Monitoring of Chinese White Dolphins in Southwest Lantau Waters

13th Monthly Progress Report (March 2016)
submitted to Environmental Project Office for the HZMB HKLR, HZMB HKBCF and TM-CLKL – Investigation

Submitted by
Samuel K.Y. Hung, Ph.D.
Hong Kong Cetacean Research Project

5 April 2016

1. Introduction

1.1. In March 2015, Hong Kong Cetacean Research Project (HKCRP) was appointed by the Environmental Project Office for the HZMB Hong Kong Projects to undertake a monitoring study of Chinese White Dolphins in Southwest Lantau (SWL) waters.

1.2. The objectives of the monitoring study are to quantify the abundance and density of Chinese White Dolphins in SWL waters, to identify individuals during the monitoring surveys, and to analyze their range use and movement patterns in Hong Kong and the wider Pearl River Estuary waters.

1.3. The monitoring study will supplement the on-going EM&A monitoring results of the HZMB Hong Kong Projects in North and West Lantau waters, and provide a more complete picture of dolphin usage and movements between different survey areas in western Hong Kong waters.

1.4. The present report is the 13th monthly progress report under this dolphin monitoring study submitted to the Environmental Project Office, summarizing the survey findings during the month of March 2016.

2. Monitoring Methodology

2.1. Vessel-based Line-transect Survey

2.1.1. According to the requirement of the technical proposal submitted to the Environmental

Project Office, dolphin monitoring programme should cover all transect lines in SWL survey area (see Figure 1) once per month upon instruction. The co-ordinates of all transect lines conducted during the dolphin monitoring survey are shown in Table 1.

Table 1. Co-ordinates of transect lines in SWL survey area (corresponding to transect line layout as shown in Figure 1)

Line #		Northing	Easting		Line #		Northing	Easting
SWL001	1	806180	802510		SWL007	13	807380	808520
	2	804250	802510			14	805600	808520
SWL002	3	806710	803480			15	804400	808520
	4	803450	803480			16	803000	808520
SWL003	5	807270	804500			17	802100	808520
	6	802690	804500			18	800470	808520
SWL004	7	807590	805450		SWL008	19	807380	809550
	8	802295	805450			20	805050	809550
SWL005	9	808490	806500			21	804400	809550
	10	801410	806500			22	800470	809550
SWL006	11	808500	807430		SWL009	23	807380	810550
	12	801250	807430			24	800470	810550
					SWL010	25	809410	811510
						26	801470	811510

2.1.2. The HKCRP survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 17 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2014). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.

2.1.3. Two experienced observers from HKCRP (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a

constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). One to two additional experienced observer was available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.

2.1.4. During on-effort survey periods, the survey team recorded effort data including time, position (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance traveled in each series (a continuous period of search effort) with the assistance of a handheld GPS (*Garmin eTrex Legend*).

2.1.5. Data including time, position and vessel speed were also automatically and continuously logged by handheld GPS throughout the entire survey for subsequent review.

2.1.6. When dolphins were sighted, the survey team would end the survey effort, and immediately record the initial sighting distance and angle of the dolphin group from the survey vessel, as well as the sighting time and position. Then the research vessel was diverted from its course to approach the animals for species identification, group size estimation, assessment of group composition, and behavioural observations. The perpendicular distance (PSD) of the dolphin group to the transect line was later calculated from the initial sighting distance and angle.

2.1.7. Survey effort being conducted along the parallel transect lines that were perpendicular to the coastlines (as indicated in Figure 1) was labeled as “primary” survey effort, while the survey effort conducted along the connecting lines between parallel lines as well as the section around the Soko Islands was labeled as “secondary” survey effort. Both primary and secondary survey effort were presented as on-effort survey effort in this report.

2.1.8. Encounter rates of Chinese White Dolphins (number of on-effort sightings per 100 km of survey effort and number of dolphins from all on-effort sightings per 100 km of survey effort) were calculated in SWL survey area in relation to the amount of survey effort conducted during each month of monitoring survey. Only data collected under Beaufort 3 or below condition would be used for encounter rate analysis. Dolphin encounter rates were calculated using the combined survey effort from both primary and secondary lines for comparison to the historical data collected by HKCRP in this survey area. For the historical data, the encounter rates were calculated by pooling all relevant survey effort

and dolphin sightings to calculate a single index.

2.2. Photo-identification Work

2.2.1. When a group of Chinese White Dolphins were sighted during the line-transect survey, the survey team would end effort and approach the group slowly from the side and behind to take photographs of them. Every attempt was made to photograph every dolphin in the group, and even photograph both sides of the dolphins, since the colouration and markings on both sides may not be symmetrical.

2.2.2. A professional digital camera (*Canon* EOS 7D model), equipped with long telephoto lenses (100-400 mm zoom), were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.

2.2.3. All digital images taken in the field were first examined, and those containing potentially identifiable individuals were sorted out. These photographs would then be examined in greater detail, and were carefully compared to the existing Chinese White Dolphin photo-identification catalogue maintained by HKCRP since 1995. For individual dolphins that are not readily identifiable from the catalogue but have distinct features on their bodies, they will be placed in a pool of "potential new individuals", with decision being made at the end of each year on whether any of them should be incorporated into the photo-ID catalogue.

2.2.4. Chinese White Dolphins can be identified by their natural markings, such as nicks, cuts, scars and deformities on their dorsal fin and body, and their unique spotting patterns were also used as secondary identifying features (Jefferson 2000).

2.2.5. All photographs of each individual were then compiled and arranged in chronological order, with data including the date and location first identified (initial sighting), re-sightings, associated dolphins, distinctive features, and age classes entered into a computer database.

3. Monitoring Results

3.1. Vessel-based Line-transect Survey

3.1.1. One set of systematic line-transect vessel survey was conducted under the present

monitoring study on March 8th to cover all transect lines in SWL survey area once. The route and track log of this survey are presented in Figure 2 and Appendix I respectively).

3.1.2. In addition, four line-transect surveys were also conducted under the AFCD long-term marine mammal monitoring programme in SWL survey area on March 4th (with lines no. SWL002, SWL004, SWL006 and SWL008 covered), March 14th (with lines no. SWL004, SWL006 and SWL008 covered), March 17th (with lines no. SWL003, SWL005, SWL007 and SWL009) and March 29th (with lines no. SWL006 and SWL008 covered). Such monitoring data were also incorporated into the present study for various analyses.

3.1.3. For the present study alone, a total of 71.00 km of survey effort was collected from 11:01 to 16:20 (i.e. 5 hours and 19 minutes of survey time) on March 8th, with 92.9% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility) (Appendix II). The total survey effort conducted on primary and secondary lines were 54.16 km and 16.84 km respectively.

3.1.4. For the combined monitoring dataset from both the present study and AFCD monitoring study, a total of 181.27 km of survey effort was collected in SWL waters in March 2016.

3.1.5. During this month, five groups of 12 Chinese White Dolphins were sighted from the present study's survey as well as two of the AFCD monitoring surveys conducted in SWL survey area (Appendix III). All five dolphin groups were sighted during on-effort search, and three of them were made on primary lines. None of these dolphin groups was associated with any operating fishing vessel.

3.1.6. Notably, two groups of five finless porpoises were also sighted in SWL survey area during this monitoring month.

3.1.7. Distribution of dolphin sightings made in March 2016 is shown in Figure 3. Four of the five dolphin groups were sighted near Fan Lau, while another sighting was made around the Soko Islands (Figure 3).

3.1.8. Encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data made under favourable conditions (Beaufort 3 or below) in March 2016 are shown in Table 2. Comparison of encounter rates was also made to the one deduced in spring months (March-May) in the past decade (2005-14), as well as in March 2015 under the present study (Table 2).

Table 2. Overall dolphin encounter rates (sightings per 100 km of survey effort) from the present monitoring survey and combined database with AFCD monitoring survey conducted in March 2016 (primary lines only, as well as both primary lines and secondary lines were used) in SWL survey area in comparison to the ones deduced during spring months (March-May 2005-14) in the past decade

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		**Encounter rate (ANI)** (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	Primary Lines Only	Both Primary and Secondary Lines	Primary Lines Only	Both Primary and Secondary Lines
HYD-HZMB data (March 2016)	1.94	1.52	3.89	3.03
Combined data (March 2016)	2.57	3.00	3.43	7.20
Combined data (March 2015)	1.41	1.05	1.41	1.05
Historical Data (Spring 2005-14)		1.54		4.14

3.1.9. From the combined data of HYD-HZMB and AFCD monitoring surveys, the overall encounter rates based on the number of dolphin sightings (ER(STG)) and the total number of dolphins (ER(ANI)) deduced in March 2016 in SWL waters were higher than the ones deduced from the historical data during the spring months of 2005-14 as well as in March 2015 (Table 2).

3.1.10. The average group size of Chinese White Dolphins in March 2016 was 2.4 animals per group, which was slightly lower than the average group size in spring months of 2005-14 (2.7). Four of the five dolphin groups were very small with only 1-2 animals per group, but one group of six dolphins was also sighted near Fan Lau with moderate group size.

3.2. Photo-identification Work

3.2.1. Attempts were made to photograph the dolphins sighted during all surveys conducted in March 2016.

3.2.2. Among the 12 dolphins sighted during this month's surveys, seven individual dolphins were identified and re-sighted seven times in total (Appendices IV and V). One of these individuals (WL208) was accompanied by her young calf.

3.2.3. The locations where all seven individuals being re-sighted were well within their past home ranges in SWL and WL waters.

4. References

Buckland, S. T., Anderson, D. R., Burnham, K. P., Laake, J. L., Borchers, D. L., and Thomas, L. 2001. Introduction to distance sampling: estimating abundance of biological populations. Oxford University Press, London.

Hung, S. K. 2014. Monitoring of Marine Mammals in Hong Kong waters: final report (2013-14). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department, 231 pp.

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

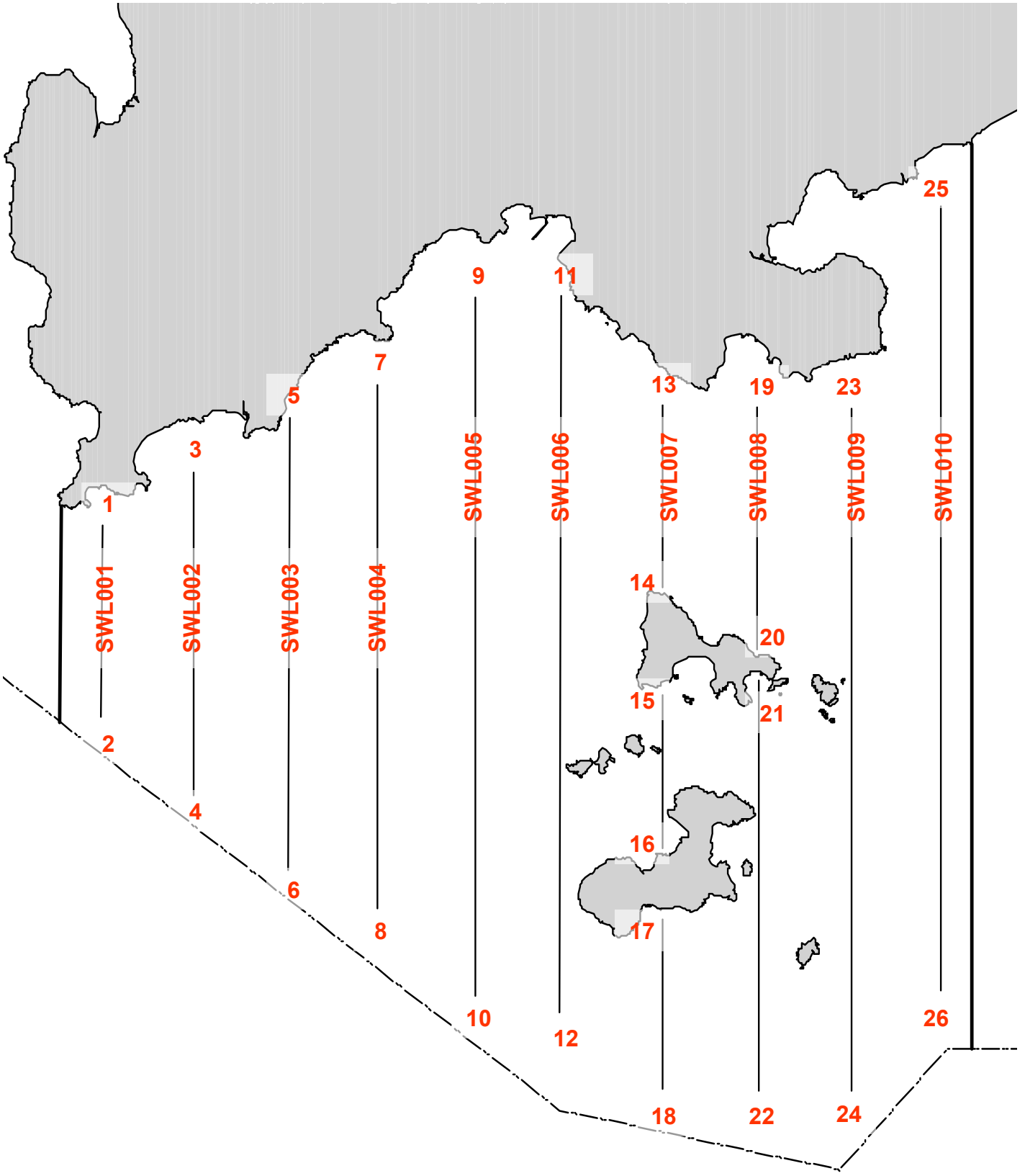

Figure 1. Survey Lines and associated coordinates in Southwest Lantau survey area

