	Water quality exceedances would not directly impact dolphins (*Sousa chinensis*) and are not expected to have indirect biological consequences affecting their fitness or vital rates. Elevated sediment concentrations and sediment deposition may cause smothering of benthic assemblages. No unacceptable adverse impacts on fisheries resources and therefore prey resources for dolphins is predicted to occur due to water quality impacts along the pipeline route (P*art 2 Section 10*).
The magnitude of the adverse environmental impacts	Although there would be exceedance of the WQO, water quality will comply with fisheries assessment criteria. With mitigation, the maximum predicted SS level at Pak Tso Wan sandy shore will be 5.5 mg L^{-1} above WQO assessment criteria which is a minor exceedance. No adverse impact is predicted.	The daily maximum contour plots (*Part 2 Section 6 Figure 6.12*), show that the sediment plume (maximum depth-averaged SS of > 5 mg L^{-1}) are not expected to extend to more than 200 m from the centreline of the gas pipeline alignment during the trailing suction hopper dredging works. The size of mixing zone is considered small and acceptable. The magnitude of impact to marine ecological resources would be minor.
The geographic extent of the adverse environmental impacts	Fish fry at Pak Tso Wan sandy shore will not be adversely impacted. Geographic extent of mixing zone is small during jetting for water main.	Geographic extent of mixing zone is small and will be centred on the position where dredging works is being conducted along the route at that time.
The duration and frequency of the adverse environmental impacts	During the works there will be short duration instances (<6 hours) of minor exceedances (5.5 mg L^{-1}) of WQO during a 2 month period.	The mixing zone will persist solely during dredging works as sediment will resettle once the dredger leaves the worksite. Dredging will occur for 45 minutes in a 2-3 hour period during a 12 hour working day.
The likely size of the community or the environment that may be affected by the adverse impacts	The sandy shore at Pak Tso Wan is small in extent covering about a 100m stretch of coast.	The area of West Lantau waters occupied by the mixing zone is small as shown in the daily maximum contour plots presented in *Section 6*.
The degree to which the adverse environmental impacts are reversible or irreversible	Water quality exceedances are completely reversible. The minor exceedances would be intermittent during the works and not prolonged in nature.	Water quality exceedances are completely reversible. Affected benthic communities are expected to recover quickly.

Evaluation Criteria	Sensitive Marine Ecological Resources and Areas	
	Pak Tso Wan Sandy Shore (Fish fry nursery habitat)	**Marine Mammal habitat in West Lantau**
The ecological context	Pak Tso Wan is considered to be of medium ecological value. In a territory-wide study to identify the conservation priority for different soft shores, Pak Tso Wan was ranked 24th out of 42 soft shores studied.	West Lantau waters are high ecological value marine mammal habitat for Indo-Pacific Humpback dolphins.
The degree of disruption to sites of cultural heritage	Not applicable	Not applicable.
International and regional importance	No adverse impacts are predicted. Pak Tso Wan sandy shore is not of international or regional importance.	West Lantau has the highest density of dolphins (1.71 - 2.81 dolphins km^{-2}) and highest encounter rate of young animals (7.1 individuals per 100 km of survey effort) compared to other Hong Kong waters.
Both the likelihood and degree of uncertainty of adverse environmental impacts	No adverse impacts are predicted. Predictions are based on water quality modelling results and fisheries assessment criteria derived from AFCD commissioned studies.	Assessment is based on water quality modelling results. There is high certainty regarding assessment provided above.
Compliance with relevant established principles and criteria	Yes	Yes

9.12 *CUMULATIVE IMPACTS*

The cumulative impacts of the various project specific construction activities have been demonstrated in *Part 2 Section 6 – Water Quality* as not causing unacceptable impacts to water quality. Consequently, unacceptable cumulative impacts to marine ecological resources are not predicted to occur. No operational phase cumulative impacts are predicted as there are no ongoing projects in the vicinity of South Soko Island.

As discussed in *Part 2 Section 3 – Project Description*, discussions with the relevant departments have indicated that the construction schedules of the HK-Zhuhai-Macau Bridge, the potential Western Port Development (CT10) and construction of the Lantau Logistics Park are unlikely to be carried out concurrently with the construction works of the gas pipeline. No other projects are presently planned to be constructed in sufficient proximity to the Project to cause cumulative effects. In light of the above, cumulative impacts on marine ecology are not anticipated.

9.13 *ENVIRONMENTAL MONITORING AND AUDIT*

The following presents a summary of the Environmental Monitoring and Audit (EM&A) measures focussed on ecology during the construction and operation phases of the LNG terminal at South Soko. Full details are presented in the separate EM&A Manual.

9.13.1 *Construction Phase*

During the construction phase, the following EM&A measures will be undertaken to verify the predictions in the EIA and ensure the environmental acceptability of the construction works:

- Water quality impacts will be monitored and checked through the implementation of a Water Quality EM&A programme (refer to *Part 2 Section 6* for details). The monitoring and control of water quality impacts will also serve to avoid unacceptable impacts to marine ecological resources.

- In addition, an EM&A programme to monitor the condition of colonies of the notable coral species *Pseudosiderastrea tayami* located on the south coast of South Soko will be implemented. Should any adverse impacts on these corals be detected due to dredging works for the turning circle and approach channel, appropriate actions will be will be undertaken to effectively reduce such impacts.

- An exclusion zone will be monitored for the presence of marine mammals around the dredging barge as described in *Part 2 Section 9.10*. This monitoring will serve to ensure impacts associated with dredging activity on dolphins are avoided.

- An exclusion zone will also be monitored for the presence of marine mammals in waters surrounding any marine percussive piling works during construction of the LNG jetty as described in *Part 2 Section 9.10*. Through implementation of the recommended EM&A measures, unacceptable impacts on marine mammals will be avoided.

Details of the coral monitoring and marine mammal exclusion zone monitoring components are presented in full in the EM&A Manual.

A pilot test to verify the performance of the dredging and jetting works against predictions in the water quality modelling exercise will be undertaken as well as a pilot test of the bubble jacket to be used during marine percussive piling works. The pilot test will also serve to test the effectiveness of the proposed silt curtains as a mitigation measure for suspended sediment impacts. Further details of these tests are presented in the EM&A Manual.

9.13.2 *Operation Phase*

The assessment presented above has indicated that operational phase impacts are not expected to occur to marine ecological resources. The gas pipeline would not give rise to operational impacts. The maintenance dredging of the approach channel and turning circle is expected to take place once every 10 years. This dredging would result in minor direct impacts due to temporary loss of small areas of low ecological value subtidal soft bottom habitat. Indirect impacts associated with water quality impacts due to maintenance dredging are not expected to be small scale and localised to the works area and would cause exceedance of current Water Quality Objective standards (refer to *Part 2 Section 6.7.2* for details). As a consequence, impacts on marine ecology are not expected.

No marine ecology specific operational phase monitoring is considered necessary.

9.13.3 *Additional Marine Mammal Monitoring*

CAPCO, as part of their Enhancement Plan proposal (refer to *Part 4* of this EIA Report) will conduct long-term monitoring of the distribution and abundance of dolphins and porpoises during the pre-construction, construction and post-construction phase of the project. The protocols for this will be agreed with AFCD in advance and conducted as part of the Enhancement Plan.

9.14 CONCLUSIONS

The proposed South Soko terminal was studied in detail through a site selection study in order to select a site that avoided to the extent practical, adverse impacts to habitats or species of high ecological value. The alignment of the submarine pipeline was also studied in detail through a route options assessment in order that adverse impacts to habitats or species of high ecological value were avoided to the extent practical.

Potential construction phase impacts to marine ecological resources, as well as impacts to marine mammals, may arise from the permanent loss of habitat due to reclamation, temporary disturbance and displacement of marine mammals, disturbances to benthic habitats in the turning circle and approach channel, or through changes to key water quality parameters, as a result of the dredging, reclamation and installation of the gas pipeline and submarine utilities.

Reclamation impacts have been substantially reduced in the design process through the adoption of a small reclamation area at South Soko Island totalling approximately 0.6 ha. Consequently, the loss of natural coastline has been reduced. In addition, habitat loss for the amphioxus, a species of high conservation interest, has been almost entirely avoided through modification of the LNG terminal layout at the design stage. Through locating the LNG jetty along the south coast of South Soko Island dredging volumes have been substantially reduced and consequently impacts to marine ecological resources reduced.

Impacts arising from the proposed dredging works for the submarine gas pipeline will be compliant with assessment criteria, localised to the works area, be of short duration, be reversible and will occur within a limited and transient mixing zone. Unacceptable adverse impacts to marine ecological resources or marine mammals are not expected to occur.

Construction methods and specific mitigation measures that will be adopted include the provision of rubble mound/armour rock seawalls on the edges of the reclamations to facilitate colonisation by intertidal and subtidal organisms and restrictions on vessel speed. The mitigation measures designed to mitigate impacts to water quality to acceptable levels (compliance with assessment criteria) are also expected to mitigate impacts to marine ecological resources.

Additional (precautionary) measures were reviewed to ensure that they would not be potentially detrimental to the population and consistent with both marine mammal specialist opinion and the *EIAO-TM*. Measures have been identified for marine works taking place in areas where marine mammals are sighted and these include monitored exclusion zones during marine percussive piling work for the construction of the jetty and monitored exclusion zones during dredging works for the gas pipeline and the LNG carrier approach channel and turning circle. In line with common local practice in Hong Kong, percussive piling works in the marine environment will be conducted inside bubble jackets, so as to ameliorate underwater sound level transmission.

Operational phase impacts to marine ecological resources are not expected to occur. Unacceptable impacts from discharges of cooled water and antifoulants are not anticipated to occur, as they will be localised to the direct vicinity of the outfall and will remain predominantly in the bed layer.

Annex 9

Baseline Marine Ecological Resources

CONTENTS

ANNEX

9 BASELINE MARINE ECOLOGICAL RESOURCES

9.1 INTRODUCTION

The waters and coastal areas of Southwest Lantau including the Soko Island group, which are located away from the major population centres of Hong Kong, have long been the subject of interest by academics, government and green groups, and there is a broad consensus that this general area is an area of conservation interest including from a marine ecological perspective. A variety of studies have investigated the marine ecology of Southwest Lantau waters , and as a result of these and in particular the AFCD-commissioned feasibility study [(1)], both the coastal waters off Southwest Lantau Island and the waters around the Soko Island Group have been proposed for designation as Marine Parks.

This *Annex* presents the findings of marine ecological studies of the South Soko Island and the surrounding Study Area. Marine ecological habitats and resources have been identified and the ecological value of the Study Area evaluated. The assessment has been based on a review of the currently available literature, as well as detailed field surveys to provide the most up-to-date information on existing conditions. Rationales for the surveys are presented, followed by the methodologies employed, results obtained and a discussion of the results and comparison with other similar studies. The findings of this *Annex* form the basis of establishing the ecological importance of the different marine habitats on and around South Soko Island, which in turn form part of the ecological assessment conducted in the EIA study.

9.1.1 *Ecological Study Area*

The Study Area for the ecological assessments is based on the footprint of the proposed LNG terminal on South Soko and the broad alignment corridor for the submarine pipeline connection to the Black Point Power Station, submarine cable and water main connection to Shek Pik, as well as the areas identified for water quality impact assessment.

The South Soko LNG terminal is proposed to be located in the centre of the island, as presented in the engineering layout (*Figure 9.1*). Due to the existing platform of the former detention camp, the majority of land needed for the terminal already exists; however, small areas of reclamation will be required to the west and east of the platform. Reclamation on the eastern side of the platform will be required for the construction of a sheltered anchorage and to the west for the third storage tank. A jetty to serve LNG carriers would be located on the southern coast of South Soko Island. To allow navigation for LNG carriers, an approach channel and turning circle is required and this

(1) HKIEd 1999. Study on the Suitability of South West Lantau to be Established as Marine Park. Submitted to AFCD.

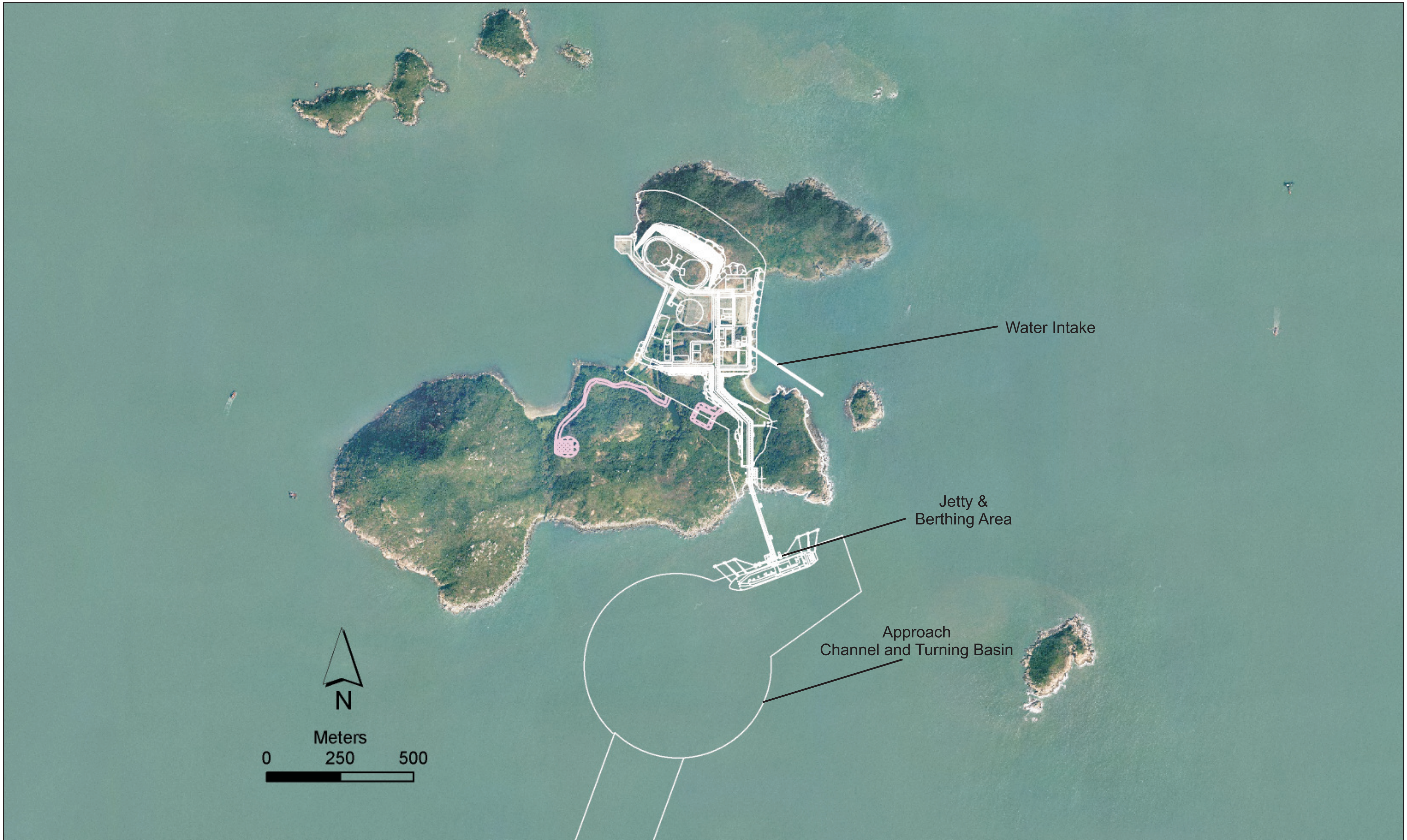

Figure 9.1

Layout for the Proposed South Soko LNG Terminal

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would be located in waters to the south of South Soko Island. The LNG terminal would also require a cooled water intake and water outflow pipe. The proposed location of the water intake is to the east of the island, while the outflow would discharge below the jetty on the southern coast.

The South Soko LNG terminal will connect to the Black Point Power Station via a submarine pipeline. The proposed alignment for the submarine pipeline corridor is presented in *Figure 9.2*. The route has been selected in order to maintain separation from the existing Sha Chau and Lung Kwu Chau Marine Park and the potential Marine Park on the West of Lantau Island.

Power and water supplies required for the routine operation of the LNG terminal will be provided by a new submarine cable and water main connecting South Soko Island to South Lantau, via Shek Pik (*Figure 9.2*). The routes for the power cable and water main are nearly parallel to each other and has the shortest length avoided most of the major elements including the Country Park, Green Belt, existing sand deposit area locations of high dolphin and porpoise sighting density.

The Study Area for the marine ecology baseline has incorporated the proposed alignment corridor for the submarine pipeline connection to the Black Point Power Station and the reclamation areas.

9.1.2 *Structure of the Annex*

Following this introductory section, the remainder of this Marine Ecological Baseline Annex is arranged as follows:

- *Section 9.2* – Presents a summary of the legislation for the protection of species and habitats of terrestrial and marine ecological importance and in Hong Kong.
- *Section 9. 3* – Presents the baseline marine ecological conditions at the South Soko Island and the proposed submarine pipeline corridor.
- *Section 9. 4* – Evaluates the ecological importance of the habitats and species of the Study Area.
- *Section 9.5* – Summarizes the baseline marine ecological conditions of the Study Area.

9.2 *LEGISLATIVE REQUIREMENTS AND EVALUATION CRITERIA*

9.2.1 *Introduction*

This section summarizes all legislative requirements and evaluation criteria for the protection of species and habitats of marine ecological importance.

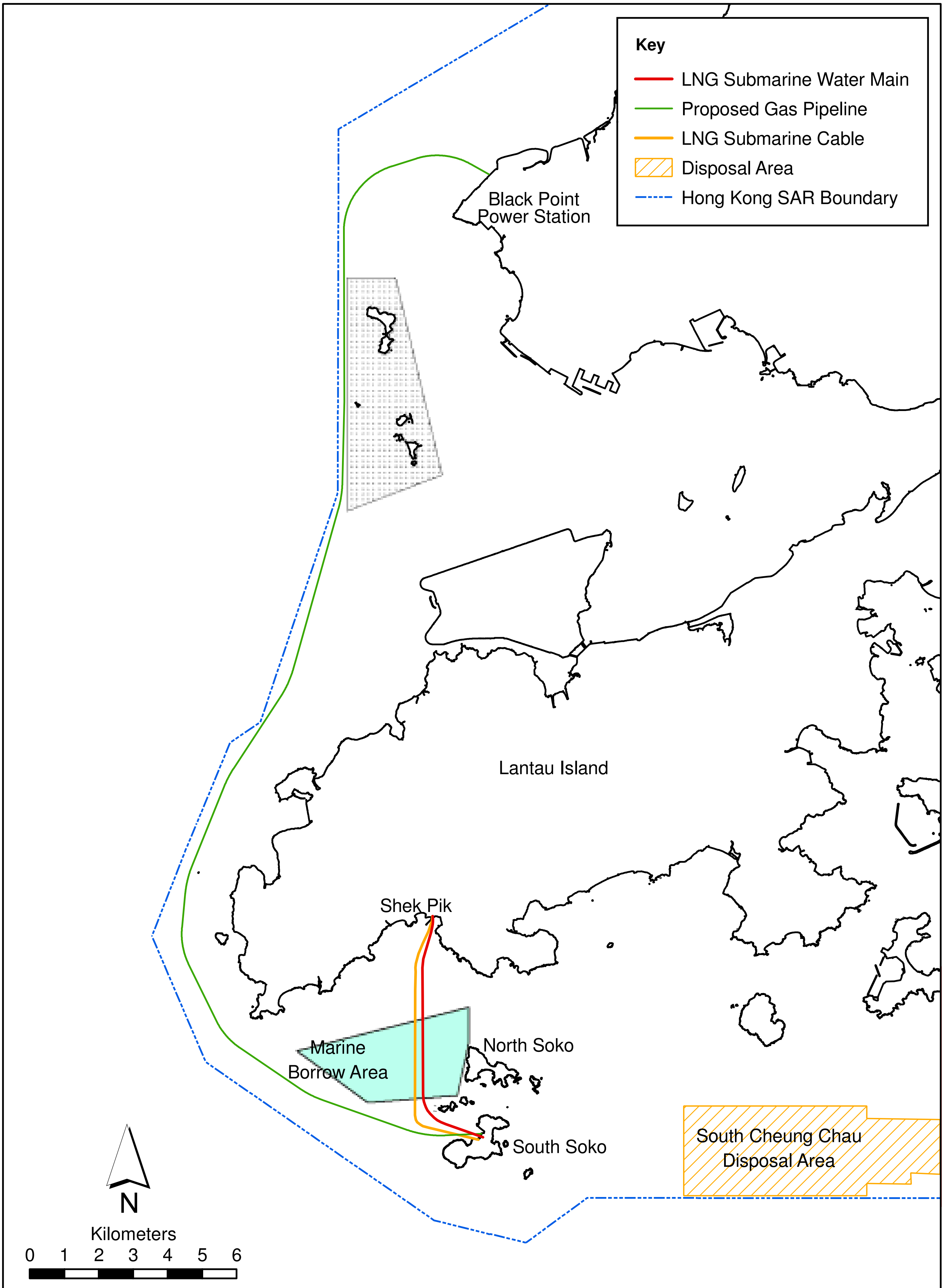

FIGURE 9.2

Provisional Corridor of the Submarine Natural Gas Pipeline from the South Soko LNG Terminal to Black Point Power Station, Submarine Cable and Watermain Connecting South Soko and Shek Pik

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9.2.2 *Legislative Requirements and Evaluation Criteria*

Legislative requirements and evaluation criteria relevant to the study are as follows:

1. *Marine Parks Ordinance (Cap 476);*
2. *Wild Animals Protection Ordinance (Cap 170);*
3. *Protection of Endangered Species of Animals and Plants Ordinance (Cap 586);*
4. *Town Planning Ordinance (Cap 131);*
5. *Hong Kong Planning Standards and Guidelines Chapter 10 (HKPSG);*
6. *The Technical Memorandum on Environmental Impact Assessment Process under the Environmental Impact Assessment Ordinance (EIAOTM);*
7. *United Nations Convention on Biodiversity (1992);*
8. *Convention on Wetlands of International Importance Especially as Waterfowl Habitat (the Ramsar Convention); and,*
9. *PRC Regulations and Guidelines.*
10. *City University of Hong Kong (2001). Agreement No. CE 62/98, Consultancy Study on Fisheries and Marine Ecological Criteria for Impact Assessment, AFCD, Final Report July 2001.*

9.2.3 *Marine Parks Ordinance (Cap 476)*

The Marine Parks Ordinance provides for the designation, control and management of marine parks and marine reserves. It also stipulates the Director of Agriculture and Fisheries as the Country and Marine Parks Authority which is advised by the Country and Marine Parks Board. The Marine Parks and Marine Reserves Regulation was enacted in July 1996 to provide for the prohibition and control certain activities in marine parks or marine reserves.

9.2.4 *Wild Animals Protection Ordinance (Cap 170)*

Under the *Wild Animals Protection Ordinance* (Cap 170), designated wild animals are protected from being hunted, whilst their nests and eggs are protected from destruction and removal. All birds and most mammals including all cetaceans are protected under this Ordinance, as well as certain reptiles (including all sea turtles), amphibians and invertebrates. The Second Schedule of the Ordinance that lists all the animals protected was last revised in June 1997.

9.2.5 *Protection of Endangered Species of Animals and Plants Ordinance (Cap 586)*

The *Protection of Endangered Species of Animals and Plants Ordinance* (Cap 586) was enacted to align Hong Kong's control regime with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). With effect from 1 July 2006, it replaces the *Animals and Plants (Protection of Endangered Species) Ordinance* (Cap 187). The purpose of the *Protection of Endangered Species of Animals and Plants Ordinance* is to restrict the import and export of species listed in CITES Appendices so as to protect wildlife from overexploitation or extinction. The Ordinance is primarily related to controlling trade in threatened and endangered species and restricting the local possession of them. Certain types of corals are CITES listed, including Blue coral (*Heliopora coerulea*), Organ pipe corals (family Tubiporidae), Black corals (order Antipatharia), Stony coral (order Scleractinia), Fire corals (family Milleporidae) and Lace corals (family Stylasteridae). The import, export and possession of listed species, no matter dead or living, is restricted.

9.2.6 *Town Planning Ordinance (Cap 131)*

The recently amended *Town Planning Ordinance* (Cap 131) provides for the designation of areas such as "Coastal Protection Areas", "Sites of Special Scientific Interest (SSSIs)", "Green Belt" and "Conservation Area" to promote conservation or protection or protect significant habitat.

9.2.7 *Hong Kong Planning Standards and Guidelines Chapter 10*

Chapter 10 of the *HKPSG* covers planning considerations relevant to conservation. This chapter details the principles of conservation, the conservation of natural landscape and habitats, historic buildings, archaeological sites and other antiquities. It also addresses the issue of enforcement. The appendices list the legislation and administrative controls for conservation, other conservation related measures in Hong Kong, and Government departments involved in conservation.

9.2.8 *Technical Memorandum on Environmental Impact Assessment Process under the Environmental Impact Assessment Ordinance*

Annex 16 of the *EIAOTM* sets out the general approach and methodology for assessment of ecological impacts arising from a project or proposal, to allow a complete and objective identification, prediction and evaluation of the potential ecological impacts. *Annex 8* recommends the criteria that can be used for evaluating ecological impacts.

9.2.9 *Other Relevant Legislation*

The Peoples' Republic of China (PRC) is a Contracting Party to the *United Nations Convention on Biological Diversity* of 1992. The Convention requires signatories to make active efforts to protect and manage their biodiversity resources. The Government of the Hong Kong Special Administrative

Region has stated that it will be "committed to meeting the environmental objectives" of the Convention (PELB 1996).

The *Convention on Wetlands of International Importance Especially as Waterfowl Habitat* (the Ramsar Convention) applies in the HKSAR. The Convention requires parties to conserve and make wise use of wetland areas, particularly those supporting waterfowl populations. Article 1 of the Convention defines wetlands as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters." The Mai Po/Inner Deep Bay wetland was declared a Wetland of International Importance ("Ramsar site") under the Convention in 1995.

The PRC in 1988 ratified the *Wild Animal Protection Law* of the PRC, which lays down basic principles for protecting wild animals. The Law prohibits killing of protected animals, controls hunting, and protects the habitats of wild animals, both protected and non-protected. The Law also provides for the creation of lists of animals protected at the state level, under Class I and Class II. There are 96 animal species in Class I and 156 in Class II. Class I provides a higher level of protection for animals considered to be more threatened.

9.3 MARINE ECOLOGICAL RESOURCES - BACKGROUND

9.3.1 Introduction

This section describes the baseline conditions of the marine ecological resources at South Soko Island and the Study Area from existing information. Baseline conditions have been assessed based on a review of the findings of relevant studies and the collation of available information regarding the marine ecological resources of this part of Hong Kong.

Based on this review, an evaluation of the information collected was conducted to identify any gaps that need to be filled in order to conduct an assessment of ecological importance of the marine habitats. Where information gaps were identified, or where certain habitats or species were considered to warrant further attention, field surveys have been conducted.

9.3.2 Site History

The South Soko Island is an outlying island located in the southwest waters of the Hong Kong Special Administrative Region (SAR), approximately 4 km from Lantau Island.

In terms of water quality, the island experiences estuarine conditions owing its position at the eastern side of the Pearl River estuary. The influence of the Pearl River is most pronounced in the summer wet season months and is characterised by elevated turbidity and reduced salinity. During the dry season, the influence of the Pearl River on waters close to the island subsides. During the dry season, the island experiences more oceanic conditions, particularly during the northeast monsoon. During a flood tide the waters surrounding the island move rapidly from the southeast passing both to the north and south of the island and through the channel between North and South Soko Islands. On the ebb tide, flows are reversed. Throughout the tidal cycle currents are generally strongest to the north of the island and weakest to the southeast.

Most recently, the island was the location of a Detention Centre operated by the Hong Kong Government. As part of the construction of this facility a relatively large portion of the coastline in Sai Wan, a sheltered bay on the west coast, and Tung Wan, an exposed bay on the east coast, was reclaimed. Prior to this development, however, the shoreline remained natural and mainly consisted of rocks, boulders and sandy beaches.

Two areas designated and administered by the Civil Engineering and Development Department (CEDD) of the Hong Kong Government for dredging and disposal operations fringe the South Soko Island (*Figure 9.2*). The Sokos Marine Borrow Area (MBA) is located to the south of Lantau and extends westwards from the Sokos Island to the boundary of Hong Kong waters. The MBA originally contained shallow sand resources that were dredged prior to 1993, primarily using cutter suction dredging techniques. Some minor volumes of sand have been extracted since 1993, but there are currently no plans for further extensive sand removal or backfilling by CEDD. Approximately 5 km east of South Soko Island is the South Cheung Chau Disposal Area. Occupying an area of approximately 7.5 km by 2.5 km, this is the largest mud disposal area in Hong Kong. The area was first gazetted for "General Purpose" disposal in 1981 and more recently has been used as an open water disposal site for uncontaminated dredged material. In 1993 alone, approximately 80 Mm^3 of grab and trailer dredged material was disposed at the site, however, due to mounding at the site, allowed disposal quantities have since been reduced.

9.3.3 *Literature Review*

Based on the literature review the following habitats and/or organisms of ecological interest have been identified at South Soko:

- Hard Bottom Habitats; and
  - *Intertidal Hard Bottom Habitats*
  - *Subtidal Hard Bottom Habitats*
- Soft Bottom Habitats;
  - *Intertidal Soft Bottom Habitats*
  - *Subtidal Soft Bottom Habitats*
    - <u>Epifaunal Assemblages</u>

    - Infaunal Assemblages

- Marine Mammals;

The existing conditions of each of the above habitats/organisms based on available literature are presented in the following sections.

9.3.4 *Hard Bottom Habitats*

Approximately 80% of Hong Kong's complex shorelines and many islands are composed of rocky outcrops. Shores in Hong Kong display characteristic zonation patterns, with a progression of different species along the vertical gradient from terrestrial to marine environments.

Intertidal Hard Bottom Habitats

The intertidal habitat of South Soko is mainly semi-exposed to exposed rocky shore, with limited boulder shore scattered along the coastline. Artificial rocky coastline fringes the bays on both the western and eastern sides of the island. At Shek Pik, the landing site for the submarine cable and watermain is a sandy beach with intertidal rocky shore in the vicinity. The intertidal habitat of Black Point where the Gas Receiving Station to be located is mainly artificial sloping seawall.

Previous surveys conducted as part of the focussed survey of the South West Lantau marine habitats, recorded assemblages that were considered to be typical of the habitat type in Hong Kong (1). The majority of species recorded were considered to be common in Hong Kong.

For this EIA Study, it was considered appropriate to conduct intertidal surveys on South Soko Island, Black Point and Shek Pik in order to fill data gaps and provide up-to-date data on the ecological value of the habitats. No surveys were considered necessary on the intertidal habitats in vicinity of the proposed submarine pipeline alignment as habitats are relatively distant and therefore, impacts are anticipated to be negligible.

Subtidal Hard Bottom Habitats

Coral reefs support a range of species providing shelter, feeding, spawning and nursery areas, resulting in the large and diverse community for which they are renowned. The coral reef system has been shown to be sensitive to pollution and impacts from development can cause the ecosystem to collapse, resulting in widespread mortality of coral and the numerous associated organisms. Natural fluctuations in water quality can also regulate coral communities.

(1) The Hong Kong Institute of Education (1999) Study on the Suitability of South West Lantau to be Established as Marine Park or Marine Reserve. Report submitted to Marine Parks Division, AFCD.

The Agriculture, Fisheries and Conservation Department report that there are over 80 species of corals recorded in Hong Kong waters (1). It appears that coral distribution in Hong Kong is primarily controlled by hydrodynamic conditions as Hong Kong's western waters are influenced by the Pearl River Estuary, which lowers salinities. The greatest diversity and abundances of corals are generally found in the north eastern waters of Hong Kong due to the optimal environmental conditions for settlement, growth and survival found in these waters. The western and southern waters of Hong Kong are influenced by the Pearl River Estuary, greatly reducing salinities, increasing turbidity and therefore reducing light penetration. Ahermatypic octocorals, including soft and black corals, which unlike the hermatypic hard corals do not require light for zooxanthellae photosynthesis, are more widely distributed and often occur at greater depths.

A number of studies of the subtidal hard bottom habitats in vicinity to the proposed South Soko LNG terminal have been conducted. In 1997, as part of the Coastal Ecology Studies, commissioned by the Civil Engineering Department, qualitative dive surveys of corals were conducted at the Soko Islands. The findings of these surveys characterised the islands as having low abundance and moderate diversity of hard coral species. Faviid coral, which are common hard coral species in Hong Kong, were identified as the most abundant species, however, cover was low (2). Other species recorded were soft coral *Dendronephthya* sp., sponges, sea whips and coralline algae.

In 1998, a study on Shek Kwu Chau, in the vicinity of the Soko Islands identified coral habitats that were of low ecological value (3) . Few sporadic and isolated hard coral communities were recorded, with considerable sedimentation on the majority of hard surface substratum (4).

Recently, as part of a study of the marine habitats of South West Lantau, dive surveys were conducted on the large granitic slabs and boulders of the Soko Island shoreline (5). The waters of the area were noted as being highly turbid with high sedimentation rates, which would likely limit coral growth. The surveys found sparsely scattered coral colonies of encrusting faviids, interspersed with a few soft corals of the genus *Dendronephthya*. Most colonies were small with relative sizes varying little amongst most colonies. In comparison to other sites in Hong Kong, the coral communities were considered to be of low ecological value.

Surveys of subtidal hard bottom habitat in the vicinity of the proposed submarine pipeline, submarine cable and watermain are limited. However,

(1) AFCD (2004) Ecological Status and Revised Species Records of Hong Kong's Scleractinian Corals, undertaken by Marine Conservation Division

(2) BCL. 1997. Marine Ecology of Hong Kong: Report on Underwater Dive Surveys (October 1991 - November 1994).

(3) ERM. 1998. Seabed Ecology Studies: Composite Report for CED.

(4) ERM. 1998. *ibid*.

(5) The Hong Kong Institute of Education (1999) Study on the Suitability of South West Lantau to be Established as Marine Park or Marine Reserve. Report submitted to Marine Parks Division, AFCD.

it should be noted that as discussed above, the general trend for coral communities in Hong Kong is one of increasing abundance and diversity from west to east with the greatest diversity and abundance generally found in the eastern waters of Hong Kong. As a result of the turbid conditions along the west and southwest of Lantau, light penetration is greatly reduced in the water column. Due to the requirements for coral growth, the cumulative effect of these conditions results in suboptimal conditions for coral recruitment and survival. Coral communities of any significance are therefore not expected to occur on the shores in vicinity of the proposed pipeline, cable and watermain route.

9.3.5 *Soft Bottom Habitats*

Intertidal Soft Bottom Habitats

As part of a recent territory wide study of Hong Kong soft shores, surveys were recently conducted at Pak Tso Wan [(1)]. Although this site had a relatively low diversity of polychaetes, crustaceans, molluscs, a moderate diversity (31 species) of chordates (i.e. fish fry) was recorded. Of the 42 soft shores studied across Hong Kong, Pak Tso Wan (labelled Tai A Chau) was ranked 24th in terms of conservation value. Together with 15 other soft shores in Hong Kong, this site was assigned into the "important" conservation category. By comparison, sites categorised as having higher conservation importance were 12 shores classed as "very important" and 1 classed as "extremely important". Sites with less conservation importance than Pak Tso Wan were 9 sites categorised as "can be conserved" and 2 sites regarded as having "low priority".

Two species of Horseshoe Crabs (*Tachypleus tridentatus* and *Carcinoscorpius rotundicauda*) have been recorded in Hong Kong waters. As numbers of these marine organisms are known to have drastically declined in recent years, recommendations for their conservation have been made [(2)]. In Hong Kong, the intertidal sand/sandy-mud flats at Shui Hau and San Tau, on Lantau Island, the mud flats at Pak Nai, in Deep Bay have recorded juveniles of both species, whereas, adult horseshoe crabs are occasionally fished from the subtidal mud along the northwest coast to the Lantau Island, including Tai O, Yi O, Sham Wat Wan, Sha Lo Wan and Tung Chung Bay (*Figure 6.3*). All of the horseshoe crab breeding grounds are located far away from the LNG terminal, proposed gas pipeline, submarine cable and watermain.

Subtidal Soft Bottom Habitats

<u>Epifaunal Assemblages</u>

(1) Shin PKS & Cheung SG. 2005. A Study of Soft Shore Habitats in Hong Kong for Conservation and Education Purposes. City University of Hong Kong. ECF Project 23/99.

(2) Chiu HMC and Morton B. 2001. The Biology, Distribution and Status of Horseshoe Crabs, *Tachypleus tridentatus* and *Carcinoscopius rotundicauda* (Arthropoda: Chericerata): Recommendations for Conservation and Management. Final Report.

Subtidal soft bottom habitats, as well as supporting infaunal species, commonly support macro-benthic epifauna. These organisms are generally greater than 1mm in size and live either on or within the surface sediments.

Data on epifaunal assemblages in Hong Kong are primarily available from studies conducted on fisheries resources. Due to the nature of the Hong Kong fishery and the typical subtidal substratum in Hong Kong being soft bottom habitat, data collected from demersal trawling operations provide the largest amount of information on epifaunal assemblages.

Information on the epifaunal assemblages in proximity to the proposed LNG terminal on South Soko Island and along the Preliminary submarine pipeline corridor has been taken from a review of the largest such study in Hong Kong, namely the Agriculture, Fisheries and Conservation Department commissioned study on Fisheries Resources and Fishing Operations in Hong Kong (1).

Surveys undertaken as part of this study indicates that that the highest biomasses recorded in the waters around the Soko Islands were of Squillidae (mantis shrimp). Other families such as Penaeidae (prawn) were recorded in relatively high abundance. In general, biomass was relatively high, however, species abundance and diversity was low in comparison to other sites in Hong Kong.

A more recent survey on epifaunal assemblages in and around the Soko Islands and Shek Pik has been conducted in 1999 as part of a focussed survey on the South West of Lantau (2). As part of this study, trawls were conducted on the soft bottom habitats to characterise the epifauna of the areas.

The majority of organisms collected in both wet and dry seasons were either mantis shrimps or prawns, with the highest species diversity from small fish or crabs. These species are common in Hong Kong and are found in the majority of Hong Kong's waters. Abundance was low in comparison to other areas of Hong Kong. It was stated that the most notable pattern in the epifaunal assemblages was the low biomass of the individuals recorded. Most fish were considered to be juveniles or immature adults. The absence of adult fish was concluded by the HKIE study to be as a result of fishing pressure in the area.

A review of 10-years of data on fisheries resources collected from demersal trawls conducted as part of the ongoing marine monitoring of contaminated mud disposal at the East of Sha Chau Contaminated Mud Pits provides data on epifaunal assemblages to the west of Lantau, in the vicinity of Tai O and

(1) ERM. 1997. Fisheries Resources and Fishing Operations in Hong Kong Waters. Draft Final Report prepared for AFCD, Hong Kong SAR Government.

(2) The Hong Kong Institute of Education. 1999. Study on the Suitability of South West Lantau to be Established as Marine Park or Marine Reserve. Report submitted to Marine Parks Division, AFCD.

the Lung Kwu Chau and Sha Chau Marine Park [1]. As these areas are in relatively close proximity to the proposed pipeline route, these data can be considered to be representative of the epifaunal assemblages in this area.

These data indicate that epifaunal assemblages are dominated by gastropods (eg *Turritella terebra*), crabs and mantis shrimps. Abundance and species composition was considered to be relatively low in comparison to other areas in Hong Kong. No species that were considered to be rare in Hong Kong were recorded.

Based on the above, the epifaunal assemblages in the proposed study area are considered to be of low abundance, diversity and biomass in comparison to other areas of Hong Kong and have, thus, not been identified of conservation interest.

<u>Infaunal Assemblages</u>

Soft sediments consisting of silt, clay and sand dominate the seabed of Hong Kong. These soft bottom habitats support infaunal assemblages that act as a food source for Hong Kong's inshore commercial fisheries resources. Due to the general dominance of these habitats in Hong Kong's subtidal marine environment, extensive studies have been conducted on infaunal assemblages throughout Hong Kong. However, the majority of these studies have focussed on providing a "snapshot" of infaunal assemblages either within or in close proximity to a proposed area for development, or as part of a specific monitoring programme. In order to provide an indication of the potential ecological value of the infaunal assemblages at the LNG terminal location as well as along the preliminary pipeline corridor, it is considered useful to review studies that have investigated infaunal assemblages in Hong Kong on a wide scale. Where considered useful, studies of infaunal assemblages at specific locations have also been included in the review.

Both the waters around the proposed terminal site as well as the waters of the preliminary submarine pipeline corridor were surveyed as part of a Hong Kong wide study conducted in 1976, however, the findings of this study are considered to be no longer applicable due to the extensive development in both Hong Kong and the Pearl River Estuary that was since occurred. This is supported by the findings of a recent, second, Hong Kong wide study on infaunal assemblages [2].

A comparison of the results of the 1976 study and the 2001 study found that changes in benthic communities, particularly species composition had occurred. This was reported as being primarily as a result of a wider

(1) ERM HK Ltd. 2002. Ecological Monitoring for Uncontaminated Mud Disposal. East Ninepins, South Tsing Yi, North Lantau and South Cheung Chau. Final Reports for Civil Engineering Department.

(2) City U Professional Services Limited. 2002. Final Report for Consultancy Study on Marine Benthic Communities in Hong Kong.

distribution and increase in abundance of pollution tolerant species such as *Prionospio* spp and *Mediomastus* spp.

The Seabed Ecology Studies were a Hong Kong wide study commissioned by the former Civil Engineering Department of the Hong Kong Government examining infaunal assemblages at areas of either previous or ongoing marine sand dredging and mud disposal. The results provided a comparison of benthic abundance, biomass and taxonomic richness at eight areas in Hong Kong, one of which was located in the waters surrounding the Soko Islands (*Table 9.1*) [1]. The findings of the study concluded that the sites in the southern waters, where the proposed South Soko LNG terminal site is located, were found to have infaunal assemblages of higher abundance, biomass and taxonomic richness when compared to sites in the eastern waters of Hong Kong, however, similar if not lower when compared to sites of increased habitat heterogeneity such as the Tathong Channel. It was speculated that the comparatively high values at the Soko MBA were as a result of the exhausted sand borrow area in the vicinity of the sampling sites. The heterogeneity of habitat provided by this substratum would likely have increased the infaunal assemblages in the area. It is worth noting, however, that the average weight per individual at the Soko MBA site was relatively low, suggesting the abundance of opportunistic, low biomass colonising species (polychaete worms).

Table 9.1 Comparison of Data on Infaunal Assemblages at Eight Sites in Hong Kong Collected in the Seabed Ecology Studies, 1996 – 1998 **[2]**.

Comparative Note	Study Site							
	East Sha Chau	Basalt Island	East of Ninepins	Soko Islands	South Cheung Chau	Eastern Waters	Tathong Channel	South Lamma
Abundance (no. m^{-2})	468	240	294	2,187	2,080	352	3,130	1,674
Rank Abundance	5	8	7	2	3	6	1	4
Biomass (g m^{-2})	7.5	6.1	12.8	35.7	47.2	32.9	35.7	30.6
Rank Biomass	7	8	6	2	1	4	2	5
Diversity (families $grab^{-1}$)	7	13	12	21	15	12	22	16
Rank Diversity	8	5	6	2	4	6	1	3
Average weight per individual (total g m^{-2}/ total no. m^{-2})	0.0016	0.026	0.044	0.017	0.023	0.094	0.012	0.019
Rank weight per individual	7	3	2	6	4	1	8	5
Average Rank	6.75	6	5.25	3	3	4.25	3	4.25

Note: Shaded cells indicate highest ranking.

(1) ERM. 1998. Seabed Ecology Studies: Composite Report for CED

(2) ERM. 1998. *ibid*.

The findings that opportunistic colonisers make up the majority of the infaunal assemblages in the soft bottom habitat in the vicinity of the Soko Islands was supported by the Hong Kong wide benthic surveys conducted in 2001 (1). Due to the extensive survey effort undertaken as part of this study, the results provide up-to-date information on the infaunal assemblages both within close proximity to the proposed LNG terminal and along the proposed submarine pipeline corridor (*Table 9.2).*

Table 9.2 ***Comparison of Data on Infaunal Assemblages at four areas in vicinity of the proposed South Soko LNG Terminal and the Submarine Pipeline, Cable and Watermain Routes, Data Collected in the Study on Marine Benthic Communities in Hong Kong, 2000 – 2001 (2).***

Comparative Note	Lung Kwu Chau and Sha Chau		West Lantau Island		Soko Islands		Shek Pik	
	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season
Abundance (no. m^{-2})	143	406	426	1,436	811	1,245	810	432
Biomass (g m^{-2})	14.52	7.98	4.08	37.62	46.99	55.47	118	36.66
Diversity (species 0.5 m^{-1})	23	56	34	38	64	70	69	59

The findings of the CityU study were that the stations at the Soko Islands had higher species, individuals and biomass in comparison to the other stations along the proposed pipeline, cable and watermain routes, ie Shek Pik, West Lantau and the Lung Kwu Chau and Sha Chau Marine Park. It was suggested that, as put forward in the Seabed Ecology Studies, the higher values for infaunal assemblage parameters were as a result of the recovery of benthos following sand dredging operations at the Soko Marine Borrow Area. This was supported by the dominance of opportunistic species such as *Prionospio* spp and *Paraprionospio* spp at the Soko Island survey stations.

Based on the findings of comparatively high abundance, biomass and diversity of the infaunal assemblages in the soft bottom habitats in the waters surrounding the Soko Islands and, to a lesser degree, along the proposed pipeline, cable and watermain routes, it is considered appropriate to conduct benthic surveys to provide up-to-date data on such assemblages.

9.3.6 *Marine Mammals*

A total of 16 (and possibly up to 18) species of marine mammals, or cetaceans, have been recorded in Hong Kong waters (3). The Indo-Pacific Humpback Dolphin, *Sousa chinensis,* and the Finless Porpoise, *Neophocaena phocaenoides,*

(1) City U Professional Services Limited. 2002. Final Report for Consultancy Study on Marine Benthic Communities in Hong Kong.

(2) City U Professional Services Limited. 2002. *ibid.*

(3) Jefferson, pers comm.

are the only two species of marine mammals regularly sighted in Hong Kong waters (1) (2).

Studies on the distribution, abundance, habitat use, and life history of humpback dolphins within Hong Kong have been undertaken since 1995 (3)(4)(5). The results of these ongoing studies indicated in 2004 that approximately 1,300 individual dolphins are estimated to utilise the waters of the Pearl River Estuary. Of these individual dolphins, approximately 360 are thought to include waters within Hong Kong as part of their range.

Historically, marine mammal data have been presented in terms of sightings (6). Recent analysis adopted in the marine mammals monitoring study (7) has allowed data to be standardised to reflect numbers of sightings in terms of survey effort. Such data are considered to be closer to a direct indication of abundance and habitat usage than raw observational data. In order to utilise the most up-to-date data, yet still allow comparison with previous studies to be made, both types of data will be discussed.

Abundance of humpback dolphins in Hong Kong waters is highest in the north and west Lantau areas (*Figure 9.3*). North Lantau and West Lantau are considered to be the major habitats for humpback dolphins in Hong Kong waters where individuals of humpback dolphins have been consistently sighted throughout the year.

Humpback dolphins exhibit a seasonal shifting in abundance and density and thus a seasonal variation of abundance in different locations. The variation is thought to be due to the increased input of freshwater from the discharge of the Pearl River Estuary and the subsequent movements of estuarine prey species (8) (9) (10) .

(1) Parsons C, Mary L. Felly and Lindsay J. Porter. 1995. An Annotated Checklist of Cetaceans recorded from Hong Kong's Terrestrial Waters. The Swire Institute of Marine Science, The University of Hong Kong, Cape d' Aguilar, Shek O, Hong Kong.

(2) Jefferson T.A. 2000. Conservation Biology of the Finless Porpoise (*Neophocaena phocaenoides*) in Hong Kong waters: Final Report. Ocean Park Conservation Foundation Ocean Park Aberdeen, Hong Kong.

(3) Jefferson T.A. 2000. Population Biology of the Indo-Pacific Humpback dolphin in Hong Kong waters. *Wildlife Monographs 144*:1-65.

(4) Jefferson T.A., S.K. Hung, L. Law, M. Torey and N. Tregenza.2002. Distribution and Abundance of Finless Porpoise in Hong Kong and Adjacent Waters of China. *The Raffles Bulletin of Zoology 2002 Supplement No. 10*: 43-55.

(5) Jefferson T.A. and S.K. Hung. 2004. A review of the status of the Indo-Pacific humpback dolphin in Chinese waters. *Aquatic Mammals (Special Issue) 30*: 149-158.

(6) AFCD. 2004. Monitoring of Chinese White Dolphins (*Sousa chinensis*) in Hong Kong waters – Data collection, Final Report (1 April 2003 to 31 March 2004), prepared by Hong Kong Cetacean Research Project

(7) AFCD. 2004. *op. cit.*

(8) Jefferson T.A. 2000. Population Biology of the Indo-Pacific Humpback dolphin in Hong Kong waters. *Wildlife Monographs 144*:1-65.

(9) Jefferson T.A. and S.K. Hung. 2004. A review of the status of the Indo-Pacific humpback dolphin in Chinese waters. *Aquatic Mammals (Special Issue) 30*: 149-158.

(10) Barros, N.B., T.A. Jefferson, and E.C.M. Parsons. 2004. Feeding habits of Indo-Pacific humpback dolphins (Sousa chinensis) stranded in Hong Kong. *Aquatic Mammals (Special Issue) 30*: 179-188.

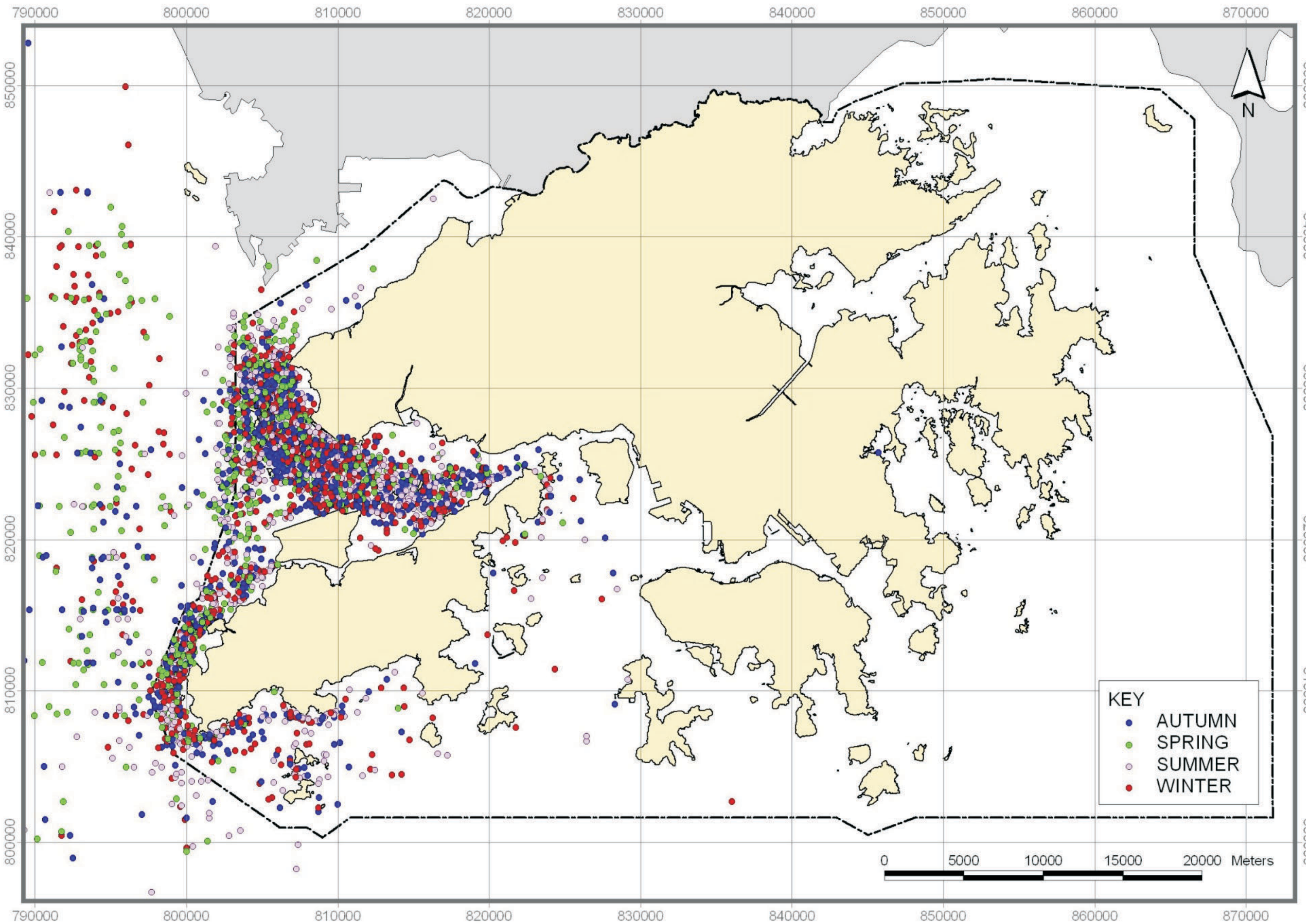

Figure 9.3

Seasonal Distribution of the Indo-Pacific Humpback Dolphin, *Sousa chinensis*, in Hong Kong waters.
Data Collected between 1995 and 2004 (AFCD 2004)

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Recently published information indicates that the abundance of dolphins in Hong Kong ranges from 91 in spring to 207 in autumn [1]. Present estimates for the Pearl River Estuary population range from 678 in summer to 1,171 in winter [2].

Historical data on the utilisation of the waters around the proposed LNG terminal on South Soko Island and the waters of the preliminary submarine pipeline have been reported [3] [4]. From October 1995 to November 2004, there were sightings of humpback dolphins in the South Lantau areas [5]. Humpback dolphins appeared to be more concentrated on the western side of South Lantau and around Soko Islands [6]. The long-term sightings database revealed that their sightings are low in comparison to other areas, particularly during the spring months.

In contrast to humpback dolphins, studies on the finless porpoise indicated that the majority of sightings in the long-term dataset have been recorded in the southern and eastern waters of Hong Kong (*Figure 9.4*). While sightings of finless porpoise have been recorded in the waters surrounding the proposed LNG terminal at South Soko, their recorded distribution in Hong Kong western waters does not extend as far as the waters off West Lantau, North Lantau or Deep Bay [7]. Therefore, in contrast to humpback dolphins, no sightings of finless porpoise have been recorded within the West Lantau waters of the submarine pipeline route connecting the LNG terminal to the Black Point Power Station.

As with humpback dolphins, distribution of finless porpoise in Hong Kong waters varies seasonally (*Figure 9.4*). The highest numbers of sightings of finless porpoise have been in spring and winter throughout Hong Kong waters, as well as those waters surrounding the Soko Islands. Lowest numbers of sightings were in summer and autumn [8]. It is suggested that a large proportion of the local finless porpoise population moves out of Hong Kong waters in the summer and autumn months, potentially as a result of the influx of freshwater in those months, and hence more estuarine conditions. In general, there appears to be a seasonal shift in sightings from the west in winter and spring to the east in summer and autumn in Hong Kong waters. Many of the finless porpoise sighted were calves and juveniles. Recent monitoring data have indicated higher sightings of Finless Porpoise in South

(1) Jefferson, T. A. (ed.). 2005. Monitoring of Indo-Pacific humpback dolphins (*Sousa chinensis*) in Hong Kong waters – data analysis: final report. Unpublished report submitted to the Hong Kong Agriculture, Fisheries and Conservation Department.

(2) Jefferson, T. A. (ed.). 2005. Ibid

(3) Jefferson, pers. comm.

(4) Jefferson, T. A. (ed.). 2005. Ibid.

(5) Jefferson, pers comm.

(6) Jefferson, pers. comm.

(7) AFCD. 2005. Monitoring of Chinese White Dolphins (*Sousa chinensis*) in Hong Kong waters – Data collection, Final Report (1 April 2003 to 31 March 2004), prepared by Hong Kong Cetacean Research Project

(8) Jefferson T.A. 2000. Conservation Biology of the Finless Porpoise (*Neophocaena phocaenoides*) in Hong Kong waters: Final Report. Ocean Park Conservation Foundation Ocean Park Aberdeen, Hong Kong.

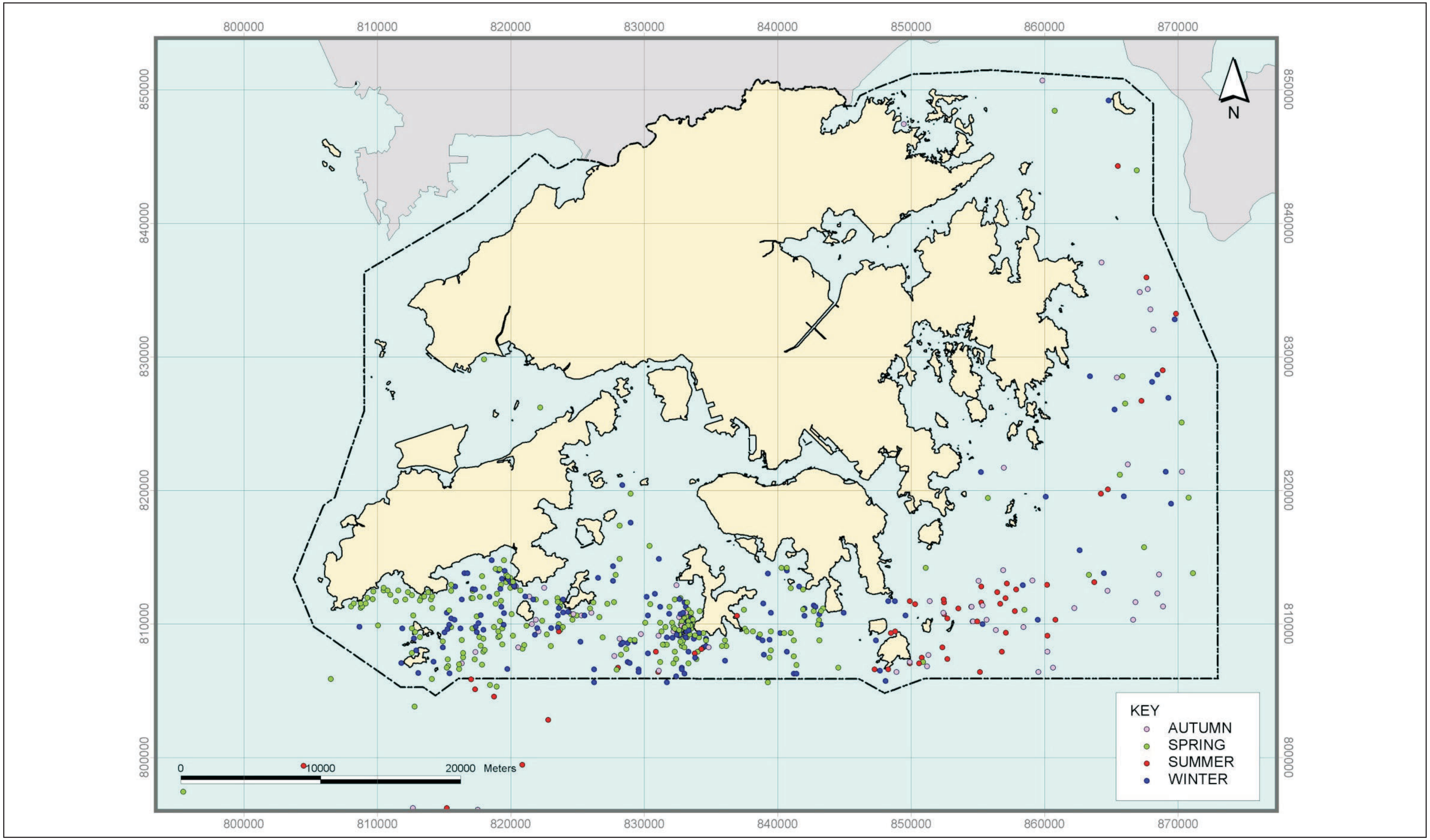

Figure 9.4

Seasonal Distribution of the Finless Porpoise, *Neophocaena phocaenoides*, in Hong Kong waters.
Date Collected between 1995 and 2004 (AFCD 2004)

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Environmental Resources Management

ERM

Lantau than Lamma but lower than in the waters around the Po Toi Island group [(1)] .

The recent studies on marine mammals in Hong Kong have attempted to conduct quantitative analysis of habitat use [(2)]. On the whole, raw sightings records plotted on maps are generally not a good guide to ascertaining marine mammal densities because different areas are not given the same amount of survey effort. To give a more meaningful picture of where dolphins occur, corrected sighting densities have been calculated in terms of number of on-effort sightings per km^2, with the survey area mapped using a 1 km by 1 km grid. These data are presented as Sightings Per Survey Effort (SPSE) values. The average SPSE per grid in West and Northwestern Lantau (most of the grids has SPSE value >20) is comparatively higher than the average SPSE per grid in other areas of Hong Kong waters with the values mostly ranged from 1 – 9.

Based on the results of the information available from the long term sighting data on marine mammals in the waters of Hong Kong, it appears that sightings of both of Hong Kong's resident cetacean species, *Sousa chinensis* and *Neophocaena phocaenoides* have been recorded within the waters surrounding the proposed LNG terminal on South Soko Island. Sightings of *Sousa chinensis* have also been recorded in the waters of the preliminary submarine pipeline corridor.

In order to provide up-to-date and detailed comprehensive baseline information to supplement information from the literature, a programme of marine mammal surveys was undertaken for this EIA Study. A dual survey approach was adopted so that both land-based surveys on South Soko and vessel-based surveys were undertaken. The timing of these different survey types was not concurrent (*Table 9.3*). It is important to note that the data generated by these two different survey approaches was intended to serve different purposes. Overall, the survey programme was specifically designed to focus on gathering information on marine mammal utilisation of waters around the Soko Islands as well as covering regions across Hong Kong western waters. For instance, the position of line transects along which the survey vessel travelled were tailored to give higher resolution of survey effort around the Soko Islands. As such, the vessel-based surveys results provide the scientific basis for calculating all quantitative estimates of dolphin abundance for this EIA Study.

Land-based surveys, on the other hand, were undertaken with the aim of closely focusing on marine mammal utilisation of nearshore waters in the vicinity of the proposed LNG terminal location. The results yielded from the land-based survey are qualitative in nature and cannot be used for

(1) AFCD 2005. Monitoring of Finless Porpoises (*Neophocaena phocaenoides*) in Hong Kong waters (2003-2005) Final Report, prepared by Hong Kong Cetacean Project.

(2) AFCD. 2004. Monitoring of Chinese White Dolphins (*Sousa chinensis*) in Hong Kong waters – Data collection, Final Report (1 April 2003 to 31 March 2004), prepared by Hong Kong Cetacean Research Project.

quantitative determination of marine mammal abundance. Land-based surveys, nevertheless, serve a useful purpose by providing supplementary information for the assessment. While the vessel-based surveys provide ample data to conduct the assessment, when taken together the vessel-based and land-based provide a highly detailed database of marine mammal information for this assessment.

9.3.7 *Baseline Marine Ecological Surveys*

The literature review of the marine ecological habitats and resources of the waters within, and in close proximity to, the proposed LNG terminal at South Soko Island and the waters of the preliminary submarine pipeline corridor has provided an indication of their ecological importance. However, in order to provide up-to-date information on the marine ecological baseline conditions the following field surveys were considered necessary (*Table 9.3*).

Table 9.3 The Marine Ecology Baseline Surveys (Location refer to Figures 9.5& 9.6)

Survey Type	Methodology	Date
Intertidal Assemblages at South Soko	Rocky shore/ artificial shoreline Quantitative (belt transects at 9 locations) survey, three 100 m belt transects (at high, mid and low intertidal zones) for each location, covered both wet and dry seasons. Sandy Shore Quantitative (line transects at two locations) survey, 50 x 50 x 50cm core at three points (high, mid and low intertidal zones) along each of the transects, covered both wet and dry seasons.	8 & 9 March, 28 & 29 July and 14 September 2004, 17 & 28 December 2004, 29 & 30 September 2005 and 27 January 2006
Intertidal Assemblages at Black Point	Rocky shore/ artificial shoreline Quantitative (belt transects at 6 locations) survey, three 100 m belt transects (at high, mid and low intertidal zones) for each location, covered both wet and dry seasons	22 & 23 March and 15 & 30 July 2004.
Intertidal Assemblages at Shek Pik	Rocky shore/ artificial shoreline Quantitative (belt transects at 1 locations) survey, three 100 m belt transects (at high, mid and low intertidal zones) covered both wet and dry seasons. Sandy Shore Quantitative (line transects at 3 locations) survey, 50 x 50 x 50cm core at three points (high, mid and low intertidal zones) along each of the transects, covered both wet and dry seasons.	30 August 2005 & 14 March 2006
Subtidal Benthic Assemblages	Quantitative grab sampling survey; covered both wet and dry seasons. Six stations sampled in each of 14 locations.	25 & 26 February, 5 & 6 July, 9 September and 8 November 2004, 23 September 2005 and 13 December 2005

Survey Type	Methodology	Date
Subtidal Hard Bottom Habitat (Coral)	Quantitative (Rapid Ecological Assessment (REA) technique, a total of twenty three 100 m transects at 15 locations) and qualitative (recorded within Study Area and areas in the vicinity, 3 locations); covered wet season.	9 & 15 May 2004, 29,30 September & 3 October 2005.
Marine Mammal *	Land-based visual survey during daytime, 5 days per month and 6 hours per day, covered four seasons and 12 months.	13, 14, 21, 23 & 26 February, 8, 9, 10, 17 & 18 March, 16, 19, 20, 21 & 26 April, 10, 12, 14, 19 & 25 May, 10, 14, 17, 18 & 28 June 2004, 23, 26, 27, 28 & 29 July 2004, 25, 26, 27, 30 & 31 August, 6, 7, 13, 14 & 22 September 2004, 27, 28, 29, 30 & 31 October 2004, 16, 17, 24, 25 & 26 November 2004, 16, 21, 28, 30 & 31 December 2004, 10, 12, 14, 17 & 28 January 2005
	Quantitative vessel based survey using line transect methods spanning Hong Kong western waters (Deep Bay, Southwest Lantau, Northwest Lantau and West Lantau) 6 days per month.	18, 19, 20,,21, 22, 25, 26, 27 July 2005, 3, 4, 5,15,24 & 25 August 2005, 5,7,15, 16 & 20 September 2005, 5, 6, 7, 17, 18 & 19 October 2005, 22, 24, 25, 28, 29 & 30 November 2005, 6,7,8 & 22 December 2005, 13, 16, 17, 19, 20 & 24 January 2006, 1, 2, 3, 7, 8 & 9 February 2006, 17, 23, 28, 29, 31 March 2006, 3, 6, 18, 25, 26, 27 April 2006, 2, 4, 8, 9, 10, 11 May 2006.

Note: * Vessel-based surveys covered the period July 2005 – May 2006.

No surveys were considered necessary for epifaunal assemblages as a review of the available literature provided sufficient evidence of a low ecological value habitat in the waters surrounding the proposed LNG terminal on South Soko and along the submarine pipeline route.

Survey methodologies have been selected to follow standard and accepted techniques for marine ecological surveys. In addition, each methodology has been previously conducted as part of other Environmental Impact Assessments (EIA) studies, accepted under the Hong Kong Environmental Protection Department *Environmental Impact Assessment Ordinance* (EIAO).

Survey schedules were undertaken in accordance with the *Environmental Impact Assessment Ordinance, Cap.499 Guidance Note - Ecological Baseline Survey For Ecological Assessment*, specifically in terms of the following:

- Duration of Survey;
- Seasonality;
- Types of Survey Period; and
- Survey Effort.

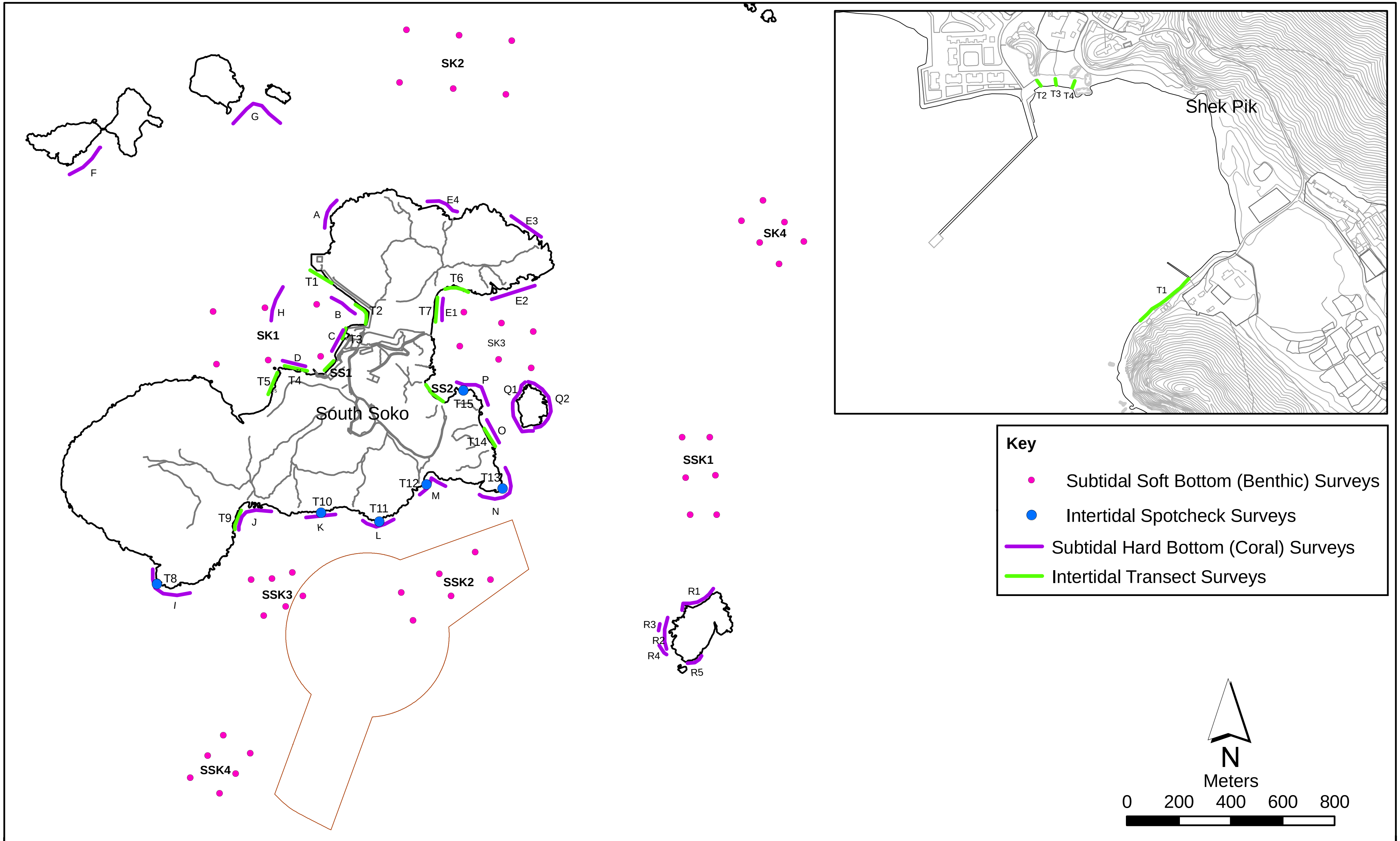

Figure 9.5

Marine Ecological Survey Locations at South Soko and Shek Pik

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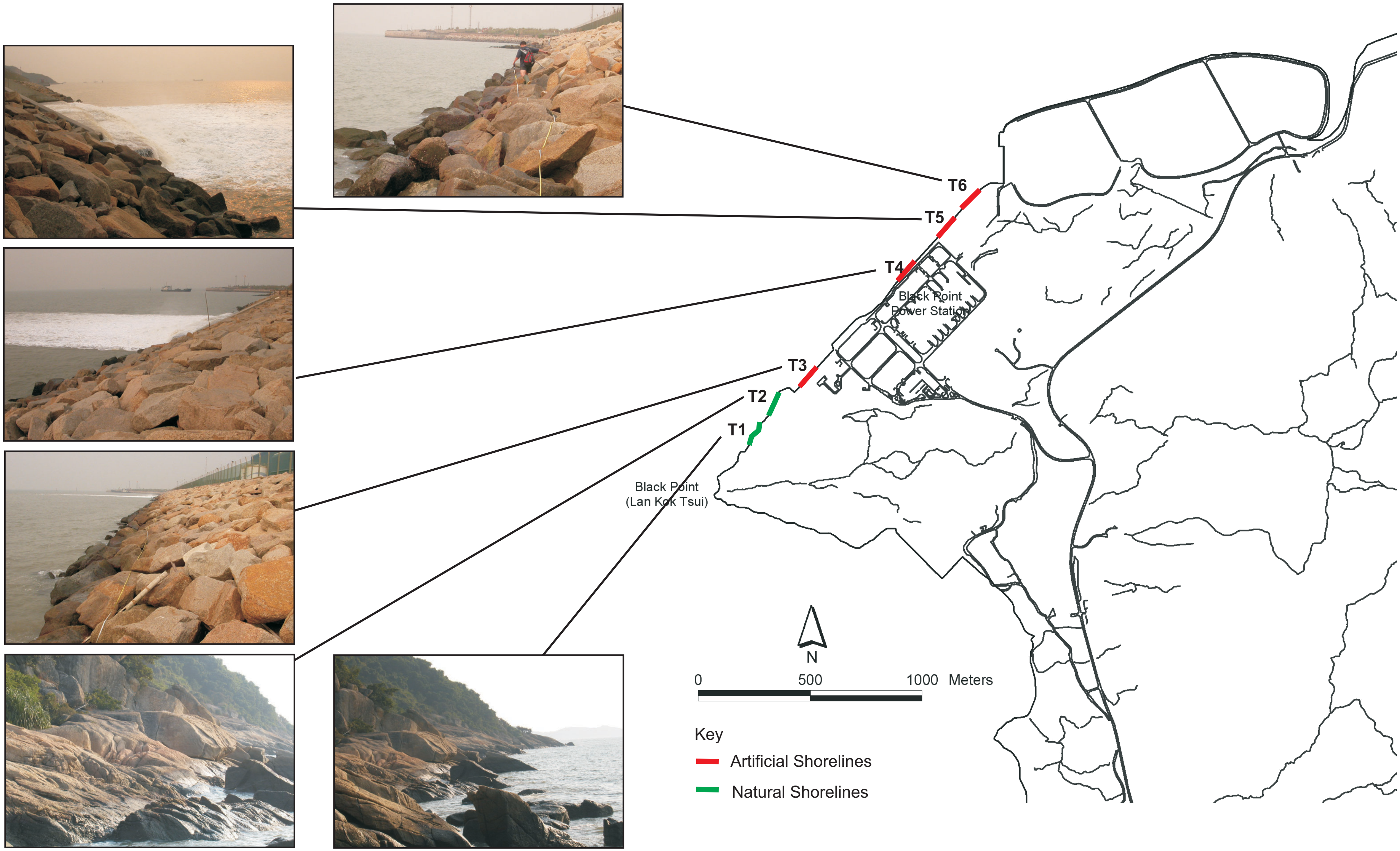

Figure 9.6

Black Point Intertidal Sampling Transect Locations

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The following sections present the methodology and results for each marine ecological survey undertaken as part of the assessment of marine ecological baseline conditions.

9.3.8 *Intertidal Habitats*

Methodology

Survey Locations

Both rocky and sandy intertidal habitats were surveyed. On the shores of South Soko, a total of nine quantitative rocky shore transect surveys were conducted in the both the wet and dry seasons, of which five were on natural rocky coastline and four on artificial rocky coastline. A further 6 sites on natural rocky shoreline on the south coast of South Soko were spotchecked due to the steep slopes and exposed nature of the shoreline that did not allow transect surveys. Two quantitative sandy shore surveys were also conducted in the study area.

