

Appendix E. Chinese White Dolphin Monitoring Findings and Analysis

Figure 1: Sightings Distribution of Chinese White Dolphins

[Pink circle: Sighting locations of CWD, White line: Vessel survey transects, Blue polygon: Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP), Green polygon: Brothers Marine Park (BMP), Red polygon: 3RS land-formation footprint]



Figure 2: Graphical Presentation of Monthly and Running Quarterly STG

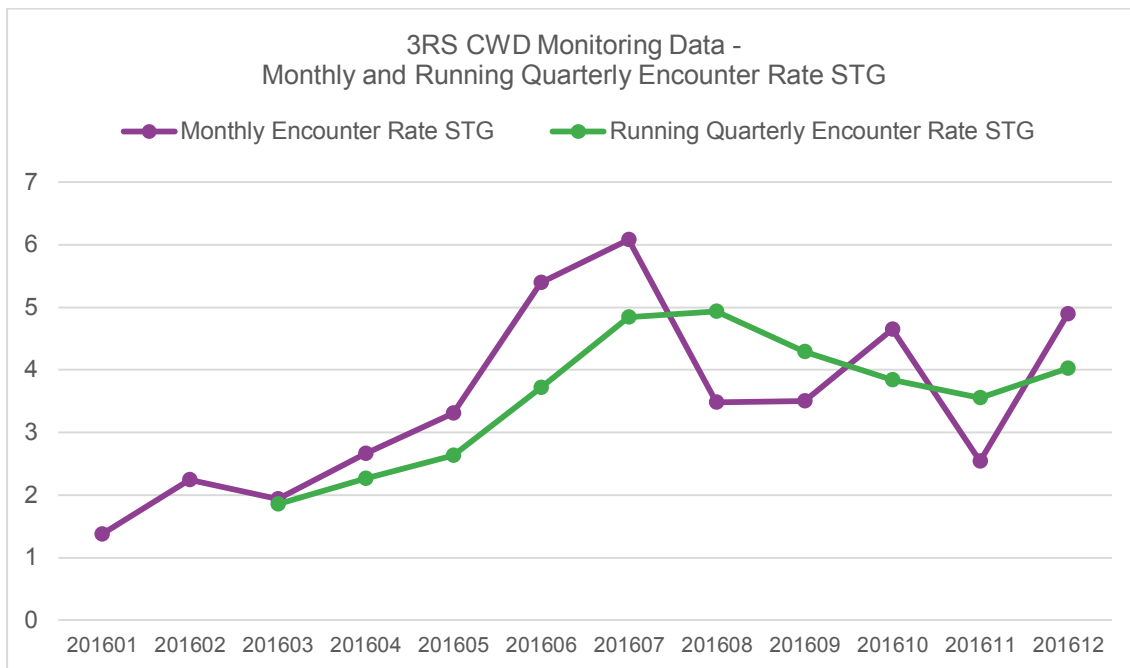


Figure 3: Graphical Presentation of Monthly and Running Quarterly ANI

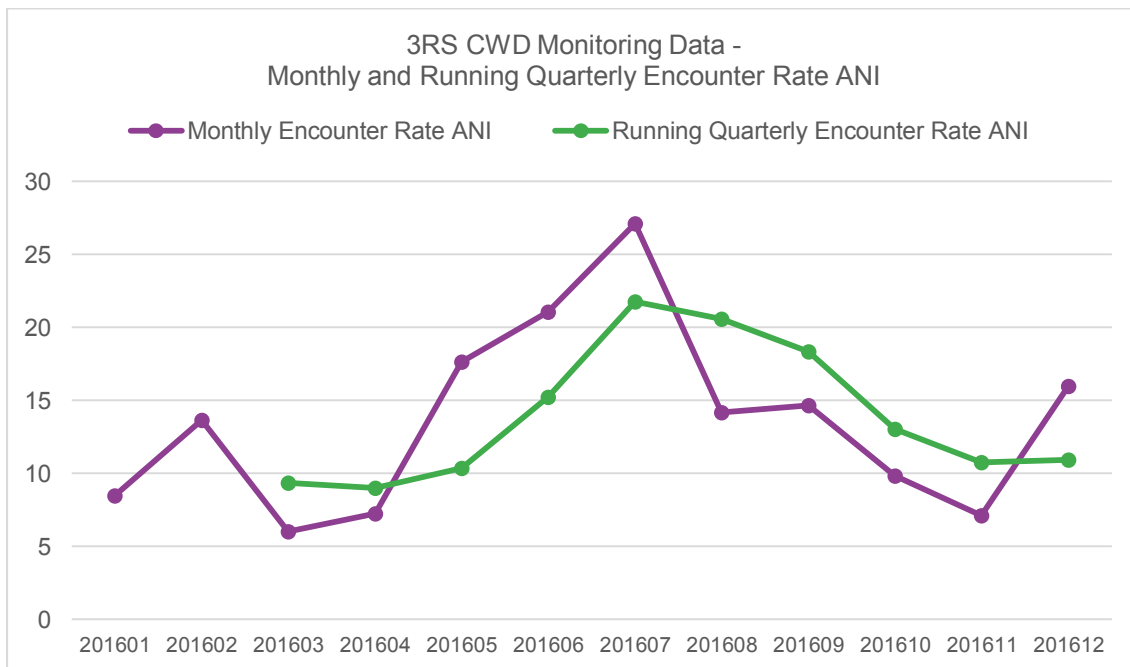


Figure 4: Quarterly Encounter Rates and Running Average Encounter Rates of AFCD's Monitoring Data

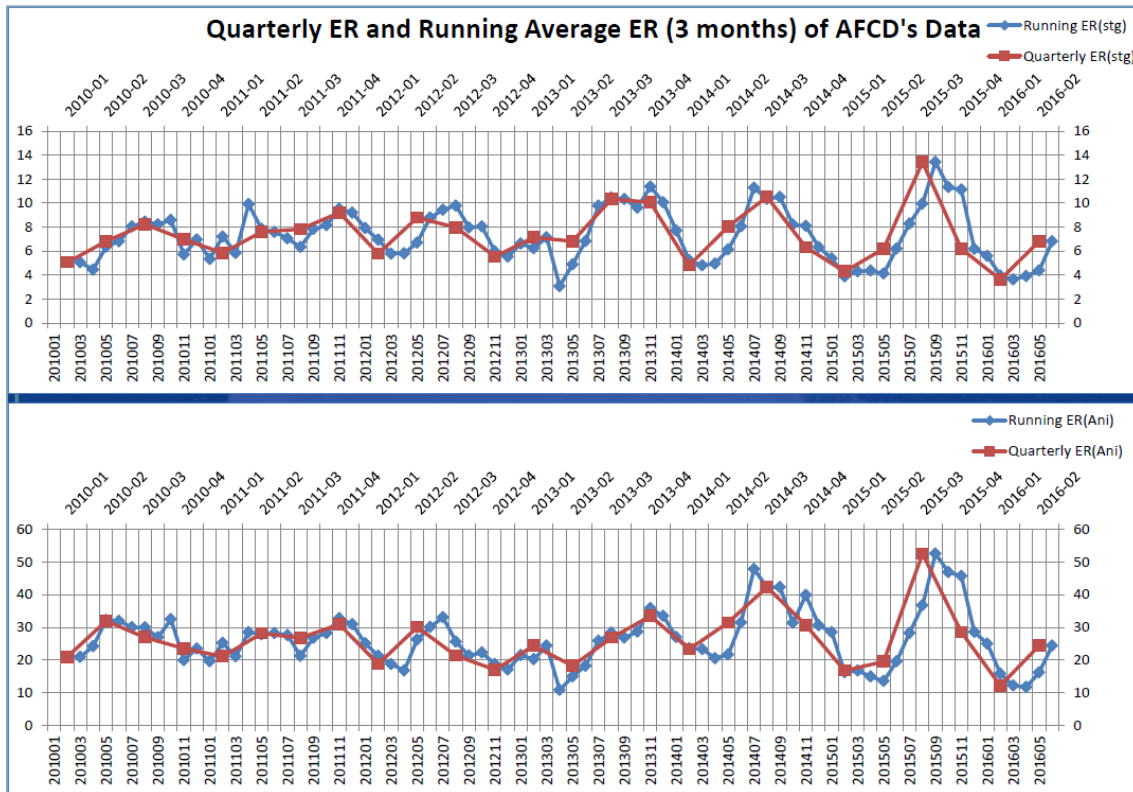


Figure 5: SPSE and DPSE of CWDs with Corrected Survey Effort per km² from Dec 2015 to Dec 2016

[Left: SPSE = no. of on-effort dolphin sightings per 100 units of survey effort, Right: DPSE = no. of dolphins per 100 units of survey effort, Pink polygon: BMP, Blue polygon: SCLKCMP, Purple polygon: 3RS land-formation footprint, Green dotted line: 3RS temporary works area boundary]

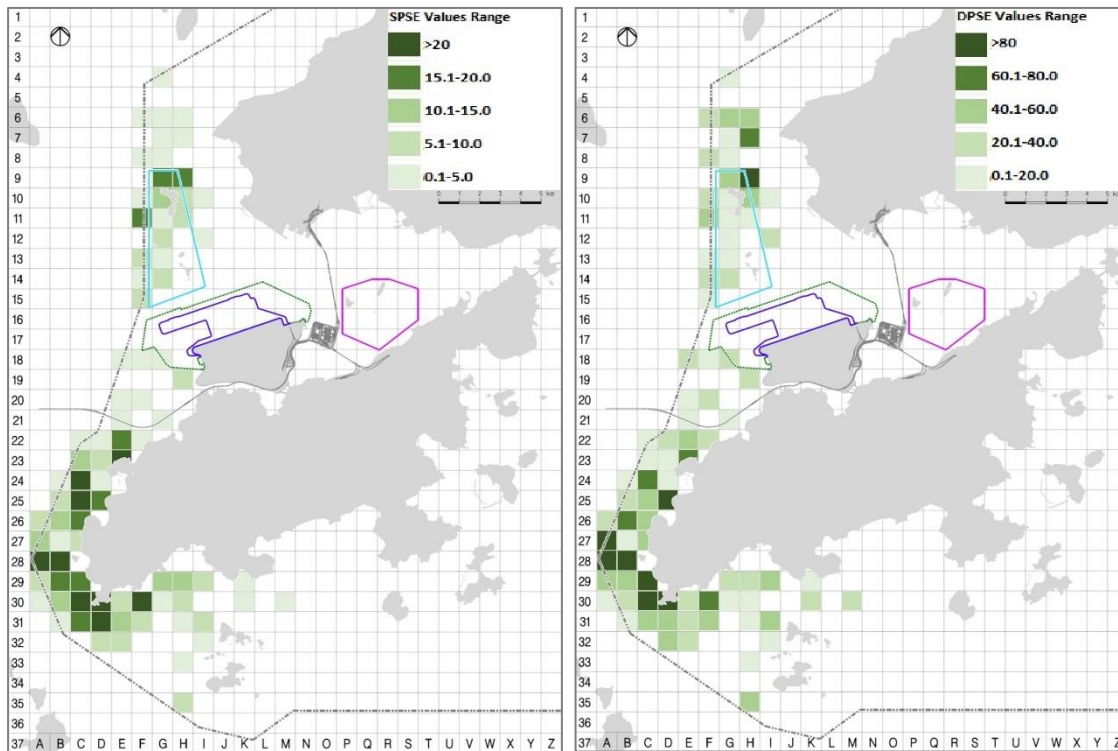


Figure 6: Sightings Distribution of Chinese White Dolphins with Different Group Sizes

[Pink circle: CWD groups with small group size (1-2 individuals), Green circle: CWD groups with medium group size (3-9 individuals), Red circle: CWD groups with large group size (10 or more individuals), White line: Vessel survey transects, Blue polygon: Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP), Green polygon: Brothers Marine Park (BMP), Red polygon: 3RS land-formation footprint]



Figure 7: Sighting Locations of CWD Groups Engaged in Different Activities

[Indigo rhombus: Foraging, Green circle: Socializing, Pink square: Resting/milling, Yellow triangle: Travelling, White line: Vessel survey transects, Blue polygon: SCLKCMP, Brothers Marine Park (BMP), Red polygon: 3RS land-formation footprint]