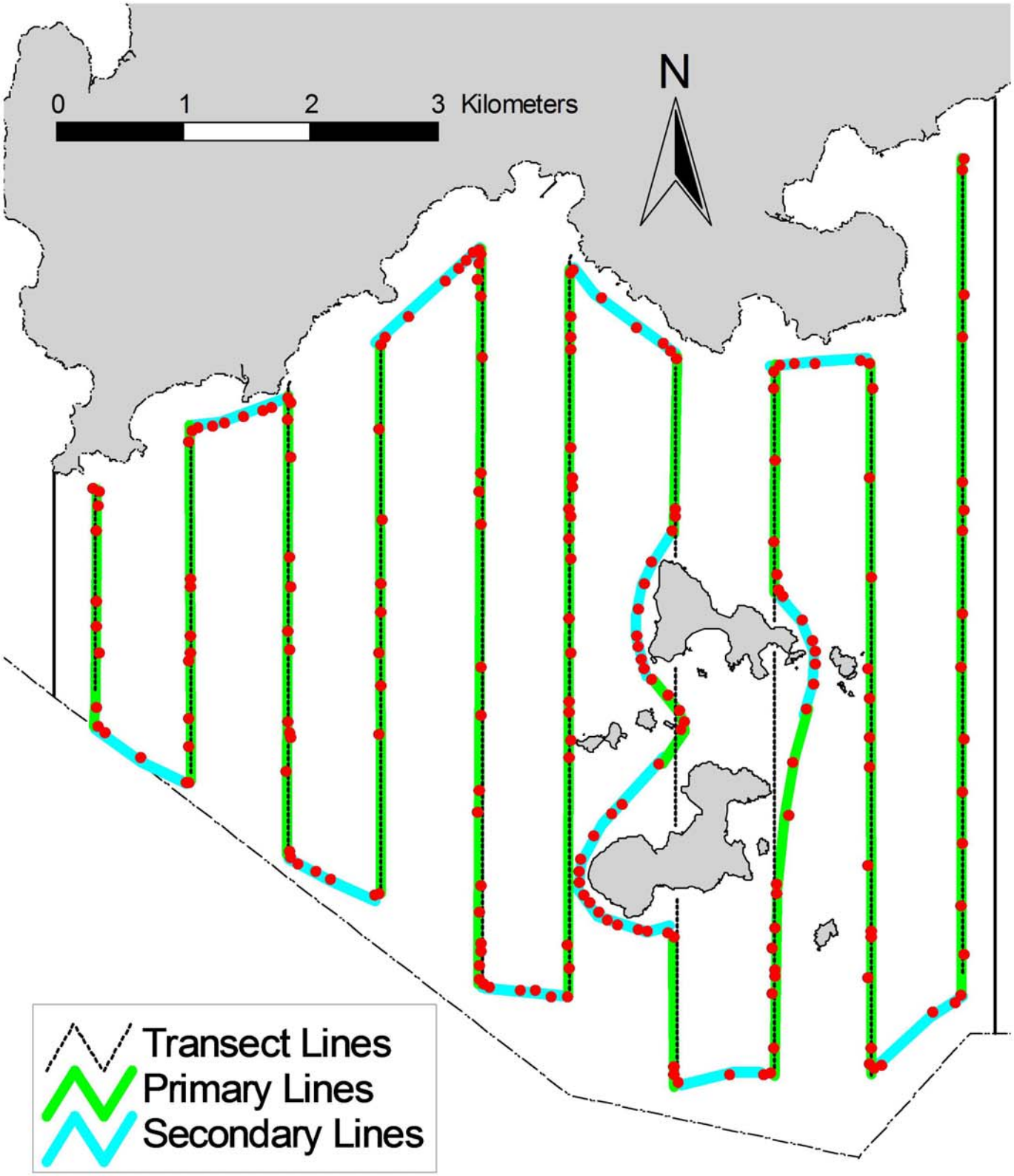

Figure 2. Survey Route on March 8th, 2016 (note: red dots represent the tracked positions of survey boat logged continuously by GPS throughout the course of the survey)

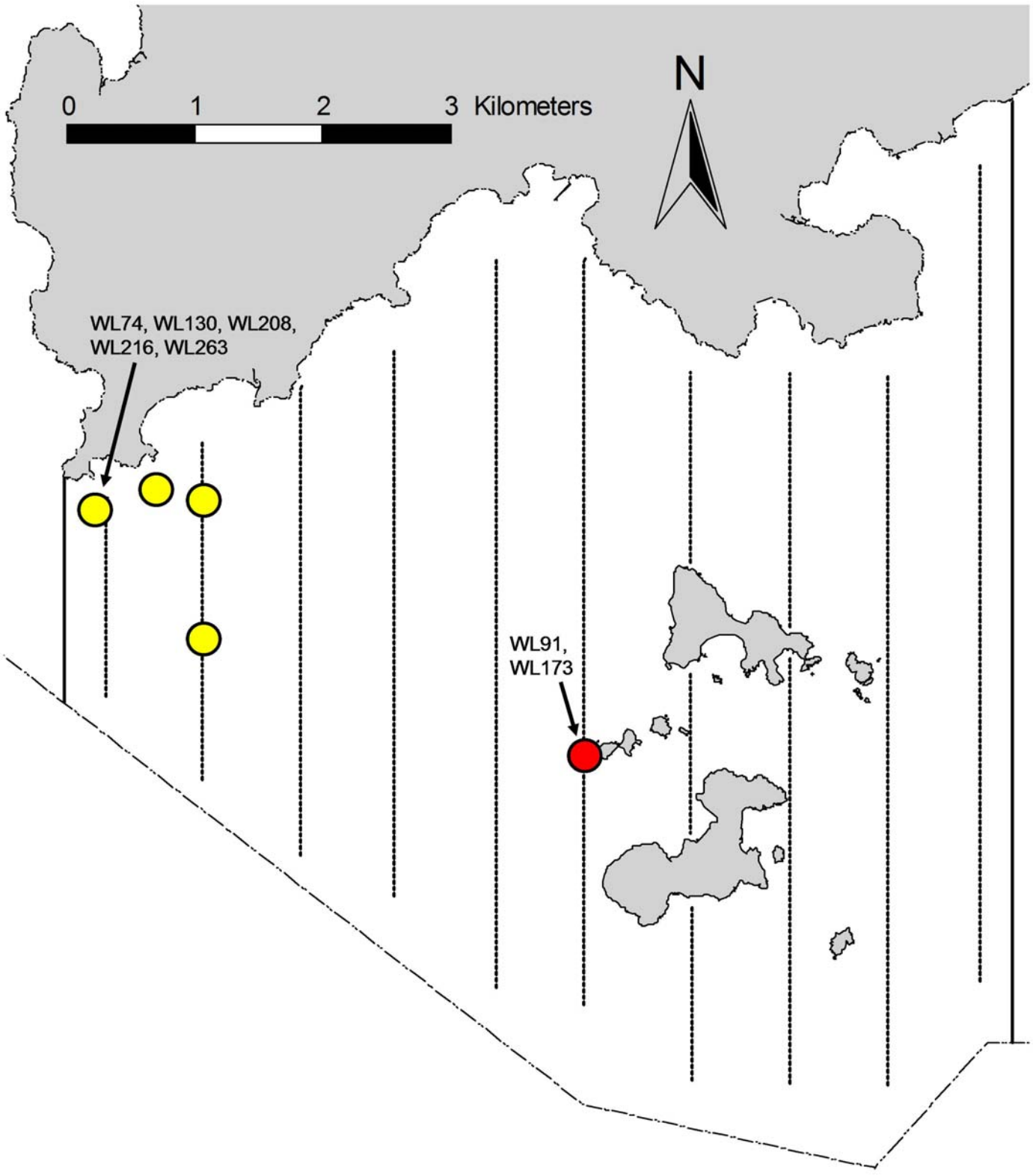

Figure 3. Distribution of Chinese White Dolphin sightings during March 2016 monitoring surveys in Southwest Lantau survey area, with identified individuals indicated for their corresponding sightings (red dot: HYD-HZMB sighting; yellow dot: AFCD sighting)