Owing to reclamation at Black Point required for a Gas Receiving Station, surveys, six quantitative rocky shore surveys were conducted on the shores of Black Point, of which two were on natural rocky coastline and four on artificial rocky coastline.

In addition, a quantitative transect survey was conducted at one site on natural rocky shore at Shek Pik where the submarine cable and watermain would land. In addition, quantitative surveys were conducted on the sandy shore. Qualitative surveys were also undertaken in the surrounding areas of the landing site of the submarine cable and watermain. Owing to the presence of Shek Pik Prison access to the western shores of Tung Wan Bay was not authorised.

The survey transects were presented in *Figures 9.5 & 9.6*.

Survey Methodology

Rocky Shore and Artificial Shoreline

A 100m transect tape was laid horizontally along the rocky and artificial shoreline at 2 metres above chart datum (CD). When tidal height was below 1m, transects could be started, local tide tables were used to assess tidal height at the site and times of surveys were adjusted accordingly. Random numbers between 1 and 100 were generated before the survey and these numbers corresponded to metres along the transect at which quadrats should be placed. Three sets of random numbers were generated per transect to represent upper, mid and low transects.

A 50cm x 50cm quadrat was used to assess abundance and distribution of flora and fauna. All fauna found within the quadrat were recorded to species level to allow density per square metre to be calculated. Sessile fauna such as barnacles and oysters recorded in samples were not counted but estimated as percentage cover on the rock surface. Species of algae (encrusting, foliose and filamentous) were also identified and recorded by estimating the percentage cover within the sample quadrat.

On the south coast of South Soko, at sites with steep, impassable terrain where it was not possible to deploy transects, the accessible section of the coast was spot checked and qualitative notes on intertidal communities and ecological features were recorded.

Sandy Shore

On sandy shores, three line transects were deployed from the low tide mark up to the high tide mark and the presence of organisms were noted. At three points (1m, 1.5m and 2m above CD) along each of the transects, a 50 x 50 x 50cm core was removed and carefully sorted. All macrofauna visible to the naked eye within the sample core were identified and recorded.

Results of Intertidal Surveys at South Soko

Intertidal surveys have been conducted over two seasons, wet and dry. The date of each survey at each location is presented in *Table 9.4*. There were three types of coastal habitats, including sandy shore, natural rocky shore and artificial shoreline, recorded within the Study Area (*Figure 9.7*).

Table 9.4 Description of the Survey Transects/ Spotchecks and Survey Dates for Intertidal Hard Bottom Surveys on South Soko Island

Transect	Site Description	Date of Survey	
		Dry Season	Wet Season
Artificial Shoreline			
T1	Located in Sai Wan, shoreline is made up of large boulders and is relatively steep.	8 Mar 2004	28 July 2004
T2	Large granite boulders make up the majority of the substrate on this relatively steep sided shoreline	8 Mar 2004	28 July 2004
T3	Located in Sai Wan, the shoreline was disturbed.	8 Mar 2004	29 July 2004
T7	Large granite boulders make up the majority of this steep rocky artificial coastline.	28 Dec 2004	14 Sept 2004
Rocky Shore			
T4	Located in Sai Wan, natural shallow sloping rocky shoreline consisting of mixture of smaller boulders at the low tide mark gradually getting larger further up the shoreline.	9 Mar 2004	29 July 2004
T5	Located in Pak Tso Wan, natural shallow sloping rocky shore line consisting of mixture of smaller boulders at the low tide mark gradually getting larger further up the shoreline.	9 Mar 2004	29 July 2004
T6	Transect 6 is a very steep natural shoreline on the northern shoreline of Tung Wan.	17 Dec 2004	14 Sept 2004

Transect	Site Description	Date of Survey	
T8 (SC)	Located on southwest coast, shore is very steeply sloped bedrock	27 Jan 2006 (spotcheck)	29 Sept 2005 (spotcheck)
T9	Rocky shore comprised large scattered boulders, which is located in a small bay on the south side of the island	27 Jan 2006 (spotcheck)	29 Sept 2005
T10(SC)	Shore was inaccessible but was observed to be comprised of large boulders	27 Jan 2006 (spotcheck)	29 Sept 2005 (spotcheck)
T11(SC)	Steep inaccessible rocky shore with large boulders	27 Jan 2006 (spotcheck)	29 Sept 2005 (spotcheck)
T12(SC)	Steep impassible bedrock with large boulders on the south side of the island	27 Jan 2006 (spotcheck)	30 Sept 2005 (spotcheck)
T13(SC)	Steep, inaccessible rocky headland on south coast.	27 Jan 2006 (spotcheck)	30 Sept 2005 (spotcheck)
T14	Shallow sloping boulder shore comprising medium and large sized boulders with occasional patches of sand and shell debris.	27 Jan 2006 (spotcheck)	30 Sept 2005
T15(SC)	Steep jagged boulders and steep sloping bedrock and large boulders.	27 Jan 2006 (spotcheck)	30 Sept 2005 (spotcheck)
Sandy Shore			
SS1	Located in Sai Wan, moderately sloping shoreline made up of reasonably coarse grained sand.	9 Mar 2004	29 July 2004
SS2	Located in Tung Wan, the beach is moderately sloping and made up of medium grained sand.	17 Dec 2004	14 Sept 2004

Rocky Shore and Artificial Shoreline

Dry Season

Rocky shore flora and fauna present on the shore at South Soko recorded during the dry season were common and widespread species, typical of semi exposed rocky shores in Hong Kong. None of the species recorded are considered to be of conservation interest.

The distribution of intertidal biota at different tidal heights on the shore followed typical vertical zonation patterns found in Hong Kong. Survey data of the quantitative transect surveys and spotcheck observations are presented in *Tables 1 – 3* of *Annex 9-A*.

The high shore was dominated by the littorinid snails (periwinkles), *Nodolittorina* spp. Particularly on the wave exposed areas, stalked barnacles, *Capitellum mitella* occurred in crevices into the high shore. On the mid and low shore were found a variety of marine snails (including *Monodonta labio*, *Thais clavigera*, *Nerita albicilla, Planaxis sulcatus, Lunella coronata* and *Chlorostoma arygrostoma*), limpets (including *Cellana toreuma*, *Nipponacmea concinna*, *Patelloida pygmea*, *Patelloida saccharina*, *Siphonaria japonica* and *Siphonaria lacinosa*) barnacles (including *Tetraclita japonica*, *Tetraclita squamosa*, *Capitellum mitella, Megabalanus volcano and Balanus amphitrite*) and bivalves (including *Saccostrea cucullata, Septifer virgatus* and *Barbatia virescens*). Other fauna found on the shore included tubeworms (*Hydriodes* sp.), crabs (*Grapsus albolineatus*

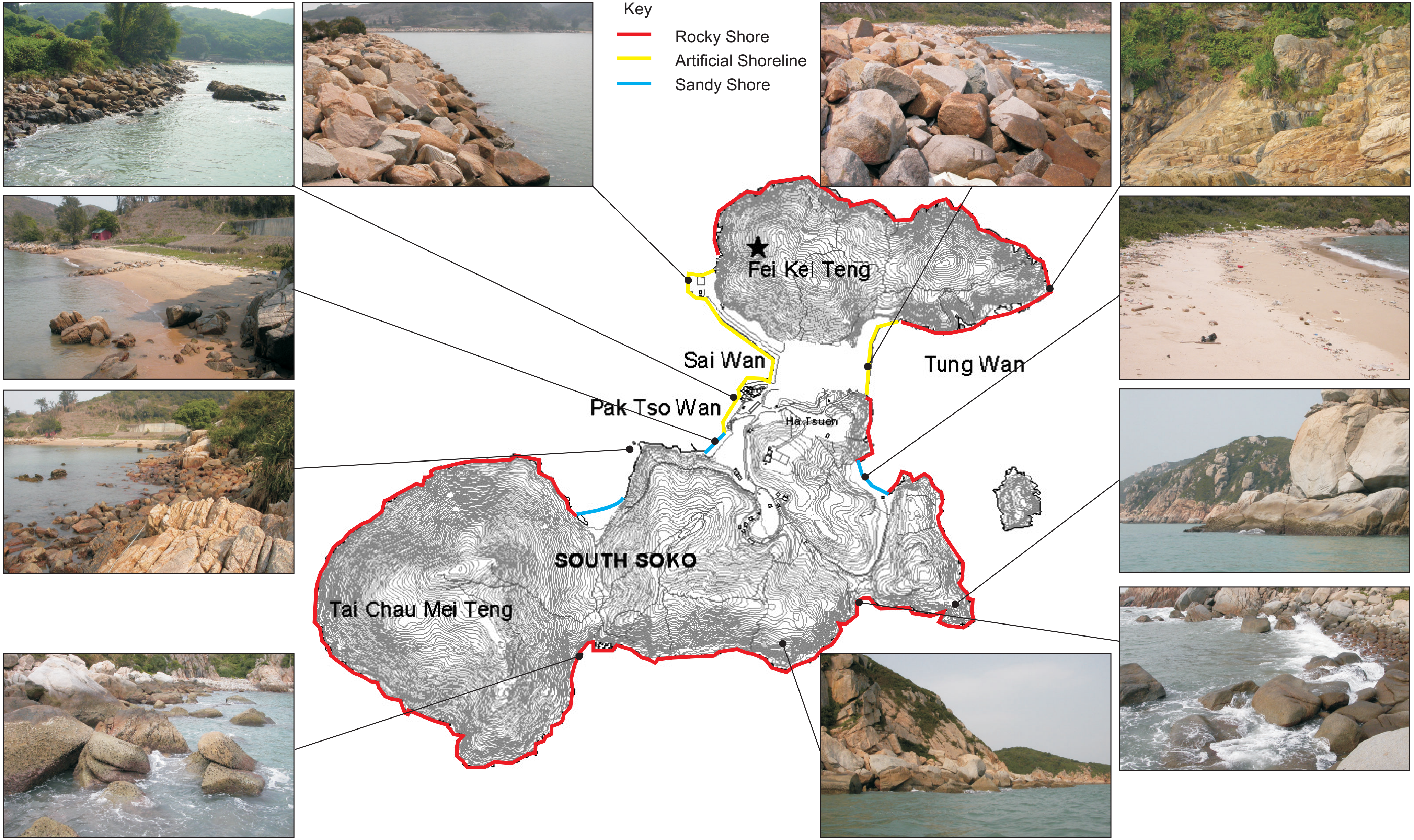

Figure 9.7

Intertidal Habitats Identified within the Study Area at South Soko

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and *Hemigrapsus* sp.), chitons (*Acanthopleura japonica*), sea anemones (*Haliplanella lineata*) and rockpool fish (*Bathygobius fuscus*).

Algal cover recorded in the dry season was dominated by the encrusting algae *Pseudulvella applanata* and *Hildenbrandtia rubra* at the mid shore and erect red turf algae, *Gelidium pusillum* at the low shore. Other algae recorded incuded *Ulva* sp., pink encrusting algae, *Endarachne binghamiae*, *Hincksia mitchelliae*, *Sargassum* sp., and the cyanobacteria *Kyrtuthrix maculans.*

Wet Season

The species composition of the intertidal organisms during the wet season was similar to that of the dry season, with a total of 48 species on the rocky shore and 22 species on artificial shoreline (*Tables 4, 5 & 6* of *Annex 9-A*). The major differences between the seasons were the abundance of littorinid snails and rock oyster. The abundance of littorinid snails recorded during the wet season was much lower than those recorded during dry season, and vice versa for rock oyster. The total abundance of the intertidal organisms recorded in wet season was generally lower than the dry season.

Sandy Shore

The sandy shores at South Soko supported a very low species diversity which is a typical feature of mobile sandy shores with unstable substrates [(1)]. The sand at SS1 was coarse grained and the sand at SS2 was fine grained, and the only species to be recorded in any of the cores was *Donax* spp. These bivalves were recorded in low numbers on the both of the shores.

Results of Intertidal Surveys at Black Point

Intertidal surveys have been conducted over two seasons, wet and dry. The date of each survey at each location is presented in ***Table 9.5***. There were two types of coastal habitats, including natural rocky shore and artificial shoreline, recorded within the Study Area (*Figure 9.8*).

Table 9.5 Description of the Survey Transects and Survey Dates for Intertidal Hard Bottom Surveys at Black Point

Transect	Site Description	Date of Survey	
		Dry Season	Wet Season
Natural Shoreline			
T1	Transect 1 is the furthest south of the rocky shore transects at Black Point and is a very steep natural shoreline made up of bedrock and the occasional boulder.	23 Mar 2004	15 July 2004
T2	Bedrock interspersed with a few large boulders and ranges from very steep to moderately steep sloping rock faces.	23 Mar 2004	15 July 2004

(1) Morton B. and Morton J. 1983. The Seashore Ecology of Hong Kong. Hong Kong University Press.

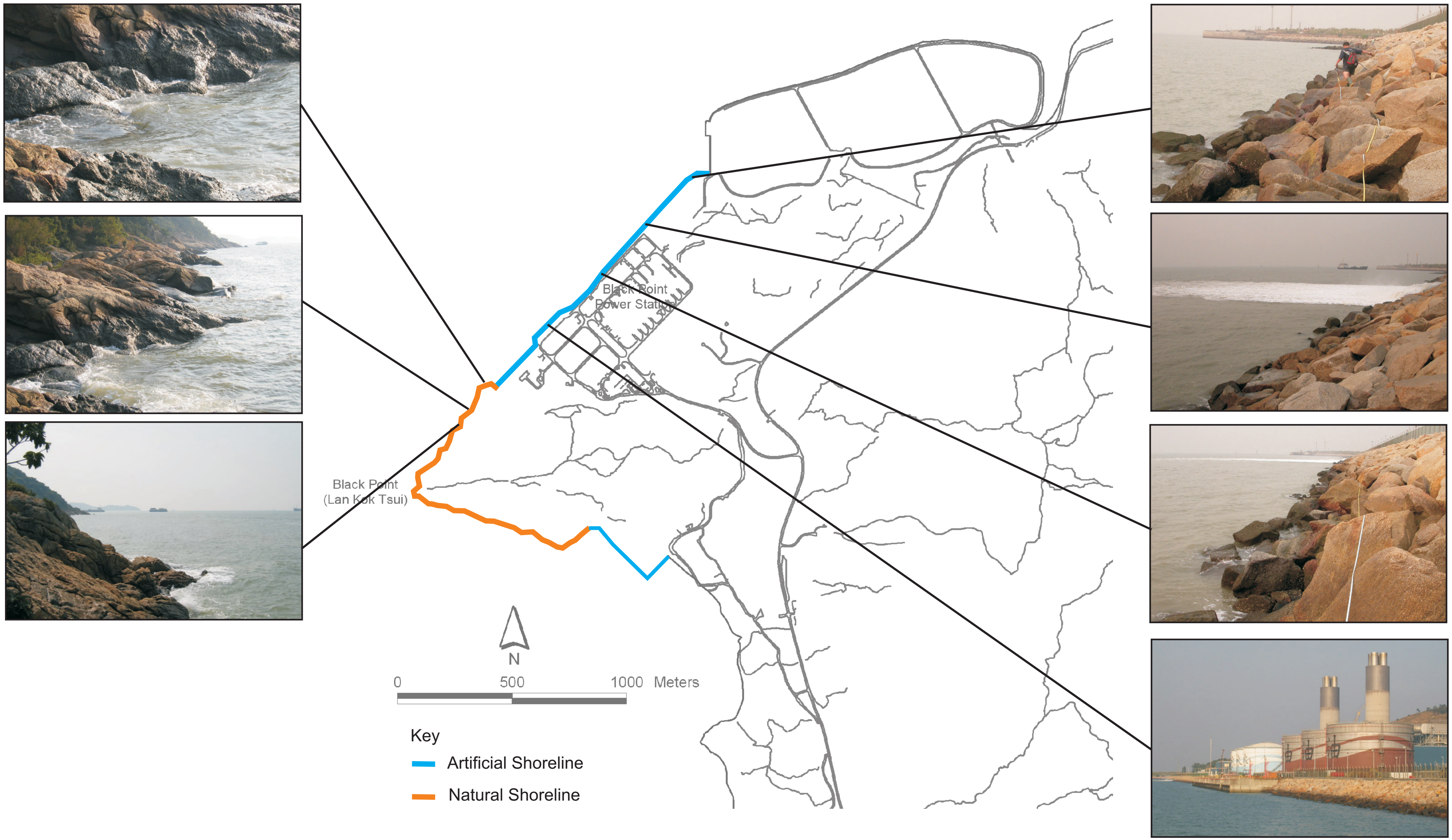

Figure 9.8

Intertidal Habitats Identified within the Study Area at Black Point

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Transect	Site Description	Date of Survey	
Artificial Shoreline			
T3	Southernmost artificial shoreline to the power stations cooling water outlet. Site consisted of steep large boulders.	23 Mar 2004	15 July 2004
T4	South of the power stations cooling water outlet. Steep artificial seawall consisting of large boulders.	22 Mar 2004	30 July 2004
T5	Adjacent to the power stations cooling water outlet. Steep artificial seawall consisting of large boulders.	22 Mar 2004	30 July 2004
T6	Located on the artificial shoreline on northern shore of Black Point power station. Steep artificial seawall consisting of large boulders.	22 Mar 2004	30 July 2004

Rocky Shore and Artificial Shoreline

Dry Season

The littorinid snails, including *Nodilittorina radiata, N. vidua* and *Littoraria articulata*, were the dominant species in the high intertidal zone on the rocky shore and artificial shoreline during the dry season at Black Point (*Tables 8* and *10* of *Annex 9-A*). The predatory gastropod *Thais clavigera* (the common dogwhelk), limpets (ie *Nipponacmea concinna* and *Siphonaria japonica*) and snail (*Monodonta labio* and *Planaxis sulcatus*) were recorded in the mid and low shore region. Sessile filter-feeding organisms such as the rock oyster (*Saccostrea cucullata*) and barnacles (*Capitulum mitella*, *Tetraclita japonica, T.squamosa, Balanus amphitrite*) were also recorded on the shores (*Tables 8* and *10* of *Annex 9-A*). There were only 2 types of algae, including *Ulva* sp. and encrusting algae, of low coverage recorded at Black Point during the dry season surveys.

In total, there were 21 species recorded on the natural and artificial shores. 12 species recorded on natural shoreline were also found on artificial shoreline (*Tables 1* and *4* of *Annex 9-A*). Except littorinid snails, all of the recorded species were in low abundances.

Wet Season

The species composition of the intertidal organisms during the wet season is similar to that of the dry season, with a total of 15 species on artificial shore and 12 species on natural shoreline (*Tables 9* and *11* of *Annex 9-A*). The major differences between the seasons were the abundance of littorinid snails and rock oyster. The abundance of littorinid snails recorded during the wet season were much lower than those recorded during dry season, and vice versa for rock oyster. The total abundance of the intertidal organisms recorded in wet season was generally lower than the dry season.

Results of Intertidal Surveys at Shek Pik

Intertidal surveys have been conducted over two seasons, wet and dry. The date of each survey at each location is presented in *Table 9.6*.

There were two types of coastal habitats, rocky shore and sandy shore (*Figure 9.9*).

Table 9.6 Description of the Survey Transects and Survey Dates for Intertidal Hard Bottom and Intertidal Soft Bottom Surveys at Shek Pik

Transect	Site Description	Date of Survey	
		Dry Season	Wet Season
Natural Rocky Shoreline			
T1	Transect 1 is located on the east coast of Tung Wan and consisted of sheltered shallow sloping rocky shore consiting of bedrock and medium size boulders.	14 March 2006	30 August 2005
Sandy Shoreline			
T2, T3, T4	Transects were laid on the sandy shore located next to the pier.	14 March 2006	30 August 2005

Rocky Shore

Dry Season

The rocky shore supported a low diversity of flora and fauna. The shore was dominated by the rock oyster, *Saccostrea cucullata* and with a high cover of *Enteromorpha* macroalgae. All biota are common and widespread and no species of note were found during the survey.

Wet Season

Surveys indicated low abundance and relatively low diversity of rocky shore fauna consiting of a species which are common and widespread in Hong Kong. The rock oyster (*Saccostrea cucullata*) dominated the shore and attained high cover on the mid and low shores. No notable species were found during the survey.

Sandy Shore

Dry Season

Survey of the sandy shore during the dry season encountered several borrows of the common Ghost Crab *Ocypode cordimana*. This shore appeared to be devoid of other burrowing or surface-dwelling fauna.

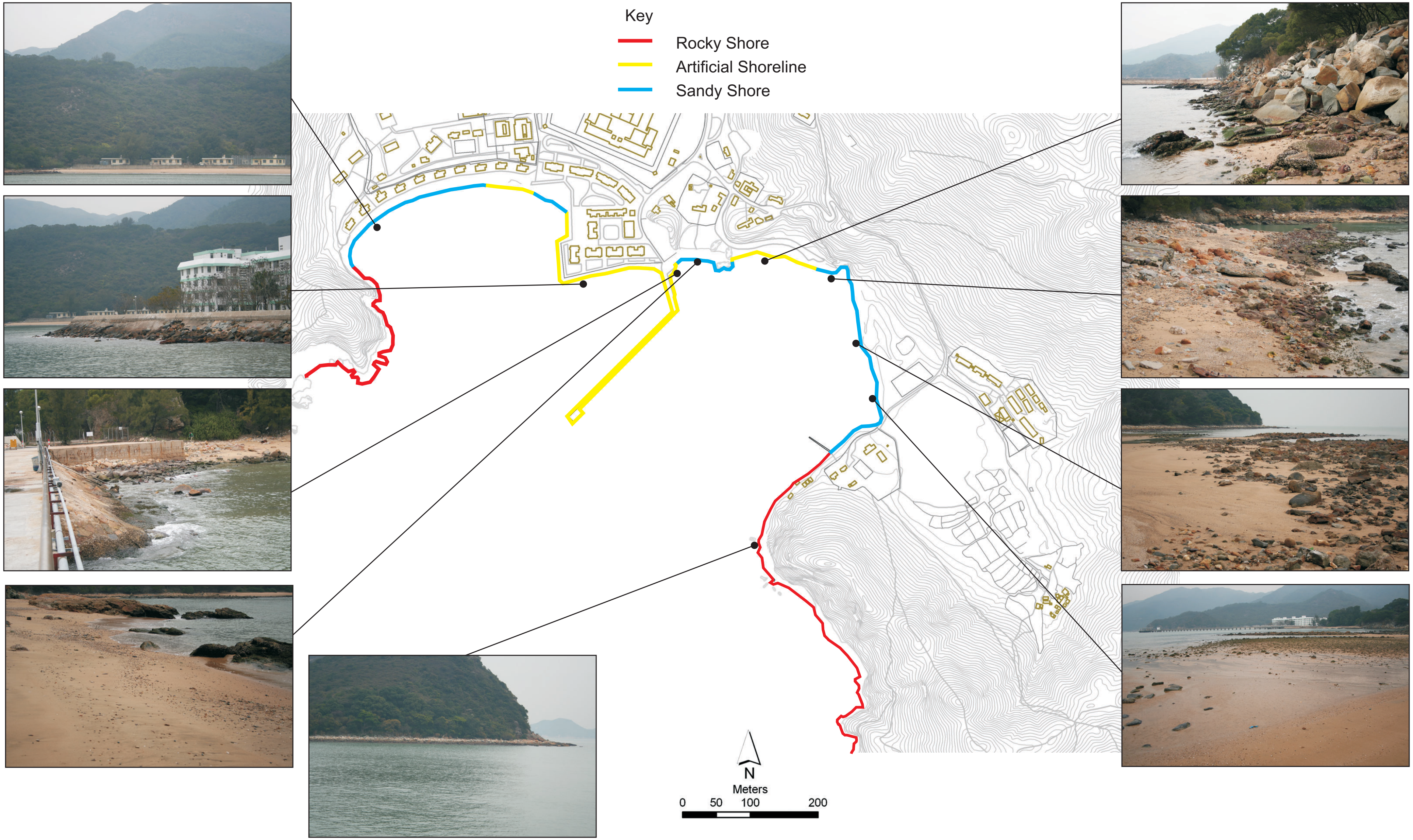

Figure 9.9

Intertidal Habitats Identified within the Study Area at Shek Pik

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Wet Season

Survey on the sandy shore at Shek Pik encountered no fauna. Sandy shores are unstable and mobile habitat, which are subject to desiccation especially during the hot summer months. Few species are able to tolerate these conditions, which may account for the absence of biota recorded at this site.

9.3.9 *Comparison of South Soko Intertidal Habitats With Other Hong Kong Sites*

The intertidal organisms found on South Soko Island are typical of those found in similar habitats in Hong Kong. In comparison to other sites, overall species richness of intertidal organisms recorded on South Soko Island was similar. For instance, the number of species found on the south coast of Soko (41 species) during the dry season was not markedly different to sites surveyed by ERM [(1)] on the west coast of Lamma (37 species) and Fa Peng & Pa Tau Kwu (44 species) (*Figure 9.7*). In addition, results revealed some pronounced differences in species richness on different shores on South Soko (*Figure 9.10*). In general, rocky shore locations which were more sheltered from wave action, had considerably lower number of species than sections of exposed rocky shore. Wet season surveys recorded 41 species of intertidal biota at the wave exposed southerly facing coast of South Soko compared to a combined total of 25 species at generally more sheltered locations on west and east coasts on the northern part of the island.

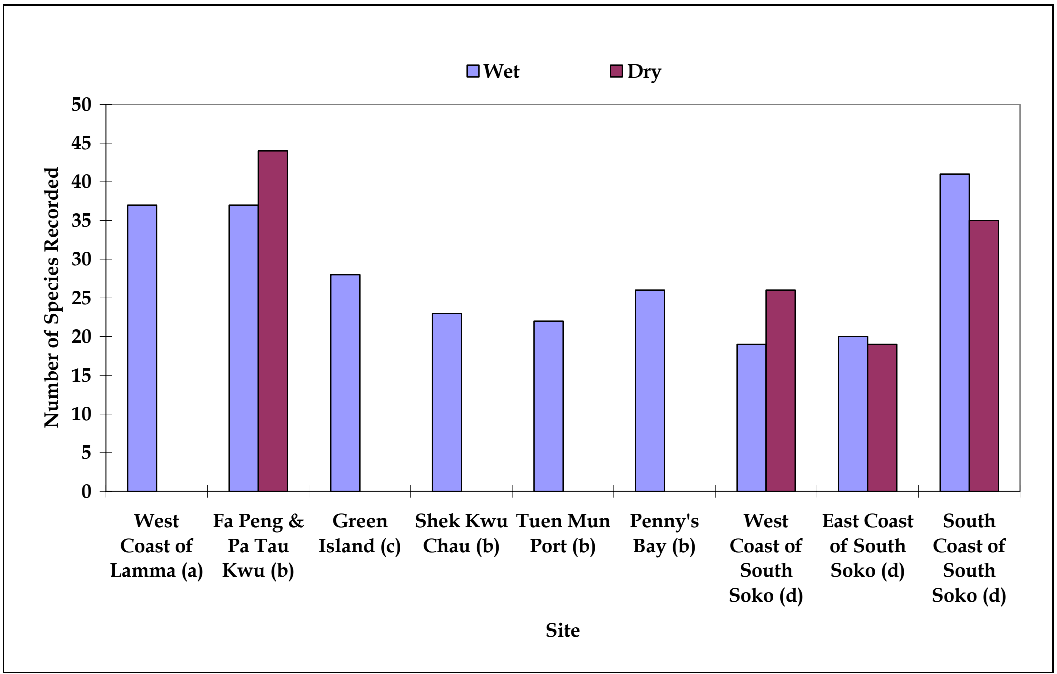


Figure 9.10 ***Comparison of Intertidal Fauna and Flora at Various Sites in Hong Kong***
(Sources: (a) ERM 1998 [(2)], (b) ERM 2000 [(1)], (c) Babtie BMT 1999 [(2)] and (d) Present Study)

(1) ERM– Hong Kong Ltd. 2000. Environmental Impact Assessment, Construction of an International Theme Park in Penny's Bay of North Lantau and its Essential Associated Infrastructures. Final EIA Report Annex (Volume 1)

(2) ERM. 1998. Environmental Impact Assessment of a 1800 MW Gas-Fired Power Station at Lamma Extension: Marine Ecological Assessment – Final Benthic Ecology Survey Report, Final Survey Report, prepared for the Hong Kong Electric Co Ltd.

9.3.10 *Subtidal Hard Bottom Habitats*

Methodology

The Rapid Ecological Assessment (REA) technique was employed in order to investigate the subtidal hard bottom habitat assemblages at the proposed LNG terminal on South Soko Island. The REA technique allows semi-quantitative information on the ecological attributes of a subtidal habitat to be obtained relatively simply without compromising scientific rigour. An explanation of the survey locations and the methodology employed using this technique is presented below.

Survey Locations

Survey locations were selected in order to provide detail on the hard bottom habitats both within the proposed development area of the LNG terminal at South Soko Island and at areas in close proximity to the development site. A total of eight locations were surveyed using quantitative REA technique, as follows:

Quantitative Surveys

- North West Point (Zone A)
- North Sai Wan (Zone B)
- East Sai Wan (Zone C)
- South Sai Wan (Zone D)
- West Tung Wan (Zone E1)
- North Tung Wan (Zone E2)
- North East Point (Zone E3)
- Lan Nai Wan (Zone E4)
- South Tai A Chau (Zone I)
- South Tai A Chau (Zone J)
- South Tai A Chau (Zone K)
- South Tai A Chau (Zone L)
- South Tai A Chau (Zone M)
- South Tai A Chau (Zone N)
- South Tai A Chau (Zone O)
- South Tai A Chau (Zone P)
- Yuen Kong Chau (Zone Q)
- Tai Lo Chau (Zone R)

In addition to the above, three locations were surveyed qualitatively, as follows:

(1) ERM - Hong Kong Ltd. 2000. Sludge Treatment and Disposal Strategy: Site Specific Feasibility Study of Sludge Management Strategy (SMS) and Sludge Disposal Plan (SDS) – Volume 2 (Annexes). Final Report. For the Environmental Protection Department

(2) Babtie BMT (Hong Kong) Ltd. 1999. Green Island Development EWQIA & MTIA Studies. Final Environmental and Water Quality Impact Assessment Report. For the Territory Development Department.

- Ma Chau (Zone F)
- Yeung Chau (Zone G)
- Outer Sai Wan (Zone H)

A summary of the dive surveys is presented below in *Table 9.7*, and locations are shown in *Figure 9.5*.

Table 9.7 Number of Transects Surveyed at South Soko

Survey Site	Number of 50m Transects Surveyed	Total Length of Area Surveyed
Zone A	1 in shallow depth zone and 1 in deep depth zone	100m
Zone B	1 in shallow depth zone and 1 in deep depth zone	100m
Zone C	1 in shallow depth zone and 1 in deep depth zone	100m
Zone D	1 in shallow depth zone and 1 in deep depth zone	100m
Zone E	4 in shallow depth zone and 4 in deep depth zone	400m
Zone F	Qualitative survey in both shallow and deep depth zones	
Zone G	Qualitative survey in both shallow and deep depth zones	
Zone H	Qualitative survey in both shallow and deep depth zones	
Zone I	1 in shallow depth zone	100m
Zone J	1 in shallow depth zone	100m
Zone K	1 in shallow depth zone	100m
Zone L	1 in shallow depth zone	100m
Zone M	1 in shallow depth zone	100m
Zone N	1 in shallow depth zone	100m
Zone O	1 in shallow depth zone	100m
Zone P	1 in shallow depth zone	100m
Zone Q	2 in shallow depth zone	200m
Zone R	3 in shallow depth zone and 2 in deep depth zone	500m
TOTAL	23	1900m

Rapid Ecological Assessment (REA) Survey Method

REA surveys were undertaken using standard SCUBA equipment. An initial qualitative reconnaissance dive was conducted within the study area and based on this, a decision was made on site as to where to position transects. Areas where corals appeared to be the most abundant, or areas of high epifaunal density, were selected as preferred locations. As such, the coordinates of the chosen transects were identified in the field using a handheld Geographic Positioning System (GPS) unit and recorded for future reference.

REA Transects for Zones A to E were laid in two distinct depth zones

- Shallow depth zone: -2 to –5m CD and;
- Deep depth zone: -6 to –10m CD.

The depths of the transects were adjusted accordingly based on the substrate habitats and the presence or absence of hard and soft corals.

REA Transects for Zones I to Q were ~100m long and deployed in the shallow depth zone (-2 to -5/-6m). In the turbid western waters, it is known that 6m is typically the depth limit at which hermatypic hard corals grow due to prevailing highly turbid conditions. At Zone R, survey conditions allowed survey transects to be deployed along deep depth zone in addition to shallow depth zone.

Following the laying of the transect line, video footage was taken of the benthos along the transect and an assessment of the benthic cover (Tier I) and taxon abundance (Tier II) was undertaken in a swathe ~ 4 m wide, 2 m either side of each transect. Swimming speed whilst videoing was kept slower than 10m per minute to prevent blurring of video and to improve clarity. An explanation of the two assessment categories (Tiers) used in the surveys is presented below.

Tier I - Categorisation of Benthic Cover

Upon the completion of each transect, six ecological and seven substratum attributes were assigned to one of seven standard ranked (ordinal) categories (*Table 9.8* and *Table 9.9*).

Table 9.8 *Benthic Attribute Categories*

Ecological	Substratum
Hard coral	Hard substrate
Dead standing coral	Continuous pavement
Soft coral	Bedrock
Antipatharia	Rubble
Macroalgae	Sand
Turf algae	Silt
	Boulders – large (>50cm), small (<50cm)

Table 9.9 *Ordinal Ranks of Percentage Cover*

Rank	Percentage Cover (%)
0	None recorded
1	<5
2	6-10
3	11-30
4	31-50
5	51-75
6	76-100

Tier II - Taxonomic Inventories to Define Types of Benthic Communities

An inventory of benthic taxa was compiled during each dive (ie each transect). Taxa were identified *in situ* to the following levels:

- Scleractinian (hard) corals to species wherever possible;
- Soft corals, anemones and conspicuous macroalgae were recorded according to morphological features and to genus level if possible.
- Other benthos (including sponges, zoanthids, ascidians and bryozoans) were recorded to genus level wherever possible but more typically to phylum plus growth form.

At the end of each dive, each taxon in the inventory was ranked in terms of abundance in the community (*Table 9.10).* These broad categories rank taxa in terms of relative abundance of individuals, rather than the contribution to benthic cover along each transect. The ranks are subjective assessments of abundance, rather than quantitative counts of each taxon.

Table 9.10 Ordinal Ranks of Taxon Abundance

Rank	Abundance
0	Absent
1	Rare
2	Uncommon
3	Common
4	Abundant
5	Dominant

Photographs of representative coral species located in the surveyed areas were taken and, where possible, photographs of the seabed composition were taken.

Results of Subtidal Hard Bottom Habitat Surveys

The surveys were performed on 9 May and 15 May 2004 as well as on 29 and 30 September and 3 October 2005. On all dates, the weather was sunny and the sea was calm. The visibility was poor and generally ranged between 0.3 m and 1.0 m and deteriorated with depth. Along each transect the seabed composition was identified and conditions were noted as shown in *Table 9.11* and *Table 9.12*.

Coral Assemblages

Dive surveys at South Soko for this EIA Study yielded similar results as BCL (1997) (1) who reported that hard corals were in low abundance and diversity and dominated by species which are common in Hong Kong. In total, fifteen hard coral species and four octocoral species, were recorded within the Study Area (*Table 9.13*). The majority were common faviids, poritids and siderasteriids with three predominant species – *Oulastrea crispata, Psammocora* sp. and the ahermatypic cup coral *Balanophyllia* sp.. Corals

(1) Binnie Consultants Limited. 1997. Coastal Ecology Studies – Soko Islands (Quanlitative Survey). Final Report to GEO, Civil Engineering Department.

occurred in extremely low abundance and percentage cover estimates ranged from 1-5%. Many live corals recorded were highly bioeroded by macroborers and barnacles. The majority of colonies exhibited partial mortality and at most survey sites a low percentage cover of dead coral was noted. Corals recorded are all common Hong Kong species with the exception of the relatively little known hard coral, the False Pillow Coral *Pseudosiderastrea tayami* at site J and K.

Following a recent AFCD commissioned study which among other goals, aimed to clarify the taxonomic identity of Hong Kong hard corals, the number of species known to be present in Hong Kong waters rose from about 50 to over 80 (1). *Pseudosiderastrea tayami* was among the recent discoveries on the revised Hong Kong species list. It was discovered in 2002 and confirmation of its identity was made in 2003 (2) (3). Owing to its small corallites, this species is difficult to identify in the field. South Soko is the second location in Hong Kong from where this species has been discovered. The other location is a site in the southern waters of Hong Kong at Lamma Island (4).

Site J, which is a small sheltered bay on the south coast of South Soko Island, currently possesses the highest abundance of this coral species of the two presently known sites in Hong Kong waters. There are indications of active recruitment with observations of coral colonies <5 cm diameter. Isolated colonies of this species were also recorded from Site K. This species lives in shallow water and exhibits a remarkable threshold for sedimentation tolerance and was observed to occur on silt covered boulders. Owing to limited number of sites where it is known to occur, this species is currently regarded as rare in Hong Kong waters. Outside Hong Kong, the species has a wide distribution from the western Pacific to Indian Ocean including Taiwan,, Vietnam, Thailand, Malaysia, Philippines, Indonesia, Northern Australia, India, East Africa, Madagascar and the Gulf of Arabia and the Red Sea. Globally, this coral is considered to be uncommon and cryptic in terms

(1) AFCD. 2004. Ecological Status and Revised Species Records of Hong Kong's Scleractinian Corals, undertaken by Marine Conservation Division.

(2) Ang, P.O., D. McCorry and C.L.S. Choi. 2003. Establishing a reference collection and field guides for Hong Kong scleractinians coral. Agriculture, Fisheries and Conservation Department, Hong Kong SAR Government tender (AFD/SQ/35/02) to the Marine Science Laboratory, The Chinese University of Hong Kong. 78 pp.

(3) Chan A.L.K., C.L.S. Choi, D. McCorry, K.K. Chan, M.W. Lee and Ang P.O. 2005. Field Guide to Hard Corals of Hong Kong. Agriculture, Fisheries and Conservation Department, Hong Kong SAR Government. 371 pp.

(4) AFCD. 2004. Ecological Status and Revised Species Records of Hong Kong's Scleractinian Corals, undertaken by Marine Conservation Division.

of its abundance [1]. Until its recent discovery in Hong Kong through the AFCD commissioned study involving world expert coral taxonomists, there were no records from the Chinese coast.

(1) Veron J.E.N (2000) Corals of the World. Australian Institute of Marine Science.

Table 9.11 Description of the Seabed Recorded Along Each Transect and The Qualitative Surveys

Transect	Depth	Description
A (shallow)	-3 mPD	The seabed was composed of mainly bedrock and boulders with sparse sandy substrate along the transect. No hard coral colonies were found. Small number of poorly growth of *Euplexaura* and coralline algae found at the hard surface.
A (deep)	-6 mPD	The seabed was mainly composed of sandy substrate with scattered boulders and rubbles. Only one colony of *Euplexaura* found.
B (shallow)	-1 to - 3 mPD	The seabed was mainly composed of boulders with sand and rubbles in between. Small number of poorly growth of *Euplexaura* were recorded.
B (deep)	-4 to –4.5 mPD	The seabed was composed of silt and prone sandy substrate. No sessile organisms were recorded.
C (shallow)	-1.2 to –3 mPD	The seabed was composed of boulders and in some parts with sand. The transect can be divided into 2 zones. The first zone (0-30m) was composed of boulders with scattered rubbles and cobbles. The second zone (30-50m) was mainly sandy with heavy silt. A common hard coral colony *Oulastrea crispata* was recorded along the transect.
C (deep)	-4 to –5 mPD	The seabed was composed of fine sand. No sessile organisms were recorded.
D (shallow)	-1 to -3 mPD	The seabed was mainly composed of sandy substrate with sparse boulders and rubbles along the transect. No corals were recorded.
D (deep)	-4 mPD	The seabed was mainly composed of silt and sandy substrate. No sessile organisms were recorded.
E1 (shallow)	-2.5 to -3 mPD	The seabed was composed of boulders and cobbles. Macro-algae grew well on the surface of the hard substrate. No hard corals were recorded along this transect.
E1 (deep)	-6.5 mPD	The bottom was composed of sandy substrate. No sessile organisms were recorded along this transect.
E2 (shallow)	-4.5 mPD	The bottom was composed of sandy substrate. Sponge, macro-algae, coralline algae were recorded on the hard substrate. No corals were recorded.
E2 (deep)	-6 to -7 mPD	The bottom was composed of sandy substrate with some rubble patches. About ten colonies of hard coral were recorded including *Porites lobata*, *Psammocora superficialis*, *Echinophyllia* sp, *Favites abdita*, *Goniopora stutchburyi*, *Goniopora lobata* and *Oulastrea crispata*. These colonies were scattered along the transect.
E3 (shallow)	-5 to –6mPD	The bottom was composed of bed rock and boulder. There were a number of octocorals including *Dendronephthya* and *Euplexaura* but the growth form and size was limited. An ahermaptypic coral *Tubastrea* was recorded.
E3 (deep)	-9mPD	The bottom was composed of sand substrate with some boulders and rubbles. Small number of octocorals including *Dendronephthya* and *Euplexa*ura. An ahermaptypic coral *Tubastrea* sp. was also recorded.
E4 (shallow)	-4mPD	The bottom was composed of bed rock, boulder and sand. Small number of octocorals including *Dendronephthya* and *Euplexaura*.
E4 (deep)	-10mPD	The bottom was composed of sand substrate with some boulders and rubbles. Small number of octocorals including *Dendronepthya* and *Euplexaura*.

Transect	Depth	Description
F	-3 to –9mPD	The bottom was composed of boulders, rubbles and sandy substrate in the shallow water. Small number of *Euplexaura* sp. were recorded. Some of the hard surfaces were covered with macro-algae. The deep region was mainly silt substratum and devoid of marine life.
G	-3 to –9mPD	In the shallow water, the bottom was composed of boulders and rubbles. Small number of *Euplexeura* sp. were recorded but their condition was very poor.
H	-3 to –5mPD	The bottom was mainly composed of sandy substrate.
I (shallow)	-2 to -6.4 mPD	Site comprised of large boulders with a visible layer of silt. Absence of coralline algae notable and sessile benthos comprised of isolated encrusting sponges and bryozoans, small, scattered hard coral colonies of three species: *Oulastrea crispata*, *Psammocora* sp. and the ahermatypic cup coral *Balanophyllia* sp. (the most abundant and recorded as common). Isolated octocorals were recorded and included small colonies of *Dendronephthya* and the gorgonian *Euplexaura*. Ahermatypic cup coral *Dendrophyllia/Tubastrea* sp. was recorded at 5-6m depth.
J (shallow)	-1.2 to -5.6 mPD	Site J encompassed a small sheltered and depositional bay of the southern section of South Soko. The main substrate composition was large boulders and the shallow upper subtidal area was dominated by encrusting corallines, sponges, oysters, barnacles and tube worms . The lower shallow subtidal (2-5/6 m depth) was extremely silty with a visible layer of silt on the surfaces of all boulders. Hard corals were recorded and included: *Oulastrea crispata*, *Psammocora* sp., *Porites lobata*, *Coscinaraea* sp., *Balanophyllia* sp. and the little known siderastreid *Pseudosiderastrea tayami*. This species was common at this site with numerous small colonies surrounded by thick layers on silt. Colonies ranged from 2-3 cm to >20 cm in diameter indicating active recruitment in this site. Isolated gorgonians were also recorded: *Euplexaura* and *Echinomuricea*. These gorgonians and the ahermatypic cup coral *Dendrophyllia/Tubastrea* sp. were recorded at slightly deeper depth than the hermatypic hard corals.
K (shallow)	-2 to -5.4 mPD	This site was similar to site J in terms of substratum and sessile benthos composition. *Pseudosiderastrea tayami* colonies were recorded as rare in abundance and the hard corals *Oulastrea crispata*, *Psammocora* sp., *Porites lobata*, *Coscinaraea* sp. and the ahermatypic cup corals *Balanophyllia* sp. and *Dendrophyllia/Tubastrea* sp. were all recorded in low abundances. A similar sessile invertebrates were observed as at site J with a dominance of encrusting sponges and bryozoans.
L (shallow)	-2 to -5 mPD	Site had a low abundance of hard corals: *Oulastrea crispata*, *Psammocora* sp., *Balanophyllia* sp., the poritid *Goniopora stutchburyi* and the faviid *Lepastrea pruinosa*. The ahermatypic cup coral *Dendrophyllia/Tubastrea* sp. and gorgonian Echinomuricea were recorded from deeper depths. Coralline algae was dominant in the upper shallows (0-2 m depth) and large boulder surfaces were encrusted with bryozoans, sponges, oysters, spiral tube worms and hydroids.
M (shallow)	-1 to -6 mPD	Site composed of large boulders. Hard corals recorded included: *Oulastrea crispata* (common), *Goniopora stutchburyi*, *Psammocora* sp., and *Coscinaraea* sp.. The ahermatypic cup coral *Balanophyllia* sp. was recorded as common and located on horizontal boulder surfaces, generally below 5 m depth.

Transect	Depth	Description
N (shallow)	-2 to -7 mPD	Site encompassed a headland promontory. On the southeast side the benthic community was similar to I-M. On the northwest facing side of this headland there was less deposition, clean boulder surfaces and visibility improved to approximately 2 m due to a swift current running between South Soko and Yuen Kong Chau. On this side invertebrates were larger and more abundant, e.g., oysters, the bryozoan *Schizoporella errata*, the encrusting brown bryozoan, a variety of encrusting sponges and unidentified jewel anemones. Hard corals recorded were *Psammocora* sp., *Plesiastrea versipora*, *Cyphastrea* sp. and *Leptastrea pruinosa*. The *Psammocora* colonies were most abundant and often >30 cm in diameter and colonies of this species were recorded at >5 m depth. The ahermatypic cup coral *Balanophyllia* sp. was recorded as abundant in patches and located on horizontal boulder surfaces, generally below 5 m depth. Isolated gorgonians *Euplexaura* and *Echinomuricea* were noted and the odd, either small or with a diseased appearance, *Dendronephthya* colony was recorded on a spot dive below six metres.
O (shallow)	-1 to -5 mPD	A shallow site composed of small boulders leading to a sandy sloping seabed. Upper, shallow sections were composed of small boulders covered in encrusting corallines, barnacles and oysters. Lower, shallow sections were composed of scattered small boulders and sand. Benthic community composition was comprised of bryozoans, encrusting sponges, small sea urchins and sea cucumbers. This site recorded seven species of hard coral with majority noted as uncommon in abundance. The faviid *Leptastrea pruinosa* was common and colonies >40 cm diameter were noted. Other faviids included *Cyphastrea* sp. and *Oulastrea crispata*. Other corals were *Psammocora* sp. , *Coscinaraea* sp., *Goniopora stutchburyi* and a solitary, juvenile *Turbinaria peltata* colony. The ahermatypic cup coral *Balanophyllia* sp. was recorded but noted as rare at this site. A number of ghost nets were recorded within this survey site.
P (shallow)	-1 to -5 mPD	This site was a headland leading to a large beach. Seabed was composed of large boulders leading to a sandy seabed at shallower depths near the beach. Several hard coral species were recorded as common at this site: *Oulastrea crispata*, *Psammocora* sp. and *Goniopora stutchburyi*. Other corals recorded included: *Porites lobata*, *Coscinaraea* sp., *Plesiastrea versipora* and the ahermatypic cup coral *Balanophyllia* sp.. Gorgonians were rare with the odd *Echinomuricea* colony noted. Fouling and mobile invertebrates were similar in composition with an abundant category designated to the large, encrusting bryozoan *Schizoporella errata*, *Diadema setosum* (long-spined sea urchin) and *Saccostrea* sp. (oysters). Also recorded at this site were large mats of stalked zoanthids. A spot dive was also conducted at South Soko on the shore opposite P across the other side of beach inlet. A large boulder composed subtidal shore was covered in corallines, jewel anemones and barnacles in the upper shallows and encrusting bryozoans in the lower shallows. A hard coral band between 4-6 m depth was noted and consisted of isolated colonies of the same coral species as recorded for P.
Q1 (shallow)	-1 to -6.8 mPD	This survey dive was the western side of Yuen Kong Chau. Substratum comprised of large and small boulders between 0-5 m gradually sloping to a sand seabed (~6 m depth). The upper shallows were predominated by encrusting corallines, turf algae, barnacles, encrusting sponges and bryozoans. The lower shallows consisted of a similar suite of sessile and mobile invertebrates as recorded for South Soko and isolated hard coral and octocoral colonies (rare-uncommon). Five coral species were recorded – *Oulastrea crispata*, *Psammocora* sp., *Porites*, *Goniopora stutchburyi* and the ahermatypic *Balanophyllia* sp.. The gorgonian *Echinomuricea* was the only octocoral recorded. Dominant sessile invertebrates included the bryozoan *Schizoporella errata*, encrusting sponges and oysters. Numerous ghost nets were recorded on this survey. At the southwest end of the dive survey a small patch of dead *Goniopora* sp. were observed.

Transect	Depth	Description
Q2 (shallow)	-1 to -6 mPD	This site encompassed the eastern side of the Yuen Kong Chau islet. The site comprised vertical bedrock (at the southern tip of the islet), and a mix of large and small boulders gradually sloping to a sand/silt seabed. Large barnacles, encrusting bryozoans and sponges predominated. Also recorded were oysters, and sea urchins including *Diadema setosum* and *Anthocidaris crassispina*. Isolated and small hard coral colonies were recorded and included: *Psammocora* sp., *Goniopora stutchburyi* (common), the faviids *Oulastrea crispata*, *Cyphastrea* sp. and *Favites abdita*, *Coscinaraea* sp. and the ahermatypic *Balanophyllia* sp..
R1 (shallow) R2 (shallow) R5 (shallow)	-2 to -8 mPD -2 to -8 mPD -4 to -7 mPD	These survey areas were comprised of a mix of large and small boulders with scattered, small sand patches gradually sloping to a silt seabed. A total of seven hard coral species were recorded and matched those recorded from South Soko and Yuen Kong Chau with predominant species such as *Psammocora* sp., *Goniopora stutchburyi* , *Oulastrea crispata* and the ahermatypic *Balanophyllia* sp.. Octocorals were recorded from R1 and R5 only. R1 possessed numerous small gorgonian colonies of *Echinomuricea*, unusual for such shallow depths, however, the majority of these colonies exhibited high partial and total mortality. R5 contained a few *Dendronephthya* and *Euplexaura* colonies on the eastern side of the channel. The sessile benthos was predominated by encrusting bryozoans such as *Schizoporella errata*, encrusting sponges, oysters, spiral tube worms, mussels (*Perna viridis*), jewel anemones and thick layers of encrusting masses of tube worms together with sponges and bryozoans. Coralline algae were encrusted on all boulder surfaces in the upper shallows.
R3 (deep) R4 (deep)	- 8 to -10 mPD - 7 to -10 mPD	Tau Lo Chau was the only location during 2005 surveys were dive conditions permitted REA surveys in the deep depth range of 6-10 m. Two surveys were conducted along the southwestern section of Tau Lo Chau and were comprised of large and small silt ladened boulders. These two survey sites possessed an atypical abundance of large, mature gorgonians (whips and fans) and large ahermatypic cup corals (*Tubastrea*/ *Dendrophyllia* sp.). Gorgonians identified were of the genera *Euplexaura*, *Echinomuricea* and *Echinogorgia*. There was a notable absence of other sessile or mobile invertebrates except for numerous hydroids and low records of encrusting sponges and bryozoans. With the exception of the cup corals no other hard coral species were recorded. Also of note was the number of gorgonian colonies with commensal anemones attached.

Table 9.12 Seabed Attributes Along the Survey Transects at South Soko

	A	A	B	B	C	C	D	D	E1	E1	E2	E2	E3	E3	E4	E4	I	J	K	L	M	N	O	P	Q1	Q2	R1	R2	R3	R4	R5
Transect depth (b)	s	d	s	d	s	d	s	d	s	d	s	d	s	d	s	d	s	s	s	s	s	s	s	s	s	s	s	s	d	d	s
Seabed attributes (a)																															
Hard substrate																															
Continuous pavement																															
Bedrock	4	1					1		1		1		3		3																
Rubble		1	1		1		1		1	1	1	1		1		1															
Sand	1	2	2	2	2		3		1		1	4		4	1	2				1			3	3	3	2	2	2	2	3	2
Silt				4	1	5		5		4												2	2						2	2	
Boulders – large		1	3		2		1		2		4	1	2	1	2	2	6	6	5	5	6	6		5	4	4	4	4	4		5
Boulders – small		1	1		1				2		1	1	1	1		1			3				5		3	2		3	3	4	2
Ecological attributes (b)																															
Hard coral					1							1	1	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Dead standing coral																	1	1	1	1	1		1	1	1	1	1			1	
Soft coral	1	1	1										1	2	1	2	1	1	1	1		1		1	1	2	1	1	2	3	1
Antipatharia																															
Macroalgae	1		2		2		1		4		1					2															

Notes: (a) 1=<5% Cover, 2= 6-10% Cover, 3 = 11-30% Cover, 4 = 31-50% Cover, 5 = 51-75% Cover, 6 = 76-100% Cover.
(b) A to E = transect line; s= shallow water; d=deep water

Table 9.13 Coral Species Recorded Along the Survey Transects at South Soko

	A	B	C	D	E1	E2	E3	E4	I	J	K	L	M	N	O	P	Q1	Q2	R1	R2	R5	R3	R4
Hard Coral Species (a)																							
Porites lobata	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	2	1	0	0	0	0	0	0
Psammocora spp.	0	0	0	0	0	1	0	0	1	1	2	2	2	3	2	3	2	3	1	0	2	0	0
Coscinarea sp.	0	0	0	0	0	0	0	0	0	1	1	0	2	0	2	2	0	1	0	0	0	0	0
Pseudosideratrea tayami	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0
Turbinaria peltata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	2	0	0	0	2	2
Balanophyllia sp.	0	0	0	0	0	0	0	0	3	2	3	3	3	3	2	2	3	2	2	3	0	3	3
Favites abdita	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Plesiastrea versipora	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2	0	0
Leptastrea pruinosa	0	0	0	0	0	0	0	0	0	0	0	1	0	2	3	0	0	0	0	0	0	0	0
Cyphastrea sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	2	0	0	2	0	0
Echinophyllia sp	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goniopora stutchburyi	0	0	0	0	0	1	0	0	0	0	0	1	2	0	2	3	2	3	2	2	0	0	0
Goniopora lobata	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oulastrea crispata	0	0	1	0	0	1	0	0	2	2	2	3	3	0	2	3	2	2	3	3	0	0	0
Tubastrea sp. / *Dendronophyllia* sp.	0	0	0	0	0	0	1	0	2	2	2	2	2	2	0	0	2	2	0	0	0	2	2
Octocoral Species (a)																							
Dendronephthya sp.	0	0	0	0	0	0	1	1	1	0	0	0	0	2	0	0	0	2	0	0	2	2	0
Euplexeura sp.	1	1	0	0	0	0	1	1	2	1	0	0	0	2	0	0	0	0	1	0	0	3	3
Echinomuricea sp.	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	1	2	1	3	0	0	3	3
Echinogorgia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3

Note: (a). 0=absent, 1=rare, 2=uncommon, 3=common, 4=abundant, 5=dominant

Also note Sites F and G were surveyed by spot dive so that REA data were not collected for these sites.

IMPORTANT

The ranks shown in the Table above indicate the relative abundance of each coral in relation to other corals in the community. In other words, these broad categories rank taxa in terms of relative abundance of individuals, rather than the contribution to benthic cover along each transect. The ranks are subjective assessments of abundance, rather than quantitative counts of each taxon. For instance, if a coral is ranked as 'common', it means it was more frequent than other coral species along the transect. It should be borne in mind that coral cover along all of the transects where corals occurred was very low (<5% cover).

9.3.11 *Comparison of South Soko Subtidal Hard Surface Habitats With Other Hong Kong Sites*

Coral coverage at South Soko is very low due to its geographic location and the heavy influence (ie freshwater runoff and siltation) of the Pearl River Estuary on the marine conditions. The generally turbid waters are acknowledged as limiting colonisation and the rate of coral growth in the Western and South Western waters of Hong Kong.

Previous studies and surveys (1) (2) (3) have shown that live coral cover in Hong Kong may reach high levels where favourable environmental conditions prevail. For instance, coral cover was recorded at 71.9% at Coral Garden in Hoi Ha Wan. *Figures 9.11* & *9.12* show the low number of coral species and low coral cover that was found at South Soko in comparison to other sites in Hong Kong's southern and western waters.

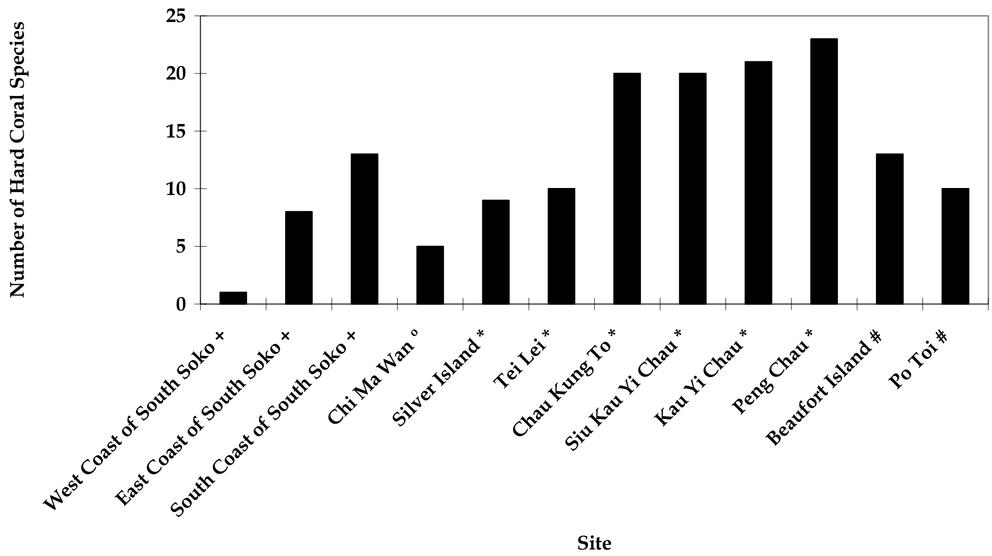


Figure 9.11 ***Comparison of Number Coral Species recorded at Other Sites in Hong Kong (Sources: +Present Study, *AFCD 2002 (4) , ºMCL 1999 (5) and #ERM 2001 (6))***

(1) AFCD. 2002. Agriculture, Fisheries and Conservation Department. Annual Report 2001-2002.

(2) ERM. 1998. Seabed Ecology Studies: Composite Report for CED

(3) ERM – Hong Kong Ltd. 2000. Environmental Impact Assessment, Construction of an International Theme Park in Penny's Bay of North Lantau and its Essential Associated Infrastructures. Final EIA Report Annex (Volume 1)

(4) AFCD. 2002. *ibid.*

(5) Mouchel Asia Environmental. 1999. Feasibility Study for Additional Cross-border Links. Stage 2: Investigations on Environmental, Ecology, Land Use Planning, Land Acquisition, Economic/Financial Viability and Preliminary Project Feasibility/Preliminary Design – Final Ecological Impact Assessment Working Paper WP3 Appendices. Planning department, Government of the Hong Kong Special Administrative Region.

(6) ERM. 2001. Study on Revitalisation of Tai O for planning Department. Final report.

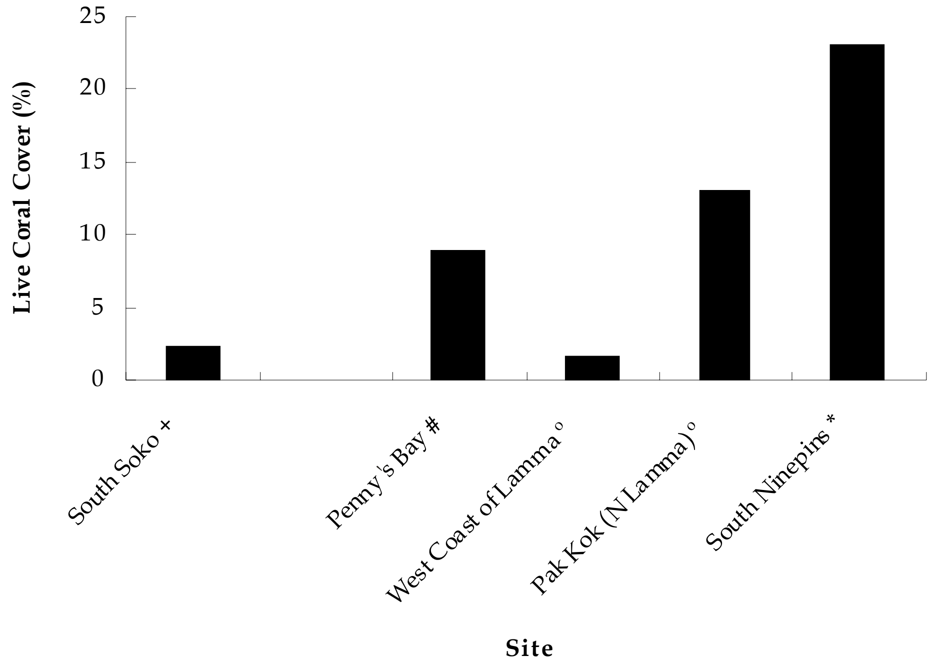


Figure 9.12 ***Comparison of Percentage Live Coral Cover at Other Sites in Hong Kong (Sources: +Present Study, *AFCD 2002 (1), ºERM 1998 (2) and #ERM 2002 (3))***

As can be seen from *Figure 9.12* coral cover at South Soko is very sparse (<3% cover) in relation to coral sites further to the east of Hong Kong such as the Ninepins where, for instance, 23.1% live coral cover was reported. Higher coral cover than South Soko was also previously recorded at the Penny's Bay Site (8.99% cover) at East Lantau. The low coral cover in western waters of Hong Kong is a direct consequence of the naturally brackish, turbid estuarine waters discharged by the Pearl River into this area. Such conditions are unfavourable to coral settlement growth and survival, and these naturally occurring conditions account for the low coral abundance in Hong Kong western waters such as at South Soko.

9.3.12 *Epifaunal and Infaunal Assemblages (Benthos)*

Survey Methodology

Sampling Locations

Benthic samples were collected at four sites representative of subtidal soft bottom habitats in the vicinity of the proposed LNG terminal at South Soko Island. Following changes in site layout plans to locate the LNG jetty on the southern side of South Soko, an additional four sites were sampled to investigate the subtidal soft bottom habitats off the southern side of South

(1) AFCD. 2002. Agriculture, Fisheries and Conservation Department. Annual Report 2001-2002.

(2) ERM. 1998. Seabed Ecology Studies: Composite Report for CED.

(3) ERM HK Ltd. 2002. Ecological Monitoring for Uncontaminated Mud Disposal. East Ninepins, South Tsing Yi, North Lantau and South Cheung Chau. Final Reports for Civil Engineering Department.

Soko. A further eight sites were sampled along or within close proximity to the submarine pipeline corridor in order to collect information on the infaunal assemblages in these waters. Sampling sites were as follows:

- South Soko Island (SK1 to SK 4)
- Southern South Soko (SSK 1 to SSK4)
- Adamasta Channel (AC)
- Peaked Hill Island (PH)
- Tai O (TO)
- Lung Kwu Chau and Sha Chau Marine Park (MP1 and MP2)
- Urmston Road (UR)
- Black Point (BP1 and BP2)

The locations of each survey site are shown in *Figure 9.13*.

Field Sampling Methodology

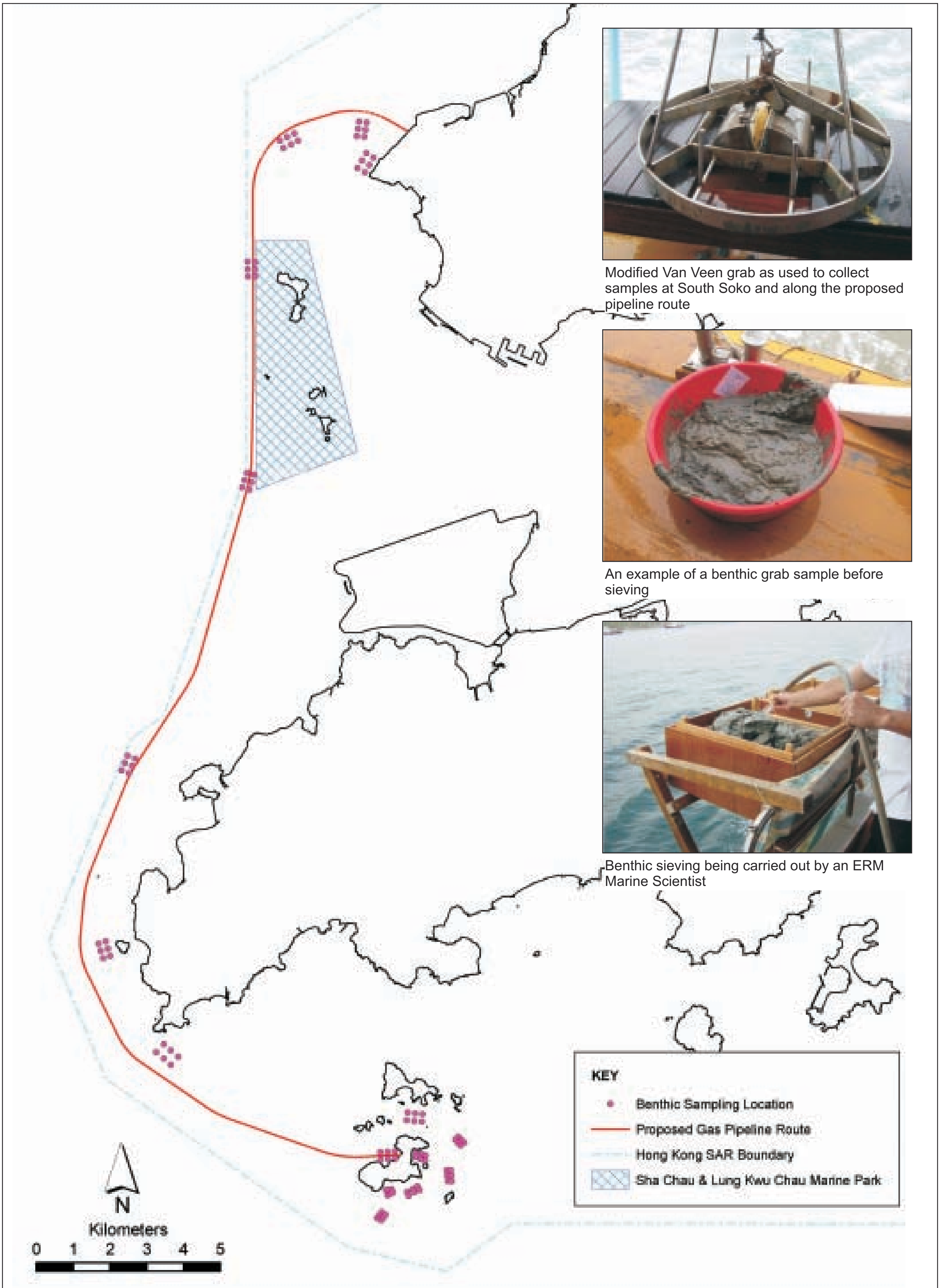
At each survey site, six stations approximately 50 m apart were established and one grab sample was collected from each station. Stations were sampled using a modified Van Veen grab sampler (960 cm^2 sampling area; 11,000 cm^3 capacity) with a supporting frame attached to a swivelling hydraulic winch cable.

Sediment from the grab samples were sieved on board the survey vessel. The sediments were washed onto a sieve stack (comprising 1 mm and 500 µm meshes) and gently rinsed with seawater to remove all fine material. Material remaining on the two screens following rinsing was combined and carefully rinsed using a minimal volume of seawater into pre-labelled thick triple-bagged ziplock plastic bags. A 20% solution of buffered formalin containing Rose Bengal in seawater was then added to the bag to ensure tissue preservation. Samples were sealed in plastic containers for shipment to the taxonomy laboratory for sorting and identification.

Laboratory Techniques

The benthic laboratory performed sample re-screening after the samples had been held in formalin for a minimum of 24 hours to ensure adequate fixation of the organisms. Individual samples from the 500 mm and 1 mm^2 mesh sieves were gently rinsed with fresh water into a 250 mm sieve to remove the formalin from the sediments. Sieves were partially filled while rinsing a specific sample to maximize washing efficiency and prevent loss of material. All material retained on the sieve was placed in a labelled plastic jar, covered with 70% ethanol, and lightly agitated to ensure complete mixing of the alcohol with the sediments. Original labels were retained with the re-screened sample material.

Standard and accepted techniques were used for sorting organisms from the sediments. Small fractions of a sample were placed in a petri dish under a



Modified Van Veen grab as used to collect samples at South Soko and along the proposed pipeline route

An example of a benthic grab sample before sieving

Benthic sieving being carried out by an ERM Marine Scientist

Figure 9.13

Subtidal Soft Bottom Sampling Stations

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10-power magnification dissecting microscope and scanned systematically with all animals and fragments removed using forceps. Each petri dish was sorted at least twice to ensure removal of all animals. Organisms representing major taxonomic groups including Polychaeta, Arthropoda, Mollusca, and miscellaneous taxa were sorted into separate, labelled vials containing 70% ethanol.

Taxonomic identifications were performed using stereo dissecting and high-power compound microscopes. These were generally to the family level except for dominant taxa, which were identified to species. The careful sampling procedure employed minimizes fragmentation of organisms. If breakage of soft-bodied organisms occurs, only anterior portions of fragments were counted, although all fragments were retained and weighed for biomass determinations (wet weight).

Results of Benthic Surveys

Survey Dates and Conditions

Grab samples were collected from sites off the north, east and west coasts of South Soko (SK1 to SK4) as well as along the proposed pipeline alignment (AC PH, TO, MP1, MP2, UR, BP1 and BP2) in both the dry (25-26th February 2004 and 8th November 2004) and wet (5-6th July 2004 and 9th September 2004). Additional surveys to collect grab samples from sites off the southern side of South Soko (SSK1 to SSK4) were conducted in the wet season (23rd September 2005) and dry season (13th December 2005).

Dry Season Survey Results

A total of 4,309 individual organisms were collected from the 96 grab sampling stations in the vicinity of the South Soko Island and along the preliminary submarine pipeline corridor during the dry season surveys in 2004 and 2005. The specimens belong to 6 Phyla with a total of 69 families and 105 genera identified. A complete set of raw data is presented in *Table 14* of *Annex 9-A*.

A breakdown of dry season 2004 benthic data by site revealed relatively large differences in terms of number of individuals, biomass and taxonomic richness (here represented by number of families of infaunal organisms). The South Soko Island site SK3 recorded the highest number of individuals with mean of 161 individuals station^{-1} (± 279.9 SD) recorded, equating to 1613.7 m^{-2} (± 2946.2 SD) (*Table 9.14).* In comparison, Tai O (TO) and the Sha Chau and Lung Kwu Chau Marine Park (MP1 and MP2) recorded the lowest mean numbers of individuals (13.0 (± 4.0 SD), 15.0 (± 6.2 SD) and 14.3 (± 12.8 SD) station^{-1}), respectively. The Adamasta Channel (AC) also recorded comparatively high numbers, with 104.0 station^{-1} (± 61.0 SD) recorded. As can be seen from the standard deviation at each site, the numbers varied greatly between stations, particularly at those sites with high numbers of individuals (SK1 and BP2).

Table 9.14 Grab Sample Composition (Infaunal Assemblages) of Each Sample Site for the Soft Bottom Habitat Surveys at South Soko Island and along the Preliminary Submarine Pipeline Corridor during the Dry Season 2004 and 2005

Site	Number of Stations Sampled	Total Number of Infaunal Individuals	Mean Number of Individuals Station^{-1} (±SD)	Mean Number of Individuals m^{-2} (±SD)	Total Biomass (g wet weight)	Mean Taxonomic Richness (No. Families) Station^{-1} (±SD)	Mean Taxonomic Richness (No. Genera) Station^{-1} (±SD)	Mean Biomass Individual^{-1} (g wet weight)
SK1	6	465	77.5 (± 50.7)	806.0 (± 527.0)	27.0	14.8 (± 4.9)	16.2 (± 5.2)	0.06
SK2	6	120	20.0 (± 4.9)	208.0 (± 50.5)	11.4	9.8 (± 2.9)	10.7 (± 2.7)	0.09
SK3	6	931	161 (± 279.9)	1613.7 (± 2946.2)	82.8	10.5 (± 4.3)	11.3 (± 4.4)	0.09
SK4	6	306	51 (± 40.2)	530.4 (± 418.2)	26.7	14.8 (± 4.40)	16.5 (± 5.28)	0.09
SSK1	6	198	33.0 (± 8.8)	343.8 (± 92.0)	14.9	13.8 (± 1.5)	13.8 (± 1.5)	0.08
SSK2	6	94	15.7 (± 4.4)	163.2 (± 46.0)	5.5	9.7 (± 2.7)	9.7 (± 2.7)	0.05
SSK3	6	213	35.5 (± 27.0)	369.8 (± 281.0)	89.3	12.7 (± 4.5)	12.7 (± 4.5)	0.04
SSK4	6	175	29.1 (± 14.2)	303.8 (± 147.8)	89.4	14.0 (± 2.7)	14.0 (± 2.7)	0.05
AC	6	624	104.0 (± 61.0)	1081.6 (± 644.8)	130.7	12.2 (± 4.7)	13.2 (± 5.6)	0.21
PH	6	255	42.5 (± 16.4)	442.0 (± 170.5)	6.1	6.2 (±1.9)	6.7 (± 1.6)	0.02
TO	6	78	13.0 (± 4.0)	135.2 (± 41.6)	7.2	8.3 (± 1.9)	8.7 (± 2.2)	0.09
MP1	6	90	15.0 (± 6.2)	156.0 (± 64.8)	9.9	7.2 (± 3.3)	7.5 (± 4.0)	0.11
MP2	6	86	14.3 (± 12.8)	149.1 (± 133.1)	12.8	6.2 (± 5.0)	6.7 (± 5.0)	0.15
UR	6	91	15.2 (± 13.7)	157.7 (± 142.8)	8.2	5.5(± 3.5)	5.8 (± 3.8)	0.09
BP1	6	203	33.8 (± 39.3)	351.9 (± 408.7)	56.9	6.7 (± 4.1)	6.8 (± 4.4)	0.28
BP2	6	380	63.3 (± 47.8)	658.7 (± 497.1)	25.2	11.0 (± 5.8)	12.0 (± 6.1)	0.07

The highest biomass in the dry season 2004 was recorded at the Adamasta Channel (AC) site, with 130.7g wet weight (*Table 9.12*). Two south South Soko sites (SSK3 and SSK4), the South Soko SK3 site and Black Point (BP1) also recorded comparatively high biomass in contrast to the other sites surveyed, with a total biomass of 89.3, 89.4, 82.8 and 56.9 g wet weight, respectively.

South Soko Island site SK1 and SK4 had the most diverse infauna present in the dry season 2004, with a mean number of 14.8 (± 4.4 SD) and 14.8 (± 4.9 SD) families, and 16.2 (±5.2 SD) and 16.5 (± 5.3 SD) genera station^{-1} respectively. Also with comparatively high diversity were south Soko sites SSK4 and SSK1, with a mean number of 14.0 (± 4.7 SD) and 13.8 (± 1.5 SD) families, and 14.0 (± 4.7 SD) and 13.8 (± 1.5 SD) genera station^{-1} respectively. Similarly to both abundance and biomass, the Adamasta Channel (AC) site also recorded a high diversity in comparison to other sites surveyed under the dry season survey.

