

## Research methods to study Hong Kong cetaceans

### Vessel Survey

Hong Kong cetacean researchers conduct regular vessel survey to monitor the distribution and abundance of the local dolphin and porpoise population. During the survey, standard line-transect methods are applied, which is the same technique that has been developed over the last decade of dolphin monitoring in Hong Kong and throughout the Pearl River Delta. A 15-m pleasure boat with an upper deck is normally used to conduct the vessel survey.

When on-effort, the research team with 3-4 observers takes turn to be responsible as data recorder and primary observer, using both naked eyes and 7x50 binoculars to search for the dolphins and porpoises.



During the course of survey, researchers record the information of the survey effort, including the time, position, boat speed, weather condition (Beaufort scale and visibility) and the distance traveled. When dolphins and porpoises are sighted, sighting time, position, sighting distance and angle, group size, age classes, boat association, behaviours and environmental conditions are recorded. The survey vessel then approaches the group of dolphins slowly to take photographs of them for photo-identification.

### Photo-Identification



When researchers find a group of dolphins, they will take pictures of them in an attempt to identify individuals (a technique also known as “photo-identification”). Their identifying features include permanent external characteristics, such as nicks and scars on dorsal fin, or permanent marks on the body. Currently, nearly 700

individual dolphins have been identified in Hong Kong waters and the rest of the Pearl River Estuary. The photographic documentations of individual dolphins can be used to study their home ranges, social structure and life history parameters.

The nomenclature of the identified dolphins consists of two parts, the first part consists of two letters indicating where they have been first recorded such NL – North Lantau; SL – South Lantau; EL – East Lantau; WL - West Lantau; CH – Chinese waters; DB – Deep Bay; and the second part consists of number according to their sequence of identification. The nickname “Curly”, “Ringo” or “Square fin” are given to individuals with accordance of their features, but they also have their binomial nomenclature as NL111, NL11 and NL24 respectively.

### Helicopter Survey

Researchers use regular helicopter trips to search for dolphins and porpoises in a large area within a relatively short period of time. When researchers find them, the time, location and group size are recorded. Due to the high cost involved, helicopter (aerial) survey is not used to collect systematic transect data. Instead, it is mainly used to carry out study on distribution of finless porpoises, especially in remote areas (e.g. Lamma, Po Toi, Ninepin, Sai Kung, Mirs Bay) that are relatively inaccessible by boat.



### Land-based Survey

Land-based observations are usually conducted at elevated points where dolphin/porpoise density is high. A few locations that Hong Kong researchers used in the past included: Lung Kwu Chau, Sha Chau, headland near Shum Wat and Tai O, Pui O, Tai A Chau, and Ha Mei Tsui on Lamma. The land-based observations aim to collect more information about the behaviour of the dolphin and porpoises, including their dive/surface

patterns as well as avoidance behaviour from boats and dolphin-watching vessels. Land-based observation is usually applied due to its relative ease to survey the entire study area instantly from a higher elevation, so that a broad and general view of the behaviours of dolphins and porpoises can be obtained, while their natural behaviour will not be affected by the presence of observers.



### Stranding Recovery and Investigation



A number of cetacean carcasses are found along Hong Kong's coastline every year, and AFCD is the responsible authority to deal with such stranding cases. In the past, Hong Kong research would investigate the carcass, to identify the species identity, as well as conduct detailed necropsy to examine the cause of death and collect

important samples for life history studies. During necropsy, body length of the dolphin would be measured first. Afterwards, a number of samples would be collected, including skin (for gender determination and taxonomic study), teeth (for age determination), blubber, liver, kidney (for ecotoxicological study), stomach (for feeding habit analysis) and skull (for taxonomic study and educational display).

### Acoustic Monitoring

To describe the underwater world of sounds as important to local dolphins in Hong Kong, acoustic monitoring is conducted along with regular line-transect vessel surveys starting in 2010. A set of broad frequency and high frequency (i.e. ultra-sonic) hydrophones built and calibrated by professional acousticians are deployed several metres below sea surface from the briefly-stopped research vessels. The recordings are streamed into digital memory field recorded, and stored in CF card for download onto a computer for further analysis. Data analysis would include the investigation of types, frequencies, intensities and bursts of occurrence of sounds. Analyzed data can provide descriptions of certain specific anthropogenic noise influences, and vocalizations of Chinese white dolphins with or without anthropogenic sounds.



### Biopsy Sampling

Biopsy sampling is usually conducted along with regular line-transect vessel surveys. When dolphins are sighted, the survey team approaches and observes the dolphin for some time. If any recognizable individuals are seen, and the group's behaviour is suitable, researchers then attempt to collect biopsy samples from them. Trained researcher uses a crossbow with specifically designed arrow and dart. Shots are typically taken at target distances of 8-20 m. Upon touching a dolphin's body a tiny sample of the dolphin's skin and blubber is taken at the tip of dart and the arrow then bounces off into the water. Researchers then collect the arrow with the dart and can get the biopsy samples. At the

same time, basic data of each biopsy attempt are taken, whether successful or not. And, photographs and video documentation are collected for all biopsy attempts.

The samples collected through biopsy sampling provide much valuable information on the dolphin biology. The skin samples, containing DNA, are used to find out gender of the sampled animals. And the blubber samples are used to determine reproductive hormone level and organochlorine contaminant concentrations, which reveals reproductive status and contaminant levels of the sampled dolphins respectively.



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