Appendix I. Track Log of Southwest Lantau Survey on March 8th, 2016

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
8/3/2016 11:01	ON	N22.19390 E113.84966			
8/3/2016 11:01	ON	N22.19324 E113.84971	74 m	0:00:19	14 kph
8/3/2016 11:01	ON	N22.19262 E113.84960	71 m	0:00:18	14 kph
8/3/2016 11:02	ON	N22.19197 E113.84952	73 m	0:00:18	15 kph
8/3/2016 11:02	ON	N22.19111 E113.84950	95 m	0:00:23	15 kph
8/3/2016 11:02	ON	N22.19036 E113.84947	84 m	0:00:20	15 kph
8/3/2016 11:03	ON	N22.18956 E113.84951	89 m	0:00:21	15 kph
8/3/2016 11:03	ON	N22.18870 E113.84951	96 m	0:00:24	14 kph
8/3/2016 11:03	ON	N22.18793 E113.84951	85 m	0:00:21	15 kph
8/3/2016 11:04	ON	N22.18707 E113.84954	97 m	0:00:24	14 kph
8/3/2016 11:04	ON	N22.18641 E113.84953	73 m	0:00:18	15 kph
8/3/2016 11:04	ON	N22.18558 E113.84958	93 m	0:00:23	15 kph
8/3/2016 11:05	ON	N22.18486 E113.84959	80 m	0:00:20	14 kph
8/3/2016 11:05	ON	N22.18416 E113.84952	78 m	0:00:20	14 kph
8/3/2016 11:05	ON	N22.18341 E113.84949	83 m	0:00:21	14 kph
8/3/2016 11:06	ON	N22.18278 E113.84947	70 m	0:00:18	14 kph
8/3/2016 11:06	ON	N22.18200 E113.84948	87 m	0:00:22	14 kph
8/3/2016 11:07	ON	N22.18108 E113.84951	103 m	0:00:26	14 kph
8/3/2016 11:07	ON	N22.18034 E113.84958	83 m	0:00:21	14 kph
8/3/2016 11:07	ON	N22.17955 E113.84965	88 m	0:00:22	14 kph
8/3/2016 11:08	ON	N22.17884 E113.84959	79 m	0:00:20	14 kph
8/3/2016 11:08	ON	N22.17805 E113.84952	89 m	0:00:22	15 kph
8/3/2016 11:08	ON	N22.17725 E113.84953	90 m	0:00:22	15 kph
8/3/2016 11:09	ON	N22.17648 E113.84952	85 m	0:00:21	15 kph
8/3/2016 11:09	ON	N22.17560 E113.84949	98 m	0:00:24	15 kph
8/3/2016 11:09	ON	N22.17477 E113.84947	93 m	0:00:23	15 kph
8/3/2016 11:10	ON	N22.17389 E113.84952	98 m	0:00:24	15 kph
8/3/2016 11:10	ON	N22.17314 E113.84965	84 m	0:00:21	14 kph
8/3/2016 11:11	ON	N22.17263 E113.85027	85 m	0:00:22	14 kph
8/3/2016 11:11	ON	N22.17214 E113.85104	97 m	0:00:24	15 kph
8/3/2016 11:11	ON	N22.17170 E113.85176	89 m	0:00:22	15 kph
8/3/2016 11:12	ON	N22.17117 E113.85263	107 m	0:00:26	15 kph
8/3/2016 11:12	ON	N22.17074 E113.85335	88 m	0:00:22	14 kph
8/3/2016 11:12	ON	N22.17035 E113.85402	83 m	0:00:21	14 kph
8/3/2016 11:13	ON	N22.16998 E113.85476	86 m	0:00:22	14 kph
8/3/2016 11:13	ON	N22.16969 E113.85541	75 m	0:00:19	14 kph
8/3/2016 11:14	ON	N22.16929 E113.85627	99 m	0:00:25	14 kph
8/3/2016 11:14	ON	N22.16898 E113.85690	74 m	0:00:19	14 kph
8/3/2016 11:14	ON	N22.16855 E113.85774	99 m	0:00:25	14 kph
8/3/2016 11:15	ON	N22.16811 E113.85849	91 m	0:00:23	14 kph
8/3/2016 11:15	ON	N22.16816 E113.85894	47 m	0:00:16	11 kph
8/3/2016 11:15	ON	N22.16884 E113.85903	76 m	0:00:22	12 kph
8/3/2016 11:16	ON	N22.16961 E113.85898	87 m	0:00:23	14 kph
8/3/2016 11:16	ON	N22.17052 E113.85886	102 m	0:00:27	14 kph
8/3/2016 11:17	ON	N22.17133 E113.85892	91 m	0:00:24	14 kph
8/3/2016 11:17	ON	N22.17212 E113.85884	87 m	0:00:23	14 kph
8/3/2016 11:17	ON	N22.17288 E113.85880	85 m	0:00:22	14 kph
8/3/2016 11:18	ON	N22.17375 E113.85886	97 m	0:00:25	14 kph
8/3/2016 11:18	ON	N22.17455 E113.85890	89 m	0:00:23	14 kph
8/3/2016 11:19	ON	N22.17548 E113.85892	104 m	0:00:27	14 kph
8/3/2016 11:19	ON	N22.17637 E113.85892	100 m	0:00:26	14 kph
8/3/2016 11:19	ON	N22.17721 E113.85896	94 m	0:00:24	14 kph
8/3/2016 11:20	ON	N22.17815 E113.85891	104 m	0:00:27	14 kph
8/3/2016 11:20	ON	N22.17887 E113.85889	80 m	0:00:21	14 kph
8/3/2016 11:21	ON	N22.17960 E113.85902	82 m	0:00:21	14 kph
8/3/2016 11:21	ON	N22.18035 E113.85900	84 m	0:00:22	14 kph
8/3/2016 11:21	ON	N22.18121 E113.85889	95 m	0:00:25	14 kph
8/3/2016 11:22	ON	N22.18194 E113.85890	81 m	0:00:21	14 kph
8/3/2016 11:22	ON	N22.18287 E113.85888	104 m	0:00:27	14 kph
8/3/2016 11:23	ON	N22.18380 E113.85891	104 m	0:00:27	14 kph
8/3/2016 11:23	ON	N22.18453 E113.85891	81 m	0:00:21	14 kph
8/3/2016 11:23	ON	N22.18541 E113.85895	98 m	0:00:25	14 kph
8/3/2016 11:24	ON	N22.18621 E113.85894	88 m	0:00:23	14 kph
8/3/2016 11:24	ON	N22.18700 E113.85895	88 m	0:00:23	14 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
8/3/2016 11:25	ON	N22.18776 E113.85890	85 m	0:00:23	13 kph
8/3/2016 11:25	ON	N22.18866 E113.85885	100 m	0:00:26	14 kph
8/3/2016 11:25	ON	N22.18982 E113.85889	130 m	0:00:33	14 kph
8/3/2016 11:26	ON	N22.19069 E113.85885	97 m	0:00:25	14 kph
8/3/2016 11:26	ON	N22.19169 E113.85884	112 m	0:00:28	14 kph
8/3/2016 11:27	ON	N22.19260 E113.85887	101 m	0:00:25	14 kph
8/3/2016 11:27	ON	N22.19358 E113.85888	109 m	0:00:27	15 kph
8/3/2016 11:28	ON	N22.19448 E113.85888	100 m	0:00:25	14 kph
8/3/2016 11:28	ON	N22.19527 E113.85882	88 m	0:00:22	14 kph
8/3/2016 11:28	ON	N22.19631 E113.85882	116 m	0:00:28	15 kph
8/3/2016 11:29	ON	N22.19746 E113.85882	128 m	0:00:31	15 kph
8/3/2016 11:29	ON	N22.19832 E113.85882	96 m	0:00:23	15 kph
8/3/2016 11:30	ON	N22.19929 E113.85906	111 m	0:00:28	14 kph
8/3/2016 11:30	ON	N22.19952 E113.85973	74 m	0:00:19	14 kph
8/3/2016 11:31	ON	N22.19961 E113.86053	83 m	0:00:21	14 kph
8/3/2016 11:31	ON	N22.19972 E113.86121	71 m	0:00:18	14 kph
8/3/2016 11:31	ON	N22.19998 E113.86226	112 m	0:00:28	14 kph
8/3/2016 11:32	ON	N22.20026 E113.86319	101 m	0:00:25	15 kph
8/3/2016 11:32	ON	N22.20063 E113.86426	118 m	0:00:28	15 kph
8/3/2016 11:33	ON	N22.20084 E113.86516	95 m	0:00:22	16 kph
8/3/2016 11:33	ON	N22.20108 E113.86617	108 m	0:00:25	16 kph
8/3/2016 11:33	ON	N22.20144 E113.86705	99 m	0:00:24	15 kph
8/3/2016 11:34	ON	N22.20178 E113.86785	90 m	0:00:22	15 kph
8/3/2016 11:34	ON	N22.20220 E113.86876	105 m	0:00:27	14 kph
8/3/2016 11:34	ON	N22.20180 E113.86897	50 m	0:00:18	10 kph
8/3/2016 11:35	ON	N22.20106 E113.86875	85 m	0:00:23	13 kph
8/3/2016 11:35	ON	N22.20030 E113.86866	85 m	0:00:23	13 kph
8/3/2016 11:36	ON	N22.19947 E113.86881	93 m	0:00:25	13 kph
8/3/2016 11:36	ON	N22.19852 E113.86886	107 m	0:00:28	14 kph
8/3/2016 11:36	ON	N22.19784 E113.86893	76 m	0:00:20	14 kph
8/3/2016 11:37	ON	N22.19704 E113.86895	89 m	0:00:23	14 kph
8/3/2016 11:37	ON	N22.19602 E113.86885	114 m	0:00:30	14 kph
8/3/2016 11:38	ON	N22.19526 E113.86888	85 m	0:00:22	14 kph
8/3/2016 11:38	ON	N22.19426 E113.86890	111 m	0:00:29	14 kph
8/3/2016 11:38	ON	N22.19365 E113.86893	68 m	0:00:18	14 kph
8/3/2016 11:39	ON	N22.19286 E113.86885	88 m	0:00:23	14 kph
8/3/2016 11:39	ON	N22.19210 E113.86884	85 m	0:00:22	14 kph
8/3/2016 11:40	ON	N22.19127 E113.86889	93 m	0:00:24	14 kph
8/3/2016 11:40	ON	N22.19038 E113.86890	99 m	0:00:26	14 kph
8/3/2016 11:40	ON	N22.18972 E113.86890	73 m	0:00:19	14 kph
8/3/2016 11:41	ON	N22.18896 E113.86887	85 m	0:00:22	14 kph
8/3/2016 11:41	ON	N22.18811 E113.86888	94 m	0:00:24	14 kph
8/3/2016 11:42	ON	N22.18716 E113.86891	107 m	0:00:27	14 kph
8/3/2016 11:42	ON	N22.18642 E113.86898	83 m	0:00:21	14 kph
8/3/2016 11:42	ON	N22.18552 E113.86904	100 m	0:00:25	14 kph
8/3/2016 11:43	ON	N22.18453 E113.86891	111 m	0:00:28	14 kph
8/3/2016 11:43	ON	N22.18388 E113.86891	73 m	0:00:18	15 kph
8/3/2016 11:44	ON	N22.18297 E113.86884	102 m	0:00:25	15 kph
8/3/2016 11:44	ON	N22.18223 E113.86883	83 m	0:00:21	14 kph
8/3/2016 11:44	ON	N22.18157 E113.86884	74 m	0:00:19	14 kph
8/3/2016 11:45	ON	N22.18071 E113.86886	95 m	0:00:24	14 kph
8/3/2016 11:45	ON	N22.17986 E113.86886	95 m	0:00:24	14 kph
8/3/2016 11:45	ON	N22.17897 E113.86892	99 m	0:00:25	14 kph
8/3/2016 11:46	ON	N22.17829 E113.86891	75 m	0:00:19	14 kph
8/3/2016 11:46	ON	N22.17766 E113.86888	71 m	0:00:18	14 kph
8/3/2016 11:46	ON	N22.17681 E113.86890	95 m	0:00:24	14 kph
8/3/2016 11:47	ON	N22.17588 E113.86886	103 m	0:00:26	14 kph
8/3/2016 11:47	ON	N22.17507 E113.86886	90 m	0:00:23	14 kph
8/3/2016 11:48	ON	N22.17421 E113.86888	97 m	0:00:24	15 kph
8/3/2016 11:48	ON	N22.17348 E113.86884	81 m	0:00:21	14 kph
8/3/2016 11:48	ON	N22.17305 E113.86886	48 m	0:00:23	8 kph
8/3/2016 11:49	ON	N22.17282 E113.86887	26 m	0:00:23	4 kph
8/3/2016 11:49	ON	N22.17268 E113.86891	15 m	0:00:23	2 kph
8/3/2016 11:50	ON	N22.17259 E113.86892	10 m	0:00:23	2 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
8/3/2016 11:50	ON	N22.17252 E113.86894	8 m	0:00:23	1.2 kph
8/3/2016 11:50	ON	N22.17247 E113.86895	6 m	0:00:21	1.0 kph
8/3/2016 11:51	ON	N22.17243 E113.86896	5 m	0:00:22	0.8 kph
8/3/2016 11:51	ON	N22.17239 E113.86898	5 m	0:00:24	0.8 kph
8/3/2016 11:51	ON	N22.17236 E113.86899	3 m	0:00:21	0.5 kph
8/3/2016 11:52	ON	N22.17229 E113.86904	9 m	0:00:21	2 kph
8/3/2016 11:52	ON	N22.17219 E113.86909	12 m	0:00:06	7 kph
8/3/2016 11:52	ON	N22.17162 E113.86907	64 m	0:00:20	12 kph
8/3/2016 11:53	ON	N22.17089 E113.86891	82 m	0:00:21	14 kph
8/3/2016 11:53	ON	N22.17000 E113.86873	100 m	0:00:25	14 kph
8/3/2016 11:53	ON	N22.16912 E113.86871	98 m	0:00:24	15 kph
8/3/2016 11:54	ON	N22.16840 E113.86874	80 m	0:00:20	14 kph
8/3/2016 11:54	ON	N22.16756 E113.86878	93 m	0:00:23	15 kph
8/3/2016 11:54	ON	N22.16679 E113.86879	86 m	0:00:21	15 kph
8/3/2016 11:55	ON	N22.16607 E113.86888	80 m	0:00:20	14 kph
8/3/2016 11:55	ON	N22.16518 E113.86888	99 m	0:00:24	15 kph
8/3/2016 11:55	ON	N22.16449 E113.86884	77 m	0:00:19	15 kph
8/3/2016 11:56	ON	N22.16376 E113.86893	82 m	0:00:20	15 kph
8/3/2016 11:56	ON	N22.16288 E113.86893	98 m	0:00:24	15 kph
8/3/2016 11:57	ON	N22.16207 E113.86888	90 m	0:00:22	15 kph
8/3/2016 11:57	ON	N22.16148 E113.86910	69 m	0:00:19	13 kph
8/3/2016 11:57	ON	N22.16103 E113.86985	91 m	0:00:24	14 kph
8/3/2016 11:58	ON	N22.16068 E113.87075	101 m	0:00:26	14 kph
8/3/2016 11:58	ON	N22.16031 E113.87163	100 m	0:00:26	14 kph
8/3/2016 11:59	ON	N22.15992 E113.87246	95 m	0:00:25	14 kph
8/3/2016 11:59	ON	N22.15955 E113.87315	83 m	0:00:22	14 kph
8/3/2016 11:59	ON	N22.15925 E113.87382	76 m	0:00:20	14 kph
8/3/2016 12:00	ON	N22.15902 E113.87464	89 m	0:00:23	14 kph
8/3/2016 12:00	ON	N22.15870 E113.87564	109 m	0:00:27	14 kph
8/3/2016 12:01	ON	N22.15842 E113.87657	101 m	0:00:25	15 kph
8/3/2016 12:01	ON	N22.15817 E113.87755	105 m	0:00:26	15 kph
8/3/2016 12:01	ON	N22.15833 E113.87810	60 m	0:00:19	11 kph