Overall, the majority (67.8%) of the numbers of infaunal organisms recorded during the dry season surveys were from the Phyla Annelida. The remainder were Mollusca (18.1%), Arthropoda (4.5%), Echinodermata (3.8%), Sipuncula (3.0%) and Echuira (2.8%). .

The polychaete worm *Prionospio queenslandica* from the family Spionidae, was the most abundant species from the surveys, particularly at the Black Point (BP1 and BP2), South Soko (SK1) and Adamasta Channel (AC) sites. No rare or uncommon species of infauna were recorded in the dry season 2004 survey at South Soko or along the preliminary submarine pipeline corridor. Nevertheless, one noteable epifaunal species, the amphioxus *Branchiostoma belcheri*, was recorded at South SK3 in the dry season. Details are provided at the end of this results section.

The composition of the infauna at each site in terms of numerical abundance of organisms present (grouped by class) in the dry season surveys, is presented in *Figure 9.14*. The majority of organisms collected were clams from the class Bivalva, owing to the high number encountered at the South Soko (SK3) site. By comparison, numbers of bivalves at other sites were low so that overall Polychaetes were typically the dominant group at each site in terms of the numbers of individuals present.

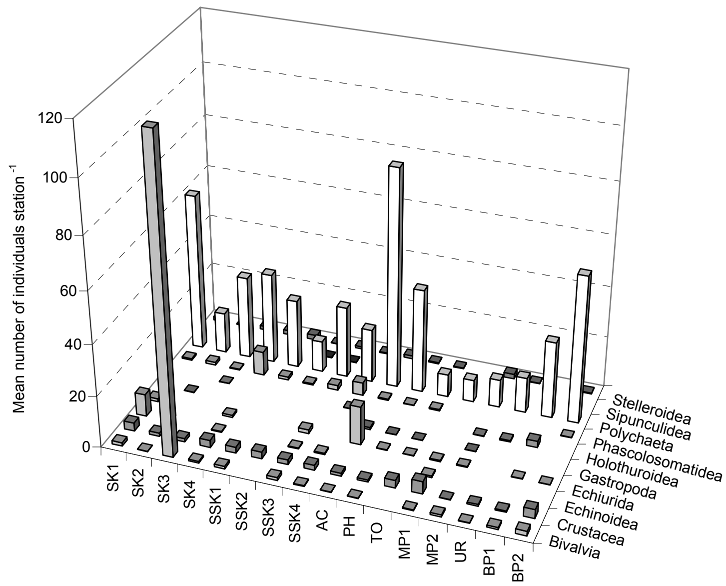

Figure 9.14 ***Mean Numbers of Individuals per Station of Infaunal Organisms (Class level) from Benthic Samples collected at South Soko Island and along the Preliminary Submarine Pipeline Corridor during the Dry Season Surveys***

The composition of infaunal assemblages at each site in terms of mean biomass of groups of organisms (by class) at each site is presented in *Figure 9.15*. The highest distribution of biomass was from Echiurida in the Adamasta Channel (AC). Other sites with generally higher levels of biomass include Echinoidea at the south South Soko SSK4 site, bivalva at the South Soko SK3 and south South Soko SSK3 sites, and Holothuroidea at Black Point (BP1).

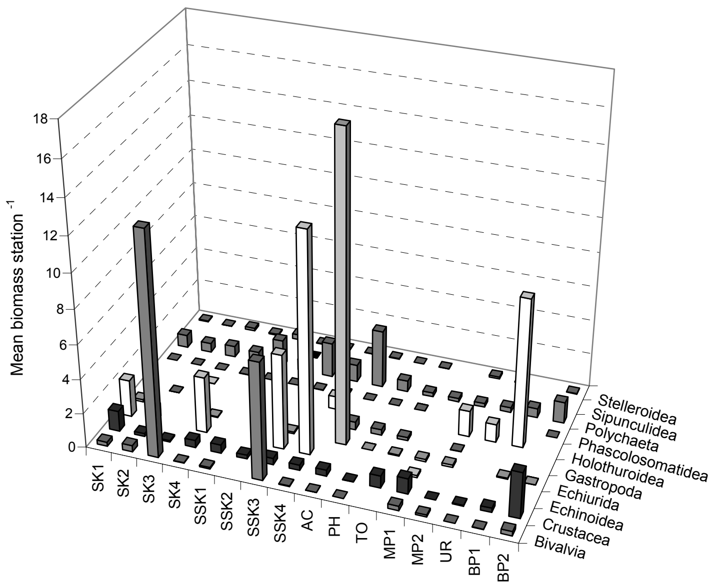

Figure 9.15 ***Mean Biomass Station^{-1} Infaunal Organisms (Class level) from Benthic Samples collected at South Soko Island and along the Preliminary Submarine Pipeline Corridor during the Dry Season Surveys***

Wet Season Survey Results

A total of 6,351 individual organisms were collected from the 96 grab sampling stations in vicinity of South Soko Island and along the preliminary submarine pipeline corridor during the wet season surveys in 2004 and 2005. The specimens belong to 7 Phyla with a total of 72 families and 111 genera identified. A complete set of raw data is presented in *Table 15* of *Annex 9-A.*

A breakdown of wet season 2004 benthic data by site revealed relatively large difference in terms of number of individuals, biomass and taxonomic richness (here represented by number of families of infaunal organisms). The Urmston Road (UR) recorded the highest number of individuals with mean of 498.8 individuals station^{-1} (± 997.3 SD) recorded, equating to 5,188 m^{-2} (± 10,372.3 SD) (*Table 9.15*). By comparison, Southern South Soko (SSK2), Tai O (TO) and the Sha Chau and Lung Kwu Chau Marine Park (MP1 and MP2) recorded the lowest mean numbers of individuals (13.5 (± 7.1), 12.7 (± 2.5 SD), 10.3 (± 4.4 SD) and 9.3 (± 7.3 SD) individuals station^{-1}, respectively). As can be seen from the standard deviation at each site, the numbers varied greatly between stations, particularly at those sites with high numbers of individuals (UR, SK3, SSK3 and BP1).

Table 9.15 Grab Sample Composition (Infaunal Assemblages) of Each Sample Site for the Soft Bottom Habitat Surveys at South Soko Island and along the Preliminary Submarine Pipeline Corridor during the Wet Season 2004 and 2005

Site	Number of Stations Sampled	Total Number of Infaunal Individuals	Mean Number of Individuals Station^{-1} (±SD)	Mean Number of Individuals m^{-2} (±SD)	Total Biomass (g wet weight)	Mean Taxonomic Richness (No. Families) Station^{-1} (±SD)	Mean Taxonomic Richness (No. Genera) Station^{-1} (±SD)	Mean Biomass Individual^{-1} (g wet weight)
SK1	6	149	24.8 (± 20.1)	258.3 (± 230.0)	50.4	11.2 (± 4.3)	11.3 (± 4.5)	0.34
SK2	6	88	14.7 (± 8.8)	152.5 (± 91.1)	122.6	7.2 (± 3.7)	7.2 (± 3.7)	1.39
SK3	6	822	137.0 (± 205.4)	1,424.8(± 2,136.3)	78.6	16.5 (± 4.2)	17.2 (± 4.0)	0.10
SK4	6	147	24.5 (± 19.3)	254.8 (± 201.2)	31.2	12.2 (± 5.04)	12.8 (± 5.71)	0.21
SSK1	6	211	35.2 (± 16.4)	366.3 (± 171.2)	35.5	11.3 (± 3.4	11.3 (± 3.4)	0.17
SSK2	6	81	13.5 (± 7.1)	140.6 (± 74.1)	36.8	8.7 (± 3.8)	8.7 (± 3.8)	0.45
SSK3	6	387	64.5 (± 56.6)	671.9 (± 589.4)	144.6	13.3 (± 3.8)	13.3 (± 3.8)	0.37
SSK4	6	240	40.0 (± 9.5)	416.7 (± 98.8)	53.6	12.0 (± 3.3)	12.0 (± 3.3)	0.22
AC	6	337	56.1 (± 21.2)	584.1 (± 220.8)	22.7	11.2 (± 3.7)	12.2 (± 4.1)	0.07
PH	6	133	22.2 (± 16.0)	230.5 (± 165.9)	2.92	5.5 (± 2.5)	5.7 (± 2.7)	0.02
TO	6	76	12.7 (± 2.5)	131.7 (± 26.0)	50.4	12.2 (± 5.0)	12.8 (± 5.7)	0.13
MP1	6	62	10.3 (± 4.4)	107.5 (± 45.9)	33.2	5.5 (± 2.1)	5.5 (± 2.1)	0.53
MP2	6	56	9.3 (± 7.3)	97.1 (± 75.8)	9.32	4.5 (± 1.9)	5.0 (± 2.3)	0.17
UR	6	2,993	499.0 (± 997.0)	5,187.9 (± 10,372.3)	174.5	7.0 (± 5.4)	7.3 (± 5.8)	0.06
BP1	6	335	55.8 (± 38.1)	580.7 (± 396.2)	161.4	10.0 (± 3.7)	10.8 (± 4.6)	0.48
BP2	6	234	39.0 (± 24.1)	405.6 (± 250.7)	376.6	8.0 (± 2.8)	8.5 (± 2.6)	1.61

The highest biomass recorded from the wet season surveys was at the Black Point (BP2) site, with 376.6 g wet weight. The Black Point Station (BP1), Southern South Soko (SSK3), South Soko Island (SK2) and Urmston Road (UR) also recorded comparatively high biomass in contrast to the other sites surveyed, with a total biomass of 161.4, 144.6, 122.6 and 174.5 g wet weight, respectively.

South Soko Island sites SK3, SK4 and SSK3 recorded the highest diversity, in terms of numbers of families, in the wet season 2004, with a mean number of 16.5 (± 4.23 SD), 12.2 (± 5.04 SD) and 13.3 (± 3.8) respectively, and, in terms of numbers of genera, the highest diversity in the wet season was also recorded at those sites with a mean number of 17.2 (± 3.97 SD), 12.8 (± 5.71 SD) and 13.3 (± 3.8) genera station^{-1} respectively.

Overall, the majority (68.7%) of infaunal organisms recorded during the wet season were from the Phyla Annelida. The remainder were Arthropoda (15.0%), Echinodermata (7.2%), Mollusca (4.9%), Sipuncula (3.9%), Echiura (0.2%) and Platyhelminthes (0.1%).

The polychaete worm *Prionospio queenslandica* from the family Spionidae, was the most abundant species from the wet season surveys. This species was recorded in highest numbers at the Black Point (BP1 and BP2) and Adamasta Channel (AC) sites. No rare or uncommon species of infauna were recorded at South Soko or along the proposed pipeline alignment. Details on a notable epifaunal species, the amphioxus *Branchiostoma belcheri*, found at SK3 in the wet season, are given at the end of this results section.

The composition of infaunal organisms (grouped by class) at each site in terms of mean number of individuals recorded during the wet season 2004 and 2005 surveys, is presented in *Figure 9.16*. At most sites, the Polychaeta marine worms were the dominant group in terms of mean number of individuals recorded. At Urmston Road (UR) and South Soko SK3 sites, much higher numbers of clams (from the class Bivalva) were found.

The composition of infauna at each site in terms of mean biomass grouped at class level is presented in *Figure 9.17.* Although animals such as the Polychaeta tended to be most numerically abundant, the larger-bodied animals from the Bivalva and Echinoidea groups made large contributions to biomass at sites such as Black Point (BP1 and BP2), Urmston Road (UR) and south South Soko (SSK3).

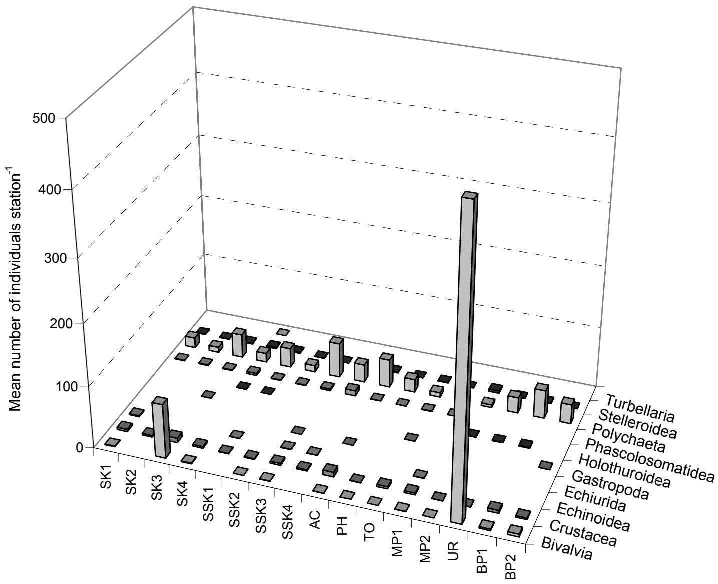

Figure 9.16 ***Mean numbers of Individuals per Station of Infaunal Organisms (Class level) from Benthic Samples collected at South Soko Island and along the Preliminary Submarine Pipeline Corridor during the Wet Season Surveys***

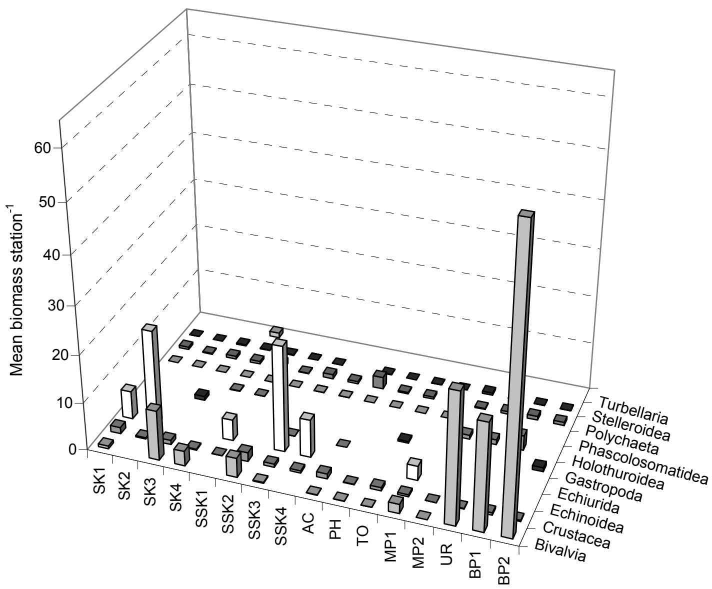

Figure 9.17 ***Mean Biomass station^{-1} Infaunal Organisms (Class level) from Benthic Samples collected at South Soko Island and along the Preliminary Submarine Pipeline Corridor during the Wet Season Surveys***

<u>Amphioxus</u>

Besides infaunal organisms, grab samples contained some epifauna that live close to or on the surface of the seabed. Among these, there was a notable record of the amphioxus species *Branchiostoma belcheri* found at the eastern facing bay, Tung Wan (Site SK3). In China, where it was an important fishery resource, it is listed as a Class II protected species due to over-exploitation. In Hong Kong, *Branchiostoma belcheri* is considered to be a species of conservation interest. During the 2004 dry season survey, a total of

36 individuals of this species were recorded with the majority found in a single grab sample from one sampling station (SK3-1: 34 individuals, SK-3-3: 1 individual, SK3-5: 1 individual). These animals were also recorded from this site in the 2004 wet season with a total of 13 individuals present in the samples (SK3-1: 10 individuals, SK-3-2: 2 individuals, SK3-6: 1 individual).

Branchiostoma belcheri is mobile animal that can freely swim through the water but typically burrows in sand during feeding. Although there are few publications on this eel-like animal's ecology, in terms of habitat preference, it has been reported that it prefers sandy seabed areas with a depth of - 8 to 15 m which have comparatively clear and saline waters (1). The species has a wide distribution and been recorded around the region including China, Taiwan, Japan, Phillipines, Thailand, Northern Australia as well as further a field in India, Madagascar and East Africa. It was recently recorded from several sampling sites across eastern Hong Kong waters from Tai Long Wan, Long Ke Wan, Sai Kung to Ninepins and the Tathong Channel (2). Except at Tai Long Wan, only one or two individuals were recorded from these locations. ERM also reported this species off Big Wave Bay, Hong Kong Island with 72 individuals recorded (3). In the past, this species was also regularly recorded in Starfish Bay, Tolo Harbour (4) . In Hong Kong, *Branchiostoma belcheri* is considered to have a restricted distribution, which means populations are mainly concentrated in specific coastal areas.

The site with the highest abundance of this species in Hong Kong is Tai Long Wan in the northeast New Territories. At Tai Long Wan, *Branchiostoma* was reported as highly abundant with densities recorded at 98 m^{-2} and 102 m^{-2}. In comparison to Tai Long Wan, it appears that site SK3 at Tung Wan, on the east side of South Soko, supports a low abundance of *Branchiostoma*. The density of *Branchiostoma* at this site was 10.4 ± 23.8 m^{-2} in the dry season and 3.8 ± 6.8 m^{-2} in the wet season.

9.3.13 *Comparison of South Soko Benthic Fauna With Other Sites in Hong Kong*

A comparison with similar sites in Hong Kong puts the ecological value of the study site in perspective with the ecology of the surrounding area and also other sites that may share the same physical attributes such as outlying islands around Hong Kong. Sources of information that were used in compiling this comparative data were the Seabed Ecology studies conducted by ERM (5), the study on marine benthic communities conducted by City U Professional Services Ltd (6) along with other EIAs and reports conducted by ERM.

(1) Rare Aquatic Organisms in China (1993)

(2) City City U Professional Services Limited. 2002. Final Report for Consultancy Study on Marine Benthic Communities in Hong Kong.

(3) ERM HK Ltd. 2001. Performance Verification of Stanley and Shek O Outfalls: Monitoring Report. For EPD

(4) Morton B. & Morton J. (1983) The Seashore Ecology of Hong Kong. Hong Kong University Press.

(5) ERM. 1998. Seabed Ecology Studies: Composite Report for CED.

(6) City U Professional Services Limited. 2002. Final Report for Consultancy Study on Marine Benthic Communities in Hong Kong.

As can be seen from *Figure 9.18* the benthic biomass of comparable areas in Hong Kong varies greatly including across seasons. Compared with previous surveys' results, the dry season biomass recorded during the present study at South Soko and Western Lantau was generally higher than other areas except Hei Ling Chau. In contrast, dry season biomass recorded near Lung Kwu Chau and Sha Chau was generally lower than other areas.

The biomass of the infaunal communities found at South Soko during the present study was higher than most of the other previously studied areas but lower than that of Hei Ling Chau, which had a mean biomass of 174 g m^{-2}. The biomass of benthic communities recorded at Western Lantau and off Lung Kwu Chau and Shau Chau during the wet season was similar to most other areas.

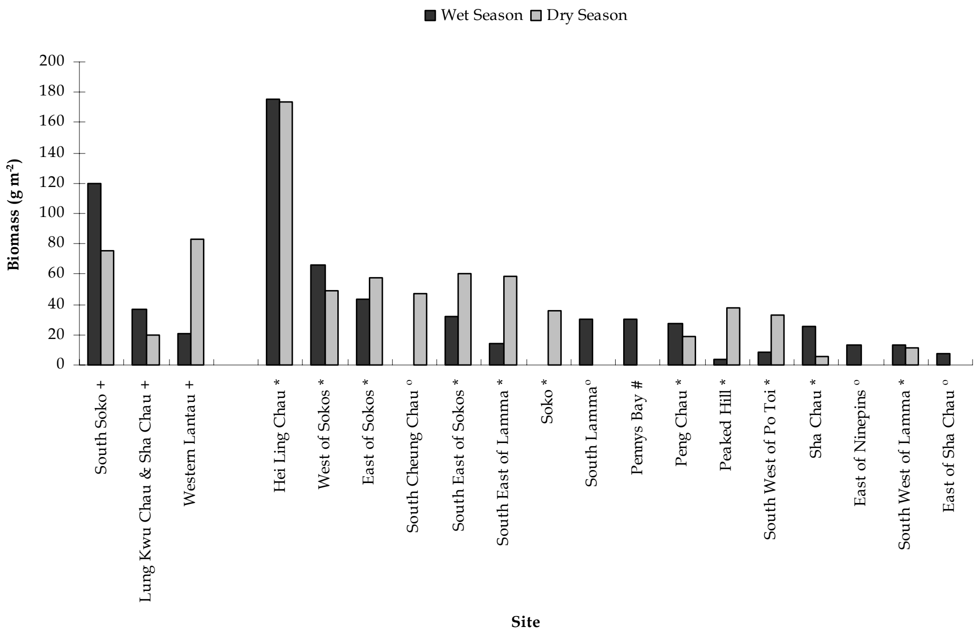

Figure 9.18 ***Comparison of Mean Biomass of Benthic communities around Hong Kong (Source: +Present Study, *City U 2002 (1), °ERM 1998 (2) and #ERM 2000b (3))***

The species diversity of the benthic community along the corridor of the proposed submarine natural gas pipeline (AC, PH, TO, MP1, MP2, UR, BP1 and BP2) was similar to most locations in Hong Kong (4). The number of species of the benthic organisms along the corridor of the proposed submarine natural gas pipeline were recorded in the range of 15 to 33 species per 0.576 m^2 during wet season and 19 to 35 species per 0.576 m^2 during dry season. In comparison, the mean number of species of the 120 stations surveyed by

(1) City U Professional Services Limited. 2002. Final Report for Consultancy Study on Marine Benthic Communities in Hong Kong.

(2) ERM. 1998. Seabed Ecology Studies: Composite Report for CED

(3) ERM. 2000. Environmental Impact Assessment, Construction of an International Theme Park in Penny's Bay of North Lantau and its Essential Associated Infrastructures. Final EIA Report Annex (Volume 1)

(4) City U Professional Services Limited. 2002. Final Report for Consultancy Study on Marine Benthic Communities in Hong Kong.

CityU [1] were 32.9 per 0.5 m^2 (wet season) and 33.7 per 0.5 m^2 (dry season) respectively.

The species diversity of the benthic community at the proposed LNG terminal (reclamation sites SK1 and SK3, and turning circle and approach channel SSK1, SSK2 and SSK4) was comparatively higher than the Hong Kong average. The number of species at the sites was in the range 30 to 53 species per 0.576 m^2 during dry season and 29 to 52 species per 0.576 m^2 during the wet season.

9.3.14 *Marine Mammals*

Methodology

Land-based Visual Survey

Land-based visual surveys were conducted in the study area to qualitatively estimate marine mammal use of habitats in the vicinity of South Soko. As stated previously, the land-based surveys were conducted to closely focus on the nearshore waters in the vicinity of the proposed LNG terminal and to provide additional information to supplement vessel-based survey findings. The observation site was a fixed concrete platform located on the north headland of South Soko approximately 60 metres above sea level. An overview of the existing environment around the observation site is presented and shown in *Figure 9.19*. The selected Observation Site was the same site used for the ongoing marine mammal research commissioned by the AFCD. It should be noted that some of the sighting areas, including the proposed jetty location, are blocked by the land mass, but the proposed reclamation sites (Tung Wan and Sai Wan) of the LNG terminal can be observed clearly from the observation site (*Figure 9.19*).

During the survey period, one of the paired observers scanned the survey area continuously with Olympus 10 x 42 hand-held marine binoculars while the other used naked eye and occasional binocular scans to identify, estimate group size, and study behaviour of the any marine mammals observed in the study area. The role of observers rotated every 30 minutes. Each survey was 6 hours in length. Survey times shifted to record marine mammal activity during all possible daylight hours during the survey period.

Monitoring surveys were conducted for five days of each month. Surveys were conducted monthly, commencing in February 2004, and lasting for a full calendar year up to the end of January 2005.

Data Collected

The locations of all marine mammals sighted within 2km of the sighting point were recorded on a data sheet (*Table 16* of *Annex 9-A*). The species and

(1) City U Professional Services Limited. 2002. *ibid.*

Northern View

Southern View

Figure 9.19

Overview of the Existing Environment from the Marine Mammal Observation Point at South Soko

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number of marine mammals, number of sightings and travelling paths were recorded, together with observed behaviours at the times of sightings. Whenever possible, the colour and spot pattern was also recorded. Due to the distances involved, the age classes recorded during land-based visual survey can only be classified as juvenile (unspotted calf or unspotted juvenile) or adult (mottled, speckled, spotted adult and unspotted adult). If fifteen minutes had passed with no sightings after an initial sighting was made, any observed marine mammals were then considered to be a new group or individual. As such, the "sighting" data recorded represents first count data, or the location where the marine mammals were first observed.

Distinguishing Features

The distinguishing features of the two marine mammals observed during the surveys are as follows:

- **Indo-Pacific Humpback Dolphin (*Sousa chinensis*)** - *Sousa chinensis* is distinguished by its wide-based, slightly falcate dorsal fin, located at mid-back. They have a long, slender rostrum, with a shallow groove between the melon and the beak. Adults are up to 2.8 m long and are white to pink in colour, and often have a variable degree of black spotting or mottling.

- **Finless Porpoise (*Neophocaena phocaenoides*) -** *Neophocaena phocaenoides* is characterized by its lack of dorsal fin and the presence of a dorsal ridge. It also has no beak. It is smaller in size than humpback dolphins with an average body length of much less than 2 metres. Adults are commonly dark grey to black in colour.

Age Classes

Age class of humpback dolphins was identified in accordance with the six age classes defined by Jefferson (Jefferson 2000) [(1)]. The classification of their age class was mainly based on their body size and length, skin colouring pattern, and density of spotting. Their skin colour pattern changes dramatically throughout their lifespan, whitening increases as age increases. The spot patterns on juveniles and subadults disappear gradually as they get older, as presented in *Table 9.16*.

(1) Jefferson T.A. 2000. Population Biology of the Indo-Pacific Humpback dolphin in Hong Kong waters. *Wildlife Monographs 144*:1-65.

Table 9.16 Age Classes of Sousa chinensis

Age Class	Body Length (m)	Colour Pattern	Spotted Pattern	Behaviour
Unspotted Calf (UC)	1 m to 1.3 m (approximately half length of adults); up to 6-8 months of age	Uniform black to dark grey	No spots	Swim dependently of adult, presumably the mother
Unspotted Juvenile (UJ)	Approximately 1.5 m to 2 m (two-third of the adult length)	Uniform light grey	No spots	Occur in the vicinity of adults.
Mottled (MO)	Approximately similar length as SAs and UAs; 8.5 to 9 years old	Light pinkish grey	Heaving spotting	Same as SAs and UAs
Speckled (SP)	With same size as SAs and UAs	Pale pink to white	Less spotting pattern than MO	Full independence of movement and association; hard to distinguish from SA.
Spotted Adult (SA)	Same as UA	Purely pink to white	Less spotting pattern than MO or SP	Same as SP
Unspotted Adult (UA)	Up to 2.6 m	Purely pink to white	Essentially no spotting pattern but may have a few tiny spots	Same as SAs and SPs

Only three classes, adult (include MO, SP, SA and UA), juvenile (UJ) and calf (UC), can be identified during the land-based visual survey due to the distant observation.

Age-determination study for finless porpoise has been undertaken by tooth aging method, however, it cannot be applied in the field (1). Growth of finless porpoise can be classified into a number of age/sex classes (2). Neonates can be distinguished by relatively large flippers, a shallow forehead, lighter colour than adults, a very light patch around the lips and a gape-to-flipper stripe (3). Very young newborns may still show prominent fetal folds. Meanwhile, light grey skill colour with steeper forehead and prominent light lip patch are still observed in juvenile stage (4). Adults are dark grey in colour.

Behaviour

Marine mammals exhibit certain behaviours and for humpback dolphins this has been previously characterised (5) (1). These are presented in (*Table 9.17).*

(1) Jefferson T.A. 2000. Conservation Biology of the Finless Porpoise (Neophocaena phocaenoides) in Hong Kong waters: Final Report. Ocean Park Conservation Foundation Ocean Park Aberdeen, Hong Kong.

(2) Jefferson T.A., S.K. Hung, L. Law, M. Torey and N. Tregenza. 2002. Distribution and Abundance of Finless Porpoise in Hong Kong and Adjacent Waters of China. *The Raffles Bulletin of Zoology 2002 Supplement No. 10*: 43-55.

(3) Jefferson T.A., S.K. Hung, L. Law, M. Torey and N. Tregenza. 2002. *ibid*.

(4) Jefferson T.A., S.K. Hung, L. Law, M. Torey and N. Tregenza. 2002. *ibid*.

(5) Parsons E.C.M. 1998. The Behaviour of Hong Kong's Resident Cetaceans: the Indo-Pacific Hump-Backed Dolphin and the Finless Porpoise. *Aquatic Mammals* 1998, 24.3, 91-110.

Table 9.17 A Summary and Description of Specific Types of Behaviour and Activities exhibited by Indo-Pacific Humpback Dolphin Sousa chinensis

Type of Social Behaviours and Activities	Descriptions
Activities	
Free Travelling	Directional motion, Swimming fast, taking regular breaths on water surface.
Feeding/Foraging	Long jumping and high-speed chasing while hunting fish; On sea surface, swimming slowly rising intermittently before commencing the next dive. They may display certain behaviours such as feeding rushes, fish whacking, carousels, and fluking dives.
Boat chasing/ Feeding behind trawlers	Following behind trawlers as a sign of feeding, they catch fish through the net or escaping from it.
Milling/Resting	Remaining in one area without any sign of feeding or social interaction; move slowly with a drifting or gliding motion, rising slowly, or breathing while circling over the same area.
Socializing	Extensive bodily contact, inverted swimming, somersaulting, leaping and chasing with aerial activity; group activities centred on animate or inanimate objects; two to three individuals form a group.
Spot Behaviour	
Breaching	A behavioural pattern also known as body slamming or a 'log' jump. The animal rises out of the water at an angle between 90° to 45° to the sea surface. When exiting the water the dolphin's flippers, its abdomen or peduncle may clear the surface.
Spyhopping	Raising the head vertically out of the water, then sinking below the water without a splash. Used to check an area for hazards.
Tail slapping	The act of slapping the tail against the sea surface.
Porpoising	Fast, shallow, arching leaps with the dolphin coming either partially or entirely out of the water. It was only observed when the dolphins were boat chasing and allows the animals to combine shallow dives for fish with a fast rate of travel. The adults will show noticeable colour changes, turning from white to a deep pink. This is probably due to vascular dilation in the blubber layer and is, possibly, a flush response to prevent overheating.
Nursing	An act of nursing a calf by a mother.

Studies on behaviour of finless porpoise are limited. Sightings are commonly less prominent as the porpoise only bring their heads and their dorsal surface above the water to breathe and the lack of dorsal fins makes them harder to spot. Observed porpoise behaviour is commonly simply feeding behaviour, such as "feeding circles" (2). Other feeding behaviours such as feeding rushes with a sudden acceleration directly towards prey and fish chasing are also

(1) Jefferson, pers comm.

(2) Beasley I. and Jefferson T.A. 2000. Surface and Dive Times of Finless Porpoise in Hong Kong's Coastal Waters. The Raffles Bulletin of Zoology 2002 Supplement No. 10: 125-129.

common. Other observed behaviour is similar to that observed in humpback dolphins, such as travelling and milling (refer to *Table 9.17).*

Site and Weather Conditions

Site conditions including sea state, weather and visibility were also recorded along with any changes in environmental conditions if they occurred during the duration of a survey. Surveys were only conducted under acceptable sighting and weather conditions. Acceptable sighting conditions were defined as days with sea state conditions of Beaufort 0 – 5, and visibility of at least 2km from the observation point. No surveys were conducted during unacceptable weather conditions, such as during low visibility or during typhoons, thunderstorms or heavy rainstorm warnings reported by the Hong Kong Observatory.

Vessel Based Visual Survey

General Approach and Survey Subareas

Surveys were conducted in four subareas. General characteristics of the four survey subareas are listed in *Table 9.18*. Southwest Lantau (66 km^2) represents a new stratification of the South Lantau survey area, and this is the western portion that includes the Fan Lau and the South Soko Island area. West Lantau (28 km^2) is the narrow strip along the western part of Lantau Island, and it would represent part of the pipeline route. Northwest Lantau (38 km^2) is a narrow strip along the western border of Hong Kong, and it includes waters of the Sha Chau and Lung Kwu Chau Marine Park. The survey area for this project represents only the western portion of the Northwest Lantau area of the long-term study (1) (2) and is part of the pipeline route.

Table 9.18 *Summary of Characteristics of the Four Survey Subareas in Hong Kong*

Survey Area	Area (km^2)	Effort (km) (1)	Description
Deep Bay (DB)	30 (2)	1,679	Very shallow enclosed bay with extensive mudflats and mangroves; influenced by the Pearl River (high turbidity)
Northwest Lantau (NWL)	38	530	Strong influence from Pearl River; location of Sha Chau/Lung Kwu Chau Marine Park; Urmston Road shipping channel goes through north end
West Lantau (WL)	28	3,094	Strong influence from Pearl River; narrow strip along western border of Hong Kong; light development; dolphin watching vessels at Tai O
Southwest Lantau (SWL)	66	5,498	Seasonally influenced by the Pearl River; very little development, but includes major ferry lanes to Macau

Note: (1) Total survey effort conducted during this study is presented here, but the survey effort (L) presented in *Table 9.19* is only that used in calculation of the abundance estimates (i.e., Beaufort 0-3 data).

(2) The total area of Deep Bay is about 97 km^2, but the portion that is within the Hong Kong SAR boundary is 60 km^2. However, only half of this area could be surveyed, due to the northern portion of the bay being too shallow for the vessel to operate. Thus, abundance was only estimated for the surveyed area of 30 km^2.

The Deep Bay subarea contains the Black Point site at its southern boundary. Deep Bay itself is actually about 97 km^2, but it is bisected by the Hong Kong SAR/Guangdong boundary. The portion that occurs within the Hong Kong SAR is only 60 km^2. However, the northern portion of Deep Bay is very shallow, with mud flats often exposed at low tides. Due to this fact, as well

(1) Jefferson T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. *Wildlife Monographs 144*: 66.

(2) Jefferson, T. A. (ed.). 2005. Monitoring of Indo-Pacific humpback dolphins (*Sousa chinensis*) in Hong Kong waters – data analysis: final report. Unpublished report submitted to the Hong Kong Agriculture, Fisheries and Conservation Department.

as the confounding presence of the Crosslinks Bridge (Deep Bay Link) and several oyster rafts, survey vessel were unable to safely navigate into the northern portion of Deep Bay. As a consequence, the vessel-based surveys were conducted only in the southern portion of Deep Bay (30 km^2).

The seasons were defined as follows: Winter (December-February), Spring (March-May), Summer (June-August), and Autumn (September-November). This is the same as in the long-term study.

The survey transect lines were presented in *Figure 9.20*.

Survey Methods

Vessel surveys were conducted from two survey vessels, the King Dragon and the Tsun Wing (both ca. 12-15 m length, with similar configuration), weather permitting (Beaufort 0-6, no heavy rain, and visibility > 1,200 m). However, only data collected in calm conditions of Beaufort 0-3 are useable in calculating line transect estimates of density and abundance [(1) (2)]. The vessel had an open upper deck, affording relatively unrestricted visibility. The observer team conducted searches and observations from the flying bridge area, 4-5 m eye height above the water's surface. Two observers made up the on-effort survey team. As the vessel transited the survey lines at a relatively constant speed of approximately 15 km/hr, the primary observer searched for dolphins and porpoises continuously through 7 X 50 Brunton marine binoculars. The data recorder searched with unaided eye and filled-out the data sheets. Both observers searched ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). On most surveys, there were three observers, and one auditor.

Observers rotated positions after approximately 30 minutes of effort, to give them a rest after each hour of search effort, thereby minimizing fatigue. Observers had undergone a 3-day training program before the start of data collection, which included detailed classroom instruction and a day of at-sea training. Only two species of small cetaceans regularly occur in Hong Kong, the humpback dolphin and finless porpoise [(3) (4)]. These two species are radically different in appearance and behaviour, and so all sightings (even those seen briefly or from a distance) could be identified to species.

Effort data collected during on-effort survey periods included time and position for the start and end of search effort, vessel speed, sea state (Beaufort scale), visibility, and distance travelled in each series (a continuous period of search effort). When dolphins or porpoises were sighted, the data recorder

(1) Jefferson T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. *Wildlife Monographs* 144: 66.

(2) Jefferson T. A. , S. K. Hung, L. Law, M. Torey and N. Tregenza. 2002. Distribution and Abundance of Finless Porpoise in Hong Kong and Adjacent Waters of China. *The Raffles Bulletin of Zoology 2002 Supplement No. 10*: 43-55.

(3) Parsons E. C. M., M. L. Felley and L. J. Porter. 1995. An annotated checklist of cetaceans recorded from Hong Kong's territorial waters. *Asian Marine Biology* 12:79-100.

(4) Jefferson T. A. , S. K. Hung, L. Law, M. Torey and N. Tregenza. 2002. *ibid.*

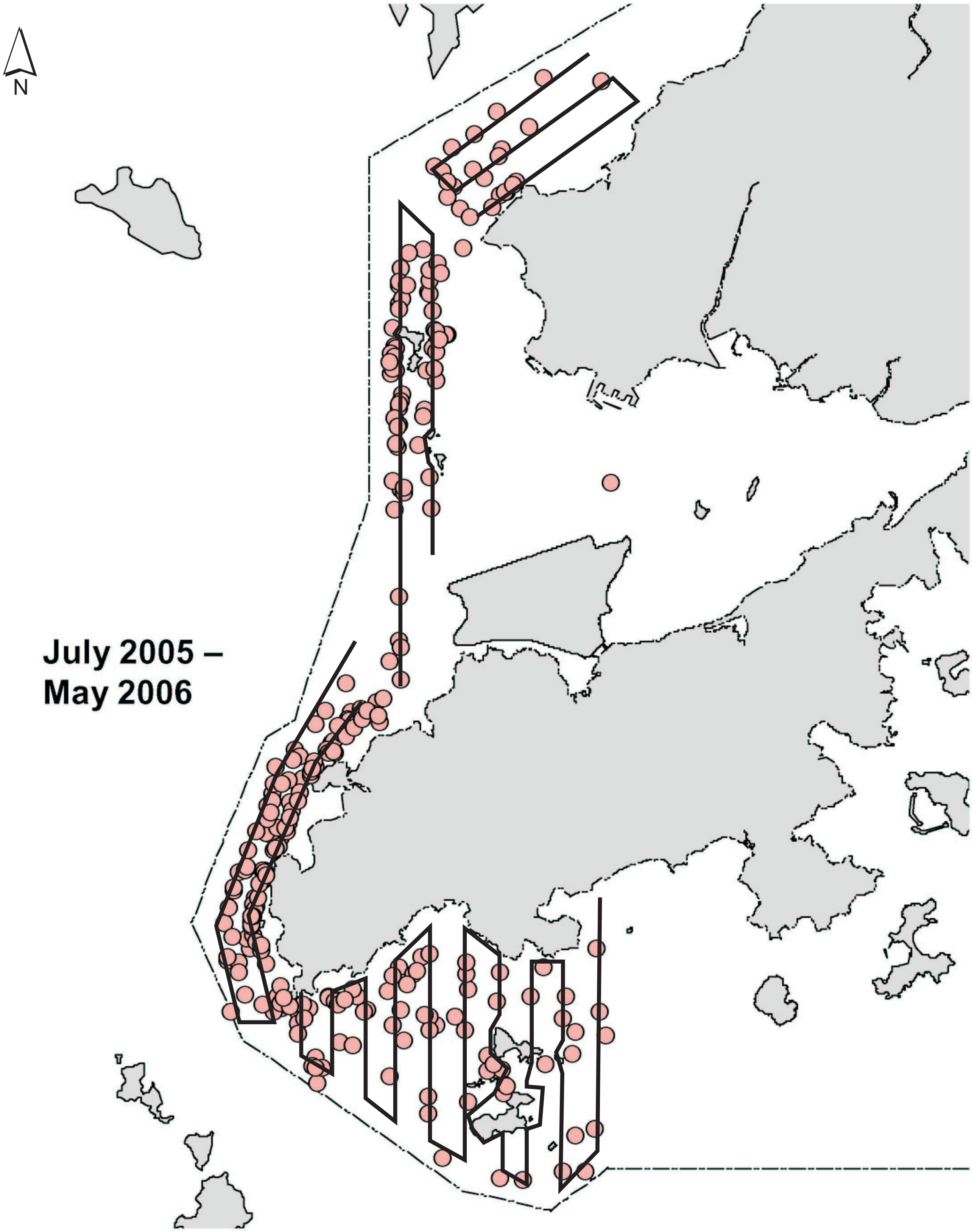

Figure 9.20

The Transect lines of Indo-Pacific Humpback Dolphin Survey and The distribution of Indo-Pacific Humpback Dolphin recorded during the 11 months (July 2005 - May 2006) Survey

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filled out a sighting sheet, and generally the team was taken off-effort and the vessel diverted from its course to approach the dolphin group for group size estimation, assessment of group composition, behavioural observations, and collection of identification photos. The sighting sheet included information on initial sighting angle and distance, position of initial sighting, sea state, group size and composition, and behaviour, such as response to the survey vessel and associations with fishing vessels (*Tables 18 and 19 of Annex 9-A*). Position, distance travelled, and vessel speed were obtained from a hand-held Global Positioning System (a Garmin Gecko GPS unit).

Observers were trained and calibrated in distance estimation, by asking them to make distance estimates to various objects (e.g., other boats, specific points on shore, floating debris, etc.). Simultaneously, a distance reading was taken with a laser rangefinder (Leica 800 or Bushnell Yardage Pro 800 model). Plots of measured vs. estimated distance were shown to observers occasionally, so they could see if they needed to refine their distance estimates. This procedure resulted in increased accuracy of observer distance estimates, and previous efforts have shown that significant bias is not caused by the remaining inaccuracy in distance estimation [(1)(2)(3)].

When dolphins were sighted, the observers typically went off-effort and the vessel approached the dolphin group for accurate estimation of group size/composition and for photo-identification. Photographs were taken with Canon 35-mm SLR autofocus cameras (EOS 20D digital model). Cameras were equipped with digital data recorders and date and time were associated with each frame, allowing it to be correlated with a particular sighting. The primary lens used was a Canon L series 300 mm / f4.0 image stabilizer telephoto. Usually, the lens was used with a 1.4X teleconverter, thereby increasing its effective focal length. Images were shot at the highest available resolution (8.2 megapixels) and stored on Compact Flash cards (mostly 1.0 GB).

For photo-identification, generally, dolphin groups were approached slowly from the side and behind [(4)]. Manoeuvring the boat to within 15-40 m, directly alongside a moving group of dolphins resulted in the best shots. Every attempt was made to photograph each dolphin in the group, even those that appeared to have no unique markings. If possible, both sides of the dolphins were photographed, since the coloration markings are not completely symmetrical.

(1) Jefferson T. A. and S. Leatherwood. 1997. Distribution and abundance of Indo-Pacific hump-backed dolphins (*Sousa chinensis* Osbeck, 1765) in Hong Kong waters. *Asian Marine Biology* 4:93-110.

(2) Jefferson T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. *Wildlife Monographs 144*: 66

(3) Jefferson T. A. , S. K. Hung, L. Law, M. Torey and N. Tregenza. 2002. *ibid.*.

(4) Würsig B. and T. A. Jefferson 1990. Methods of photo-identification for small cetaceans. *Reports of the International Whaling Commission (Special Issue)* 12:43-52.

Data Analysis Methods

Line Transect Analysis

One day's survey effort was used as the sample for analyses. For estimation of density and abundance, only surveys with at least 2.0 km of useable effort were included. Estimates were calculated from sighting and effort data collected during conditions of Beaufort 0-3 (1)(2)(3), using line transect methods (4). The estimates were made using the computer program DISTANCE Version 2.2 (5). The following formulae were used to estimate density, abundance, and their associated coefficient of variation:

$$\hat{D} = \frac{n\,\hat{f}(0)\,\hat{E}(s)}{2\,L\,\hat{g}(0)}$$

$$\hat{N} = \frac{n\,\hat{f}(0)\,\hat{E}(s)\,A}{2\,L\,\hat{g}(0)}$$

$$C\hat{V} = \sqrt{\frac{\hat{var}(n)}{n^2} + \frac{\hat{var}[\hat{f}(0)]}{[\hat{f}(0)]^2} + \frac{\hat{var}[\hat{E}(s)]}{[\hat{E}(s)]^2} + \frac{\hat{var}[\hat{g}(0)]}{[\hat{g}(0)]^2}}$$

where D = density (of individuals),

n = number of on-effort sightings,

f(0) = trackline probability density at zero distance,

E(s) = unbiased estimate of average group size,

L = length of transect lines surveyed on effort,

g(0) = trackline detection probability,

N = abundance,

A = size of the survey area,

CV = coefficient of variation, and

var = variance.

(1) Jefferson T. A. and S. Leatherwood. 1997. Distribution and abundance of Indo-Pacific hump-backed dolphins (*Sousa chinensis* Osbeck, 1765) in Hong Kong waters. *Asian Marine Biology* 4:93-110.

(2) Jefferson T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. *Wildlife Monographs 144*: 66

(3) Jefferson T. A. , S. K. Hung, L. Law, M. Torey and N. Tregenza. 2002. Distribution and Abundance of Finless Porpoise in Hong Kong and Adjacent Waters of China. *The Raffles Bulletin of Zoology* 2002 Supplement No. 10: 43-55.

(4) Buckland S. T., D. R. Anderson, K. P. Burnham and J. L. Laake. 2001. Distance Sampling: Estimating Abundance of Biological Populations. Chapman and Hall, Landon, UK.

(5) Laake J. L., S. T. Buckland, D. R. Anderson and K. P. Burnham. 1994. DISTANCE User's Guide, Version 2.1. Colorado Cooperative Fish and Wildlife Research Unit, Fort Collins, CO, USA.

For the Northwest Lantau area, because the current study did not survey the entire survey area used in the long-term study, individual encounter rates for each season were calculated as a basis for comparison. This is largely equivalent to calculating densities, but it does not explicitly take into account variations in sightability of the dolphins. However, despite this, it provides a useful basis for comparison with future surveys. The encounter rates were calculated by dividing the number of individual dolphins observed on a particular day by the amount of effort conducted on that day. Seasonal averages and their standard deviations were then computed. Only data collected during Beaufort 0-3 conditions were used for this.

Pooling and Stratification Strategies

A strategy of selective pooling and stratification was used, in order to minimize bias and maximize precision in making the estimates of density and abundance [(1)]. Data from the long-term database (most research funded by AFCD) were pooled with data from the present study to increase sample sizes and improve the robustness of the analyses. This strategy can be applied directly to the Deep Bay, Southwest Lantau and West Lantau areas. It involved post stratification of the long-term data from South Lantau into Southeast and Southwest Lantau areas to allow the pooling of long-term data from Southwest Lantau with data from the LNG study. The Northwest Lantau area of the current study was defined specifically for this project, and this subarea was not used in the long-term study. Different strategies were used for various line transect components, and these are described below:

Sighting Rate [n/L] - Sighting rate varies strongly with season and area [(2)(3)], and thus a fully-stratified analysis (full stratification by both season and survey area) was used. Clearly, sighting rate is one of the major parameters affecting density and abundance estimates, and although sample sizes were small for some strata (n < 5), pooling was not justified.

Trackline Probability Density [f(0)] - Because biases associated with small sample sizes can strongly affect the accuracy of density and abundance estimates, Buckland *et al*.'s (2001) [(4)] guidelines regarding minimal sample sizes for estimation of the trackline probability density were followed. They suggested a minimum sample size of 60 sightings for modeling of this parameter. Several mathematical models were fitted to the data (hazard-rate, half-normal, and uniform), and the model with the lowest value of the Akaike's Information Criterion was automatically chosen by DISTANCE for

(1) Buckland S. T., D. R. Anderson, K. P. Burnham and J. L. Laake. 2001. Distance Sampling: Estimating Abundance of Biological Populations. Chapman and Hall, Landon, UK.

(2) Jefferson T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. *Wildlife Monographs 144*: 66

(3) Jefferson T. A. , S. K. Hung, L. Law, M. Torey and N. Tregenza. 2002. Distribution and Abundance of Finless Porpoise in Hong Kong and Adjacent Waters of China. *The Raffles Bulletin of Zoology* 2002 *Supplement No. 10*: 43-55.

(4) Buckland S. T., D. R. Anderson, K. P. Burnham and J. L. Laake. 2001. Distance Sampling: Estimating Abundance of Biological Populations. Chapman and Hall, Landon, UK.

estimation of f(0). Because most seasons within a phase did not have adequate numbers of sightings, all the data (from all four seasons and the three main survey subareas) were pooled to calculate a single humpback dolphin trackline probability density, and then used this in all the estimates of density and abundance. This strategy ensured sample sizes of > 100 for humpback dolphins.

For finless porpoises, although only 29 sightings were made in the LNG study, the post-stratification of the South Lantau long-term data into Southeast and Southwest Lantau (see above) allowed the LNG and long-term data to be pooled together, thereby achieving a sample size of more than 60 for this species.

Average Group Size [E(s)] - Because of indications that group size varies by geographic region and season [(1)(2)], a fully-stratified analysis was used. DISTANCE computed both the arithmetic mean and a size-bias corrected mean; the lesser of these two values was used in the calculations (in order to avoid size-bias generally caused by missing smaller groups at large perpendicular distances).

Trackline Detection Probability [g(0)] - For Hong Kong humpback dolphins, Jefferson (2000) [(3)] reported group dive time data and collected 71.8 hours of independent observer data, and from this estimated that the detection probability is unity for that study. The present study was an extension of Jefferson's (2000) [(4)], with all survey techniques held constant. Therefore the previously estimated value of g(0) = 1.0 was used for all density and abundance calculations.

For finless porpoises, the estimate of g(0) presented by Jefferson *et al*. (2002) [(5)], which was calculated from data collected with a Porpoise Detector (POD), was used. This device collects data on the occurrence of acoustic clicks made by porpoises. The value of the estimate was 0.72.

Coefficient of Variation [CV] – The variance component for the appropriate estimate of each component of the line transect equation was used in calculating the overall CV of the estimated density and abundance (see formula above). This resulted in more precise estimates for some areas and seasons than would have been the case with a fully-stratified analysis. However, this came at the expense of some slight potential for increase in bias.

(1) Jefferson T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. *Wildlife Monographs 144*: 66

(2) Jefferson T. A. , S. K. Hung, L. Law, M. Torey and N. Tregenza. 2002. Distribution and Abundance of Finless Porpoise in Hong Kong and Adjacent Waters of China. *The Raffles Bulletin of Zoology 2002 Supplement No. 10*: 43-55.

(3) Jefferson T. A. 2000. *ibid*.

(4) Jefferson T. A. 2000. *ibid*.

(5) Jefferson T. A. , S. K. Hung, L. Law, M. Torey and N. Tregenza. 2002. *ibid*.

Photo-identification and Age Class Composition

Photographs of dolphins taken during surveys were first examined and sorted into those that contained a potentially identifiable individual. Then, those photos were again examined in detail and any identifiable individuals were compared to the photo-ID catalog accumulated over the last 10+ years of dolphin research in Hong Kong and the Pearl River Estuary. Any new individuals were given a new identification number and their data were added to the catalog. Most of the analyses used data from the long-term database. Photo-identification is not possible with finless porpoises.

Observers attempted to classify the dolphins observed into the six age classes identified in the long-term study on humpback dolphins in Hong Kong (see *Table 9.16*). However, many animals were not seen at close enough range to place them into an age class, and therefore only data on groups from which the age class composition of the entire group was determined was analyzed.

Grid Analysis of Habitat Use

For the quantitative grid analysis of habitat use of humpback dolphins and finless porpoises, positions of on-effort sightings were plotted onto 1 km^2 grids within the four survey subareas. Sighting densities (number of on-effort sightings per km^2) were calculated for each grid. Sighting density grids were then further normalized with the amount of survey effort conducted within each grid. The survey effort spent in each grid for each survey day was examined in detail (i.e., when the survey boat traversed through a specific grid once, one unit of survey effort was counted for that grid), and then the amount of survey effort per grid was calculated for all sighting density grids. After normalizing the original sighting density grids by survey effort, sighting density data were generated. The new density unit is termed "SPSE", representing the number of on-effort sightings per unit of survey effort. This sighting density information, was further elaborated to look at actual dolphin / porpoise densities (exact number of dolphins or porpoises from on-effort sightings per km^2). The new unit was termed "DPSE", which is the number of individual dolphins / porpoises per unit of survey effort. Plotting the DPSE values of surveyed grid squares on maps allows areas where the most dense sightings of dolphins and porpoises occur to be identified.

Ranging Pattern Analysis

Location data were obtained from the long-term sighting database and photoidentification catalog, and only those individuals sighted ten times or more were included for analysis of individual home ranges (1). A desktop GIS (ArcView© 3.1) with the Animal Movement Extension was used to examine individual ranging patterns. Using the Animal Movement

(1) Hung S. K. and T. A. Jefferson. 2004. Ranging patterns of Indo-Pacific humpback dolphins (Sousa chinensis) in the Pearl River Estuary, People's Republic of China. *Aquatic Mammals (Special Issue) 30*: 159-174

Extension for ArcView©, a polygon joining the outermost sighting positions was formed, indicating the area used by an individual dolphin during the long-term study period. Range dimensions of the dolphin were then calculated by GIS with land masses excluded.

Behavioural Data Analysis

When dolphins were sighted during vessel surveys, their behaviours were recorded through direct observations and by digital video system. Different activities were categorized (i.e., feeding, milling/resting, traveling, socializing) and recorded on the sighting datasheets, and the dolphin behaviours were taped by a digital video recorder. These data were input into a separate database with sighting information, which was then used to determine the distribution of behaviours with desktop GIS.

Survey Results

<u>Land-based Visual Survey</u>

Seasonal Records

During February 2004 to January 2005, there were a total of 65 marine mammal surveys undertaken (a total of 360 hours). Over this period, two residential marine mammals Indo-Pacific Humpback Dolphin Sousa chinensis and Finless Porpoise Neophocaena phocaenoides were observed and recorded at South Soko. There were 24 sighting records of humpback dolphins (52 individuals), and 5 sighting records of finless porpoise (13 individuals) reported during the surveys. Seasonal records of marine mammal sightings are presented in Table 17 of Annex 9-A. The locations of sightings were plotted in relation to season, and are presented in *Figure 9.21* (1) .

Humpback dolphins were recorded in all four seasons and most sightings were recorded in waters around Lan Nai Wan, the sea channel between North and South Sokos, and outer Tung Wan. Finless porpoises were only found in spring and winter in Sai Wan, Pak Tso Wan and the sea channel between North and South Sokos.

Number of sightings and number of individuals of marine mammals are presented in *Figures 9.22* & *9.23*. The data presented in these figures have not been corrected for effort and are raw sightings data.

(1) There are certain limitations associated with the land-based survey. It should be noted that there is a decrease in detection objects with increase in distance from the observer. It should also be noted that part of the jetty location, turning circle and approach channel were obscured from view by the island's terrain.

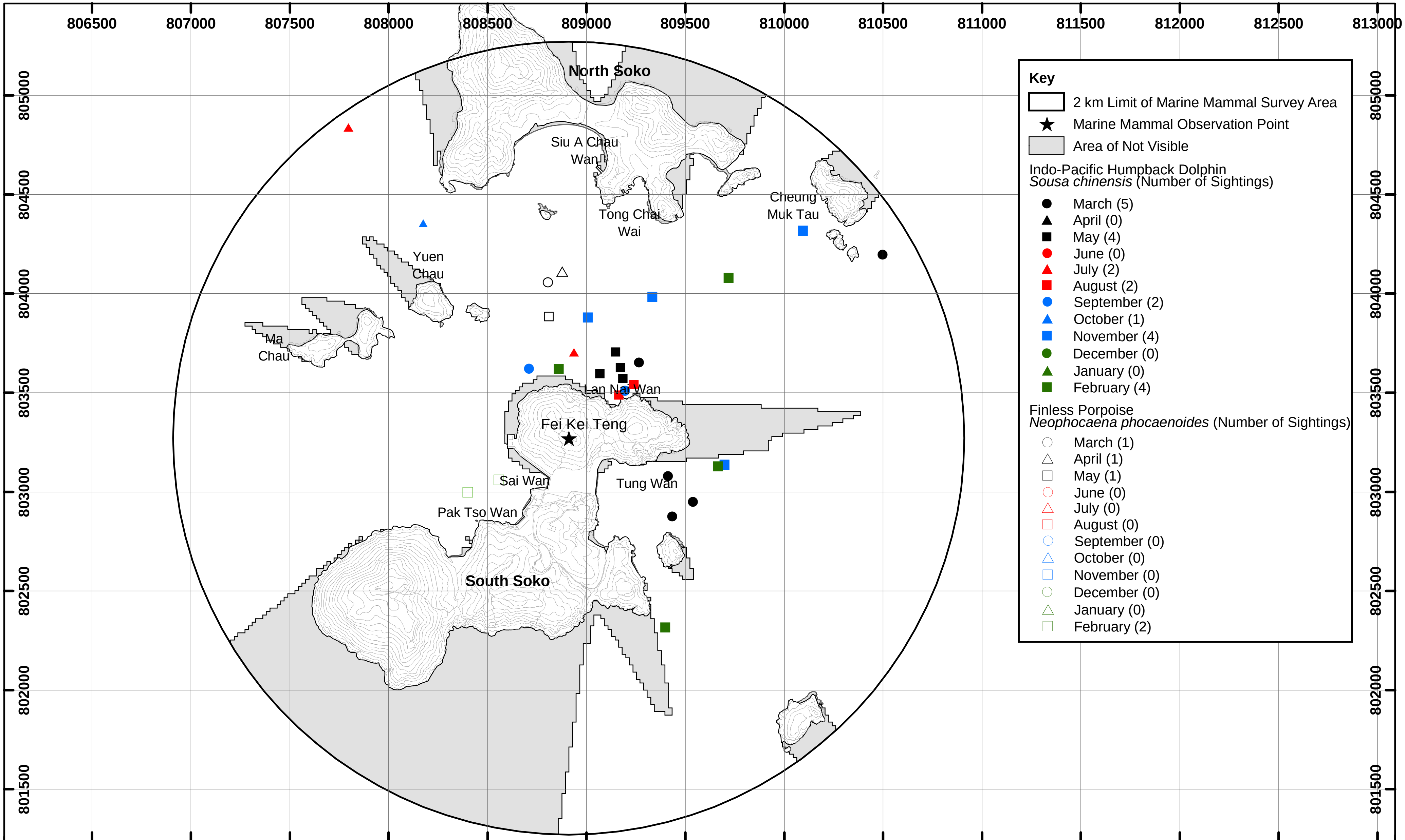

Figure 9.21

Land-based Marine Mammal Sighting Records
(Survey data collected from February 2004 to January 2005)

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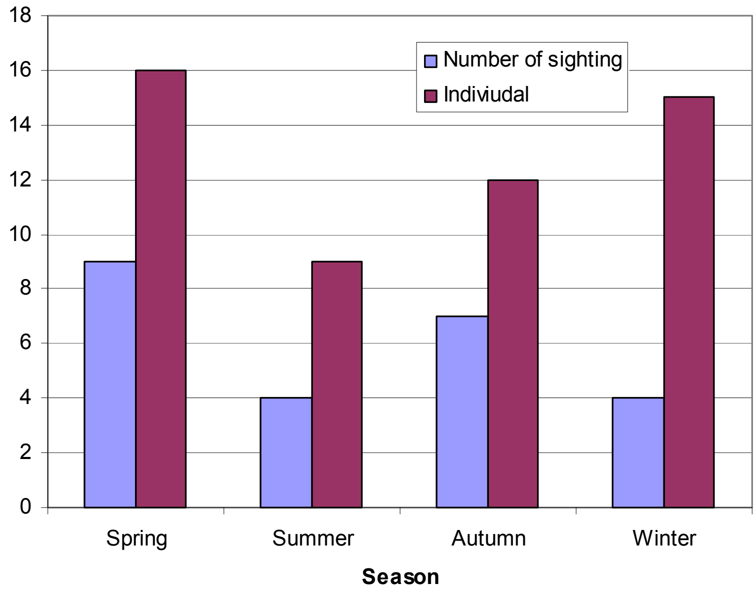

Figure 9.22 *Number of Sightings and Individuals of Indo-Pacific Humpback Dolphin* **Sousa chinensis** *at South Soko (Data collected from February 2004 to January 2005) from land based surveys*

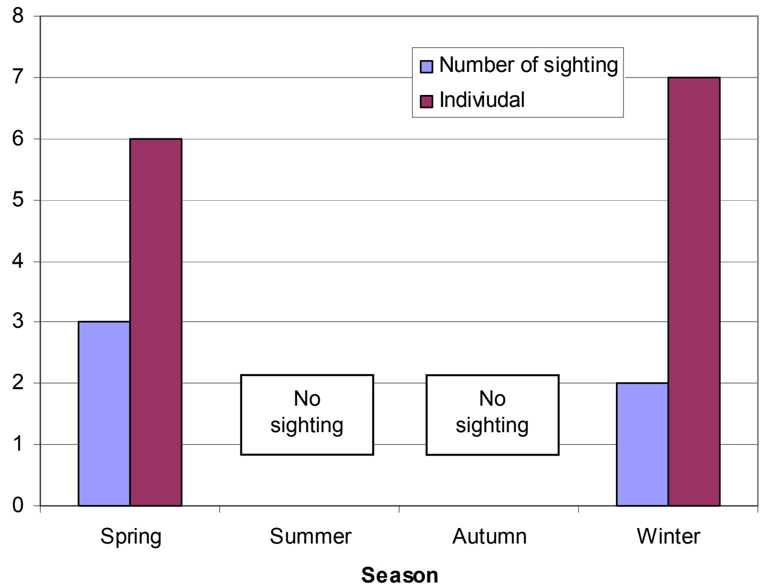

Figure 9.23 *Number of Sightings and Individuals of Finless Porpoise* **Neophocaena phocaenoides** *at South Soko (Data collected from February 2004 to January 2005) from land based surveys*

Note: (1) These data provide supplementary information to check on habitat use in the immediate vicinity of the proposed works but were not relied upon for characterisation of dolphin abundance or seasonal distribution in these waters. Instead, vessel-based survey results (both LNG surveys and long-term data) (presented below) for the same waters and across Southwest Lantau provided the scientific basis for quantifying seasonal abundance of marine mammals for assessment purposes.

From the land based surveys, both marine mammal species exhibited a seasonal pattern at South Soko. The majority of humpback dolphins and finless porpoises were recorded in spring and in winter. For the humpback dolphins, there were 9 sightings (16 individuals) recorded in spring and 4 sightings (13 individuals) recorded in winter (*Figures 9.22 & 9.23*). For finless porpoise, there were 3 sightings (6 individuals) recorded in spring and 2 sightings (7 individuals) recorded in winter (*Figures 9.22 & 9.23*).

It is important to note, owing to the small sample size of the land-based survey dataset, quantitative comparisons of seasonal abundance with extensive data collected from vessel-based survey are of limited value. Nevertheless, the usefulness of the land-based surveys is demonstrated by the fact that dolphins were observed in the immediate vicinity of South Soko in spring whereas there have been no sightings of dolphins close to the Soko Islands by vessel-based surveys. Owing to the difference in survey methods and survey times, such differences are not unexpected. Even though vessel-based survey may not record dolphins in certain areas, this does not mean dolphins never occur in those areas.

Marine Mammal Age Class

The majority of humpback dolphins recorded during the land-based surveys were identified as Adults (50 individuals). Juveniles (2 individuals) were also recorded, as presented in *Table 17* of *Annex 9-A* and *Figure 9.20*. *Neophocaena phocaenoides* were all adults, except for one juvenile recorded (*Table 17* of *Annex 9-A*).

Vessel Based Visual Survey

Data Collected

In the 11 month study period (July 2005 to May 2006), 70 days of surveys have been conducted. During this time, a total of 5,045 km of transect lines have been surveyed. Among the 5,045 km surveyed transect lines, 4,097 km (81%) of the total were conducted during relatively calm sea conditions of Beaufort 0-3, and therefore were useable in the estimation of density and abundance. Of the effort conducted in Beaufort 0-3 conditions, 2,409 km was in Southwest Lantau, 396 km was in West Lantau, 385 km was in Northwest Lantau, and 906 km was in Deep Bay.

There were a total of 275 sightings of Indo-Pacific Humpback Dolphins *Sousa chinensis*. Most sightings took place in West Lantau (n = 109) and Southwest Lantau (n = 79), with fewer sightings from Northwest Lantau (n = 62), and the fewest in Deep Bay (n = 25). The dolphin sightings were relatively evenly-distributed among most seasons: Summer (n = 66), Autumn (n = 88), Winter (n = 82), but only 39 were obtained in spring.

Finless porpoise sightings numbered 29 in total, and all of these occurred in Southwest Lantau. Most took place in winter and spring months (n = 13 in each season), with only one in summer and two in autumn.

Distribution

It is important to recognize that, due to differential survey effort in various survey subareas, it is not possible to compare densities of dolphins or porpoises by examining maps of distribution. The distribution maps are only useful for determining where animals do and do not occur, and for comparing use of the area on a small scale (within a survey subarea). Comparisons of density or habitat use on a larger scale should make use of numerical density estimates or the results of the grid analyses (discuss below).

Dolphins were observed throughout all of the surveyed areas, and sightings occurred in most areas, except directly south of the Sha Chau/ Lung Kwu Chau Marine Park and at the very northern end of the Deep Bay survey area (*Figure 9.20*). The areas of both potential sites for the LNG terminal are used by dolphins in all seasons covered in this report. To date, there appear to be no strong seasonal differences in distribution of dolphins among the different survey subareas, except there are fewer dolphins around in the spring months (*Figures 9.24 - 9.27*).

The distribution of young dolphins (Unspotted Calves and Unspotted Juveniles) (*Figures 9.28 - 9.31*) indicated that they were concentrated in four areas: (1) southern Deep Bay, (2) around Lung Kwu Chau, (3) all along the West Lantau coastline, and (4) in Southwest Lantau between Fan Lau and the Soko Island. The composition of young animals in Deep Bay differed from the other areas owing to the much lower number of Unspotted Calves sighted in this area. It can be noted that the latest analysis of calving seasonality based on methods for determining the age of stranded calves and hence their time of birth, indicates that most (76%) calving occurs in a six month period between March and August [(1)]. Within this six month period, the highest calving frequency occurs in the months of May and June. It is noted that calving also occurs in all other months but at comparatively lower levels.

The distribution of dolphins engaged in feeding and socializing behaviours are shown in *Figures 9.32 - 9.35*, respectively. These will be discussed in more detail under the Behaviour section below.

As expected, finless porpoises were only observed in the Southwest Lantau subarea, and most of the sightings were in the winter and spring months (*Figure 9.36*). Finless porpoise groups occurred around the Soko Islands, mainly within 2 km of the islands, but not near shore. The overlap of distribution between finless porpoises and dolphins in the Southwest Lantau area is shown in *Figure 9.37*.

(1) Jefferson, T. A. (ed.). 2005. Monitoring of Indo-Pacific humpback dolphins (Sousa chinensis) in Hong Kong waters – data analysis: final report. Unpublished report submitted to the Hong Kong Agriculture, Fisheries and Conservation Department.