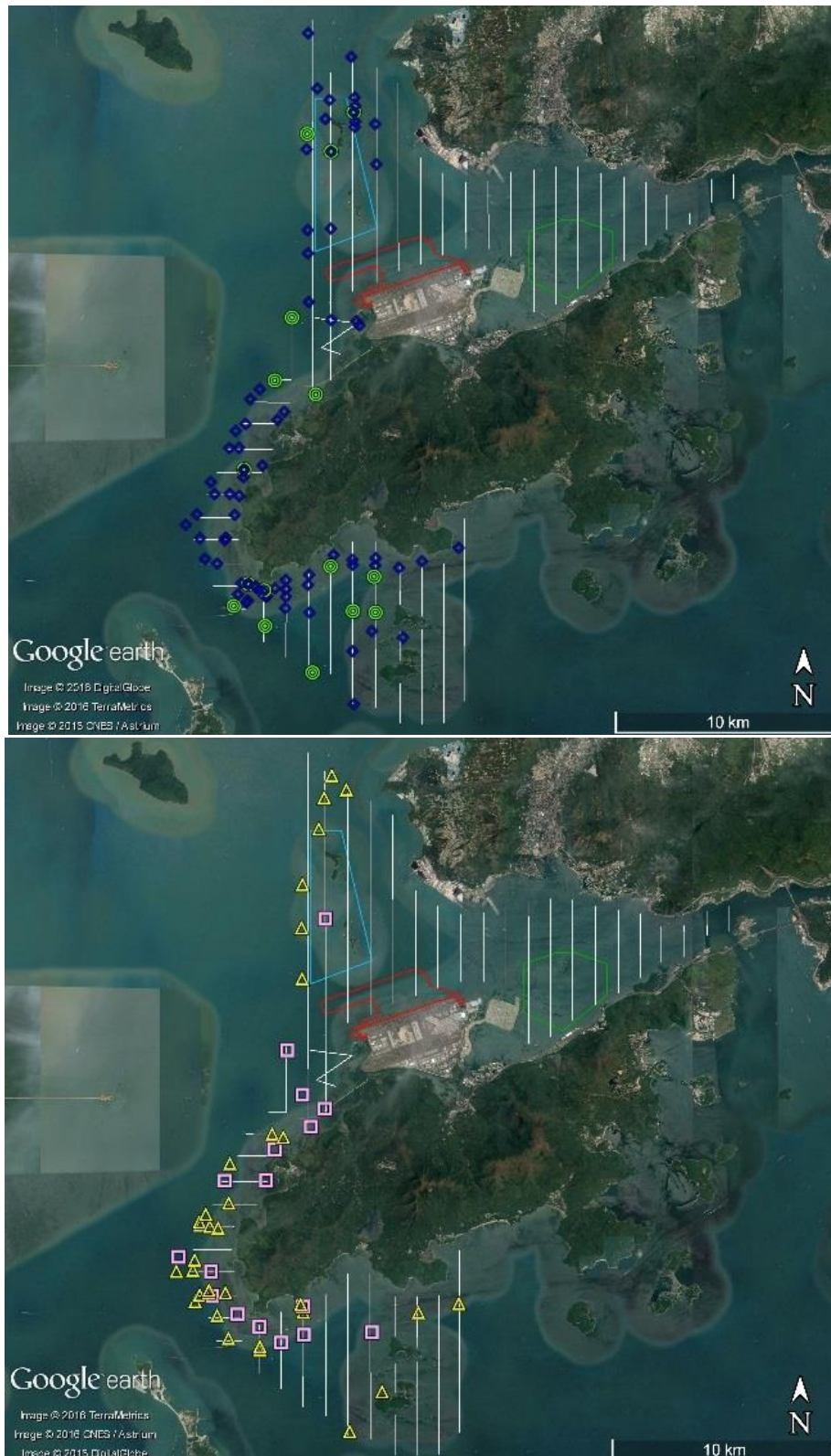


Figure 8: Sighting Locations of CWD Groups in Association with Fishing Boat

[Red hexagon: Gillnetter, Orange hexagon: Purse Seiner, Yellow hexagon: Trawler, White line: Vessel survey transects, Blue polygon: SCLKCMP, Brothers Marine Park (BMP), Red polygon: 3RS land-formation footprint]



Figure 9: Sighting Locations of Mother-Calf Pairs

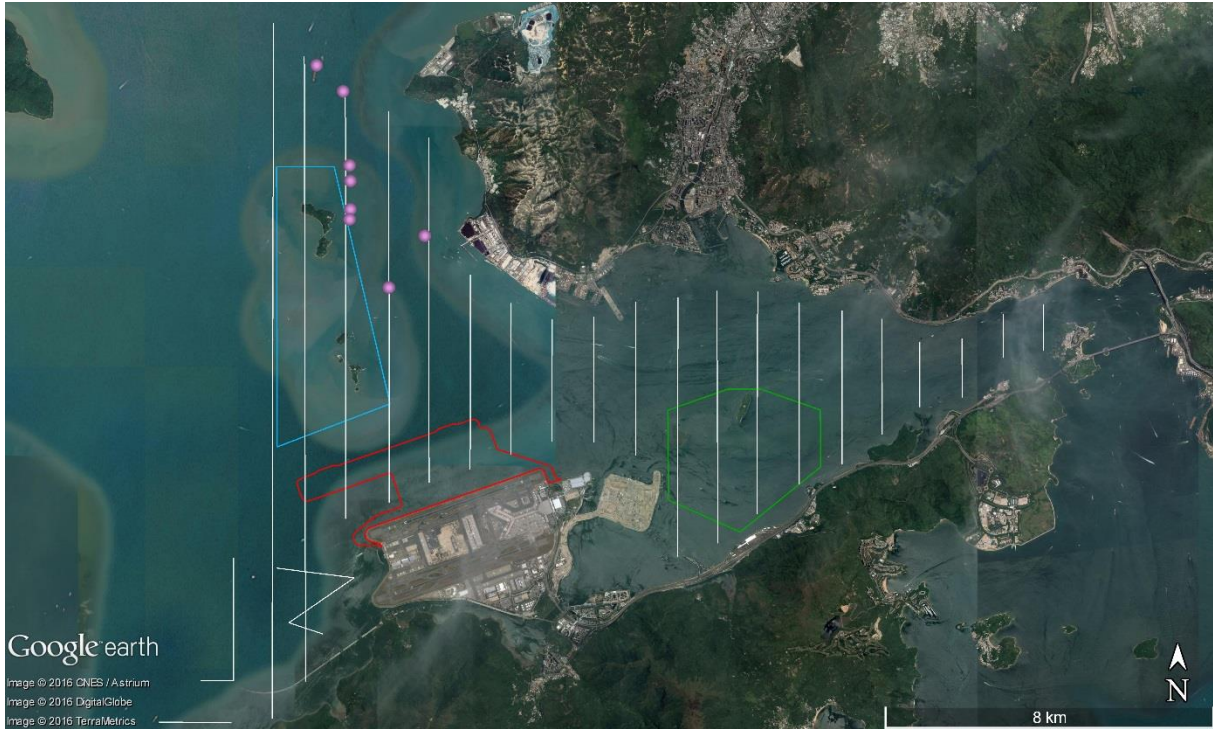
[Pink circle: Sighting locations of mother-calf pairs, White line: Vessel survey transects, Blue polygon: Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP), Green polygon: Brothers Marine Park (BMP), Red polygon: 3RS land-formation footprint]



Figure 11 (batch): Photo Identification – Re-sighting Locations

[Pink circle: Sighting locations of individual dolphin, White line: Vessel survey transects, Blue polygon: Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP), Red polygon: 3RS land-formation footprint]