8/3/2016 12:02	ON	N22.15915 E113.87815	91 m	0:00:24	14 kph
8/3/2016 12:02	ON	N22.16006 E113.87809	102 m	0:00:26	14 kph
8/3/2016 12:02	ON	N22.16084 E113.87805	87 m	0:00:22	14 kph
8/3/2016 12:03	ON	N22.16157 E113.87805	80 m	0:00:20	14 kph
8/3/2016 12:03	ON	N22.16235 E113.87805	88 m	0:00:22	14 kph
8/3/2016 12:04	ON	N22.16318 E113.87800	93 m	0:00:25	13 kph
8/3/2016 12:04	ON	N22.16392 E113.87801	82 m	0:00:22	13 kph
8/3/2016 12:04	ON	N22.16476 E113.87801	94 m	0:00:25	13 kph
8/3/2016 12:05	ON	N22.16560 E113.87804	93 m	0:00:25	13 kph
8/3/2016 12:05	ON	N22.16650 E113.87803	101 m	0:00:27	13 kph
8/3/2016 12:06	ON	N22.16744 E113.87801	104 m	0:00:28	13 kph
8/3/2016 12:06	ON	N22.16835 E113.87806	102 m	0:00:28	13 kph
8/3/2016 12:07	ON	N22.16924 E113.87805	99 m	0:00:27	13 kph
8/3/2016 12:07	ON	N22.17006 E113.87804	91 m	0:00:25	13 kph
8/3/2016 12:07	ON	N22.17096 E113.87806	100 m	0:00:27	13 kph
8/3/2016 12:08	ON	N22.17175 E113.87804	89 m	0:00:24	13 kph
8/3/2016 12:08	ON	N22.17254 E113.87798	88 m	0:00:24	13 kph
8/3/2016 12:09	ON	N22.17333 E113.87798	87 m	0:00:24	13 kph
8/3/2016 12:09	ON	N22.17420 E113.87799	97 m	0:00:26	13 kph
8/3/2016 12:10	ON	N22.17508 E113.87805	98 m	0:00:26	14 kph
8/3/2016 12:10	ON	N22.17602 E113.87806	106 m	0:00:28	14 kph
8/3/2016 12:10	ON	N22.17684 E113.87811	91 m	0:00:24	14 kph
8/3/2016 12:11	ON	N22.17771 E113.87806	98 m	0:00:26	14 kph
8/3/2016 12:11	ON	N22.17863 E113.87805	102 m	0:00:27	14 kph
8/3/2016 12:12	ON	N22.17957 E113.87800	104 m	0:00:27	14 kph
8/3/2016 12:12	ON	N22.18034 E113.87804	86 m	0:00:22	14 kph
8/3/2016 12:12	ON	N22.18107 E113.87810	82 m	0:00:21	14 kph
8/3/2016 12:13	ON	N22.18172 E113.87809	72 m	0:00:19	14 kph
8/3/2016 12:13	ON	N22.18242 E113.87817	78 m	0:00:20	14 kph
8/3/2016 12:14	ON	N22.18329 E113.87821	97 m	0:00:25	14 kph
8/3/2016 12:14	ON	N22.18415 E113.87808	97 m	0:00:26	13 kph
8/3/2016 12:14	ON	N22.18503 E113.87811	98 m	0:00:26	14 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
8/3/2016 12:15	ON	N22.18575 E113.87805	80 m	0:00:21	14 kph
8/3/2016 12:15	ON	N22.18665 E113.87809	101 m	0:00:26	14 kph
8/3/2016 12:16	ON	N22.18759 E113.87812	104 m	0:00:27	14 kph
8/3/2016 12:16	ON	N22.18839 E113.87811	89 m	0:00:23	14 kph
8/3/2016 12:17	ON	N22.18940 E113.87812	112 m	0:00:29	14 kph
8/3/2016 12:17	ON	N22.19038 E113.87812	109 m	0:00:28	14 kph
8/3/2016 12:17	ON	N22.19143 E113.87819	116 m	0:00:29	14 kph
8/3/2016 12:18	ON	N22.19225 E113.87809	92 m	0:00:24	14 kph
8/3/2016 12:18	ON	N22.19320 E113.87811	106 m	0:00:27	14 kph
8/3/2016 12:19	ON	N22.19397 E113.87816	86 m	0:00:22	14 kph
8/3/2016 12:19	ON	N22.19497 E113.87809	111 m	0:00:28	14 kph
8/3/2016 12:20	ON	N22.19588 E113.87813	102 m	0:00:26	14 kph
8/3/2016 12:20	ON	N22.19679 E113.87812	101 m	0:00:25	15 kph
8/3/2016 12:20	ON	N22.19760 E113.87808	90 m	0:00:22	15 kph
8/3/2016 12:21	ON	N22.19861 E113.87807	112 m	0:00:28	14 kph
8/3/2016 12:21	ON	N22.19944 E113.87804	93 m	0:00:23	15 kph
8/3/2016 12:22	ON	N22.20038 E113.87808	105 m	0:00:26	14 kph
8/3/2016 12:22	ON	N22.20133 E113.87811	105 m	0:00:26	15 kph
8/3/2016 12:22	ON	N22.20220 E113.87812	97 m	0:00:24	15 kph
8/3/2016 12:23	ON	N22.20320 E113.87812	110 m	0:00:27	15 kph
8/3/2016 12:23	ON	N22.20407 E113.87811	97 m	0:00:24	15 kph
8/3/2016 12:24	ON	N22.20508 E113.87810	113 m	0:00:28	14 kph
8/3/2016 12:24	ON	N22.20602 E113.87808	104 m	0:00:26	14 kph
8/3/2016 12:25	ON	N22.20697 E113.87814	107 m	0:00:26	15 kph
8/3/2016 12:25	ON	N22.20759 E113.87861	84 m	0:00:21	14 kph
8/3/2016 12:25	ON	N22.20815 E113.87931	97 m	0:00:23	15 kph
8/3/2016 12:26	ON	N22.20877 E113.88012	108 m	0:00:26	15 kph
8/3/2016 12:26	ON	N22.20945 E113.88087	108 m	0:00:26	15 kph
8/3/2016 12:27	ON	N22.21005 E113.88155	97 m	0:00:23	15 kph
8/3/2016 12:27	ON	N22.21063 E113.88224	96 m	0:00:23	15 kph
8/3/2016 12:27	ON	N22.21132 E113.88306	114 m	0:00:27	15 kph
8/3/2016 12:28	ON	N22.21184 E113.88374	91 m	0:00:22	15 kph
8/3/2016 12:28	ON	N22.21259 E113.88458	119 m	0:00:29	15 kph
8/3/2016 12:29	ON	N22.21326 E113.88526	102 m	0:00:25	15 kph
8/3/2016 12:29	ON	N22.21384 E113.88591	94 m	0:00:23	15 kph
8/3/2016 12:30	ON	N22.21445 E113.88671	106 m	0:00:26	15 kph
8/3/2016 12:30	ON	N22.21509 E113.88752	110 m	0:00:27	15 kph
8/3/2016 12:30	ON	N22.21538 E113.88812	70 m	0:00:20	13 kph
8/3/2016 12:31	ON	N22.21498 E113.88820	46 m	0:00:17	10 kph
8/3/2016 12:31	ON	N22.21423 E113.88798	86 m	0:00:23	13 kph
8/3/2016 12:31	ON	N22.21356 E113.88796	74 m	0:00:20	13 kph
8/3/2016 12:32	ON	N22.21272 E113.88794	94 m	0:00:25	14 kph
8/3/2016 12:32	ON	N22.21197 E113.88804	84 m	0:00:22	14 kph
8/3/2016 12:33	ON	N22.21115 E113.88816	91 m	0:00:24	14 kph
8/3/2016 12:33	ON	N22.21042 E113.88815	82 m	0:00:22	13 kph
8/3/2016 12:33	ON	N22.20966 E113.88822	84 m	0:00:22	14 kph
8/3/2016 12:34	ON	N22.20891 E113.88824	83 m	0:00:22	14 kph
8/3/2016 12:34	ON	N22.20816 E113.88828	84 m	0:00:22	14 kph
8/3/2016 12:34	ON	N22.20738 E113.88828	87 m	0:00:23	14 kph
8/3/2016 12:35	ON	N22.20665 E113.88828	81 m	0:00:21	14 kph
8/3/2016 12:35	ON	N22.20586 E113.88829	89 m	0:00:23	14 kph
8/3/2016 12:36	ON	N22.20503 E113.88825	92 m	0:00:24	14 kph
8/3/2016 12:36	ON	N22.20412 E113.88826	101 m	0:00:26	14 kph
8/3/2016 12:36	ON	N22.20321 E113.88824	102 m	0:00:26	14 kph
8/3/2016 12:37	ON	N22.20233 E113.88822	97 m	0:00:25	14 kph
8/3/2016 12:37	ON	N22.20160 E113.88821	82 m	0:00:21	14 kph
8/3/2016 12:38	ON	N22.20077 E113.88818	93 m	0:00:24	14 kph
8/3/2016 12:38	ON	N22.19988 E113.88819	98 m	0:00:25	14 kph
8/3/2016 12:38	ON	N22.19908 E113.88819	90 m	0:00:23	14 kph
8/3/2016 12:39	ON	N22.19816 E113.88821	102 m	0:00:26	14 kph
8/3/2016 12:39	ON	N22.19729 E113.88821	97 m	0:00:25	14 kph
8/3/2016 12:40	ON	N22.19638 E113.88819	101 m	0:00:26	14 kph
8/3/2016 12:40	ON	N22.19561 E113.88820	86 m	0:00:22	14 kph
8/3/2016 12:40	ON	N22.19480 E113.88816	91 m	0:00:23	14 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
8/3/2016 12:41	ON	N22.19388 E113.88807	103 m	0:00:27	14 kph
8/3/2016 12:41	ON	N22.19300 E113.88808	97 m	0:00:25	14 kph
8/3/2016 12:42	ON	N22.19208 E113.88819	103 m	0:00:26	14 kph
8/3/2016 12:42	ON	N22.19101 E113.88825	119 m	0:00:30	14 kph
8/3/2016 12:43	ON	N22.19005 E113.88821	107 m	0:00:27	14 kph
8/3/2016 12:43	ON	N22.18892 E113.88821	127 m	0:00:32	14 kph
8/3/2016 12:44	ON	N22.18788 E113.88824	115 m	0:00:29	14 kph
8/3/2016 12:44	ON	N22.18685 E113.88826	115 m	0:00:29	14 kph
8/3/2016 12:45	ON	N22.18573 E113.88824	125 m	0:00:31	14 kph
8/3/2016 12:45	ON	N22.18476 E113.88828	107 m	0:00:27	14 kph
8/3/2016 12:46	ON	N22.18380 E113.88821	107 m	0:00:27	14 kph
8/3/2016 12:46	ON	N22.18303 E113.88817	86 m	0:00:22	14 kph
8/3/2016 12:46	ON	N22.18222 E113.88819	90 m	0:00:23	14 kph
8/3/2016 12:47	ON	N22.18124 E113.88816	109 m	0:00:28	14 kph
8/3/2016 12:47	ON	N22.18034 E113.88823	100 m	0:00:25	14 kph
8/3/2016 12:48	ON	N22.17934 E113.88823	112 m	0:00:28	14 kph
8/3/2016 12:48	ON	N22.17846 E113.88826	98 m	0:00:25	14 kph
8/3/2016 12:48	ON	N22.17758 E113.88826	98 m	0:00:25	14 kph
8/3/2016 12:49	ON	N22.17651 E113.88827	119 m	0:00:30	14 kph
8/3/2016 12:49	ON	N22.17577 E113.88828	83 m	0:00:21	14 kph
8/3/2016 12:50	ON	N22.17499 E113.88827	87 m	0:00:22	14 kph
8/3/2016 12:50	ON	N22.17424 E113.88828	83 m	0:00:21	14 kph
8/3/2016 12:50	ON	N22.17335 E113.88822	100 m	0:00:25	14 kph
8/3/2016 12:51	ON	N22.17229 E113.88821	117 m	0:00:29	15 kph
8/3/2016 12:51	ON	N22.17146 E113.88817	93 m	0:00:23	15 kph
8/3/2016 12:52	ON	N22.17043 E113.88821	114 m	0:00:28	15 kph
8/3/2016 12:52	ON	N22.16936 E113.88826	119 m	0:00:29	15 kph
8/3/2016 12:53	ON	N22.16848 E113.88821	97 m	0:00:24	15 kph
8/3/2016 12:53	ON	N22.16753 E113.88824	106 m	0:00:26	15 kph
8/3/2016 12:54	ON	N22.16661 E113.88808	103 m	0:00:26	14 kph
8/3/2016 12:54	ON	N22.16563 E113.88800	109 m	0:00:27	15 kph
8/3/2016 12:54	ON	N22.16475 E113.88808	99 m	0:00:24	15 kph
8/3/2016 12:55	ON	N22.16378 E113.88814	108 m	0:00:26	15 kph
8/3/2016 12:55	ON	N22.16289 E113.88812	99 m	0:00:24	15 kph
8/3/2016 12:56	ON	N22.16192 E113.88821	108 m	0:00:26	15 kph
8/3/2016 12:56	ON	N22.16087 E113.88828	117 m	0:00:28	15 kph
8/3/2016 12:57	ON	N22.15995 E113.88830	102 m	0:00:25	15 kph
8/3/2016 12:57	ON	N22.15899 E113.88832	107 m	0:00:26	15 kph
8/3/2016 12:57	ON	N22.15821 E113.88822	87 m	0:00:22	14 kph
8/3/2016 12:58	ON	N22.15740 E113.88821	91 m	0:00:23	14 kph
8/3/2016 12:58	ON	N22.15668 E113.88813	81 m	0:00:21	14 kph
8/3/2016 12:58	ON	N22.15591 E113.88817	85 m	0:00:22	14 kph
8/3/2016 12:59	ON	N22.15521 E113.88818	78 m	0:00:20	14 kph
8/3/2016 12:59	ON	N22.15448 E113.88822	81 m	0:00:21	14 kph
8/3/2016 12:59	ON	N22.15386 E113.88828	70 m	0:00:18	14 kph
8/3/2016 13:00	ON	N22.15316 E113.88831	78 m	0:00:20	14 kph
8/3/2016 13:00	ON	N22.15259 E113.88825	64 m	0:00:17	14 kph
8/3/2016 13:00	ON	N22.15203 E113.88808	64 m	0:00:17	14 kph
8/3/2016 13:01	ON	N22.15137 E113.88810	73 m	0:00:19	14 kph
8/3/2016 13:01	ON	N22.15078 E113.88812	66 m	0:00:17	14 kph
8/3/2016 13:01	ON	N22.15036 E113.88858	67 m	0:00:19	13 kph
8/3/2016 13:02	ON	N22.15012 E113.88916	66 m	0:00:17	14 kph
8/3/2016 13:02	ON	N22.14997 E113.88996	84 m	0:00:21	14 kph
8/3/2016 13:02	ON	N22.14991 E113.89070	77 m	0:00:19	15 kph
8/3/2016 13:03	ON	N22.14987 E113.89165	98 m	0:00:24	15 kph
8/3/2016 13:03	ON	N22.14980 E113.89244	82 m	0:00:20	15 kph
8/3/2016 13:03	ON	N22.14981 E113.89310	68 m	0:00:17	14 kph
8/3/2016 13:04	ON	N22.14978 E113.89380	72 m	0:00:18	14 kph
8/3/2016 13:04	ON	N22.14955 E113.89461	88 m	0:00:21	15 kph
8/3/2016 13:04	ON	N22.14934 E113.89538	83 m	0:00:20	15 kph
8/3/2016 13:05	ON	N22.14920 E113.89623	90 m	0:00:22	15 kph
8/3/2016 13:05	ON	N22.14922 E113.89712	91 m	0:00:24	14 kph
8/3/2016 13:05	ON	N22.14973 E113.89723	57 m	0:00:19	11 kph
8/3/2016 13:06	ON	N22.15043 E113.89723	79 m	0:00:23	12 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
8/3/2016 13:06	ON	N22.15118 E113.89720	84 m	0:00:24	13 kph