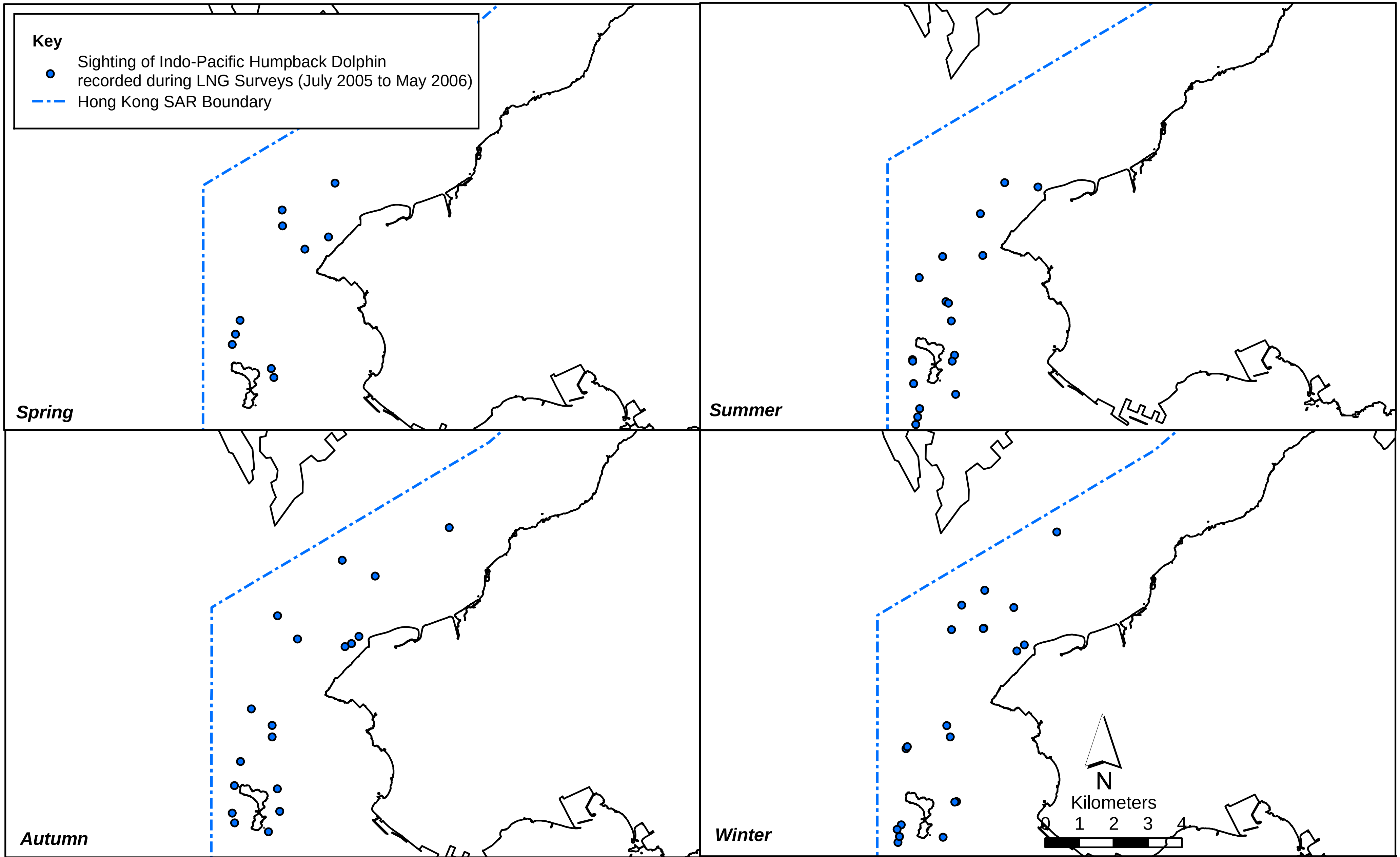

Figure 9.24

Distribution of Indo-Pacific Humpback Dolphin with Seasonal Variation at Deep Bay

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Date: 13/07/2006

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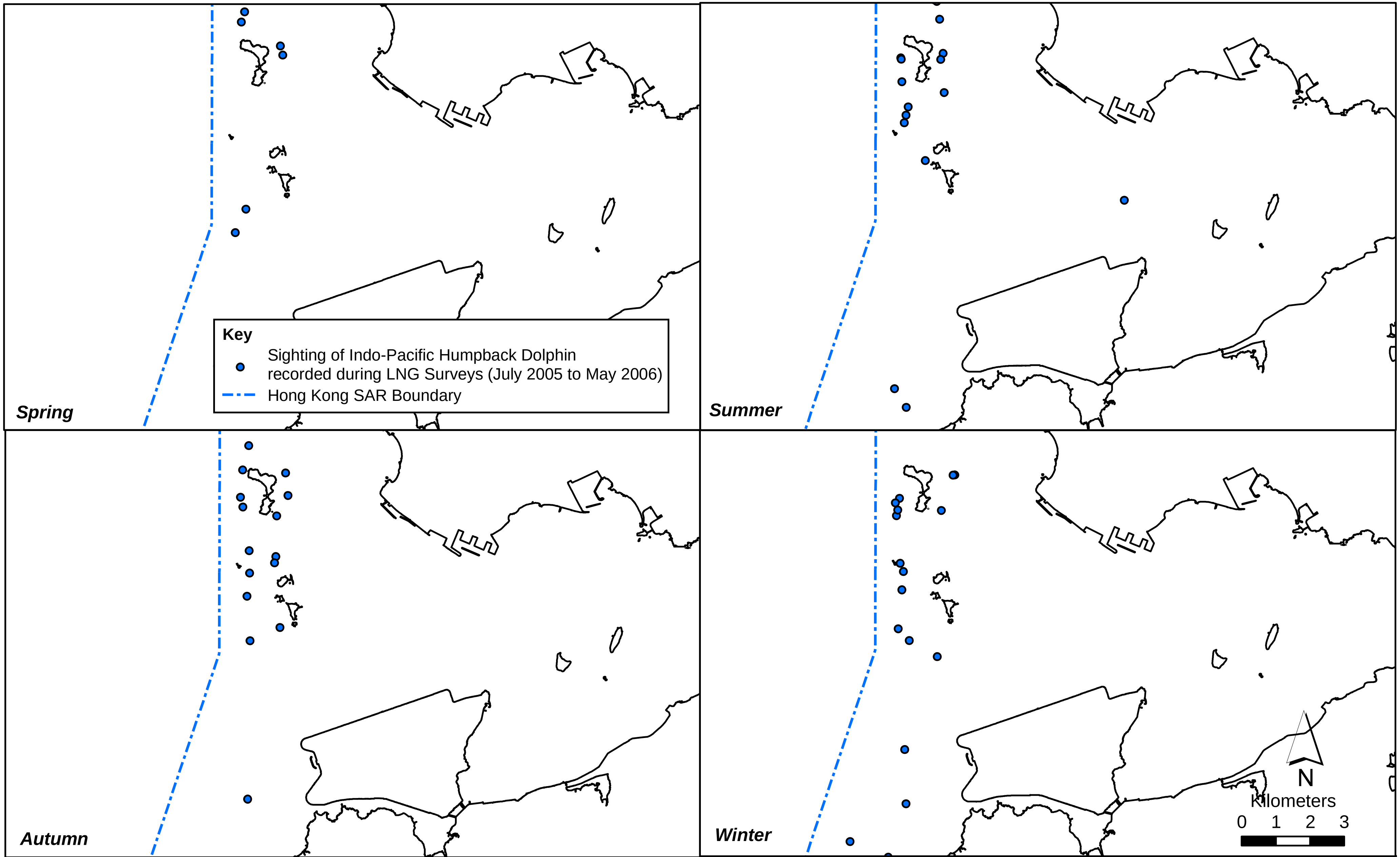

Figure 9.25

Distribution of Indo-Pacific Humpback Dolphin with Seasonal Variation at Northwest Lantau

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Date: 13/07/2006

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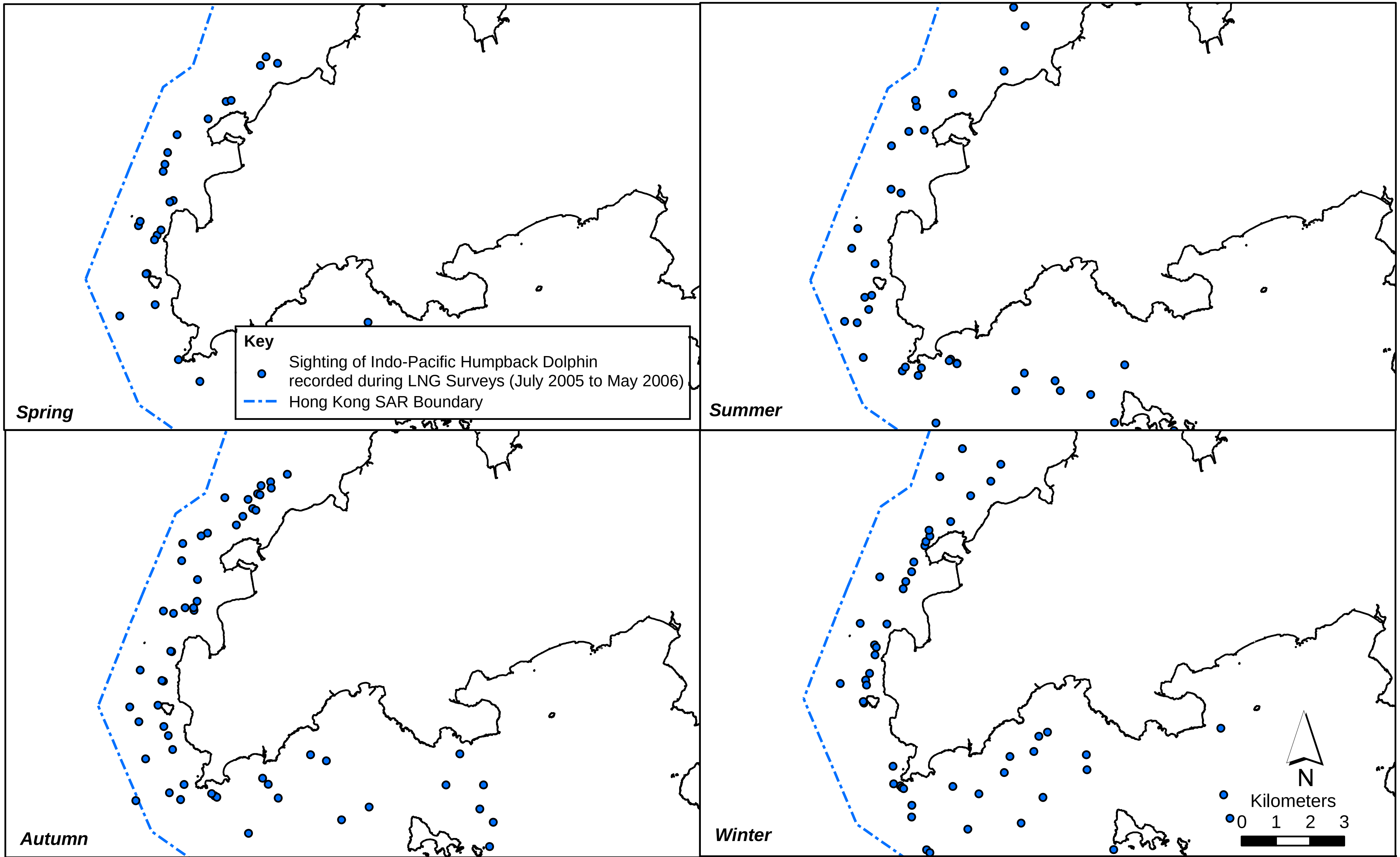

Figure 9.26

Distribution of Indo-Pacific Humpback Dolphin with Seasonal Variation at West Lantau

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Date: 13/07/2006

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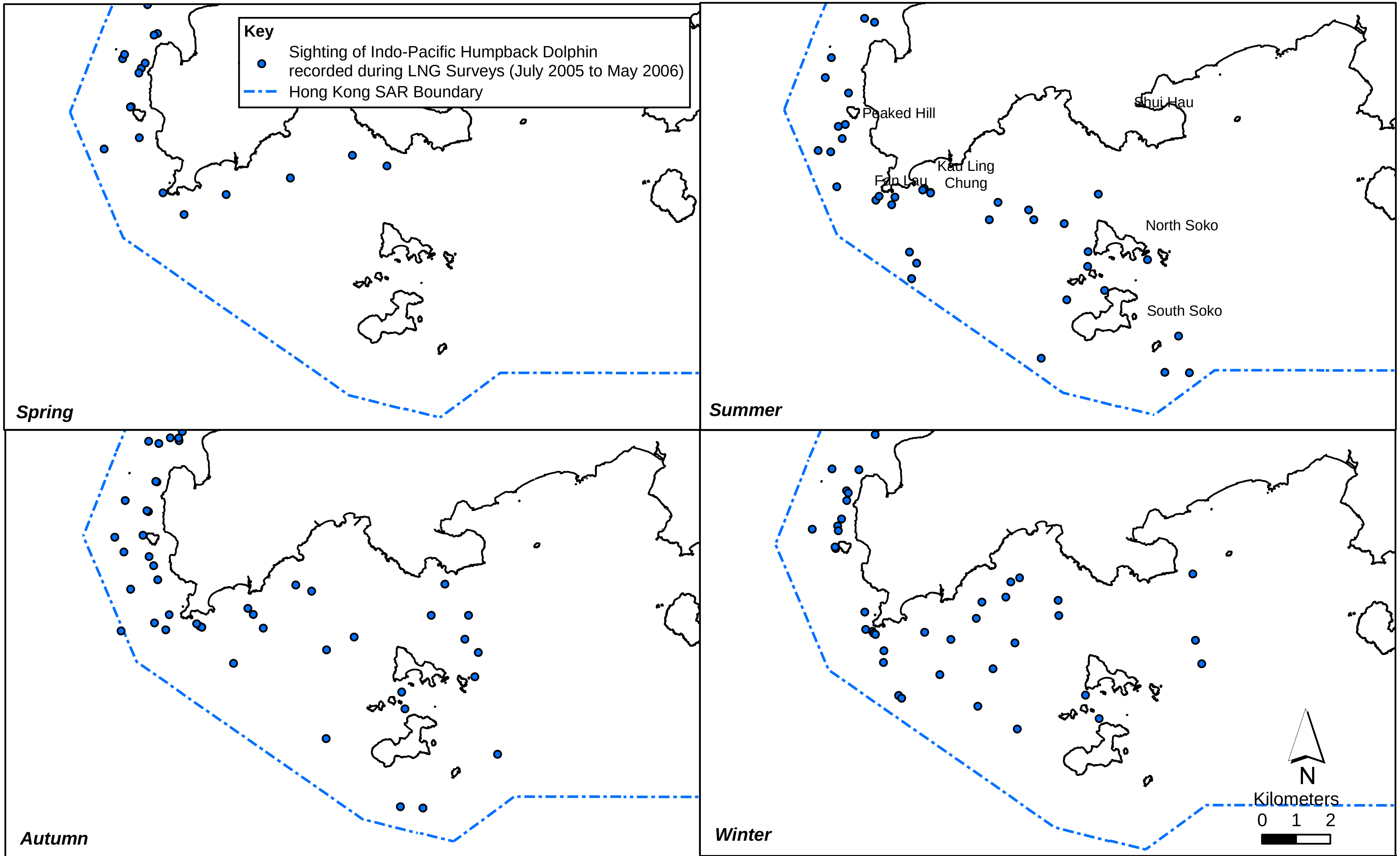

Figure 9.27

Distribution of Indo-Pacific Humpback Dolphin with Seasonal Variation at Southwest Lantau

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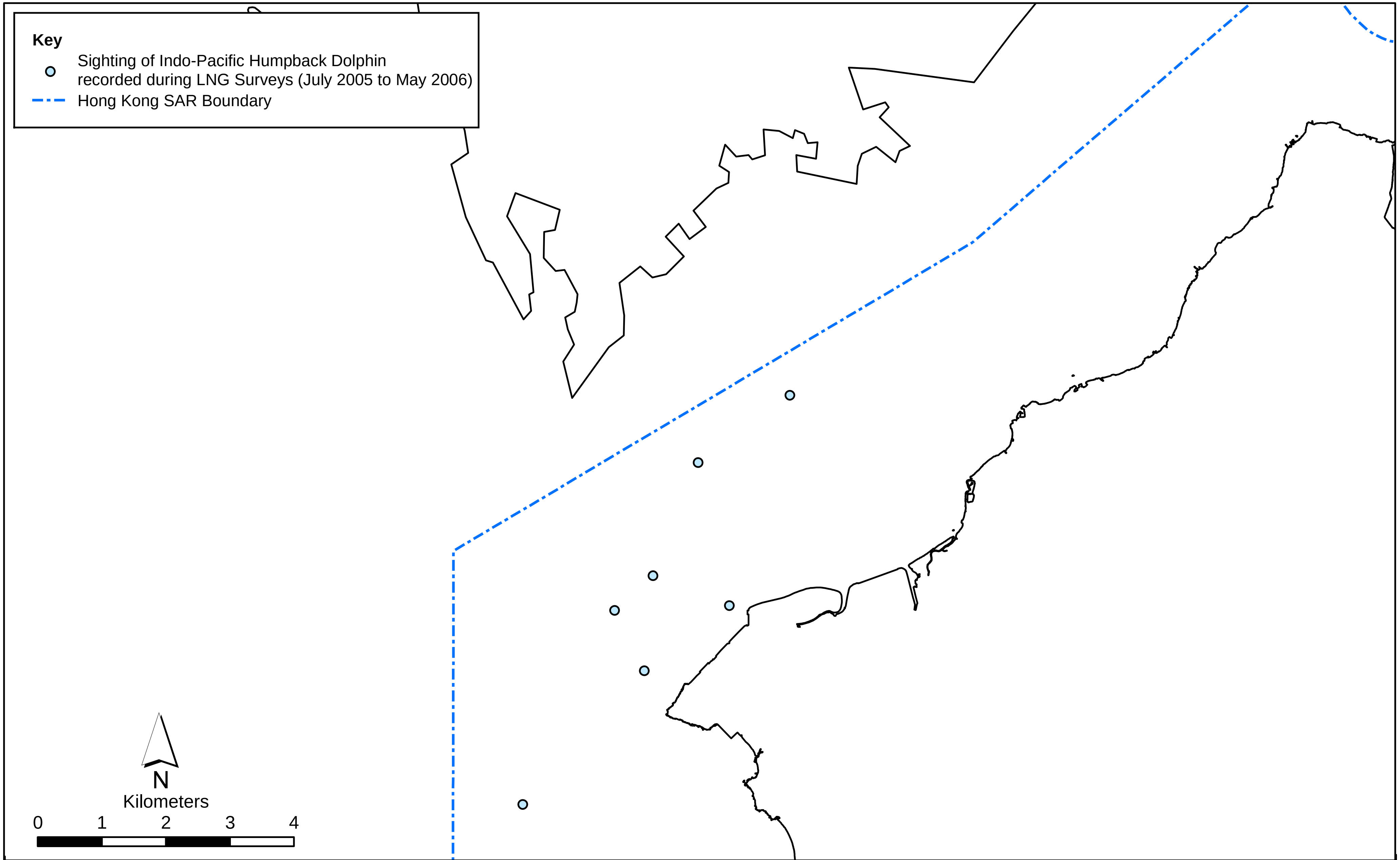

Figure 9.28

Distribution of Young Animals of Indo-Pacific Humpback Dolphin
(Unspotted Calves and Unspotted Juveniles) at Deep Bay

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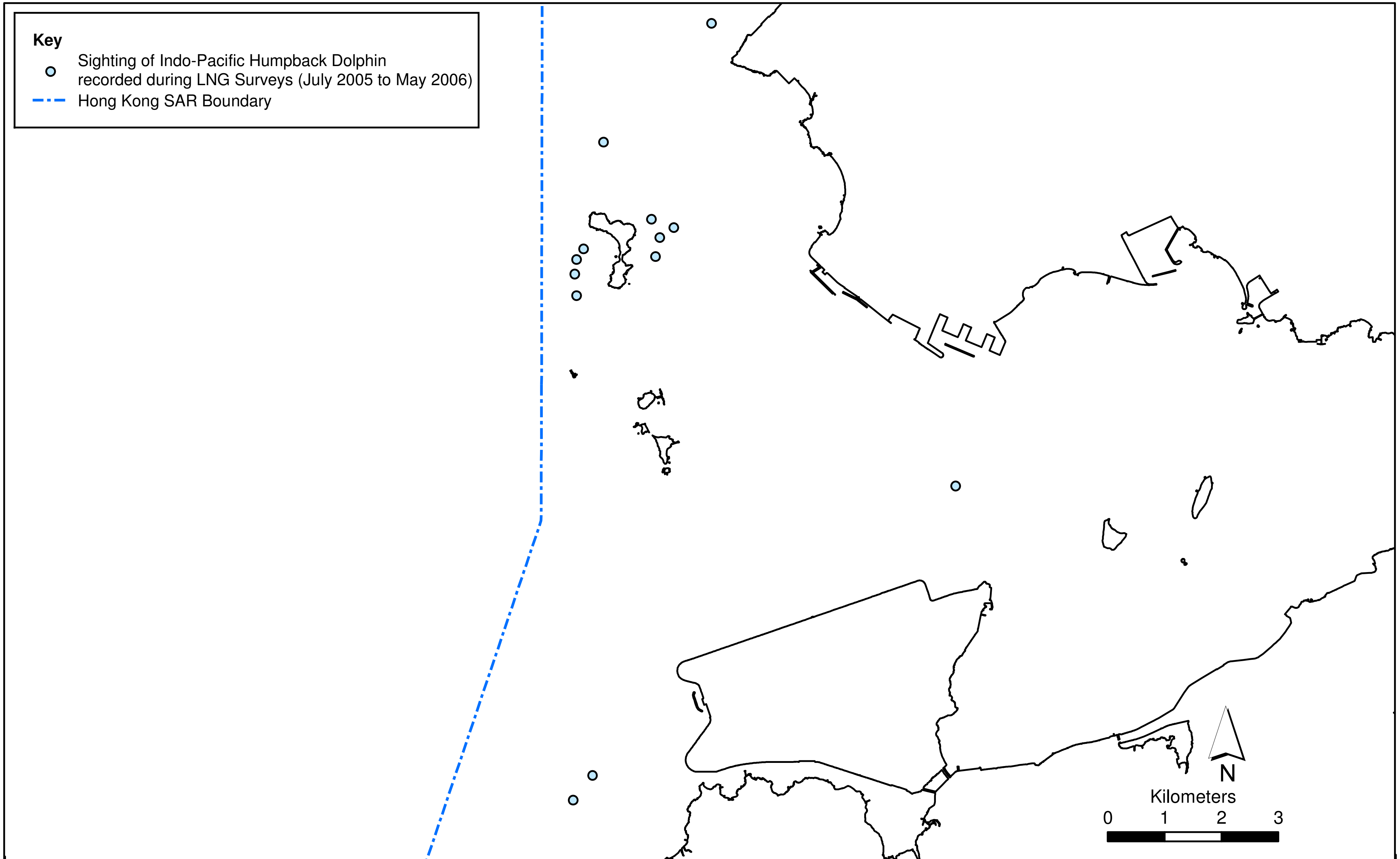

Figure 9.29

Distribution of Young Animals of Indo-Pacific Humpback Dolphin (Unspotted Calves and Unspotted Juveniles) at Northwest Lantau

File: EIA_Docu-set2/0018180_Indo-Pacific-Humpback_NW-Lantau_juven.mxd
Date: 13/07/2006

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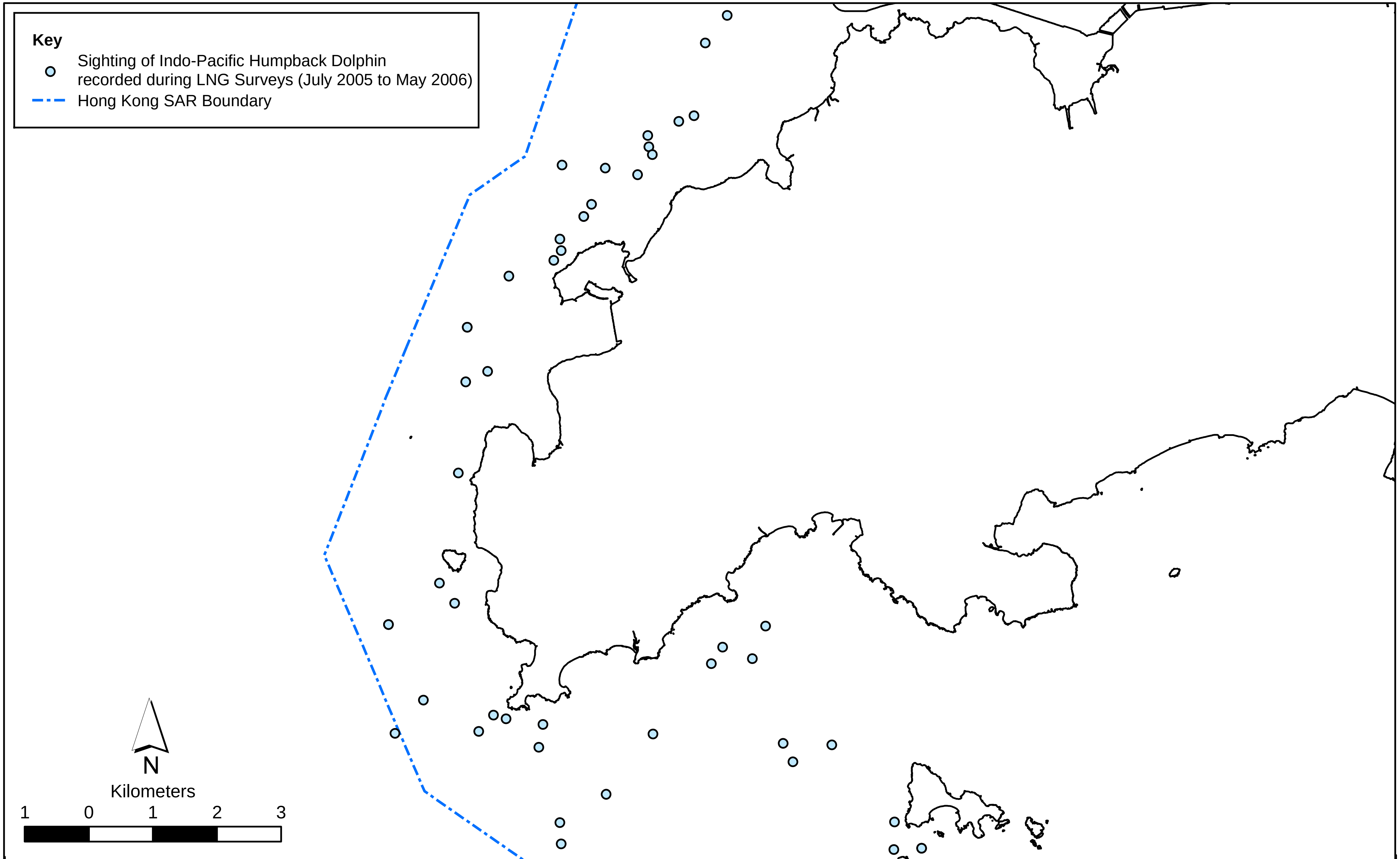

Figure 9.30

Distribution of Young Animals of Indo-Pacific Humpback Dolphin (Unspotted Calves and Unspotted Juveniles) at West Lantau

File: EIA_Docu-set2/0018180_Indo-Pacific-Humpback_W-Lantau_juven.mxd
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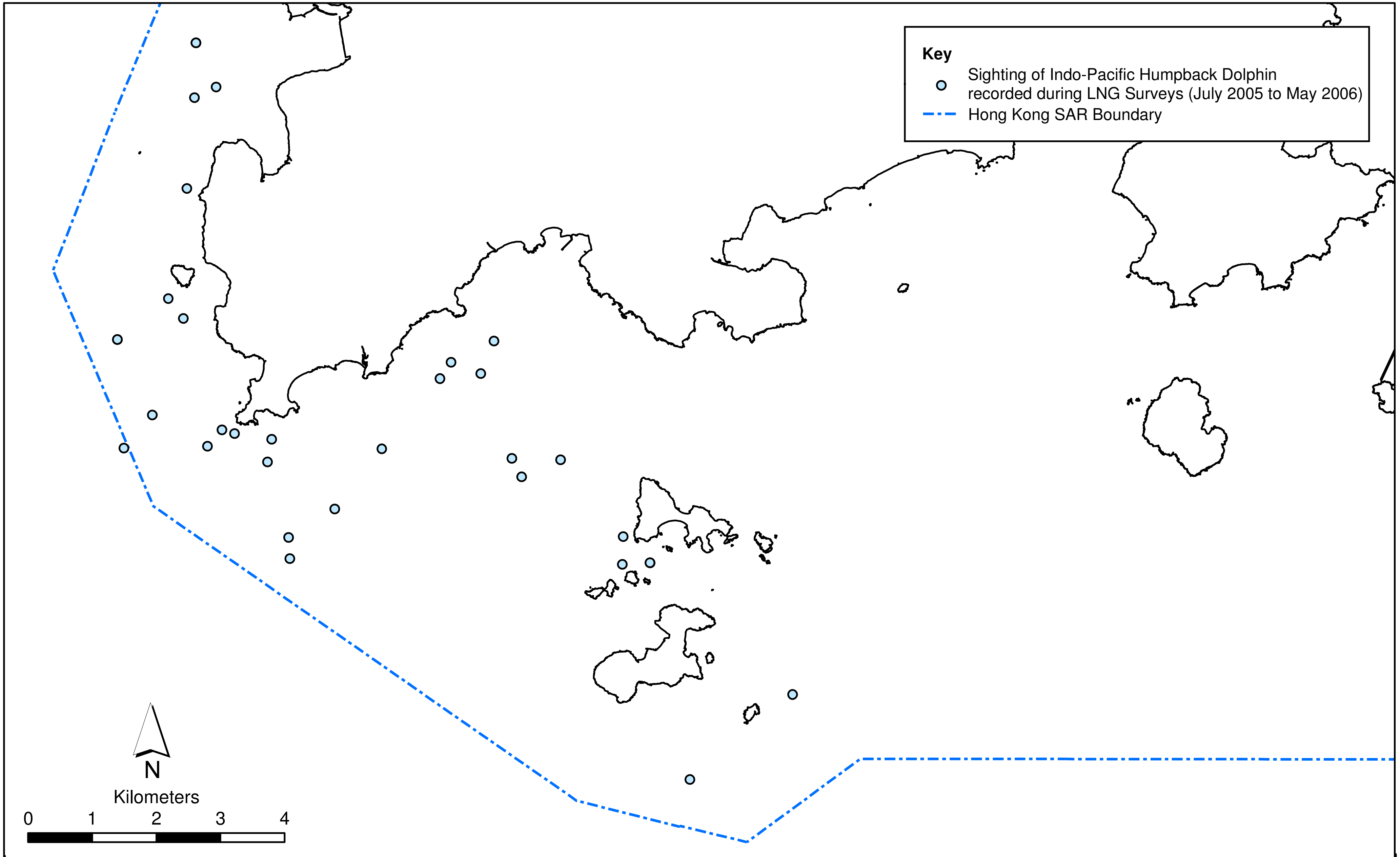

Figure 9.31

Distribution of Young Animals of Indo-Pacific Humpack Dolphin
(Unspotted Calves and Unspotted Juveniles) at Southwest Lantau

File: EIA_Docu-set2/0018180_Indo-Pacific-Humpback_SW-Lantau_juven.mxd
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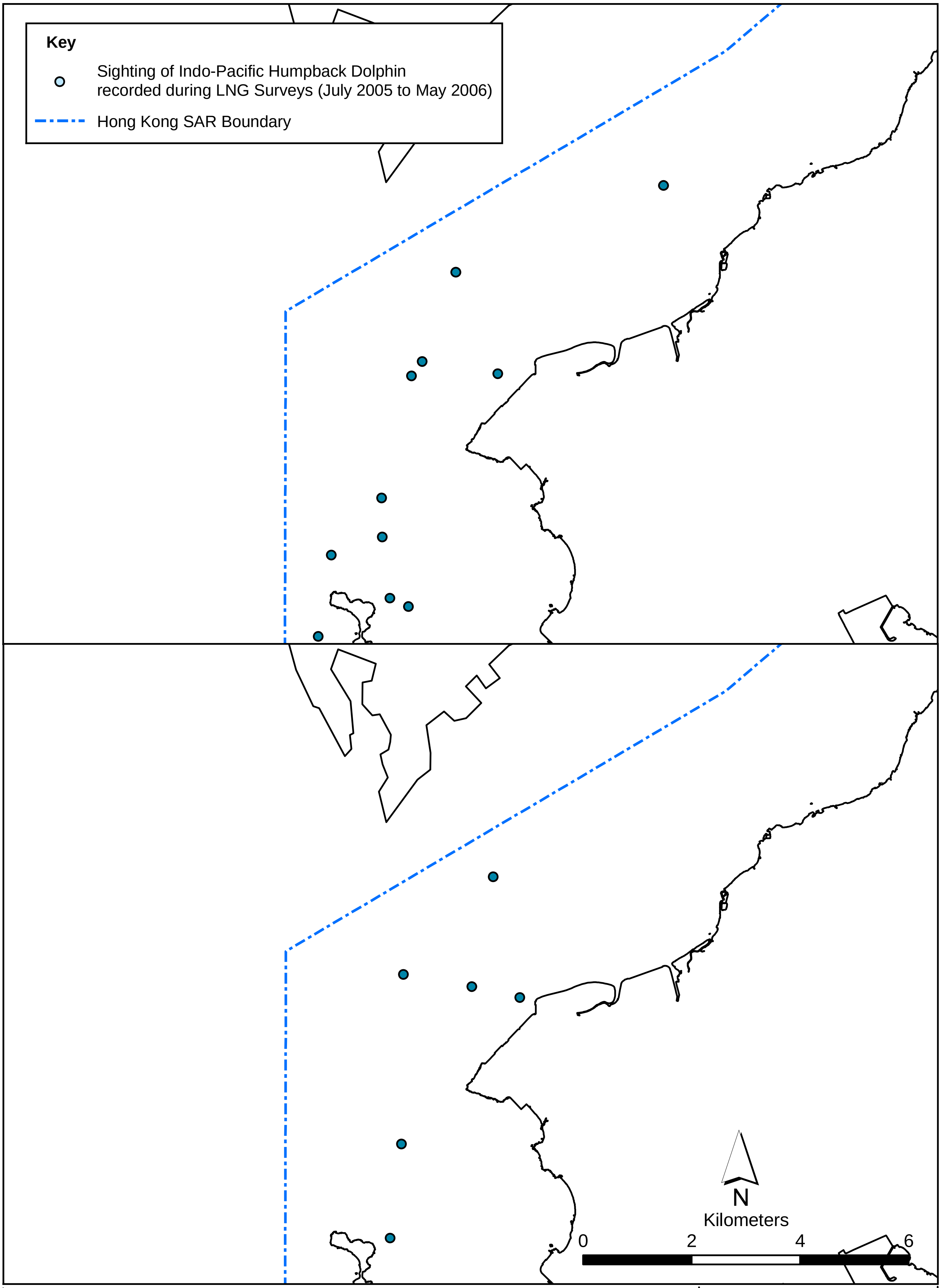

FIGURE 9.32

Distribution of Indo-Pacific Humpback Dolphin with Feeding or Socialising Activities at Deep Bay

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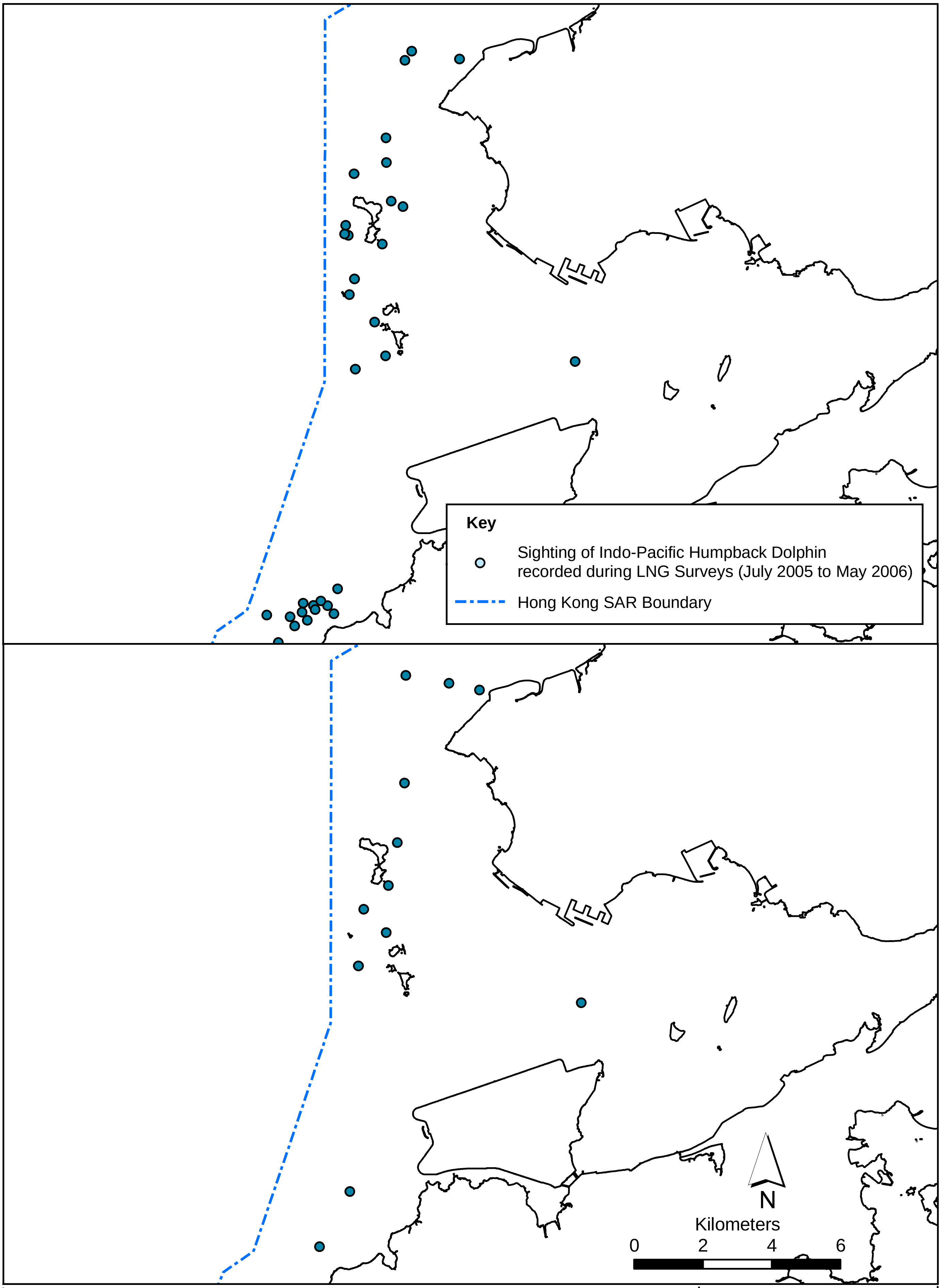

FIGURE 9.33

Distribution of Indo-Pacific Humpback Dolphin with Feeding or Socialising Activities at Northwest Lantau

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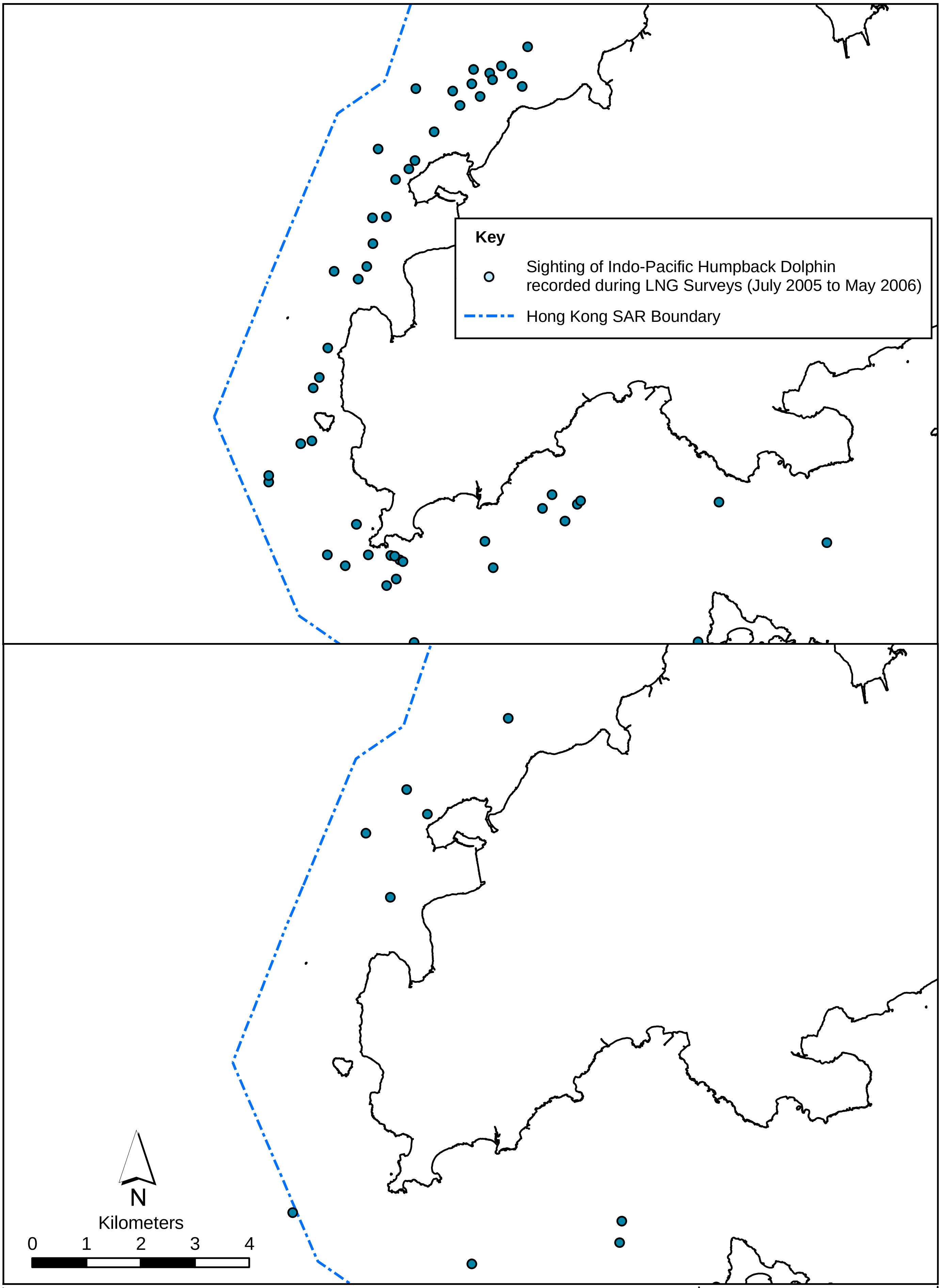

FIGURE 9.34

Distribution of Indo-Pacific Humpback Dolphin with Feeding or Socialising Activities at West Lantau

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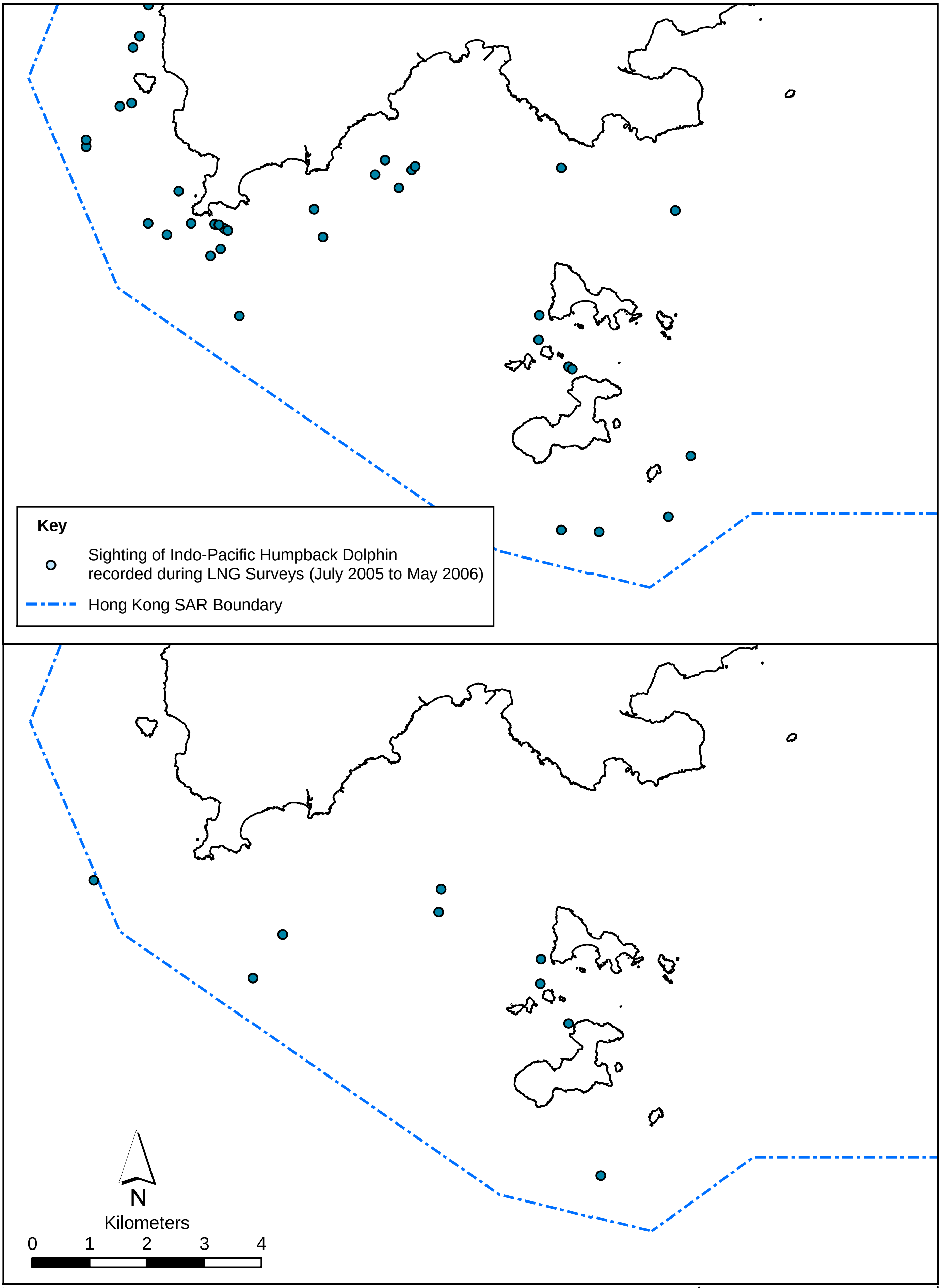

FIGURE 9.35

Distribution of Indo-Pacific Humpback Dolphin with Feeding or Socialising Activities at Southwest Lantau

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Date: 17/07/2006

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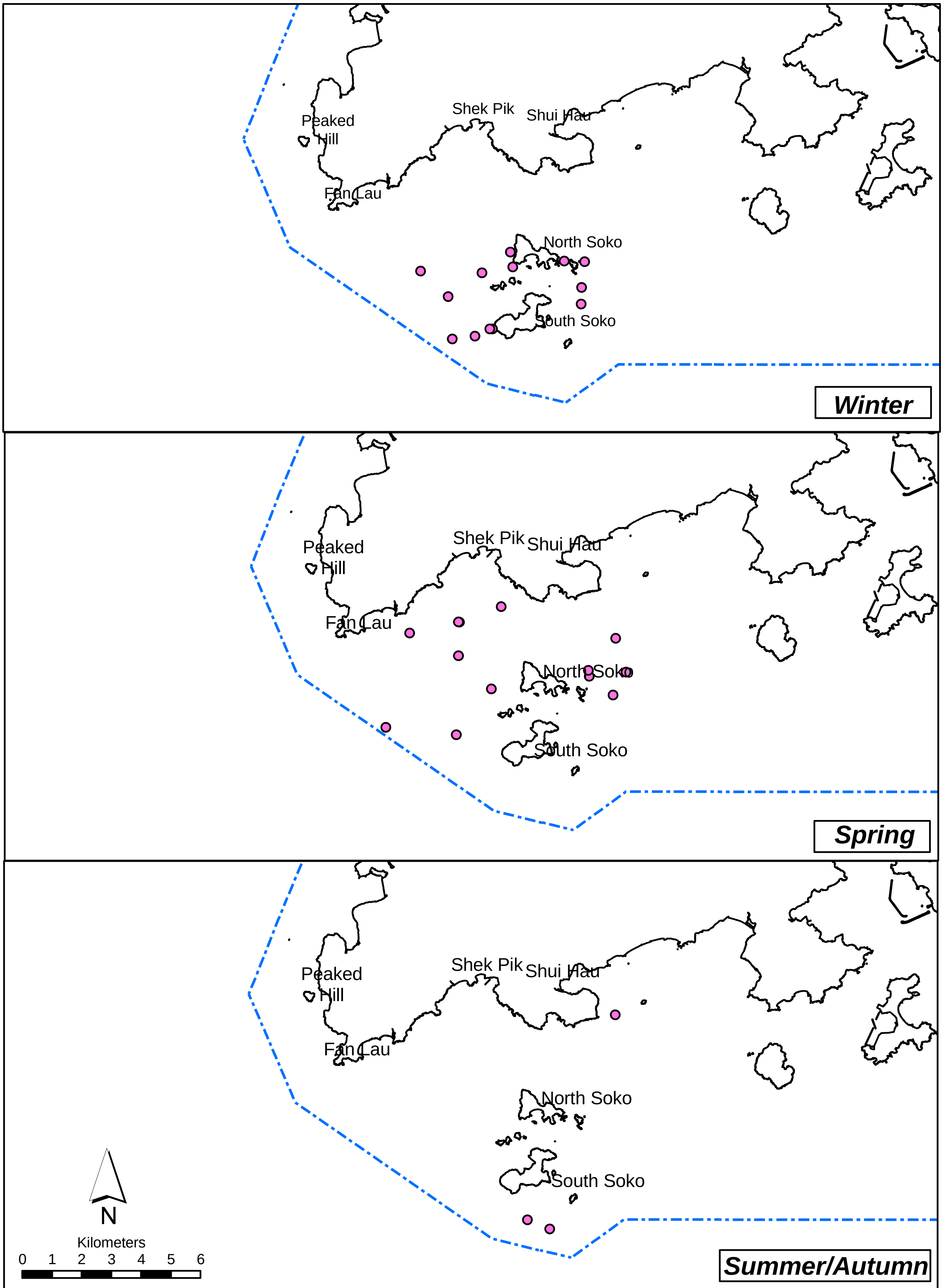

FIGURE 9.36

Distribution of Finless Porpoise with Seasonal Variation
2 at South Soko

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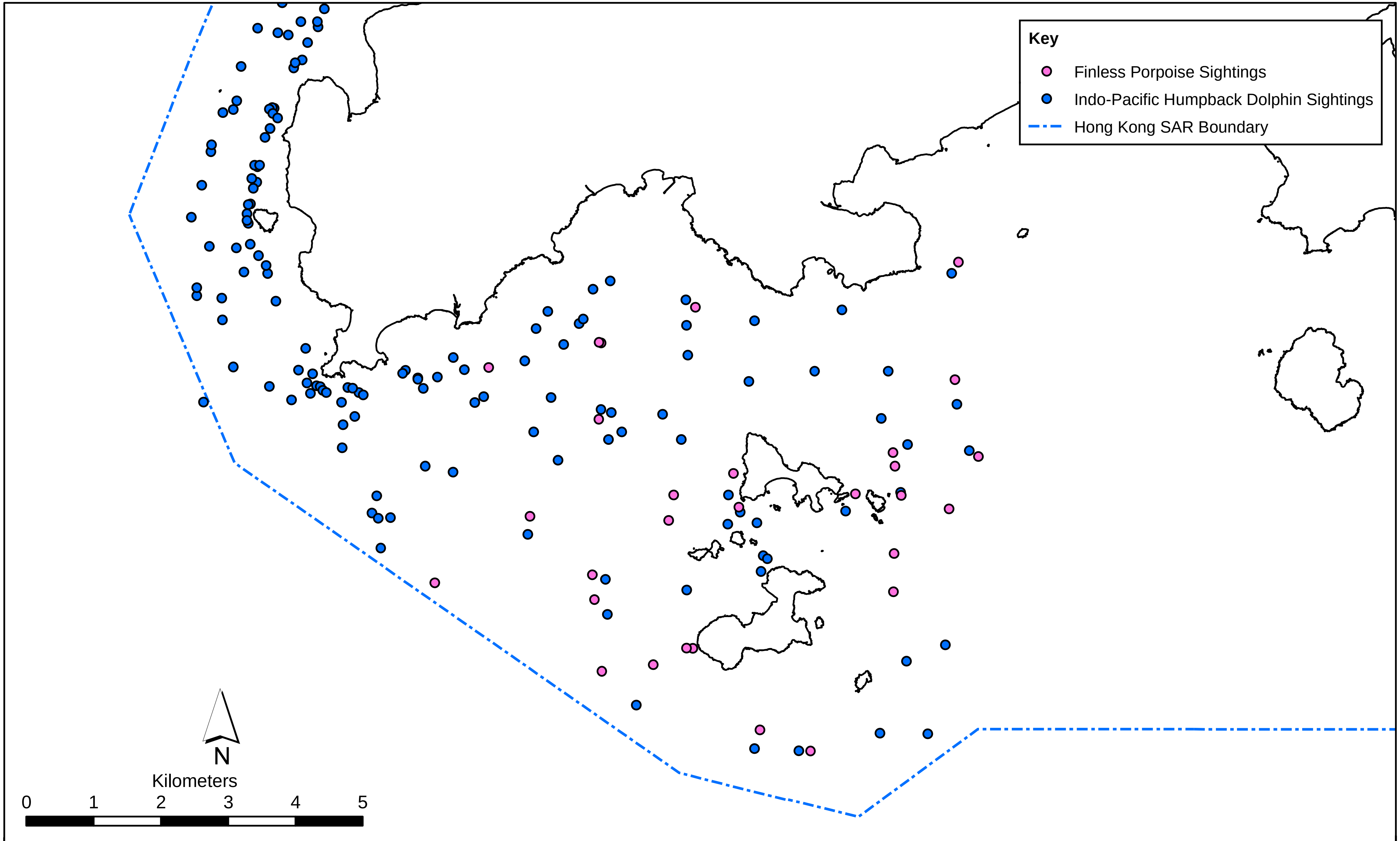

Figure 9.37

Distribution of Finless Porpoise and Indo-Pacific Humpback Dolphin recorded during the 11 months (July 2005 - May 2006) Survey

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Date: 18/07/2006

Abundance and Density

Survey effort corrected estimates of density and abundance, and their associated parameters are presented for Deep Bay, West Lantau, and Southwest Lantau in *Table 9.19*. For humpback dolphins, Deep Bay had low densities (0.08-0.23 dolphins km^{-2}) and low estimates of abundance (<10 dolphins in all seasons). It is clear that dolphins use the mouth of Deep Bay at a low level throughout the year. West Lantau had high humpback dolphin densities (1.71-2.81 dolphins km^{-2}) and relatively high abundances (47-78) of dolphins (for such a small area) in all seasons. Dolphins are sighted in this area in all seasons. Southwest Lantau had lower levels of dolphin density (0.10-0.44 dolphins km^{-2}) and abundance (6-29 dolphins) than West Lantau, but higher than Deep Bay. Dolphins are sighted in this area in three seasons, but clearly it is used much less heavily in spring months. Northwest Lantau also had lower levels of dolphin density (0.57-0.94), but similar abundance (49-82) compared to West Lantau. Northwest Lantau had higher levels of dolphin density and abundance than Deep Bay and Southwest Lantau. Dolphins were sighted in Northwest Lantau in all seasons, but less so in spring.

Table 9.19 ***Estimates of Abundance and Associated Parameters for Humpback Dolphins and Finless Porpoises in the Three Survey Subareas (NWL is also discussed in the text), and other Subareas for Comparison***

Survey Area	**Survey Days**	**L (km)**	**n**	**f(0) (km^{-1})**	**E (s)**	**D (km^{-2})**	**N**	**CV (%)**
Indo-Pacific Humpback Dolphin *Sousa chinensis*								
Deep Bay								
Winter	19	314	11	4.7071	2.72	**0.23**	7	46
Spring	21	354	5	4.7071	4.80	**0.16**	5	55
Summer	21	376	5	4.7071	2.60	**0.08**	2	49
Autumn	20	374	9	4.7071	4.11	**0.23**	7	42
Northwest Lantau								
Winter	36	1,051	107	3.6502	3.90	**0.73**	63	17
Spring	36	1,059	93	3.6502	3.51	**0.57**	49	17
Summer	38	1,084	113	3.6502	3.78	**0.72**	63	15
Autumn	38	1,229	152	3.6502	4.16	**0.94**	82	12
West Lantau								
Winter	29	448	107	4.7071	4.94	**2.78**	77	18
Spring	28	401	92	4.7071	3.17	**1.71**	47	20
Summer	29	473	128	4.7071	3.84	**2.45**	68	18
Autumn	34	550	137	4.7071	4.80	**2.81**	78	18
Southwest Lantau								
Winter	44	1136	48	4.7071	3.10	**0.31**	20	20
Spring	37	1051	8	4.7071	5.38	**0.10**	6	44
Summer	38	1374	47	4.7071	3.47	**0.28**	18	27
Autumn	31	908	37	4.7071	4.57	**0.44**	29	27
Finless porpoise *Neophocaena phocaenoides*								
Southwest Lantau								
Winter	44	1136	22	5.2054	1.9	**0.09**	8	35
Spring	37	1051	26	5.2054	2.6	**0.17**	15	39
Summer	38	1374	1	5.2054	1.0	**< 0.01**	0	78
Autumn	31	908	2	5.2054	1.5	**0.01**	1	67
Lamma[(4)]								

Winter	-	1173	17	6.10	2.4	**0.10**	17	32
Spring	-	1126	35	3.75	5.9	**0.52**	90	32
Summer	-	1007	4	3.75	2.0	**0.02**	4	50
Autumn	-	1283	12	3.84	1.6	**0.04**	7	32
Po Toi(4)								
Winter	-	400	6	7.68	1.3	**0.07**	14	63
Spring	-	962	3	79.47	1.7	**0.02**	4	60
Summer	-	940	18	5.50	2.8	**0.17**	32	36
Autumn	-	667	16	4.65	2.0	**0.14**	26	36

Note: (1) L=total length of transect surveyed; n=number of on-effort sightings; f(0)=trackline probability density; E(s)=unbiased mean group size; D= density of individuals; N=individual abundance; and CV=coefficient of variation.

(2) Only data collected in Beau 0-3 conditions are included here.

(3) As explained previously, the individual density value (D) represents an estimate of the number of individual dolphins / porpoises in a 1 km^2 grid square area.

(4) Data extracted from Jefferson *et al.* 2002 [1] for comparative purposes. Note (3) is not applicable to this data.

Finless porpoises were only seen in Southwest Lantau, and estimates of abundance (0-15 porpoises) and density (0.002-0.167 porpoises km^{-2}) were low for most seasons. However, spring season shows much higher densities and abundances of porpoises for this area, suggesting this at least a moderately important area for the species in Hong Kong during that season. According to the literature, other areas of Hong Kong such as key habitats at Lamma and Po Toi were found to support considerably higher densities (Lamma: 0.02 - 0.52 porpoises km^{-2}, Po Toi; 0.02 - 0.17 porpoises km^{-2}) and abundance (Lamma: 4 - 90 porpoises, Po Toi: 4 - 32 porpoises) of these animals (*Table 9.19*). However, based on the latest data, this situation may have changed as sightings were higher in the waters of the Po Toi Islands. In monitoring conducted in 2003 to 2005, finless porpoise sightings in South Lantau (12 sightings) were higher than in Lamma (2), Nine Pins (4) and Sai Kung (4), but lower than in Po Toi (15) [2] .

For the Northwest Lantau area, the seasonal estimates of average individual encounter rate (number of dolphin individuals recorded per survey effort) are shown in *Table 9.20*. Encounter rates increased from summer to autumn and then increased again from autumn to winter, finally decreasing dramatically in spring months.

(1) Jefferson TA, Hung S, Law L, Torey M, Tregenza N. 2002. Distribution and abundance of finless porpoises in Hong Kong and adjacent waters of China. *The Raffles Bulletin of Zoology* Supplement 10:43-55.

(2) AFCD 2005. Monitoring of Finless Porpoises (*Neophocaena phocaenoides*) in Hong Kong waters (2003-2005) Final Report, prepared by Hong Kong Cetacean Project.

Table 9.20 Individual Encounter Rate Information for Dolphins in Northwest Lantau (1) (Analysis Uses only Data Collected during Beaufort 0-3 Conditions)

Season	No. Surveys	Individuals	Encounter Rate	Std. Dev.
Summer	7	36	24.9	31.65
Autumn	6	53	46.5	20.62
Winter	3	65	166.3	52.58
Spring	6	18	17.1	20.93

Note: (1) This analysis uses only data collected by surveys for this EIA Study due to the unique designation of this survey subarea.

Long-term Trends in Abundance and Density

In order to investigate long-term trends in abundance of dolphins and porpoises in the survey subareas, data from the 1996-2006 line-transect dataset were used to calculate a time series of density and abundance estimates (*Table 9.21*). It should be noted that there were limitations on the temporal resolution attainable since it is necessary to maintain an adequate level of precision for the estimates (as indicated by lower CV values). As such, it was only possible to provide annual estimates for the West Lantau subarea. For other subareas, it was necessary to pool two or even three years of data.

Table 9.21 Trends in Estimates of Abundance and Associated Parameters for Humpback Dolphins and Finless Porpoises in the Three Survey Subareas

Survey Area	Survey Days	L (km)	n	f(0) (km^{-1})	E (s)	D (km^{-2})	N	CV (%)
Indo-Pacific Humpback Dolphin *Sousa chinensis*								
Deep Bay								
1997/98/99	22	514	10	4.7071	3.60	**0.17**	5	24
2005	35	543	7	4.7071	3.71	**0.11**	3	52
2006	24	360	13	4.7071	3.23	**0.27**	8	43
West Lantau								
1997	6	67	9	4.7071	6.33	**2.00**	55	57
2002	10	108	39	4.7071	3.65	**3.10**	86	23
2003	43	661	175	4.7071	4.80	**2.99**	83	16
2004	39	641	160	4.7071	4.02	**2.36**	65	15
2005	57	1015	205	4.7071	3.88	**1.84**	51	10
2006	17	273	70	4.7071	4.64	**2.80**	77	19
Southwest Lantau								
1997/98	23	444	16	4.7071	5.14	**0.44**	29	42
1999/00	20	430	13	4.7071	2.15	**0.15**	10	38
2001/02	23	448	22	4.7071	3.14	**0.36**	24	31
2003/04	20	536	23	4.7071	3.74	**0.38**	25	30
2005/06	64	2611	66	4.7071	3.85	**0.23**	15	21
Finless porpoise *Neophocaena phocaenoides*								
Southwest Lantau								
1997/98	11	230	8	5.2054	2.38	**0.22**	14	55
1999/00	10	196	4	5.2054	2.50	**0.13**	9	111
2001/02	13	235	8	5.2054	3.00	**0.27**	17	61
2003/04	12	328	4	5.2054	2.25	**0.07**	5	65

2005/06	35	1197	25	5.2054	2.08	**0.11**	7	30

Note: (1) L=total length of transect surveyed; n=number of on-effort sightings; f(0)=trackline probability density; E(s)=unbiased mean group size; D= density of individuals; N=individual abundance; and CV=coefficient of variation.
(2) Only data collected in Beau 0-3 conditions are included here.
(3) For 2006, estimates are incomplete, with only winter and spring data included.
(4) As explained previously, the density of individuals value (D) represents an estimate of the number of individual dolphins / porpoises in a 1 km^2 grid square area.

Based on examination of estimates of dolphin density over time, it appears there are no consistent trends for any of the surveyed subareas. It should be borne in mind, a degree of caution is warranted in interpreting these figures to take account of the level of precision achievable. In general, in Deep Bay, it seems there was a decrease in past years and then an increase in humpback dolphins in the last year. In West Lantau, there was an increase, a decrease, and finally another increase. In Southwest Lantau, there was a decrease, followed by an increase, and another decrease. However the decrease in 2006 is considered to be an artefact of not including summer and autumn sightings data [(1)] when dolphin abundance is expected to be higher. For Finless Porpoises, abundance in Southwest Lantau decreased, then increased and then decreased. Overall, examination of estimates of dolphin density over time suggests that there have not been any dramatic changes in the abundance of dolphins or porpoises in the survey subareas over the last 10 years. The observed changes have generally been temporary short term fluctuations, not lasting more than a few years.

Grid Analysis of Habitat Use (July 2005 – May 2006)

Grid analysis of habitat use provides the best way to compare dolphin and porpoise use of specific areas, especially on a small scale. Because the data are standardized for differential survey effort, it is possible to compare density of two grids, even if they are in different survey subareas.

Using the line-transect survey data from the 11 month study, combined with AFCD data collected from the same period, survey effort data and dolphin/porpoise sighting data were retrieved to calculate DPSE values for 158 grids among the four study areas. The maps with density (DPSE) of humpback dolphins and finless porpoises with corrected survey effort per km^2 of the four areas are shown in *Figures 9.38* and *9.39* respectively.

The average DPSE values of the 158 grids for humpback dolphins in the four survey areas was 0.28 Among them, West Lantau represented the highest use area for dolphins, with an average DPSE value of 0.67. Moreover, West Lantau has the highest number of grids DPSE values >1. The western end of Northwest Lantau was also identified as an area with high dolphin usage, with average DPSE values 0.44. On the contrary, Southwest Lantau, in which

(1) Not available at time of writing

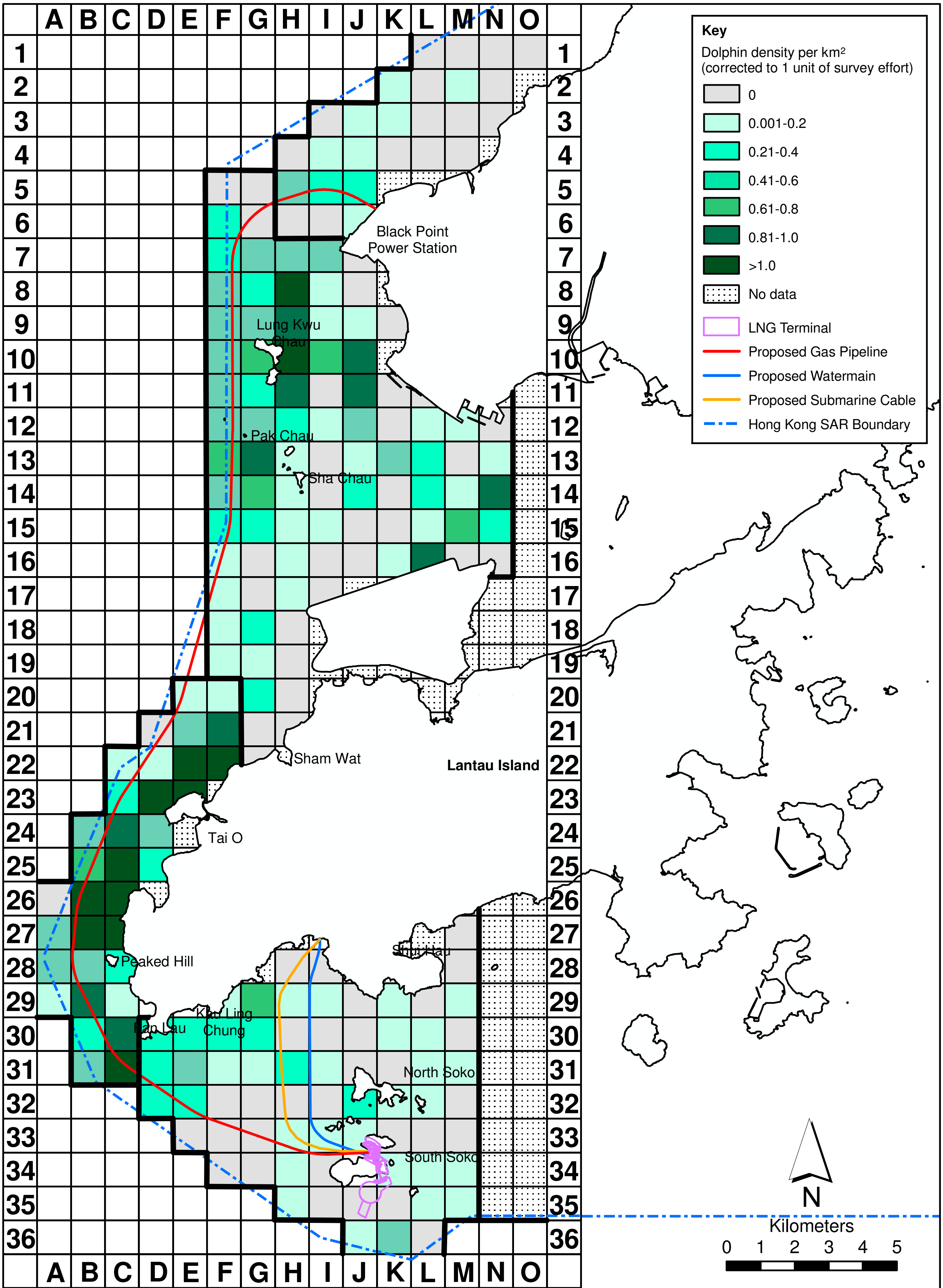

FIGURE 9.38

Density of Chinese White Dolphins with Corrected Survey Effort per km in Waters around Lantau Island (Using data from ERM's July 2005-May 2006 survey combined with AFCD's monitoring data for the same period

File: EIA_Docu-set2/0018180_white-Dolphin_DPSE.mxd
Date: 09/11/2006

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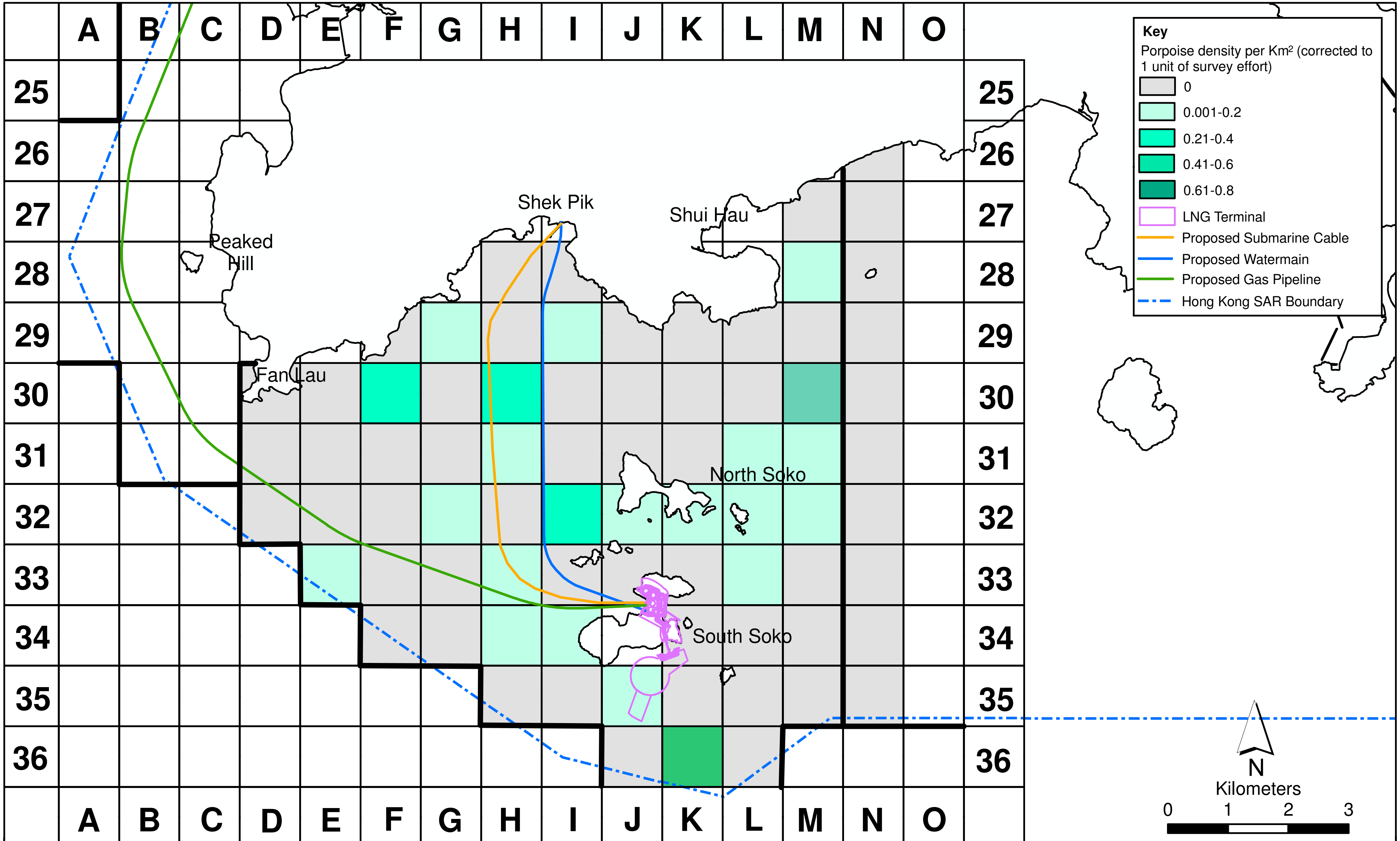

Figure 9.39

Density of Finless Porpoises with Corrected Survey Effort per km2
in Southwest Lantau Waters (using data from ERM's July 2005 - May 2006
survey combined with AFCD's monitoring data from the same period)

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Date: 09/11/2006

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South Soko forms part of the survey area, was moderately used by the dolphins, while Deep Bay was only used to a small extent (*Table 9.22*).

Table 9.22 *Average DPSE for Different Survey Subareas during the Study*

	# grids	Ave. DPSE	# grids w/ DPSE>1
Deep Bay	26	0.06 ± 0.12	0
Northwest Lantau	28	0.44 ± 0.54	2
West Lantau	34	0.67 ± 0.51	10
Southwest Lantau	70	0.09 ± 0.13	0
Total	**158**	**0.27 ± 0.42**	**2 (ave)**

Habitat use of humpback dolphins was very uneven among the 1 km^2 grids within the 4 areas. In Deep Bay, dolphin usage was higher toward the southwestern end of the survey area, and the highest densities occurred near the Black Point Power Station (Grids H5, I5 & J5). In Northwest Lantau, the dolphin usage was high around Lung Kwu Chau, especially at the eastern sides of the island (Grids G10 & H11). Dolphin densities were also high around the small island of Pak Chau (Grid G13). On the contrary, the southern portion of Northwest Lantau was much less heavily used by dolphins, especially the waters just west and northwest of the airport platform.

In West Lantau, dolphin usage was uniformly high all along the coastline. In particular, the waters between Sham Wat & Tai O (Grids D23, E22-23 & F22) and north to Peaked Hill (Grids B26-27 & C25-27) had relatively high dolphin usage. In Southwest Lantau, dolphin usage was relatively even throughout the survey area, with higher densities of dolphins near Fan Lau, Kau Ling Chung and around North Soko.

Grid Analysis of Habitat Use (Seasonal)

To examine the seasonal habitat use patterns of humpback dolphins and finless porpoises quantitatively in recent years, survey effort and dolphin/porpoise sighting data from the long-term monitoring database and the additional LNG survey data were stratified by season to calculate DPSE values (total number of dolphin/porpoises per unit of survey effort) within 1 km^2 grids in the survey subareas. For humpback dolphins, line-transect data collected during 2003-06 were used, and DPSE values for grid squares in Deep Bay, Northwest Lantau, Northeast Lantau, West Lantau, Southwest Lantau and Southeast Lantau were examined (see *Figure 9.40*). For finless porpoise, line-transect data collected during 2002-06 were used (to allow larger sample size). Only Southwest and Southeast Lantau subareas were examined (see *Figure 9.41*) since finless porpoises do not occur in west and north Lantau waters.

Dolphins: Humpback dolphins showed different levels of seasonal differences in habitat use among the six survey areas *(Figure 9.40)*. Seasonal habitat use patterns were less obvious in West Lantau and Northwest Lantau, and dolphins appeared to use two areas as their important habitats, with very high densities throughout the four seasons. Several areas were heavily used

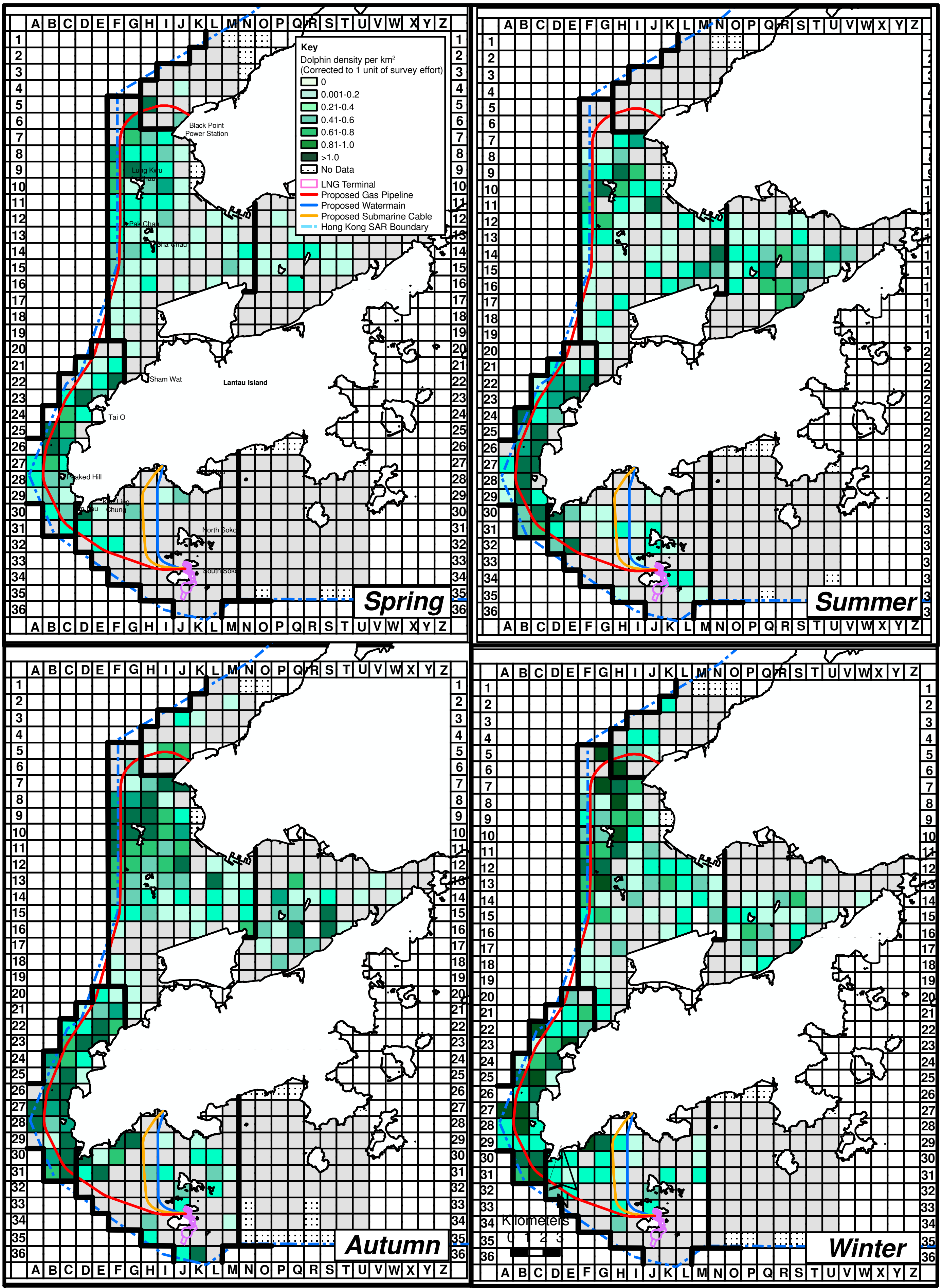

FIGURE 9.40

Seasonal Density of Chinese White Dolphins with Corrected Survey Effort per km^2 in Western Waters around Lanta Island (Using 2003-2006 data)

File: Report_August/0018180_white-Dolphin_DPSE_Seasonal.mxd
Date: 09/11/2006

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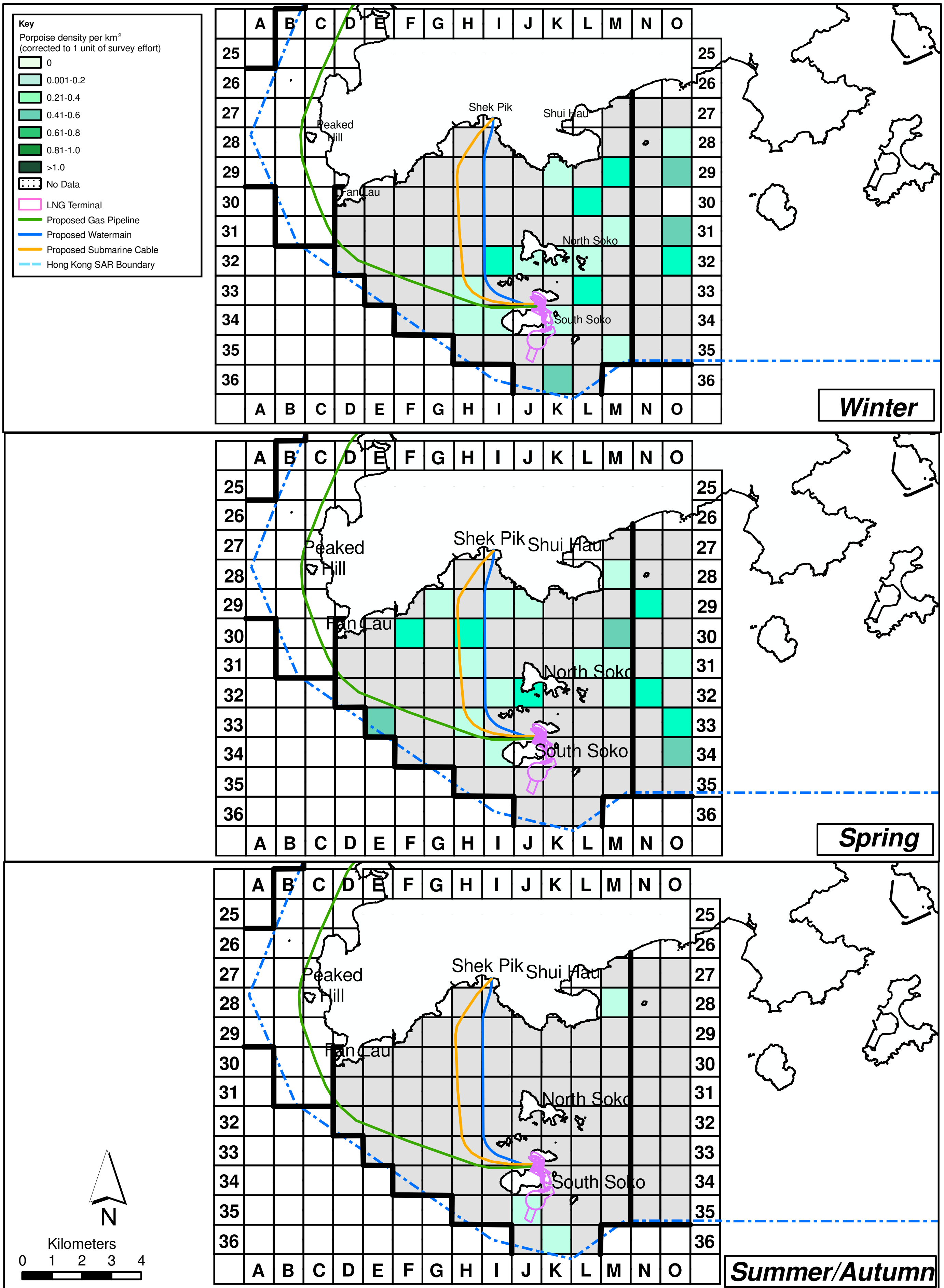

FIGURE 9.41

Seasonal Density of Finless Porpoises with Corrected Survey Effort per km² in Waters in Southwest Lantau Subarea

File: Report_August/0018180_FP_SPSE_Seasonal.mxd
Date: 09/11/2006

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by dolphins in all four seasons, including the northern waters of Lung Kwu Chau (G9-10 & H9-10); northern waters of Tai O Peninsula (D23, E22-23 & F22); and waters between Kai Kung Shan and Fan Lau (D25-27, D29-30, C25-28).