NLMM002



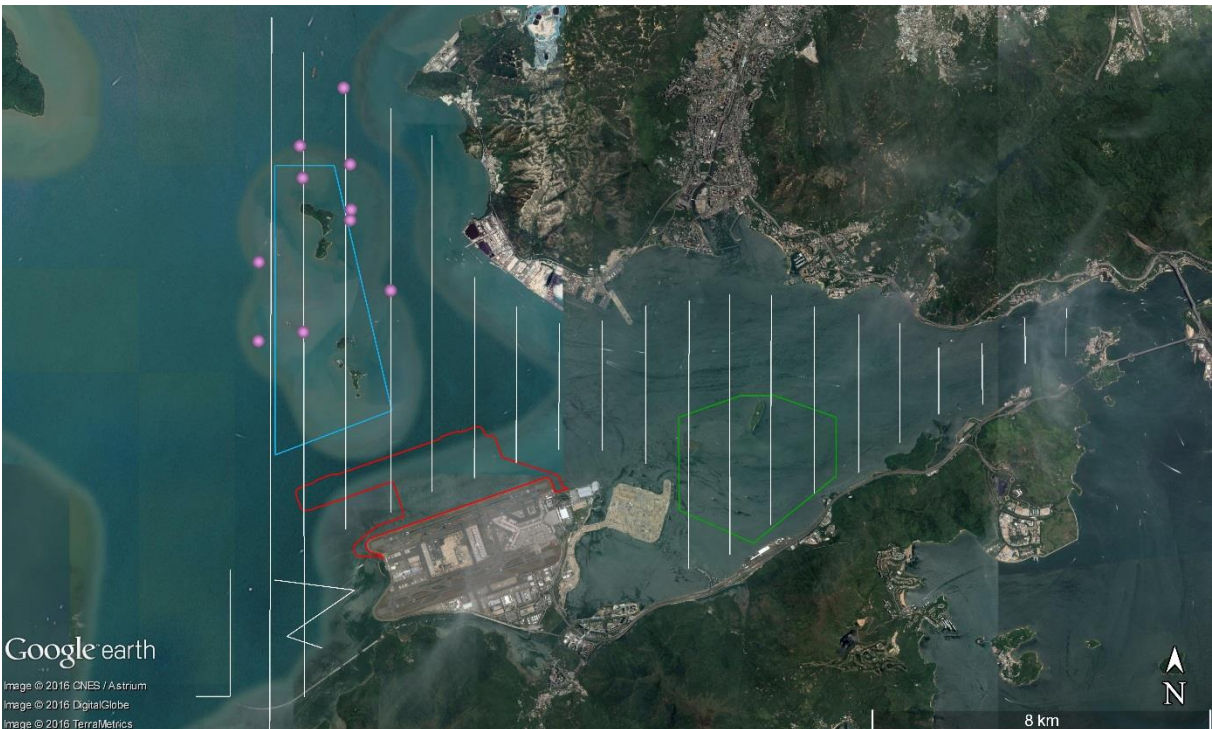
NLMM004



NLMM005



NLMM006



NLMM008



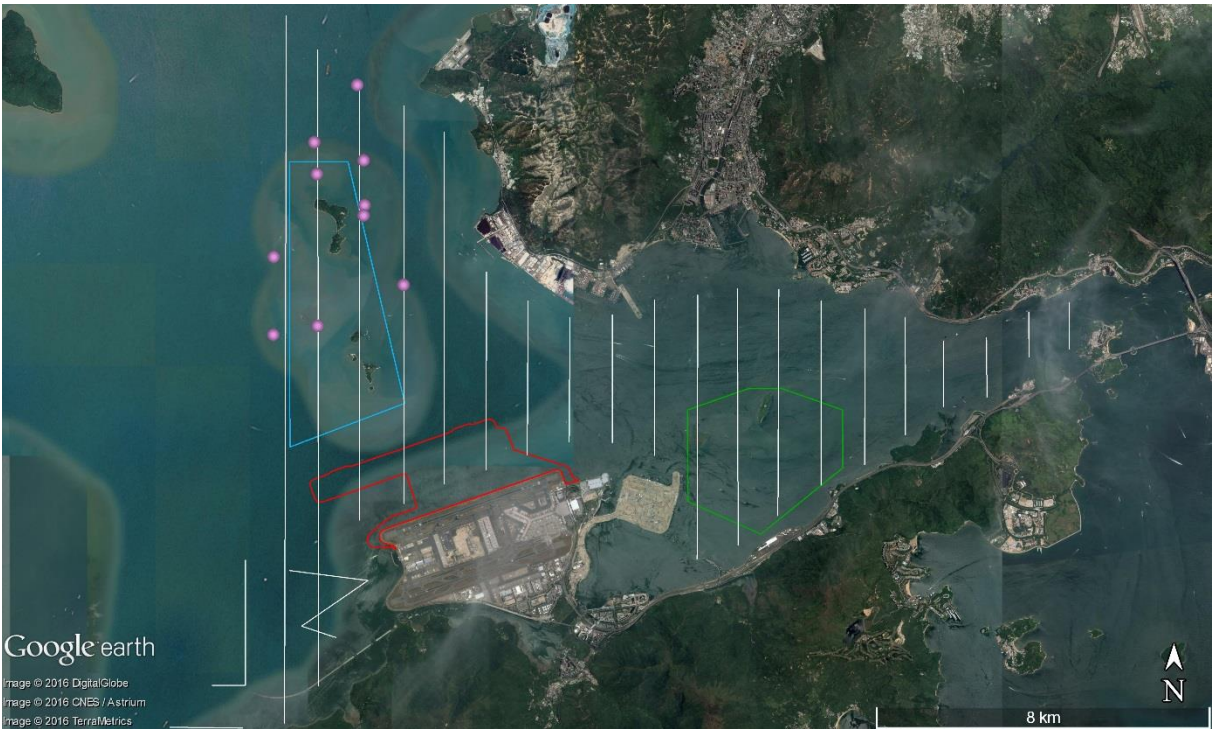
NLMM010



NLMM012



NLMM013



NLMM017



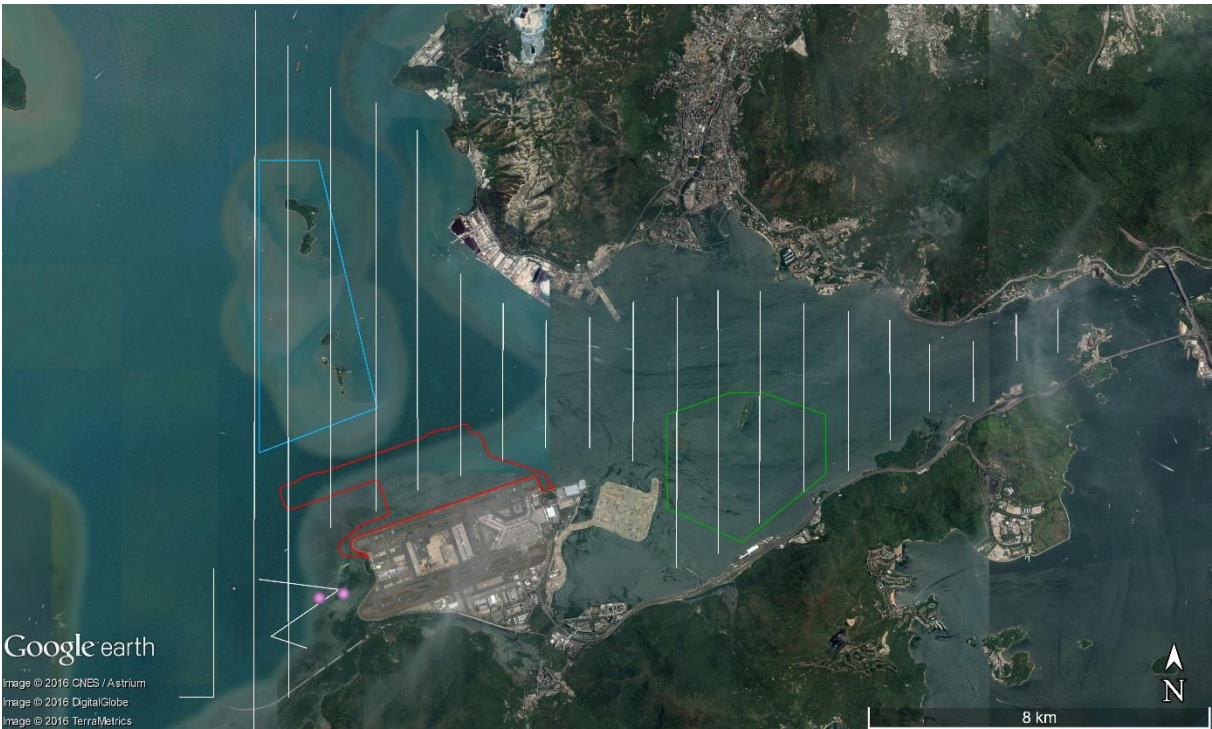
NLMM018



NLMM019



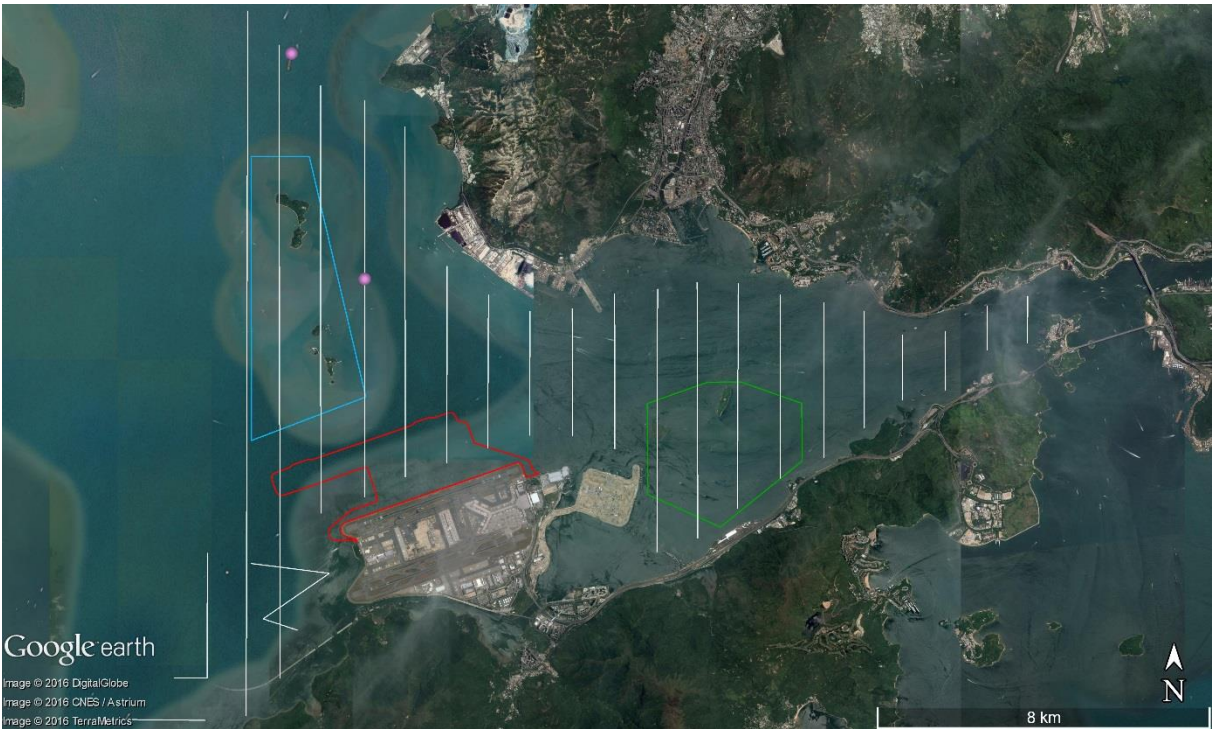
NLMM020



NLMM021



NLMM027



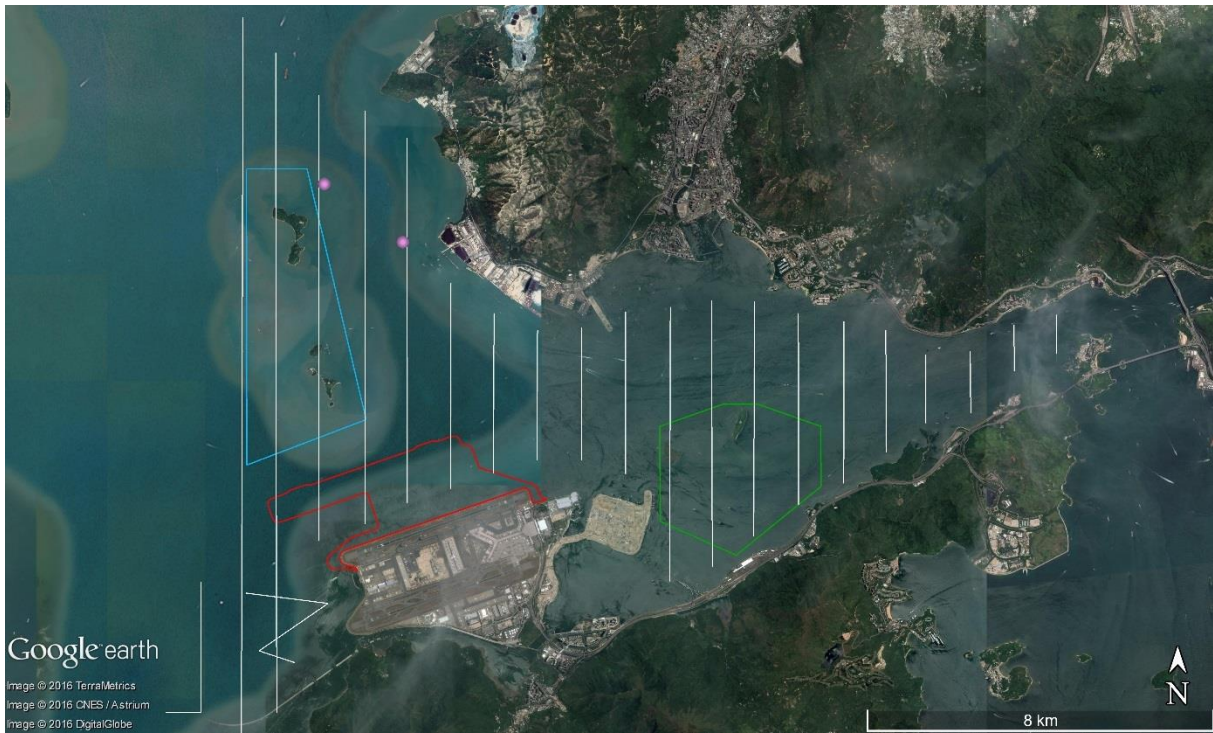
NLMM028



NLMM035



NLMM037



NLMM038



NLMM046



SLMM011



SLMM028



WLMM024



WLMM026



WLMM027



WLMM030



WLMM050



WLMM054



Figure 11: Plots of First Sightings of All CWD Groups (prior to filtering out short-track data) Obtained from Land-based Stations

[Large green square on land: LKC station; Small green squares: CWD groups off LKC; Large orange circle on land: SC station; small orange circle: CWD group off SC Red line: SCLKCMP boundary]

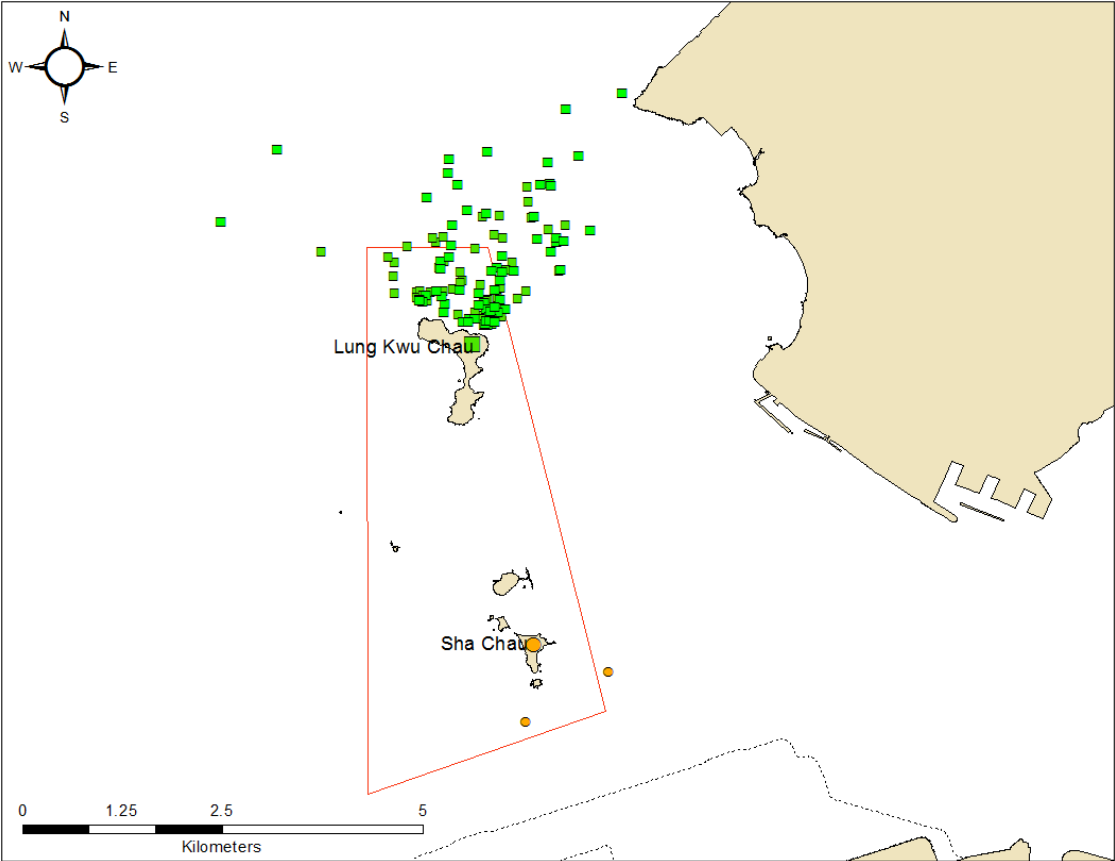


Figure 12: Total Duration of CWD Groups Tracked (per total effort time) from Lung Kwu Chau (prior to filtering short-track data) Based on Time of Day

[Time indicates the hour block during which CWD groups were tracked. The "n" in parentheses represents the number of days that survey effort was carried out during the associated hour block.]

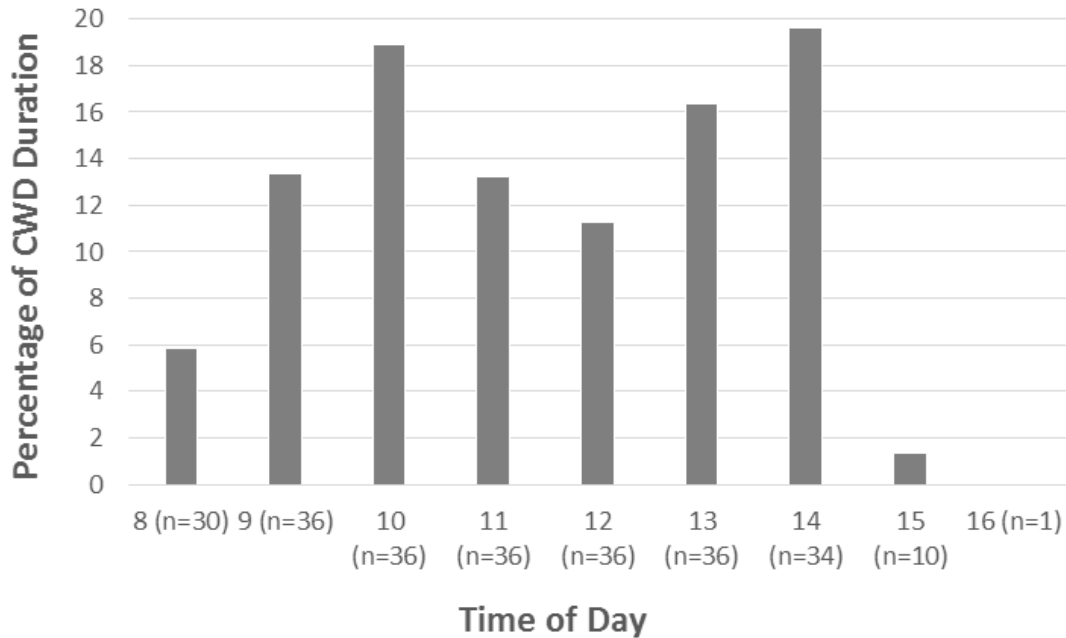
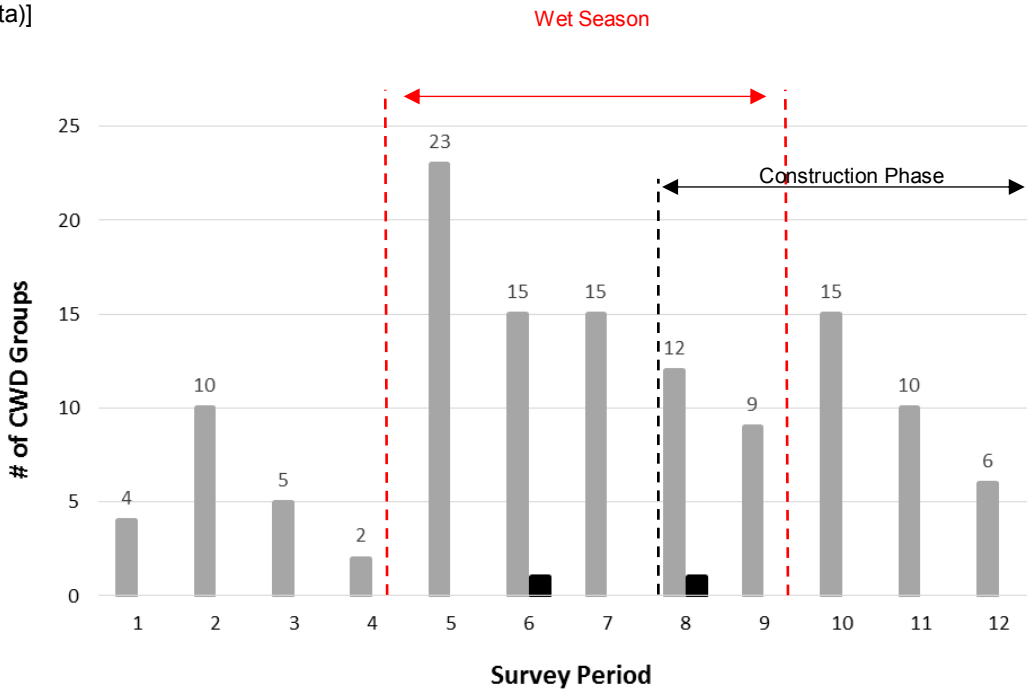