8/3/2016 13:06	ON	N22.15181 E113.89723	70 m	0:00:20	13 kph
8/3/2016 13:07	ON	N22.15249 E113.89719	76 m	0:00:22	12 kph
8/3/2016 13:07	ON	N22.15310 E113.89715	68 m	0:00:20	12 kph
8/3/2016 13:07	ON	N22.15380 E113.89707	78 m	0:00:23	12 kph
8/3/2016 13:08	ON	N22.15460 E113.89709	90 m	0:00:26	12 kph
8/3/2016 13:08	ON	N22.15535 E113.89707	84 m	0:00:24	13 kph
8/3/2016 13:09	ON	N22.15626 E113.89711	101 m	0:00:29	13 kph
8/3/2016 13:09	ON	N22.15698 E113.89707	80 m	0:00:23	12 kph
8/3/2016 13:10	ON	N22.15773 E113.89710	83 m	0:00:24	12 kph
8/3/2016 13:10	ON	N22.15858 E113.89714	95 m	0:00:27	13 kph
8/3/2016 13:10	ON	N22.15944 E113.89719	96 m	0:00:28	12 kph
8/3/2016 13:11	ON	N22.16035 E113.89717	101 m	0:00:30	12 kph
8/3/2016 13:11	ON	N22.16119 E113.89715	93 m	0:00:28	12 kph
8/3/2016 13:12	ON	N22.16211 E113.89720	103 m	0:00:30	12 kph
8/3/2016 13:12	ON	N22.16305 E113.89721	104 m	0:00:30	12 kph
8/3/2016 13:13	ON	N22.16396 E113.89724	101 m	0:00:29	13 kph
8/3/2016 13:13	ON	N22.16488 E113.89726	103 m	0:00:29	13 kph
8/3/2016 13:14	ON	N22.16581 E113.89725	103 m	0:00:29	13 kph
8/3/2016 13:14	ON	N22.16665 E113.89725	94 m	0:00:26	13 kph
8/3/2016 13:15	ON	N22.16740 E113.89721	84 m	0:00:23	13 kph
8/3/2016 13:15	ON	N22.16831 E113.89721	101 m	0:00:28	13 kph
8/3/2016 13:16	ON	N22.16930 E113.89723	110 m	0:00:30	13 kph
8/3/2016 13:16	ON	N22.17040 E113.89724	123 m	0:00:34	13 kph
8/3/2016 13:17	ON	N22.17097 E113.89725	64 m	0:00:21	11 kph
8/3/2016 13:17	OFF	N22.17126 E113.89725	32 m	0:00:22	5 kph
8/3/2016 13:17	OFF	N22.17143 E113.89727	19 m	0:00:23	3 kph
8/3/2016 13:18	OFF	N22.17158 E113.89720	18 m	0:00:20	3 kph
8/3/2016 13:18	OFF	N22.17162 E113.89719	5 m	0:00:06	3 kph
8/3/2016 13:18	OFF	N22.17170 E113.89715	10 m	0:00:06	6 kph
8/3/2016 13:18	OFF	N22.17225 E113.89677	73 m	0:00:25	11 kph
8/3/2016 13:19	OFF	N22.17281 E113.89636	74 m	0:00:27	10 kph
8/3/2016 13:19	OFF	N22.17311 E113.89610	44 m	0:00:25	6 kph
8/3/2016 13:20	OFF	N22.17335 E113.89587	35 m	0:00:24	5 kph
8/3/2016 13:20	OFF	N22.17358 E113.89565	34 m	0:00:27	5 kph
8/3/2016 13:20	OFF	N22.17374 E113.89552	23 m	0:00:24	3 kph
8/3/2016 13:21	OFF	N22.17404 E113.89547	34 m	0:00:27	5 kph
8/3/2016 13:21	OFF	N22.17439 E113.89544	39 m	0:00:26	5 kph
8/3/2016 13:22	OFF	N22.17470 E113.89544	34 m	0:00:23	5 kph
8/3/2016 13:22	OFF	N22.17501 E113.89545	35 m	0:00:23	5 kph
8/3/2016 13:22	OFF	N22.17524 E113.89544	25 m	0:00:17	5 kph
8/3/2016 13:23	OFF	N22.17557 E113.89544	37 m	0:00:27	5 kph
8/3/2016 13:23	OFF	N22.17585 E113.89555	33 m	0:00:21	6 kph
8/3/2016 13:24	OFF	N22.17613 E113.89579	40 m	0:00:23	6 kph
8/3/2016 13:24	OFF	N22.17634 E113.89604	34 m	0:00:23	5 kph
8/3/2016 13:24	OFF	N22.17642 E113.89618	18 m	0:00:18	4 kph
8/3/2016 13:25	OFF	N22.17648 E113.89632	15 m	0:00:21	3 kph
8/3/2016 13:25	OFF	N22.17652 E113.89644	13 m	0:00:22	2 kph
8/3/2016 13:25	OFF	N22.17653 E113.89653	10 m	0:00:22	2 kph
8/3/2016 13:26	OFF	N22.17653 E113.89662	10 m	0:00:30	1.2 kph
8/3/2016 13:26	OFF	N22.17652 E113.89665	3 m	0:00:23	0.4 kph
8/3/2016 13:27	OFF	N22.17659 E113.89675	13 m	0:00:20	2 kph
8/3/2016 13:27	OFF	N22.17657 E113.89714	41 m	0:00:23	6 kph
8/3/2016 13:27	OFF	N22.17602 E113.89711	61 m	0:00:20	11 kph
8/3/2016 13:28	OFF	N22.17519 E113.89698	94 m	0:00:24	14 kph
8/3/2016 13:28	OFF	N22.17435 E113.89690	94 m	0:00:23	15 kph
8/3/2016 13:28	OFF	N22.17356 E113.89678	89 m	0:00:22	14 kph
8/3/2016 13:29	OFF	N22.17286 E113.89679	77 m	0:00:19	15 kph
8/3/2016 13:29	OFF	N22.17178 E113.89672	121 m	0:00:29	15 kph
8/3/2016 13:30	OFF	N22.17103 E113.89695	87 m	0:00:23	14 kph
8/3/2016 13:30	OFF	N22.17120 E113.89732	42 m	0:00:17	9 kph
8/3/2016 13:30	ON	N22.17199 E113.89732	88 m	0:00:27	12 kph
8/3/2016 13:31	ON	N22.17289 E113.89728	101 m	0:00:29	12 kph
8/3/2016 13:31	ON	N22.17374 E113.89727	95 m	0:00:26	13 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
8/3/2016 13:32	ON	N22.17453 E113.89723	88 m	0:00:24	13 kph
8/3/2016 13:32	ON	N22.17543 E113.89720	100 m	0:00:27	13 kph
8/3/2016 13:33	ON	N22.17652 E113.89723	121 m	0:00:32	14 kph
8/3/2016 13:33	ON	N22.17729 E113.89722	87 m	0:00:23	14 kph
8/3/2016 13:33	ON	N22.17800 E113.89722	79 m	0:00:21	14 kph
8/3/2016 13:34	ON	N22.17878 E113.89726	87 m	0:00:23	14 kph
8/3/2016 13:34	ON	N22.17967 E113.89726	98 m	0:00:26	14 kph
8/3/2016 13:35	ON	N22.18082 E113.89723	129 m	0:00:35	13 kph
8/3/2016 13:35	ON	N22.18180 E113.89718	109 m	0:00:30	13 kph
8/3/2016 13:36	ON	N22.18278 E113.89714	110 m	0:00:30	13 kph
8/3/2016 13:36	ON	N22.18366 E113.89716	97 m	0:00:26	13 kph
8/3/2016 13:37	ON	N22.18458 E113.89722	103 m	0:00:27	14 kph
8/3/2016 13:37	ON	N22.18522 E113.89724	72 m	0:00:19	14 kph
8/3/2016 13:37	ON	N22.18600 E113.89718	87 m	0:00:23	14 kph
8/3/2016 13:38	ON	N22.18676 E113.89718	84 m	0:00:22	14 kph
8/3/2016 13:38	ON	N22.18795 E113.89726	133 m	0:00:34	14 kph
8/3/2016 13:39	ON	N22.18898 E113.89714	115 m	0:00:30	14 kph
8/3/2016 13:39	ON	N22.18979 E113.89705	91 m	0:00:24	14 kph
8/3/2016 13:40	ON	N22.19083 E113.89721	116 m	0:00:29	14 kph
8/3/2016 13:40	ON	N22.19168 E113.89726	95 m	0:00:24	14 kph
8/3/2016 13:40	ON	N22.19251 E113.89717	93 m	0:00:24	14 kph
8/3/2016 13:41	ON	N22.19337 E113.89726	96 m	0:00:24	14 kph
8/3/2016 13:41	ON	N22.19437 E113.89744	113 m	0:00:28	15 kph
8/3/2016 13:42	ON	N22.19523 E113.89750	96 m	0:00:24	14 kph
8/3/2016 13:42	ON	N22.19605 E113.89749	91 m	0:00:23	14 kph
8/3/2016 13:43	ON	N22.19696 E113.89728	104 m	0:00:27	14 kph
8/3/2016 13:43	ON	N22.19779 E113.89725	92 m	0:00:23	14 kph
8/3/2016 13:43	ON	N22.19865 E113.89727	96 m	0:00:24	14 kph
8/3/2016 13:44	ON	N22.19951 E113.89729	96 m	0:00:24	14 kph
8/3/2016 13:44	ON	N22.20065 E113.89731	127 m	0:00:32	14 kph
8/3/2016 13:45	ON	N22.20165 E113.89719	112 m	0:00:29	14 kph
8/3/2016 13:45	ON	N22.20266 E113.89724	112 m	0:00:28	14 kph
8/3/2016 13:46	ON	N22.20355 E113.89722	99 m	0:00:25	14 kph
8/3/2016 13:46	ON	N22.20453 E113.89719	109 m	0:00:27	15 kph
8/3/2016 13:46	ON	N22.20542 E113.89716	100 m	0:00:25	14 kph
8/3/2016 13:47	ON	N22.20655 E113.89723	126 m	0:00:31	15 kph
8/3/2016 13:47	ON	N22.20757 E113.89715	114 m	0:00:29	14 kph
8/3/2016 13:48	ON	N22.20848 E113.89725	102 m	0:00:26	14 kph
8/3/2016 13:48	ON	N22.20936 E113.89729	97 m	0:00:25	14 kph
8/3/2016 13:49	ON	N22.21023 E113.89724	97 m	0:00:25	14 kph
8/3/2016 13:49	ON	N22.21111 E113.89723	98 m	0:00:25	14 kph
8/3/2016 13:50	ON	N22.21231 E113.89725	134 m	0:00:35	14 kph
8/3/2016 13:50	ON	N22.21339 E113.89715	120 m	0:00:32	14 kph
8/3/2016 13:51	ON	N22.21355 E113.89753	43 m	0:00:17	9 kph
8/3/2016 13:51	ON	N22.21304 E113.89819	88 m	0:00:23	14 kph
8/3/2016 13:51	ON	N22.21246 E113.89890	98 m	0:00:24	15 kph
8/3/2016 13:52	ON	N22.21174 E113.89974	118 m	0:00:29	15 kph
8/3/2016 13:52	ON	N22.21118 E113.90042	93 m	0:00:23	15 kph
8/3/2016 13:53	ON	N22.21061 E113.90118	101 m	0:00:25	15 kph
8/3/2016 13:53	ON	N22.21015 E113.90180	81 m	0:00:20	15 kph
8/3/2016 13:53	ON	N22.20954 E113.90259	106 m	0:00:26	15 kph
8/3/2016 13:54	ON	N22.20897 E113.90332	99 m	0:00:24	15 kph
8/3/2016 13:54	ON	N22.20846 E113.90402	91 m	0:00:22	15 kph
8/3/2016 13:55	ON	N22.20798 E113.90483	99 m	0:00:24	15 kph
8/3/2016 13:55	ON	N22.20755 E113.90576	107 m	0:00:26	15 kph
8/3/2016 13:55	ON	N22.20707 E113.90662	104 m	0:00:25	15 kph
8/3/2016 13:56	ON	N22.20641 E113.90744	112 m	0:00:27	15 kph
8/3/2016 13:56	ON	N22.20570 E113.90791	93 m	0:00:24	14 kph
8/3/2016 13:57	ON	N22.20484 E113.90795	95 m	0:00:24	14 kph
8/3/2016 13:57	ON	N22.20403 E113.90795	90 m	0:00:23	14 kph
8/3/2016 13:57	ON	N22.20348 E113.90790	62 m	0:00:16	14 kph
8/3/2016 13:58	ON	N22.20274 E113.90789	81 m	0:00:21	14 kph
8/3/2016 13:58	ON	N22.20197 E113.90790	86 m	0:00:22	14 kph
8/3/2016 13:58	ON	N22.20115 E113.90791	92 m	0:00:24	14 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
8/3/2016 13:59	ON	N22.20044 E113.90794	79 m	0:00:20	14 kph
8/3/2016 13:59	ON	N22.19976 E113.90796	75 m	0:00:19	14 kph
8/3/2016 13:59	ON	N22.19896 E113.90798	89 m	0:00:23	14 kph
8/3/2016 14:00	ON	N22.19816 E113.90793	89 m	0:00:23	14 kph
8/3/2016 14:00	ON	N22.19733 E113.90795	92 m	0:00:24	14 kph
8/3/2016 14:01	ON	N22.19655 E113.90787	88 m	0:00:23	14 kph
8/3/2016 14:01	ON	N22.19581 E113.90784	83 m	0:00:22	14 kph
8/3/2016 14:01	ON	N22.19491 E113.90784	100 m	0:00:26	14 kph
8/3/2016 14:02	ON	N22.19415 E113.90786	85 m	0:00:22	14 kph
8/3/2016 14:02	ON	N22.19321 E113.90784	104 m	0:00:27	14 kph
8/3/2016 14:03	ON	N22.19248 E113.90787	82 m	0:00:21	14 kph
8/3/2016 14:03	ON	N22.19180 E113.90782	76 m	0:00:20	14 kph
8/3/2016 14:03	ON	N22.19109 E113.90771	80 m	0:00:21	14 kph
8/3/2016 14:04	ON	N22.19045 E113.90751	74 m	0:00:20	13 kph
8/3/2016 14:04	ON	N22.18973 E113.90703	93 m	0:00:26	13 kph
8/3/2016 14:04	ON	N22.18921 E113.90654	77 m	0:00:22	13 kph
8/3/2016 14:05	ON	N22.18854 E113.90598	94 m	0:00:27	13 kph
8/3/2016 14:05	ON	N22.18784 E113.90546	95 m	0:00:27	13 kph
8/3/2016 14:06	ON	N22.18683 E113.90500	122 m	0:00:34	13 kph
8/3/2016 14:06	ON	N22.18578 E113.90468	122 m	0:00:33	13 kph
8/3/2016 14:07	ON	N22.18469 E113.90445	124 m	0:00:34	13 kph
8/3/2016 14:08	ON	N22.18362 E113.90423	120 m	0:00:33	13 kph
8/3/2016 14:08	ON	N22.18247 E113.90407	130 m	0:00:35	13 kph
8/3/2016 14:09	ON	N22.18130 E113.90403	130 m	0:00:34	14 kph
8/3/2016 14:09	ON	N22.18027 E113.90408	114 m	0:00:29	14 kph
8/3/2016 14:10	ON	N22.17908 E113.90442	137 m	0:00:34	14 kph
8/3/2016 14:10	ON	N22.17825 E113.90482	101 m	0:00:25	15 kph
8/3/2016 14:11	ON	N22.17744 E113.90553	116 m	0:00:28	15 kph
8/3/2016 14:11	ON	N22.17674 E113.90630	111 m	0:00:26	15 kph
8/3/2016 14:12	ON	N22.17600 E113.90709	116 m	0:00:28	15 kph
8/3/2016 14:12	ON	N22.17526 E113.90778	109 m	0:00:26	15 kph
8/3/2016 14:12	ON	N22.17462 E113.90832	90 m	0:00:21	15 kph
8/3/2016 14:13	ON	N22.17374 E113.90872	106 m	0:00:25	15 kph
8/3/2016 14:13	ON	N22.17300 E113.90853	85 m	0:00:22	14 kph