On the other hand, Northeast Lantau and Southwest Lantau showed more distinct seasonal habitat use patterns. In Northeast Lantau, dolphin densities were moderately high in summer, autumn and winter months, but were generally low in spring months. Off Black Point (I7), dolphin density was highest in autumn. Similarly, the waters around the Brothers Islands were used consistently throughout the year, with higher dolphin densities in summer and autumn months.

In Southwest Lantau, dolphin usage was moderate to high across different seasons, except in spring. Dolphins used this area to a very low extent in spring months as compared to other seasons, with very limited occurrence near Fan Lau. Around the Soko Islands, dolphins seemed to disappear from this area in spring months, coinciding with the occurrence of finless porpoises (see below). Dolphins moderately used the waters around Sokos in the other three seasons. In 2003-06, no dolphin sighting was made in Southeast Lantau, and therefore seasonal patterns cannot be examined in this area.

In Deep Bay, dolphin usage was very low in spring and summer months, but was more intensified in autumn and winter months. In these two seasons, dolphins appeared to have preference to use the waters near the mouth of Deep Bay (H5, I5 & J55).

Porpoises: Seasonal habitat use patterns for finless porpoises were also examined in Southwest and Southeast Lantau using line-transect data collected in 2002-06. The porpoises showed distinct seasonal movement in southern waters of Lantau, with moderate to high usage in winter and spring months and extremely low usage in summer and autumn months (*Figure 9.41*).

In winter months, porpoises preferred to use the waters around the Soko Islands and south of Shui Hau Peninsula, while they did not use the waters along the coastline from Fan Lau to Shek Pik. In spring months, they appeared to move inshore to use the coastline from Fan Lau to Shek Pik more intensively, while they still moderately used the waters around North Soko. In summer and autumn months, porpoises generally shifted out of South Lantau waters, with only rare sightings made in the southern waters of South Soko.

Seasonal Habitat Partitioning: The waters around the Soko Islands and nearshore waters between Fan Lau and Shui Hau Peninsula are the areas in Hong Kong where both resident cetacean species occur in different seasons. The distinct seasonal shifts in porpoise usage in South Lantau corresponded well with humpback dolphin usage across different seasons. In spring months, porpoises shifted inshore to the coastal waters while dolphin usage was particularly low during this time of the year. In summer and autumn months, dolphins started to move back to South Lantau waters, while porpoises shifted out of these waters, resulting in higher densities of dolphins and rare usage by porpoises from June to November. Winter months appeared to be the transitional period when porpoises started to shift back to South Lantau waters while humpback dolphin usage was still moderately high.

Individual Movements and Patterns of Use

During the study period, a number of individual dolphins in all four of the study subareas were successfully identified (*Figures 9.42* & *9.43*). The individuals identified so far are listed in *Table 9.23*, along with an assessment of the importance of the subarea as part of the dolphin's home range. The subarea was considered an important part of the dolphin's range if >25% of the sightings of that individual occurred in the area.

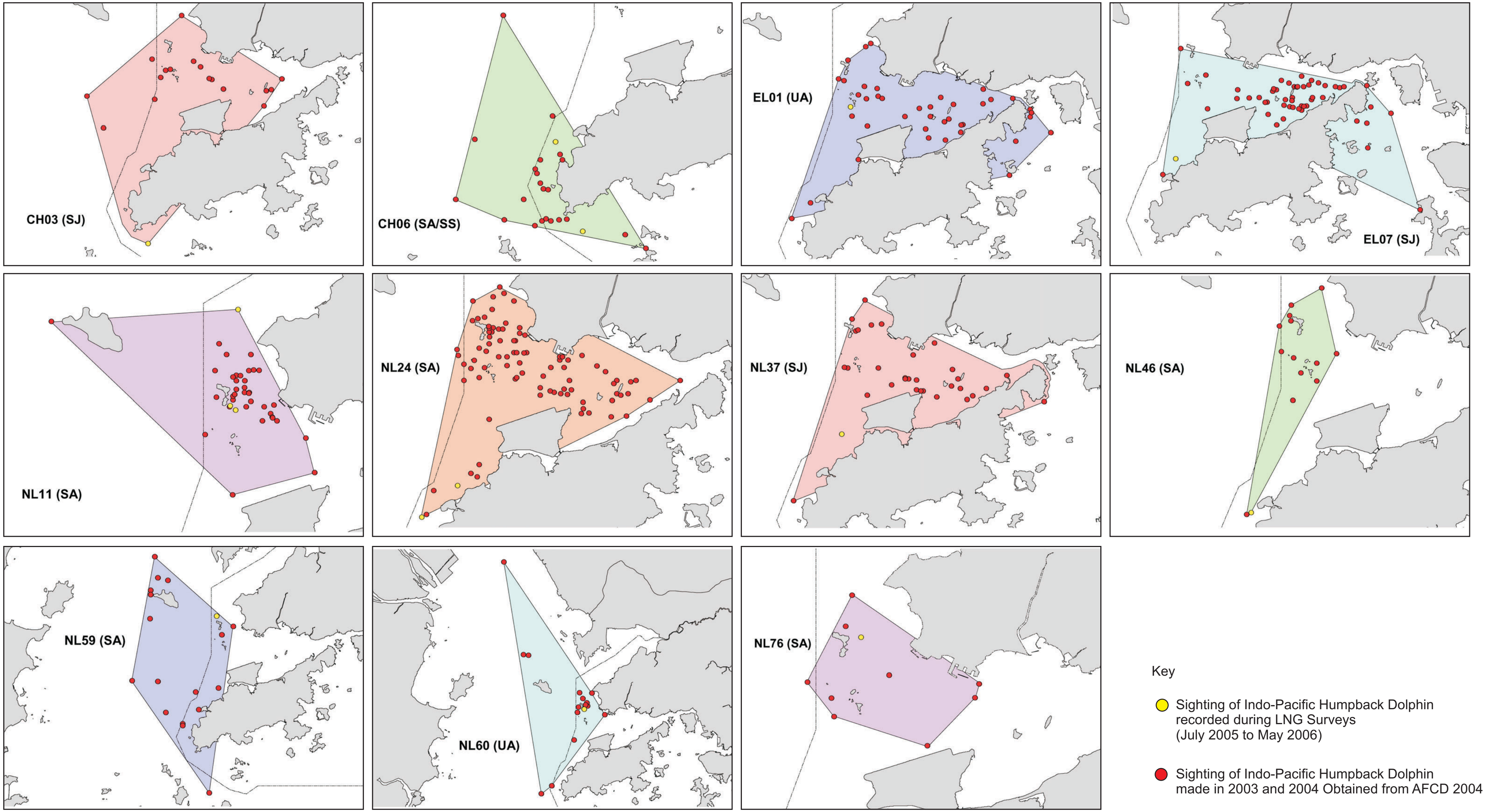

Figure 9.42

Ranging Pattern of Selected Individual Indo-Pacific Humpback Dolphin Present in the Western Waters of Hong Kong during the 11 months (July 2005 - May 2006) Surveys

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Figure 9.43

Ranging Pattern of Selected Individual Indo-Pacific Humpback Dolphin Present in the Western Waters of Hong Kong during the 11 months (July 2005 - May 2006) Surveys

FILE: EIA/SK/0018180_CWD7_5_17.cdr
DATE: 13/11/2006

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Table 9.23 Individual Humpback Dolphins Observed during the LNG Study (July 2005 – May 2006)

Dolphin's ID	Total sightings (1)	EIA Study sightings (2)	SWL (3) (4)	DB (3) (4)	West NWL (3) (4)	WL (3) (4)	HR Study?
CH03	18	1	1 (6%)		4 (22%)		Yes
CH06	25	2	3 (12%)			**14 (56%)**	Yes
CH37	7	1	1 (14%)		1 (14%)		
DB02	2	2		**2 (100%)**			
DB03	1	1		**1 (100%)**			
EL01	43	1			6 (14%)	2 (5%)	Yes
EL03	5	1	1 (20%)		1 (20%)	1 (20%)	
EL07	57	1			2 (4%)	2 (4%)	Yes
NL11	45	3		1 (2%)	**16 (36%)**		Yes
NL24	95	2			18 (19%)	7 (7%)	Yes
NL37	35	1			5 (14%)	2 (6%)	Yes
NL46	15	1			**8 (53%)**	2 (13%)	Yes
NL59	18	1			3 (17%)	3 (17%)	Yes
NL60	16	1			**8 (50%)**	2 (13%)	Yes
NL76	10	1			**6 (60%)**		Yes
NL98	47	1			6 (13%)	7 (15%)	Yes
NL123	43	5			**11 (26%)**	2 (5%)	Yes
NL128	10	1	2 (20%)		1 (10%)	**6 (60%)**	Yes
NL136	8	1			**5 (63%)**		
NL139	42	1			5 (12%)	5 (12%)	Yes
NL141	31	1			6 (19%)	3 (10%)	Yes
NL150	7	1		1 (14%)	**6 (86%)**		
NL169	10	3		3 (30%)	**6 (60%)**		Yes
NL170	4	1			**2 (50%)**	**2 (50%)**	
NL181	14	5		4 (29%)	**9 (64%)**		Yes
NL191	9	1			2 (22%)	2 (22%)	
NL202	6	1			**4 (67%)**	**2 (33%)**	
SL07	13	2	2 (15%)			**7 (54%)**	Yes
SL35	5	3	**3 (60%)**			**2 (40%)**	
SL36	1	1	**1 (100%)**				
SL37	1	1	**1 (100%)**				
WL11	16	2			6 (38%)	3 (19%)	Yes
WL25	22	2	1 (5%)		1 (5%)	**15 (68%)**	Yes
WL26	4	1	1 (25%)			**3 (75%)**	
WL30	2	1		**1 (50%)**		**1 (50%)**	
WL48	2	1				**2 (100%)**	
WL51	4	2	**2 (50%)**			**2 (50%)**	

Note: (1) Total sightings in the long-term database.

(2) Sightings in ERM's surveys (July 2005 – May 2006) for this EIA Study.

(3) Number of sightings in each of the LNG survey areas (along with the proportion of the total in parentheses).

(4) Areas with >25% of the total sightings are in bold.

Twelve individuals of humpback dolphin were identified in the Southwest Lantau subarea during the study period. Of these, it appears that most of them use Southwest Lantau as only a portion of their home range, which generally extends further north and/or west. Although it would appear to be important for a few individuals it is noted that the sample size is too small to make a firm conclusion.

In the West Lantau subarea, 25 individuals were identified during this study, 11 of which used the subarea as a substantial part of their home range. There are many other individuals that used the West Lantau area over the last ten years of monitoring (at least 32 individuals), and 27 of these used the West Lantau area as part of their range in the period before the LNG study.

Northwest Lantau is used by a very large number of individuals (several dozen that use it at least on an occasional basis). Twenty-six dolphins were observed in North Lantau during the LNG surveys, and there appear to be at least 12 different individuals that used Northwest Lantau as part of their range during the study period. Only seven individuals were identified in Deep Bay during the LNG study. However, of these, five (DB02, DB03, WL26, NL169 and NL181) appeared to use Deep Bay as portion of their home range during the study period (although the sample sizes are small). In addition, two other individuals were identified in Deep Bay in previous surveys, and both of them used it as a significant part of their home range.

The ranging patterns of 21 individual dolphins identified during the 11 month surveys are shown in *Figures 9.42* & *9.43*. Among these individuals, 18 were identified in Northwest Lantau, 16 in West Lantau, 4 in Southwest Lantau, and 3 in Deep Bay. This indicates the importance of West Lantau and Northwest Lantau to humpback dolphins in Hong Kong. Of the four survey areas for this project, 68% of the individuals identified in the study period used at least one of the areas as a part of their home range.

Currently, among the 398 individuals identified in Hong Kong and Mainland waters of the Pearl River Estuary, 59 individuals (15%) were re-sighted 10 or more times, which were used in the ranging pattern analysis. Among them, 51 individuals (86%) had home ranges covering the western end of Northwest Lantau, while 36 individuals (61%) had ranges covering West Lantau. On the contrary, only 14 of the 56 individuals (24%) were sighted in Southwest Lantau, and only one (NL11) had range covering Deep Bay. The large proportion of identified individuals sighted in Northwest and West Lantau strongly suggested the importance of these habitats to the dolphins residing in the Pearl River Estuary.

Group Size and Composition

Humpback dolphin average group size was similar for the Northwest Lantau, West Lantau, and Southwest Lantau subareas (3.6-4.2 dolphins/group); however it was smaller for the Deep Bay subarea (3.0 dolphins) (*Table 9.24*).

Table 9.24 ***Average Group Size for Dolphins and Porpoises among the Different Survey Subareas***

Species	Subarea	N	Mean	±SD	Range
Humpback dolphin	Deep Bay	55	3.0	2.4	1 to 12
	Northwest Lantau	62	3.7	2.9	1 to 17
	West Lantau	843	4.2	3.8	1 to 26
	Southwest Lantau	89	3.6	3.0	1 to 17
Finless porpoise	Deep Bay	0	-	-	-
	Northwest Lantau	0	-	-	-
	West Lantau	0	-	-	-
	Southwest Lantau	186	2.9	2.4	1 to 12

Finless porpoise average group size (all sightings from Southwest Lantau) was small, with an average of 2.9 porpoises per group (*Table 9.24*). It should be noted that for both species the standard deviation around the means was high indicating that group size varies markedly between sightings.

Due to the need to observe dolphin groups for extended periods at close range (which somewhat conflicted with the goal of completing all the transect lines), the surveys were only able to accurately record complete age class composition for a portion of the groups observed in each area (*Table 9.25*). In this subsample, all age groups were represented in each of the four survey subareas, except that no Unspotted Calves were found in Northwest Lantau (it is important to note this age class was observed in this area during the study; however, the subsample of data on groups with complete age class data did not include any groups with them). The absence of Unspotted Calves in Northwest Lantau appears to be a result of the small sample size. Previous surveys have observed many Unspotted Calves in the entire area north of Lantau Island. Besides that mentioned above, there were no dramatic differences in group composition among the different subareas, but there were some differences in the age classes most represented (i.e., those with greater than 20% of the total). Northwest Lantau has a smaller proportion of Mottleds (SJs) and higher proportion of Spotted Adults (SAs) than other areas, which would indicate somewhat older individuals in that area.

Table 9.25 ***Age Class Composition of Groups of Dolphins among the Four Survey Subareas (Percentage of Total Given in Parentheses). Data included this study and long-term data. Note that only groups in which the composition of the entire group was determined are presented***

Area	No. of Groups	UC	UJ	SJ	SS	SA	UA
Deep Bay	19	8 (7%)	8 (14%)	13 (24%)	14 (25%)	13 (23%)	4 (7%)
Northwest Lantau	16	5 (11%)	5 (11%)	6 (13%)	12 (26%)	18 (39%)	5 (11%)
Southwest Lantau	24	4 (6%)	4 (6%)	21 (30%)	15 (21%)	19 (27%)	10 (13%)
West Lantau	231	78 (8%)	78 (8%)	206 (22%)	196 (21%)	210 (23%)	211 (24%)

Behaviour

Dolphin sightings associated with different types of activities were examined on GIS to determine important areas for certain types of dolphin activity. For sightings with dolphins engaged in feeding activities, most were made along the coastal waters of West Lantau, extending from Sham Wat to Peaked Hill (*Figures 9.32-9.35*).

In Northwest Lantau, most of the feeding activities occurred around Lung Kwu Chau and Sha Chau; while in Southwest Lantau, sightings associated with feeding activities were concentrated around the corner of Fan Lau. Feeding activities were rarely observed in Deep Bay.

Dolphins were occasionally observed socializing during the study period, and there was no particular area where sightings associated with socializing activities were frequently observed.

9.4 EVALUATION OF ECOLOGICAL IMPORTANCE OF THE STUDY AREA

The existing conditions of the marine ecological habitats and resources in the waters of the proposed LNG terminal at South Soko Island and, those surrounding and those along the proposed submarine pipeline route have been assessed. These baseline conditions of individual marine habitat types have been based on available literature and, where considered necessary, detailed field surveys to update and supplement the data. Based on this information, the ecological importance of each habitat has been determined according to the *EIAO-TM Annex 8* criteria, as follows:

- Naturalness
- Size
- Diversity
- Rarity
- Re-creatability
- Fragmentation
- Ecological Linkage
- Potential Value
- Nursery Ground
- Age
- Abundance

As noted previously, the marine waters and coastal habitats of the Southwest Lantau area including offshore islands of the Soko group, when taken as whole, are considered to be of high ecological importance and of conservation interest. Bearing this mind, it is also the case that within such a large area there are variations in the ecological characteristics of habitats in different areas. To provide information of key relevance to the marine ecological assessment, the ecological importance of habitats presented in this baseline is therefore primarily focused on the vicinity of the works areas of the proposed project.

9.4.1 *Intertidal Habitats*

The criteria listed below have been applied to the information gathered or reviewed on the marine ecology of the intertidal habitats at South Soko, Black Point and Shek Pik in order to determine the ecological value. The application of these criteria has led the artificial shoreline and the sandy shores to be classified as low and natural rocky shore as medium at South Soko (*Table 9.26).*

Table 9.26 Ecological Importance of Intertidal Habitats at South Soko

Criteria	Rocky Shore	Artificial Shorelines	Sandy Shore
Naturalness	The natural rocky shoreline is interspersed with areas of artificial seawall and are largely undisturbed by human activity	Artificial constructed habitat.	The shores are moderately disturbed
Size	Large in extent with the majority of South Soko shoreline consisting of this habitat	The length of the artificial shorelines at South Soko is relatively small at approximately 920 m	Small. The two sandy shores in the study area at South Soko total approximately 250 m in length
Diversity	Typical of exposed and semi-exposed rocky shores in Hong Kong.	Low. Artificial shores support similar assemblages to natural intertidal shores.	Very low. Only one species was recorded on the sandy shore and in low numbers
Rarity	No species recorded are considered rare or of recognised conservation interest.	No species recorded were rare or of recognised conservation interest	No species recorded are considered rare or of recognised conservation interest.
Re-creatability	The habitat is re-creatable.	N/A	The habitat is re-creatable.
Fragmentation	Low. Rocky shore is predominant intertidal habitat.	N/A	Moderate. Sandy shores form a small portion of the intertidal habitat in the Study Area and are also present on North Soko.

Criteria	Rocky Shore	Artificial Shorelines	Sandy Shore
Ecological Linkage	The habitat is not functionally linked to any high value habitat in a significant way.	The habitat is not functionally linked to any high value habitat in a significant way	The habitat is not functionally linked to any high value habitat in a significant way
Potential Value	Low.	None identified	Low to moderate.
Nursery Area	No significant records identified during the literature review or field surveys.	No significant records identified during the literature review or surveys	Higher abundance of nearshore fish fry were reported at Pak Tso Wan. No significant records identified in the sandy shores during the literature review or surveys.
Age	n/a for these assemblages as the life cycle of the fauna and flora is short.	The artificial seawall has been in place since the detention centre was built in 1989	n/a for these assemblages as the life cycle of the fauna is short.
Abundance	Moderate. Typical species of similar composition and abundance as other exposed and semi-exposed rocky shores in Hong Kong.	Low. Assemblages similar to nearby rocky shores but in lower abundance.	Very low. This finding is typical of semi-exposed sandy beaches in Hong Kong.
SUMMARY	Rocky shore supports assemblages typical of exposed and semi-exposed shores in Hong Kong. .	Artificial shores support established assemblages similar to natural rocky shore but with lower abundance.	Sandy shores are small and based on survey findings support low abundance and diversity of species.
	Ecological Importance - Medium.	**Ecological Importance - Low.**	**Ecological Importance – Medium for Pak Tso Wan Low for the remaining Sandy Shores.**

Note: n/a: Not Applicable

The application of these criteria has led the artificial shoreline and natural rocky shore at Black Point to be classified as low ecological importance (*Table 9.26)*.

Table 9.27 Ecological Importance of Intertidal Habitats at Black Point

Criteria	Rocky Shore	Artificial Shorelines
Naturalness	The natural rocky shoreline is interspersed with areas of artificial seawall and are largely undisturbed prior to the development of the thermal power station (BPPS) commenced in 1993.	Artificial, constructed habitat.

Criteria	Rocky Shore	Artificial Shorelines
Size	Large. Within the Study Area, rocky shore habitat are approximately 390 m in total length and are predominant habitat on Black Point headland.	Large. The total length of the artificial shore in the Study Area at Black Point is approximately 522 m and are predominant habitat to the north of the power station.
Diversity	Low. The intertidal communities are composed of typical biota of semi-exposed rocky shores in Hong Kong, but with low diversity.	Records indicate that sloping artificial shores support similar assemblages to natural intertidal shores.
Rarity	No species recorded are considered rare or of recognised conservation interest.	No species recorded are considered rare or of recognised conservation interest..
Re-creatability	The habitat can be re-created.	n/a.
Fragmentation	Low. The surrounding environment contains similar intertidal habitats.	Low. The surrounding coastlines are composed of a mixture of natural and artificial intertidal shores.
Ecological Linkage	The habitat is not functionally linked to any high value habitat in a significant way.	The habitat is not functionally linked to any high value habitat in a significant way.
Potential Value	Unlikely that the site can develop conservation interest.	Unlikely to become an area of conservation value
Nursery Area	No significant records identified during the literature review or field surveys.	No significant records identified during the literature review or surveys
Age	n/a for these assemblages as the life cycle of the fauna and flora is very short.	The artificial seawall has been in place since the site access of Black Point Power Station was obtained in March 1993.
Abundance	Typical of other semi exposed shores in Hong Kong.	Lower abundance than natural rocky shore habitat.
SUMMARY	The fauna of the intertidal region appears to be typical of semi exposed shores in Hong Kong, but with low diversity. The sites appear to have suffered some human disturbance. **Ecological Importance - Low.**	The fauna of the intertidal region of the artificial shores is reported to support a similar diversity and abundance of intertidal organisms as natural shores. **Ecological Importance - Low.**

Note: n/a: Not Applicable

The application of these criteria has led the artificial shoreline, natural rocky shore and sandy shore at Shek Pik to be classified as low ecological importance (*Table 9.28*).

Table 9.28 Ecological Importance of Intertidal Habitats at Shek Pik

Criteria	Rocky Shore	Artificial Shorelines	Sandy Shore
Naturalness	Natural rocky shoreline occurs along the mouth of the bay away from developed areas and is largely undisturbed by human activity	Artificial constructed habitat.	Owing to their location close to Shek Pik maximum security prison the shores are largely undisturbed.
Size	Large in extent with the majority of the shoreline at the periphery of the study area consisting of this habitat	Medium in extent. The artificial shorelines at Shek Pik occurs in the middle part of the bay.	Large. The two sandy shores in the study area at South Soko total approximately 650 m in length
Diversity	The shore was characterised as a relatively low diversity of intertidal species shores compared to other semi-exposed rocky shores in Hong Kong.	Low. Artificial shores support similar assemblages to natural intertidal shores.	Very low. Only one species was recorded on the sandy shore and in low numbers
Rarity	No species recorded are considered rare or of recognised conservation interest.	No species recorded were rare or of recognised conservation interest	No species recorded are considered rare or of recognised conservation interest.
Re-creatability	The habitat is re-creatable.	N/A	The habitat is re-creatable.
Fragmentation	Low. Rocky shore is common intertidal habitat.	N/A	Low. Sandy shores form long contiguous stretches of the intertidal habitat in the Study Area and are also present at other locations along South Lantau.
Ecological Linkage	The habitat is not functionally linked to any high value habitat in a significant way.	The habitat is not functionally linked to any high value habitat in a significant way	The habitat is not functionally linked to any high value habitat in a significant way
Potential Value	Low.	None identified	Low.
Nursery Area	No significant records identified during the literature review or field surveys.	No significant records identified during the literature review or surveys.	No significant records identified during the literature review or surveys.
Age	n/a for these assemblages as the life cycle of the fauna and flora is short.	The artificial seawall was probably built as part of the prison development in the 1980s.	n/a for these assemblages as the life cycle of the fauna is short.

Criteria	Rocky Shore	Artificial Shorelines	Sandy Shore
Abundance	Relatively low. Typical species of similar composition but generally lower abundance compared to other semi-exposed rocky shores in Hong Kong.	Low. Assemblages similar to nearby rocky shores.	Very low. This finding is typical of semi-exposed sandy beaches in Hong Kong.
SUMMARY	Rocky shore supports assemblages typical of semi-exposed shores in Hong Kong but with generally lower diversity and abundance. **Ecological Importance - Low.**	Artificial shores support established assemblages similar to natural rocky shore but with lower abundance. **Ecological Importance - Low.**	Sandy shores are large and based on survey findings support low abundance and diversity of species. **Ecological Importance – Low.**

Note: n/a: Not Applicable

9.4.2 *Subtidal Habitats*

The criteria listed above have been applied to the information gathered or reviewed on the marine ecology of the subtidal hard surface benthic habitat within the Study Area. The habitat has been classified as of low ecological value (*Table 9.29).*

Table 9.29 Ecological Importance of the Subtidal Hard Substrate Habitat at South Soko

Criteria	Subtidal Hard Surface Habitat along Natural Shoreline	Subtidal Hard Surface Habitat along Artificial Shoreline
Naturalness	Habitat is largely natural. There is evidence at the site of indirect impacts to the assemblages through poor water quality and deposited sediments.	The artificial habitat will have been largely undisturbed since the decommissioning of the detention centre. There is evidence at the site of indirect impacts to the assemblages through poor water quality and deposited sediments.
Size	Medium in extent. Predominant habitat fringing South Soko. Corals are restricted to shallows and have a very sparse and scattered occurrence.	The assemblages at South Soko extend along the entire length of the artificial shorelines of approximately 920 m, but are only found along a narrow band at depths of 3-4m below chart datum.
Diversity	A total of fifteen species of hard corals, including *Porites lobata*, *Psammocora superficialis, Coscinarea* sp., *Pseudosiderastrea tayami, Turbinaria peltata, Balonophyllia* sp.,*Plesiastrea versipora, Leptastrea pruinosa, Cyphastrea* sp, *Echinophyllia* sp, *Favites abdita, Goniopora stutchburyi, Goniopora lobata, Oulastrea crispata* and *Tubastrea* sp./ *Dendronophyllia* sp., and 4 genera of octocorals, including *Dendronepthya, Euplexaura, Echinomuricea and Echinogorgia* were recorded, with low diversity on west and east coast and moderate diversity on south coast of South Soko in comparison to other sites in Hong Kong.	One hard coral *Oulastrea crispata* and one octocoral *Euplexaura* were recorded, this is very low in comparison to other sites in Hong Kong.

Criteria	Subtidal Hard Surface Habitat along Natural Shoreline	Subtidal Hard Surface Habitat along Artificial Shoreline
Rarity	With the exception of the little known *Pseudosiderastrea tayami* recorded at two locations (Transects J & K) on the south coast of South Soko, all species of hard and soft corals are commonly recorded on rocky coasts across Hong Kong southern and eastern waters. *P. tayami* which was discovered in 2002 during a study to clarify taxonomic identities of Hong Kong hard corals, has only been recorded from 2 sites so far.	All species of hard and soft corals are commonly recorded on rocky coasts in Hong Kong.
Re-creatability	Hard bottom substrata may be recolonised by subtidal organisms including corals.	Hard bottom substrata may be recolonised by subtidal organisms including corals.
Fragmentation	Low. Similar subtidal habitats are situated around the shores of South Soko, Yuen Chau and Ma Chau.	Low. Similar subtidal hard surface habitats are situated around the shores of South Soko, North Soko, Yuen Chau and Ma Chau.
Ecological Linkage	The habitat is not functionally linked to any high value habitat in a significant way.	The habitat is not functionally linked to any high value habitat in a significant way.
Potential Value	Low. Conditions are marginal for coral growth this habitat supports sparse coral cover. High turbidity and high rates of sedimentation mean that the area is unlikely to become an area of coral conservation, although the location, where the little known, hardy coral *Pseudosiderastra tayami* is common, represents a notable record.	Very low. This habitat supported few coral species which were sparse in abundance. Conditions are not highly suited for coral growth. High turbidity and high rates of sedimentation mean that the area is unlikely to become an area of coral conservation.
Nursery Area	No significant records identified during the literature review or field surveys.	No significant records identified during the literature review or field surveys.
Age	Coral colonies were scattered and small. No large mature hard coral colonies were observed.	Coral colonies were scattered and small. No large mature coral colonies were observed.
Abundance	Very low live coral coverage was found in the study area.	Very low live coral coverage was found in the study area.
SUMMARY	Coral cover is very low in comparison to other sites in Hong Kong. **Ecological Importance – Low** **except sites at Transect J & K on south coast of South Soko – Medium**	Coral cover is very low in comparison to other sites in Hong Kong. **Ecological Importance - Low.**

Note: n/a: Not Applicable

The criteria listed above have been applied to the information gathered or reviewed on the marine ecology of the subtidal soft bottom benthic habitat at South Soko in order to determine the ecological value. The application of these criteria has led the habitat to be classified as of relatively low ecological value *(Table 9.30)*.

Table 9.30 Ecological Importance of the Subtidal Soft Benthos Assemblages at South Soko and along the Corridor of the Proposed Submarine Natural Gas Pipeline

Criteria	Subtidal Soft Benthos at South Soko (SK 1 - SK 4, SSK 1 – SSK 4)	Subtidal Soft Benthos along the Corridor of the Proposed Submarine Natural Gas Pipeline (AC, PH, TO, MP1, MP2, UR & BP1)
Naturalness	Habitat disturbed to some extent by fisheries vessel trawling activities and is influenced by discharges from the Pearl River.	Habitat disturbed to some extent by fisheries vessel trawling activities and is influenced by discharges from the Pearl River.
Size	Habitat is large in extent.	Habitat is large in extent. Pipeline alignment is approx 40 Km
Diversity	The assemblages are of relative higher diversity (number of benthic species recorded per unit area above the mean value of the CityU (2002) data) compared to other areas in the Hong Kong waters.	The assemblages are of similar diversity to other areas in the Hong Kong waters.
Rarity	No infaunal organisms were found that are considered as rare. One epifaunal species listed as a Class II protected species in China – amphioxus *Branchiostoma belcheri* was recorded in grab samples taken from the eastern bay (SK3 in Tung Wan) of South Soko. This species has been recorded from a number of sites across eastern Hong Kong waters.	No organisms were found that are considered as rare or of recognised conservation interest.
Re-creatability	Benthic organisms may recolonise disturbed seabed areas.	Benthic organisms may recolonise disturbed seabed areas.
Fragmentation	The habitat is not fragmented.	The habitat is not fragmented.
Ecological Linkage	The habitat is not functionally linked to any high value habitat in a significant way.	The habitat is not functionally linked to any high value habitat in a significant way.
Potential Value	It is unlikely that the habitat could develop conservation interest.	It is unlikely that the habitat could develop conservation interest.
Nursery Area	No significant records identified in the review or surveys.	No significant records identified in the review or surveys.

Criteria	Subtidal Soft Benthos at South Soko (SK 1 - SK 4, SSK 1 – SSK 4)	Subtidal Soft Benthos along the Corridor of the Proposed Submarine Natural Gas Pipeline (AC, PH, TO, MP1, MP2, UR & BP1)
Age	The fauna appear to be typical of those present in Hong Kong's soft benthos. The sediments in the habitat are constantly accreting and eroding and the fauna present there are typically short lived.	The fauna appear to be typical of those present in Hong Kong's soft benthos. The sediments in the habitat are constantly accreting and eroding and the fauna present there are typically short lived.
Abundance	In comparison to other parts of the southern and western waters the assemblages are of moderate abundance.	In comparison to other parts of the western waters the assemblages are of moderate abundance.
SUMMARY	The sediments support average diversity and abundance of benthic organisms that are typical of Hong Kong's benthos. **Ecological Importance – Medium except SK3 in Tung Wan – High.**	The sediments support average diversity and abundance of benthic organisms that are typical of Hong Kong's benthos. **Ecological Importance – Low.**

Note: n/a: Not Applicable

9.4.3 *Marine Mammal Habitat off South Soko and along the Proposed Submarine Pipeline Route*

The same assessment criteria have been applied to the marine waters within the Study Area with regard to the usage of the area by marine mammals. Both species are sighted in the waters of Southwest Lantau although typically at different times of the year. The submarine pipeline route has been divided in distinct areas in which dolphin use of the habitat differs markedly and has been based on the recent on effort sightings data from AFCD. The waters around West Lantau have been classified as of high ecological importance and the Northwest Lantau areas as medium ecological importance to *Sousa chinensis*. The section of the pipeline route from South Lantau to the Terminal at South Soko has been classified as of lower ecological importance to both *Sousa chinensis* and *Neophocaena phocaenoides* based on the comparatively lower number of sightings (*Table 9.31).*

Table 9.31 Ecological Importance of the Marine Waters off South Soko and along the Corridor of the Proposed Submarine Natural Gas Pipeline

Criteria	Marine Waters around South Soko	Along the Corridor of the Proposed Submarine Natural Gas Pipeline
Naturalness	Close proximity to the artificial shoreline and marine traffic lanes in Hong Kong.	Largely undisturbed in West Lantau and adjacent to the Sah Chau Lung Kwu Chau Marine Park. Other sections are in close proximity to marine traffic lanes in Hong Kong waters pass along the route.
Rarity	The South Lantau waters (extending from Fan Lau to south of Cheung Chau) is the only area in Hong Kong where there is a major spatial overlap in the distribution of Indo-Pacific Humpback dolphin and Finless Porpoises. There are however marked seasonal differences of these species use of South Lantau waters. Finless porpoises are generally absent from South Lantau waters in the seasons when dolphin abundance is at its highest. Therefore, while there is a strong spatial overlap, the temporal overlap is less pronounced due to strong seasonal habitat partitioning. Around South Soko, Indo-Pacific humpback dolphin *Sousa chinensis* has been recorded in coastal waters to the east (Tung Wan) and north (Lan Nai Wan) of South Soko, and the finless porpoise has been recorded in the west (Sai Wan) and north (the waters between North and South Soko) of South Soko.	Indo-Pacific humpback dolphin *Sousa chinensis* has been recorded along the majority of the waters of the route, whereas, sightings of the *Neophocaena phocaenoides* (are uncommon, if at all, along the entire route)
Re-creatability	n/a	n/a
Ecological Linkage	Preferred marine mammal habitat occurs to the north (north-western Lantau) for humpback dolphins and west (South Lamma) for finless porpoise of this area.	Route lies in waters that are utilised by humpback dolphins as part of their larger habitat. West Lantau and Northwest Lantau waters are major habitat for humpback dolphins.
Potential Value	South Soko Island has been considered as a potential marine park as was included in the Proposed Southwest Lantau Marine Park.	West Lantau and Northwest Lantau waters are highly utilised and are important parts of the home range for a number of animals. The W and SW Lantau areas, including Fan Lau, have been considered as a potential marine park and have been proposed for designation as such.

Criteria	Marine Waters around South Soko	Along the Corridor of the Proposed Submarine Natural Gas Pipeline
Nursery Area	Not key nursery areas in the review of baseline conditions or field surveys.	Review of baseline conditions and field surveys, indicated higher sightings of young animals off West Lantau in the waters surrounding or in proximity to the route. Monitoring data indicated that West Lantau has the highest sightings of dolphins and of mothers with calves compared to other areas of Hong Kong, which indicates the importance of this area to these animals.
Abundance	Seasonal changes in the distribution patterns of dolphins were observed near the areas of the proposed LNG terminal and pipeline route alignment, with comparatively higher sightings in spring and winter months. Abundance of dolphins is low at South Soko when compared to the preferred habitat in West and Northwest Lantau, however, Southwest Lantau is in the fourth most important dolphin habitat in Hong Kong among AFCD's 12 survey areas. Finless Porpoise sightings are lower than areas such as Po Toi and vary strongly throughout the year; however, Southwest Lantau is the second most important porpoise habitat in Hong Kong among AFCD's 12 survey areas.	Northwest and West Lantau are consistently highly utilised by dolphins with no strong seasonal variations. West Lantau represents highest use area by dolphins in Hong Kong. Limited sightings of the finless porpoise recorded along the route.
SUMMARY	Sightings of humpback dolphins and finless porpoise (occupying different areas) have been made in these waters. The number of sightings is low and seasonally varies. **Ecological Importance:** - Marine Waters at Tung Wan and Sai Wan of South Soko **Low** for *Sousa chinensis*, **Medium** for *Neophocaena phocaenoides*(2). - Marine Waters at the southeast of South Soko Island at the location of the LNG jetty **Low** for both *Sousa chinensis* and *Neophocaena phocaenoides*. - Marine Waters along the Corridor of the Proposed water main and submarine cable circuit **Medium** for both *Sousa chinensis* and *Neophocaena phocaenoides*.	Route passes through waters where sightings are common and consistent throughout the year. Sightings of finless porpoise are either low, or not all, along the route. **Ecological Importance:** **Medium** for both *Sousa chinensis* and *Neophocaena phocaenoides* west of South Soko(2). **Medium** in southwest Lantau for *Sousa chinensis*, **Low** for *Neophocaena phocaenoides*. **High** in west and northwest Lantau only for *Sousa chinensis* (1). **Low** at Black Point landing area only for *Sousa chinensis*.

Note: (1) The rank of 'high' is the highest rank that can be accorded to a habitat under ERM's system for evaluating habitat importance. While both west and northwest Lantau are deemed to be of high ecological importance, it is recognised that West Lantau has greater dolphin sightings densities compared to northwest Lantau.

(2) It is noted that as a whole, the marine waters around South Soko may be considered as high ecological value in terms of general marine ecology.

9.4.4 *Species of Recognised or Potential Conservation Interest Conservation Interest*

In accordance with *EIAO-TM Annex 8* criteria, species of recognised or potential conservation value and their conservation and protection status, are presented in *Table 9.32*.

Table 9.32 Species of Recognised or Potential Conservation Interest within the Study Area

Common Name	Scientific Name	Protection Status	Distribution, Rarity and other Notes
Chinese White Dolphin (also known as the Indo-Pacific Humpback dolphin)	*Sousa chinensis*	Wild Animals Protection Ordinance, Animals and Plant Ordinance, Class I Protected Species in the PRC, CITES Appendix 1, IUCN-listed (data deficient), Listed in UN Biodiversity Treaty	Range across Pearl River estuary and across Hong Kong western and Southern Waters from Deep Bay to Lamma.
Finless Porpoise (also known as the Black Finless Porpoise)	*Neophocaena phocaenoides*	Wild Animals Protection Ordinance, Animal and Plants Ordinance, Class I Protected Species in the PRC. CITES Appendix 1, IUCN-listed (data deficient)	Range from South Lantau to Mirs Bay (mainly in south and east of Hong Kong) and PRC waters
Amphioxus	*Branchiostoma belcheri*	Not protected in Hong Kong. Class II Protected Species in the PRC.	Recent studies indicate wider distribution than previously known. Recorded from across Hong Kong eastern waters from Sai Kung to Big Wave Bay.
False Pillow Coral	*Pseudosiderastrea tayami*	Wild Animals Protection Ordinance, Animal and Plants Ordinance	Little known species in Hong Kong recently discovered following study to clarify identity of Hong Kong hard corals. Species is difficult to identify in the field and so far is recorded from 2 locations in Hong Kong southern waters.

9.5 SUMMARY

The findings from the literature review and field surveys on marine ecological conditions are detailed above and are summarized as follows.

The marine ecological habitats in the immediate vicinity of the South Soko Island have undergone some anthropogenic disturbance through reclamations in Sai Wan and Tung Wan as a result of the site formation for the Detention Centre (now decommissioned). Even before this facility was built there had been some modifications to the coastline, in the form of piers and seawalls, as a result of the village developments at Ha Tsuen and Sheung Tsuen (now abandoned). To the east of the South Soko Island lies the active mud disposal ground at South Cheung Chau and to the west a former marine sand borrow area.

The key finding of the literature review was the recorded presence in the waters in southern Lantau of both the Indo-Pacific humpback dolphin *Sousa chinensis* and the Finless Porpoise *Neophocaena phocaenoides*. Both species are sighted in the waters of Southwest Lantau although typically at different times of the year.

The review highlighted that the waters around the Soko Islands did not report large numbers of sightings. A higher number of sightings have been recorded in the waters along and in vicinity of the proposed submarine pipeline corridor in West Lantau, however, these were, and in general limited to be sightings of humpback dolphins only.

The ecological importance of the habitats was determined through reference to the following:

- Literature review;
- Findings of the field surveys;
- Comparison with other outlying islands in Hong Kong as well as South Lantau; and,
- *Annexes 8* and *16 of the EIAO TM*.

9.5.1 *Dolphins and Porpoises*

For this study, an extensive programme of vessel-based surveys have been conducted to supplement data available from ongoing long-term AFCD monitoring. These surveys have provided a detailed overview of dolphin utilisation of Hong Kong western waters spanning South West Lantau, West Lantau, North West Lantau and Deep Bay areas. During field surveys, dolphins were observed throughout all the surveyed areas except directly south of the Sha Chau/ Lung Kwu Chau Marine Park and the very northern end of the Deep Bay survey area.

Deep Bay has relatively low densities (0.08 - 0.23 dolphins km^{-2}) and low estimates of abundance (<10 dolphins). As such it appears that dolphins use the mouth of Deep Bay at a low level throughout the year.

In contrast, West Lantau had highest dolphin densities (1.71 – 2.81 dolphins km^{-2}) and comparatively higher abundance (47 - 78) of dolphins.

Southwest Lantau had lower levels of dolphin density (0.10 - 0.44 dolphins km^{-2}) and abundance (26 - 29 dolphins) than West Lantau but higher than Deep Bay.

Northwest Lantau had lower levels of dolphin density (0.57-0.94) but similar abundance (49-82) compared to West Lantau. Northwest Lantau had higher levels of dolphin density and abundance than Deep Bay and Southwest Lantau.

Finless Porpoises were only seen in Southwest Lantau and estimates of abundance (0 - 15 porpoises) and density (<0.01 - 0.17 porpoises km^{-2}) were low for all seasons. According to the literature [(1)], other areas of Hong Kong such as key habitats at Lamma and Po Toi were found to support considerably higher densities (Lamma: 0.02 - 0.52 porpoises km^{-2}, Po Toi; 0.02 - 0.17 porpoises km^{-2}) and abundance (Lamma: 4 - 90 porpoises, Po Toi: 4 - 32 porpoises) of these animals. However, based on the latest data, this situation may have changed as sightings were higher at the Po Toi area. In monitoring conducted in 2003 to 2005, finless porpoise sightings in South Lantau (12 sightings) were higher than in Lamma (2), Nine Pins (4) and Sai Kung (4), but lower than in Po Toi (15) [(2)].

9.5.2 *Subtidal Hard Bottom Habitats*

Dive surveys at South Soko for this EIA Study yielded similar results as BCL [(3)]. In total, fifteen hard coral species and four octocoral species, were recorded within the Study Area (*Annex 9*). The majority were common faviids, poritids and siderasteriids with three predominant species – *Oulastrea crispata, Psammocora* sp. and the ahermatypic cup coral *Balanophyllia* sp.. Corals occurred in extremely low abundance and percentage cover estimates ranged from 1-5%. Many live corals recorded were highly bioeroded by macroborers and barnacles. The majority of colonies exhibited partial mortality and at most survey sites a low percentage cover of dead coral was noted. The corals recorded are all common Hong Kong species with the exception of the relatively little known hard coral, the False Pillow Coral *Pseudosiderastrea tayami* on the south coast of South Soko Island.

Subtidal Soft Bottom Habitats

A total of 96 grab samples were taken from 16 sites during both the wet and dry seasons: 8 of the sites (48 grabs) were located close to South Soko Island; 6

(1) Jefferson TA, Hung S, Law L, Torey M, Tregenza N. 2002. Distribution and abundance of finless porpoises in Hong Kong and adjacent waters of China. *The Raffles Bulletin of Zoology Supplement* 10:43-55.

(2) AFCD 2005. Monitoring of Finless Porpoises (*Neophocaena phocaenoides*) in Hong Kong waters (2003-2005) Final Report, prepared by Hong Kong Cetacean Project.

(3) Binnie Consultants Limited. 1997. Coastal Ecology Studies – Soko Islands (Qualitative Survey). Final Report to GEO, Civil Engineering Department.

of the sites (36 grabs) were located along the submarine pipeline alignment; and 2 of the site (12 grabs) were located off Black Point. A total of 4,309 individual organisms were identified during the dry season surveys and 6,351 during the wet season survey. In both seasons, benthic assemblages were dominated by polychaete worms except off Black Point were bivalves had higher numbers. In terms of diversity and abundance, benthic communities at the sites were similar to other locations reported in Hong Kong. At sites close to South Soko Island, the level of diversity and biomass was generally higher than the Hong Kong average reported from the literature. In addition, a low number of amphioxus *Branchiostoma belcheri* were recorded in Tung Wan on the east coast of South Soko Island.

Intertidal Hard Bottom Habitats

Quantitative transect surveys and spotchecks were conducted on natural rocky shore and artificial seawalls on the west, east and south coasts of South Soko Island, Black Point and Shek Pik. Rocky shore species at all locations were common and widespread and no species of note were recorded. At South Soko, assemblages with the highest diversity were recorded on the south coast of the island. In comparison to records of other shores in Hong Kong reported in the literature, the diversity of intertidal biota at South Soko, was similar to other shores in Hong Kong.

Intertidal Soft Bottom Habitats

The sandy shores at South Soko and Shek Pik supported a very low species diversity in the dry and wet season, which is a typical feature of mobile sandy shores with unstable substrates.

Detailed and comprehensive seasonal surveys were conducted examining the major habitats and species surrounding the South Soko Island as well as along the provisional pipeline corridor to the Black Point Power Station. The details of the baseline surveys are summarized in *Table 9.33.*

Table 9.33 Marine Ecology Baseline Surveys

Survey Type	Methodology	Date
Intertidal Assemblages at South Soko	Rocky shore/ artificial shoreline Quantitative (belt transects at 9 locations) survey, three 100 m belt transects (at high, mid and low intertidal zones) for each location, covered both wet and dry seasons. Sandy Shore Quantitative (line transects at two locations) survey, 50 x 50 x 50cm core at three points (high, mid and low intertidal zones) along each of the transects, covered both wet and dry seasons.	8 & 9 March, 28 & 29 July and 14 September, 17 & 28 December 2004, 29 & 30 September 2005 and 27 January 2006

Survey Type	Methodology	Date
Intertidal Assemblages at Black Point	Rocky shore/ artificial shoreline Quantitative (belt transects at 6 locations) survey, three 100 m belt transects (at high, mid and low intertidal zones) for each location, covered both wet and dry seasons	22 & 23 March and 15 & 30 July 2004.
Intertidal Assemblages at Shek Pik	Rocky shore/ artificial shoreline Quantitative (belt transects at 1 locations) survey, three 100 m belt transects (at high, mid and low intertidal zones) covered both wet and dry seasons. Sandy Shore Quantitative (line transects at 3 locations) survey, 50 x 50 x 50cm core at three points (high, mid and low intertidal zones) along each of the transects, covered both wet and dry seasons.	30 August 2005 & 14 March 2006
Subtidal Benthic Assemblages	Quantitative grab sampling survey; covered both wet and dry seasons. Six stations sampled in each of 10 locations.	25 & 26 February, 5 & 6 July, 9 September and 8 November 2004, 23 September 2005 and 13 December 2005.
Subtidal Hard Bottom Habitat (Coral)	Quantitative (Rapid Ecological Assessment (REA) technique, a total of eight 100 m transects at 5 locations) and qualitative (recorded within Study Area and areas in the vicinity, 3 locations); covered wet season.	9 & 15 May 2004, 29,30 September & 3 October 2005.
Marine Mammal	Land-based visual survey during daytime, 5 days per month and 6 hours per day, covered four seasons (12 months).	13, 14, 21, 23 & 26 February, 8, 9, 10, 17 & 18 March, 16, 19, 20, 21 & 26 April, 10, 12, 14, 19 & 25 May, 10, 14, 17, 18 & 28 June 2004, 23, 26, 27, 28 & 29 July 2004, 25, 26, 27, 30 & 31 August, 6, 7, 13, 14 & 22 September 2004, 27, 28, 29, 30 & 31 October 2004, 16, 17, 24, 25 & 26 November 2004, 16, 21, 28, 30 & 31 December 2004, 10, 12, 14, 17 & 28 January 2005
	Quantitative vessel based survey using line transect methods spanning Hong Kong western waters (Deep Bay, Southwest Lantau,Northwest Lantau and West Lantau) 3 days, 2 times per month	18, 19, 20,21, 22, 25, 26, 27 July 2005, 3, 4, 5,15,24 & 25 August 2005, 5,7,15, 16 & 20 September 2005, 5, 6, 7, 17, 18 & 19 October 2005, 22, 24, 25, 28, 29 & 30 November 2005, 6,7,8 & 22 December 2005, 13, 16, 17, 19, 20 & 24 January 2006, 1, 2, 3, 7, 8 & 9 February 2006, 17, 23, 28, 29, 31 March 2006, 3, 6, 18, 25, 26, 27 April 2006, 2, 4, 8, 9, 10, 11 May 2006.

Annex 9-A

Data of Marine Ecological Resources

Table 1 *Density (m^{-2}) of Intertidal Fauna and Percentage Cover (%) of Sessile Fauna and Flora recorded on Artificial Shoreline Transects T1, T2 T3 and T7 on South Soko Island during Dry Season 2004*

Flora/Fauna	High-Intertidal Zone				Mid-Intertidal Zone				Low-Intertidal Zone			
	T1	T2	T3	T7	T1	T2	T3	T7	T1	T2	T3	T7
Snail												
Nodilittorina trochoides	5.60±12.4	1.60±5.66	33.6±144		0.40±0.00	0.80±0.00	0.80±0.00	15.0±24.3				
Nodilittorina radiata	9.20±35.9	2.80±2.83	68.4±184		3.20±0.00	9.60±35.6	6.80±13.2					
Nodilittorina vidua	0.80±0.00			1.60±2.31	20.8±88.1	2.80±0.00		13.0±6.41				
Littoraria articulata		0.40±0.00			2.00±2.31	0.80±0.00						
Planaxis sulcatus											0.40±0.00	
Lunella coronata												
Monodonta labio				3.20±2.31		0.80±0.00	3.20±8.33		2.80±4.62	2.40±0.00	24.8±29.6	
Monodonta neritoides												
Nerita albicilla					2.00±2.83	9.60±16.6	1.60±0.00	8.00±4.62	18.8±72.7	21.6±16.8	2.80±6.11	6.40±7.87
Nerita costata												
Thais clavigera				4.00±6.93	0.40±0.00	0.40±0.00	0.80±0.00	6.00±11.3	3.20±4.62	8.40±8.94	1.20±0.00	11.2±15.1
Limpet												
Siphonaria japonica						0.80±0.00			6.80±8.76	13.2±16.5	4.80±10.6	
Siphonaria lacinosa				1.60±2.31					0.40±0.00	8.00±10.6		
Nipponacmea concinna					6.40±5.01		0.40±0.00		6.40±5.01	11.6±21.6	4.40±5.03	
Cellana grata												
Cellana toreuma									0.80±0.00		2.80±14.1	1.60±2.31
Patelloida saccharina										0.40±0.00		1.20±0.00
Patelloida pygmaea										0.80±0.00	0.40±0.00	
Chiton												
Acanthopleura japonica				4.00±5.66							0.40±0.00	2.80±3.83
Bivalves %												
Saccostrea cucullata						0.30±0.48	0.20±0.42	4.25±4.27	3.20±4.08	13.5±14.0	8.70±21.7	
Barbatia virescens												
Perna viridis												

Flora/Fauna	High-Intertidal Zone				Mid-Intertidal Zone				Low-Intertidal Zone			
	T1	T2	T3	T7	T1	T2	T3	T7	T1	T2	T3	T7
Barnacles %												
Capitulum mitella					0.20±0.63	0.50±1.58			1.00±1.63	0.10±0.32		
Tetraclita japonica				22.1±16.8		0.10±0.32		35.1±34.6				39.4±37.0
Tetraclita squamosa						0.70±1.57			0.20±0.42	4.30±8.29		
Balanus amphitrite												
Cthalamus malayensis			0.10±0.32									
Megabalanus volcano									0.20±0.63			
Septifer virgatus							0.10±0.32		0.40±0.97	1.50±2.42		
Algae %												
Ulva spp.												
Gelidium pusillum												
Epiphytic Algae												
Others %												
Cyanobacteria %							0.10±0.32				1.00±3.16	
Haliplanella lineata %												

Table 2 Density (m^{-2}) of Intertidal Fauna and Percentage Cover (%) of Sessile Fauna and Flora recorded on Rocky Shore Transects T4 to T5 on South Soko Island during Dry Season 2004

Flora/Fauna	High-Intertidal Zone			Mid-Intertidal Zone			Low-Intertidal Zone		
	T4	T5	T6	T4	T5	T6	T4	T5	T6
Snail									
Nodilittorina trochoides	25.6±48.1	29.2±27.9	37.2±73.1		2.80±0.00				
Nodilittorina radiata	180±654	136±149	20.8±44.6		4.00±11.3				
Nodilittorina vidua	7.20±16.9		1.60±2.31						
Littoraria articulata	0.40±0.00	0.80±0.00				1.60±0.00			
Planaxis sulcatus	2.00±8.49		0.80±0.00	5.60±18.9	1.20±0.00			31.6±59.6	
Lunella coronata							0.40±0.00	0.40±0.00	
Monodonta labio	1.20±0.00			21.6±13.8	35.6±29.5	16.0±20.8	26.8±17.8	39.6±29.1	1.20±0.00
Monodonta neritoides									
Nerita albicilla	0.80±0.00		0.40±0.00	14.0±13.0	11.2±18.0	20.8±85.4	1.20±0.00	17.6±16.3	4.80±28.3
Nerita costata									
Thais clavigera				2.40±4.00	3.20±3.27	2.40±2.31	4.00±3.27	6.40±4.13	5.60±4.62
Limpet									
Siphonaria japonica				1.60±2.31	4.00±6.11	0.40±0.00	8.00±6.70	6.00±5.66	0.40±0.00
Siphonaria lacinosa						0.80±0.00	0.40±0.00		17.2±5.67
Nipponacmea concinna				0.40±0.00			1.60±2.31	0.80±0.00	
Cellana grata								0.80±0.00	4.40±4.38
Cellana toreuma						3.20±0.00			1.20±2.83
Patelloida saccharina									
Patelloida pygmaea				27.2±130	4.40±12.2		6.40±10.3	11.6±8.14	5.20±25.5
Chiton									
Acanthopleura japonica									12.0±17.9
Bivalves %									
Saccostrea cucullata				5.20±6.51	2.60±4.20	2.00±1.73	1.10±2.08	13.6±17.4	45.0±35.4
Barbatia virescens									
Perna viridis									

Flora/Fauna	High-Intertidal Zone			Mid-Intertidal Zone			Low-Intertidal Zone		
	T4	T5	T6	T4	T5	T6	T4	T5	T6
Barnacles %									
Capitulum mitella	0.20±0.42	0.30±0.67			2.10±3.45	3.00±2.83			
Tetraclita japonica						3.67±2.31			25.3±38.7
Tetraclita squamosa							0.20±0.42	0.10±0.32	6.67±2.89
Balanus amphitrite									
Cthalamus malayensis									
Megabalanus volcano									
Septifer virgatus				0.90±1.52	0.20±0.42		0.70±1.57	1.80±2.30	1.00±0.00
Algae %									
Ulva spp.								1.60±2.37	
Gelidium pusillum				1.20±3.12			5.20±9.32	4.00±5.68	20.0±14.1
Epiphytic Algae									
Others %									
Cyanobacteria %	4.00±12.7			18.6±17.2	7.10±15.3		27.0±25.1	2.50±5.40	
Haliplanella lineata %								0.20±0.42	

Table 3 Qualitative spotcheck results of Intertidal Fauna composition and abundance (Abundant (A) > Common (C) > Uncommon (U) > Rare (R)) recorded on Rocky Shoreline locations T8, T9, T10, T11, T12, T 13, T14 and T15 on South Soko Island during Dry Season 27 January 2006

Flora/Fauna	Spot check location															
	T8*	Notes	T9*	Notes	T10*	Notes	T11*	Notes	T12	Notes	T13*	Notes	T14*	Notes	T15*	Notes
Snails																
Nodilittorina trochoides									C	High shore					C	High shore
Nodilittorina radiata									U	High shore					U	High shore
Nodilittorina vidua															U	High shore
Monodonta labio									C	Mid shore among small boulders					C	Mid shore among small boulders
Nerita albicilla									U	Mid shore among small boulders						
Nerita costata															U	Large individuals , mid shore
Chlorostoma argyrostoma															R	Mid shore
Planaxis sulcatus															R	Mid shore among sheltered boulders
Thais clavigera									U	Mid-low shore					U	Mid shore
Limpets																
Siphonaria japonica															U	Mid shore
Nipponacmea concinna									R	Mid shore					C	Mid shore

Flora/Fauna	Spot check location															
	T8*	Notes	T9*	Notes	T10*	Notes	T11*	Notes	T12	Notes	T13*	Notes	T14*	Notes	T15*	Notes
Cellana grata									R	Mid shore					U	Mid shore
Cellana toreuma									C	Mid shore					C	Mid shore
Patelloida saccharina															U	Mid shore
Chiton																
Acanthopleura japonica									U	Low shore					R	Mid-low shore
															R	In crevices, mid-low shore
Bivalves																
Barbatia virescens															R	In crevices, mid shore
Saccostrea cucullata									C	On sheltered boulders, low shore					A	On sheltered boulders, low shore
Septifer virgatus									R	In crevices, low shore						
Barnacles																
Capitulum mitella					C	Mid-high shore	C	Mid-high shore	C	In crevices, mid- high shore			C	Mid-high shore	C	In crevices, mid- high shore
Tetraclita japonica	A	Dominated shore	A	Dominated shore	A	Dominated shore	A	Dominated shore	A	Dominated mid-low shore	A	Dominated shore	A	Dominated shore	C	Common on exposed rocks
Tetraclita squamosa									C	Mid shore						
Tubeworms																
Hydroides sp.															R	In rock pool

Flora/Fauna	Spot check location															
	T8*	Notes	T9*	Notes	T10*	Notes	T11*	Notes	T12	Notes	T13*	Notes	T14*	Notes	T15*	Notes
Amphipods																
Amphipoda spp.									C	Under boulders						
Crabs																
Grapsus albolineatus															U	Seen along shore
Hemigrapsus sp.															R	In rock pool
Algae																
Endarachne binghamiae															U	Small clumps on low shore boulders
Gelidium pusillum											A	Thick band low-mid shore			A	Thick band low-mid shore
Hildenbrandtia rubra			A	Mid – low shore			A	Mid – low shore	A	High cover across mid-low shore			A	High cover across mid-low shore	A	High cover across mid-low shore
Hincksia mitchelliae									R	Small patches, low shore					U	Small patches, low shore & large patches in rock pools
Pseudovella applanata	C	Band at mid shore	C	Band at mid shore											A	Low shore
Sargassum sp.															R	Patches, low shore
Ulva sp.											A	Low shore			A	Low shore

Flora/Fauna	**Spot check location**															
	T8*	**Notes**	**T9***	**Notes**	**T10***	**Notes**	**T11***	**Notes**	**T12**	**Notes**	**T13***	**Notes**	**T14***	**Notes**	**T15***	**Notes**
Krytuthrix maculans											C	High shore			R	Small patches, high shore
Pink encrusting									R	Small patches, low shore					R	Small patches, low shore
Fish																
Bathygobius fuscus															R	In rock pools

** - vessel-based observations with binoculars due to inability to disembark on to shore due to safety considerations*

Table 4 Density (m^{-2}) of Intertidal Fauna and Percentage Cover (%) of Sessile Fauna and Flora recorded on Artificial Shoreline Transects T1, T2, T3 and T7 on South Soko Island during Wet Season 2004

Flora/Fauna	High-Intertidal Zone				Mid-Intertidal Zone				Low-Intertidal Zone			
	T1	T2	T3	T7	T1	T2	T3	T7	T1	T2	T3	T7
Snail												
Nodilittorina trochoides	12.0±16.3	6.40±21.4	4.00±12.9		0.40±0.00			1.60±5.66				
Nodilittorina radiata	0.40±0.00	1.60±0.00	45.2±127		4.00±0.00							
Nodilittorina vidua	1.20±2.83			4.00±9.24	1.20±2.83			5.60±10.1				
Littoraria articulata					0.40±0.00							
Planaxis sulcatus			0.40±0.00									
Lunella coronata											0.40±0.00	
Monodonta labio			0.40±0.00	3.20±5.66				0.40±0.00			0.40±0.00	
Nerita albicilla			0.40±0.00			8.40±8.49		3.20±5.66	8.00±35.9	2.00±0.00	13.2±29.2	4.80±5.37
Thais clavigera				6.40±7.45		0.80±0.00		3.20±11.3	2.00±4.62	3.20±8.33	20.4±50.9	10.4±26.9
Limpet												
Siphonaria japonica						1.60±0.00	4.00±17.0		8.40±31.8	1.60±0.00	0.80±0.00	
Siphonaria lacinosa				1.60±5.66								1.20±0.00
Cellana toreuma									0.80±0.00			0.80±0.00
Patelloida saccharina												1.20±2.83
Patelloida pygmaea											0.80±0.00	
Chiton												
Acanthopleura japonica				1.20±2.83							2.40±0.00	2.80±14.1
Bivalves %												
Saccostrea cucullata					27.0±32.6	23.5±31.3	5.70±9.56	0.80±1.55	5.50±7.98	73.0±29.1	5.10±6.59	
Perna viridis						0.50±1.58					0.20±0.63	
Barnacles %												
Capitulum mitella						0.10±0.32						
Tetraclita japonica				19.0±23.8	3.20±6.25	2.00±4.22		26.0±33.1	2.20±6.27	6.50±10.6	22.1±34.1	40.1±35.8
Balanus amphitrite											0.10±0.32	
Megabalanus volcano								0.50±1.58				

Flora/Fauna	High-Intertidal Zone				Mid-Intertidal Zone				Low-Intertidal Zone			
	T1	T2	T3	T7	T1	T2	T3	T7	T1	T2	T3	T7
Algae %												
Epiphytic Algae			2.00±6.32		6.00±19.0	6.00±19.0			45.0±38.7	12.5±25.1	9.00±10.8	
Others %												
Cyanobacteria %		9.00±25.1				2.00±6.32			3.00±6.75		3.00±6.75	

Table 5 Density (m-2) of Intertidal Fauna and Percentage Cover (%) of Sessile Fauna and Flora recorded on Rocky Shore Transects T4 to T6 on South Soko Island during Wet Season 2004

Flora/Fauna	High-Intertidal Zone			Mid-Intertidal Zone			Low-Intertidal Zone		
	T4	T5	T6	T4	T5	T6	T4	T5	T6
Snail									
Nodilittorina trochoides	3.20±6.11		69.2±84.7			0.40±0.00			
Nodilittorina radiata						0.80±0.00			
Nodilittorina vidua		1.20±2.83	0.40±0.00						
Planaxis sulcatus		31.6±92.0	1.20±0.00		2.80±2.83				
Monodonta labio	0.80±0.00	3.20±5.66		5.20±12.2				5.20±10.5	1.20±0.00
Nerita albicilla	8.40±20.3	4.80±6.07	1.20±0.00	0.80±0.00	14.4±21.6	0.40±0.00	1.60±2.31	13.2±23.6	1.60±0.00
Nerita costata			0.40±0.00			0.40±0.00			0.40±0.00
Thais clavigera			0.80±0.00	2.00±0.00	3.20±11.3	4.40±0.00	7.60±10.4	5.20±9.21	15.6±20.5
Limpet									
Siphonaria japonica				2.80±2.31	4.40±5.22	2.00±2.31	13.6±22.2		
Siphonaria lacinosa									18.8±65.1
Cellana toreuma			0.40±0.00			4.80±6.93			3.20±3.58
Patelloida saccharina			2.80±6.11			4.40±14.1			
Patelloida pygmaea				1.60±0.00		13.6±15.9	2.00±5.08		5.20±25.5
Chiton									
Acanthopleura japonica			1.20±2.83			5.20±4.86			40.8±21.5
Bivalves %									
Saccostrea cucullata	0.10±0.32	5.00±6.67		7.00±13.2	25.0±36.6	6.40±9.41	9.50±10.7	65.5±27.3	17.2±34.6
Perna viridis				0.50±1.58	0.50±1.58		4.00±6.99		
Septifer virgatus									0.70±1.64
Barnacles %									
Capitulum mitella		1.00±3.16	4.60±4.27			4.90±5.22			
Tetraclita japonica			0.20±0.42			2.00±3.50			7.60±22.0
Tetraclita squamosa						1.00±3.16			
Cthalamus malayensis			2.10±3.21			0.30±0.48			

Flora/Fauna	High-Intertidal Zone			Mid-Intertidal Zone			Low-Intertidal Zone		
	T4	T5	T6	T4	T5	T6	T4	T5	T6
Megabalanus volcano									0.60±1.58
Algae %									
Ulva spp.	0.60±1.58								
Epiphytic Algae				9.50±25.0			10.5±18.6	5.00±8.50	
Others %									
Cyanobacteria %	5.00±12.7	26.0±29.5	0.20±0.42	2.50±4.25					

Table 6 Density (m^{-2}) of Intertidal Fauna and Percentage Cover (%) of Sessile Fauna and Flora recorded on Rocky Shoreline Transects T8 and T13 on South Soko Island during Wet Season 2005

Flora/Fauna	High-Intertidal Zone		Mid-Intertidal Zone		Low-Intertidal Zone	
	T9	T14	T9	T14	T9	T14
Snail						
Nodilittorina trochoides	3.2±4.1	1.6±3.4				
Nodilittorina radiata	18.4±15.8	21.6±58.7				
Nodilittorina vidua	9.6±10.5	2.4±6.3		2.4±0.4		
Lunella coronata			0.8±2.5	0.4±1.3		
Monodonta labio				1.6±3.9	4.0±9.9	3.6±3.5
Chlorostoma argyrostoma				0.4±1.3		
Nerita albicilla			11.2±29.1	14.4±19.6	2.0±4.3	
Nerita yoldii			0.4±1.6		2.0±6.3	
Thais clavigera			0.4±1.3	1.2±3.8	2.8±6.3	0.8±1.7
Limpet						
Siphonaria japonica						0.4±1.3
Siphonaria lacinosa			0.4±1.3	4.8±13.8	2.0±2.8	1.6±2.8
Nipponacmea concinna						
Cellana grata						
Cellana toreuma	3.2±8.8		2.0±3.9	0.4±1.3	3.6±7.4	2.0±2.8
Patelloida saccharina					16±35.1	
Bivalves %						
Saccostrea cucullata			1.2±1.8	0.3±0.7		4.7±14.2
Barbatia virescens			0.4±1.0	0.1±0.3		
Barnacles %						
Capitulum mitella	1.0±2.1	1.9±3.3	1.5±3.4	0.5±1.1		0.2±0.6
Tetraclita japonica	3.7±3.2		11.5±17.0	2.7±4.7	1.5±2.4	
Cthalamus malayensis	0.1±0.3	0.3±0.7	0.1±0.3			
Seaslaters						
Ligia exotica	1.2±3.8		9.2±25.0		16.0±50.6	10.0±18.9

Flora/Fauna	High-Intertidal Zone		Mid-Intertidal Zone		Low-Intertidal Zone	
	T9	**T14**	**T9**	**T14**	**T9**	**T14**
Crabs						
Grapsus albolineatus					0.8±1.7	0.4±1.3
Pagurus dubius					0.8±1.7	
Eriphia laevimana					0.4±1.3	
Algae %						
Gelidium pusillum					2.0±6.3	
Hildenbrandtia rubra	0.5±1.5		15.0±22.2	10.0±21.1	5.0±15.8	20.0±31.9
Pseudovella applanata				2.0±6.3	5.0±10.8	
Halospongidion gelatinosum						2.5±7.9
Krytuthrix maculans		11.0±26.0				
Pink encrusting					12.7±25.5	
Tubeworms						
Hydriodes sp. %	1.2±3.2				5.0±8.8	5.5±10.7
Sea anemones						
Haliplanella lineata						0.4±1.3

Table 7 Qualitative spotcheck results of Intertidal Fauna composition and abundance (Abundant (A) > Common (C) > Uncommon (U) > Rare (R)) recorded on Rocky Shoreline locations T7, T9, T10, T11, T12 and T14 on South Soko Island during Wet Season 2005

Flora/Fauna	Spot check location											
	T8	Notes	T10*	Notes	T11*	Notes	T12	Notes	T13*	Notes	T15	Notes
Snail												
Nodilittorina trochoides	U	Relatively low number on high shore									C	High shore
Nodilittorina radiata											C	High shore
Nodilittorina vidua											C	High Shore
Monodonta labio											C	Found mid-low mainly among boulders
Nerita albicilla											C	Found sheltering among boulders
Nerita yoldii							U	Some on mid shore				
Nerita costata											U	Several in small rock pools on mid shore
Thais clavigera							U	A few observed on the low shore			C	Found on low-mid shore
Bursa granularis	R	One individual found on low shore										
Limpet												
Siphonaria japonica							U	Several found on mid - high shore			A	Dominated the shore, high cover on mid-low shore

Flora/Fauna	Spot check location											
	T8	Notes	T10*	Notes	T11*	Notes	T12	Notes	T13*	Notes	T15	Notes
Siphonaria lacinosa							U	Several found on mid - high shore			U	Found on mid-shore
Nipponacmea concinna											R	Few found at mid-low shore
Cellana toreuma	U	Few individuals found around midshore					U	Some on mid shore			C	Found on mid-shore
Patelloida saccharina	C	Found at midshore									U	Found on mid-shore
Chiton												
Acanthopleura japonica							R	Few on low shore			C	Found on low shore
Bivalves %												
Saccostrea cucullata											C	Found in abundance encrusted on sheltered boulders at low shore
Septifer virgatus							R	Isolated individuals				
Barnacles %												
Capitulum mitella	A	Present in crevices on mid-high shore	A	Abundant in crevices	A	Abundant in crevices	C	Present in crevices on mid-high shore			C	In crevises mainly mid-high shore

Flora/Fauna	Spot check location											
	T8	Notes	T10*	Notes	T11*	Notes	T12	Notes	T13*	Notes	T15	Notes
Tetraclita japonica	A	Dominant on the shore, forming wide band around mid shore of 40-50% cover					A	Dominant on the shore, forming wide band around mid shore of 40-50% cover	A	Dominant on the mid shore		
Tetraclita squamosa			A	Dominated the mid shore	A	Dominated the mid shore						
Seaslaters												
Ligia exotica	**C**	Found at all levels					**C**	Found at all levels			C	Common especially among boulders
Crabs												
Grapsus albolineatus											U	A few individuals seen along the low shore
Pagurus dubius											R	Couple seen inhabiting *Chlorostoma* shells
Algae %												
Gelidium pusillum	A	Abundant along the low shore	A	Abundant along the low shore	A	Abundant along the low shore	C	Large patches along low shore				
Hildenbrandtia rubra	C	Large patches along mid-low shore					C	Patches on mid shore			C	Mid-low shore
Corallina spp.	C	Common along low shore									C	Along low shore

Flora/Fauna	Spot check location											
	T8	Notes	T10*	Notes	T11*	Notes	T12	Notes	T13*	Notes	T15	Notes
Pseudovella applanata	C	Patches around mid-shore										
Pterocladia tenius							C	Patches on low shore				
Ralfsia expansa											R	Patch observed on boulders
Others												
Krytuthrix maculans %											C	Several patches along high shore
Pink encrusting %	C	Common along low shore					C	Patchy high cover on low shore				
Anthocidaris crassispina											U	Several seen along the shore at low water mark
Bathygobius fuscus											U	Several seen in small rock pools at low shore

- Vessel-based observations with binoculars due to inability to disembark on to shore due to safety considerations

Table 8 *Density (m^{-2}) of Intertidal Fauna and Percentage Cover (%) of Sessile Fauna and Flora recorded at Natural Rocky Shore Transects T1 and T2 at Black Point during Dry Season 2004*

	High-Intertidal Zone		Mid-Intertidal Zone		Low-Intertidal Zone	
Species	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
Snail						
Nodilittorina trochoides						
Nodilittorina radiata	61.6 ±170	3.60 ±5.15	2.40 ±5.06	3.60 ±5.80		
Nodilittorina vidua						
Littoraria articulata	173 ±207	93.2 ±102	74.0 ±101	140 ±140		
Planaxis sulcatus						
Lunella coronata						
Monodonta labio			0.40 ±1.26	0.80 ±2.53	0.40 ±1.26	0.80 ±2.53
Monodonta neritoides						
Nerita albicilla			4.00 ±7.54	7.60 ±11.8		1.20 ±2.70
Thais clavigera					1.20 ±3.79	
Limpet						
Siphonaria japonica				3.20 ±7.73		13.6 ±11.2
Nipponacmea concinna						2.00 ±3.40
Cellana toreuma						
Bivalves %						
Saccostrea cucullata			1.00 ±2.11	0.90 ±1.52	21.1 ±26.3	4.30 ±3.71
Barbatia virescens						
Perna viridis						

	High-Intertidal Zone		Mid-Intertidal Zone		Low-Intertidal Zone	
Species	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
Barnacles %						
Capitulum mitella						
Tetraclita japonica			1.60 ±3.34	3.80 ±3.74	16.2 ±21.9	12.2 ±11.9
Tetraclita squamosa						
Balanus amphitrite	0.50 ±1.58		0.60 ±1.58	1.90 ±2.85	9.60 ±12.7	27.5 ±19.3
Algae %						
Ulva spp						
Epiphytic Algae			6.50 ±12.5		17.0 ±18.7	25.5 ±29.9
Others %						
Cyanobacteria			4.00 ±9.37	5.00 ±7.07	0.50 ±1.58	11.0 ±12.0
Haliplanella lineata						
Lyngbya spp						

Table 9 *Density (m^{-2}) of Intertidal Fauna and Percentage Cover (%) of Sessile Fauna and Flora recorded at Natural Rocky Shore Transects T1 and T2 at Black Point during Wet Season 2004*

	High-Intertidal Zone		Mid-Intertidal Zone		Low-Intertidal Zone	
Species	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
Snail						
Nodilittorina trochoides		0.80±2.53				
Nodilittorina radiata	9.20±21.2	9.60±16.9				
Nodilittorina vidua						
Littoraria articulata	27.2±38.6	31.2±44.9	2.40±7.59			
Planaxis sulcatus						
Lunella coronata						
Monodonta labio		1.20±3.79				
Monodonta neritoides						
Nerita albicilla		0.40±1.26	2.40±3.86	34.4±55.5		1.60±2.80
Thais clavigera					0.40±1.26	1.60±5.06
Limpet						
Siphonaria japonica			1.20±2.70	4.80±10.3		
Nipponacmea concinna						
Cellana toreuma			3.20±10.1	2.00±4.32		
Bivalves %						
Saccostrea cucullata		0.10±0.32	12.1±18.4	10.8±12.7	1.00±3.16	4.00±9.66
Barbatia virescens						
Perna viridis						

	High-Intertidal Zone		Mid-Intertidal Zone		Low-Intertidal Zone	
Species	**T1**	**T2**	**T1**	**T2**	**T1**	**T2**
Barnacles %						
Capitulum mitella						
Tetraclita japonica		0.10 ±0.32	12.3 ±16.1	18.8 ±21.5	66.0 ±17.1	44.0 ±31.7
Tetraclita squamosa						
Balanus amphitrite						
Algae %						
Ulva spp						
Epiphytic Algae					27.4 ±17.7	50.0 ±29.1
Others %						
Cyanobacteria	40.0 ±33.7	18.0 ±29.0	21.0 ±23.3	9.00 ±17.3		
Haliplanella lineata						
Lyngbya spp						