Figure 13: CWD Groups Sighted and Tracked from Lung Kwu Chau (gray bars) and Sha Chau (black bars) Based on Month of the Year

[The numbers above the bars indicate the total number of CWD groups tracked per study period (prior to filtering data)]



*Note: There was no marine construction activities in August and September 2016.

Figure 14: Plots of CWD Short-track Positions (Standardized Segments) relative to Group Size obtained from Lung Kwu Chau

[Station is indicated by large green square on land, fix positions of the CWD groups by green circles (increasing in size with CWD group size), and SCLKCMP boundary by red lines.]

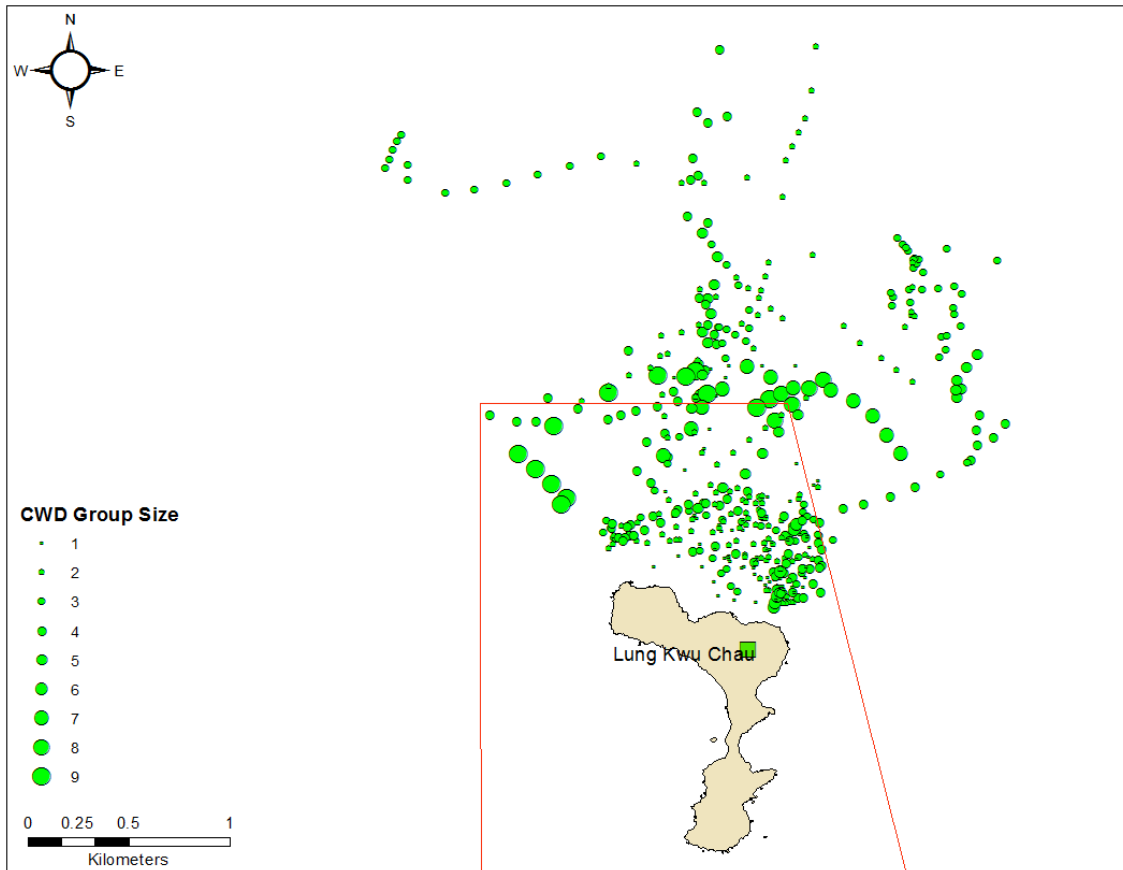


Figure 15: Plots of CWD Short-track Positions (Standardized Segments) relative to Group Size obtained from Sha Chau

[Station is indicated by large orange circle on land, fix positions of the CWD group by orange circles, SCLKCMP boundary by red lines, and proposed third runway by black dotted line.]

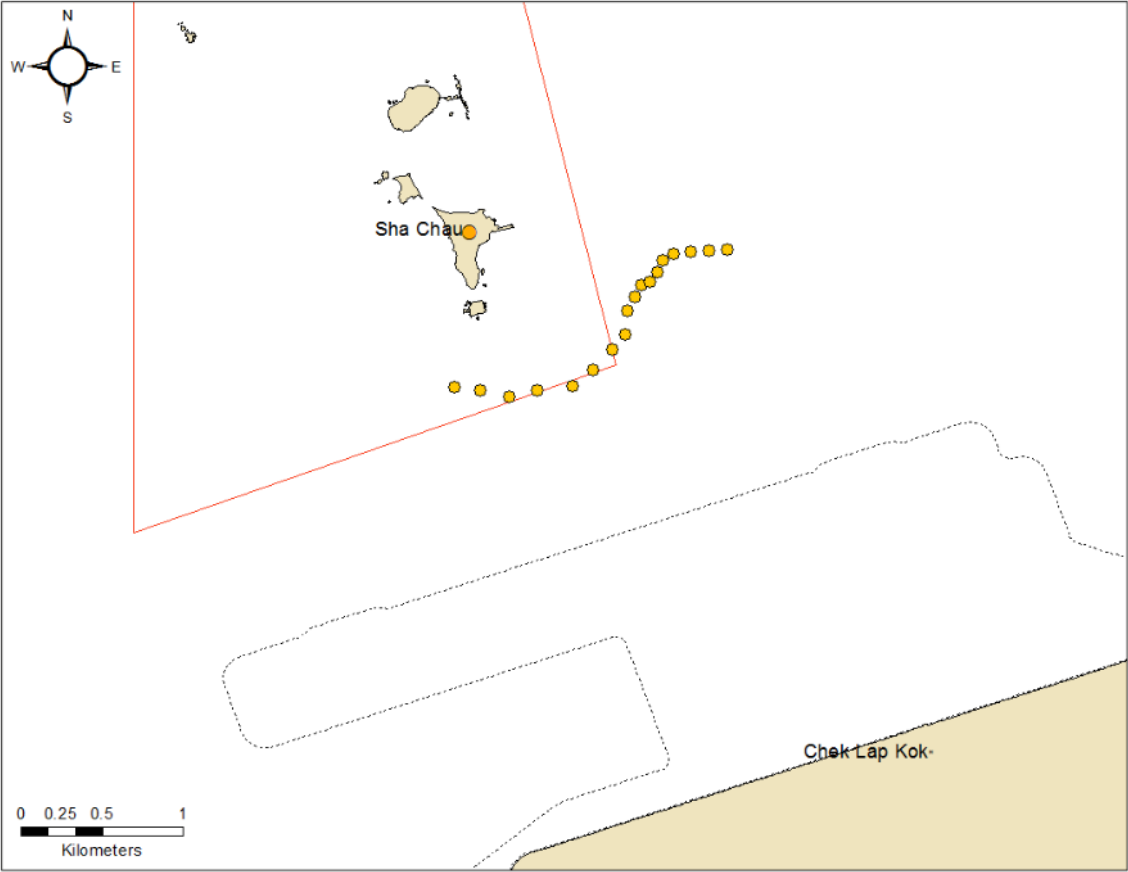


Figure 16: Percentages of CWD Behavioural States, excluding Unknown Category, recorded from Lung Kwu Chau

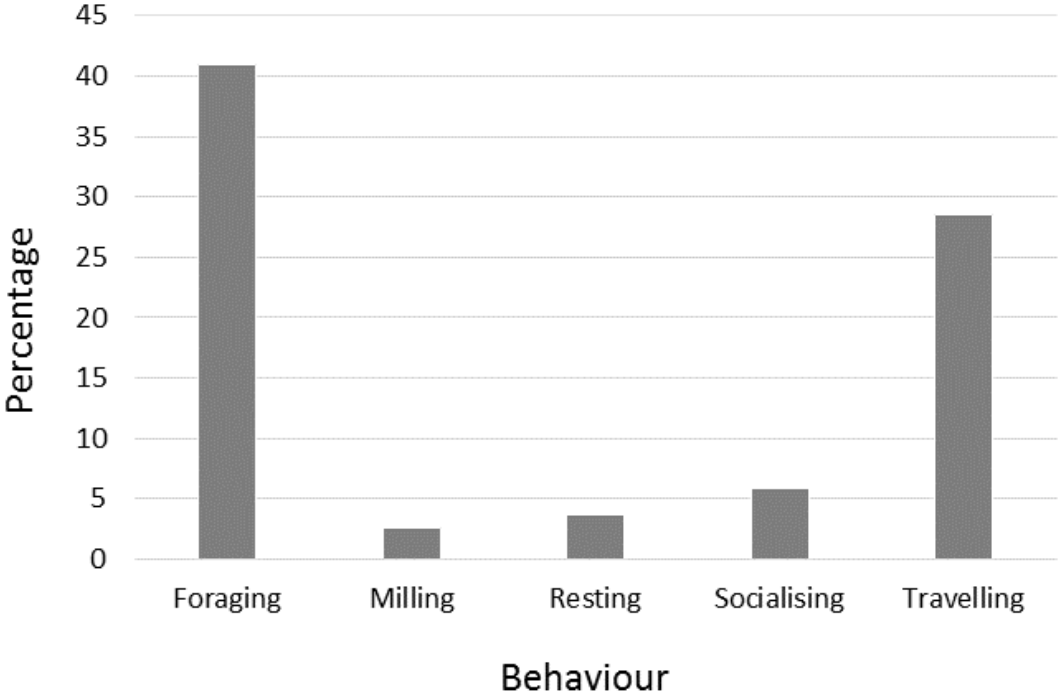


Figure 17: Dolphin Detections as Percentage of Files Per Day, 8 Jan to 28 Dec 2016
 [Grey shading indicates no recording]

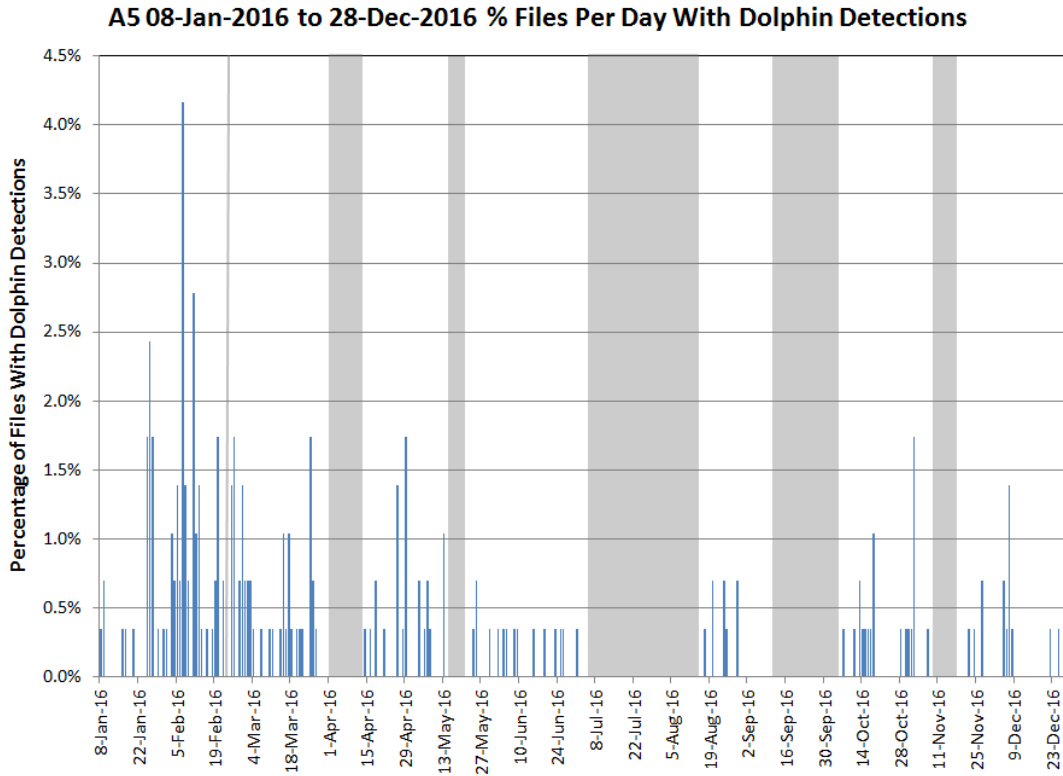


Figure 18: Dolphin Detections as Percentage of Files Per Day, 8 Jan to 7 Dec 2013
 [Grey shading indicates no recording]