8/3/2016 14:14	ON	N22.17205 E113.90787	127 m	0:00:33	14 kph
8/3/2016 14:14	ON	N22.17104 E113.90714	135 m	0:00:35	14 kph
8/3/2016 14:15	ON	N22.16991 E113.90632	151 m	0:00:38	14 kph
8/3/2016 14:15	ON	N22.16904 E113.90545	132 m	0:00:34	14 kph
8/3/2016 14:16	ON	N22.16802 E113.90436	160 m	0:00:44	13 kph
8/3/2016 14:17	ON	N22.16714 E113.90340	139 m	0:00:38	13 kph
8/3/2016 14:17	ON	N22.16629 E113.90246	136 m	0:00:36	14 kph
8/3/2016 14:18	ON	N22.16543 E113.90151	136 m	0:00:36	14 kph
8/3/2016 14:19	ON	N22.16450 E113.90062	138 m	0:00:36	14 kph
8/3/2016 14:19	ON	N22.16349 E113.89975	144 m	0:00:37	14 kph
8/3/2016 14:20	ON	N22.16260 E113.89908	120 m	0:00:30	14 kph
8/3/2016 14:20	ON	N22.16148 E113.89842	142 m	0:00:34	15 kph
8/3/2016 14:21	ON	N22.16037 E113.89815	126 m	0:00:29	16 kph
8/3/2016 14:21	ON	N22.15938 E113.89823	110 m	0:00:25	16 kph
8/3/2016 14:22	ON	N22.15831 E113.89868	129 m	0:00:29	16 kph
8/3/2016 14:22	ON	N22.15755 E113.89931	106 m	0:00:24	16 kph
8/3/2016 14:23	ON	N22.15677 E113.90015	123 m	0:00:28	16 kph
8/3/2016 14:23	ON	N22.15609 E113.90110	123 m	0:00:28	16 kph
8/3/2016 14:23	ON	N22.15560 E113.90210	117 m	0:00:27	16 kph
8/3/2016 14:24	ON	N22.15534 E113.90302	100 m	0:00:23	16 kph
8/3/2016 14:24	ON	N22.15521 E113.90419	121 m	0:00:28	16 kph
8/3/2016 14:25	ON	N22.15514 E113.90512	96 m	0:00:22	16 kph
8/3/2016 14:25	ON	N22.15502 E113.90609	100 m	0:00:23	16 kph
8/3/2016 14:25	ON	N22.15487 E113.90714	110 m	0:00:25	16 kph
8/3/2016 14:26	ON	N22.15451 E113.90777	77 m	0:00:21	13 kph
8/3/2016 14:26	ON	N22.15386 E113.90771	73 m	0:00:20	13 kph
8/3/2016 14:26	ON	N22.15330 E113.90773	62 m	0:00:16	14 kph
8/3/2016 14:27	ON	N22.15250 E113.90775	88 m	0:00:22	14 kph
8/3/2016 14:27	ON	N22.15177 E113.90774	82 m	0:00:20	15 kph
8/3/2016 14:27	ON	N22.15106 E113.90774	79 m	0:00:19	15 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
8/3/2016 14:28	ON	N22.15023 E113.90773	92 m	0:00:22	15 kph
8/3/2016 14:28	ON	N22.14940 E113.90773	92 m	0:00:22	15 kph
8/3/2016 14:29	ON	N22.14859 E113.90779	91 m	0:00:22	15 kph
8/3/2016 14:29	ON	N22.14785 E113.90783	82 m	0:00:20	15 kph
8/3/2016 14:29	ON	N22.14719 E113.90785	73 m	0:00:18	15 kph
8/3/2016 14:30	ON	N22.14638 E113.90786	90 m	0:00:22	15 kph
8/3/2016 14:30	ON	N22.14542 E113.90785	108 m	0:00:26	15 kph
8/3/2016 14:30	ON	N22.14449 E113.90780	103 m	0:00:25	15 kph
8/3/2016 14:31	ON	N22.14375 E113.90781	83 m	0:00:20	15 kph
8/3/2016 14:31	ON	N22.14304 E113.90779	79 m	0:00:19	15 kph
8/3/2016 14:31	ON	N22.14227 E113.90784	86 m	0:00:21	15 kph
8/3/2016 14:32	ON	N22.14171 E113.90817	71 m	0:00:21	12 kph
8/3/2016 14:32	ON	N22.14172 E113.90889	74 m	0:00:19	14 kph
8/3/2016 14:32	ON	N22.14185 E113.90973	88 m	0:00:21	15 kph
8/3/2016 14:33	ON	N22.14190 E113.91062	91 m	0:00:22	15 kph
8/3/2016 14:33	ON	N22.14200 E113.91156	98 m	0:00:24	15 kph
8/3/2016 14:34	ON	N22.14220 E113.91258	107 m	0:00:26	15 kph
8/3/2016 14:34	ON	N22.14230 E113.91344	90 m	0:00:22	15 kph
8/3/2016 14:34	ON	N22.14232 E113.91440	100 m	0:00:24	15 kph
8/3/2016 14:35	ON	N22.14235 E113.91532	95 m	0:00:23	15 kph
8/3/2016 14:35	ON	N22.14235 E113.91609	80 m	0:00:19	15 kph
8/3/2016 14:35	ON	N22.14231 E113.91694	88 m	0:00:21	15 kph
8/3/2016 14:36	ON	N22.14252 E113.91755	66 m	0:00:19	13 kph
8/3/2016 14:36	ON	N22.14323 E113.91766	80 m	0:00:22	13 kph
8/3/2016 14:36	ON	N22.14398 E113.91777	84 m	0:00:22	14 kph
8/3/2016 14:37	ON	N22.14474 E113.91785	85 m	0:00:22	14 kph
8/3/2016 14:37	ON	N22.14563 E113.91790	99 m	0:00:26	14 kph
8/3/2016 14:38	ON	N22.14651 E113.91787	98 m	0:00:26	14 kph
8/3/2016 14:38	ON	N22.14727 E113.91786	84 m	0:00:22	14 kph
8/3/2016 14:38	ON	N22.14799 E113.91789	81 m	0:00:21	14 kph
8/3/2016 14:39	ON	N22.14868 E113.91789	76 m	0:00:20	14 kph
8/3/2016 14:39	ON	N22.14946 E113.91781	88 m	0:00:23	14 kph
8/3/2016 14:40	ON	N22.15030 E113.91784	94 m	0:00:24	14 kph
8/3/2016 14:40	ON	N22.15111 E113.91795	90 m	0:00:23	14 kph
8/3/2016 14:40	ON	N22.15173 E113.91795	70 m	0:00:18	14 kph
8/3/2016 14:41	ON	N22.15256 E113.91784	93 m	0:00:24	14 kph
8/3/2016 14:41	ON	N22.15363 E113.91775	119 m	0:00:30	14 kph
8/3/2016 14:42	ON	N22.15447 E113.91780	94 m	0:00:23	15 kph
8/3/2016 14:42	ON	N22.15543 E113.91797	109 m	0:00:27	14 kph
8/3/2016 14:42	ON	N22.15640 E113.91795	107 m	0:00:27	14 kph
8/3/2016 14:43	ON	N22.15732 E113.91798	103 m	0:00:25	15 kph
8/3/2016 14:43	ON	N22.15836 E113.91806	116 m	0:00:28	15 kph
8/3/2016 14:44	ON	N22.15931 E113.91815	106 m	0:00:26	15 kph
8/3/2016 14:44	ON	N22.16009 E113.91830	88 m	0:00:22	14 kph
8/3/2016 14:45	ON	N22.16106 E113.91845	109 m	0:00:27	15 kph
8/3/2016 14:45	ON	N22.16193 E113.91862	99 m	0:00:24	15 kph
8/3/2016 14:45	ON	N22.16266 E113.91877	83 m	0:00:20	15 kph
8/3/2016 14:46	ON	N22.16357 E113.91898	103 m	0:00:25	15 kph
8/3/2016 14:46	ON	N22.16457 E113.91917	114 m	0:00:28	15 kph
8/3/2016 14:47	ON	N22.16540 E113.91932	93 m	0:00:23	15 kph
8/3/2016 14:47	ON	N22.16646 E113.91943	118 m	0:00:29	15 kph
8/3/2016 14:47	ON	N22.16725 E113.91948	88 m	0:00:22	14 kph
8/3/2016 14:48	ON	N22.16823 E113.91961	110 m	0:00:27	15 kph
8/3/2016 14:48	ON	N22.16918 E113.91970	106 m	0:00:26	15 kph
8/3/2016 14:49	ON	N22.17005 E113.91977	97 m	0:00:24	15 kph
8/3/2016 14:49	ON	N22.17092 E113.92000	100 m	0:00:25	14 kph
8/3/2016 14:49	ON	N22.17163 E113.92026	84 m	0:00:21	14 kph
8/3/2016 14:50	ON	N22.17260 E113.92053	110 m	0:00:27	15 kph
8/3/2016 14:50	ON	N22.17317 E113.92075	67 m	0:00:17	14 kph
8/3/2016 14:51	ON	N22.17398 E113.92097	93 m	0:00:23	15 kph
8/3/2016 14:51	ON	N22.17472 E113.92114	85 m	0:00:21	14 kph
8/3/2016 14:51	ON	N22.17537 E113.92130	73 m	0:00:18	15 kph
8/3/2016 14:52	ON	N22.17623 E113.92156	100 m	0:00:24	15 kph
8/3/2016 14:52	ON	N22.17695 E113.92178	83 m	0:00:20	15 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
8/3/2016 14:52	ON	N22.17776 E113.92193	92 m	0:00:22	15 kph
8/3/2016 14:53	ON	N22.17882 E113.92203	119 m	0:00:28	15 kph
8/3/2016 14:53	ON	N22.17993 E113.92202	123 m	0:00:29	15 kph
8/3/2016 14:54	ON	N22.18085 E113.92174	107 m	0:00:26	15 kph
8/3/2016 14:54	ON	N22.18169 E113.92130	104 m	0:00:26	14 kph
8/3/2016 14:55	ON	N22.18257 E113.92065	119 m	0:00:30	14 kph
8/3/2016 14:55	ON	N22.18351 E113.91982	135 m	0:00:34	14 kph
8/3/2016 14:56	ON	N22.18411 E113.91928	86 m	0:00:22	14 kph
8/3/2016 14:56	ON	N22.18470 E113.91872	88 m	0:00:23	14 kph
8/3/2016 14:56	ON	N22.18529 E113.91820	84 m	0:00:22	14 kph
8/3/2016 14:57	ON	N22.18588 E113.91804	68 m	0:00:19	13 kph
8/3/2016 14:57	ON	N22.18670 E113.91805	92 m	0:00:24	14 kph
8/3/2016 14:57	ON	N22.18762 E113.91792	103 m	0:00:27	14 kph
8/3/2016 14:58	ON	N22.18864 E113.91781	115 m	0:00:30	14 kph
8/3/2016 14:58	ON	N22.18957 E113.91778	104 m	0:00:27	14 kph
8/3/2016 14:59	ON	N22.19030 E113.91778	82 m	0:00:21	14 kph
8/3/2016 14:59	ON	N22.19120 E113.91787	100 m	0:00:25	14 kph
8/3/2016 15:00	ON	N22.19203 E113.91784	93 m	0:00:24	14 kph
8/3/2016 15:00	ON	N22.19271 E113.91784	76 m	0:00:19	14 kph
8/3/2016 15:00	ON	N22.19353 E113.91788	91 m	0:00:23	14 kph
8/3/2016 15:01	ON	N22.19446 E113.91787	103 m	0:00:26	14 kph
8/3/2016 15:01	ON	N22.19529 E113.91786	92 m	0:00:23	14 kph
8/3/2016 15:01	ON	N22.19604 E113.91788	84 m	0:00:21	14 kph
8/3/2016 15:02	ON	N22.19679 E113.91790	83 m	0:00:21	14 kph
8/3/2016 15:02	ON	N22.19771 E113.91791	103 m	0:00:26	14 kph
8/3/2016 15:03	ON	N22.19839 E113.91790	75 m	0:00:19	14 kph
8/3/2016 15:03	ON	N22.19927 E113.91782	99 m	0:00:25	14 kph
8/3/2016 15:03	ON	N22.19999 E113.91784	80 m	0:00:20	14 kph
8/3/2016 15:04	ON	N22.20075 E113.91789	85 m	0:00:21	15 kph
8/3/2016 15:04	ON	N22.20153 E113.91788	86 m	0:00:22	14 kph
8/3/2016 15:04	ON	N22.20216 E113.91785	70 m	0:00:18	14 kph
8/3/2016 15:05	ON	N22.20308 E113.91779	103 m	0:00:26	14 kph
8/3/2016 15:05	ON	N22.20378 E113.91777	79 m	0:00:20	14 kph
8/3/2016 15:06	ON	N22.20474 E113.91782	107 m	0:00:26	15 kph
8/3/2016 15:06	ON	N22.20518 E113.91836	74 m	0:00:20	13 kph
8/3/2016 15:06	ON	N22.20528 E113.91915	82 m	0:00:19	16 kph
8/3/2016 15:06	ON	N22.20531 E113.91990	77 m	0:00:18	15 kph
8/3/2016 15:07	ON	N22.20530 E113.92089	102 m	0:00:24	15 kph
8/3/2016 15:07	ON	N22.20534 E113.92196	110 m	0:00:26	15 kph
8/3/2016 15:08	ON	N22.20546 E113.92278	86 m	0:00:20	15 kph
8/3/2016 15:08	ON	N22.20552 E113.92367	92 m	0:00:22	15 kph
8/3/2016 15:08	ON	N22.20554 E113.92467	103 m	0:00:25	15 kph
8/3/2016 15:09	ON	N22.20557 E113.92580	116 m	0:00:28	15 kph
8/3/2016 15:09	ON	N22.20561 E113.92664	87 m	0:00:21	15 kph
8/3/2016 15:10	ON	N22.20543 E113.92749	90 m	0:00:23	14 kph
8/3/2016 15:10	ON	N22.20476 E113.92766	77 m	0:00:21	13 kph
8/3/2016 15:10	ON	N22.20398 E113.92775	87 m	0:00:22	14 kph
8/3/2016 15:11	ON	N22.20321 E113.92783	86 m	0:00:22	14 kph
8/3/2016 15:11	ON	N22.20238 E113.92783	92 m	0:00:24	14 kph
8/3/2016 15:11	ON	N22.20169 E113.92779	78 m	0:00:20	14 kph
8/3/2016 15:12	ON	N22.20095 E113.92779	82 m	0:00:21	14 kph
8/3/2016 15:12	ON	N22.20022 E113.92772	82 m	0:00:21	14 kph
8/3/2016 15:13	ON	N22.19935 E113.92764	97 m	0:00:25	14 kph
8/3/2016 15:13	ON	N22.19872 E113.92758	70 m	0:00:18	14 kph
8/3/2016 15:13	ON	N22.19805 E113.92754	75 m	0:00:19	14 kph
8/3/2016 15:14	ON	N22.19726 E113.92754	88 m	0:00:22	14 kph
8/3/2016 15:14	ON	N22.19659 E113.92751	74 m	0:00:19	14 kph
8/3/2016 15:14	ON	N22.19607 E113.92745	59 m	0:00:15	14 kph
8/3/2016 15:14	ON	N22.19533 E113.92742	82 m	0:00:21	14 kph
8/3/2016 15:15	ON	N22.19448 E113.92747	95 m	0:00:24	14 kph
8/3/2016 15:15	ON	N22.19369 E113.92747	88 m	0:00:22	14 kph
8/3/2016 15:16	ON	N22.19280 E113.92749	99 m	0:00:25	14 kph
8/3/2016 15:16	ON	N22.19194 E113.92753	96 m	0:00:24	14 kph
8/3/2016 15:16	ON	N22.19107 E113.92754	96 m	0:00:24	14 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
8/3/2016 15:17	ON	N22.19039 E113.92752	76 m	0:00:19	14 kph
8/3/2016 15:17	ON	N22.18964 E113.92749	84 m	0:00:21	14 kph
8/3/2016 15:18	ON	N22.18879 E113.92753	95 m	0:00:24	14 kph