Table 10 *Density (m^{-2}) of Intertidal Fauna and Percentage Cover (%) of Sessile Fauna and Flora recorded at Artificial Shoreline Transects T3, T4, T5 and T6 at Black Point during Dry Season 2004*

	High-Intertidal Zone				Mid-Intertidal Zone				Low-Intertidal Zone			
	T3	T4	T5	T6	T3	T4	T5	T6	T3	T4	T5	T6
Snail												
Nodilittorina trochoides			28.4 ±54.1									
Nodilittorina radiata	6.80 ±17.5	4.40 ±6.10		150 ±156				5.20 ±12.8				
Nodilittorina vidua			112 ±125									
Littoraria articulata	117 ±171	140 ±196		75.2 ±77.5	60.4 ±119	13.6 ±26.7	5.20 ±15.1	12.0 ±17.5	0.40 ±1.26			
Planaxis sulcatus			83.6 ±152									
Lunella coronata								5.20 ±11.3				
Monodonta labio				0.80 ±1.69	2.00 ±2.83	0.40 ±1.26						
Monodonta neritoides								2.00 ±4.32		12.0 ±18.4	0.80 ±1.69	2.40 ±5.40
Nerita albicilla		1.20 ±3.79		4.00 ±7.54	4.00 ±7.77	12.0 ±36.6	32.0 ±49.4	1.20 ±2.70	0.40 ±1.26		1.20 ±3.79	
Thais clavigera						0.80 ±2.53	2.00 ±4.32	4.00 ±5.66	3.20 ±8.80	6.00 ±11.2	4.00 ±7.54	0.80 ±1.69
Limpet												
Siphonaria japonica					1.20 ±1.93	42.4 ±48.1		53.2 ±69.7	1.20 ±2.70	48.8 ±103	82.0 ±60.0	98.0 ±62.9
Nipponacmea concinna						0.40 ±1.26	42.8 ±57.9					
Cellana toreuma												
Bivalves %												
Saccostrea cucullata					3.90 ±6.08				0.50 ±0.53			
Barbatia virescens												
Perna viridis												

	High-Intertidal Zone				Mid-Intertidal Zone				Low-Intertidal Zone			
	T3	T4	T5	T6	T3	T4	T5	T6	T3	T4	T5	T6
Barnacles %												
Capitulum mitella						4.00 ±6.02		3.00 ±4.22		0.50 ±1.58	9.00 ±15.8	0.80 ±1.55
Tetraclita japonica					3.00 ±3.20	9.70 ±17.9	4.00 ±3.94	0.70 ±1.57	1.00 ±2.11	47.5 ±28.6	8.00 ±5.37	8.10 ±7.78
Tetraclita squamosa							1.60 ±2.37					
Balanus amphitrite					12.5 ±29.2	4.50 ±8.32			50.0 ±38.3	13.0 ±13.4	23.0 ±28.7	21.5 ±29.3
Algae %												
Ulva spp								1.00 ±3.16			10.0 ±21.6	1.00 ±3.16
Epiphytic Algae			4.50 ±6.85		3.00 ±9.49	30.5 ±26.7	5.10 ±9.37	9.00 ±15.1	21.8 ±24.2	12.9 ±19.6	4.00 ±6.58	3.00 ±4.83
Others %												
Cyanobacteria					11.1 ±23.3				3.00 ±4.22	1.00 ±3.16		
Haliplanella lineata					0.40 ±1.26		10.3 ±16.2					
Lyngbya spp												

Table 11 Density (m^{-2}) of Intertidal Fauna and Percentage Cover (%) of Sessile Fauna and Flora recorded at Artificial Shoreline Transects T3, T4, T5 and T6 at Black Point during Wet Season 2004

	High-Intertidal Zone				Mid-Intertidal Zone				Low-Intertidal Zone			
Species	**T3**	**T4**	**T5**	**T6**	**T3**	**T4**	**T5**	**T6**	**T3**	**T4**	**T5**	**T6**
Snail												
Nerita albicilla	0.80 ±2.53		4.00 ±12.6	17.2 ±18.4	17.2 ±31.9	4.40 ±8.53	66.8 ±113	11.6 ±21.1	2.40 ±6.31		2.00 ±5.08	2.00 ±5.08
Nodilittorina trochoides	5.60 ±16.4	1.60 ±3.86										
Nodilittorina radiata	5.20 ±9.05	1.20 ±3.79	117 ±207	23.6 ±27.8				0.40 ±1.26				
Nodilittorina vidua												
Littoraria articulata	14.4 ±17.2					2.40 ±7.59						
Planaxis sulcatus			20.8 ±50.9	1.20 ±2.70								0.40 ±1.26
Lunella coronata												
Monodonta labio					1.20 ±2.70	0.40 ±1.26						
Monodonta neritoides												
Thais clavigera					0.80 ±1.69				1.60 ±2.80	2.80 ±5.35	1.60 ±2.80	2.80 ±6.27
Limpet												
Siphonaria japonica						0.40 ±1.26				6.00 ±11.2		
Nipponacmea concinna						0.80 ±2.53						
Cellana toreuma												
Bivalves %												
Saccostrea cucullata				0.10 ±0.32		9.30 ±8.10	10.5 ±12.3	10.0 ±8.16		0.70 ±1.57	2.20 ±3.39	5.10 ±6.59
Barbatia virescens					1.20 ±2.57							
Perna viridis												1.10 ±3.14

	High-Intertidal Zone				Mid-Intertidal Zone				Low-Intertidal Zone			
Species	**T3**	**T4**	**T5**	**T6**	**T3**	**T4**	**T5**	**T6**	**T3**	**T4**	**T5**	**T6**
Barnacles %												
Capitulum mitella			0.80 ±1.62									1.00 ±3.16
Tetraclita japonica	0.10 ±0.32	0.50 ±1.58		1.00 ±3.16	10.8 ±12.7	9.00 ±15.5		2.70 ±3.40	48.5 ±23.8	13.5 ±17.3	39.1 ±29.8	19.6 ±20.2
Tetraclita squamosa												
Balanus amphitrite												
Algae %												
Ulva spp												
Epiphytic Algae				9.00 ±28.5		3.00 ±6.75	51.0 ±40.9	51.9 ±32.8	51.5 ±23.8	43.0 ±25.4	58.5 ±27.5	68.8 ±20.1
Others %												
Cyanobacteria	17.0 ±15.7	2.00 ±4.22	1.60 ±3.34		18.8 ±21.5	30.5 ±26.3				1.00 ±3.16		
Haliplanella lineata												
Lyngbya spp												

Table 12 Density (m^{-2}) of Intertidal Fauna and Percentage Cover (%) of Sessile Fauna and Flora recorded at Natural Rocky Shore Transects T1, at Shek Pik during Wet Season 2005

Species	High-Intertidal Zone T1	Mid-Intertidal Zone T1	Low-Intertidal Zone T1
Snail			
Nerita albicilla	0.8 ± 1.7		2.4 ± 6.3
Nodilittorina trochoides	10.4 ± 14.5		
Nodilittorina radiata	21.2 ± 35.7		
Nodilittorina vidua			
Littoraria articulata			
Planaxis sulcatus	1.6 ± 3.9	26.4 ± 41.7	6.8 ± 21.5
Lunella coronata		1.6 ± 5.1	0.4 ± 1.3
Monodonta labio		4.4 ± 9.3	
Monodonta neritoides			
Thais clavigera		6.0 ± 18.9	1.6 ± 3.9
Limpet			
Siphonaria japonica			
Nipponacmea concinna			
Cellana toreuma			
Patelloidea pygmea		3.2 ± 7.0	
Bivalves %			
Saccostrea cucullata		65.0 ± 24.6	87.9 ± 17.9
Barbatia virescens			3.5 ± 4.7
Perna viridis			
Barnacles %			
Capitulum mitella	0.1 ± 0.3		
Tetraclita japonica			
Tetraclita squamosa			0.1 ± 0.3
Balanus amphitrite			
Algae %			
Ulva spp			

Species	High-Intertidal Zone T1	Mid-Intertidal Zone T1	Low-Intertidal Zone T1
Epiphytic Algae			
Others %			
Cyanobacteria		7.4 ± 8.2	

Table 13 Density (m^{-2}) of Intertidal Fauna and Percentage Cover (%) of Sessile Fauna and Flora recorded at Natural Rocky Shorel Transects T1, at Shek Pik during Dry Season 2006

Species	High-Intertidal Zone T1	Mid-Intertidal Zone T1	Low-Intertidal Zone T1
Snail			
Nerita albicilla			
Nodilittorina trochoides	20.8 ± 33.7		
Nodilittorina radiata	244.0 ± 347.0		
Nodilittorina vidua			
Littoraria articulata			
Planaxis sulcatus		0.8 ± 1.8	0.8 ± 1.8
Lunella coronata			
Monodonta labio		2.4 ± 3.6	4.0 ± 4.0
Monodonta neritoides			
Thais clavigera		0.8 ± 1.8	
Limpet			
Siphonaria japonica			
Nipponacmea concinna			0.8 ± 1.8
Cellana toreuma			
Patelloidea pygmea			1.6 ± 3.5
Bivalves %			
Saccostrea cucullata		2.0 4.4	64.0 ± 11.4
Barbatia virescens			
Perna viridis			
Barnacles %			
Capitulum mitella			
Tetraclita japonica			
Tetraclita squamosa			1.6 ± 3.5
Balanus amphitrite		0.2 ± 0.4	0.8 ± 1.7
Chthamalus malayensis		0.2 ± 0.4	
Algae %			

Species	High-Intertidal Zone T1	Mid-Intertidal Zone T1	Low-Intertidal Zone T1
Ulva spp			0.2 ± 0.4
Enteromorpha sp.		6.0 ± 13.4	17.0 ± 10.4
Epiphytic Algae			
Others %			
Cyanobacteria			

Table 14 Benthic Grab Survey Raw Data (Dry Season)

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
AC-1	0.0226	2	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
AC-1	0.0455	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Gastrolepidia	*Gastrolepidia sp.*
AC-1	0.1402	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
AC-1	6.9845	6	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia sp.*
AC-1	0.3267	1	Annelida	Polychaeta	Eunicida	Eunicidae	Marphysa	*Marphysa sanguinea*
AC-1	0.0374	4	Annelida	Polychaeta	Orbiniida	Orbiniidae	Phylo	*Phylo sp.*
AC-1	2.7378	147	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
AC-1	0.0032	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
AC-1	0.0231	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	*Raphidopus ciliatus*
AC-1	0.2774	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus villosa*
AC-1	4.8808	1	Coelentera	Anthozoa	Ceriantharia	Cerianthidae	Cerianthus	*Cerianthus sp.*
AC-1	0.0882	1	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
AC-1	0.0008	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
AC-2a	0.0796	4	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
AC-2a	0.0051	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	*Cossurella dimorpha*
AC-2a	3.7674	5	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	*Dasybranchus caducus*
AC-2a	0.1655	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
AC-2a	0.0054	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	*Lepidonotus sp.*
AC-2a	0.0057	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
AC-2a	0.0006	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
AC-2a	0.3137	3	Annelida	Polychaeta	Phyllodocida	Nereidae	Nectoneanthes	*Nectoneanthes ijimai*
AC-2a	0.164	14	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
AC-2a	0.1319	14	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
AC-2a	0.0112	1	Annelida	Polychaeta	Phyllodocida	Acoetidae	Polyodontes	*Polyodontes melanonotus*
AC-2a	0.0881	11	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
AC-2a	0.0619	7	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	*Scoloplos sp.*
AC-2a	0.0047	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
AC-2a	0.1563	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus laevis*
AC-2a	49.9176	42	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
AC-3a	0.1081	10	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
AC-3a	0.2143	2	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	*Dasybranchus caducus*
AC-3a	0.118	3	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
AC-3a	0.0059	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
AC-3a	0.0007	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
AC-3a	0.143	15	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
AC-3a	0.0578	6	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
AC-3a	0.0015	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Phylo	*Phylo sp.*
AC-3a	0.0199	5	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
AC-3a	0.4218	2	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
AC-3a	3.1567	1	Coelentera	Anthozoa	Ceriantharia	Cerianthidae	Cerianthus	*Cerianthus sp.*
AC-3a	0.061	3	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus laevis*
AC-3a	13.1203	17	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
AC-4	0.005	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
AC-4	0.0935	13	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
AC-4	0.0002	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
AC-4	0.0007	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
AC-5	0.0006	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
AC-5	0.2321	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Alpheus sp.*
AC-5	0.1007	10	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
AC-5	0.1322	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	*Dasybranchus caducus*
AC-5	0.0081	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera chirori*
AC-5	0.0303	4	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
AC-5	0.0004	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
AC-5	0.4917	41	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
AC-5	0.0674	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
AC-5	0.0081	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
AC-5	0.1079	10	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
AC-5	0.0028	3	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
AC-5	0.6486	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	*Raphidopus ciliatus*
AC-5	0.0011	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus laevis*
AC-5	5.3419	9	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
AC-5	2.1426	1	Mollusca	Gastropoda	Neogastropoda	Nassariidae	Nassarius	*Nassarius sp.*
AC-6	0.0001	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
AC-6	0.0669	1	Annelida	Polychaeta	Amphinomida	Amphinomidae	Amphinome	*Amphinome rostrata*
AC-6	0.0056	2	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Ancistrosyllis	*Ancistrosyllis pilargiformis*
AC-6	0.548	25	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
AC-6	1.123	9	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	*Dasybranchus caducus*
AC-6	0.1394	4	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
AC-6	0.0095	2	Annelida	Polychaeta	Terebellida	Terebellidae	Lysilla	*Lysilla pacifica*
AC-6	0.0226	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nectoneanthes	*Nectoneanthes ijimai*
AC-6	0.7518	53	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
AC-6	0.0565	6	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
AC-6	0.0041	2	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
AC-6	0.3034	34	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
AC-6	0.0003	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	*Scoloplos sp.*
AC-6	0.0008	2	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
AC-6	0.0012	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
AC-6	0.8175	2	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
AC-6	0.0245	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus laevis*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
AC-6	36.9601	21	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
AC-6	0.5875	4	Mollusca	Gastropoda	Neogastropoda	Nassariidae	Nassarius	*Nassarius sp.*
AC-6	0.0691	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	*Nitidotellina iridella*
AC-6	0.002	2	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
BP1-1	0.0596	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Alpheus sp.*
BP1-1	0.0026	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
BP1-1	0.028	1	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Eteone	*Eteone sp.*
BP1-1	0.0059	1	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	*Eunice indica*
BP1-1	0.3785	9	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
BP1-1	0.1215	6	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
BP1-1	0.0162	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
BP1-1	0.008	2	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	*Pectinaria sp.*
BP1-1	0.0012	1	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Phyllodoce	*Phyllodoce sp.*
BP1-1	0.8212	64	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
BP1-1	0.0242	1	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	*Cavernularia obesa*
BP1-1	7.4262	2	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	*Protankyra sp.*
BP1-1	0.3819	1	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
BP1-1	0.0661	1	Mollusca	Bivalvia	Veneroida	Veneridae	Ruditapes	*Ruditapes philippinarum*
BP1-1	0.0273	2	Mollusca	Bivalvia	Veneroida	Solenidae	Solen	*Soloplos sp.*
BP1-2a	0.0253	1	Annelida	Polychaeta	Amphinomida	Amphinomidae	Amphinome	*Amphinome rostrata*
BP1-2a	0.0027	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Gattyana	*Gattyana sp.*
BP1-2a	0.198	4	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
BP1-2a	0.1443	19	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
BP1-2a	0.7182	41	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
BP1-2a	0.8699	2	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Tritodynamia	*Tritodynamia sp.*
BP1-2a	2.3773	1	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	*Cavernularia obesa*
BP1-2a	15.5977	5	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	*Protankyra sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
BP1-2a	0.0145	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	*Nitidotellina iridella*
BP1-2a	0.0063	1	Mollusca	Bivalvia	Veneroida	Veneridae	Ruditapes	*Ruditapes philippinarum*
BP1-3a	0.2304	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Alpheus sp.*
BP1-3a	0.063	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
BP1-3a	0.0179	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
BP1-3a	0.0186	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrinereis sp.*
BP1-3a	0.0218	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
BP1-3a	0.0054	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*
BP1-3a	0.018	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
BP1-3a	11.2027	4	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	*Protankyra sp.*
BP1-4	0.1189	8	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
BP1-4	0.6044	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
BP1—5	0.0136	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
BP1—5	0.0085	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Ceratonereis	*Ceratonereis sp.*
BP1—5	0.0633	3	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
BP1—5	0.0204	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
BP1—5	8.3038	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Odontamblyopus	*Odontamblyopus rubicundus*
BP1—5	3.4676	1	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	*Protankyra sp.*
BP1-6	0.0195	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
BP1-6	0.0994	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
BP1-6	0.0285	1	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	*Virgularia gustaviana*
BP1-6	13.9764	3	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	*Protankyra sp.*
BP2—1a	0.0092	4	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
BP2—1a	0.053	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Ceratonereis	*Ceratonereis sp.*
BP2—1a	0.0425	6	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
BP2—1a	0.0228	1	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	*Eunice indica*
BP2—1a	0.4076	6	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
BP2—1a	0.0055	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
BP2—1a	0.0016	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
BP2—1a	0.043	3	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
BP2—1a	0.0061	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*
BP2—1a	0.6473	33	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
BP2—1a	0.0425	6	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	*Scoloplos sp.*
BP2—1a	0.0919	1	Arthropoda	Crustacea	Decapoda	Portunidae	Charybdis	*Charybdis variegata*
BP2—1a	1.3596	2	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
BP2—1a	17.0773	7	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	*Cavernularia obesa*
BP2—1a	0.0204	1	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	*Virgularia gustaviana*
BP2-2a	0.0058	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
BP2-2a	0.0325	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
BP2-2a	0.0768	2	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	*Eunice indica*
BP2-2a	0.0771	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
BP2-2a	0.0103	2	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
BP2-2a	0.0066	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
BP2-2a	0.0107	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
BP2-2a	0.0019	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
BP2-2a	0.0048	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
BP2-2a	0.007	2	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
BP2-2a	0.1552	1	Annelida	Polychaeta	Flabelligerida	Flabelligeridae	Pherusa	*Pherusa parmata*
BP2-2a	0.0302	2	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Phyllodoce	*Phyllodoce (A.) chinensis*
BP2-2a	1.1077	60	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
BP2-2a	0.0057	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	*Scoloplos sp.*
BP2-2a	0.012	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
BP2-2a	2.0372	4	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
BP2-2a	0.0549	1	Chordata	Osteichthyes	Perciforms	Callionymidae	Callionymus	*Callionymus richardsoni*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
BP2-2a	1.3529	2	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	*Cavernularia obesa*
BP2-2a	0.1434	8	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	*Virgularia gustaviana*
BP2-2a	0.039	1	Coelenterata	Anthozoa	Actiniaria	Actiniidae	Actinia	*Actinia sp.*
BP2-2a	0.1837	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus depressus*
BP2-2a	0.1435	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Cadella	*Cadella sp.*
BP2-2a	0.0737	1	Mollusca	Bivalvia	Veneroida	Cultellidae	Cultellus	*Cultellus scalprum*
BP2-2a	0.1117	1	Mollusca	Bivalvia	Veneroida	Solenidae	Solen	*Solen canaliculatus*
BP2-3	0.3681	1	Annelida	Polychaeta	Eunicida	Onuphidae	Diopatra	*Diopatra sp.*
BP2-3	0.0329	2	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
BP2-3	0.9786	1	Arthropoda	Crustacea	Decapoda	Goneplacidae	Eucrate	*Eucrate haswelli*
BP2-3	12.0195	5	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	*Cavernularia obesa*
BP2-3	0.2549	8	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	*Virgularia gustaviana*
BP2-4a	0.0065	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
BP2-4a	0.0053	1	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	*Eunice indica*
BP2-4a	0.8139	32	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
BP2-4a	0.0027	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	*Scoloplos sp.*
BP2-4a	0.0131	1	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	*Corophium sp.*
BP2-4a	9.5386	6	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	*Cavernularia obesa*
BP2-4a	0.0153	1	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	*Virgularia gustaviana*
BP2-4a	0.0583	1	Mollusca	Bivalvia	Veneroida	Veneridae	Dosinia	*Dosinia exasperata*
BP2-4a	0.2236	1	Mollusca	Bivalvia	Veneroida	Veneridae	Ruditapes	*Ruditapes philippinarum*
BP2-5	0.0212	1	Annelida	Polychaeta	Spionida	Cirratulidae	Chaetozone	*Chaetozone setosa*
BP2-5	0.0046	2	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
BP2-5	0.2984	4	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
BP2-5	0.0038	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
BP2-5	0.0069	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
BP2-5	0.0168	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
BP2-5	0.0018	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
BP2-5	0.0173	3	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
BP2-5	0.4733	21	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
BP2-5	0.0054	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	*Scoloplos sp.*
BP2-5	4.8969	4	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
BP2-5	0.0016	1	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	*Virgularia gustaviana*
BP2-5	0.2494	1	Mollusca	Bivalvia	Mytiloida	Pinnidae	Atrina	*Atrina pectinata*
BP2-5	0.0122	1	Mollusca	Bivalvia	Veneroida	Veneridae	Ruditapes	*Ruditapes philippinarum*
BP2-6a	0.0019	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
BP2-6a	0.4054	5	Annelida	Polychaeta	Spionida	Cirratulidae	Chaetozone	*Chaetozone setosa*
BP2-6a	0.0381	2	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
BP2-6a	0.1429	3	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
BP2-6a	0.0761	5	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
BP2-6a	0.0096	3	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
BP2-6a	0.0059	2	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Phyllodoce	*Phyllodoce (A.) chinensis*
BP2-6a	0.001	1	Annelida	Polychaeta	Spionida	Spionidae	Polydora	*Polydora sp.*
BP2-6a	1.7667	98	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
BP2-6a	0.0495	8	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	*Scoloplos sp.*
BP2-6a	6.6138	8	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
BP2-6a	2.1041	3	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	*Cavernularia obesa*
BP2-6a	0.017	3	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	*Virgularia gustaviana*
BP2-6a	0.0589	1	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
BP2-6a	0.4582	2	Mollusca	Bivalvia	Veneroida	Psammobiidae	Gari	*Gari hosoyai*
BP2-6a	0.0042	1	Mollusca	Bivalvia	Veneroida	Veneridae	Ruditapes	*Ruditapes philippinarum*
BP2-6a	0.2282	1	Mollusca	Bivalvia	Veneroida	Solenidae	Solen	*Solen sp.*
BP2-6a	0.0022	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
MP1-1a	0.0389	8	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
MP1-1a	0.0082	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	*Cossurella dimorpha*
MP1-1a	0.0038	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
MP1-1a	0.1938	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
MP1-1a	0.0007	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrinereis sp.*
MP1-1a	0.0433	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nereis	*Nereis sp.*
MP1-1a	0.0123	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
MP1-1a	0.0034	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
MP1-1a	0.0111	2	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
MP1-1a	0.0098	1	Annelida	Polychaeta	Sternaspida	Sternaspidae	Sternaspis	*Sternaspis sculata*
MP1-1a	0.0186	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
MP1-1a	0.8121	3	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
MP1-1a	0.0506	1	Arthropoda	Crustacea	Decapoda	Goneplacidae	Scalopidia	*Scalopidia spinosipes*
MP1-1a	0.0742	1	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	*Lovenia subcarinata*
MP1-1a	0.1296	2	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
MP1-2	0.0172	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
MP1-2	0.1427	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris latreilli*
MP1-2	0.6486	3	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
MP1-2	1.4557	1	Mollusca	Bivalvia	Veneroida	Veneridae	Paphia	*Paphia undulata*
MP1-3	0.0308	4	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
MP1-3	0.0073	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Ceratonereis	*Ceratonereis sp.*
MP1-3	0.1103	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris lat*
MP1-3	0.0538	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
MP1-3	1.0921	5	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
MP1-4	0.0031	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	*Euclymene sp.*
MP1-4	0.0175	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	*Lepiodonotus sp.*
MP1-4	0.3835	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
MP1-4	0.0119	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
MP1-4	0.0006	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
MP1-4	0.0684	1	Arthropoda	Crustacea	Stomatopoda	Squillidae	Clorida	*Clorida microphthalma*
MP1-4	0.0005	1	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	*Corophium sp.*
MP1-4	0.7856	4	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
MP1-4	0.7133	3	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	*Lovenia subcarinata*
MP1-5	0.0049	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
MP1-5	0.0102	1	Annelida	Polychaeta	Amphinomida	Amphinomidae	Amphinome	*Amphinome rostrata*
MP1-5	0.0108	2	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	*Euclymene sp.*
MP1-5	0.0278	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
MP1-5	0.0129	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
MP1-5	0.4309	3	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
MP1-6	0.0244	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
MP1-6	0.023	1	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	*Onuphis eremita*
MP1-6	0.0184	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslanelica*
MP1-6	1.5048	7	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
MP1-6	0.005	1	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	*Virgularia gustaviana*
MP1-6	0.7276	1	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
MP1-6	0.1507	1	Mollusca	Bivalvia	Veneroida	Veneridae	Paphia	*Paphia undulata*
MP2-1	0.0017	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
MP2-1	0.3501	5	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
MP2-1	0.0329	2	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
MP2-1	0.0277	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*
MP2-1	0.0172	3	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
MP2-2	0.0384	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
MP2-2	0.0211	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
MP2-2	0.0089	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
MP2-3	0.0199	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
MP2-3	0.0668	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
MP2-3	0.0341	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
MP2-3	0.0088	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
MP2-4	0.0364	4	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
MP2-4	0.0196	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
MP2-4	16.5921	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Odontamblyopus	*Odontamblyopus rubicundus*
MP2-5	0.004	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
MP2-5	0.0519	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
MP2-5	0.1259	2	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada japonica*
MP2-5	0.0046	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
MP2-5	0.0078	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
MP2-5	0.0041	2	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
MP2-5	0.0146	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
MP2-5	0.0426	4	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
MP2-5	0.0005	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
MP2-5	0.466	4	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus laevis*
MP2-5	0.8457	1	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
MP2-5	0.1023	1	Mollusca	Bivalvia	Veneroida	Veneridae	Dosinia	*Dosinia(Dosinell) corrugata*
MP2-6	0.0074	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
MP2-6	0.0077	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
MP2-6	0.0027	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
MP2-6	0.0358	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	*Lepidonotus sp.*
MP2-6	0.2872	10	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
MP2-6	0.0014	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
MP2-6	0.0015	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*
MP2-6	0.0188	4	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
MP2-6	0.0059	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
MP2-6	0.0224	1	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	*Virgularia gustaviana*
MP2-6	0.2037	7	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus laevis*
MP2-6	9.1172	1	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	*Protankyra sp.*
MP2-6	0.0479	1	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
MP2-6	0.6015	4	Mollusca	Bivalvia	Veneroida	Veneridae	Dosinia	*Dosinia(Dosinell) corrugata*
MP2-6	0.1228	1	Mollusca	Gastropoda	Neogastropoda	Nassariidae	Nassarius	*Nassarius sp.*
PH1-1a	0.0152	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
PH1-1a	0.0004	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Ancistrosyllis	*Ancistrosyllis pilargiformis*
PH1-1a	0.0015	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
PH1-1a	0.6933	35	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
PH1-1a	0.003	5	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
PH1-1a	0.0343	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
PH-2a	0.0007	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
PH-2a	0.0084	3	Annelida	Polychaeta	Amphinomida	Amphinomidae	Amphinome	*Amphinome rostrata*
PH-2a	0.0759	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	*Cossurella dimorpha*
PH-2a	0.3161	16	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
PH-2a	0.0008	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
PH-2a	0.0752	2	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
PH-2a	9.3844	1	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	*Cavernularia obesa*
PH-3a	0.0006	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
PH-3a	0.0146	1	Annelida	Polychaeta	Amphinomida	Amphinomidae	Amphinome	*Amphinome rostrata*
PH-3a	0.0019	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
PH-3a	0.0081	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nectoneanthes	*Nectoneanthes ijimai*
PH-3a	0.1037	15	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
PH-3a	0.0005	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
PH-3a	0.0007	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
PH-3a	0.0398	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
PH-3a	0.0121	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus laevis*
PH-3a	2.0074	1	Mollusca	Gastropoda	Neogastropoda	Nassariidae	Nassarius	*Nassarius sp.*
PH4	0.0016	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
PH4	0.9959	47	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
PH4	0.0061	4	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
PH4	0.0008	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
PH4	0.0055	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus laevis*
PH4	0.0101	1	Mollusca	Bivalvia	Veneroida	Semelidae	Theora	*Theora lata*
PH5	0.0076	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
PH5	0.0004	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Ancistrosyllis	*Ancistrosyllis pilargiformis*
PH5	0.0009	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
PH5	0.8676	56	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
PH5	0.0015	2	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
PH5	0.0005	1	Arthropoda	Crustacea	Cumacea	Bodotriidae	Eocuma	*Eocuma lata*
PH6a	0.0239	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Ancistrosyllis	*Ancistrosyllis pilargiformis*
PH6a	0.0689	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	*Cossurella dimorpha*
PH6a	0.039	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	*Dasybranehus cuducus*
PH6a	0.6105	36	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
PH6a	0.0299	1	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
PH6a	0.0006	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SK1-1	0.058	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	*Dasybranchus caducus*
SK1-1	0.0829	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK1-1	0.0554	2	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SK1-1	0.0118	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	*Lepidonotus sp.*
SK1-1	0.0219	8	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SK1-1	0.1502	5	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK1-1	0.0039	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SK1-1	1.3068	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SK1-1	0.1811	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiura	*Amphiura sp.*
SK1-1	2.8889	9	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	*Lovenia subcarinata*
SK1-1	0.0138	2	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SK1-2	0.0141	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	*Euclymene sp.*
SK1-2	0.0275	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK1-2	0.1053	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SK1-2	0.0043	2	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SK1-2	0.0443	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SK1-2	0.2667	13	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK1-2	0.0084	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
SK1-2	0.7633	3	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*
SK1-2	2.146	5	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	*Lovenia subcarinata*
SK1-2	0.2113	1	Mollusca	Bivalvia	Veneroida	Veneridae	Timoclea	*Timoclea imbricata*
SK1-2	0.0015	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SK1-3	0.0055	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SK1-3	0.0081	2	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	*Cossurella dimorpha*
SK1-3	0.191	2	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	*Dasybranchis caducus*
SK1-3	0.006	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	*Euclymene sp.*
SK1-3	0.1509	3	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK1-3	0.0126	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Leocrates	*Leocrates chinensis*
SK1-3	0.0013	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SK1-3	0.0063	4	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SK1-3	0.0641	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SK1-3	0.1129	8	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK1-3	0.0598	2	Annelida	Polychaeta	Sternaspida	Sternaspidae	Sternaspis	*Sternaspis sculata*
SK1-3	0.0005	1	Annelida	Polychaeta	Terebellida	Trichobranchidae	Terebellides	*Terebellides stroemii*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SK1-3	0.0007	1	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	*Corophium sp.*
SK1-3	0.1349	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*
SK1-3	0.0097	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiura	*Amphiura sp.*
SK1-3	3.2276	8	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	*Lovenia subcarinata*
SK1-3	0.0646	1	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
SK1-3	0.0029	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SK1-4	0.0094	7	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SK1-4	0.0073	1	Annelida	Polychaeta	Terebellida	Terebellidae	Amaeana	*Amaeana trilobata*
SK1-4	0.0182	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera chirori*
SK1-4	0.0299	9	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SK1-4	0.0185	9	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SK1-4	0.2048	11	Annelida	Polychaeta	Phyllodocida	Nereidae	Nectoneanthes	*Nectoneanthes ijimai*
SK1-4	0.0019	1	Annelida	Polychaeta	Phyllodocida	Lacydoniidae	Paralacydonia	*Paralacydonia paradoxa*
SK1-4	0.1364	10	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SK1-4	0.0009	1	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Phyllodoce	*Phyllodoce (A.) chinensis*
SK1-4	0.0116	5	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*
SK1-4	0.3169	21	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK1-4	0.0029	2	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
SK1-4	0.0039	2	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	*Corophium sp.*
SK1-4	1.3931	2	Arthropoda	Crustacea	Decapoda	Diogenidae	Diogenes	*Diogenes sp.*
SK1-4	0.0402	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiura	*Amphiura sp.*
SK1-5	0.0089	6	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SK1-5	0.0195	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera chirori*
SK1-5	0.0845	6	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK1-5	0.0065	3	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	*Lepidonotus sp.*
SK1-5	0.0473	17	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SK1-5	0.1678	2	Annelida	Polychaeta	Terebellida	Ampharetidae	Melinna	*Melinna sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SK1-5	0.003	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SK1-5	0.0032	1	Annelida	Polychaeta	Spionida	Spionidae	Polydora	*Polydora sp.*
SK1-5	0.3451	41	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK1-5	0.0004	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	*Scoloplos sp.*
SK1-5	0.004	2	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	*Corophium sp.*
SK1-5	0.0088	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus depressus*
SK1-5	4.3435	25	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	*Lovenia subcarinata*
SK1-5	0.0216	1	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
SK1-5	0.0753	1	Mollusca	Bivalvia	Pholadomyoida	Thraciidae	Cyathodonta	*Cyathodonta sp.*
SK1-5	0.4317	1	Mollusca	Bivalvia	Veneroida	Psammobiidae	Gari	*Gari hosoyai*
SK1-5	0.0428	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	*Nitidotellina minuta*
SK1-5	0.2267	2	Mollusca	Bivalvia	Veneroida	Solenidae	Solen	*Solen canaliculatus*
SK1-6	0.0036	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SK1-6	0.0853	3	Annelida	Polychaeta	Terebellida	Pectinariidae	Amphictene	*Amphictene japonica*
SK1-6	0.0013	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	*Euclymene sp.*
SK1-6	0.1617	5	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	*Eunice indica*
SK1-6	0.1051	5	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK1-6	0.0176	5	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SK1-6	0.1159	2	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SK1-6	0.0505	2	Annelida	Polychaeta	Terebellida	Sabellariidae	Lygdamis	*Lygdamis giardi*
SK1-6	0.0146	7	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SK1-6	0.0087	2	Annelida	Polychaeta	Phyllodocida	Nereidae	Nectoneanthes	*Nectoneanthes ijimai*
SK1-6	0.0082	1	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	*Onuphis eremita*
SK1-6	0.0035	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
SK1-6	0.0044	2	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Phyllodoce	*Phyllodoce (A.) chinensis*
SK1-6	0.0089	1	Annelida	Polychaeta	Terebellida	Terebellidae	Pista	*Pista typha*
SK1-6	0.0032	2	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SK1-6	0.0108	3	Annelida	Polychaeta	Spionida	Spionidae	Polydora	*Polydora sp.*
SK1-6	0.9337	92	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK1-6	0.0136	1	Annelida	Polychaeta	Opheiida	Scalibregmidae	Scalibregma	*Scalibregma inflatum*
SK1-6	0.0005	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
SK1-6	3.5244	5	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SK1-6	0.0559	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus depressus*
SK1-6	0.2763	5	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	*Lovenia subcarinata*
SK1-6	0.671	5	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
SK1-6	0.0578	1	Mollusca	Bivalvia	Pholadomyoida	Thraciidae	Cyathodonta	*Cyathodonta sp.*
SK1-6	0.4095	1	Mollusca	Bivalvia	Veneroida	Psammobiidae	Gari	*Gari hosoyai*
SK2-1	0.012	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SK2-1	0.0038	2	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	*Euclymene sp.*
SK2-1	0.1576	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SK2-1	0.7538	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SK2-1	0.1425	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SK2-1	0.0136	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SK2-1	0.1423	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
SK2-1	0.0008	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
SK2-1	0.0548	4	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK2-1	0.0013	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
SK2-1	0.0067	1	Annelida	Polychaeta	Terebellida	Trichobranchidae	Terebellides	*Terebellides stroemii*
SK2-1	0.0153	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
SK2-1	0.4535	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SK2-1	0.0384	3	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SK2-2	0.0591	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SK2-2	0.014	1	Annelida	Polychaeta	Amphinomida	Amphinomidae	Amphinome	*Amphinome rostrata*
SK2-2	0.003	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Ceratonereis	*Ceratonereis sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SK2-2	0.0011	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
SK2-2	0.0807	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SK2-2	0.3942	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SK2-2	0.0036	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SK2-2	0.0595	5	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK2-2	0.0056	3	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
SK2-2	0.0066	1	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	*Corophium sp.*
SK2-2	0.2768	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SK2-2	0.0039	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SK2-3	0.0311	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	*Dasybranchus caducus*
SK2-3	0.249	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SK2-3	0.0663	10	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SK2-3	0.0016	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
SK2-3	0.0067	2	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
SK2-3	0.0145	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
SK2-3	0.0285	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SK2-3	0.047	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SK2-4	0.0163	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SK2-4	0.1208	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus lyrochaeta*
SK2-4	0.0064	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Ceratonereis	*Ceratonereis sp.*
SK2-4	0.0115	3	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SK2-4	0.0961	3	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SK2-4	0.0148	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK2-4	0.0156	7	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
SK2-4	0.0438	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus laevis*
SK2-4	2.2198	1	Mollusca	Bivalvia	Veneroida	Veneridae	Paphia	*Paphia undulata*
SK2-5	0.0016	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SK2-5	0.1566	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus lyrochaeta*
SK2-5	0.0018	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	*Euclymene sp.*
SK2-5	0.0052	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SK2-5	0.1839	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SK2-5	0.0034	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona cincta*
SK2-5	0.0046	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SK2-5	0.0076	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SK2-5	0.0168	3	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK2-5	0.0097	1	Mollusca	Gastropoda	Cephalaspidea	Philinidae	Philine	*Philine sp.*
SK2-6	0.0529	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus lyrochaeta*
SK2-6	0.004	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
SK2-6	0.0042	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	*Cossurella dimorpha*
SK2-6	0.0223	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK2-6	0.0113	2	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SK2-6	0.1272	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SK2-6	0.0577	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SK2-6	0.0269	4	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK2-6	0.002	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
SK2-6	0.1052	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SK2-6	0.1721	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*
SK2-6	4.6636	6	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	*Lovenia subcarinata*
SK2-6	0.0168	3	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SK3-1	0.0018	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SK3-1	0.2185	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus laevis*
SK3-1	0.2079	34	Chordata	Amphioxi	Amphioxiformes	Amphioxidae	Branchiostoma	*Branchiostoma belcheri*
SK3-1	0.0031	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SK3-1	0.0028	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SK3-1	0.0306	1	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	*Onuphis eremita*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SK3-1	0.0041	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK3-2	0.0793	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus laevis*
SK3-2	0.093	4	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK3-2	0.0038	2	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SK3-2	0.7201	4	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SK3-2	0.0133	5	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SK3-2	0.001	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SK3-2	0.0524	1	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	*Onuphis eremita*
SK3-2	0.0025	1	Annelida	Polychaeta	Phyllodocida	Lacydoniidae	Paralacydonia	*Paralacydonia paradoxa*
SK3-2	0.0198	3	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SK3-2	0.0016	1	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Phyllodoce	*Phyllodoce (A.) chinensis*
SK3-2	0.0714	10	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK3-3	0.0083	2	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SK3-3	0.0015	1	Chordata	Amphioxi	Amphioxiformes	Amphioxidae	Branchiostoma	*Branchiostoma belcheri*
SK3-3	0.0008	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Gattyana	*Gattyana sp.*
SK3-3	0.0159	3	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK3-3	0.0048	2	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SK3-3	0.5442	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SK3-3	0.0011	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona cincta*
SK3-3	0.0018	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SK3-3	0.0392	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SK3-3	0.0014	1	Annelida	Polychaeta	Phyllodocida	Lacydoniidae	Paralacydonia	*Paralacydonia paradoxa*
SK3-3	0.0728	1	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	*Pectinaria sp.*
SK3-3	0.0098	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*
SK3-3	0.1931	22	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SK3-3	0.0364	2	Annelida	Polychaeta	Terebellida	Ampharetidae	Samytha	*Samytha besslei*
SK3-3	0.0011	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
SK3-3	0.0016	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
SK3-4	0.0365	2	Coelenterata	Anthozoa	Actiniaria	Actiniidae	Actinia	*Actinia sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SK3-4	0.0027	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus laevis*
SK3-4	0.6836	3	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiura	*Amphiura vadicola*
SK3-4	0.0156	6	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SK3-4	0.001	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SK3-4	0.0269	3	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SK3-4	0.4505	1	Mollusca	Bivalvia	Veneroida	Veneridae	Paphia	*Paphia gallus*
SK3-4	76.8856	715	Mollusca	Bivalvia	Veneroida	Veneridae	Timoclea	*Timoclea imbricata*
SK3-5	0.0103	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SK3-5	0.001	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus depressus*
SK3-5	0.001	1	Annelida	Polychaeta	Orbiniida	Paraonidae	Aricidea	*Aricidea fragilis*
SK3-5	0.0087	1	Chordata	Amphioxi	Amphioxiformes	Amphioxidae	Branchiostoma	*Branchiostoma belcheri*
SK3-5	0.0055	4	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	*Corophium sp.*
SK3-5	0.6574	2	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	*Dasybranchis caducus*
SK3-5	0.0441	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK3-5	0.0024	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SK3-5	0.0195	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	*Lepidonotus sp.*
SK3-5	0.1216	2	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SK3-5	0.1599	63	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SK3-5	0.0127	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	*Nitidotellina minuta*
SK3-5	0.0099	3	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SK3-5	0.0159	1	Annelida	Polychaeta	Oweniida	Oweniidae	Owenia	*Owenia fusformis*
SK3-5	0.0034	2	Annelida	Polychaeta	Phyllodocida	Lacydoniidae	Paralacydonia	*Paralacydonia paradoxa*
SK3-5	0.0681	1	Echinodermata	Holothuroidea	Dendrochirota	Phyllophoridae	Phyllophorus	*Phyllophorus sp.*
SK3-5	0.0108	1	Mollusca	Bivalvia	Veneroida	Mactridae	Raetellops	*Raetellops pulchella*
SK3-5	0.0205	8	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK3-5	0.2691	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus villosa*
SK3-6	0.0271	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	*Alpheus sp.*
SK3-6	0.089	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
SK3-6	0.2549	8	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	*Eunice indica*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SK3-6	0.0644	4	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK3-6	0.0028	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SK3-6	0.3583	2	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SK3-6	0.0182	2	Annelida	Polychaeta	Phyllodocida	Nereidae	Nereis	*Nereis sp.*
SK3-6	0.1016	2	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Phyllodoce	*Phyllodoce (A.) chinensis*
SK3-6	0.0384	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
SK3-6	0.1398	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus villosa*
SK4-1	0.0041	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	*Alpheus sp.*
SK4-1	0.1275	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SK4-1	0.0472	16	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SK4-1	0.0031	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	*Cossurella dimorpha*
SK4-1	0.0728	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK4-1	0.0023	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SK4-1	0.0443	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SK4-1	0.0114	6	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SK4-1	0.1043	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	*Nitidotellina minuta*
SK4-1	0.0095	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SK4-1	0.0018	1	Arthropoda	Crustacea	Tanaidacea	Apseudidae	Paranthura	*Paranthura sp*
SK4-1	0.0185	3	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SK4-1	0.003	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*
SK4-1	0.0148	5	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK4-1	0.0035	1	Annelida	Polychaeta	Ophieliida	Scalibregmidae	Scalibregma	*Scalibregma inflatum*
SK4-1	0.0023	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	*Tharyx sp.*
SK4-1	0.0302	1	Mollusca	Bivalvia	Veneroida	Veneridae	Timoclea	*Timoclea imbricata*
SK4-1	0.208	2	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*
SK4-2	0.0529	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	*Alpheus sp.*
SK4-2	0.1012	3	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SK4-2	0.0026	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SK4-2	0.0943	3	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SK4-2	0.0083	2	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SK4-2	0.1161	2	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SK4-2	0.4438	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SK4-2	0.0063	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SK4-2	0.2986	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SK4-2	0.0658	8	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK4-2	0.2972	4	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
SK4-2	0.0022	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	*Tharyx sp.*
SK4-2	0.0149	1	Mollusca	Bivalvia	Veneroida	Semelidae	Theora	*Theora lata*
SK4-2	0.3238	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus villosa*
SK4-3	0.0194	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SK4-3	0.0006	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SK4-3	0.0133	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK4-3	0.0361	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SK4-3	0.0197	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SK4-3	0.0185	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SK4-3	0.0072	1	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	*Onuphis eremita*
SK4-3	0.012	3	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SK4-3	0.0138	1	Annelida	Polychaeta	Phyllodocida	Acoetidae	Polydontes	*Polydontes sp.*
SK4-3	0.0644	9	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK4-3	0.0178	1	Mollusca	Bivalvia	Pholadomyoida	Thraciidae	Trigonothracia	*Trigonothracia jinxingae*
SK4-3	0.1612	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*
SK4-4	0.0021	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	*Alpheus sp.*
SK4-4	0.1117	3	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SK4-4	0.001	1	Annelida	Polychaeta	Phyllodocida	Pilargidae	Ancistrosyllis	*Ancistrosyllis pilargiformis*
SK4-4	0.0391	14	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SK4-4	0.0022	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
SK4-4	0.0187	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	*Cossurella dimorpha*
SK4-4	0.0069	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	*Euclymene sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SK4-4	0.0054	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Gattyana	*Gattyana sp.*
SK4-4	0.0006	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK4-4	0.0008	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SK4-4	0.0293	16	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SK4-4	0.0119	3	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SK4-4	0.001	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
SK4-4	0.0027	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*
SK4-4	0.0012	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio ehlersi*
SK4-4	0.0397	6	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK4-4	0.005	2	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	*Tharyx sp.*
SK4-4	0.7605	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*
SK4-5	0.2043	2	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	*Alpheus sp.*
SK4-5	0.0027	1	Annelida	Polychaeta	Terebellida	Terebellidae	Amaeana	*Amaeana trilobata*
SK4-5	0.1395	1	Annelida	Polychaeta	Amphinomida	Amphinomidae	Amphinome	*Amphinome rostrata*
SK4-5	0.0495	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SK4-5	0.002	1	Annelida	Polychaeta	Phyllodocida	Pilargidae	Ancistrosyllis	*Ancistrosyllis pilargiformis*
SK4-5	0.0599	22	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SK4-5	0.0135	2	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	*Cossurella dimorpha*
SK4-5	0.5454	2	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	*Dasybranchus caducus*
SK4-5	0.0095	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	*Euclymene sp.*
SK4-5	0.0053	3	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK4-5	0.1184	4	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SK4-5	0.0572	3	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SK4-5	0.1248	37	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SK4-5	0.1207	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SK4-5	0.443	8	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SK4-5	0.0015	1	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	*Onuphis eremita*
SK4-5	0.0193	5	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SK4-5	0.0035	2	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SK4-5	0.1289	1	Annelida	Polychaeta	Phyllodocida	Acoetidae	Polydontes	*Polydontes sp.*
SK4-5	0.0025	1	Annelida	Polychaeta	Spionida	Spionidae	Polydora	*Polydora sp.*
SK4-5	0.24	22	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK4-5	0.1127	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	*Raphidopus ciliatus*
SK4-5	0.0029	1	Annelida	Polychaeta	Ophieliida	Scalibregmidae	Scalibregma	*Scalibregma inflatum*
SK4-5	19.6168	2	Echinodermata	Echinoidea	Spatangoida	Schizasteridae	Schizaster	*Schizaster lacunosus*
SK4-5	0.0297	1	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
SK4-5	0.0022	2	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	*Tharyx sp.*
SK4-6	0.012	2	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SK4-6	0.0641	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SK4-6	0.1022	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SK4-6	0.0208	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SK4-6	0.0081	2	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SK4-6	0.2995	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SK4-6	0.0217	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SK4-6	0.0724	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
SK4-6	0.0575	8	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SK4-6	0.0047	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	*Scoloplos sp.*
SK4-6	0.0255	1	Annelida	Polychaeta	Sternaspida	Sternaspidae	Sternaspis	*Sternaspis sculata*
SK4-6	0.0444	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*
TO-1a	0.0018	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
TO-1a	0.179	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
TO-1a	0.0071	3	Annelida	Polychaeta	Capitellida	Capitellidae	Mediomastus	*Mediomastus californiensis*
TO-1a	0.0281	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*
TO-1a	0.3748	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
TO-1a	0.0034	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
TO-2	0.0044	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
TO-2	0.0022	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
TO-2	0.1287	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	*Dasybranchus caducus*
TO-2	0.0939	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
TO-2	0.4323	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia bendera*
TO-2	0.0015	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
TO-2	0.0189	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
TO-2	0.0053	2	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
TO-2	0.0046	2	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
TO-2	0.965	4	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
TO-2	0.3648	1	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
TO-2	0.0068	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
TO-3	0.0137	2	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	*Cossurella dimorpha*
TO-3	0.0141	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	*Euclymene sp.*
TO-3	0.0625	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Naineris	*Naineris lavigata*
TO-3	0.0072	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
TO-3	0.0078	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
TO-3	0.0017	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
TO-3	0.045	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
TO-3	0.2067	2	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
TO-3	0.0341	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus laevis*
TO-3	0.0043	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
TO-4a	0.0022	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
TO-4a	0.1139	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus lyrochaete*
TO-4a	0.012	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Ancistrosyllis	*Ancistrosyllis pilargiformis*
TO-4a	0.0063	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
TO-4a	0.0015	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
TO-4a	0.021	3	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericeas*
TO-4a	0.0012	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
TO-4a	0.0226	1	Annelida	Polychaeta	Sternaspida	Sternaspidae	Sternaspis	*Sternaspis sculata*
TO-4a	0.2856	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
TO-4a	0.1083	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*
TO-5a	0.0111	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
TO-5a	0.0047	1	Annelida	Polychaeta	Capitellida	Capitellidae	Capitella	*Capitella capitata*
TO-5a	0.0129	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
TO-5a	0.0562	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
TO-5a	0.0042	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
TO-5a	0.843	4	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
TO-5a	1.1226	1	Mollusca	Gastropoda	Cephalaspidea	Philinidae	Philine	*Philine sp.*
TO-6a	0.0084	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
TO-6a	0.0011	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
TO-6a	0.0405	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
TO-6a	0.004	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
TO-6a	0.0022	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
TO-6a	0.0097	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
TO-6a	1.4672	4	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
TO-6a	0.0419	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus laevis*
UR1	0.0117	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
UR2	0.0185	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
UR2	0.0049	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
UR2	0.0041	2	Annelida	Polychaeta	Capitellida	Capitellidae	Mediomastus	*Mediomastus californiensis*
UR2	0.0198	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
UR2	0.0037	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	*Scoloplos sp.*
UR3	0.1074	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
UR3	0.0087	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	*Cirratulus sp.*
UR3	0.15	6	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
UR3	0.0027	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
UR4	0.1336	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
UR4	0.0104	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
UR4	0.002	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	*Lepidonotus sp.*
UR4	0.0781	13	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
UR4	0.3554	3	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	*Onuphis eremita*
UR4	0.3114	6	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
UR4	0.129	7	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
UR4	0.001	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	*Scoloplos sp.*
UR4	0.0147	2	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
UR4	0.0078	1	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	*Corophium sp.*
UR4	0.0012	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia sp.*
UR4	2.3578	1	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	*Protankyra sp.*
UR5	0.01	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
UR5	0.0197	2	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	*Lepidonotus sp.*
UR5	0.1082	13	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
UR5	0.0036	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
UR5	3.8906	2	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	*Protankyra sp.*
UR6	0.0063	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrinereis sp.*
UR6	0.0125	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nectoneanthes	*Nectoneanthes ijimai*
UR6	0.0277	5	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
UR6	0.0005	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*
UR6	0.0968	3	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
UR6	0.0006	1	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	*Corophium sp.*
UR6	0.3103	2	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*
UR6	0.0026	1	Mollusca	Bivalvia	Veneroida	Semelidae	Theora	*Theora lata*
SSK1-1	0.0074	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	*Alpheus sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SSK1-1	0.1807	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SSK1-1	0.0024	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK1-1	0.0196	3	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SSK1-1	0.0048	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SSK1-1	0.0864	2	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SSK1-1	1.878	6	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK1-1	0.0299	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SSK1-1	0.0398	10	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SSK1-1	0.1013	5	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK1-1	0.0019	1	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	*Onuphis eremita*
SSK1-1	0.022	1	Annelida	Polychaeta	Terebellida	Terebellidae	Pista	*Pista sp.*
SSK1-1	0.0193	2	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*
SSK1-1	0.099	10	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK1-1	0.0011	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	*Tharyx sp.*
SSK1-2	0.3126	4	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SSK1-2	0.0007	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Ancistrosyllis	*Ancistrosyllis pilargiformis*
SSK1-2	0.0017	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK1-2	0.0097	1	Annelida	Polychaeta	Orbiniida	Paraonidae	Aricidea	*Aricidea fragilis*
SSK1-2	0.0534	4	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
SSK1-2	0.0525	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SSK1-2	0.2501	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SSK1-2	0.0299	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	*Nitidotellina minuta*
SSK1-2	0.1027	9	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SSK1-2	0.0234	1	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	*Pectinaria sp.*
SSK1-2	0.0213	4	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK1-2	0.0034	1	Annelida	Polychaeta	Ophieliida	Scalibregmidae	Scalibregma	*Scalibregma inflatum*
SSK1-2	0.0497	1	Mollusca	Bivalvia	Veneroida	Solenidae	Solen	*Solen sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SSK1-3	0.3137	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	*Alpheus sp.*
SSK1-3	0.4936	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SSK1-3	0.001	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Ancistrosyllis	*Ancistrosyllis pilargiformis*
SSK1-3	0.0127	3	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK1-3	0.0049	1	Annelida	Polychaeta	Orbiniida	Paraonidae	Aricidea	*Aricidea fragilis*
SSK1-3	0.9536	2	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK1-3	0.0814	13	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SSK1-3	0.198	2	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	*Nitidotellina minuta*
SSK1-3	0.044	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SSK1-3	0.0045	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SSK1-3	0.0034	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*
SSK1-3	0.0377	5	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK1-3	0.0292	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
SSK1-4	0.5411	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SSK1-4	0.0014	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK1-4	0.0512	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	*Dasybranchis caducus*
SSK1-4	0.0491	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SSK1-4	0.01	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SSK1-4	0.3308	5	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK1-4	0.0015	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SSK1-4	0.0646	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SSK1-4	0.016	1	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	*Pectinaria sp.*
SSK1-4	0.0364	1	Annelida	Polychaeta	Terebellida	Terebellidae	Pista	*Pista sp.*
SSK1-4	0.0059	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK1-4	0.6105	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*
SSK1-5	0.0096	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus lyrochaeta*
SSK1-5	0.2978	2	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	*Alpheus sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SSK1-5	0.0023	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK1-5	0.0173	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Gattyana	*Gattyana sp.*
SSK1-5	0.1247	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SSK1-5	0.0202	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SSK1-5	2.4145	4	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK1-5	0.0043	2	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SSK1-5	0.2976	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SSK1-5	0.1565	3	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SSK1-5	0.1161	1	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	*Pectinaria sp.*
SSK1-5	0.0063	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	*Poecilochaetus serpens*
SSK1-5	0.2216	1	Annelida	polychaeta	Phyllodocida	Acoetidae	Polyodontes	*Polyodontes atromarginatus*
SSK1-5	0.1932	14	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK1-5	0.0122	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
SSK1-5	0.0133	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	*Tharyx sp.*
SSK1-6	0.0327	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	*Alpheus sp.*
SSK1-6	0.293	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SSK1-6	1.286	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	*Dasybranchis caducus*
SSK1-6	0.1385	2	Annelida	Polychaeta	Eunicida	Onuphidae	Diopatra	*Diopatra sp.*
SSK1-6	0.0381	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SSK1-6	0.0922	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SSK1-6	0.0786	1	Mollusca	Bivalvia	Mytiloida	Mytilidae	Modiolus	*Modiolus sp.*
SSK1-6	1.0838	2	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SSK1-6	0.1112	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomastus latericens*
SSK1-6	0.2987	4	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	*Onuphis eremita*
SSK1-6	0.0246	1	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	*Pectinaria sp.*
SSK1-6	0.0405	4	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK1-6	0.0109	2	Annelida	Polychaeta	Ophieliida	Scalibregmidae	Scalibregma	*Scalibregma inflatum*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SSK1-6	0.1698	1	Mollusca	Bivalvia	Veneroida	Solenidae	Solen	*Solen sp.*
SSK2-1	0.1142	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus lyrochaeta*
SSK2-1	0.0126	3	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
SSK2-1	0.0047	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SSK2-1	0.0032	1	Annelida	Polychaeta	Terebellida	Ampharetidae	Melinna	*Melinna sp.*
SSK2-1	0.0021	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
SSK2-1	0.0068	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK2-1	0.0153	3	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio ehlersi*
SSK2-1	0.0027	1	Annelida	Polychaeta	Spionida	Spionidae	Spio	*Spio martiensis*
SSK2-2	0.2126	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SSK2-2	0.0039	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK2-2	0.0786	2	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
SSK2-2	0.1628	2	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK2-2	0.0529	1	Annelida	Polychaeta	Terebellida	Ampharetidae	Melinna	*Melinna sp.*
SSK2-2	0.5198	2	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SSK2-2	0.0044	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK2-2	0.1487	3	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
SSK2-2	0.0027	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
SSK2-2	0.0117	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK2-2	0.0798	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*
SSK2-3	0.1389	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus lyrochaeta*
SSK2-3	0.0599	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	*Alpheus sp.*
SSK2-3	0.0076	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK2-3	0.0113	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
SSK2-3	1.4391	1	Chordata	Osteichthyes	Anguilliformes	Ophichthyidae	Cirrhimuracma	*Cirrhimuracma chinensis*
SSK2-3	0.012	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	*Cossurella dimorpha*
SSK2-3	0.0104	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Gattyana	*Gattyana sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SSK2-3	0.0028	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SSK2-3	0.1034	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK2-3	0.1382	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SSK2-3	0.0261	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK2-3	0.1416	2	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
SSK2-3	0.0111	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	*Tharyx sp.*
SSK2-4	0.0468	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK2-4	0.2229	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SSK2-4	0.3149	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SSK2-4	1.2061	11	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
SSK2-4	0.1254	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	*Sthenolepis japonica*
SSK2-4	0.1638	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Trypauchen	*Trypauchen vagina*
SSK2-5	0.0415	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SSK2-5	0.0189	1	Annelida	Polychaeta	Terebellida	Terebellidae	Amaeana	*Amaeana trilobata*
SSK2-5	0.0066	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
SSK2-5	0.2159	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	*Dasybranchis caducus*
SSK2-5	0.0604	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SSK2-5	0.1205	2	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK2-5	0.1192	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SSK2-5	0.0987	2	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SSK2-5	0.0055	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SSK2-5	0.0032	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio ehlersi*
SSK2-6	0.1205	5	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SSK2-6	0.0208	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	*Alpheus sp.*
SSK2-6	0.0032	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK2-6	0.004	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera chirori*
SSK2-6	0.0849	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SSK2-6	0.4223	6	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK2-6	0.0226	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SSK2-6	0.0167	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK2-6	0.0213	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SSK2-6	0.0303	2	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	*Pectinaria sp.*
SSK2-6	0.0152	3	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK2-6	0.06	1	Sipuncula	Sipunculidea	Sipunculiformes	Sipunculidae	Sipunculus	*Sipunculus nudus*
SSK3-1	0.0349	4	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK3-1	0.0342	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
SSK3-1	0.0281	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SSK3-1	0.0079	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	*Lepidonotus sp.*
SSK3-1	1.2712	2	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK3-1	0.0242	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SSK3-1	0.0313	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	*Nitidotellina minuta*
SSK3-1	0.2965	8	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK3-1	0.0385	8	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK3-1	0.0594	1	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
SSK3-2	0.0248	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SSK3-2	0.0219	2	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK3-2	0.0281	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
SSK3-2	0.0495	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK3-2	0.1198	3	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SSK3-2	12.9125	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Macoma	*Macoma candida*
SSK3-2	0.0394	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK3-2	0.2031	2	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
SSK3-2	8.7521	1	Mollusca	Bivalvia	Veneroida	Veneridae	Paphia	*Paphia undulata*
SSK3-2	0.2912	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SSK3-2	0.0057	1	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	*Virgularia gustaviana*
SSK3-3	0.1286	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	*Alpheus sp.*
SSK3-3	0.0062	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Ancistrosyllis	*Ancistrosyllis pilargiformis*
SSK3-3	0.0055	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK3-3	0.0037	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SSK3-3	3.5178	4	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK3-3	0.0701	4	Annelida	Polychaeta	Capitellida	Capitellidae	Mediomastus	*Mediomastus californiensis*
SSK3-3	0.0145	1	Annelida	Polychaeta	Terebellida	Ampharetidae	Melinna	*Melinna sp.*
SSK3-3	0.38	7	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK3-3	0.0067	1	Annelida	polychaeta	Phyllodocida	Acoetidae	Polyodontes	*Polyodontes atromarginatus*
SSK3-3	0.6189	49	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK3-3	0.0025	1	Annelida	Polychaeta	Ophieliida	Scalibregmidae	Scalibregma	*Scalibregma inflatum*
SSK3-3	0.0015	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	*Scoloplos sp.*
SSK3-3	0.0078	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	*Sigambra hanaokai*
SSK3-3	0.0652	1	Sipuncula	Sipunculidea	Sipunculiformes	Sipunculidae	Sipunculus	*Sipunculus nudus*
SSK3-3	0.2355	4	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
SSK3-3	0.0138	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	*Tharyx sp.*
SSK3-3	0.0923	1	Mollusca	Bivalvia	Pholadomyoida	Thraciidae	Trigonothracia	*Trigonothracia jinxingae*
SSK3-3	0.3207	1	Arthropoda	Crustacea	Decapoda	Upogebiidae	Upogebia	*Upogebia sp.*
SSK3-4	0.0157	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	*Amphiodia microplax*
SSK3-4	0.005	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK3-4	0.0494	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SSK3-4	19.0508	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Macoma	*Macoma candida*
SSK3-4	0.011	4	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SSK3-4	0.2327	3	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK3-4	16.5	1	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	*Lovenia subcarinata*
SSK3-4	0.1802	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SSK3-4	0.1661	2	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
SSK3-5	0.0125	1	Annelida	Polychaeta	Terebellida	Terebellidae	Amaeana	*Amaeana trilobata*
SSK3-5	0.1204	3	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus depressus*
SSK3-5	0.0048	2	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK3-5	0.0038	1	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	*Eunice indica*
SSK3-5	0.0215	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SSK3-5	0.0028	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SSK3-5	0.1243	2	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	*Lepidonotus sp.*
SSK3-5	3.7864	7	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK3-5	0.877	2	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SSK3-5	0.001	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nereis	*Nereis sp.*
SSK3-5	0.0235	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	*Nitidotellina minuta*
SSK3-5	0.4296	11	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK3-5	0.1637	3	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	*Onuphis eremita*
SSK3-5	0.1531	3	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	*Pectinaria sp.*
SSK3-5	0.0473	9	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK3-5	0.005	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	*Scoloplos sp.*
SSK3-5	0.3308	4	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	*Thalassema sabinum*
SSK3-5	0.044	1	Mollusca	Bivalvia	Pholadomyoida	Thraciidae	Trigonothracia	*Trigonothracia jinxingae*
SSK3-5	0.0721	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*
SSK3-6	0.0124	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SSK3-6	0.0057	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK3-6	0.0007	1	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	*Corophium sp.*
SSK3-6	0.073	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK3-6	16.5919	1	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	*Lovenia subcarinata*
SSK3-6	0.0013	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SSK3-6	0.2894	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SSK3-6	0.0197	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK3-6	0.0666	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
SSK3-6	0.0188	7	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK4-1	0.7487	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	*Alpheus sp.*
SSK4-1	0.0241	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SSK4-1	0.1055	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus lyrochaeta*
SSK4-1	0.0232	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
SSK4-1	0.0199	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SSK4-1	0.3268	4	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK4-1	0.1657	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SSK4-1	0.0944	3	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK4-1	0.1946	3	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
SSK4-1	0.1764	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Phylo	*Phylo ornatus*
SSK4-1	0.0096	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK4-2	0.0179	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	*Alpheus sp.*
SSK4-2	0.0048	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SSK4-2	0.0213	1	Annelida	Polychaeta	Terebellida	Terebellidae	Amaeana	*Amaeana trilobata*
SSK4-2	0.1001	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	*Amphioplus depressus*
SSK4-2	0.0005	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Ancistrosyllis	*Ancistrosyllis pilargiformis*
SSK4-2	0.0985	14	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK4-2	0.01	3	Annelida	Polychaeta	Orbiniida	Paraonidae	Aricidea	*Aricidea fragilis*
SSK4-2	0.0074	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	*Cossurella dimorpha*
SSK4-2	0.0256	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera onomichiensis*
SSK4-2	0.2295	4	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SSK4-2	0.0043	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Leocrates	*Leocrates chinensis*
SSK4-2	0.4004	5	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK4-2	0.068	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SSK4-2	0.0005	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SSK4-2	0.0034	1	Annelida	Polychaeta	Capitellida	Capitellidae	Mediomastus	*Mediomastus californiensis*
SSK4-2	0.3416	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK4-2	0.2152	4	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
SSK4-2	0.0817	9	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK4-2	4.5459	1	Echinodermata	Holothuroidea	Dendrochirota	Cucumariidae	Thyone	*Thyone sp.*
SSK4-3	0.0045	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SSK4-3	0.0215	3	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK4-3	0.0064	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SSK4-3	0.0457	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SSK4-3	0.2443	4	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK4-3	0.218	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SSK4-3	0.0009	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SSK4-3	0.0229	3	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK4-3	0.3465	5	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
SSK4-3	0.0019	1	Annelida	Polychaeta	Phyllodocida	Lacydoniidae	Paralacydonia	*Paralacydonia paradoxa*
SSK4-3	0.0201	2	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SSK4-3	0.061	8	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK4-3	0.1672	1	Mollusca	Bivalvia	Veneroida	Solenidae	Solen	*Solen sp.*
SSK4-4	0.0051	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SSK4-4	0.1727	11	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK4-4	0.001	2	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	*Corophium sp.*
SSK4-4	0.005	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	*Cossurella dimorpha*
SSK4-4	0.0438	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	*Glycera chirori*
SSK4-4	0.0471	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SSK4-4	0.7834	4	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK4-4	0.1335	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SSK4-4	0.0016	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SSK4-4	0.0064	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK4-4	0.0012	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	*Paraprionospio pinnata*
SSK4-4	0.008	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK4-4	0.0859	1	Arthropoda	Crustacea	Decapoda	Goneplacidae	Scalopidia	*Scalopidia spinosipes*
SSK4-4	0.0494	1	Mollusca	Bivalvia	Veneroida	Solenidae	Solen	*Solen sp.*
SSK4-5	0.043	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus dibranchis*
SSK4-5	0.0029	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SSK4-5	0.0697	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SSK4-5	0.005	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Leocrates	*Leocrates chinensis*
SSK4-5	0.1969	3	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*
SSK4-5	76.3087	3	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	*Lovenia subcarinata*
SSK4-5	0.0007	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	*Magelona pacifica*
SSK4-5	0.1831	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SSK4-5	0.0468	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK4-5	0.0871	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
SSK4-5	0.0046	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	*Ophiodromus angustifrons*
SSK4-5	0.0126	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	*Prionospio queenslandica*
SSK4-5	0.0103	1	Annelida	Polychaeta	Terebellida	Trichobranchidae	Terebellides	*Terebellides stroemii*
SSK4-5	0.6961	2	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*
SSK4-6	0.6308	1	Annelida	polychaeta	Phyllodocida	Acoetidae	Acoetes	*Acoetes melanonota*
SSK4-6	0.1198	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	*Aglaophamus lyrochaeta*
SSK4-6	0.0095	2	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	*Apionsoma trichocephalus*
SSK4-6	0.0079	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	*Callianassa sp.*
SSK4-6	0.0015	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	*Goniada sp.*
SSK4-6	0.0618	2	Annelida	Polychaeta	Spionida	Spionidae	Laonice	*Laonice cirrata*
SSK4-6	0.0584	2	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	*Loimia medusa*

Station	Biomass (g)	Abundance	Phylum	Class	Order	Family	Genus	Species
SSK4-6	0.0872	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	*Lumbrineris sp.*
SSK4-6	0.0665	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	*Neoxenophthalmus obscurus*
SSK4-6	0.0048	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	*Notomasfus latericens*
SSK4-6	0.0042	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	*Ophelina grandis*
SSK4-6	0.0145	1	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	*Pectinaria sp.*
SSK4-6	0.046	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	*Typhlocarcinus nudus*

Table 15 Benthic Grab Survey Raw Data (Wet Season)

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
AC-1	0.0761	9	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
AC-1	0.3064	7	Annelida	Polychaeta	Spionida	Spionidae	Scolelepis	Scolelepis sp.
AC-1	0.0892	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus
AC-1	0.0128	3	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
AC-1	0.002	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
AC-1	0.0599	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
AC-1	1.1735	9	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
AC-1	0.0066	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nectoneanthes	Nectoneanthes ijimai
AC-1	6.2323	4	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia sp.
AC-1	0.0939	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	Lepidonotus sp.
AC-1	0.0466	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
AC-1	0.5726	3	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchis caducus
AC-1	0.0226	3	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
AC-1	0.0309	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
AC-1	0.1658	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
AC-2	0.001	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	Sigambra hanaokai
AC-2	0.0757	8	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
AC-2	0.0772	2	Annelida	Polychaeta	Spionida	Spionidae	Scolelepis	Scolelepis sp.
AC-2	0.1539	21	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
AC-2	0.0069	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
AC-2	0.0144	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
AC-2	0.1878	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	Nitidotellina minuta
AC-2	0.0208	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nereis	Nereis sp.
AC-2	0.2799	3	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
AC-2	0.0025	2	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
AC-2	0.0316	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
AC-2	0.0016	1	Annelida	Polychaeta	Eunicida	Onuphidae	Diopatra	Diopatra sp.
AC-2	2.2291	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchus caducus
AC-2	0.1503	11	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
AC-2	0.1276	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
AC-2	0.0011	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
AC-3	0.0018	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
AC-3	0.0464	11	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
AC-3	2.0811	11	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
AC-3	0.018	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
AC-3	0.4612	3	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchus caducus
AC-3	0.222	5	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
AC-3	0.1811	3	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
AC-3	0.0567	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus depressus
AC-4	0.011	4	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
AC-4	0.0021	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
AC-4	0.0018	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
AC-4	0.266	21	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
AC-4	0.3928	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	Nitidotellina minuta

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
AC-4	0.4327	3	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
AC-4	0.0041	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Micropodarke	Micropodarke dubia
AC-4	0.0558	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
AC-4	0.056	3	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
AC-4	0.0065	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
AC-4	0.0095	4	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
AC-5	0.0012	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
AC-5	0.0474	19	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
AC-5	0.0415	11	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
AC-5	0.0023	4	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
AC-5	1.4717	10	Arthropoda	Crustacea	Decapoda	Diogenidae	Diogenes	Diogenes sp.
AC-5	0.0851	4	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
AC-5	0.0056	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
AC-5	0.0205	2	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Ancistrosyllis	Ancistrosyllis pilargiformis
AC-6	0.0142	1	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	Thalassema sabinum
AC-6	0.0054	1	Annelida	Polychaeta	Spionida	Spionidae	Scolelepis	Scolelepis sp.
AC-6	0.3333	52	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
AC-6	0.0092	3	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
AC-6	0.8284	8	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
AC-6	0.002	3	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
AC-6	2.5871	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
AC-6	0.0567	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
AC-6	0.0094	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	Euclymene sp.