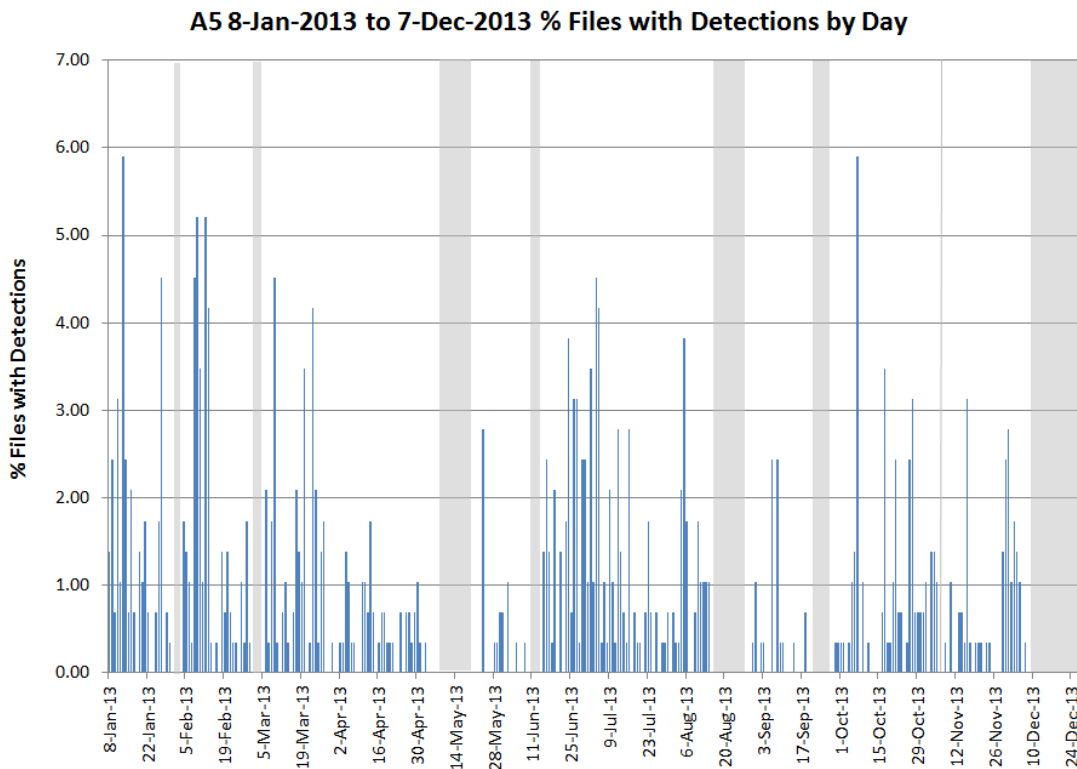


Figure 19: Dolphin Detections by Hour of Day, 8 Jan to 28 Dec 2016

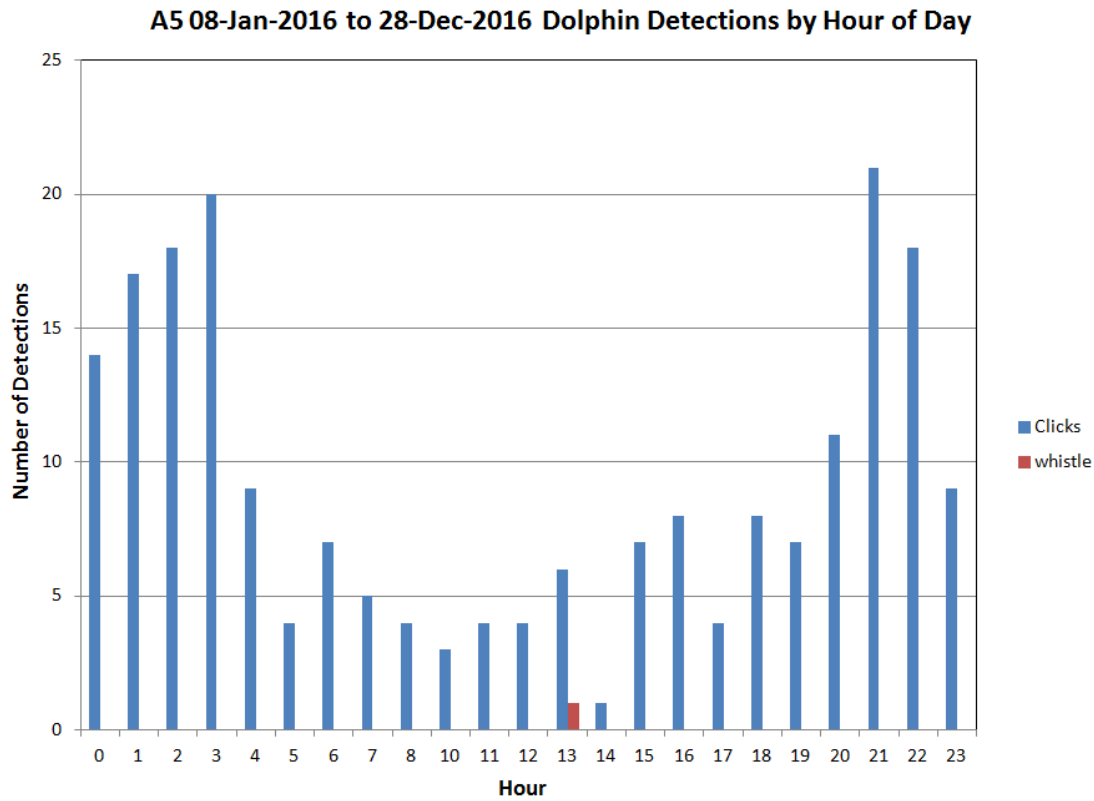


Figure 20: Dolphin Detections by Hour of Day and Solar Season, 8 Jan to 28 Dec 2016
 [Winter = Dec-Jan-Feb, Spring = Mar-Apr-May, Summer = Jun-Jul-Aug, Autumn = Sep-Oct-Nov]

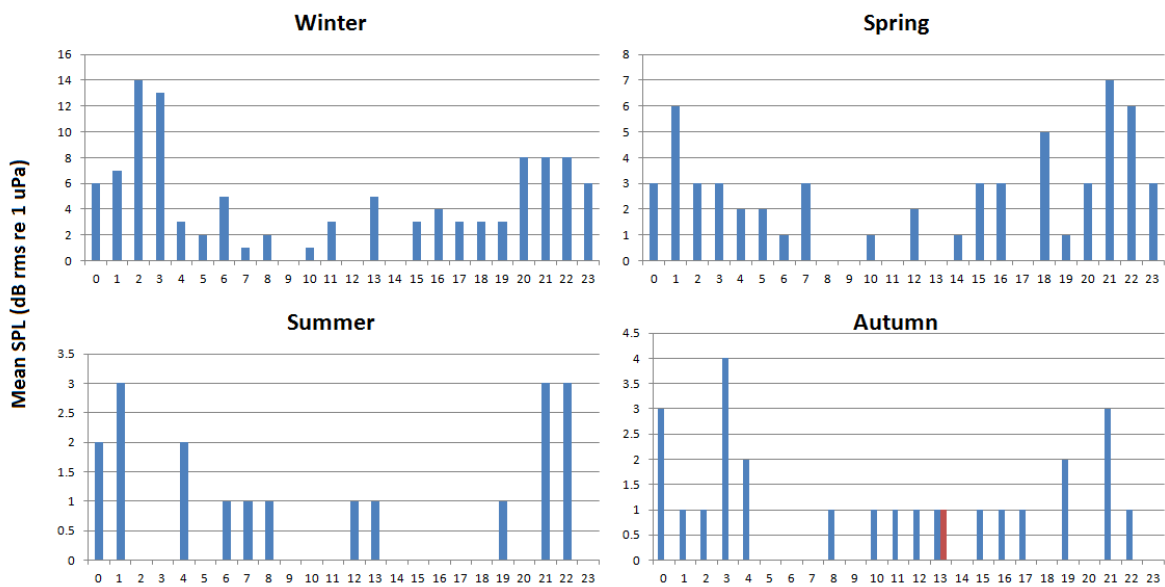


Figure 21: Daily Mean Sound Pressure Level (dB rms re 1 μ Pa), 8 Jan to 28 Dec 2016
 [Blank area represents no recording]

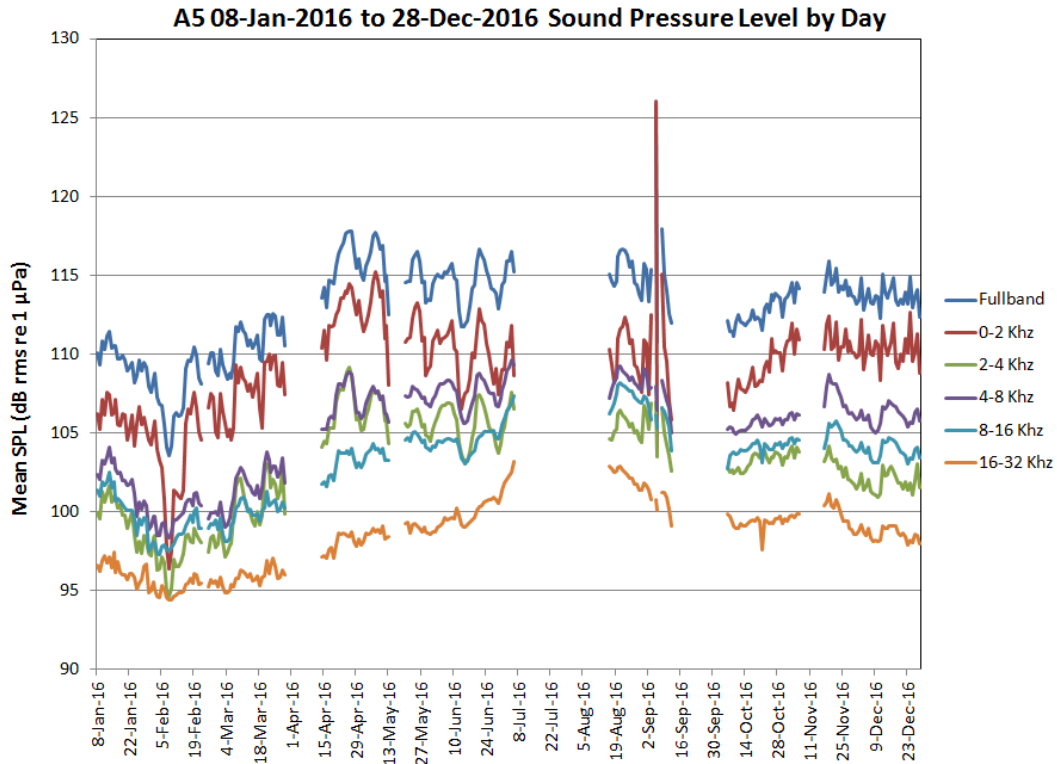


Figure 22: Daily Mean Sound Pressure Level (dB rms re 1 μ Pa), 6 Dec 2012 to 5 Dec 2013
 [Blank area represents no recording]