8/3/2016 15:18	ON	N22.18794 E113.92761	94 m	0:00:23	15 kph
8/3/2016 15:18	ON	N22.18715 E113.92764	89 m	0:00:22	15 kph
8/3/2016 15:19	ON	N22.18639 E113.92761	85 m	0:00:21	15 kph
8/3/2016 15:19	ON	N22.18558 E113.92759	89 m	0:00:22	15 kph
8/3/2016 15:19	ON	N22.18479 E113.92756	89 m	0:00:22	15 kph
8/3/2016 15:20	ON	N22.18394 E113.92755	94 m	0:00:23	15 kph
8/3/2016 15:20	ON	N22.18313 E113.92750	91 m	0:00:22	15 kph
8/3/2016 15:20	ON	N22.18237 E113.92743	85 m	0:00:21	15 kph
8/3/2016 15:21	ON	N22.18143 E113.92745	105 m	0:00:26	14 kph
8/3/2016 15:21	ON	N22.18066 E113.92751	85 m	0:00:21	15 kph
8/3/2016 15:22	ON	N22.17991 E113.92750	84 m	0:00:21	14 kph
8/3/2016 15:22	ON	N22.17908 E113.92742	93 m	0:00:23	14 kph
8/3/2016 15:22	ON	N22.17840 E113.92739	75 m	0:00:19	14 kph
8/3/2016 15:23	ON	N22.17762 E113.92741	87 m	0:00:22	14 kph
8/3/2016 15:23	ON	N22.17691 E113.92745	79 m	0:00:20	14 kph
8/3/2016 15:23	ON	N22.17628 E113.92749	70 m	0:00:18	14 kph
8/3/2016 15:24	ON	N22.17566 E113.92754	69 m	0:00:18	14 kph
8/3/2016 15:24	ON	N22.17508 E113.92753	65 m	0:00:17	14 kph
8/3/2016 15:24	ON	N22.17449 E113.92751	66 m	0:00:17	14 kph
8/3/2016 15:24	ON	N22.17378 E113.92752	79 m	0:00:20	14 kph
8/3/2016 15:25	ON	N22.17313 E113.92749	72 m	0:00:18	14 kph
8/3/2016 15:25	ON	N22.17231 E113.92748	92 m	0:00:23	14 kph
8/3/2016 15:25	ON	N22.17170 E113.92749	67 m	0:00:17	14 kph
8/3/2016 15:26	ON	N22.17106 E113.92749	72 m	0:00:18	14 kph
8/3/2016 15:26	ON	N22.17035 E113.92752	79 m	0:00:20	14 kph
8/3/2016 15:26	ON	N22.16960 E113.92750	83 m	0:00:21	14 kph
8/3/2016 15:27	ON	N22.16894 E113.92748	73 m	0:00:18	15 kph
8/3/2016 15:27	ON	N22.16815 E113.92749	88 m	0:00:22	14 kph
8/3/2016 15:27	ON	N22.16733 E113.92746	92 m	0:00:23	14 kph
8/3/2016 15:28	ON	N22.16665 E113.92746	76 m	0:00:19	14 kph
8/3/2016 15:28	ON	N22.16589 E113.92748	85 m	0:00:22	14 kph
8/3/2016 15:28	ON	N22.16522 E113.92752	74 m	0:00:20	13 kph
8/3/2016 15:29	ON	N22.16449 E113.92747	82 m	0:00:22	13 kph
8/3/2016 15:29	ON	N22.16376 E113.92742	81 m	0:00:22	13 kph
8/3/2016 15:30	ON	N22.16300 E113.92744	84 m	0:00:23	13 kph
8/3/2016 15:30	ON	N22.16244 E113.92749	63 m	0:00:17	13 kph
8/3/2016 15:30	ON	N22.16169 E113.92745	84 m	0:00:22	14 kph
8/3/2016 15:31	ON	N22.16092 E113.92740	87 m	0:00:23	14 kph
8/3/2016 15:31	ON	N22.16017 E113.92744	83 m	0:00:22	14 kph
8/3/2016 15:31	ON	N22.15947 E113.92751	79 m	0:00:21	13 kph
8/3/2016 15:32	ON	N22.15876 E113.92755	79 m	0:00:21	14 kph
8/3/2016 15:32	ON	N22.15808 E113.92754	75 m	0:00:20	13 kph
8/3/2016 15:32	ON	N22.15735 E113.92755	82 m	0:00:22	13 kph
8/3/2016 15:33	ON	N22.15660 E113.92757	84 m	0:00:22	14 kph
8/3/2016 15:33	ON	N22.15591 E113.92762	76 m	0:00:20	14 kph
8/3/2016 15:33	ON	N22.15513 E113.92768	87 m	0:00:23	14 kph
8/3/2016 15:34	ON	N22.15447 E113.92770	74 m	0:00:20	13 kph
8/3/2016 15:34	ON	N22.15366 E113.92762	90 m	0:00:24	13 kph
8/3/2016 15:35	ON	N22.15307 E113.92762	66 m	0:00:18	13 kph
8/3/2016 15:35	ON	N22.15236 E113.92760	79 m	0:00:21	14 kph
8/3/2016 15:35	ON	N22.15166 E113.92749	79 m	0:00:21	13 kph
8/3/2016 15:36	ON	N22.15089 E113.92744	85 m	0:00:23	13 kph
8/3/2016 15:36	ON	N22.15034 E113.92750	62 m	0:00:16	14 kph
8/3/2016 15:36	ON	N22.14951 E113.92749	92 m	0:00:24	14 kph
8/3/2016 15:37	ON	N22.14886 E113.92754	73 m	0:00:19	14 kph
8/3/2016 15:37	ON	N22.14817 E113.92755	77 m	0:00:20	14 kph
8/3/2016 15:37	ON	N22.14747 E113.92756	78 m	0:00:20	14 kph
8/3/2016 15:38	ON	N22.14681 E113.92763	74 m	0:00:19	14 kph
8/3/2016 15:38	ON	N22.14613 E113.92761	75 m	0:00:19	14 kph
8/3/2016 15:38	ON	N22.14550 E113.92766	70 m	0:00:18	14 kph
8/3/2016 15:39	ON	N22.14482 E113.92768	75 m	0:00:19	14 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
8/3/2016 15:39	ON	N22.14415 E113.92759	76 m	0:00:19	14 kph
8/3/2016 15:39	ON	N22.14338 E113.92762	86 m	0:00:22	14 kph
8/3/2016 15:39	ON	N22.14298 E113.92797	58 m	0:00:17	12 kph
8/3/2016 15:40	ON	N22.14318 E113.92870	78 m	0:00:21	13 kph
8/3/2016 15:40	ON	N22.14358 E113.92923	71 m	0:00:18	14 kph
8/3/2016 15:40	ON	N22.14409 E113.92979	81 m	0:00:20	15 kph
8/3/2016 15:41	ON	N22.14469 E113.93037	89 m	0:00:22	15 kph
8/3/2016 15:41	ON	N22.14528 E113.93100	93 m	0:00:23	15 kph
8/3/2016 15:41	ON	N22.14570 E113.93143	65 m	0:00:16	15 kph
8/3/2016 15:42	ON	N22.14626 E113.93204	88 m	0:00:22	14 kph
8/3/2016 15:42	ON	N22.14685 E113.93272	97 m	0:00:24	15 kph
8/3/2016 15:43	ON	N22.14736 E113.93323	77 m	0:00:19	15 kph
8/3/2016 15:43	ON	N22.14788 E113.93386	87 m	0:00:22	14 kph
8/3/2016 15:43	ON	N22.14813 E113.93455	77 m	0:00:19	15 kph
8/3/2016 15:44	ON	N22.14846 E113.93533	87 m	0:00:22	14 kph
8/3/2016 15:44	ON	N22.14884 E113.93609	89 m	0:00:22	15 kph
8/3/2016 15:44	ON	N22.14940 E113.93678	94 m	0:00:24	14 kph
8/3/2016 15:45	ON	N22.15001 E113.93672	68 m	0:00:19	13 kph
8/3/2016 15:45	ON	N22.15076 E113.93690	86 m	0:00:22	14 kph
8/3/2016 15:45	ON	N22.15146 E113.93691	77 m	0:00:19	15 kph
8/3/2016 15:46	ON	N22.15222 E113.93693	85 m	0:00:21	15 kph
8/3/2016 15:46	ON	N22.15314 E113.93698	102 m	0:00:25	15 kph
8/3/2016 15:46	ON	N22.15383 E113.93693	77 m	0:00:19	15 kph
8/3/2016 15:47	ON	N22.15473 E113.93692	101 m	0:00:25	15 kph
8/3/2016 15:47	ON	N22.15561 E113.93687	98 m	0:00:24	15 kph
8/3/2016 15:48	ON	N22.15637 E113.93684	85 m	0:00:21	15 kph
8/3/2016 15:48	ON	N22.15725 E113.93684	97 m	0:00:24	15 kph
8/3/2016 15:48	ON	N22.15809 E113.93678	94 m	0:00:23	15 kph
8/3/2016 15:49	ON	N22.15889 E113.93683	89 m	0:00:22	15 kph
8/3/2016 15:49	ON	N22.15966 E113.93691	85 m	0:00:21	15 kph
8/3/2016 15:49	ON	N22.16038 E113.93692	81 m	0:00:20	15 kph
8/3/2016 15:50	ON	N22.16130 E113.93697	102 m	0:00:25	15 kph
8/3/2016 15:50	ON	N22.16203 E113.93695	81 m	0:00:20	15 kph
8/3/2016 15:51	ON	N22.16291 E113.93692	97 m	0:00:24	15 kph
8/3/2016 15:51	ON	N22.16390 E113.93689	111 m	0:00:27	15 kph
8/3/2016 15:52	ON	N22.16496 E113.93680	119 m	0:00:29	15 kph
8/3/2016 15:52	ON	N22.16573 E113.93678	85 m	0:00:21	15 kph
8/3/2016 15:52	ON	N22.16660 E113.93678	97 m	0:00:24	15 kph
8/3/2016 15:53	ON	N22.16751 E113.93676	102 m	0:00:25	15 kph
8/3/2016 15:53	ON	N22.16832 E113.93680	89 m	0:00:22	15 kph
8/3/2016 15:53	ON	N22.16923 E113.93682	102 m	0:00:25	15 kph
8/3/2016 15:54	ON	N22.16997 E113.93692	83 m	0:00:21	14 kph
8/3/2016 15:54	ON	N22.17072 E113.93696	83 m	0:00:22	14 kph
8/3/2016 15:55	ON	N22.17143 E113.93698	80 m	0:00:21	14 kph
8/3/2016 15:55	ON	N22.17221 E113.93703	87 m	0:00:23	14 kph
8/3/2016 15:55	ON	N22.17293 E113.93702	80 m	0:00:21	14 kph
8/3/2016 15:56	ON	N22.17362 E113.93702	77 m	0:00:20	14 kph
8/3/2016 15:56	ON	N22.17446 E113.93696	93 m	0:00:24	14 kph
8/3/2016 15:56	ON	N22.17526 E113.93689	89 m	0:00:23	14 kph
8/3/2016 15:57	ON	N22.17623 E113.93678	108 m	0:00:28	14 kph
8/3/2016 15:57	ON	N22.17705 E113.93676	91 m	0:00:24	14 kph
8/3/2016 15:58	ON	N22.17770 E113.93675	73 m	0:00:19	14 kph
8/3/2016 15:58	ON	N22.17854 E113.93674	93 m	0:00:24	14 kph
8/3/2016 15:58	ON	N22.17927 E113.93677	81 m	0:00:21	14 kph
8/3/2016 15:59	ON	N22.17992 E113.93683	73 m	0:00:19	14 kph
8/3/2016 15:59	ON	N22.18068 E113.93687	85 m	0:00:22	14 kph
8/3/2016 15:59	ON	N22.18162 E113.93688	105 m	0:00:27	14 kph
8/3/2016 16:00	ON	N22.18244 E113.93688	90 m	0:00:23	14 kph
8/3/2016 16:00	ON	N22.18320 E113.93691	85 m	0:00:22	14 kph
8/3/2016 16:01	ON	N22.18404 E113.93692	94 m	0:00:24	14 kph
8/3/2016 16:01	ON	N22.18492 E113.93690	98 m	0:00:25	14 kph
8/3/2016 16:01	ON	N22.18588 E113.93691	107 m	0:00:27	14 kph
8/3/2016 16:02	ON	N22.18698 E113.93692	122 m	0:00:31	14 kph
8/3/2016 16:02	ON	N22.18791 E113.93693	104 m	0:00:26	14 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
8/3/2016 16:03	ON	N22.18875 E113.93690	94 m	0:00:24	14 kph
8/3/2016 16:03	ON	N22.18974 E113.93685	111 m	0:00:28	14 kph
8/3/2016 16:04	ON	N22.19055 E113.93683	89 m	0:00:23	14 kph
8/3/2016 16:04	ON	N22.19150 E113.93689	107 m	0:00:27	14 kph
8/3/2016 16:05	ON	N22.19234 E113.93698	94 m	0:00:24	14 kph
8/3/2016 16:05	ON	N22.19311 E113.93696	85 m	0:00:22	14 kph
8/3/2016 16:05	ON	N22.19411 E113.93686	112 m	0:00:28	14 kph
8/3/2016 16:06	ON	N22.19492 E113.93680	90 m	0:00:23	14 kph
8/3/2016 16:06	ON	N22.19584 E113.93685	102 m	0:00:26	14 kph
8/3/2016 16:07	ON	N22.19680 E113.93685	107 m	0:00:27	14 kph
8/3/2016 16:07	ON	N22.19776 E113.93686	107 m	0:00:27	14 kph
8/3/2016 16:08	ON	N22.19877 E113.93682	113 m	0:00:29	14 kph
8/3/2016 16:08	ON	N22.19966 E113.93683	99 m	0:00:25	14 kph
8/3/2016 16:08	ON	N22.20057 E113.93683	101 m	0:00:26	14 kph
8/3/2016 16:09	ON	N22.20162 E113.93682	117 m	0:00:30	14 kph
8/3/2016 16:09	ON	N22.20256 E113.93685	104 m	0:00:27	14 kph
8/3/2016 16:10	ON	N22.20337 E113.93687	90 m	0:00:23	14 kph
8/3/2016 16:10	ON	N22.20451 E113.93689	127 m	0:00:33	14 kph
8/3/2016 16:11	ON	N22.20537 E113.93684	96 m	0:00:25	14 kph
8/3/2016 16:11	ON	N22.20661 E113.93684	137 m	0:00:35	14 kph
8/3/2016 16:12	ON	N22.20779 E113.93679	132 m	0:00:34	14 kph
8/3/2016 16:12	ON	N22.20868 E113.93683	98 m	0:00:26	14 kph
8/3/2016 16:13	ON	N22.20952 E113.93686	94 m	0:00:25	14 kph
8/3/2016 16:13	ON	N22.21060 E113.93693	121 m	0:00:32	14 kph
8/3/2016 16:14	ON	N22.21152 E113.93695	102 m	0:00:27	14 kph
8/3/2016 16:14	ON	N22.21260 E113.93693	121 m	0:00:31	14 kph
8/3/2016 16:15	ON	N22.21369 E113.93694	121 m	0:00:31	14 kph
8/3/2016 16:15	ON	N22.21474 E113.93686	118 m	0:00:30	14 kph
8/3/2016 16:16	ON	N22.21594 E113.93688	133 m	0:00:34	14 kph
8/3/2016 16:16	ON	N22.21685 E113.93686	101 m	0:00:26	14 kph
8/3/2016 16:17	ON	N22.21804 E113.93690	132 m	0:00:34	14 kph
8/3/2016 16:17	ON	N22.21906 E113.93683	114 m	0:00:29	14 kph
8/3/2016 16:18	ON	N22.22011 E113.93687	117 m	0:00:30	14 kph
8/3/2016 16:18	ON	N22.22121 E113.93687	122 m	0:00:32	14 kph
8/3/2016 16:19	ON	N22.22250 E113.93682	144 m	0:00:38	14 kph
8/3/2016 16:19	ON	N22.22350 E113.93699	113 m	0:00:30	14 kph
8/3/2016 16:20	ON	N22.22354 E113.93761	64 m	0:00:19	12 kph