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
AC-6	0.0142	1	Annelida	Polychaeta	Eunicida	Onuphidae	Diopatra	Diopatra sp.
AC-6	0.1659	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchus caducus
AC-6	0.1892	13	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
AC-6	0.0177	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
AC-6	0.0005	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
AC-6	0.0658	4	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Ancistrosyllis	Ancistrosyllis pilargiformis
AC-6	0.2114	3	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
BP1-1	0.5678	3	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	Virgularia gustaviana
BP1-1	134.4296	13	Mollusca	Bivalvia	Veneroida	Veneridae	Ruditapes	Ruditapes philippinarum
BP1-1	0.1646	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus
BP1-1	0.0297	6	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
BP1-1	0.0144	1	Annelida	Polychaeta	Flabelligerida	Flabelligeridae	Pherusa	Pherusa parmata
BP1-1	0.021	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
BP1-1	0.0573	4	Annelida	Polychaeta	Terebellida	Ampharetidae	Isolda	Isolda pulchella
BP1-1	0.1211	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
BP1-1	0.0148	1	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	Eunice indica
BP1-1	0.1763	4	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
BP1-1	0.2157	2	Coelentera	Anthozoa	Ceriantharia	Cerianthidae	Cerianthus	Cerianthus sp.
BP1-1	1.5599	2	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	Cavernularia obesa
BP1-2	0.5703	1	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	Virgularia gustaviana
BP1-2	0.0043	2	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	Tharyx sp.
BP1-2	0.0048	2	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
BP1-2	0.1069	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
BP1-2	0.4413	78	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
BP1-2	0.0006	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio cirrifera
BP1-2	0.0171	1	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Phyllodoce	Phyllodoce (A.) chinensis
BP1-2	0.6016	1	Annelida	Polychaeta	Flabelligerida	Flabelligeridae	Pherusa	Pherusa parmata
BP1-2	0.0246	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
BP1-2	0.071	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
BP1-2	0.0023	1	Annelida	Polychaeta	Terebellida	Ampharetidae	Isolda	Isolda pulchella
BP1-2	0.1717	4	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
BP1-2	0.0644	4	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
BP1-2	0.0528	1	Coelentera	Anthozoa	Ceriantharia	Cerianthidae	Cerianthus	Cerianthus sp.
BP1-2	0.9462	2	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	Cavernularia obesa
BP1-2	0.0181	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
BP1-2	0.1015	2	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
BP1-3	0.0703	1	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	Virgularia gustaviana
BP1-3	0.0019	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
BP1-3	0.0021	1	Annelida	Polychaeta	Spionida	Spionidae	Scolelepis	Scolelepis sp.
BP1-3	0.7528	1	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	Protankyra sp.
BP1-3	0.2185	32	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
BP1-3	0.001	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
BP1-3	0.0358	6	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
BP1-3	0.1359	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	Nitidotellina iridella
BP1-3	0.2631	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nereis	Nereis sp.
BP1-3	0.3922	5	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
BP1-3	0.005	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Naineris	Naineris laevigata
BP1-3	0.0683	3	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
BP1-3	0.0091	3	Annelida	Polychaeta	Terebellida	Ampharetidae	Isolda	Isolda pulchella
BP1-3	0.4712	9	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
BP1-3	0.4797	7	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
BP1-3	4.3033	4	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	Cavernularia obesa
BP1-3	0.2516	5	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
BP1-3	0.0627	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
BP1-3	0.0029	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
BP1-4	1.0502	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
BP1-4	10.9442	5	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	Protankyra sp.
BP1-4	0.1048	11	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
BP1-4	0.0321	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
BP1-4	0.0038	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
BP1-5	0.0026	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	Tharyx sp.
BP1-5	7.013	3	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	Protankyra sp.
BP1-5	0.004	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
BP1-5	0.0899	5	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
BP1-5	0.0129	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
BP1-5	0.0947	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
BP1-5	0.2657	1	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	Cavernularia obesa
BP1-5	0.0026	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
BP1-6	0.0842	1	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	Virgularia gustaviana

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
BP1-6	0.0051	1	Annelida	Polychaeta	Phyllodocida	Sigalionidae	Sthenolepis	Sthenolepis japonica
BP1-6	0.3456	5	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus
BP1-6	0.1913	44	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
BP1-6	0.0211	2	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
BP1-6	0.0426	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
BP1-6	0.5987	7	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
BP1-6	0.0088	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
BP1-6	0.0182	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	Lepidonotus sp.
BP1-6	0.0333	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Leocrates	Leocrates chinensis
BP1-6	0.3594	5	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
BP1-6	0.0017	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Gattyana	Gattyana sp.
BP1-6	0.2361	1	Annelida	Polychaeta	Eunicida	Onuphidae	Diopatra	Diopatra sp.
BP1-6	0.3154	8	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
BP1-6	0.058	4	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
BP2—1	0.0453	1	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	Virgularia gustaviana
BP2—1	0.0425	10	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
BP2—1	0.4351	28	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
BP2—1	0.0015	1	Annelida	Polychaeta	Phyllodocida	Lacydoniidae	Paralacydonia	Paralacydonia paradoxa
BP2—1	0.0011	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
BP2—1	0.0196	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
BP2—1	1.1984	9	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
BP2—1	0.8076	10	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
BP2—1	0.1379	6	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	Eunice indica

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
BP2－1	0.4596	10	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
BP2－1	0.0119	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Ceratonereis	Ceratonereis sp.
BP2－1	6.9424	5	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	Cavernularia obesa
BP2－1	0.0013	1	Annelida	Polychaeta	Orbiniida	Paraonidae	Aricidea	Aricidea fragilis
BP2－1	0.0338	2	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
BP2-2	0.71	3	Coelenterata	Anthozoa	Actiniaria	Actiniidae	Actinia	Actinia sp.
BP2-2a	0.1714	29	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
BP2-2a	0.0048	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
BP2-2a	0.3215	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	Nitidotellina iridella
BP2-2a	0.0082	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nereis	Nereis sp.
BP2-2a	0.1219	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
BP2-2a	0.1357	5	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
BP2-2a	0.1384	7	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	Eunice indica
BP2-2a	0.1517	1	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	Cavernularia obesa
BP2-2a	0.2736	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus depressus
BP2-3	0.042	12	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
BP2-3	0.0934	9	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
BP2-3	0.0049	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
BP2-3	0.03	1	Annelida	Polychaeta	Terebellida	Ampharetidae	Melinna	Melinna sp.
BP2-3	0.0139	4	Annelida	Polychaeta	Terebellida	Ampharetidae	Isolda	Isolda pulchella
BP2-3	0.0654	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
BP2-3	0.1405	6	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	Eunice indica
BP2-3	0.0358	2	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
BP2-3	2.5934	4	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	Cavernularia obesa
BP2-4	0.0046	2	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
BP2-4	0.025	10	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
BP2-4	0.0196	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
BP2-4	0.0644	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
BP2-4	0.0977	4	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	Eunice indica
BP2-4	0.1826	1	Annelida	Polychaeta	Eunicida	Onuphidae	Diopatra	Diopatra sp.
BP2-4	0.0535	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
BP2-4	8.0531	7	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	Cavernularia obesa
BP2-5	0.2968	2	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	Virgularia gustaviana
BP2-5	0.0066	2	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
BP2-5	0.0629	1	Annelida	Polychaeta	Spionida	Spionidae	Scolelepis	Scolelepis sp.
BP2-5	0.1374	1	Mollusca	Bivalvia	Veneroida	Veneridae	Ruditapes	Ruditapes philippinarum
BP2-5	0.1348	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus
BP2-5	0.0438	6	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
BP2-5	0.006	1	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	Pectinaria sp.
BP2-5	0.1629	1	Mollusca	Gastropoda	Stenoglossa	Pyrenidae	Mitrella	Mitrella bella
BP2-5	0.4393	2	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
BP2-5	0.0044	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
BP2-5	0.0122	1	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	Eunice indica
BP2-5	1.0714	1	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	Cavernularia obesa
BP2-5	0.0214	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
BP2-6	362.4198	25	Mollusca	Bivalvia	Veneroida	Veneridae	Ruditapes	Ruditapes philippinarum

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
BP2-6	0.2388	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Odontamblyopus	Odontamblyopus rubicundus
BP2-6	0.085	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nectoneanthes	Nectoneanthes ijimai
BP2-6	4.8207	1	Mollusca	Gastropoda	Mesogastropoda	Naticidae	Natica	Natica sp.
BP2-6	2.9699	1	Mollusca	Bivalvia	Veneroida	Veneridae	Dosinia	Dosinia aspera
BP2-6	1.9352	1	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	Cavernularia obesa
BP2-6	0.0271	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
MP1-1	0.0049	4	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	Sigambra hanaokai
MP1-1	0.0052	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
MP1-1	0.4986	3	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
MP1-1	0.0109	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
MP1-1	0.0175	4	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
MP1-2	0.0147	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
MP1-2	0.0183	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
MP1-2	0.5802	3	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
MP1-2	0.0489	1	Mollusca	Bivalvia	Veneroida	Cultellidae	Cultellus	Cultellus scalprum
MP1-2	0.036	4	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
MP1-3	0.0168	1	Coelentera	Anthozoa	Pennatulacea	Virgulariidae	Virgularia	Virgularia gustaviana
MP1-3	0.004	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
MP1-3	0.3181	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	Nitidotellina iridella
MP1-3	0.8258	4	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
MP1-3	0.0156	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris lat
MP1-3	4.9126	1	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	Lovenia subcarinata
MP1-3	0.0113	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Leocrates	Leocrates chinensis

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
MP1-3	0.0249	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
MP1-3	0.0482	4	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
MP1-4	11.457	1	Mollusca	Bivalvia	Veneroida	Veneridae	Paphia	Paphia undulata
MP1-4	5.1996	1	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	Lovenia subcarinata
MP1-5	0.0322	2	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
MP1-5	0.0661	3	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
MP1-5	0.1405	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
MP1-5	8.1539	1	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	Lovenia subcarinata
MP1-5	0.1379	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia bendera
MP1-5	0.0338	2	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
MP1-5	0.0019	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
MP1-6	0.0054	1	Annelida	Polychaeta	Sternaspida	Sternaspidae	Sternaspis	Sternaspis sculata
MP1-6	0.0044	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
MP1-6	0.0096	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
MP1-6	0.4689	3	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
MP1-6	0.0458	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
MP1-6	0.0169	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
MP2-1	0.0005	1	Annelida	Polychaeta	Spionida	Spionidae	Polydora	Polydora sp.
MP2-1	0.0035	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
MP2-1	0.0552	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
MP2-1	0.1081	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
MP2-1	0.021	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
MP2-1	0.0281	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia bendera

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
MP2-1	0.1794	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
MP2-1	0.0299	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
MP2-1	0.1286	3	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
MP2-2	0.1596	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
MP2-2	4.9522	2	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	Protankyra sp.
MP2-2	0.0013	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
MP2-3	0.0026	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	Sigambra hanaokai
MP2-3	0.0097	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
MP2-3	0.0772	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
MP2-3	0.291	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchis caducus
MP2-3	0.002	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Ancistrosyllis	Ancistrosyllis pilargiformis
MP2-3	0.0116	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
MP2-4	0.02	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
MP2-4	0.0159	1	Annelida	Polychaeta	Eunicida	Onuphidae	Diopatra	Diopatra sp.
MP2-4	0.3759	3	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
MP2-5	0.0315	2	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
MP2-5	0.0193	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
MP2-5	0.1661	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nereis	Nereis sp.
MP2-5	2.3392	17	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
MP2-5	0.0026	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
MP2-6	0.0881	1	Mollusca	Bivalvia	Myoida	Corbulidae	Potamocorbula	Potamocorbula laevis
MP2-6	0.1705	1	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	Pectinaria sp.
MP2-6	13.0834	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Odontamblyopus	Odontamblyopus rubicundus

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
MP2-6	0.0143	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
MP2-6	0.0195	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
PH1-1	0.0023	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	Sigambra hanaokai
PH1-1	0.0053	2	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
PH1-1	0.0955	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
PH1-1	0.0102	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
PH-2	0.0091	6	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	Sigambra hanaokai
PH-2	0.0058	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio multipinnata
PH-2	0.0024	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
PH-2	0.0095	5	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
PH-2	8.5068	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Odontamblyopus	Odontamblyopus rubicundus
PH-2	0.3586	31	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
PH-2	0.0272	2	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
PH-2	0.0019	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
PH-2	0.0154	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
PH-3	0.0018	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
PH-3	0.0221	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
PH-3	0.0046	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
PH-3	0.0191	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
PH4	0.0012	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	Sigambra hanaokai
PH4	0.0089	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
PH4	0.2378	16	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
PH4	0.0058	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nereis	Nereis sp.

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
PH4	0.6877	3	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
PH4	0.3286	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
PH4	0.0019	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
PH4	0.01	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
PH5	0.2266	14	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
PH5	0.0144	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	Cossurella dimorpha
PH5	1.1142	1	Chordata	Osteichthyes	Anguilliformes	Ophichthyidae	Cirrhimuracma	Cirrhimuracma chinensis
PH-6	0.0028	2	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	Sigambra hanaokai
PH-6	0.0014	2	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
PH-6	0.0063	3	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
PH-6	0.4288	18	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
PH-6	0.3379	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	Nitidotellina iridella
PH-6	0.0086	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
PH-6	0.0142	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
PH-6	0.0019	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK1-1	0.0365	4	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK1-1	0.0294	1	Annelida	Polychaeta	Oweniida	Oweniidae	Owenia	Owenia fusformis
SK1-1	0.0024	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SK1-1	9.4793	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Odontamblyopus	Odontamblyopus rubicundus
SK1-1	0.003	3	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SK1-1	0.0008	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	Goniada sp.
SK1-1	0.8653	1	Mollusca	Bivalvia	Veneroida	Veneridae	Dosinia	Dosinia sp.
SK1-1	0.0734	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SK1-1	0.0068	2	Annelida	Polychaeta	Orbiniida	Paraonidae	Aricidea	Aricidea fragilis
SK1-1	0.0016	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SK1-1	0.1388	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SK1-1	0.0042	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK1-2	0.0359	3	Annelida	Polychaeta	Sternaspida	Sternaspidae	Sternaspis	Sternaspis sculata
SK1-2	0.0037	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
SK1-2	0.002	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
SK1-2	0.0184	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SK1-2	30.6639	7	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	Lovenia subcarinata
SK1-2	0.0026	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	Goniada sp.
SK1-2	0.0251	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
SK1-2	0.0346	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SK1-3	0.3197	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
SK1-3	0.3996	8	Annelida	Polychaeta	Terebellida	Trichobranchidae	Terebellides	Terebellides stroemii
SK1-3	0.1027	1	Mollusca	Bivalvia	Veneroida	Solenidae	Solen	Solen sp.
SK1-3	0.0048	2	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK1-3	0.0041	1	Annelida	Polychaeta	Capitellida	Maldanidae	Praxillella	Praxillella gracilis
SK1-3	0.0453	1	Annelida	Polychaeta	Terebellida	Terebellidae	Pista	Pista cristata
SK1-3	0.0009	1	Annelida	Polychaeta	Phyllodocida	Phyllodocidae	Phyllodoce	Phyllodoce (A.) chinensis
SK1-3	1.7434	1	Mollusca	Bivalvia	Veneroida	Veneridae	Paphia	Paphia undulata
SK1-3	0.0112	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Odontamblyopus	Odontamblyopus rubicundus
SK1-3	0.0016	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SK1-3	0.5432	2	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SK1-3	3.2781	2	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	Lovenia subcarinata
SK1-3	0.0738	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SK1-3	0.0088	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	Euclymene sp.
SK1-3	0.1007	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
SK1-3	0.0041	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK1-4	0.3791	2	Mollusca	Bivalvia	Pholodomyoida	Thraciidae	Trigonothracia	Trigonothracia sp.
SK1-4	0.2524	1	Mollusca	Bivalvia	Veneroida	Solenidae	Solen	Solen sp.
SK1-4	0.0074	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
SK1-4	0.0063	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK1-4	0.004	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
SK1-4	0.0994	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SK1-4	0.0028	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	Goniada sp.
SK1-4	1.1951	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchis caducus
SK1-4	0.596	1	Arthropoda	Crustacea	Dicapoda	Calappidae	Calappa	Calappa sp.
SK1-4	0.085	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiura	Amphiura sp.
SK1-5	0.0029	2	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio ehlersi
SK1-5	0.0072	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SK1-5	0.4742	1	Arthropoda	Crustacea	Decapoda	Ocypodidae	Macrophthalmus	Macrophthalmus sp.
SK1-5	0.0052	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SK1-5	0.0034	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SK1-5	0.0463	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK1-6	0.0808	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
SK1-6	0.0933	6	Annelida	Polychaeta	Terebellida	Trichobranchidae	Terebellides	Terebellides stroemii

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SK1-6	0.1147	15	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK1-6	0.0024	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
SK1-6	0.0025	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SK1-6	5.1922	11	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SK1-6	0.0194	11	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SK1-6	1.54	2	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	Lovenia subcarinata
SK1-6	0.2183	1	Mollusca	Bivalvia	Pholadomyoida	Laternulidae	Laternula	Laternula sp.
SK1-6	0.299	3	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SK1-6	0.1605	6	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	Eunice indica
SK1-6	0.3882	1	Arthropoda	Crustacea	Decapoda	Goneplacidae	Eucrate	Eucrate haswelli
SK1-6	0.3622	1	Annelida	Polychaeta	Eunicida	Onuphidae	Diopatra	Diopatra sp.
SK1-6	0.0004	1	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	Corophium sp.
SK1-6	0.1572	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SK1-6	0.0061	3	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SK1-6	0.0209	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
SK1-6	0.0006	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK2-1	0.009	1	Annelida	Polychaeta	Sternaspida	Sternaspidae	Sternaspis	Sternaspis sculata
SK2-1	0.0046	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
SK2-1	0.1685	4	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SK2-1	0.3501	2	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SK2-1	0.0027	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SK2-1	0.0103	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SK2-1	0.082	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	Laonice cirrata

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SK2-1	0.0196	6	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SK2-1	0.0208	5	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK2-2	46.7092	3	Echinodermata	Echinoidea	Spatangoida	Schizasteridae	Schizaster	Schizaster lacunosus
SK2-2	0.3436	2	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SK2-2	0.0115	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SK2-2	0.0052	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SK2-2	0.0123	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK2-3	0.003	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	Sigambra hanaokai
SK2-3	6.0353	1	Echinodermata	Echinoidea	Spatangoida	Schizasteridae	Schizaster	Schizaster lacunosus
SK2-3	0.0245	2	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK2-3	0.1727	2	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SK2-3	0.0907	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SK2-3	0.0231	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SK2-3	3.2105	1	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	Lovenia subcarinata
SK2-3	0.3177	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SK2-3	0.0096	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	Cossurella dimorpha
SK2-3	8.3907	1	Coelentera	Anthozoa	Pennatulacea	Veretillidae	Cavernularia	Cavernularia obesa
SK2-3	0.0486	4	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK2-4	0.0235	1	Annelida	Polychaeta	Amphinomida	Amphinomidae	Amphinome	Amphinome rostrata
SK2-5	0.0691	2	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus villosa
SK2-5	0.0121	9	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	Sigambra hanaokai
SK2-5	0.0025	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio ehlersi
SK2-5	0.0038	2	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SK2-5	0.0048	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
SK2-5	0.1497	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SK2-5	0.2011	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SK2-5	0.0053	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SK2-5	0.0693	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
SK2-5	0.0179	1	Annelida	Polychaeta	Amphinomida	Amphinomidae	Amphinome	Amphinome rostrata
SK2-5	0.0132	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK2-6	0.4904	3	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
SK2-6	0.0019	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
SK2-6	0.1923	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SK2-6	63.528	7	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	Lovenia subcarinata
SK2-6	0.0649	2	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SK2-6	0.0047	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SK2-6	0.031	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK3-1	2.0088	1	Mollusca	Bivalvia	Pholodomyoida	Thraciidae	Thracia	Thracia sp.
SK3-1	0.1793	1	Mollusca	Bivalvia	Veneroida	Solenidae	Solen	Solen linearis
SK3-1	0.0037	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
SK3-1	0.0188	2	Annelida	Polychaeta	Spionida	Spionidae	Scolelepis	Scolelepis sp.
SK3-1	0.0024	2	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK3-1	0.0551	1	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	Onuphis eremita
SK3-1	5.1184	1	Mollusca	Gastropoda	Stenoglossa	Olividae	Oliva	Oliva multiplicata
SK3-1	0.0123	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SK3-1	0.0023	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SK3-1	2.4569	1	Mollusca	Bivalvia	Veneroida	Psammobiidae	Gari	Gari truncata
SK3-1	0.1126	1	Mollusca	Bivalvia	Veneroida	Psammobiidae	Gari	Gari hosoyai
SK3-1	0.0087	5	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	Corophium sp.
SK3-1	0.4467	10	Chordata	Amphioxi	Amphioxiformes	Amphioxidae	Branchiostoma	Branchiostoma belcheri
SK3-1	0.0688	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
SK3-2	0.006	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	Tharyx sp.
SK3-2	0.0166	1	Annelida	Polychaeta	Terebellida	Trichobranchidae	Terebellides	Terebellides stroemii
SK3-2	0.0257	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus
SK3-2	0.0472	12	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK3-2	0.0315	1	Annelida	Polychaeta	Sabellida	Sabellidae	Potamilla	Potamilla sp.
SK3-2	0.0466	1	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	Onuphis eremita
SK3-2	0.0134	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
SK3-2	0.0101	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nereis	Nereis sp.
SK3-2	0.2045	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SK3-2	0.015	3	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SK3-2	0.0066	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SK3-2	0.2807	2	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SK3-2	0.0149	1	Annelida	Polychaeta	Spionida	Heterospionidae	Heterospio	Heterospio sp.
SK3-2	0.1873	4	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SK3-2	0.1424	1	Mollusca	Bivalvia	Veneroida	Ungulinidae	Cycladicama	Cycladicama sp.
SK3-2	0.1343	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SK3-2	0.0596	2	Chordata	Amphioxi	Amphioxiformes	Amphioxidae	Branchiostoma	Branchiostoma belcheri
SK3-2	0.002	1	Annelida	Polychaeta	Orbiniida	Paraonidae	Aricidea	Aricidea fragilis

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SK3-2	0.0064	2	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SK3-2	0.2326	3	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
SK3-2	0.0357	1	Annelida	Polychaeta	Terebellida	Ampharetidae	Ampharete	Ampharete sp.
SK3-2	0.0357	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
SK3-2	0.0054	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK3-3	0.1671	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
SK3-3	0.0232	2	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	Tharyx sp.
SK3-3	0.1193	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus
SK3-3	0.0176	4	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK3-3	0.1364	5	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SK3-3	0.0018	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
SK3-3	2.3061	4	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SK3-3	0.0009	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SK3-3	0.0349	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SK3-3	0.1008	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SK3-3	0.0786	2	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	Lepidonotus sp.
SK3-3	0.0036	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Leocrates	Leocrates chinensis
SK3-3	0.0031	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SK3-3	0.0096	1	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	Eunice indica
SK3-3	0.3668	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchis caducus
SK3-3	0.0239	1	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
SK3-3	0.0029	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SK3-3	0.0976	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SK3-4	0.0226	1	Mollusca	Bivalvia	Pholodomyoida	Thraciidae	Trigonothracia	Trigonothracia sp.
SK3-4	56.8661	521	Mollusca	Bivalvia	Veneroida	Veneridae	Timoclea	Timoclea imbricata
SK3-4	0.0017	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
SK3-4	0.0018	2	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK3-4	0.0023	2	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
SK3-4	0.8395	1	Mollusca	Bivalvia	Veneroida	Veneridae	Paphia	Paphia gallus
SK3-4	0.0012	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nectoneanthes	Nectoneanthes ijimai
SK3-4	0.0073	12	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SK3-4	0.0025	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	Goniada sp.
SK3-4	0.0048	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SK3-4	0.5078	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchis caducus
SK3-4	0.0022	1	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	Corophium sp.
SK3-4	0.0007	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SK3-4	1.0274	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SK3-4	0.0024	1	Annelida	Polychaeta	Terebellida	Ampharetidae	Ampharete	Ampharete sp.
SK3-4	0.0026	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK3-5	0.0012	2	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	Tharyx sp.
SK3-5	0.0033	6	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK3-5	0.0012	4	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
SK3-5	0.0014	1	Annelida	Polychaeta	Terebellida	Terebellidae	Pista	Pista cristata
SK3-5	0.001	1	Annelida	Polychaeta	Phyllodocida	Lacydoniidae	Paralacydonia	Paralacydonia paradoxa
SK3-5	0.0597	1	Annelida	Polychaeta	Oweniida	Oweniidae	Owenia	Owenia fusformis
SK3-5	0.1217	2	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	Onuphis eremita

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SK3-5	0.1949	72	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SK3-5	0.0069	3	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona cincta
SK3-5	0.0017	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SK3-5	0.0224	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	Lepidonotus sp.
SK3-5	0.0007	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	Goniada sp.
SK3-5	0.0026	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SK3-5	0.0008	1	Arthropoda	Crustacea	Cumacea	Bodotriidae	Eocuma	Eocuma lata
SK3-5	0.8395	2	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchis caducus
SK3-5	0.0176	8	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	Corophium sp.
SK3-5	0.0015	1	Annelida	Polychaeta	Orbiniida	Paraonidae	Aricidea	Aricidea fragilis
SK3-5	0.0027	2	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SK3-5	0.0364	4	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SK3-5	0.1384	2	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
SK3-5	0.0012	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK3-6	0.078	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus villosa
SK3-6	0.102	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus
SK3-6	0.0801	28	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK3-6	0.1031	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SK3-6	0.0033	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	Goniada sp.
SK3-6	0.0649	3	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SK3-6	0.003	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Gattyana	Gattyana sp.
SK3-6	0.1444	5	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	Eunice indica
SK3-6	2.0724	2	Arthropoda	Crustacea	Decapoda	Goneplacidae	Eucrate	Eucrate haswelli

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SK3-6	0.0224	9	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	Corophium sp.
SK3-6	0.0204	3	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
SK3-6	0.0612	1	Chordata	Amphioxi	Amphioxiformes	Amphioxidae	Branchiostoma	Branchiostoma belcheri
SK3-6	0.1159	4	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
SK4-1	0.0889	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus villosa
SK4-1	0.0006	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	Sigambra hanaokai
SK4-1	0.0017	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK4-1	0.0174	1	Annelida	Polychaeta	Terebellida	Terebellidae	Pista	Pista cristata
SK4-1	0.0075	2	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
SK4-1	0.1513	5	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SK4-1	0.1187	3	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris latreilli
SK4-1	6.1982	1	Plathyhelminthes	Turbellaria	Polyclaida	Leptoplanidae	Leptoplana	Leptoplana sp.
SK4-1	0.0616	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SK4-1	0.016	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SK4-1	0.0014	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SK4-1	0.1178	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SK4-1	0.0048	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK4-2	0.456	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus
SK4-2	0.0042	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK4-2	0.0951	3	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SK4-2	0.2507	2	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SK4-2	0.0006	2	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SK4-2	0.0026	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SK4-2	0.0365	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	Laonice cirrata
SK4-2	0.0692	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SK4-2	0.1462	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchis caducus
SK4-2	0.0022	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SK4-2	0.2908	3	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SK4-2	0.1137	2	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
SK4-3	0.0399	1	Annelida	Polychaeta	Sternaspida	Sternaspidae	Sternaspis	Sternaspis sculata
SK4-3	0.6215	1	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	Protankyra sp.
SK4-3	0.0361	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SK4-3	11.6226	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Macoma	Macoma candida
SK4-3	0.0273	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SK4-3	0.0008	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SK4-3	0.1036	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SK4-3	0.016	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SK4-4	0.0693	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus
SK4-4	0.0119	4	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK4-4	0.0024	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
SK4-4	0.0023	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
SK4-4	0.1098	5	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SK4-4	0.0079	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SK4-4	0.0216	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SK4-4	0.0093	9	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SK4-4	0.3772	1	Mollusca	Bivalvia	Veneroida	Mactridae	Mactra	Mactra sp.

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SK4-4	6.2196	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Macoma	Macoma candida
SK4-4	0.0012	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SK4-4	0.5485	2	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SK4-4	0.1472	3	Annelida	Polychaeta	Spionida	Spionidae	Laonice	Laonice cirrata
SK4-4	0.0012	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	Goniada sp.
SK4-4	0.0358	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SK4-4	0.0006	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Gattyana	Gattyana sp.
SK4-4	0.0368	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SK4-4	0.0028	2	Annelida	Polychaeta	Orbiniida	Paraonidae	Aricidea	Aricidea fragilis
SK4-4	0.0357	15	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SK4-4	0.0921	3	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SK4-4	0.1297	2	Annelida	Polychaeta	Amphinomida	Amphinomidae	Amphinome	Amphinome rostrata
SK4-4	0.0425	2	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
SK4-4	0.2344	1	Annelida	Polychaeta	Phyllodocida	Acoetidae	Acoetes	Acoetes melanonotus
SK4-5	0.0734	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
SK4-5	0.0085	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	Tharyx sp.
SK4-5	0.0304	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus
SK4-5	0.0138	2	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK4-5	0.0085	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
SK4-5	0.0391	1	Annelida	Polychaeta	Terebellida	Terebellidae	Pista	Pista cristata
SK4-5	0.1852	5	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SK4-5	0.0493	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Odontamblyopus	Odontamblyopus rubicundus
SK4-5	0.4466	3	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	Nitidotellina minuta

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SK4-5	0.0102	6	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SK4-5	0.0084	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	Cossurella dimorpha
SK4-5	0.0076	1	Annelida	Polychaeta	Orbiniida	Paraonidae	Aricidea	Aricidea fragilis
SK4-5	0.0073	3	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SK4-5	0.2092	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SK4-5	0.144	2	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
SK4-6	0.0042	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SK4-6	0.0221	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SK4-6	0.0038	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nereis	Nereis sp.
SK4-6	0.9993	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SK4-6	0.0185	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchis caducus
SK4-6	0.0168	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SK4-6	0.0519	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
TO-1	0.0021	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio ehlersi
TO-1	0.0011	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
TO-1	0.9024	4	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
TO-1	0.0123	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	Cossurella dimorpha
TO-1	0.023	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
TO-1	0.082	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
TO-1	0.0019	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
TO-2	0.0285	2	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
TO-2	0.0037	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
TO-2	0.0726	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
TO-2	2.4002	1	Mollusca	Gastropoda	Neogastropoda	Nassariidae	Nassarius	Nassarius sp.
TO-2	0.0023	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Gattyana	Gattyana sp.
TO-2	1.0806	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchis caducus
TO-2	29.3906	1	Chordata	Osteichthyes	Anguilliformes	Ophichthyidae	Cirrhimuracma	Cirrhimuracma chinensis
TO-2	0.4085	1	Coelentera	Anthozoa	Ceriantharia	Cerianthidae	Cerianthus	Cerianthus sp.
TO-2	0.4862	2	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
TO-2	0.0122	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
TO-3	0.0029	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
TO-3	0.0124	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
TO-3	0.9076	4	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
TO-3	0.0272	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
TO-3	0.0397	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Leocrates	Leocrates chinensis
TO-3	0.3213	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
TO-3	0.1487	3	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
TO-3	0.3315	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
TO-3	0.0268	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
TO-4	0.0028	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
TO-4	0.0064	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericeas
TO-4	0.236	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
TO-4	0.0031	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	Euclymene sp.
TO-4	0.0013	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	Cossurella dimorpha
TO-4	0.0199	3	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
TO-4	0.0162	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
TO-5	0.6244	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
TO-5	0.0233	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
TO-5	0.1665	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
TO-5	0.0057	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericeas
TO-5	0.1469	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
TO-5	0.0113	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
TO-5	0.5063	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchis caducus
TO-5	0.8031	1	Coelentera	Anthozoa	Ceriantharia	Cerianthidae	Cerianthus	Cerianthus sp.
TO-5	0.2393	3	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
TO-5	0.0054	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
TO-6	0.017	1	Annelida	Polychaeta	Sternaspida	Sternaspidae	Sternaspis	Sternaspis sculata
TO-6	0.0006	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
TO-6	0.0018	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
TO-6	0.2393	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Nitidotellina	Nitidotellina iridella
TO-6	0.1414	2	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
TO-6	0.1672	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nectoneanthes	Nectoneanthes ijimai
TO-6	0.0365	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
TO-6	0.0137	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphioplus	Amphioplus laevis
TO-6	0.0716	2	Annelida	Polychaeta	Amphinomida	Amphinomidae	Amphinome	Amphinome rostrata
TO-6	0.0253	5	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
UR1	2.3627	48	Mollusca	Bivalvia	Myoida	Corbulidae	Potamocorbula	Potamocorbula laevis
UR2	0.006	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	Tharyx sp.
UR2	0.15	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
UR2	7.8496	127	Mollusca	Bivalvia	Myoida	Corbulidae	Potamocorbula	Potamocorbula laevis
UR2	0.0118	4	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
UR2	0.0499	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
UR2	0.2063	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
UR2	0.0044	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dobranchis
UR3	0.3881	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
UR3	0.0008	1	Annelida	Polychaeta	Phyllodocida	Syllidae	Syllis	Syllis sp.
UR3	5.1869	1	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	Protankyra sp.
UR3	0.0028	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
UR3	0.2358	12	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
UR3	0.0024	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
UR3	0.0672	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	Lepidonotus sp.
UR3	0.0829	4	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
UR3	0.0023	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
UR4	0.1915	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
UR4	1.0223	1	Echinodermata	Holothuroidea	Apoda	Synaptidae	Protankyra	Protankyra sp.
UR4	0.0143	6	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
UR4	143.2537	2468	Mollusca	Bivalvia	Myoida	Corbulidae	Potamocorbula	Potamocorbula laevis
UR4	0.0606	1	Annelida	Polychaeta	Terebellida	Terebellidae	Pista	Pista cristata
UR4	0.0266	1	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	Pectinaria sp.
UR4	0.0004	1	Annelida	Polychaeta	Phyllodocida	Lacydoniidae	Paralacydonia	Paralacydonia paradoxa
UR4	0.3864	35	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
UR4	0.1397	4	Annelida	Polychaeta	Phyllodocida	Nereidae	Nectoneanthes	Nectoneanthes ijimai

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
UR4	0.0023	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
UR4	0.1957	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
UR4	0.655	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
UR4	0.0028	1	Annelida	Polychaeta	Eunicida	Eunicidae	Eunice	Eunice indica
UR4	0.0063	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	Euclymene sp.
UR4	0.0323	2	Annelida	Polychaeta	Spionida	Cirratulidae	Cirratulus	Cirratulus sp.
UR4	0.1053	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia sp.
UR4	0.0027	1	Coelenterata	Anthozoa	Actiniaria	Actiniidae	Actinia	Actinia sp.
UR5	0.0012	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	Sigambra hanaokai
UR5	0.0191	3	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
UR5	10.0876	202	Mollusca	Bivalvia	Myoida	Corbulidae	Potamocorbula	Potamocorbula laevis
UR5	0.0016	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
UR5	0.5785	25	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
UR5	0.0087	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
UR5	0.4696	4	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
UR5	0.0436	1	Annelida	Polychaeta	Eunicida	Onuphidae	Diopatra	Diopatra sp.
UR5	0.0259	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia sp.
UR5	0.1252	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus sp.
UR5	0.0034	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
UR6	0.4769	14	Mollusca	Bivalvia	Myoida	Corbulidae	Potamocorbula	Potamocorbula laevis
SSK1-1	0.256	2	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
SSK1-1	0.2893	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SSK1-1	0.0184	1	Annelida	Polychaeta	Amphinomida	Amphinomidae	Amphinome	Amphinome rostrata

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SSK1-1	0.0376	1	Annelida	Polychaeta	Spionida	Cirratulidae	Chaetozone	Chaetozone setosa
SSK1-1	0.0082	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SSK1-1	0.0292	3	Annelida	Polychaeta	Spionida	Spionidae	Laonice	Laonice cirrata
SSK1-1	0.652	4	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SSK1-1	0.0078	2	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SSK1-1	0.2573	14	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK1-1	0.0411	3	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	Pectinaria sp.
SSK1-1	0.0353	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Phylo	Phylo ornatus
SSK1-1	0.0088	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
SSK1-1	0.3434	1	Annelida	polychaeta	Phyllodocida	Acoetidae	Polyodontes	Polyodontes atromarginatus
SSK1-1	0.0284	3	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK1-1	0.1301	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Trypauchen	Trypauchen vagina
SSK1-2	0.1154	2	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SSK1-2	0.0402	2	Annelida	Polychaeta	Spionida	Spionidae	Laonice	Laonice cirrata
SSK1-2	0.5882	2	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SSK1-2	0.0726	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SSK1-2	0.0343	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
SSK1-2	0.0807	3	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK1-2	0.0014	1	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	Pectinaria sp.
SSK1-2	0.0029	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
SSK1-2	0.0372	5	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK1-2	26.4503	1	Echinodermata	Echinoidea	Spatangoida	Schizasteridae	Schizaster	Schizaster lacunosus
SSK1-3	0.0092	2	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SSK1-3	0.1686	1	Annelida	Polychaeta	Amphinomida	Amphinomidae	Amphinome	Amphinome rostrata
SSK1-3	0.0742	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SSK1-3	0.0803	3	Annelida	Polychaeta	Spionida	Spionidae	Laonice	Laonice cirrata
SSK1-3	0.156	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SSK1-3	0.018	1	Annelida	Polychaeta	Terebellida	Ampharetidae	Melinna	Melinna sp.
SSK1-3	0.7134	27	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK1-3	0.0008	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
SSK1-3	0.1159	12	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK1-4	0.076	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SSK1-4	0.0008	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK1-4	0.6735	1	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchis caducus
SSK1-4	0.1004	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SSK1-4	0.0034	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SSK1-4	0.1083	1	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	Onuphis eremita
SSK1-4	0.1078	4	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK1-4	0.0048	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
SSK1-4	0.0283	1	Annelida	polychaeta	Phyllodocida	Acoetidae	Polyodontes	Polyodontes atromarginatus
SSK1-4	0.0045	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
SSK1-5	0.0201	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus lyrochaeta
SSK1-5	0.2346	1	Echinodermata	Holothuroidea	Molpadonia	Molpadiidae	Acaudina	Acaudina molpadioides
SSK1-5	0.0543	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SSK1-5	0.9584	3	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchis caducus
SSK1-5	0.0026	2	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SSK1-5	0.0065	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
SSK1-5	0.0339	1	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	Onuphis eremita
SSK1-5	0.2862	24	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK1-6	0.0549	3	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus lyrochaeta
SSK1-6	0.0046	1	Annelida	Polychaeta	Terebellida	Terebellidae	Amaeana	Amaeana trilobata
SSK1-6	0.0275	2	Annelida	Polychaeta	Terebellida	Pectinariidae	Amphictene	Amphictene japonica
SSK1-6	0.0054	2	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK1-6	0.2675	4	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SSK1-6	0.0266	2	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SSK1-6	0.0005	1	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	Corophium sp.
SSK1-6	1.0514	3	Annelida	Polychaeta	Capitellida	Capitellidae	Dasybranchus	Dasybranchis caducus
SSK1-6	0.102	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SSK1-6	0.0414	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	Laonice cirrata
SSK1-6	0.0067	1	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	Lepidonotus sp.
SSK1-6	0.0093	4	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SSK1-6	0.0632	5	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK1-6	0.0092	1	Annelida	Polychaeta	Oweniida	Oweniidae	Owenia	Owenia fusformis
SSK1-6	0.021	2	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
SSK1-6	0.3318	20	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK1-6	0.0025	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	Sigambra hanaokai
SSK2-1	0.0058	2	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK2-1	0.047	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris latreilli
SSK2-1	24.5248	1	Mollusca	Bivalvia	Veneroida	Tellinidae	Macoma	Macoma candida

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SSK2-1	0.1588	1	Arthropoda	Crustacea	Decapoda	Penaeidae	Metapenaeus	Metapenaeus sp.
SSK2-1	0.0236	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK2-1	0.0628	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SSK2-1	0.001	1	Annelida	Polychaeta	Orbinida	Paraonidae	Paraonis	Paraonis sp.
SSK2-1	0.0025	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
SSK2-1	0.0007	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio ehlersi
SSK2-2	0.0048	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SSK2-2	0.0077	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SSK2-2	0.017	1	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SSK2-2	0.1079	2	Annelida	Polychaeta	Spionida	Spionidae	Laonice	Laonice cirrata
SSK2-2	0.0078	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Leocrates	Leocrates chinensis
SSK2-2	0.0504	2	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SSK2-2	0.0505	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SSK2-2	0.0005	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SSK2-2	0.0087	1	Annelida	Polychaeta	Capitellida	Capitellidae	Mediomastus	Mediomastus californiensis
SSK2-2	0.0012	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SSK2-2	0.039	2	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK2-2	0.0205	2	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
SSK2-2	0.012	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK2-2	0.0006	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio multipinnulata
SSK2-2	0.0383	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus
SSK2-3	0.0041	2	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK2-3	0.0012	2	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SSK2-3	0.0268	3	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SSK2-3	0.0015	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Ophiodromus	Ophiodromus angustifrons
SSK2-3	0.001	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
SSK2-3	0.0119	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK2-3	0.0105	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	Tharyx sp.
SSK2-3	0.1416	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
SSK2-4	0.0168	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SSK2-4	0.0013	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SSK2-4	0.003	1	Annelida	Polychaeta	Orbinida	Paraonidae	Paraonis	Paraonis sp.
SSK2-4	1.3846	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Trypauchen	Trypauchen vagina
SSK2-5	0.0443	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SSK2-5	0.0018	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK2-5	0.0073	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	Laonice cirrata
SSK2-5	7.6955	1	Arthropoda	Crustacea	Decapoda	Penaeidae	Metapenaeus	Metapenaeus ensis
SSK2-5	0.0475	4	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SSK2-5	0.0052	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK2-5	0.0038	1	Annelida	Polychaeta	Terebellida	Ampharetidae	Samytha	Samytha sp.
SSK2-5	0.0015	1	Annelida	Polychaeta	Phyllodocida	Pilargiidae	Sigambra	Sigambra hanaokai
SSK2-6	0.0035	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SSK2-6	0.0042	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SSK2-6	0.0041	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK2-6	2.3785	1	Arthropoda	Crustacea	Decapoda	Portunidae	Charybdis	Charybdis callianassa
SSK2-6	0.0148	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SSK2-6	0.0015	1	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SSK2-6	0.068	6	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SSK2-6	0.0997	8	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK2-6	0.9664	2	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
SSK3-1	0.0197	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus sp.
SSK3-1	0.0126	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SSK3-1	0.0193	6	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK3-1	0.0598	2	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SSK3-1	0.7241	4	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SSK3-1	0.0018	2	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SSK3-1	0.6765	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SSK3-1	0.0108	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nereis	Nereis sp.
SSK3-1	0.0117	2	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SSK3-1	0.0185	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK3-1	0.2025	1	Arthropoda	Crustacea	Stomatopoda	Squillidae	Oratoquilla	Oratoquilla oratoria
SSK3-1	0.0008	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
SSK3-1	0.9941	115	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK3-1	0.323	1	Echiura	Echiurida	Echiuroinea	Echiuridae	Thalassema	Thalassema sabinum
SSK3-1	0.0041	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	Tharyx sp.
SSK3-1	0.4352	2	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
SSK3-2	0.0038	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SSK3-2	0.0041	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK3-2	0.0026	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	Cossurella dimorpha

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SSK3-2	0.0131	1	Annelida	Polychaeta	Spionida	Spionidae	Laonice	Laonice cirrata
SSK3-2	27.7717	1	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	Lovenia subcarinata
SSK3-2	0.0793	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SSK3-2	0.0113	1	Arthropoda	Crustacea	Decapoda	Penaeidae	Metapenaeus	Metapenaeus sp
SSK3-2	0.0044	2	Annelida	Polychaeta	Phyllodocida	Hesionidae	Micropodarke	Micropodarke dubia
SSK3-2	0.0094	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SSK3-2	0.0415	1	Arthropoda	Crustacea	Stomatopoda	Squillidae	Oratoquilla	Oratoquilla oratoria
SSK3-2	0.001	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
SSK3-2	0.001	1	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK3-2	0.0039	1	Mollusca	Bivalvia	Veneroida	Semelidae	Theora	Theora lata
SSK3-3	0.0194	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
SSK3-3	0.0255	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SSK3-3	0.0079	3	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK3-3	0.1772	1	Arthropoda	Crustacea	Stomatopoda	Squillidae	Cloridopsis	Cloridopsis scorpio
SSK3-3	0.1514	3	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SSK3-3	0.6743	2	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SSK3-3	0.6151	1	Arthropoda	Crustacea	Decapoda	Penaeidae	Metapenaeus	Metapenaeus ensis
SSK3-3	0.4765	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SSK3-3	0.0039	1	Annelida	Polychaeta	Phyllodocida	Nereidae	Nereis	Nereis sp.
SSK3-3	0.0035	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SSK3-3	0.0978	8	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK3-3	0.0279	1	Mollusca	Bivalvia	Veneroida	Veneridae	Paphia	Paphia undulata
SSK3-3	0.4655	80	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SSK3-3	0.0224	1	Annelida	Polychaeta	Sternaspida	Sternaspidae	Sternaspis	Sternaspis sculata
SSK3-3	0.0037	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	Tharyx sp.
SSK3-3	0.1181	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus villosa
SSK3-4	0.0199	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
SSK3-4	105.5133	3	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	Lovenia subcarinata
SSK3-4	0.0071	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SSK3-4	0.017	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK3-4	0.001	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
SSK3-4	0.0297	3	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK3-4	0.0168	1	Mollusca	Bivalvia	Veneroida	Semelidae	Theora	Theora lata
SSK3-4	0.0879	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SSK3-4	0.0258	5	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK3-4	0.0335	1	Annelida	Polychaeta	Spionida	Cirratulidae	Chaetozone	Chaetozone setosa
SSK3-4	0.0092	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	Euclymene sp.
SSK3-4	0.2474	6	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SSK3-4	0.0061	2	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	Lepidonotus sp.
SSK3-4	1.0249	5	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SSK3-4	0.6789	3	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SSK3-4	0.0075	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SSK3-4	0.0084	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK3-4	1.2284	1	Mollusca	Bivalvia	Veneroida	Veneridae	Paphia	Paphia undulata
SSK3-4	0.0936	1	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	Pectinaria sp.
SSK3-4	0.0041	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SSK3-4	0.4162	60	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK3-4	0.021	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus
SSK3-4	0.0064	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	Tharyx sp.
SSK3-4	0.3626	2	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
SSK3-5	1.2284	1	Mollusca	Bivalvia	Veneroida	Veneridae	Paphia	Paphia undulata
SSK3-5	0.6789	3	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SSK3-5	0.021	1	Arthropoda	Crustacea	Decapoda	Porcellanidae	Raphidopus	Raphidopus ciliatus
SSK3-5	0.3626	2	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
SSK3-5	0.0258	5	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK3-5	0.0335	1	Annelida	Polychaeta	Spionida	Cirratulidae	Chaetozone	Chaetozone setosa
SSK3-5	0.0092	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	Euclymene sp.
SSK3-5	0.2474	6	Annelida	Polychaeta	Phyllodocida	Glyceridae	Glycera	Glycera onomichiensis
SSK3-5	0.0061	2	Annelida	Polychaeta	Phyllodocida	Polynoidae	Lepidonotus	Lepidonotus sp.
SSK3-5	1.0249	5	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SSK3-5	0.0075	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
SSK3-5	0.0084	1	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK3-5	0.0936	1	Annelida	Polychaeta	Terebellida	Pectinariidae	Pectinaria	Pectinaria sp.
SSK3-5	0.0041	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
SSK3-5	0.4162	60	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK3-5	0.0064	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	Tharyx sp.
SSK3-5	0.0879	1	Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	Amphiodia	Amphiodia microplax
SSK3-6	0.2047	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
SSK3-6	0.0002	1	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SSK3-6	0.0062	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	Cossurella dimorpha
SSK3-6	0.0004	1	Annelida	Polychaeta	Capitellida	Maldanidae	Euclymene	Euclymene sp.
SSK3-6	0.0169	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Leocrates	Leocrates chinensis
SSK3-6	0.0079	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SSK3-6	0.002	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SSK3-6	0.0023	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomastus latericens
SSK3-6	0.0177	2	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK3-6	0.0909	8	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK3-6	0.0003	1	Annelida	Polychaeta	Orbiniida	Orbiniidae	Scoloplos	Scoloplos sp.
SSK4-1	0.0131	5	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK4-1	0.0119	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SSK4-1	0.079	1	Annelida	Polychaeta	Spionida	Cirratulidae	Chaetozone	Chaetozone setosa
SSK4-1	0.064	5	Annelida	Polychaeta	Spionida	Spionidae	Laonice	Laonice cirrata
SSK4-1	0.0956	2	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SSK4-1	0.0012	2	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SSK4-1	0.0069	3	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SSK4-1	0.0966	5	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK4-1	0.0039	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
SSK4-1	0.0328	5	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK4-1	0.8053	1	Arthropoda	Crustacea	Decapoda	Goneplacidae	Scalopidia	Scalopidia spinosipes
SSK4-1	0.0065	2	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	Tharyx sp.
SSK4-1	0.059	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Trypauchen	Trypauchen vagina
SSK4-2	0.0048	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SSK4-2	0.0528	14	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK4-2	0.0231	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SSK4-2	0.1504	8	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK4-2	0.1528	1	Annelida	Polychaeta	Flabelligerida	Flabelligeridae	Pherusa	Pherusa plumosa
SSK4-2	0.0114	2	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK4-2	0.2182	1	Arthropoda	Crustacea	Decapoda	Goneplacidae	Scalopidia	Scalopidia spinosipes
SSK4-3	0.0237	9	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK4-3	0.0134	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SSK4-3	0.0053	1	Annelida	Polychaeta	Phyllodocida	Goniadidae	Goniada	Goniada sp.
SSK4-3	0.049	2	Annelida	Polychaeta	Spionida	Spionidae	Laonice	Laonice cirrata
SSK4-3	0.0062	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Leocrates	Leocrates chinensis
SSK4-3	0.1348	3	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SSK4-3	0.2113	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Neoxenophthalmus	Neoxenophthalmus obscurus
SSK4-3	0.0039	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SSK4-3	0.0049	1	Annelida	Polychaeta	Eunicida	Onuphidae	Onuphis	Onuphis eremita
SSK4-3	0.3975	18	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK4-3	0.0542	6	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK4-3	0.009	1	Annelida	Polychaeta	Spionida	Cirratulidae	Tharyx	Tharyx sp.
SSK4-3	0.6413	1	Arthropoda	Crustacea	Decapoda	Pilumnidae	Typhlocarcinus	Typhlocarcinus nudus
SSK4-3	0.3551	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Trypauchen	Trypauchen vagina
SSK4-4	0.0036	1	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SSK4-4	0.0368	1	Annelida	Polychaeta	Amphinomida	Amphinomidae	Amphinome	Amphinome rostrata
SSK4-4	0.0155	4	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SSK4-4	0.0557	5	Annelida	Polychaeta	Spionida	Spionidae	Laonice	Laonice cirrata
SSK4-4	0.0189	1	Annelida	Polychaeta	Terebellida	Terebellidae	Loimia	Loimia medusa
SSK4-4	0.0402	1	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SSK4-4	0.0009	2	Annelida	Polychaeta	Spionida	Magelonidae	Magelona	Magelona pacifica
SSK4-4	0.0173	3	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SSK4-4	0.4328	23	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK4-4	0.0245	2	Annelida	Polychaeta	Oweniida	Oweniidae	Owenia	Owenia fusformis
SSK4-4	0.001	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
SSK4-4	0.0746	3	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK4-4	0.6538	1	Arthropoda	Crustacea	Decapoda	Goneplacidae	Scalopidia	Scalopidia spinosipes
SSK4-5	0.0013	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SSK4-5	0.0042	1	Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus	Alpheus sp.
SSK4-5	0.0199	8	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK4-5	0.0015	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SSK4-5	0.0012	1	Arthropoda	Crustacea	Amphipoda	Corophiidae	Corophium	Corophium sp.
SSK4-5	0.1163	4	Annelida	Polychaeta	Spionida	Spionidae	Laonice	Laonice cirrata
SSK4-5	0.0336	1	Annelida	Polychaeta	Phyllodocida	Hesionidae	Leocrates	Leocrates chinensis
SSK4-5	15.1101	1	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	Lovenia subcarinata
SSK4-5	0.1691	5	Annelida	Polychaeta	Eunicida	Lumbrineridae	Lumbrineris	Lumbrineris sp.
SSK4-5	0.0122	1	Annelida	Polychaeta	Capitellida	Capitellidae	Notomastus	Notomasfus latericens
SSK4-5	0.1539	10	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK4-5	0.0157	3	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
SSK4-5	0.0131	2	Annelida	Polychaeta	Terebellida	Terebellidae	Pista	Pista sp.

Station	Biomass (g)	Abundance	Phylumn	Class	Order	Family	Genus	Species
SSK4-5	0.0035	1	Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	Poecilochaetus serpens
SSK4-5	0.0878	8	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK4-5	0.0104	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Tritodynamia	Tritodynamia hainanonsis
SSK4-5	0.0686	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Trypauchen	Trypauchen vagina
SSK4-5	0.3719	1	Arthropoda	Crustacea	Decapoda	Pinnotheridae	Xenophthalmus	Xenophthalmus pinnotheroides
SSK4-6	0.0064	2	Annelida	Polychaeta	Phyllodocida	Nephtyidae	Aglaophamus	Aglaophamus dibranchis
SSK4-6	0.0299	11	Sipuncula	Phascolosomatidea	Phascolosomaliformes	Phascolosomatidae	Apionsoma	Apionsoma trichocephalus
SSK4-6	0.0029	1	Arthropoda	Crustacea	Decapoda	Callianassidae	Callianassa	Callianassa sp.
SSK4-6	0.0028	1	Annelida	Polychaeta	Cossurida	Cossuridae	Cossurella	Cossurella dimorpha
SSK4-6	32.488	1	Echinodermata	Echinoidea	Spatangoida	Loveniidae	Lovenia	Lovenia subcarinata
SSK4-6	0.1223	8	Annelida	Polychaeta	Opheliida	Opheliidae	Ophelia	Ophelina grandis
SSK4-6	0.0005	1	Annelida	Polychaeta	Spionida	Spionidae	Paraprionospio	Paraprionospio pinnata
SSK4-6	0.0483	7	Annelida	Polychaeta	Spionida	Spionidae	Prionospio	Prionospio queenslandica
SSK4-6	0.0099	1	Annelida	Polychaeta	Terebellida	Terebellidae	Terebella	Terebella sp.
SSK4-6	0.0134	1	Annelida	Polychaeta	Terebellida	Terebellidae	Thelepus	Thelepus sp.
SSK4-6	0.7255	1	Chordata	Osteichthyes	Perciformes	Taenioididae	Trypauchen	Trypauchen vagina

Table 16 Data Sheet for Marine Mammal Recording During Land-based Observation Survey

Date: ____________ **Weather:** ____________ **Site: Black Point ( ) Soko Islands ( )** **Observers:** ____________

Time	Event	Beaufort	Visibility	Mammal Species	Group Size	Behaviour	Other Comments

Table 17 Marine Mammal Land-based Sighting Records at Soko Islands (Survey data collected between December 2004 to January 2005)

Season	Survey Date	Weather	Beaufort	Visibility	First Sighting Records (Time)	Mammal Species [(a)]	Number of Individuals	Age Class of the Mammals [(b)]	Activities of the Mammals
Spring	8th March 2004 (1209-1809)	Sunny	1-3	Unlimited	1232	SC	2	2 Adults	Free Travelling
					1536	SC	6	6 Adults	Feeding behind the hang and pair trawler
					1613	SC	1	1 Adult	Following a vessel with medium size
	9th March 2004 (1100-1700)	Sunny, Light Wind, Calm	1-3	Unlimited	-	-	-	-	-
	10th March 2004 (1120-1720)	Rain, Cloudy	2	Unlimited	1332	SC	1	1 Adult	Free Travelling and Feeding/Foraging in a round circle pattern
					1354	SC	2	2 Adults	Free Travelling
	17th March 2004 (0820-1420)	Sunny, Light Wind	2-3	Unlimited	0853	FP	1	1 Adult	Free Travelling
	18th March 2004 (0815-1415)	Windy, Sunny, Calm	2-5	Unlimited	-	-	-	-	-
	16th April 2004 (0905-1505)	Sunny, Windy	2-3	Unlimited	1445	FP	2	2 Adults	Feeding/Foraging
	19th April 2004 (0900-1500)	Sunny, Calm	2	Unlimited	-	-	-	-	-
	20th April 2004 (0901-1501)	Sunny, Light WInd	2	Unlimited	-	-	-	-	-
	21th April 2004 (0900-1500)	Cloudy, Windy	3	Unlimited	-	-	-	-	-

Season	Survey Date	Weather	Beaufort	Visibility	First Sighting Records (Time)	Mammal Species (a)	Number of Individuals	Age Class of the Mammals (b)	Activities of the Mammals
	26th April 2004 (0903-1503)	Sunny, Calm	2-3	Unlimited	-	-	-	-	-
	10th May 2004 (0915-1515)	Sunny, Light Breeze	2	Unlimited	-	-	-	-	-
	12th May 2004 (0900-1500)	Sunny, Light Wind	2	Unlimited	1330	SC	1	1 Adult	Breaching
					1405	SC	1	1 Adult	Breaching
					1456	SC	1	1 Adult	Breaching
	14th May 2004 (0815-1415)	Rain, Cloudy	2	Unlimited	1339	SC	1	1 Juenvile	Breaching
	19th May 2004 (0830-1430)	Sunny, Few Shower	2	Unlimited	0900	FP	3	2 Adults, 1 Juvenile	Free Travelling, Feeding/Foraging
	25th May 2004 (0830-1430)	Sunny, Light Wind	2	Unlimited	-	-	-	-	-
Summer	10th June 2004 (0912-1512)	Fine	1	Unlimited	-	-	-	-	-
	14th June 2004 (0900-1500)	Sunny, Windy	3-4	Unlimited	-	-	-	-	-
	17th June 2004 (0900-1500)	Sunny, Calm	2	Unlimited	-	-	-	-	-
	18th June 2004 (0910-1510)	Fine	1	Unlimited	-	-	-	-	-
	28th June 2004 (0900-1500)	Sunny, Breeze	2	Unlimited	-	-	-	-	-
	23rd July 2004 (1000-1600)	Sunny, Breeze	3	Unlimited	-	-	-	-	-

Season	Survey Date	Weather	Beaufort	Visibility	First Sighting Records (Time)	Mammal Species [a]	Number of Individuals	Age Class of the Mammals [b]	Activities of the Mammals
	26th July 2004 (1000-1600)	Sunny, Breeze	4	Unlimited	-	-	-	-	-
	27th July 2004 (1000-1600)	Sunny, Breeze	4	Unlimited	-	-	-	-	-
	28th July 2004 (1030-1630)	Sunny, Breeze	6	Unlimited	1323	SC	4	3 Adults, 1 Juvenile	Feeding following hang trawler
					1352	SC	3	3 Adults	Feeding following shrimp trawler
	29th July 2004 (1200-1800)	Sunny, Shower, Windy	3	Unlimited	-	-	-	-	-
	25th August 2004 (0900-1500)	Sunny	2	Unlimited	0940	SC	1	1 Adult	Free Travelling, Feeding/Foraging
	26th August 2004 (0900-1500)	Sunny	1	Unlimited	1220	SC	1	1 Adult	Feeding/Foraging
	27th August 2004 (0900-1500)	Sunny	2	Unlimited	-	-	-	-	-
	30th August 2004 (0900-1500)	Sunny	2	Unlimited	-	-	-	-	-
	31stAugust 2004 (0900-1500)	Sunny, Windy	1-2	Unlimited	-	-	-	-	-
Autumn	6th September 2004 (0900-1500)	Sunny, Breeze	3-4	Unlimited	1254	SC	1	1 Adult	Feeding/Foraging
					1300	SC	1	1 Adult	Porpoising
	7th September 2004 (0900-1500)	Sunny, Breeze	2	Unlimited	-	-	-	-	-

Season	Survey Date	Weather	Beaufort	Visibility	First Sighting Records (Time)	Mammal Species (a)	Number of Individuals	Age Class of the Mammals (b)	Activities of the Mammals
	13th September 2004 (0900-1500)	Sunny, Breeze	3-4	Unlimited	-	-	-	-	-
	14th September 2004 (0900-1500)	Sunny	3-4	Unlimited	-	-	-	-	-
	22nd September 2004 (1000 – 1600)	Sunny	1	Unlimited	-	-	-	-	-
	27th October 2004 (0815 – 1415)	Cloudy	4-5	Unlimited	-	-	-	-	-
	28th October 2004 (0915 – 1515)	Sunny, Windy	4-5	Unlimited	-	-	-	-	-
	29th October 2004 (0900 – 1500)	Sunny, Light Wind	4-5	Unlimited	0946	SC	2	2 Adults	Feeding behind hang trawler
	30th October 2004 (0950 – 1550)	Sunny, Light Wind	2-3	Unlimited	-	-	-	-	-
	31st October 2004 (0915 – 1515)	Sunny	1	Unlimited	-	-	-	-	-
	16th November 2004 (0930 – 1530)	Sunny, Calm	4	Unlimited	-	-	-	-	-
	17th November 2004 (0930 – 1530)	Sunny, Windy	4	Unlimited	-	-	-	-	-
	24th November 2004 (0900 – 1500)	Sunshine/Shaded	2	Unlimited	-	-	-	-	-
	25th November 2004 (0940 – 1540)	Sunny	3-4	Unlimited	-	-	-	-	-
	26th November 2004 (0900 – 1500)	Sunny	3-4	Unlimited	1100	SC	1	1 Adult	Feeding/Foraging

Season	Survey Date	Weather	Beaufort	Visibility	First Sighting Records (Time)	Mammal Species (a)	Number of Individuals	Age Class of the Mammals (b)	Activities of the Mammals
					1120	SC	2	2 Adults	Feeding/Foraging
					1400	SC	3	3 Adults	Socializing, Spyhopping, Breaching
					1430	SC	2	2 Adults	Free Travelling
Winter	13th February 2004 (1100-1700)	Sunny, Calm	1	Unlimited	1026	SC	2	2 Adults	Feeding behind hang trawler
					1336	FP	3	3 Adults	Feeding on surface
					1443	SC	10	10 Adults	Feeding behind pair trawler; Porpoising
	14th February 2004 (0900 - 1500)	Sunny, Calm	1	Unlimited	1248	SC	2	2 Adults	Feeding/ Foraging
					1337	FP	4	4 Adults	Feeding over water surface
	21th February 2004 (1000-1600)	Sunny, Calm	1-2	Unlimited	-	-	-	-	-
	23rd February 2004 (0900-1500)	Windy/ Warm, Partly Sunshine	2	Unlimited	-	-	-	-	-
	26th February 2004 (0900 - 1500)	Sunny, Calm	1-2	Unlimited	1003	SC	1	1 Adult	Free Travelling
	16th December 2004 (0910 – 1510)	Sunny, Windy	2-3	Unlimited	-	-	-	-	-
	21st December 2004 (0900 1500)	Windy, Sunny	2-3	Unlimited	-	-	-	-	-
	28th December 2004 (0900 – 1500)	Cloudy	6	Unlimited	-	-	-	-	-
	30th December 2004 (0905 – 1505)	Cloudy, Cold	3-4	Unlimited	-	-	-	-	-

Season	Survey Date	Weather	Beaufort	Visibility	First Sighting Records (Time)	Mammal Species (a)	Number of Individuals	Age Class of the Mammals (b)	Activities of the Mammals
	31st December 2004 (0900 – 1500)	Cloudy	3	Unlimited	-	-	-	-	-
	10th January 2005 (0905 – 1505)	Sunny	4-5	Unlimited	-	-	-	-	-
	12th January 2005 (0905 – 1505)	Cloudy	4	Unlimited	-	-	-	-	-
	14th January 2005 (0905 – 1505)	Sunny	4-6	Unlimited	-	-	-	-	-
	17th January 2005 (0905 – 1505)	Sunny, Windy	5-6	Unlimited	-	-	-	-	-
	28th January 2005 (0900 – 1500)	Cloudy, Rainy	3-4	Unlimited	-	-	-	-	-

Notes: (a) SC = Indo-Pacific Humpback Dolphin, *Sousa chinensis,* FP = Finless Porpoise, *Neophocaena phocaenoides*
(b) Adult of Indo-Pacific Humpback Dolphin include MO (Mottled); SP (Speckled); SA (Spotted Adult) and UA (Unspotted Adult)

Table 18 Dolphin/Porpoise Vessel Based Sighting Sheet

DOLPHIN / PORPOISE SIGHTING SHEET

HIGH PRIORITY DATA (Record at Initial Sighting)

Date ____________ Time ____________ Sighting No. ____________

Sighting Distance (metres) ____________ Sighting Angle (°) ____________

Sighting Angle – Dolphins ____________ Sighting Angle – Bow of Boat ____________

Sighting Position (initial) ____________

Sighting Position (dolphin) ____________ (Trip: ______ km)

LOW PRIORITY DATA (Record During or After Sighting)

Species ☐ Humpback Dolphin ☐ Finless Porpoise ☐ Other ____________

Effort ☐ on ☐ off Seen by ____________

Group Size Best ______ High ______ Low ______

CWD Group Composition UC ____ UJ ____ SJ ____ SS ____ SA ____ UA ____

FP Group Composition Calves ____________ Adults ____________

Beaufort 0 1 2 3 4 5 6 7 + Boat Assoc. ☐None ☐ Pair ☐ Shrimp ☐ Hang ☐ Other ______

Photos ☐ No ☐ Yes Videos ☐ No ☐ Yes

Survey Area ____________ Survey Type ____________

BEHAVIOUR / COMMENTS

☐ Feeding ☐ Socializinig ☐ Traveling ☐ Milling/Resting ☐ Breaching ☐ Spy-hopping ☐ Porpoising

Other Behaviour ____________

Identified Individual(s) ____________

Other Comments ____________

CONVERTED DATA (To Be Filled by SH)

Perpendicular Distance (m) ____________ Position (3 decimal places) ____________

Table 19 Vessel Survey Effort Data Sheet

VESSEL SURVEY EFFORT DATA SHEET

P. ____ of ____

Date ____________ Survey Area ____________ Survey Direction ____________

Weather condition ____________ Survey Type ____________

Observers ____________ Vessel ____________

Flood Tide ____________ Ebb Tide ____________

Event	Series	Time	Position	Speed	Beau	Visib.	Trip	Stg.#

Table 20 Vessel Survey Effort

Date	Area	Sea Condition (Beaufort Scale)	Transect Distance Seached (Km)	Season	Vessel
18-Jul-05	SW LANTAU	1	1.85	SUMMER	KING DRAGON II
18-Jul-05	SW LANTAU	2	18.62	SUMMER	KING DRAGON II
18-Jul-05	SW LANTAU	3	42.85	SUMMER	KING DRAGON II
18-Jul-05	SW LANTAU	4	2.04	SUMMER	KING DRAGON II
18-Jul-05	DEEP BAY	2	3.39	SUMMER	KING DRAGON II
18-Jul-05	DEEP BAY	3	8.81	SUMMER	KING DRAGON II
19-Jul-05	DEEP BAY	2	1.98	SUMMER	KING DRAGON II
19-Jul-05	DEEP BAY	3	14.32	SUMMER	KING DRAGON II
19-Jul-05	SW LANTAU	0	1.02	SUMMER	KING DRAGON II
19-Jul-05	SW LANTAU	1	13.06	SUMMER	KING DRAGON II
19-Jul-05	SW LANTAU	2	28.64	SUMMER	KING DRAGON II
19-Jul-05	SW LANTAU	3	24.08	SUMMER	KING DRAGON II
20-Jul-05	W LANTAU	1	1.12	SUMMER	KING DRAGON II
20-Jul-05	W LANTAU	2	20.26	SUMMER	KING DRAGON II
20-Jul-05	W LANTAU	3	2.01	SUMMER	KING DRAGON II
20-Jul-05	NW LANTAU	1	4.07	SUMMER	KING DRAGON II
20-Jul-05	NW LANTAU	2	7.63	SUMMER	KING DRAGON II
20-Jul-05	NW LANTAU	3	12.40	SUMMER	KING DRAGON II
20-Jul-05	NW LANTAU	4	1.30	SUMMER	KING DRAGON II
20-Jul-05	DEEP BAY	2	16.59	SUMMER	KING DRAGON II
20-Jul-05	DEEP BAY	3	2.01	SUMMER	KING DRAGON II
21-Jul-05	SW LANTAU	1	9.19	SUMMER	KING DRAGON II
21-Jul-05	SW LANTAU	2	47.12	SUMMER	KING DRAGON II
21-Jul-05	SW LANTAU	3	8.51	SUMMER	KING DRAGON II
21-Jul-05	NW LANTAU	3	7.69	SUMMER	KING DRAGON II
21-Jul-05	NW LANTAU	4	2.18	SUMMER	KING DRAGON II
21-Jul-05	NW LANTAU	5	5.53	SUMMER	KING DRAGON II
22-Jul-05	DEEP BAY	1	1.00	SUMMER	KING DRAGON II
22-Jul-05	DEEP BAY	2	6.19	SUMMER	KING DRAGON II
22-Jul-05	DEEP BAY	3	7.98	SUMMER	KING DRAGON II
22-Jul-05	DEEP BAY	4	1.92	SUMMER	KING DRAGON II
22-Jul-05	SW LANTAU	1	6.90	SUMMER	KING DRAGON II
22-Jul-05	SW LANTAU	2	31.25	SUMMER	KING DRAGON II
22-Jul-05	SW LANTAU	3	12.40	SUMMER	KING DRAGON II
22-Jul-05	SW LANTAU	4	6.60	SUMMER	KING DRAGON II
25-Jul-05	DEEP BAY	2	5.67	SUMMER	KING DRAGON II
25-Jul-05	DEEP BAY	3	5.70	SUMMER	KING DRAGON II
25-Jul-05	DEEP BAY	4	7.13	SUMMER	KING DRAGON II
25-Jul-05	SW LANTAU	0	6.56	SUMMER	KING DRAGON II
25-Jul-05	SW LANTAU	1	42.72	SUMMER	KING DRAGON II
25-Jul-05	SW LANTAU	2	11.87	SUMMER	KING DRAGON II
26-Jul-05	W LANTAU	1	8.71	SUMMER	KING DRAGON II

Date	Area	Sea Condition (Beaufort Scale)	Transect Distance Seached (Km)	Season	Vessel
26-Jul-05	W LANTAU	2	10.97	SUMMER	KING DRAGON II
26-Jul-05	NW LANTAU	2	5.58	SUMMER	KING DRAGON II
26-Jul-05	NW LANTAU	3	10.32	SUMMER	KING DRAGON II
26-Jul-05	NW LANTAU	4	5.78	SUMMER	KING DRAGON II
26-Jul-05	DEEP BAY	2	4.69	SUMMER	KING DRAGON II
26-Jul-05	DEEP BAY	3	10.40	SUMMER	KING DRAGON II
26-Jul-05	DEEP BAY	4	3.22	SUMMER	KING DRAGON II
27-Jul-05	DEEP BAY	2	11.66	SUMMER	KING DRAGON II
27-Jul-05	DEEP BAY	3	5.14	SUMMER	KING DRAGON II
27-Jul-05	SW LANTAU	0	3.56	SUMMER	KING DRAGON II
27-Jul-05	SW LANTAU	1	12.95	SUMMER	KING DRAGON II
27-Jul-05	SW LANTAU	2	28.49	SUMMER	KING DRAGON II
27-Jul-05	SW LANTAU	3	12.40	SUMMER	KING DRAGON II
03-Aug-05	DEEP BAY	2	6.67	SUMMER	KING DRAGON II
03-Aug-05	DEEP BAY	3	11.33	SUMMER	KING DRAGON II
03-Aug-05	SW LANTAU	1	0.40	SUMMER	KING DRAGON II
03-Aug-05	SW LANTAU	2	29.81	SUMMER	KING DRAGON II
03-Aug-05	SW LANTAU	3	29.70	SUMMER	KING DRAGON II
04-Aug-05	DEEP BAY	2	9.43	SUMMER	KING DRAGON II
04-Aug-05	DEEP BAY	3	4.87	SUMMER	KING DRAGON II
04-Aug-05	DEEP BAY	4	2.20	SUMMER	KING DRAGON II
04-Aug-05	SW LANTAU	1	7.86	SUMMER	KING DRAGON II
04-Aug-05	SW LANTAU	2	36.74	SUMMER	KING DRAGON II
04-Aug-05	SW LANTAU	3	13.50	SUMMER	KING DRAGON II
05-Aug-05	DEEP BAY	1	5.04	SUMMER	KING DRAGON II
05-Aug-05	DEEP BAY	2	12.66	SUMMER	KING DRAGON II
05-Aug-05	DEEP BAY	3	0.10	SUMMER	KING DRAGON II
05-Aug-05	NW LANTAU	1	6.38	SUMMER	KING DRAGON II
05-Aug-05	NW LANTAU	2	13.60	SUMMER	KING DRAGON II
05-Aug-05	W LANTAU	1	5.13	SUMMER	KING DRAGON II
05-Aug-05	W LANTAU	2	9.01	SUMMER	KING DRAGON II
05-Aug-05	W LANTAU	3	8.74	SUMMER	KING DRAGON II
05-Aug-05	W LANTAU	4	1.27	SUMMER	KING DRAGON II
12-Aug-05	DEEP BAY	3	12.21	SUMMER	KING DRAGON II
12-Aug-05	DEEP BAY	4	5.49	SUMMER	KING DRAGON II
12-Aug-05	SW LANTAU	0	2.10	SUMMER	KING DRAGON II
12-Aug-05	SW LANTAU	1	6.50	SUMMER	KING DRAGON II
12-Aug-05	SW LANTAU	2	23.59	SUMMER	KING DRAGON II
12-Aug-05	SW LANTAU	3	27.51	SUMMER	KING DRAGON II
12-Aug-05	SW LANTAU	4	1.10	SUMMER	KING DRAGON II
15-Aug-05	W LANTAU	2	4.95	SUMMER	KING DRAGON II
15-Aug-05	W LANTAU	3	14.79	SUMMER	KING DRAGON II
15-Aug-05	NW LANTAU	2	15.01	SUMMER	KING DRAGON II
15-Aug-05	NW LANTAU	3	8.39	SUMMER	KING DRAGON II
15-Aug-05	DEEP BAY	2	16.62	SUMMER	KING DRAGON II
19-Aug-05	SW LANTAU	3	12.47	SUMMER	KING DRAGON II

Date	Area	Sea Condition (Beaufort Scale)	Transect Distance Seached (Km)	Season	Vessel
19-Aug-05	SW LANTAU	4	7.20	SUMMER	KING DRAGON II
19-Aug-05	SW LANTAU	5	3.94	SUMMER	KING DRAGON II
22-Aug-05	SW LANTAU	1	4.20	SUMMER	KING DRAGON II
22-Aug-05	SW LANTAU	2	41.20	SUMMER	KING DRAGON II
22-Aug-05	SW LANTAU	3	1.20	SUMMER	KING DRAGON II
22-Aug-05	DEEP BAY	3	10.02	SUMMER	KING DRAGON II
22-Aug-05	DEEP BAY	4	7.78	SUMMER	KING DRAGON II
23-Aug-05	DEEP BAY	3	16.20	SUMMER	KING DRAGON II
23-Aug-05	DEEP BAY	4	0.20	SUMMER	KING DRAGON II
23-Aug-05	SW LANTAU	1	37.57	SUMMER	KING DRAGON II
23-Aug-05	SW LANTAU	2	6.80	SUMMER	KING DRAGON II
23-Aug-05	SW LANTAU	3	3.33	SUMMER	KING DRAGON II
24-Aug-05	W LANTAU	1	3.39	SUMMER	KING DRAGON II
24-Aug-05	W LANTAU	2	14.52	SUMMER	KING DRAGON II
24-Aug-05	SW LANTAU	2	42.67	SUMMER	KING DRAGON II
24-Aug-05	SW LANTAU	3	14.73	SUMMER	KING DRAGON II
24-Aug-05	NW LANTAU	0	4.48	SUMMER	KING DRAGON II
24-Aug-05	NW LANTAU	1	4.85	SUMMER	KING DRAGON II
24-Aug-05	NW LANTAU	2	12.48	SUMMER	KING DRAGON II
25-Aug-05	NW LANTAU	2	13.20	SUMMER	KING DRAGON II
25-Aug-05	NW LANTAU	3	6.65	SUMMER	KING DRAGON II
25-Aug-05	NW LANTAU	4	4.63	SUMMER	KING DRAGON II
25-Aug-05	W LANTAU	2	2.17	SUMMER	KING DRAGON II
25-Aug-05	W LANTAU	3	14.17	SUMMER	KING DRAGON II
25-Aug-05	W LANTAU	4	6.56	SUMMER	KING DRAGON II
25-Aug-05	SW LANTAU	2	26.50	SUMMER	KING DRAGON II
25-Aug-05	SW LANTAU	3	18.74	SUMMER	KING DRAGON II
25-Aug-05	SW LANTAU	4	2.16	SUMMER	KING DRAGON II
26-Aug-05	SW LANTAU	1	1.46	SUMMER	KING DRAGON II
26-Aug-05	SW LANTAU	2	38.78	SUMMER	KING DRAGON II
26-Aug-05	SW LANTAU	3	10.76	SUMMER	KING DRAGON II
26-Aug-05	DEEP BAY	2	17.60	SUMMER	KING DRAGON II
05-Sep-05	DEEP BAY	1	3.45	AUTUMN	TSUN WING
05-Sep-05	DEEP BAY	2	11.55	AUTUMN	TSUN WING
05-Sep-05	DEEP BAY	3	3.90	AUTUMN	TSUN WING
05-Sep-05	SW LANTAU	1	2.70	AUTUMN	TSUN WING
05-Sep-05	SW LANTAU	2	61.20	AUTUMN	TSUN WING
05-Sep-05	SW LANTAU	3	0.70	AUTUMN	TSUN WING
06-Sep-05	DEEP BAY	1	11.81	AUTUMN	TSUN WING
06-Sep-05	DEEP BAY	2	7.27	AUTUMN	TSUN WING
06-Sep-05	SW LANTAU	0	2.45	AUTUMN	TSUN WING
06-Sep-05	SW LANTAU	1	4.48	AUTUMN	TSUN WING
06-Sep-05	SW LANTAU	2	45.87	AUTUMN	TSUN WING
06-Sep-05	SW LANTAU	3	11.70	AUTUMN	TSUN WING
07-Sep-05	DEEP BAY	2	15.65	AUTUMN	TSUN WING
07-Sep-05	DEEP BAY	3	4.35	AUTUMN	TSUN WING