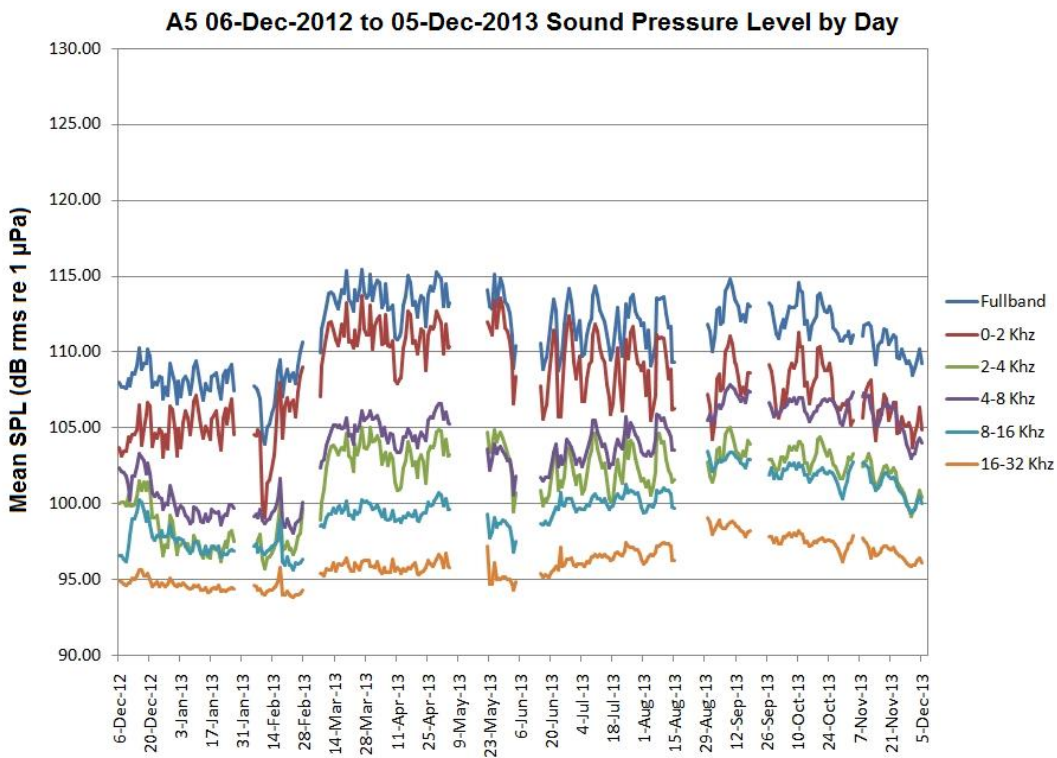


Figure 23: Sound Pressure Level (SPL) by Hour of Day, 8 Jan to 28 Dec 2016

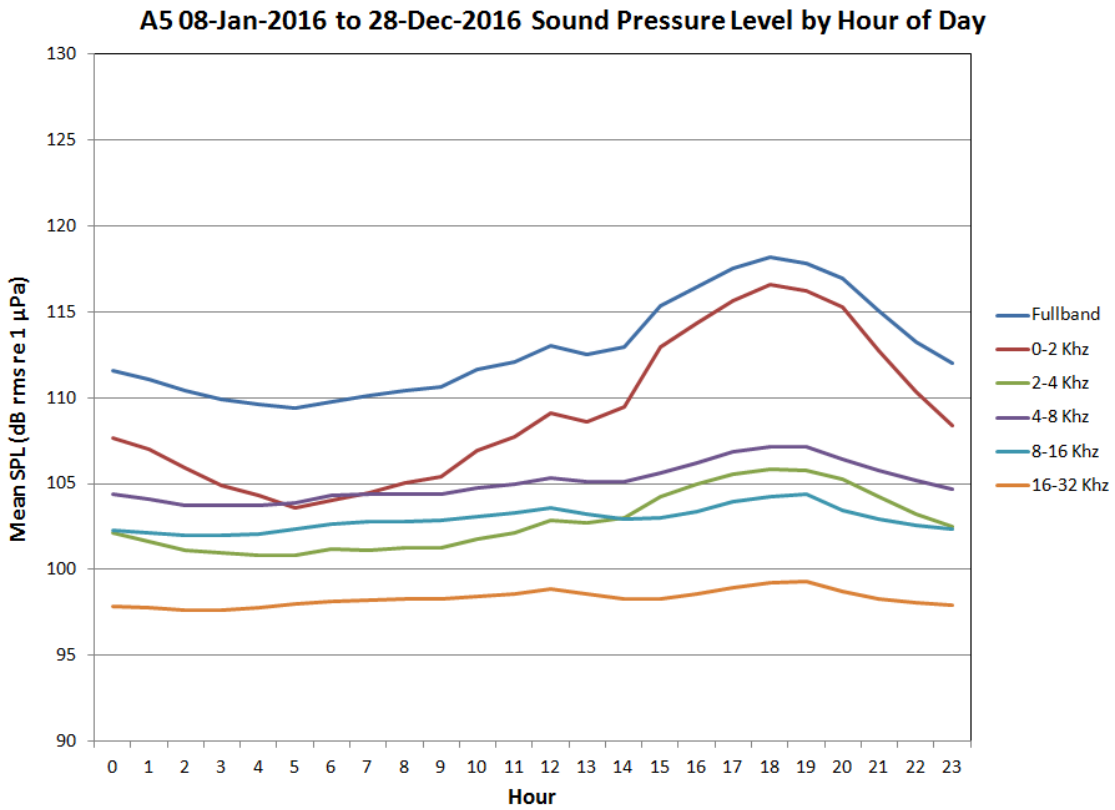


Figure 24: Sound Pressure Level (SPL) by Hour of Day and Solar Season, 8 Jan to 28 Dec 2016
 [Winter = Dec-Jan-Feb, Spring = Mar-Apr-May, Summer = Jun-Jul-Aug, Autumn = Sep-Oct-Nov]

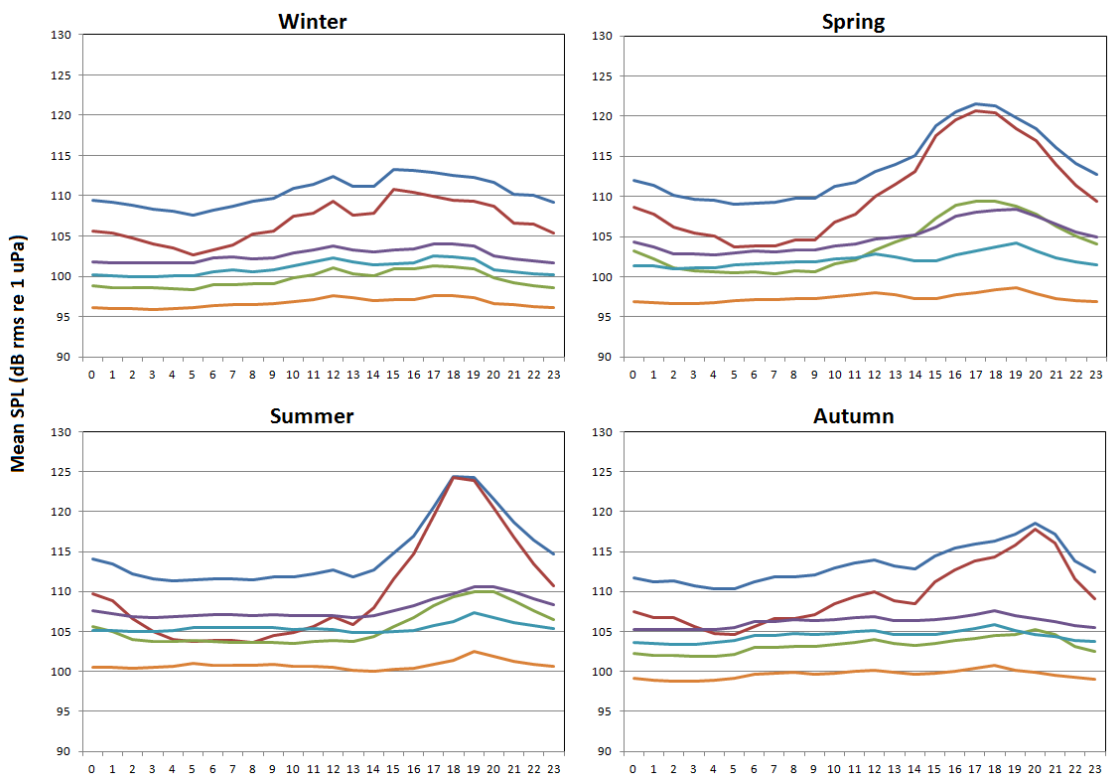


Table 1: CWD Encounter Rates by Survey Areas

| Survey Area | Encounter Rate (STG) | Encounter Rate (ANI) |
|-------------|----------------------|----------------------|
| NEL | 0 | 0 |
| NWL | 2.32 | 9.51 |
| AW | 2.81 | 11.23 |
| WL | 11.85 | 44.27 |
| SWL | 3.46 | 13.99 |
| Combined | 3.44 | 13.44 |

Table 2: Summary of Monthly and Running Quarterly STGs and ANIs

| | Winter | | Spring | | | Summer | | | Autumn | | | Winter |
|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | Jan 16 | Feb 16 | Mar 16 | Apr 16 | May 16 | Jun 16 | Jul 16 | Aug 16 | Sep 16 | Oct 16 | Nov 16 | Dec 16 |
| Monthly STG | 1.38 | 2.24 | 1.94 | 2.66 | 3.31 | 5.40 | 6.08 | 3.48 | 3.50 | 4.65 | 2.54 | 4.89 |
| Monthly ANI | 8.49 | 13.65 | 6.03 | 7.27 | 17.66 | 21.06 | 27.10 | 14.17 | 14.65 | 9.81 | 7.11 | 15.96 |
| Running Quarterly STG | N/A | N/A | 1.86 | 2.27 | 2.63 | 3.72 | 4.84 | 4.93 | 4.29 | 3.84 | 3.55 | 4.02 |
| Running Quarterly ANI | N/A | N/A | 9.35 | 8.99 | 10.37 | 15.21 | 21.75 | 20.57 | 18.32 | 13.02 | 10.74 | 10.95 |

Table 3: CWD Line Transects Parameters and Estimates of Density and Abundance for Western Hong Kong based on 3RS Project Data (December 2015 – December 2016)

| Time Period | Stratum | No. Stgs.* | Avg. Grp. Sz. | Trackline Detection Prob. - g(0) | Individual Density (#/100km ²) | Abundance | 95% CI (Abund.) | %CV |
|-----------------|---------|------------|---------------|----------------------------------|--|-----------|-----------------|------|
| Dec2015-Dec2016 | AW | 3 | 2.0 | 1.0 | 14.00 | 1 | 0-2 | 64.6 |
| Dec2015-Dec2016 | NEL | 0 | n/a | 1.0 | 0.00 | 0 | n/a | n/a |
| Dec2015-Dec2016 | NWL | 40 | 3.3 | 1.0 | 17.60 | 15 | 10-25 | 24.3 |
| Dec2015-Dec2016 | SWL | 44 | 2.7 | 1.0 | 21.80 | 14 | 8-26 | 30.7 |
| Dec2015-Dec2016 | WL | 77 | 3.8 | 1.0 | 109.20 | 30 | 19-48 | 23.3 |
| Dec2015-Dec2016 | Winter | 38 | 2.9 | 1.0 | 19.30 | 51 | 31-83 | 25.0 |
| Dec2015-Dec2016 | Spring | 42 | 4.3 | 1.0 | 30.60 | 81 | 46-141 | 28.6 |
| Dec2015-Dec2016 | Summer | 40 | 3.4 | 1.0 | 31.10 | 83 | 39-178 | 39.1 |
| Dec2015-Dec2016 | Autumn | 43 | 3.1 | 1.0 | 23.40 | 62 | 34-112 | 30.5 |

* Analysed using distance-sampling methodology (Buckland et al., 2001)

From Jefferson (2000)

Table 4: Average Group Sizes of CWDs by Survey Areas

| Survey Area | Average Group Size of CWDs |
|-------------|----------------------------|
| NEL | 0 |
| NWL | 3.93 |
| AW | 4.00 |
| WL | 3.61 |
| SWL | 3.89 |
| Overall | 3.77 ± 3.09 |

Table 5: Average Group Sizes of CWDs by Seasons

| | Spring | Summer | Autumn | Winter |
|--------------------|--------|--------|--------|--------|
| Average Group Size | 4.06 | 4.04 | 2.91 | 4.21 |

Table 6: Percentage of CWD Groups recorded as Exhibiting Various Behaviours/Activities, and recorded as having Association with Fishing Boat

| Survey Area | Activity | | | | Fishing Boat Assoc. |
|-------------|----------|-----------|-------------|-----------------|---------------------|
| | Feeding | Traveling | Socializing | Resting/Milling | |
| AW | 75% | - | - | - | - |
| NEL | - | - | - | - | - |
| NWL | 41% | 15% | 9% | 9% | 7% |
| WL | 33% | 31% | 5% | 8% | 4% |
| SWL | 48% | 13% | 11% | 8% | 13% |