Appendix II. Survey Effort Database in SWL (March 2016)

(Abbreviations: BEAU = Beaufort Sea State; P = Primary Line Effort; S = Secondary Line Effort)

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
4-Mar-16	SW LANTAU	1	7.68	SPRING	STANDARD31516	HKCRP	P
4-Mar-16	SW LANTAU	2	9.45	SPRING	STANDARD31516	HKCRP	P
4-Mar-16	SW LANTAU	1	0.33	SPRING	STANDARD31516	HKCRP	S
4-Mar-16	SW LANTAU	2	7.87	SPRING	STANDARD31516	HKCRP	S
8-Mar-16	SW LANTAU	2	17.76	SPRING	STANDARD31516	HYD-HZMB	P
8-Mar-16	SW LANTAU	3	33.70	SPRING	STANDARD31516	HYD-HZMB	P
8-Mar-16	SW LANTAU	4	2.70	SPRING	STANDARD31516	HYD-HZMB	P
8-Mar-16	SW LANTAU	2	9.29	SPRING	STANDARD31516	HYD-HZMB	S
8-Mar-16	SW LANTAU	3	5.24	SPRING	STANDARD31516	HYD-HZMB	S
8-Mar-16	SW LANTAU	4	2.31	SPRING	STANDARD31516	HYD-HZMB	S
14-Mar-16	SW LANTAU	2	8.31	SPRING	STANDARD31516	HKCRP	P
14-Mar-16	SW LANTAU	3	4.00	SPRING	STANDARD31516	HKCRP	P
14-Mar-16	SW LANTAU	2	6.20	SPRING	STANDARD31516	HKCRP	S
14-Mar-16	SW LANTAU	3	3.08	SPRING	STANDARD31516	HKCRP	S
17-Mar-16	SW LANTAU	2	1.57	SPRING	STANDARD31516	HKCRP	P
17-Mar-16	SW LANTAU	3	22.78	SPRING	STANDARD31516	HKCRP	P
17-Mar-16	SW LANTAU	4	4.80	SPRING	STANDARD31516	HKCRP	P
17-Mar-16	SW LANTAU	2	5.00	SPRING	STANDARD31516	HKCRP	S
17-Mar-16	SW LANTAU	3	2.80	SPRING	STANDARD31516	HKCRP	S
17-Mar-16	SW LANTAU	4	4.30	SPRING	STANDARD31516	HKCRP	S
29-Mar-16	SW LANTAU	2	5.86	SPRING	STANDARD31516	HKCRP	P
29-Mar-16	SW LANTAU	3	5.60	SPRING	STANDARD31516	HKCRP	P
29-Mar-16	SW LANTAU	2	7.04	SPRING	STANDARD31516	HKCRP	S
29-Mar-16	SW LANTAU	3	3.10	SPRING	STANDARD31516	HKCRP	S
29-Mar-16	SW LANTAU	4	0.50	SPRING	STANDARD31516	HKCRP	S

Appendix III. Chinese White Dolphin Sighting Database in SWL (March 2016)

(Abberviations: STG# = Sighting Number; HRD SZ = Dolphin Herd Size; BEAU = Beaufort Sea State; PSD = Perpendicular Distance; ND = Not Determined; BOAT ASSOC. = Fishing Boat Association; P/S: Sighting Made on Primary/Secondary Lines)

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
4-Mar-16	1	1313	1	SW LANTAU	1	167	ON	HKCRP	806159	803477	SPRING	NONE	P
4-Mar-16	2	1329	1	SW LANTAU	1	421	ON	HKCRP	804808	803474	SPRING	NONE	P
8-Mar-16	1	1317	2	SW LANTAU	2	223	ON	HYD-HZMB	803671	807422	SPRING	NONE	P
14-Mar-16	1	1340	6	SW LANTAU	2	331	ON	HKCRP	806062	802353	SPRING	NONE	S
14-Mar-16	2	1353	2	SW LANTAU	2	136	ON	HKCRP	806260	802982	SPRING	NONE	S

Appendix IV. Individual dolphins identified during HYD-HZMB and AFCD monitoring surveys in SWL waters in March 2016

ID#	DATE	STG#	TYPE	AREA
WL74	14/03/16	1	HKCRP	SW LANTAU
WL91	08/03/16	1	HYD-HZMB	SW LANTAU
WL130	14/03/16	1	HKCRP	SW LANTAU
WL173	08/03/16	1	HYD-HZMB	SW LANTAU
WL208	14/03/16	1	HKCRP	SW LANTAU
WL216	14/03/16	1	HKCRP	SW LANTAU
WL263	14/03/16	1	HKCRP	SW LANTAU

Appendix V. Photographs of Identified Individual Dolphins in March 2016 in SWL waters