Date	Area	Sea Condition (Beaufort Scale)	Transect Distance Seached (Km)	Season	Vessel
07-Sep-05	NW LANTAU	2	17.49	AUTUMN	TSUN WING
07-Sep-05	NW LANTAU	3	4.65	AUTUMN	TSUN WING
07-Sep-05	W LANTAU	2	3.43	AUTUMN	TSUN WING
07-Sep-05	W LANTAU	3	22.97	AUTUMN	TSUN WING
15-Sep-05	DEEP BAY	2	14.12	AUTUMN	TSUN WING
15-Sep-05	DEEP BAY	3	4.07	AUTUMN	TSUN WING
15-Sep-05	DEEP BAY	4	0.81	AUTUMN	TSUN WING
15-Sep-05	SW LANTAU	2	6.00	AUTUMN	TSUN WING
15-Sep-05	SW LANTAU	3	33.11	AUTUMN	TSUN WING
15-Sep-05	SW LANTAU	4	17.99	AUTUMN	TSUN WING
15-Sep-05	SW LANTAU	5	1.00	AUTUMN	TSUN WING
16-Sep-05	DEEP BAY	2	10.70	AUTUMN	TSUN WING
16-Sep-05	DEEP BAY	3	5.38	AUTUMN	TSUN WING
16-Sep-05	DEEP BAY	4	2.60	AUTUMN	TSUN WING
16-Sep-05	SW LANTAU	2	1.90	AUTUMN	TSUN WING
16-Sep-05	SW LANTAU	3	13.60	AUTUMN	TSUN WING
16-Sep-05	SW LANTAU	4	15.22	AUTUMN	TSUN WING
16-Sep-05	SW LANTAU	5	22.58	AUTUMN	TSUN WING
16-Sep-05	SW LANTAU	6	1.60	AUTUMN	TSUN WING
20-Sep-05	SW LANTAU	2	58.33	AUTUMN	TSUN WING
20-Sep-05	SW LANTAU	3	1.57	AUTUMN	TSUN WING
20-Sep-05	NW LANTAU	0	3.50	AUTUMN	TSUN WING
20-Sep-05	NW LANTAU	1	5.70	AUTUMN	TSUN WING
20-Sep-05	NW LANTAU	2	14.98	AUTUMN	TSUN WING
20-Sep-05	W LANTAU	1	6.41	AUTUMN	TSUN WING
20-Sep-05	W LANTAU	2	10.52	AUTUMN	TSUN WING
20-Sep-05	W LANTAU	3	5.19	AUTUMN	TSUN WING
20-Sep-05	W LANTAU	4	0.93	AUTUMN	TSUN WING
05-Oct-05	DEEP BAY	2	8.50	AUTUMN	TSUN WING
05-Oct-05	DEEP BAY	3	10.50	AUTUMN	TSUN WING
05-Oct-05	SW LANTAU	1	1.93	AUTUMN	TSUN WING
05-Oct-05	SW LANTAU	2	34.19	AUTUMN	TSUN WING
05-Oct-05	SW LANTAU	3	20.57	AUTUMN	TSUN WING
05-Oct-05	SW LANTAU	4	4.80	AUTUMN	TSUN WING
06-Oct-05	SW LANTAU	2	18.09	AUTUMN	TSUN WING
06-Oct-05	SW LANTAU	3	13.11	AUTUMN	TSUN WING
06-Oct-05	SW LANTAU	4	12.60	AUTUMN	TSUN WING
06-Oct-05	SW LANTAU	5	6.40	AUTUMN	TSUN WING
06-Oct-05	DEEP BAY	2	4.67	AUTUMN	TSUN WING
06-Oct-05	DEEP BAY	3	10.23	AUTUMN	TSUN WING
06-Oct-05	DEEP BAY	4	3.83	AUTUMN	TSUN WING
07-Oct-05	NW LANTAU	2	14.61	AUTUMN	TSUN WING
07-Oct-05	NW LANTAU	3	8.61	AUTUMN	TSUN WING
07-Oct-05	DEEP BAY	2	9.78	AUTUMN	TSUN WING
07-Oct-05	DEEP BAY	3	8.56	AUTUMN	TSUN WING
07-Oct-05	DEEP BAY	4	0.21	AUTUMN	TSUN WING

Date	Area	Sea Condition (Beaufort Scale)	Transect Distance Seached (Km)	Season	Vessel
07-Oct-05	W LANTAU	1	0.85	AUTUMN	TSUN WING
07-Oct-05	W LANTAU	2	7.20	AUTUMN	TSUN WING
07-Oct-05	W LANTAU	3	13.71	AUTUMN	TSUN WING
07-Oct-05	W LANTAU	4	0.78	AUTUMN	TSUN WING
17-Oct-05	DEEP BAY	1	4.30	AUTUMN	TSUN WING
17-Oct-05	DEEP BAY	2	5.71	AUTUMN	TSUN WING
17-Oct-05	DEEP BAY	3	6.45	AUTUMN	TSUN WING
17-Oct-05	DEEP BAY	4	1.04	AUTUMN	TSUN WING
17-Oct-05	SW LANTAU	2	14.21	AUTUMN	TSUN WING
17-Oct-05	SW LANTAU	3	27.04	AUTUMN	TSUN WING
17-Oct-05	SW LANTAU	4	15.51	AUTUMN	TSUN WING
18-Oct-05	DEEP BAY	2	4.14	AUTUMN	TSUN WING
18-Oct-05	DEEP BAY	3	9.83	AUTUMN	TSUN WING
18-Oct-05	DEEP BAY	4	3.68	AUTUMN	TSUN WING
18-Oct-05	SW LANTAU	4	10.71	AUTUMN	TSUN WING
18-Oct-05	SW LANTAU	5	18.30	AUTUMN	TSUN WING
19-Oct-05	SW LANTAU	4	1.89	AUTUMN	TSUN WING
19-Oct-05	SW LANTAU	5	13.91	AUTUMN	TSUN WING
19-Oct-05	NW LANTAU	3	8.12	AUTUMN	TSUN WING
19-Oct-05	NW LANTAU	4	14.50	AUTUMN	TSUN WING
19-Oct-05	NW LANTAU	5	2.39	AUTUMN	TSUN WING
19-Oct-05	W LANTAU	2	2.48	AUTUMN	TSUN WING
19-Oct-05	W LANTAU	3	6.42	AUTUMN	TSUN WING
19-Oct-05	W LANTAU	4	5.40	AUTUMN	TSUN WING
19-Oct-05	W LANTAU	5	2.74	AUTUMN	TSUN WING
19-Oct-05	W LANTAU	6	1.41	AUTUMN	TSUN WING
22-Nov-05	SW LANTAU	2	12.12	AUTUMN	TSUN WING
22-Nov-05	SW LANTAU	3	46.30	AUTUMN	TSUN WING
22-Nov-05	SW LANTAU	4	11.04	AUTUMN	TSUN WING
22-Nov-05	SW LANTAU	5	0.90	AUTUMN	TSUN WING
22-Nov-05	DEEP BAY	1	2.49	AUTUMN	TSUN WING
22-Nov-05	DEEP BAY	2	15.71	AUTUMN	TSUN WING
24-Nov-05	DEEP BAY	3	6.90	AUTUMN	TSUN WING
24-Nov-05	DEEP BAY	4	4.90	AUTUMN	TSUN WING
24-Nov-05	DEEP BAY	5	6.85	AUTUMN	TSUN WING
24-Nov-05	SW LANTAU	2	27.89	AUTUMN	TSUN WING
24-Nov-05	SW LANTAU	3	17.44	AUTUMN	TSUN WING
24-Nov-05	SW LANTAU	4	16.39	AUTUMN	TSUN WING
25-Nov-05	W LANTAU	2	5.78	AUTUMN	TSUN WING
25-Nov-05	W LANTAU	3	14.04	AUTUMN	TSUN WING
25-Nov-05	NW LANTAU	2	13.91	AUTUMN	TSUN WING
25-Nov-05	NW LANTAU	3	7.37	AUTUMN	TSUN WING
25-Nov-05	DEEP BAY	1	1.18	AUTUMN	TSUN WING
25-Nov-05	DEEP BAY	2	4.46	AUTUMN	TSUN WING
25-Nov-05	DEEP BAY	3	11.71	AUTUMN	TSUN WING
25-Nov-05	DEEP BAY	4	1.35	AUTUMN	TSUN WING

Date	Area	Sea Condition (Beaufort Scale)	Transect Distance Seached (Km)	Season	Vessel
28-Nov-05	SW LANTAU	1	8.50	AUTUMN	TSUN WING
28-Nov-05	SW LANTAU	2	40.23	AUTUMN	TSUN WING
28-Nov-05	SW LANTAU	3	3.09	AUTUMN	TSUN WING
28-Nov-05	DEEP BAY	2	16.40	AUTUMN	TSUN WING
28-Nov-05	DEEP BAY	3	2.00	AUTUMN	TSUN WING
29-Nov-05	DEEP BAY	2	2.22	AUTUMN	TSUN WING
29-Nov-05	DEEP BAY	3	3.54	AUTUMN	TSUN WING
29-Nov-05	DEEP BAY	4	12.32	AUTUMN	TSUN WING
29-Nov-05	SW LANTAU	2	29.42	AUTUMN	TSUN WING
29-Nov-05	SW LANTAU	3	8.84	AUTUMN	TSUN WING
29-Nov-05	SW LANTAU	4	7.04	AUTUMN	TSUN WING
29-Nov-05	SW LANTAU	5	5.25	AUTUMN	TSUN WING
30-Nov-05	W LANTAU	2	8.56	AUTUMN	TSUN WING
30-Nov-05	W LANTAU	3	9.46	AUTUMN	TSUN WING
30-Nov-05	W LANTAU	4	0.37	AUTUMN	TSUN WING
30-Nov-05	W LANTAU	5	2.88	AUTUMN	TSUN WING
30-Nov-05	SW LANTAU	2	0.30	AUTUMN	TSUN WING
30-Nov-05	SW LANTAU	3	2.20	AUTUMN	TSUN WING
30-Nov-05	SW LANTAU	4	11.29	AUTUMN	TSUN WING
30-Nov-05	SW LANTAU	5	17.19	AUTUMN	TSUN WING
30-Nov-05	SW LANTAU	6	5.12	AUTUMN	TSUN WING
30-Nov-05	NW LANTAU	2	3.94	AUTUMN	TSUN WING
30-Nov-05	NW LANTAU	3	12.92	AUTUMN	TSUN WING
30-Nov-05	NW LANTAU	4	3.85	AUTUMN	TSUN WING
30-Nov-05	NW LANTAU	5	2.51	AUTUMN	TSUN WING
01-Dec-05	SW LANTAU	2	0.97	WINTER	TSUN WING
01-Dec-05	SW LANTAU	3	7.94	WINTER	TSUN WING
01-Dec-05	SW LANTAU	4	22.94	WINTER	TSUN WING
01-Dec-05	SW LANTAU	5	12.04	WINTER	TSUN WING
01-Dec-05	SW LANTAU	6	1.24	WINTER	TSUN WING
01-Dec-05	DEEP BAY	2	16.83	WINTER	TSUN WING
01-Dec-05	DEEP BAY	3	1.77	WINTER	TSUN WING
02-Dec-05	SW LANTAU	1	2.20	WINTER	TSUN WING
02-Dec-05	SW LANTAU	2	39.10	WINTER	TSUN WING
02-Dec-05	SW LANTAU	3	9.40	WINTER	TSUN WING
02-Dec-05	SW LANTAU	4	4.00	WINTER	TSUN WING
02-Dec-05	SW LANTAU	5	6.30	WINTER	TSUN WING
02-Dec-05	DEEP BAY	2	18.50	WINTER	TSUN WING
02-Dec-05	DEEP BAY	3	0.30	WINTER	TSUN WING
06-Dec-05	W LANTAU	4	1.07	WINTER	TSUN WING
06-Dec-05	W LANTAU	5	8.35	WINTER	TSUN WING
06-Dec-05	W LANTAU	6	7.48	WINTER	TSUN WING
06-Dec-05	W LANTAU	7	4.01	WINTER	TSUN WING
06-Dec-05	NW LANTAU	4	12.13	WINTER	TSUN WING
06-Dec-05	NW LANTAU	5	5.23	WINTER	TSUN WING
06-Dec-05	NW LANTAU	6	2.18	WINTER	TSUN WING

Date	Area	Sea Condition (Beaufort Scale)	Transect Distance Seached (Km)	Season	Vessel
06-Dec-05	DEEP BAY	3	8.47	WINTER	TSUN WING
06-Dec-05	DEEP BAY	4	5.70	WINTER	TSUN WING
06-Dec-05	DEEP BAY	5	4.13	WINTER	TSUN WING
07-Dec-05	DEEP BAY	2	2.80	WINTER	TSUN WING
07-Dec-05	DEEP BAY	3	15.20	WINTER	TSUN WING
07-Dec-05	SW LANTAU	2	6.61	WINTER	TSUN WING
07-Dec-05	SW LANTAU	3	18.65	WINTER	TSUN WING
07-Dec-05	SW LANTAU	4	18.60	WINTER	TSUN WING
07-Dec-05	SW LANTAU	5	6.40	WINTER	TSUN WING
08-Dec-05	SW LANTAU	2	18.02	WINTER	TSUN WING
08-Dec-05	SW LANTAU	3	37.27	WINTER	TSUN WING
08-Dec-05	DEEP BAY	2	2.96	WINTER	TSUN WING
08-Dec-05	DEEP BAY	3	8.28	WINTER	TSUN WING
08-Dec-05	DEEP BAY	4	4.49	WINTER	TSUN WING
08-Dec-05	DEEP BAY	5	2.27	WINTER	TSUN WING
22-Dec-05	W LANTAU	5	1.72	WINTER	TSUN WING
22-Dec-05	W LANTAU	6	7.03	WINTER	TSUN WING
22-Dec-05	SW LANTAU	3	6.97	WINTER	TSUN WING
22-Dec-05	SW LANTAU	4	10.75	WINTER	TSUN WING
22-Dec-05	SW LANTAU	5	18.92	WINTER	TSUN WING
22-Dec-05	SW LANTAU	6	13.08	WINTER	TSUN WING
22-Dec-05	NW LANTAU	4	11.80	WINTER	TSUN WING
22-Dec-05	NW LANTAU	5	11.48	WINTER	TSUN WING
13-Jan-06	W LANTAU	1	4.07	WINTER	TSUN WING
13-Jan-06	W LANTAU	2	10.70	WINTER	TSUN WING
13-Jan-06	W LANTAU	3	4.52	WINTER	TSUN WING
13-Jan-06	W LANTAU	4	1.86	WINTER	TSUN WING
13-Jan-06	SW LANTAU	0	19.54	WINTER	TSUN WING
13-Jan-06	SW LANTAU	1	22.13	WINTER	TSUN WING
13-Jan-06	SW LANTAU	2	10.90	WINTER	TSUN WING
13-Jan-06	NW LANTAU	1	3.02	WINTER	TSUN WING
13-Jan-06	NW LANTAU	2	16.73	WINTER	TSUN WING
13-Jan-06	NW LANTAU	3	2.12	WINTER	TSUN WING
16-Jan-06	SW LANTAU	1	2.83	WINTER	TSUN WING
16-Jan-06	SW LANTAU	2	40.93	WINTER	TSUN WING
16-Jan-06	SW LANTAU	3	9.86	WINTER	TSUN WING
16-Jan-06	DEEP BAY	2	13.75	WINTER	TSUN WING
16-Jan-06	DEEP BAY	3	3.45	WINTER	TSUN WING
17-Jan-06	DEEP BAY	2	11.13	WINTER	TSUN WING
17-Jan-06	DEEP BAY	3	5.20	WINTER	TSUN WING
17-Jan-06	SW LANTAU	3	15.00	WINTER	TSUN WING
17-Jan-06	SW LANTAU	4	30.02	WINTER	TSUN WING
17-Jan-06	SW LANTAU	5	2.00	WINTER	TSUN WING
19-Jan-06	W LANTAU	3	1.55	WINTER	TSUN WING
19-Jan-06	W LANTAU	4	2.72	WINTER	TSUN WING
19-Jan-06	W LANTAU	5	9.49	WINTER	TSUN WING

Date	Area	Sea Condition (Beaufort Scale)	Transect Distance Seached (Km)	Season	Vessel
19-Jan-06	W LANTAU	6	5.06	WINTER	TSUN WING
19-Jan-06	NW LANTAU	5	8.13	WINTER	TSUN WING
19-Jan-06	NW LANTAU	6	1.83	WINTER	TSUN WING
19-Jan-06	DEEP BAY	1	1.00	WINTER	TSUN WING
19-Jan-06	DEEP BAY	2	6.05	WINTER	TSUN WING
19-Jan-06	DEEP BAY	3	8.85	WINTER	TSUN WING
19-Jan-06	DEEP BAY	4	1.01	WINTER	TSUN WING
20-Jan-06	SW LANTAU	2	18.58	WINTER	TSUN WING
20-Jan-06	SW LANTAU	3	25.59	WINTER	TSUN WING
20-Jan-06	SW LANTAU	4	4.80	WINTER	TSUN WING
20-Jan-06	DEEP BAY	2	10.70	WINTER	TSUN WING
24-Jan-06	DEEP BAY	2	10.98	WINTER	TSUN WING
24-Jan-06	DEEP BAY	3	6.52	WINTER	TSUN WING
24-Jan-06	SW LANTAU	2	3.42	WINTER	TSUN WING
24-Jan-06	SW LANTAU	3	33.79	WINTER	TSUN WING
24-Jan-06	SW LANTAU	4	13.71	WINTER	TSUN WING
24-Jan-06	SW LANTAU	5	1.44	WINTER	TSUN WING
01-Feb-06	SW LANTAU	2	11.45	WINTER	TSUN WING
01-Feb-06	SW LANTAU	3	37.25	WINTER	TSUN WING
01-Feb-06	SW LANTAU	4	3.67	WINTER	TSUN WING
01-Feb-06	DEEP BAY	2	14.96	WINTER	TSUN WING
01-Feb-06	DEEP BAY	3	2.01	WINTER	TSUN WING
02-Feb-06	DEEP BAY	0	1.43	WINTER	TSUN WING
02-Feb-06	DEEP BAY	1	13.08	WINTER	TSUN WING
02-Feb-06	DEEP BAY	2	1.72	WINTER	TSUN WING
02-Feb-06	SW LANTAU	2	1.40	WINTER	TSUN WING
02-Feb-06	SW LANTAU	3	11.56	WINTER	TSUN WING
02-Feb-06	SW LANTAU	4	13.93	WINTER	TSUN WING
02-Feb-06	SW LANTAU	5	8.99	WINTER	TSUN WING
02-Feb-06	SW LANTAU	6	2.82	WINTER	TSUN WING
03-Feb-06	W LANTAU	1	5.12	WINTER	TSUN WING
03-Feb-06	W LANTAU	2	7.84	WINTER	TSUN WING
03-Feb-06	W LANTAU	3	2.08	WINTER	TSUN WING
03-Feb-06	NW LANTAU	1	3.78	WINTER	TSUN WING
03-Feb-06	NW LANTAU	2	13.59	WINTER	TSUN WING
03-Feb-06	NW LANTAU	3	6.55	WINTER	TSUN WING
03-Feb-06	DEEP BAY	1	3.35	WINTER	TSUN WING
03-Feb-06	DEEP BAY	2	14.15	WINTER	TSUN WING
07-Feb-06	SW LANTAU	1	39.70	WINTER	TSUN WING
07-Feb-06	SW LANTAU	2	11.97	WINTER	TSUN WING
07-Feb-06	DEEP BAY	1	4.89	WINTER	TSUN WING
07-Feb-06	DEEP BAY	2	11.71	WINTER	TSUN WING
08-Feb-06	NW LANTAU	2	5.09	WINTER	TSUN WING
08-Feb-06	NW LANTAU	3	12.99	WINTER	TSUN WING
08-Feb-06	NW LANTAU	4	1.99	WINTER	TSUN WING
08-Feb-06	W LANTAU	2	5.43	WINTER	TSUN WING

Date	Area	Sea Condition (Beaufort Scale)	Transect Distance Seached (Km)	Season	Vessel
08-Feb-06	W LANTAU	3	10.35	WINTER	TSUN WING
08-Feb-06	W LANTAU	4	4.33	WINTER	TSUN WING
08-Feb-06	SW LANTAU	3	3.20	WINTER	TSUN WING
08-Feb-06	SW LANTAU	4	7.62	WINTER	TSUN WING
08-Feb-06	SW LANTAU	5	10.08	WINTER	TSUN WING
08-Feb-06	SW LANTAU	6	6.60	WINTER	TSUN WING
09-Feb-06	DEEP BAY	1	0.40	WINTER	TSUN WING
09-Feb-06	DEEP BAY	2	11.20	WINTER	TSUN WING
09-Feb-06	DEEP BAY	3	5.20	WINTER	TSUN WING
09-Feb-06	SW LANTAU	3	2.50	WINTER	TSUN WING
09-Feb-06	SW LANTAU	4	5.60	WINTER	TSUN WING
09-Feb-06	SW LANTAU	5	11.38	WINTER	TSUN WING
09-Feb-06	SW LANTAU	6	0.82	WINTER	TSUN WING
15-Mar-06	SW LANTAU	1	4.88	SPRING	TSUN WING
15-Mar-06	SW LANTAU	2	30.55	SPRING	TSUN WING
15-Mar-06	SW LANTAU	3	18.07	SPRING	TSUN WING
15-Mar-06	SW LANTAU	4	0.46	SPRING	TSUN WING
15-Mar-06	DEEP BAY	2	0.80	SPRING	TSUN WING
15-Mar-06	DEEP BAY	3	16.60	SPRING	TSUN WING
17-Mar-06	NW LANTAU	3	7.84	SPRING	TSUN WING
17-Mar-06	NW LANTAU	4	4.41	SPRING	TSUN WING
17-Mar-06	NW LANTAU	5	7.39	SPRING	TSUN WING
17-Mar-06	DEEP BAY	2	9.26	SPRING	TSUN WING
17-Mar-06	DEEP BAY	3	8.64	SPRING	TSUN WING
17-Mar-06	W LANTAU	0	2.05	SPRING	TSUN WING
17-Mar-06	W LANTAU	1	1.88	SPRING	TSUN WING
17-Mar-06	W LANTAU	2	1.50	SPRING	TSUN WING
17-Mar-06	W LANTAU	3	10.89	SPRING	TSUN WING
17-Mar-06	W LANTAU	4	8.03	SPRING	TSUN WING
23-Mar-06	W LANTAU	2	2.54	SPRING	TSUN WING
23-Mar-06	W LANTAU	3	14.91	SPRING	TSUN WING
23-Mar-06	W LANTAU	4	0.91	SPRING	TSUN WING
23-Mar-06	SW LANTAU	1	5.39	SPRING	TSUN WING
23-Mar-06	SW LANTAU	2	6.02	SPRING	TSUN WING
23-Mar-06	SW LANTAU	3	7.25	SPRING	TSUN WING
23-Mar-06	NW LANTAU	2	6.75	SPRING	TSUN WING
23-Mar-06	NW LANTAU	3	7.35	SPRING	TSUN WING
23-Mar-06	NW LANTAU	4	8.45	SPRING	TSUN WING
28-Mar-06	DEEP BAY	2	1.49	SPRING	TSUN WING
28-Mar-06	DEEP BAY	3	15.91	SPRING	TSUN WING
28-Mar-06	SW LANTAU	1	7.81	SPRING	TSUN WING
28-Mar-06	SW LANTAU	2	31.77	SPRING	TSUN WING
28-Mar-06	SW LANTAU	3	15.82	SPRING	TSUN WING
29-Mar-06	DEEP BAY	1	1.85	SPRING	TSUN WING
29-Mar-06	DEEP BAY	2	5.90	SPRING	TSUN WING
29-Mar-06	DEEP BAY	3	10.03	SPRING	TSUN WING

Date	Area	Sea Condition (Beaufort Scale)	Transect Distance Seached (Km)	Season	Vessel
29-Mar-06	SW LANTAU	3	11.10	SPRING	TSUN WING
29-Mar-06	SW LANTAU	4	14.24	SPRING	TSUN WING
29-Mar-06	SW LANTAU	5	10.36	SPRING	TSUN WING
31-Mar-06	SW LANTAU	2	2.40	SPRING	TSUN WING
31-Mar-06	SW LANTAU	3	47.44	SPRING	TSUN WING
31-Mar-06	DEEP BAY	3	15.95	SPRING	TSUN WING
31-Mar-06	DEEP BAY	4	0.87	SPRING	TSUN WING
03-Apr-06	SW LANTAU	1	32.44	SPRING	TSUN WING
03-Apr-06	SW LANTAU	2	11.26	SPRING	TSUN WING
03-Apr-06	SW LANTAU	3	1.34	SPRING	TSUN WING
03-Apr-06	DEEP BAY	1	5.96	SPRING	TSUN WING
03-Apr-06	DEEP BAY	2	7.73	SPRING	TSUN WING
03-Apr-06	DEEP BAY	3	3.96	SPRING	TSUN WING
06-Apr-06	DEEP BAY	1	12.10	SPRING	TSUN WING
06-Apr-06	DEEP BAY	2	6.10	SPRING	TSUN WING
06-Apr-06	SW LANTAU	1	7.70	SPRING	TSUN WING
06-Apr-06	SW LANTAU	2	2.40	SPRING	TSUN WING
06-Apr-06	SW LANTAU	3	14.88	SPRING	TSUN WING
06-Apr-06	SW LANTAU	4	5.90	SPRING	TSUN WING
06-Apr-06	SW LANTAU	5	7.11	SPRING	TSUN WING
06-Apr-06	SW LANTAU	6	2.39	SPRING	TSUN WING
18-Apr-06	W LANTAU	2	16.47	SPRING	TSUN WING
18-Apr-06	W LANTAU	3	4.72	SPRING	TSUN WING
18-Apr-06	NW LANTAU	1	1.09	SPRING	TSUN WING
18-Apr-06	NW LANTAU	2	5.64	SPRING	TSUN WING
18-Apr-06	NW LANTAU	3	9.11	SPRING	TSUN WING
18-Apr-06	NW LANTAU	4	6.25	SPRING	TSUN WING
18-Apr-06	DEEP BAY	2	14.22	SPRING	TSUN WING
18-Apr-06	DEEP BAY	3	3.68	SPRING	TSUN WING
25-Apr-06	SW LANTAU	3	6.40	SPRING	TSUN WING
25-Apr-06	SW LANTAU	4	25.60	SPRING	TSUN WING
25-Apr-06	SW LANTAU	5	8.30	SPRING	TSUN WING
25-Apr-06	SW LANTAU	6	0.90	SPRING	TSUN WING
25-Apr-06	DEEP BAY	3	2.00	SPRING	TSUN WING
25-Apr-06	DEEP BAY	4	5.11	SPRING	TSUN WING
25-Apr-06	DEEP BAY	5	7.89	SPRING	TSUN WING
26-Apr-06	DEEP BAY	3	10.80	SPRING	TSUN WING
26-Apr-06	DEEP BAY	4	0.70	SPRING	TSUN WING
26-Apr-06	SW LANTAU	2	35.58	SPRING	TSUN WING
26-Apr-06	SW LANTAU	3	12.36	SPRING	TSUN WING
26-Apr-06	SW LANTAU	4	1.30	SPRING	TSUN WING
27-Apr-06	W LANTAU	2	7.72	SPRING	TSUN WING
27-Apr-06	W LANTAU	3	4.83	SPRING	TSUN WING
27-Apr-06	W LANTAU	4	10.15	SPRING	TSUN WING
27-Apr-06	NW LANTAU	3	2.81	SPRING	TSUN WING
27-Apr-06	NW LANTAU	4	13.99	SPRING	TSUN WING

Date	Area	Sea Condition (Beaufort Scale)	Transect Distance Seached (Km)	Season	Vessel
27-Apr-06	NW LANTAU	5	2.20	SPRING	TSUN WING
27-Apr-06	SW LANTAU	1	2.00	SPRING	TSUN WING
27-Apr-06	SW LANTAU	2	27.10	SPRING	TSUN WING
27-Apr-06	SW LANTAU	3	17.20	SPRING	TSUN WING
02-May-06	SW LANTAU	1	1.12	SPRING	TSUN WING
02-May-06	SW LANTAU	2	24.05	SPRING	TSUN WING
02-May-06	SW LANTAU	3	15.83	SPRING	TSUN WING
02-May-06	DEEP BAY	3	4.47	SPRING	TSUN WING
02-May-06	DEEP BAY	4	8.23	SPRING	TSUN WING
02-May-06	DEEP BAY	5	1.24	SPRING	TSUN WING
04-May-06	SW LANTAU	2	1.20	SPRING	TSUN WING
04-May-06	SW LANTAU	3	19.60	SPRING	TSUN WING
04-May-06	SW LANTAU	4	22.90	SPRING	TSUN WING
04-May-06	SW LANTAU	5	0.40	SPRING	TSUN WING
04-May-06	DEEP BAY	3	4.18	SPRING	TSUN WING
04-May-06	DEEP BAY	4	10.15	SPRING	TSUN WING
04-May-06	DEEP BAY	5	1.27	SPRING	TSUN WING
08-May-06	W LANTAU	2	13.03	SPRING	TSUN WING
08-May-06	W LANTAU	3	8.14	SPRING	TSUN WING
08-May-06	NW LANTAU	3	21.13	SPRING	TSUN WING
08-May-06	NW LANTAU	4	0.88	SPRING	TSUN WING
08-May-06	DEEP BAY	3	15.10	SPRING	TSUN WING
09-May-06	DEEP BAY	2	6.54	SPRING	TSUN WING
09-May-06	DEEP BAY	3	7.59	SPRING	TSUN WING
09-May-06	DEEP BAY	4	1.37	SPRING	TSUN WING
09-May-06	SW LANTAU	1	0.35	SPRING	TSUN WING
09-May-06	SW LANTAU	2	24.11	SPRING	TSUN WING
09-May-06	SW LANTAU	3	27.52	SPRING	TSUN WING
09-May-06	SW LANTAU	4	4.90	SPRING	TSUN WING
10-May-06	SW LANTAU	1	3.51	SPRING	TSUN WING
10-May-06	SW LANTAU	2	25.03	SPRING	TSUN WING
10-May-06	SW LANTAU	3	20.96	SPRING	TSUN WING
10-May-06	DEEP BAY	3	8.98	SPRING	TSUN WING
10-May-06	DEEP BAY	4	4.42	SPRING	TSUN WING
11-May-06	W LANTAU	1	2.75	SPRING	TSUN WING
11-May-06	W LANTAU	2	7.92	SPRING	TSUN WING
11-May-06	W LANTAU	3	8.15	SPRING	TSUN WING
11-May-06	W LANTAU	4	1.16	SPRING	TSUN WING
11-May-06	SW LANTAU	0	1.01	SPRING	TSUN WING
11-May-06	SW LANTAU	1	2.78	SPRING	TSUN WING
11-May-06	SW LANTAU	2	23.31	SPRING	TSUN WING
11-May-06	SW LANTAU	3	20.00	SPRING	TSUN WING
11-May-06	NW LANTAU	2	0.86	SPRING	TSUN WING
11-May-06	NW LANTAU	3	10.44	SPRING	TSUN WING
11-May-06	NW LANTAU	4	2.70	SPRING	TSUN WING
11-May-06	NW LANTAU	5	1.20	SPRING	TSUN WING

Date	Area	Sea Condition (Beaufort Scale)	Transect Distance Seached (Km)	Season	Vessel

Table 21 Indo-Pacific Humpback Dolphin Sightings Records

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LONG	SEASON	BOAT ASSOC	GRP. COMP.
15-Jul-05	1	0830	12	NW LANTAU	2	ND	OFF	ERM-LNG	22.3389	113.9399	SUMMER	NONE	
15-Jul-05	2	0936	2	DEEP BAY	2	581	OFF	ERM-LNG	22.4219	113.9119	SUMMER	NONE	
15-Jul-05	3	1117	6	NW LANTAU	2	ND	OFF	ERM-LNG	22.3672	113.8886	SUMMER	NONE	1 SJ, 1 SS, 2 SA, 2 UA
15-Jul-05	4	1220	3	W LANTAU	2	ND	OFF	ERM-LNG	22.2255	113.8289	SUMMER	HANG	
15-Jul-05	5	1257	1	SW LANTAU	2	36	OFF	ERM-LNG	22.1953	113.8588	SUMMER	NONE	
15-Jul-05	6	1443	2	SW LANTAU	2	469	OFF	ERM-LNG	22.1949	113.9065	SUMMER	NONE	
15-Jul-05	7	1457	9	SW LANTAU	1	122	OFF	ERM-LNG	22.1797	113.9036	SUMMER	NONE	
15-Jul-05	8	1515	7	SW LANTAU	2	61	OFF	ERM-LNG	22.1695	113.9083	SUMMER	NONE	3 SJ, 1 SS, 3 SA
18-Jul-05	1	1232	1	SW LANTAU	3	15	ON	ERM-LNG	22.1516	113.8904	SUMMER	NONE	1 SA
18-Jul-05	2	1257	2	SW LANTAU	1	0	ON	ERM-LNG	22.1881	113.8882	SUMMER	NONE	
18-Jul-05	3	1403	2	SW LANTAU	3	30	ON	ERM-LNG	22.1963	113.8570	SUMMER	NONE	
19-Jul-05	1	1227	3	SW LANTAU	1	80	ON	ERM-LNG	22.1927	113.8780	SUMMER	NONE	
19-Jul-05	2	1333	2	SW LANTAU	2	173	ON	ERM-LNG	22.1871	113.8968	SUMMER	NONE	
19-Jul-05	3	1406	6	SW LANTAU	2	257	ON	ERM-LNG	22.1758	113.9035	SUMMER	NONE	
20-Jul-05	1	0855	1	W LANTAU	2	594	ON	ERM-LNG	22.2401	113.8428	SUMMER	SHRIMP	
20-Jul-05	2	0913	1	W LANTAU	2	186	ON	ERM-LNG	22.2214	113.8355	SUMMER	NONE	
20-Jul-05	3	0922	1	W LANTAU	2	174	ON	ERM-LNG	22.2094	113.8337	SUMMER	NONE	
20-Jul-05	4	1001	6	W LANTAU	2	93	ON	ERM-LNG	22.2307	113.8306	SUMMER	NONE	
21-Jul-05	1	1239	4	SW LANTAU	2	98	ON	ERM-LNG	22.1907	113.8867	SUMMER	NONE	1 UC, 1 SJ, 1 SA, 1 UA
21-Jul-05	2	1327	3	SW LANTAU	1	56	ON	ERM-LNG	22.1881	113.8755	SUMMER	NONE	
22-Jul-05	1	1244	1	SW LANTAU	3	74	OFF	ERM-LNG	22.1725	113.8535	SUMMER	NONE	
22-Jul-05	2	1525	1	SW LANTAU	1	69	ON	ERM-LNG	22.1776	113.9205	SUMMER	NONE	1 SS
22-Jul-05	3	1611	2	SW LANTAU	1	250	ON	ERM-LNG	22.1479	113.9255	SUMMER	NONE	1 SS, 1 SA
25-Jul-05	1	0828	14	SW LANTAU	1	ND	OFF	ERM-LNG	22.2891	113.8747	SUMMER	NONE	
25-Jul-05	2	1326	1	SW LANTAU	0	11	ON	ERM-LNG	22.1959	113.8566	SUMMER	NONE	

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LONG	SEASON	BOAT ASSOC	GRP. COMP.
26-Jul-05	1	0838	2	W LANTAU	2	118	OFF	ERM-LNG	22.2567	113.8494	SUMMER	SHRIMP, HANG	
26-Jul-05	2	0905	3	W LANTAU	2	15	ON	ERM-LNG	22.2126	113.8326	SUMMER	HANG	1 SJ, 1 SS, 1 SA
26-Jul-05	3	0936	4	W LANTAU	2	205	ON	ERM-LNG	22.2062	113.8269	SUMMER	HANG	
26-Jul-05	4	1003	2	W LANTAU	2	101	ON	ERM-LNG	22.2525	113.8401	SUMMER	NONE	1 SA, 1 UA
26-Jul-05	5	1014	4	W LANTAU	2	507	ON	ERM-LNG	22.2629	113.8472	SUMMER	NONE	
26-Jul-05	6	1111	2	NW LANTAU	2	235	ON	ERM-LNG	22.3592	113.8773	SUMMER	NONE	
26-Jul-05	7	1230	2	DEEP BAY	2	234	ON	ERM-LNG	22.4230	113.9024	SUMMER	NONE	1 SJ, 1 SS
26-Jul-05	8	1332	2	DEEP BAY	3	20	OFF	ERM-LNG	22.4148	113.8955	SUMMER	NONE	1 SJ, 1 SS
26-Jul-05	9	1343	3	NW LANTAU	3	ND	OFF	ERM-LNG	22.4038	113.8962	SUMMER	NONE	
26-Jul-05	10	1359	3	NW LANTAU	3	55	ON	ERM-LNG	22.3916	113.8858	SUMMER	NONE	
27-Jul-05	1	0855	1	SW LANTAU	1	ND	OFF	ERM-LNG	22.1920	113.8478	SUMMER	NONE	
27-Jul-05	2	0918	2	SW LANTAU	2	374	OFF	ERM-LNG	22.1951	113.8588	SUMMER	NONE	
27-Jul-05	3	1036	1	SW LANTAU	2	100	ON	ERM-LNG	22.1670	113.8976	SUMMER	NONE	
03-Aug-05	1	1209	2	SW LANTAU	2	284	ON	ERM-LNG	22.1478	113.9324	SUMMER	NONE	
03-Aug-05	2	1318	4	SW LANTAU	2	62	ON	ERM-LNG	22.1575	113.9293	SUMMER	PAIR	1 UJ, 1 SS, 2 UA
03-Aug-05	3	1615	3	SW LANTAU	3	273	OFF	ERM-LNG	22.1940	113.8487	SUMMER	HANG	2 SS, 1 SA
05-Aug-05	1	0900	3	NW LANTAU	1	115	ON	ERM-LNG	22.3634	113.8784	SUMMER	NONE	2 SS, 1 SA
05-Aug-05	2	0925	2	NW LANTAU	2	112	ON	ERM-LNG	22.3763	113.8763	SUMMER	NONE	
05-Aug-05	3	1223	1	W LANTAU	2	482	ON	ERM-LNG	22.2645	113.8469	SUMMER	NONE	
05-Aug-05	4	1259	4	W LANTAU	2	205	ON	ERM-LNG	22.1967	113.8322	SUMMER	NONE	
05-Aug-05	5	1308	3	W LANTAU	3	148	OFF	ERM-LNG	22.1932	113.8433	SUMMER	NONE	
15-Aug-05	1	0905	4	W LANTAU	3	124	OFF	ERM-LNG	22.2131	113.8346	SUMMER	NONE	
15-Aug-05	2	1123	2	NW LANTAU	3	93	ON	ERM-LNG	22.3979	113.8782	SUMMER	NONE	
15-Aug-05	3	1329	3	NW LANTAU	3	426	ON	ERM-LNG	22.3775	113.8883	SUMMER	NONE	
24-Aug-05	1	0838	5	W LANTAU	2	311	ON	ERM-LNG	22.2664	113.8575	SUMMER	NONE	
24-Aug-05	2	0925	1	W LANTAU	2	93	OFF	ERM-LNG	22.1942	113.8442	SUMMER	NONE	
24-Aug-05	3	1401	4	W LANTAU	2	151	ON	ERM-LNG	22.2059	113.8305	SUMMER	NONE	2 SJ, 1 SS, 1 SA

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LONG	SEASON	BOAT ASSOC	GRP. COMP.
24-Aug-05	4	1425	2	W LANTAU	2	136	ON	ERM-LNG	22.2411	113.8400	SUMMER	NONE	
24-Aug-05	5	1441	4	W LANTAU	2	130	OFF	ERM-LNG	22.2563	113.8450	SUMMER	NONE	
24-Aug-05	6	1536	2	NW LANTAU	1	426	ON	ERM-LNG	22.3492	113.8833	SUMMER	NONE	1 SA, 1 UA
24-Aug-05	7	1551	4	NW LANTAU	2	759	ON	ERM-LNG	22.3612	113.8778	SUMMER	NONE	
24-Aug-05	8	1600	1	NW LANTAU	2	412	ON	ERM-LNG	22.3759	113.8764	SUMMER	NONE	
24-Aug-05	9	1621	4	NW LANTAU	2	756	ON	ERM-LNG	22.4035	113.8848	SUMMER	NONE	
24-Aug-05	10	1628	2	NW LANTAU	2	28	ON	ERM-LNG	22.3912	113.8865	SUMMER	SHRIMP	1 SS, 1 SA
24-Aug-05	11	1632	4	NW LANTAU	2	30	ON	ERM-LNG	22.3865	113.8873	SUMMER	NONE	
24-Aug-05	12	1639	4	NW LANTAU	2	40	ON	ERM-LNG	22.3759	113.8876	SUMMER	NONE	
25-Aug-05	1	0936	3	NW LANTAU	4	5	OFF	ERM-LNG	22.3700	113.8766	SUMMER	NONE	
25-Aug-05	2	1022	5	NW LANTAU	4	45	ON	ERM-LNG	22.2842	113.8780	SUMMER	NONE	
25-Aug-05	3	1143	7	SW LANTAU	3	57	ON	ERM-LNG	22.1795	113.8529	SUMMER	NONE	
25-Aug-05	4	1156	8	SW LANTAU	3	69	ON	ERM-LNG	22.1766	113.8549	SUMMER	NONE	
25-Aug-05	5	1635	1	W LANTAU	3	ND	OFF	ERM-LNG	22.2723	113.8720	SUMMER	NONE	1 SA
05-Sep-05	1	1322	4	SW LANTAU	1	ND	OFF	ERM-LNG	22.1933	113.8503	AUTUMN	NONE	
05-Sep-05	2	1347	5	W LANTAU	2	ND	OFF	ERM-LNG	22.2235	113..8356	AUTUMN	NONE	
06-Sep-05	1	0921	10	DEEP BAY	2	139	ON	ERM-LNG	22.4205	113.8936	AUTUMN	NONE	1 UJ, 2 SJ, 5 SS, 1 SA, 1 UA
07-Sep-05	1	0836	2	W LANTAU	2	291	ON	ERM-LNG	22.2751	113.8633	AUTUMN	NONE	
07-Sep-05	2	0854	6	W LANTAU	2	87	ON	ERM-LNG	22.2730	113.8623	AUTUMN	NONE	
07-Sep-05	3	0934	3	W LANTAU	3	658	ON	ERM-LNG	22.2422	113.8443	AUTUMN	NONE	1 SJ, 2 SS
07-Sep-05	4	0955	4	W LANTAU	3	650	ON	ERM-LNG	22.2313	113.8380	AUTUMN	NONE	1 SJ, 1 SS, 1 SA, 1 UA
07-Sep-05	5	1106	10	W LANTAU	2	224	ON	ERM-LNG	22.2626	113.8481	AUTUMN	NONE	
07-Sep-05	6	1223	2	NW LANTAU	3	131	ON	ERM-LNG	22.3605	113.8776	AUTUMN	NONE	
07-Sep-05	7	1441	6	NW LANTAU	2	75	ON	ERM-LNG	22.3697	113.8854	AUTUMN	NONE	
07-Sep-05	8	1512	1	NW LANTAU	2	48	ON	ERM-LNG	22.3590	113.8852	AUTUMN	NONE	
07-Sep-05	9	1527	5	NW LANTAU	2	111	ON	ERM-LNG	22.3403	113.8864	AUTUMN	NONE	1 SJ, 1 SS, 2 SA, 1 UA
15-Sep-05	1	1305	5	W LANTAU	2	ND	OFF	ERM-LNG	22.2414	113.8385	AUTUMN	NONE	

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LONG	SEASON	BOAT ASSOC	GRP. COMP.
15-Sep-05	2	1322	2	W LANTAU	2	ND	OFF	ERM-LNG	22.2503	113.8453	AUTUMN	NONE	1 SJ, 1 SS
16-Sep-05	1	0845	4	DEEP BAY	2	74	ON	ERM-LNG	22.4212	113.9110	AUTUMN	NONE	1 UJ, 1 SJ, 1 SS, 1 SA
20-Sep-05	1	0839	4	W LANTAU	1	214	ON	ERM-LNG	22.2761	113.8660	AUTUMN	NONE	
20-Sep-05	2	0853	6	W LANTAU	1	0	ON	ERM-LNG	22.2727	113.8630	AUTUMN	NONE	1 SJ, 4 SS, 1 SA
20-Sep-05	3	0905	2	W LANTAU	1	74	ON	ERM-LNG	22.2670	113.8581	AUTUMN	NONE	
20-Sep-05	4	0927	5	W LANTAU	3	366	ON	ERM-LNG	22.2429	113.8418	AUTUMN	NONE	2 UJ, 1 SJ, 2 SS
20-Sep-05	5	1407	6	W LANTAU	2	ND	OFF	ERM-LNG	22.1920	113.8279	AUTUMN	NONE	
20-Sep-05	6	1428	1	W LANTAU	1	75	ON	ERM-LNG	22.2030	113.8306	AUTUMN	NONE	
20-Sep-05	7	1442	6	W LANTAU	2	32	ON	ERM-LNG	22.2167	113.8261	AUTUMN	NONE	
20-Sep-05	8	1451	2	W LANTAU	1	ND	OFF	ERM-LNG	22.2128	113.8287	AUTUMN	NONE	1 SJ, 1 SA
20-Sep-05	9	1646	2	NW LANTAU	1	403	ON	ERM-LNG	22.3947	113.8864	AUTUMN	NONE	
05-Oct-05	1	1220	13	SW LANTAU	2	88	ON	ERM-LNG	22.2042	113.8775	AUTUMN	PAIR	
05-Oct-05	2	1311	8	SW LANTAU	2	18	ON	ERM-LNG	22.1964	113.8655	AUTUMN	NONE	
05-Oct-05	3	1339	5	SW LANTAU	3	190	ON	ERM-LNG	22.1930	113.8509	AUTUMN	NONE	
06-Oct-05	1	0905	1	DEEP BAY	2	173	ON	ERM-LNG	22.4499	113.9367	AUTUMN	NONE	1 SJ
07-Oct-05	1	0826	8	W LANTAU	1	21	OFF	ERM-LNG	22.2745	113.8662	AUTUMN	NONE	
07-Oct-05	2	0847	5	W LANTAU	1	363	ON	ERM-LNG	22.2691	113.8609	AUTUMN	NONE	1 SJ, 1 SS, 2 SA, 1 UA
07-Oct-05	3	0906	6	W LANTAU	3	238	ON	ERM-LNG	22.2647	113.8563	AUTUMN	NONE	
07-Oct-05	4	1113	5	NW LANTAU	2	182	ON	ERM-LNG	22.3368	113.8779	AUTUMN	NONE	
07-Oct-05	5	1134	3	NW LANTAU	3	52	ON	ERM-LNG	22.3485	113.8770	AUTUMN	NONE	
07-Oct-05	6	1236	3	DEEP BAY	3	170	ON	ERM-LNG	22.4413	113.9062	AUTUMN	NONE	
07-Oct-05	7	1414	2	NW LANTAU	2	216	ON	ERM-LNG	22.3573	113.8848	AUTUMN	NONE	1 SJ, 1 SS
17-Oct-05	2	1216	6	SW LANTAU	3	73	ON	ERM-LNG	22.2026	113.8820	AUTUMN	PAIR	1 UJ, 2 SJ, 1 SA, 2 UA
17-Oct-05	3	1312	17	SW LANTAU	3	52	ON	ERM-LNG	22.1835	113.8599	AUTUMN	NONE	
18-Oct-05	1	0932	1	DEEP BAY	3	39	ON	ERM-LNG	22.4371	113.9156	AUTUMN	NONE	1 SJ
18-Oct-05	2	1013	5	DEEP BAY	3	51	ON	ERM-LNG	22.4185	113.9071	AUTUMN	NONE	
19-Oct-05	1	0859	2	NW LANTAU	3	15	ON	ERM-LNG	22.3751	113.8886	AUTUMN	NONE	1 UJ, 1 SA

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LONG	SEASON	BOAT ASSOC	GRP. COMP.
19-Oct-05	2	0932	8	NW LANTAU	4	389	ON	ERM-LNG	22.3818	113.8757	AUTUMN	NONE	
19-Oct-05	3	0959	1	NW LANTAU	3	18	ON	ERM-LNG	22.3720	113.8758	AUTUMN	NONE	1 SA
19-Oct-05	4	1041	2	NW LANTAU	4	274	ON	ERM-LNG	22.2950	113.8773	AUTUMN	NONE	1 SJ, 1 SA
19-Oct-05	5	1112	2	W LANTAU	4	279	OFF	ERM-LNG	22.2446	113.8452	AUTUMN	NONE	1 SJ, 1 SS
19-Oct-05	6	1135	1	W LANTAU	3	58	ON	ERM-LNG	22.2172	113.8341	AUTUMN	NONE	
19-Oct-05	7	1145	2	W LANTAU	4	130	ON	ERM-LNG	22.2055	113.8383	AUTUMN	NONE	
19-Oct-05	8	1153	5	W LANTAU	4	52	ON	ERM-LNG	22.1963	113.8416	AUTUMN	NONE	
19-Oct-05	9	1341	3	W LANTAU	3	376	ON	ERM-LNG	22.2420	113.8356	AUTUMN	NONE	
19-Oct-05	10	1401	3	W LANTAU	2	219	ON	ERM-LNG	22.2719	113.8530	AUTUMN	NONE	
22-Nov-05	1	1011	5	SW LANTAU	3	194	ON	ERM-LNG	22.1900	113.9256	AUTUMN	NONE	
22-Nov-05	2	1037	3	SW LANTAU	3	205	ON	ERM-LNG	22.1963	113.9266	AUTUMN	NONE	
22-Nov-05	3	1056	2	SW LANTAU	3	556	ON	ERM-LNG	22.2045	113.9199	AUTUMN	NONE	
22-Nov-05	4	1127	10	SW LANTAU	3	301	ON	ERM-LNG	22.1455	113.9138	AUTUMN	NONE	
22-Nov-05	5	1146	3	SW LANTAU	3	29	ON	ERM-LNG	22.1458	113.9074	AUTUMN	NONE	
22-Nov-05	6	1203	2	SW LANTAU	2	130	ON	ERM-LNG	22.1716	113.9086	AUTUMN	NONE	
22-Nov-05	7	1215	5	SW LANTAU	2	0	ON	ERM-LNG	22.1760	113.9077	AUTUMN	NONE	1 UC, 1 UJ, 2 SJ, 1 UA
22-Nov-05	8	1250	4	SW LANTAU	4	530	ON	ERM-LNG	22.1905	113.8941	AUTUMN	NONE	
22-Nov-05	9	1328	7	SW LANTAU	3	94	ON	ERM-LNG	22.1637	113.8862	AUTUMN	NONE	
24-Nov-05	1	1008	2	DEEP BAY	5	81	ON	ERM-LNG	22.4193	113.9089	AUTUMN	NONE	
24-Nov-05	2	1119	2	SW LANTAU	4	ND	OFF	ERM-LNG	22.1939	113.8494	AUTUMN	NONE	1 SJ, 1 UA
24-Nov-05	3	1147	2	SW LANTAU	2	117	ON	ERM-LNG	22.1980	113.8639	AUTUMN	NONE	1 SJ, 1 SA
24-Nov-05	4	1248	8	SW LANTAU	3	32	ON	ERM-LNG	22.1871	113.8863	AUTUMN	NONE	2 SJ, 4 SS, 2 SA
24-Nov-05	5	1525	1	SW LANTAU	2	0	ON	ERM-LNG	22.1597	113.9349	AUTUMN	NONE	
25-Nov-05	1	0836	4	W LANTAU	2	4	ON	ERM-LNG	22.2781	113.8707	AUTUMN	NONE	1 UJ, 1 SJ, 1 SS, 1 SA
25-Nov-05	2	0854	6	W LANTAU	2	296	ON	ERM-LNG	22.2715	113.8596	AUTUMN	NONE	
25-Nov-05	3	0920	6	W LANTAU	2	70	ON	ERM-LNG	22.2429	113.8442	AUTUMN	NONE	
25-Nov-05	4	0938	3	W LANTAU	3	221	ON	ERM-LNG	22.2314	113.8377	AUTUMN	NONE	

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LONG	SEASON	BOAT ASSOC	GRP. COMP.
25-Nov-05	5	0959	4	W LANTAU	2	96	OFF	ERM-LNG	22.2116	113.8358	AUTUMN	NONE	1 SJ, 1 SS, 2 SA
25-Nov-05	6	1003	2	W LANTAU	2	37	ON	ERM-LNG	22.2092	113.8371	AUTUMN	NONE	
25-Nov-05	7	1014	5	W LANTAU	3	166	ON	ERM-LNG	22.1923	113.8406	AUTUMN	NONE	
25-Nov-05	8	1031	3	W LANTAU	2	208	ON	ERM-LNG	22.1941	113.8374	AUTUMN	NONE	
25-Nov-05	9	1054	1	W LANTAU	3	193	ON	ERM-LNG	22.2264	113.8290	AUTUMN	NONE	
25-Nov-05	10	1111	3	W LANTAU	3	161	ON	ERM-LNG	22.2598	113.8411	AUTUMN	NONE	
25-Nov-05	11	1118	3	W LANTAU	3	46	ON	ERM-LNG	22.2553	113.8408	AUTUMN	NONE	1 SS, 2 SA
25-Nov-05	12	1128	8	W LANTAU	3	42	ON	ERM-LNG	22.2618	113.8463	AUTUMN	NONE	
25-Nov-05	13	1415	3	NW LANTAU	2	22	ON	ERM-LNG	22.3977	113.8864	AUTUMN	NONE	
25-Nov-05	14	1433	9	NW LANTAU	2	84	ON	ERM-LNG	22.3810	113.8879	AUTUMN	NONE	2 UJ, 2 SJ, 3 SS, 2 SA
28-Nov-05	1	1006	3	SW LANTAU	3	203	ON	ERM-LNG	22.1801	113.9284	AUTUMN	NONE	
28-Nov-05	2	1022	1	SW LANTAU	2	98	ON	ERM-LNG	22.1865	113.9294	AUTUMN	NONE	1 SA
29-Nov-05	1	0929	1	DEEP BAY	4	0	ON	ERM-LNG	22.4266	113.8879	AUTUMN	NONE	1 SS
29-Nov-05	2	1233	3	SW LANTAU	2	158	ON	ERM-LNG	22.1928	113.8683	AUTUMN	NONE	1 SJ, 1 SS, 1 SA
29-Nov-05	4	1452	3	SW LANTAU	3	164	ON	ERM-LNG	22.1963	113.9160	AUTUMN	NONE	
30-Nov-05	1	0831	1	W LANTAU	3	37	ON	ERM-LNG	22.2686	113.8618	AUTUMN	NONE	1 SS
30-Nov-05	2	0858	2	W LANTAU	2	78	ON	ERM-LNG	22.2237	113.8352	AUTUMN	NONE	
30-Nov-05	3	1313	1	NW LANTAU	3	84	ON	ERM-LNG	22.3546	113.8777	AUTUMN	NONE	
30-Nov-05	4	1328	6	NW LANTAU	3	137	ON	ERM-LNG	22.3746	113.8751	AUTUMN	NONE	
30-Nov-05	5	1353	1	NW LANTAU	3	4	ON	ERM-LNG	22.3882	113.8774	AUTUMN	NONE	1 SA
30-Nov-05	6	1407	4	NW LANTAU	3	165	ON	ERM-LNG	22.4021	113.8805	AUTUMN	NONE	
01-Dec-05	1	1045	2	SW LANTAU	4	123	ON	ERM-LNG	22.1712	113.9092	WINTER	NONE	
01-Dec-05	2	1236	1	SW LANTAU	4	185	ON	ERM-LNG	22.1772	113.8522	WINTER	NONE	
06-Dec-05	1	0900	2	W LANTAU	6	204	OFF	ERM-LNG	22.2312	113.8373	WINTER	NONE	
07-Dec-05	1	1132	1	SW LANTAU	2	196	ON	ERM-LNG	22.2094	113.9357	WINTER	NONE	
08-Dec-05	1	0935	3	SW LANTAU	2	24	ON	ERM-LNG	22.1843	113.8790	WINTER	NONE	
08-Dec-05	2	0946	4	SW LANTAU	2	796	ON	ERM-LNG	22.1976	113.8742	WINTER	PAIR	

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08-Dec-05	3	0959	4	SW LANTAU	2	420	ON	ERM-LNG	22.2072	113.8840	WINTER	NONE	
08-Dec-05	4	1013	1	SW LANTAU	2	89	ON	ERM-LNG	22.2083	113.8865	WINTER	NONE	1 SJ
08-Dec-05	5	1240	4	SW LANTAU	3	117	ON	ERM-LNG	22.1857	113.9383	WINTER	NONE	
08-Dec-05	6	1253	1	SW LANTAU	3	0	ON	ERM-LNG	22.1919	113.9365	WINTER	NONE	
22-Dec-05	1	0843	3	W LANTAU	6	41	ON	ERM-LNG	22.2531	113.8484	WINTER	NONE	
22-Dec-05	2	0857	1	W LANTAU	6	104	ON	ERM-LNG	22.2306	113.8378	WINTER	NONE	1 SS
22-Dec-05	3	0905	2	W LANTAU	6	37	ON	ERM-LNG	22.2219	113.8348	WINTER	SHRIMP	
22-Dec-05	4	0923	5	W LANTAU	5	19	OFF	ERM-LNG	22.1941	113.8447	WINTER	NONE	1 UJ, 1 SJ, 2 SS, 1 SA
22-Dec-05	5	1054	2	SW LANTAU	3	23	ON	ERM-LNG	22.1984	113.8977	WINTER	NONE	
22-Dec-05	6	1113	1	SW LANTAU	3	93	ON	ERM-LNG	22.1774	113.9053	WINTER	NONE	1 UA
13-Jan-06	1	0833	10	W LANTAU	1	0	ON	ERM-LNG	22.2744	113.8702	WINTER	NONE	
13-Jan-06	2	0851	4	W LANTAU	2	375	ON	ERM-LNG	22.2638	113.8588	WINTER	NONE	
13-Jan-06	3	0903	3	W LANTAU	2	0	ON	ERM-LNG	22.2574	113.8515	WINTER	NONE	
13-Jan-06	4	0927	2	W LANTAU	2	325	ON	ERM-LNG	22.2206	113.8350	WINTER	NONE	
13-Jan-06	5	0935	3	W LANTAU	2	0	ON	ERM-LNG	22.2159	113.8343	WINTER	NONE	
13-Jan-06	6	0948	4	W LANTAU	1	115	ON	ERM-LNG	22.1992	113.8426	WINTER	NONE	
13-Jan-06	7	0958	1	SW LANTAU	2	30	OFF	ERM-LNG	22.1936	113.8451	WINTER	NONE	
13-Jan-06	11	1331	1	SW LANTAU	0	376	ON	ERM-LNG	22.1911	113.8852	WINTER	NONE	
13-Jan-06	12	1406	4	SW LANTAU	2	118	ON	ERM-LNG	22.1765	113.8531	WINTER	NONE	1 UJ, 1 SJ, 2 SS
13-Jan-06	13	1420	2	SW LANTAU	2	239	ON	ERM-LNG	22.1890	113.8480	WINTER	NONE	1 SJ, 1 SA
13-Jan-06	14	1449	2	W LANTAU	4	344	ON	ERM-LNG	22.2369	113.8332	WINTER	NONE	
13-Jan-06	15	1529	1	NW LANTAU	2	71	ON	ERM-LNG	22.3073	113.8776	WINTER	NONE	
13-Jan-06	16	1543	5	NW LANTAU	2	797	ON	ERM-LNG	22.3360	113.8788	WINTER	NONE	
13-Jan-06	17	1608	1	NW LANTAU	1	121	ON	ERM-LNG	22.3936	113.8773	WINTER	NONE	
13-Jan-06	18	1642	3	NW LANTAU	2	204	ON	ERM-LNG	22.3318	113.8868	WINTER	NONE	
16-Jan-06	4	1235	3	SW LANTAU	3	179	ON	ERM-LNG	22.1827	113.8639	WINTER	NONE	
16-Jan-06	5	1301	8	SW LANTAU	3	ND	OFF	ERM-LNG	22.1946	113.8428	WINTER	NONE	

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17-Jan-06	1	0912	6	DEEP BAY	2	239	ON	ERM-LNG	22.4250	113.8902	WINTER	NONE	
17-Jan-06	2	0939	4	DEEP BAY	3	165	ON	ERM-LNG	22.4309	113.9079	WINTER	NONE	
17-Jan-06	3	1021	1	DEEP BAY	2	25	ON	ERM-LNG	22.4194	113.9088	WINTER	NONE	1 SJ
19-Jan-06	1	0849	12	W LANTAU	3	224	OFF	ERM-LNG	22.2585	113.8518	WINTER	NONE	
19-Jan-06	2	0922	1	W LANTAU	5	63	ON	ERM-LNG	22.2479	113.8461	WINTER	NONE	
19-Jan-06	3	0932	1	W LANTAU	5	113	ON	ERM-LNG	22.2367	113.8408	WINTER	NONE	
19-Jan-06	4	0954	5	W LANTAU	5	56	ON	ERM-LNG	22.2163	113.8341	WINTER	NONE	
19-Jan-06	5	1113	4	NW LANTAU	5	271	ON	ERM-LNG	22.3689	113.8751	WINTER	NONE	
19-Jan-06	6	1154	4	DEEP BAY	2	48	ON	ERM-LNG	22.4508	113.9201	WINTER	NONE	2 UJ, 1 SA, 1 UA
20-Jan-06	1	1122	3	SW LANTAU	3	55	ON	ERM-LNG	22.1684	113.8859	WINTER	NONE	
24-Jan-06	1	1120	1	SW LANTAU	3	104	ON	ERM-LNG	22.1939	113.8596	WINTER	NONE	1 SJ
24-Jan-06	2	1142	1	SW LANTAU	3	26	OFF	ERM-LNG	22.1744	113.8747	WINTER	NONE	
24-Jan-06	3	1244	1	SW LANTAU	4	82	ON	ERM-LNG	22.2024	113.8975	WINTER	NONE	1 SA
01-Feb-06	2	1153	5	SW LANTAU	2	0	ON	ERM-LNG	22.2032	113.8826	WINTER	PAIR	1 SJ, 1 SS, 2 SA, 1 UA
01-Feb-06	3	1442	4	DEEP BAY	2	34	ON	ERM-LNG	22.4254	113.8994	WINTER	NONE	1 UJ, 2 SJ, 1 SA
01-Feb-06	4	1505	1	DEEP BAY	2	107	ON	ERM-LNG	22.4315	113.8931	WINTER	NONE	1 SS
02-Feb-06	1	0913	2	DEEP BAY	1	0	ON	ERM-LNG	22.4354	113.8996	WINTER	NONE	1 SS, 1 UA
02-Feb-06	2	0937	2	DEEP BAY	1	54	ON	ERM-LNG	22.4253	113.8992	WINTER	NONE	
02-Feb-06	3	1016	1	DEEP BAY	1	109	ON	ERM-LNG	22.4210	113.9109	WINTER	NONE	1 SS
03-Feb-06	1	0830	7	W LANTAU	2	0	ON	ERM-LNG	22.2706	113.8645	WINTER	NONE	
03-Feb-06	2	0857	5	W LANTAU	2	0	ON	ERM-LNG	22.2599	113.8529	WINTER	HANG	
03-Feb-06	3	0910	4	W LANTAU	2	79	ON	ERM-LNG	22.2460	113.8454	WINTER	HANG	
03-Feb-06	4	0930	6	W LANTAU	2	29	ON	ERM-LNG	22.2286	113.8374	WINTER	HANG	
03-Feb-06	5	1010	5	W LANTAU	2	0	ON	ERM-LNG	22.2210	113.8276	WINTER	NONE	
03-Feb-06	6	1027	8	W LANTAU	1	691	ON	ERM-LNG	22.2491	113.8387	WINTER	NONE	1 UC, 2 UJ, 2 SA, 3 UA
03-Feb-06	7	1057	5	W LANTAU	3	384	ON	ERM-LNG	22.2756	113.8557	WINTER	NONE	
03-Feb-06	8	1059	1	W LANTAU	3	120	ON	ERM-LNG	22.2830	113.8621	WINTER	NONE	

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LONG	SEASON	BOAT ASSOC	GRP. COMP.
03-Feb-06	9	1126	2	NW LANTAU	2	795	ON	ERM-LNG	22.3391	113.8757	WINTER	NONE	
03-Feb-06	10	1133	2	NW LANTAU	1	40	ON	ERM-LNG	22.3494	113.8767	WINTER	NONE	1 SS, 1 SA
03-Feb-06	11	1140	5	NW LANTAU	1	234	ON	ERM-LNG	22.3564	113.8762	WINTER	NONE	
03-Feb-06	12	1156	4	NW LANTAU	1	44	ON	ERM-LNG	22.3735	113.8760	WINTER	NONE	
03-Feb-06	13	1348	4	NW LANTAU	2	300	ON	ERM-LNG	22.3997	113.8889	WINTER	NONE	
03-Feb-06	14	1356	4	NW LANTAU	3	100	ON	ERM-LNG	22.3797	113.8917	WINTER	NONE	
03-Feb-06	15	1415	17	NW LANTAU	3	143	ON	ERM-LNG	22.3796	113.8912	WINTER	HANG	
03-Feb-06	16	1447	3	NW LANTAU	3	173	ON	ERM-LNG	22.3703	113.8879	WINTER	NONE	
03-Feb-06	17	1212	1	DEEP BAY	1	496	ON	ERM-LNG	22.3941	113.8777	WINTER	NONE	
07-Feb-06	5	1223	5	SW LANTAU	1	81	ON	ERM-LNG	22.2019	113.8758	WINTER	PAIR	
07-Feb-06	7	1308	4	SW LANTAU	1	0	ON	ERM-LNG	22.1920	113.8670	WINTER	NONE	
07-Feb-06	8	1333	3	SW LANTAU	2	281	ON	ERM-LNG	22.1859	113.8479	WINTER	NONE	
08-Feb-06	1	0834	3	NW LANTAU	3	0	ON	ERM-LNG	22.2930	113.8780	WINTER	NONE	1 UJ, 1 SS, 1 UA
08-Feb-06	2	0915	1	NW LANTAU	3	24	ON	ERM-LNG	22.3542	113.8771	WINTER	NONE	
08-Feb-06	3	0927	2	NW LANTAU	3	536	ON	ERM-LNG	22.3704	113.8755	WINTER	NONE	
08-Feb-06	4	0938	6	NW LANTAU	2	0	ON	ERM-LNG	22.3723	113.8748	WINTER	NONE	
08-Feb-06	5	1007	12	NW LANTAU	3	72	ON	ERM-LNG	22.3967	113.8899	WINTER	NONE	
08-Feb-06	6	1404	1	SW LANTAU	5	62	OFF	ERM-LNG	22.1933	113.8456	WINTER	NONE	
08-Feb-06	7	1419	7	W LANTAU	3	0	ON	ERM-LNG	22.2237	113.8359	WINTER	HANG	
08-Feb-06	8	1441	7	W LANTAU	3	102	ON	ERM-LNG	22.2505	113.8478	WINTER	HANG	
08-Feb-06	9	1508	3	W LANTAU	2	203	ON	ERM-LNG	22.2789	113.8730	WINTER	HANG	
09-Feb-06	1	1310	10	W LANTAU	2	ND	OFF	ERM-LNG	22.2615	113.8527	WINTER	HANG	
15-Mar-06	1	1107	1	SW LANTAU	2	237	ON	ERM-LNG	22.2058	113.8974	SPRING	NONE	
17-Mar-06	1	0827	8	W LANTAU	0	70	ON	ERM-LNG	22.2734	113.8667	SPRING	NONE	
17-Mar-06	2	0849	3	W LANTAU	0	72	ON	ERM-LNG	22.2757	113.8683	SPRING	NONE	1 SJ, 2 SS
17-Mar-06	3	1108	1	NW LANTAU	3	74	ON	ERM-LNG	22.3895	113.8784	SPRING	NONE	1 SA
23-Mar-06	1	1159	13	W LANTAU	2	43	ON	ERM-LNG	22.2073	113.8269	SPRING	PAIR	

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LONG	SEASON	BOAT ASSOC	GRP. COMP.
23-Mar-06	2	1342	2	NW LANTAU	2	56	ON	ERM-LNG	22.3805	113.8886	SPRING	NONE	1 SS, 1 SA
28-Mar-06	1	1144	8	SW LANTAU	2	565	ON	ERM-LNG	22.1998	113.8798	SPRING	PAIR	2 SJ, 3 SS, 2 SA, 1 UA
28-Mar-06	2	1254	2	SW LANTAU	1	222	OFF	ERM-LNG	22.2030	113.9073	SPRING	HANG	1 SJ, 1 SS
29-Mar-06	2	1307	12	DEEP BAY	3	18	ON	ERM-LNG	22.4181	113.8917	SPRING	NONE	
31-Mar-06	3	1420	1	DEEP BAY	3	83	ON	ERM-LNG	22.4294	113.9066	SPRING	NONE	1 SJ
03-Apr-06	5	1407	3	DEEP BAY	2	143	ON	ERM-LNG	22.4223	113.8916	SPRING	NONE	
18-Apr-06	1	0852	1	W LANTAU	2	51	ON	ERM-LNG	22.2286	113.8374	SPRING	NONE	
18-Apr-06	2	0903	3	W LANTAU	3	355	ON	ERM-LNG	22.2103	113.8369	SPRING	NONE	
18-Apr-06	3	0946	2	W LANTAU	2	78	ON	ERM-LNG	22.2504	113.8404	SPRING	NONE	1 SJ, 1 SS
18-Apr-06	4	0951	4	W LANTAU	2	159	ON	ERM-LNG	22.2551	113.8431	SPRING	NONE	1 SS, 2 SA, 1 UA
18-Apr-06	5	1030	1	NW LANTAU	4	0	ON	ERM-LNG	22.3313	113.8759	SPRING	NONE	
18-Apr-06	6	1237	4	NW LANTAU	3	0	ON	ERM-LNG	22.3781	113.8893	SPRING	NONE	2 UJ, 2 SA
02-May-06	1	1344	3	DEEP BAY	4	75	ON	ERM-LNG	22.4152	113.9048	SPRING	NONE	
08-May-06	1	0834	1	W LANTAU	2	276	ON	ERM-LNG	22.2639	113.8570	SPRING	NONE	
08-May-06	2	0846	3	W LANTAU	2	66	ON	ERM-LNG	22.2593	113.8519	SPRING	NONE	
08-May-06	3	0905	7	W LANTAU	2	72	ON	ERM-LNG	22.2378	113.8420	SPRING	NONE	2 SJ, 2 SS, 2 SA, 1 UA
08-May-06	4	0924	3	W LANTAU	2	0	ON	ERM-LNG	22.2274	113.8367	SPRING	NONE	1 SJ, 1 SS, 1 UA
08-May-06	5	0934	1	W LANTAU	2	42	ON	ERM-LNG	22.2185	113.8346	SPRING	NONE	1 SS
08-May-06	6	1005	3	W LANTAU	3	181	ON	ERM-LNG	22.2311	113.8321	SPRING	NONE	
08-May-06	7	1118	4	NW LANTAU	2	575	ON	ERM-LNG	22.3375	113.8789	SPRING	PAIR	
08-May-06	8	1142	2	NW LANTAU	2	298	ON	ERM-LNG	22.3868	113.8775	SPRING	NONE	
08-May-06	9	1147	6	NW LANTAU	3	0	ON	ERM-LNG	22.3932	113.8797	SPRING	NONE	
09-May-06	1	0843	4	NW LANTAU	3	ND	OFF	ERM-LNG	22.4120	113.8981	SPRING	NONE	
09-May-06	2	1116	1	SW LANTAU	2	204	ON	ERM-LNG	22.1954	113.8616	SPRING	NONE	1 SS
10-May-06	1	1225	6	SW LANTAU	2	0	ON	ERM-LNG	22.1901	113.8497	SPRING	NONE	
11-May-06	1	0827	2	W LANTAU	2	287	ON	ERM-LNG	22.2740	113.8716	SPRING	NONE	
11-May-06	2	0839	1	W LANTAU	2	120	ON	ERM-LNG	22.2642	113.8584	SPRING	NONE	

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LONG	SEASON	BOAT ASSOC	GRP. COMP.
11-May-06	3	0856	4	W LANTAU	2	0	ON	ERM-LNG	22.2374	113.8410	SPRING	NONE	
11-May-06	4	0910	2	W LANTAU	1	42	ON	ERM-LNG	22.2300	113.8385	SPRING	NONE	1 SJ, 1 UA
11-May-06	5	0919	2	W LANTAU	2	121	ON	ERM-LNG	22.2184	113.8343	SPRING	NONE	1 SS, 1 UA
11-May-06	6	0939	6	W LANTAU	2	58	ON	ERM-LNG	22.1958	113.8436	SPRING	NONE	
11-May-06	7	1330	2	W LANTAU	2	41	ON	ERM-LNG	22.2323	113.8326	SPRING	NONE	
11-May-06	8	1347	5	W LANTAU	3	39	ON	ERM-LNG	22.2454	113.8391	SPRING	NONE	
11-May-06	9	1356	4	W LANTAU	3	131	ON	ERM-LNG	22.2473	113.8396	SPRING	NONE	

Table 22 Finless Porpoise Sightings Records

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LONG	SEASON
04-Aug-05	1	1121	1	SW LANTAU	3	76	ON	ERM-LNG	22.1483	113.9082	SUMMER
17-Oct-05	1	0926	2	SW LANTAU	2	153	ON	ERM-LNG	22.2109	113.9367	AUTUMN
29-Nov-05	3	1427	1	SW LANTAU	3	7	ON	ERM-LNG	22.1455	113.9155	AUTUMN
13-Jan-06	8	1110	1	SW LANTAU	1	48	ON	ERM-LNG	22.1668	113.9274	WINTER
13-Jan-06	9	1218	1	SW LANTAU	1	211	OFF	ERM-LNG	22.1781	113.9051	WINTER
13-Jan-06	10	1225	2	SW LANTAU	1	16	ON	ERM-LNG	22.1826	113.9043	WINTER
16-Jan-06	1	0959	1	SW LANTAU	2	126	ON	ERM-LNG	22.1797	113.9285	WINTER
16-Jan-06	2	1052	1	SW LANTAU	2	33	ON	ERM-LNG	22.1592	113.8985	WINTER
16-Jan-06	3	1146	2	SW LANTAU	3	50	ON	ERM-LNG	22.1570	113.8928	WINTER
17-Jan-06	4	1358	2	SW LANTAU	4	87	ON	ERM-LNG	22.1799	113.9219	WINTER
01-Feb-06	1	0954	3	SW LANTAU	3	97	ON	ERM-LNG	22.1719	113.9275	WINTER
07-Feb-06	1	1051	2	SW LANTAU	1	54	ON	ERM-LNG	22.1592	113.8976	WINTER
07-Feb-06	2	1135	1	SW LANTAU	1	104	ON	ERM-LNG	22.1763	113.8950	WINTER
07-Feb-06	3	1153	2	SW LANTAU	1	81	OFF	ERM-LNG	22.1561	113.8854	WINTER
07-Feb-06	4	1201	1	SW LANTAU	1	49	ON	ERM-LNG	22.1690	113.8840	WINTER
07-Feb-06	6	1253	2	SW LANTAU	1	110	ON	ERM-LNG	22.1768	113.8750	WINTER

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LONG	SEASON
15-Mar-06	2	1124	2	SW LANTAU	2	274	ON	ERM-LNG	22.1797	113.8957	SPRING
29-Mar-06	1	1031	1	SW LANTAU	3	29	ON	ERM-LNG	22.2048	113.8988	SPRING
31-Mar-06	1	0948	3	SW LANTAU	3	136	ON	ERM-LNG	22.2000	113.8852	SPRING
31-Mar-06	2	1151	1	SW LANTAU	3	55	ON	ERM-LNG	22.1849	113.9396	SPRING
03-Apr-06	1	0930	10	SW LANTAU	1	0	ON	ERM-LNG	22.1952	113.9362	SPRING
03-Apr-06	2	0956	2	SW LANTAU	1	127	ON	ERM-LNG	22.1779	113.9354	SPRING
03-Apr-06	3	1024	1	SW LANTAU	1	201	ON	ERM-LNG	22.1836	113.9276	SPRING
03-Apr-06	4	1149	1	SW LANTAU	2	51	ON	ERM-LNG	22.1657	113.8843	SPRING
06-Apr-06	1	1118	1	SW LANTAU	1	110	ON	ERM-LNG	22.1679	113.8613	SPRING
06-Apr-06	2	1326	1	SW LANTAU	5	65	ON	ERM-LNG	22.1854	113.9273	SPRING
26-Apr-06	1	1348	2	SW LANTAU	2	0	ON	ERM-LNG	22.1898	113.8849	SPRING
26-Apr-06	2	1357	2	SW LANTAU	2	105	ON	ERM-LNG	22.2001	113.8849	SPRING
27-Apr-06	1	1219	4	SW LANTAU	2	85	OFF	ERM-LNG	22.1967	113.8690	SPRING