Table 7: Summary of Photo Identification

| Individual ID | Date of sighting (dd/mm/yyyy) | Sighting Group No. | Area | Individual ID | Date of sighting (dd/mm/yyyy) | Sighting Group No. | Area |
|---------------|-------------------------------|--------------------|------|---------------|-------------------------------|--------------------|------|
| NLMM001 | 06/01/2016 | 1 | AW | SLMM022 | 19/01/2016 | 2 | SWL |
| NLMM002 | 05/02/2016 | 1 | NWL | | 21/04/2016 | 4 | WL |
| | 23/05/2016 | 1 | NWL | | 24/05/2016 | 8 | WL |
| | 19/08/2016 | 1 | NWL | | 19/09/2016 | 2 | WL |
| | | 2 | NWL | | | 4 | WL |
| | 24/08/2016 | 1 | NWL | | 25/10/2016 | 4 | WL |
| | 22/09/2016 | 2 | NWL | | 05/12/2016 | 5 | WL |
| | 04/11/2016 | 2 | NWL | SLMM023 | 19/01/2016 | 2 | SWL |
| | 19/12/2016 | 7 | NWL | | 02/03/2016 | 1 | WL |
| NLMM003 | 05/02/2016 | 1 | NWL | SLMM024 | 19/01/2016 | 2 | SWL |
| NLMM004 | 05/02/2016 | 1 | NWL | SLMM025 | 19/01/2016 | 2 | SWL |
| | 23/05/2016 | 1 | NWL | SLMM026 | 19/01/2016 | 2 | SWL |
| | 19/08/2016 | 2 | NWL | | 09/05/2016 | 6 | SWL |
| | 19/12/2016 | 6 | NWL | SLMM027 | 19/01/2016 | 2 | SWL |
| NLMM005 | 05/02/2016 | 1 | NWL | SLMM028 | 07/06/2016 | 1 | SWL |
| | 22/09/2016 | 1 | NWL | | 18/07/2016 | 1 | SWL |
| | | 2 | NWL | | | 3 | SWL |
| | 28/10/2016 | 1 | NWL | | 25/07/2016 | 7 | SWL |
| NLMM006 | 05/02/2016 | 1 | NWL | | 04/11/2016 | 1 | NWL |
| | 29/02/2016 | 2 | NWL | SLMM029 | 07/07/2016 | 13 | SWL |
| | 23/03/2016 | 2 | NWL | | 05/12/2016 | 5 | WL |
| | | 3 | NWL | SLMM030 | 18/07/2016 | 1 | SWL |
| | 24/08/2016 | 1 | NWL | | | 3 | SWL |
| | 22/09/2016 | 2 | NWL | | 19/09/2016 | 4 | WL |
| | 28/10/2016 | 2 | NWL | | | 5 | WL |
| | 04/11/2016 | 2 | NWL | SLMM031 | 18/07/2016 | 1 | SWL |
| | 19/12/2016 | 3 | NWL | | | 3 | SWL |
| | | 7 | NWL | | 25/07/2016 | 8 | SWL |
| NLMM007 | 05/02/2016 | 1 | NWL | | 13/12/2016 | 7 | SWL |
| NLMM008 | 05/02/2016 | 1 | NWL | SLMM032 | 18/07/2016 | 3 | SWL |
| | 22/08/2016 | 3 | WL | | 19/09/2016 | 6 | SWL |
| NLMM009 | 05/02/2016 | 1 | NWL | SLMM033 | 18/07/2016 | 3 | SWL |

| Individual ID | Date of sighting (dd/mm/yyyy) | Sighting Group No. | Area | Individual ID | Date of sighting (dd/mm/yyyy) | Sighting Group No. | Area |
|---------------|-------------------------------|--------------------|------|---------------|-------------------------------|--------------------|------|
| NLMM010 | 05/02/2016 | 1 | NWL | | 14/11/2016 | 1 | SWL |
| | 23/03/2016 | 1 | NWL | SLMM034 | 18/07/2016 | 3 | SWL |
| | 24/08/2016 | 1 | NWL | | 25/07/2016 | 6 | SWL |
| | 06/09/2016 | 1 | NWL | | 19/09/2016 | 2 | WL |
| | 22/09/2016 | 2 | NWL | SLMM035 | 18/07/2016 | 3 | SWL |
| | 19/12/2016 | 5 | NWL | SLMM036 | 18/07/2016 | 4 | SWL |
| | | 7 | NWL | SLMM037 | 25/07/2016 | 6 | SWL |
| NLMM011 | 05/02/2016 | 1 | NWL | | | 8 | SWL |
| NLMM012 | 05/02/2016 | 1 | NWL | | 05/12/2016 | 5 | WL |
| | 22/07/2016 | 5 | NWL | SLMM038 | 25/07/2016 | 6 | SWL |
| | 08/09/2016 | 2 | WL | SLMM039 | 25/07/2016 | 6 | SWL |
| | 28/10/2016 | 1 | NWL | SLMM040 | 25/07/2016 | 6 | SWL |
| NLMM013 | 05/02/2016 | 1 | NWL | | | 8 | SWL |
| | 29/02/2016 | 2 | NWL | SLMM041 | 25/07/2016 | 6 | SWL |
| | 23/03/2016 | 2 | NWL | SLMM042 | 25/07/2016 | 6 | SWL |
| | | 3 | NWL | SLMM043 | 25/07/2016 | 7 | SWL |
| | 24/08/2016 | 1 | NWL | | | 8 | SWL |
| | 22/09/2016 | 2 | NWL | SLMM044 | 25/07/2016 | 7 | SWL |
| | 28/10/2016 | 2 | NWL | | | 8 | SWL |
| | 04/11/2016 | 2 | NWL | SLMM045 | 25/07/2016 | 7 | SWL |
| | 19/12/2016 | 3 | NWL | | | 8 | SWL |
| | | 7 | NWL | SLMM046 | 25/07/2016 | 8 | SWL |
| NLMM014 | 05/02/2016 | 1 | NWL | SLMM047 | 25/07/2016 | 8 | SWL |
| NLMM015 | 05/02/2016 | 2 | NWL | SLMM048 | 25/07/2016 | 8 | SWL |
| NLMM016 | 05/02/2016 | 2 | NWL | SLMM049 | 25/07/2016 | 8 | SWL |
| NLMM017 | 05/02/2016 | 2 | NWL | | 05/12/2016 | 5 | WL |
| | 08/09/2016 | 2 | WL | SLMM050 | 26/09/2016 | 3 | SWL |
| NLMM018 | 18/02/2016 | 1 | AW | SLMM051 | 26/09/2016 | 3 | SWL |
| | | 2 | AW | SLMM052 | 26/10/2016 | 7 | SWL |
| | 18/03/2016 | 4 | SWL | SLMM053 | 13/12/2016 | 9 | SWL |
| NLMM019 | 18/02/2016 | 1 | AW | WLMM001 | 18/12/2015 | 2 | WL |
| | | 2 | AW | | 17/11/2016 | 1 | WL |
| | 06/06/2016 | 5 | SWL | WLMM002 | 18/12/2015 | 2 | WL |
| | 22/08/2016 | 3 | WL | WLMM003 | 18/12/2015 | 2 | WL |
| NLMM020 | 18/02/2016 | 1 | AW | | 19/01/2016 | 1 | WL |
| | | 2 | AW | WLMM004 | 18/12/2015 | 2 | WL |
| NLMM021 | 29/02/2016 | 1 | NWL | WLMM005 | 18/12/2015 | 2 | WL |
| | 21/04/2016 | 1 | WL | | 24/05/2016 | 3 | WL |
| | 27/09/2016 | 6 | SWL | | | 6 | WL |
| NLMM022 | 29/02/2016 | 1 | NWL | WLMM006 | 18/12/2015 | 2 | WL |
| NLMM023 | 05/10/2016 | 4 | NWL | | 07/07/2016 | 11 | WL |
| NLMM024 | 23/03/2016 | 1 | NWL | WLMM007 | 18/12/2015 | 2 | WL |
| NLMM025 | 23/03/2016 | 1 | NWL | | 24/05/2016 | 3 | WL |
| NLMM026 | 23/03/2016 | 1 | NWL | | 19/09/2016 | 5 | WL |
| NLMM027 | 23/05/2016 | 1 | NWL | | | 7 | SWL |
| | 22/09/2016 | 2 | NWL | | 05/12/2016 | 3 | WL |
| NLMM028 | 23/05/2016 | 1 | NWL | WLMM008 | 18/12/2015 | 2 | WL |
| | 22/08/2016 | 1 | WL | | 25/07/2016 | 8 | SWL |
| | 24/08/2016 | 1 | NWL | WLMM009 | 18/12/2015 | 2 | WL |
| | 22/09/2016 | 2 | NWL | | 07/07/2016 | 11 | WL |
| NLMM029 | 23/05/2016 | 1 | NWL | WLMM010 | 06/01/2016 | 2 | WL |
| NLMM030 | 22/07/2016 | 1 | NWL | WLMM011 | 19/01/2016 | 1 | WL |
| NLMM031 | 22/07/2016 | 1 | NWL | WLMM012 | 19/01/2016 | 1 | WL |
| NLMM032 | 22/07/2016 | 1 | NWL | WLMM013 | 19/01/2016 | 1 | WL |
| NLMM033 | 22/07/2016 | 3 | NWL | | 09/08/2016 | 3 | WL |
| NLMM034 | 22/07/2016 | 4 | NWL | WLMM014 | 19/01/2016 | 1 | WL |
| NLMM035 | 19/08/2016 | 1 | NWL | WLMM015 | 21/04/2016 | 1 | WL |
| | | 2 | NWL | | | 5 | WL |

| Individual ID | Date of sighting (dd/mm/yyyy) | Sighting Group No. | Area | Individual ID | Date of sighting (dd/mm/yyyy) | Sighting Group No. | Area |
|---------------|-------------------------------|--------------------|------|---------------|-------------------------------|--------------------|------|
| NLMM036 | 19/08/2016 | 1 | NWL | | 19/09/2016 | 5 | WL |
| NLMM037 | 19/08/2016 | 1 | NWL | WLMM016 | 21/04/2016 | 1 | WL |
| | | 2 | NWL | | 25/07/2016 | 8 | SWL |
| NLMM038 | 22/08/2016 | 1 | WL | WLMM017 | 21/04/2016 | 1 | WL |
| | 24/08/2016 | 1 | NWL | | 25/07/2016 | 7 | SWL |
| NLMM039 | 28/10/2016 | 1 | NWL | WLMM018 | 21/04/2016 | 1 | WL |
| NLMM040 | 28/10/2016 | 1 | NWL | | 25/07/2016 | 8 | SWL |
| NLMM041 | 28/10/2016 | 1 | NWL | WLMM019 | 21/04/2016 | 1 | WL |
| NLMM042 | 28/10/2016 | 1 | NWL | WLMM020 | 21/04/2016 | 1 | WL |
| NLMM043 | 21/11/2016 | 1 | NWL | | 19/09/2016 | 7 | SWL |
| NLMM044 | 21/11/2016 | 1 | NWL | WLMM021 | 21/04/2016 | 2 | WL |
| NLMM045 | 02/12/2016 | 1 | NWL | | | 5 | WL |
| NLMM046 | 19/12/2016 | 2 | NWL | | 03/05/2016 | 8 | SWL |
| | | 6 | NWL | | 24/05/2016 | 11 | SWL |
| NLMM047 | 19/12/2016 | 6 | NWL | WLMM022 | 02/02/2016 | 1 | WL |
| NLMM048 | 19/12/2016 | 7 | NWL | WLMM023 | 18/02/2016 | 3 | WL |
| NLMM049 | 19/12/2016 | 7 | NWL | | 07/07/2016 | 10 | WL |
| SLMM001 | 18/12/2015 | 3 | SWL | WLMM024 | 02/03/2016 | 1 | WL |
| SLMM002 | 18/12/2015 | 3 | SWL | | 19/09/2016 | 1 | AW |
| | 06/06/2016 | 5 | SWL | WLMM025 | 02/03/2016 | 1 | WL |
| | 19/09/2016 | 2 | WL | | 19/09/2016 | 2 | WL |
| | | 7 | SWL | | | 7 | SWL |
| | 26/09/2016 | 3 | SWL | WLMM026 | 06/04/2016 | 1 | WL |
| | 26/10/2016 | 2 | WL | | 04/11/2016 | 1 | NWL |
| | 05/12/2016 | 5 | WL | WLMM027 | 06/04/2016 | 1 | WL |
| SLMM003 | 18/12/2015 | 3 | SWL | | 07/06/2016 | 1 | SWL |
| | 19/01/2016 | 2 | SWL | | 18/07/2016 | 1 | SWL |
| | 09/05/2016 | 4 | WL | | | 3 | SWL |
| | 05/12/2016 | 5 | WL | | 08/09/2016 | 3 | WL |
| SLMM004 | 18/12/2015 | 3 | SWL | | 27/09/2016 | 5 | SWL |
| SLMM005 | 18/12/2015 | 3 | SWL | | 05/10/2016 | 1 | NWL |
| SLMM006 | 18/12/2015 | 3 | SWL | | 24/10/2016 | 7 | WL |
| SLMM007 | 18/12/2015 | 3 | SWL | | 04/11/2016 | 1 | NWL |
| | 19/01/2016 | 2 | SWL | WLMM028 | 06/04/2016 | 2 | WL |
| | 24/05/2016 | 3 | WL | | 27/04/2016 | 4 | SWL |
| | 25/07/2016 | 8 | SWL | | 28/11/2016 | 6 | SWL |
| | 05/12/2016 | 3 | WL | WLMM029 | 06/04/2016 | 2 | WL |
| SLMM008 | 27/04/2016 | 4 | SWL | | 27/04/2016 | 4 | SWL |
| | 18/07/2016 | 3 | SWL | | 28/11/2016 | 6 | SWL |
| SLMM009 | 18/12/2015 | 3 | SWL | WLMM030 | 06/04/2016 | 2 | WL |
| SLMM010 | 18/12/2015 | 3 | SWL | | 07/07/2016 | 7 | WL |
| | 21/04/2016 | 5 | WL | | 09/08/2016 | 1 | WL |
| | 09/05/2016 | 6 | SWL | | 19/12/2016 | 4 | NWL |
| | 24/05/2016 | 4 | WL | WLMM031 | 21/04/2016 | 4 | WL |
| | | 8 | WL | | 07/07/2016 | 3 | WL |
| | 22/08/2016 | 7 | WL | | | 5 | WL |
| | 19/09/2016 | 7 | SWL | WLMM032 | 21/04/2016 | 6 | WL |
| | 18/11/2016 | 1 | WL | | 26/10/2016 | 5 | WL |
| | 05/12/2016 | 5 | WL | WLMM033 | 21/04/2016 | 6 | WL |
| | 13/12/2016 | 8 | SWL | WLMM034 | 21/04/2016 | 6 | WL |
| SLMM011 | 04/01/2016 | 2 | SWL | WLMM035 | 24/05/2016 | 6 | WL |
| | 07/06/2016 | 1 | SWL | | 26/10/2016 | 5 | WL |
| | 18/07/2016 | 2 | SWL | WLMM036 | 24/05/2016 | 6 | WL |
| | 22/08/2016 | 7 | WL | WLMM037 | 24/05/2016 | 6 | WL |
| | 25/08/2016 | 1 | SWL | WLMM038 | 06/06/2016 | 3 | WL |
| | 24/10/2016 | 7 | WL | | 22/08/2016 | 2 | WL |
| | 21/11/2016 | 1 | NWL | WLMM039 | 06/06/2016 | 3 | WL |
| SLMM012 | 18/12/2015 | 3 | SWL | WLMM040 | 07/07/2016 | 2 | WL |

| Individual ID | Date of sighting (dd/mm/yyyy) | Sighting Group No. | Area | Individual ID | Date of sighting (dd/mm/yyyy) | Sighting Group No. | Area |
|---------------|-------------------------------|--------------------|------|---------------|-------------------------------|--------------------|------|
| | 09/05/2016 | 4 | WL | WLMM041 | 07/07/2016 | 2 | WL |
| | 28/11/2016 | 4 | SWL | | | 6 | WL |
| | 05/12/2016 | 5 | WL | WLMM042 | 07/07/2016 | 7 | WL |
| SLMM013 | 19/01/2016 | 3 | SWL | WLMM043 | 07/07/2016 | 7 | WL |
| | 06/06/2016 | 6 | SWL | | 09/08/2016 | 1 | WL |
| | 18/07/2016 | 1 | SWL | | 08/09/2016 | 1 | WL |
| | | 3 | SWL | WLMM044 | 07/07/2016 | 11 | WL |
| | 25/07/2016 | 8 | SWL | WLMM045 | 07/07/2016 | 11 | WL |
| | 26/10/2016 | 2 | WL | | 25/07/2016 | 6 | SWL |
| SLMM014 | 19/01/2016 | 3 | SWL | | | 8 | SWL |
| | 22/01/2016 | 1 | SWL | WLMM046 | 09/08/2016 | 3 | WL |
| | 24/05/2016 | 11 | SWL | WLMM047 | 22/08/2016 | 2 | WL |
| | 18/07/2016 | 1 | SWL | WLMM048 | 22/08/2016 | 2 | WL |
| | | 3 | SWL | WLMM049 | 22/08/2016 | 4 | WL |
| | 25/07/2016 | 8 | SWL | | 24/10/2016 | 1 | WL |
| | 26/10/2016 | 10 | SWL | | 26/10/2016 | 3 | WL |
| | 13/12/2016 | 4 | SWL | WLMM050 | 08/09/2016 | 2 | WL |
| SLMM015 | 19/01/2016 | 3 | SWL | | 28/10/2016 | 1 | NWL |
| | 27/04/2016 | 4 | SWL | WLMM051 | 08/09/2016 | 2 | WL |
| | 03/05/2016 | 8 | SWL | WLMM052 | 08/09/2016 | 2 | WL |
| | 22/08/2016 | 6 | WL | WLMM053 | 08/09/2016 | 2 | WL |
| | | 7 | WL | WLMM054 | 08/09/2016 | 3 | WL |
| | 27/09/2016 | 4 | SWL | | 27/09/2016 | 5 | SWL |
| SLMM016 | 19/01/2016 | 3 | SWL | | 05/10/2016 | 2 | NWL |
| SLMM017 | 09/03/2016 | 5 | SWL | WLMM055 | 19/09/2016 | 2 | WL |
| | 26/09/2016 | 3 | SWL | WLMM056 | 19/09/2016 | 2 | WL |
| | 28/11/2016 | 4 | SWL | WLMM057 | 19/09/2016 | 2 | WL |
| SLMM018 | 18/03/2016 | 1 | SWL | WLMM058 | 19/09/2016 | 2 | WL |
| | | 4 | SWL | WLMM059 | 19/09/2016 | 5 | WL |
| | 12/04/2016 | 2 | WL | WLMM060 | 24/10/2016 | 1 | WL |
| SLMM019 | 06/04/2016 | 3 | SWL | WLMM061 | 26/10/2016 | 1 | WL |
| | 05/12/2016 | 1 | WL | | | 5 | WL |
| SLMM020 | 06/04/2016 | 4 | SWL | WLMM062 | 17/11/2016 | 1 | WL |
| SLMM021 | 19/01/2016 | 2 | SWL | WLMM063 | 05/12/2016 | 4 | WL |
| | 09/03/2016 | 5 | SWL | | | | |

Table 8: Land-based Survey, Theodolite Effort and CWD Group Summary

| Land-based Station | # of Survey Sessions | Survey Effort (hh:mm) | # CWD Groups Sighted | CWD Group Sighting per Survey Hr | # Groups After Filtering | # of 10-minutes segments |
|--------------------|----------------------|-----------------------|----------------------|----------------------------------|--------------------------|--------------------------|
| Sha Chau | 24 | 144:33 | 2 | 0.014 | 1 | 3 |
| Lung Kwu Chau | 36 | 217:16 | 126 | 0.580 | 51 | 78 |
| TOTAL | 60 | 361:49 | 128 | 0.354 | 52 | 81 |

Table 9: CWD Groups Sighted and Tracked from Land-based Stations by Survey Month

| Month | No. of Survey Days | # of CWD Groups per Sha Chau Station | # of CWD Groups per Lung Kwu Chau Station | TOTAL |
|---|---|--------------------------------------|---|------------|
| 1 st Survey Month (18 Dec 2015 – 17 Jan 2016) | Sha Chau: 2 Lung Kwu Chau: 3 | 0 | 4 | 4 |
| 2 nd Survey Month (18 Jan 2016 – 17 Feb 2016) | Sha Chau: 2 Lung Kwu Chau: 3 | 0 | 10 | 10 |
| 3 rd Survey Month (18 Feb 2016 – 17 Mar 2016) | Sha Chau: 2 Lung Kwu Chau: 3 | 0 | 5 | 5 |
| 4 th Survey Month (18 Mar 2016 – 17 Apr 2016) | Sha Chau: 2 Lung Kwu Chau: 3 | 0 | 2 | 2 |
| 5 th Survey Month (18 Apr 2016 – 17 May 2016) | Sha Chau: 2 Lung Kwu Chau: 3 | 0 | 23 | 23 |
| 6 th Survey Month (18 May 2016 – 17 Jun 2016) | Sha Chau: 2 Lung Kwu Chau: 3 | 1 | 15 | 16 |
| 7 th Survey Month (Jul 2016) | Sha Chau: 2 Lung Kwu Chau: 3 | 0 | 15 | 15 |
| Commencement of marine construction for HKIA Three-Runway System | | | | |
| *8 th Survey Month (Aug 2016) | Sha Chau: 2 Lung Kwu Chau: 3 | 1 | 12 | 13 |
| *9 th Survey Month (Sep 2016) | Sha Chau: 2 Lung Kwu Chau: 3 | 0 | 9 | 9 |
| 10 th Survey Month (Oct 2016) | Sha Chau: 2 Lung Kwu Chau: 3 | 0 | 15 | 15 |
| 11 th Survey Month (Nov 2016) | Sha Chau: 2 Lung Kwu Chau: 3 | 0 | 10 | 10 |
| 12 th Survey Month (Dec 2016) | Sha Chau: 2 Lung Kwu Chau: 3 | 0 | 6 | 6 |
| TOTAL | Sha Chau: 24 Lung Kwu Chau: 36 | 2 | 126 | 128 |

*Note: There was no marine construction activities in August and September 2016.

Table 10: Land-based CWD Focal Group Size Summary

| Station | n (sample size) | Minimum # Individuals | Maximum # Individuals | Mean Grp Size | Standard Deviation |
|---------------|-----------------|-----------------------|-----------------------|---------------|--------------------|
| Sha Chau | 3 | 4 | 4 | 4 | 0 |
| Lung Kwu Chau | 78 | 1 | 9 | 3.08 | 1.81 |

Table 11: Summary of PAM Data Collection and Dolphin Detections, 8 Jan to 28 Dec 2016

| Site | Dep # | Data start (dd/mm/yyyy) | Data end (dd/mm/yyyy) | # recording days | # files | Analysis status | Days with dolphins (%) | Files with dolphins (%) |
|------|-------|-------------------------|-----------------------|------------------|---------|-----------------|------------------------|-------------------------|
| A5 | 1 | 08/01/2016 | 22/02/2016 | 46 | 13120 | Complete | 27 (59%) | 82 (0.6%) |
| A5 | 2 | 25/02/2016 | 29/03/2016 | 34 | 9650 | Complete | 22 (65%) | 45 (0.5%) |
| A5 | 3 | 14/04/2016 | 13/05/2016 | 30 | 8504 | Complete | 12 (40%) | 24 (0.3%) |
| A5 | 4 | 20/05/2016 | 06/07/2016 | 48 | 13689 | Complete | 14 (29%) | 15 (0.1%) |
| A5 | 5 | 16/08/2016 | 12/09/2016 | 28 | 7950 | Complete | 5 (18%) | 8 (0.1%) |
| A5 | 6 | 06/10/2016 | 07/11/2016 | 32 | 9369 | Complete | 14 (42%) | 21 (0.2%) |
| A5 | 7 | 17/11/2016 | 28/12/2016 | 42 | 11952 | Complete | 10 (24%) | 15 (0.1%) |

Annex 1 List of References for CWD Monitoring

- Buckland, S.T., Anderson, D.R., Burnham, K.P., Laake, J.L., Borchers, D.L. & Thomas, L. (2001) Introduction to Distance Sampling: Estimating Abundance of Biological Populations. Oxford University Press.
- Chen, T., Hung, S.K., Qiu, Y., Jia, X. & Jefferson, T.A. (2010) Distribution, abundance, and individual movements of Indo-Pacific humpback dolphins (*Sousa chinensis*) in the Pearl River Estuary, China. *Mammalia*, 74, 117-125.
- Gailey, G. & Ortega-Ortiz, J.G. (2002) A note on a computer-based system for theodolite tracking of cetaceans. *Journal of Cetacean Research and Management*, 4, 213-218.
- Gailey, G., Würsig, B. & McDonald, T.L. (2007) Abundance, behavior, and movement patterns of western gray whales in relation to a 3-D seismic survey, Northeast Sakhalin Island, Russia. *Environmental Monitoring and Assessment*, 134, 75-91.
- Hastie T., Tibshirani R. (1986) Generalized additive models. *Statistical science*:297-310.
- Hoyt, E. 2011. Marine Protected Areas for Whales, Dolphins, and Porpoises, Second Edition. Earthscan Press, London, UK. 464 pp.
- Hung, S. K. 2008. Habitat use of Indo-Pacific humpback dolphins (*Sousa chinensis*) in Hong Kong. Ph.D. dissertation. University of Hong Kong, Hong Kong, 266 p.
- Hung, S. K. 2016. Monitoring of Marine Mammals in Hong Kong Waters (2015 – 2016) Final Report (1 April 2015 to 31 March 2016). Agriculture, Fisheries and Conservation Department of the Hong Kong SAR Government.
- Jefferson, T.A. (2000) Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. *Wildlife Monographs*, 144, 65 pp.
- Lammers, M.O., Brainard, R.E., Au, W.W.L., Mooney, T.A. & Wong, K.B. (2008) An ecological acoustic recorder (EAR) for long-term monitoring of biological and anthropogenic sounds on coral reefs and other marine habitats. *Journal of the Acoustical Society of America*, 123, 1720-1728.
- Lundquist, D., Gemmell, N.J. & Würsig, B. (2012) Behavioural responses of dusky dolphin groups (*Lagenorhynchus obscurus*) to tour vessels off Kaikoura, New Zealand. *PLoS ONE*, 7, 9pp.
- Lusseau, D. (2006). The short-term behavioral reactions of bottlenose dolphins to interactions with boats in Doubtful Sound, New Zealand. *Marine Mammal Science*, 22(4), 802-818.
- Mott MacDonald (2014). Expansion of Hong Kong International Airport into a Three-Runway System Environmental Impact Assessment Report. The Airport Authority Hong Kong, Hong Kong.
- Munger, L., Lammers, M.O., Cifuentes, M., Würsig, B., Jefferson, T.A. & Hung, S.K. (2016) Indo-Pacific humpback dolphin occurrence north of Lantau Island, Hong Kong, based on year-round passive acoustic monitoring. *Journal of the Acoustical Society of America*, 140, 2754–2765
- Piwetz, S., Hung, S., Wang, J., Lundquist, D. & Würsig, B. (2012) Influence of vessel traffic on movements of Indo-Pacific Humpback dolphins (*Sousa chinensis*) off Lantau Island, Hong Kong. *Aquatic Mammals*, 38, 325-331.
- Quinn, G. P., & Keough, M. J. (2002). Experimental design and data analysis for biologists. Cambridge University Press.
- Sims, P.Q., Vaughn, R., Hung, S.K. & Würsig, B. (2011) Sounds of Indo-Pacific humpback dolphins (*Sousa chinensis*) in West Hong Kong: A preliminary description. *JASA Express Letters*, 131, E48-E53.

Sims, P.Q., Hung, S.K. & Würsig, B. (2012) High-speed vessel noises in West Hong Kong waters and their contributions relative to Indo-Pacific humpback dolphins (*Sousa chinensis*). *Journal of Marine Biology*, 2012, 11 pp.

Turchin, P. (1998) *Quantitative Analysis of Movement: Measuring and modelling population redistribution in animals and plants*. Sinauer Associates, Inc., U.S.A.

Wiggins, S.M. & Hildebrand, J. (2007) High-frequency Acoustic Recording Package (HARP) for broadband, long-term marine mammal monitoring. In: *Symposium on Underwater Technology and Workshop on Scientific Use of Submarine Cables and Related Technologies* (ed. by Anonymous), pp. 551-557.

Wood S. (2006) *Generalized additive models: an introduction with R* CRC press.

Würsig, B., Cipriano, F. & Würsig, M. (1991) Dolphin movement patterns: information from radio and theodolite tracking studies. In: *Dolphin societies: Discoveries and puzzles* (ed. by K. Pryor & K.S. Norris), pp. 79-111. University of California Press.