

Report of Gray Whale Sighting Survey off Korean waters from 2003 to 2011

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ABSTRACT

Three shore based and five vessel based sighting surveys were conducted during winter season for the purpose of finding gray whale in Korean waters from 2003 to 2011. Determination of the survey area and schedule were considered by historical whaling record of gray whales in Korea. 226 hours were spent on the two stations for the shore based surveys. During the vessel based surveys, 808.5 n. miles were navigated from 2006 to 2011. Minke whale, common dolphin, Pacific white sided dophin, Dall's porpoise and several unidentified species were sighted whereas gray whales were not observed from the surveys.

INTRODUCTION

The gray whales (*Eschrichtius robustus*) were overexploited from the 19th century and close to extinct. But eastern gray whales were protected under a ban on commercial whaling since 1937, as a result, the present population is thought to approximately 20,000 individuals and appears to be approaching the carrying-capacity of its environment (Rugh et al., 2004). In contrast to the population recovery of eastern gray whale, the western gray whales still remain critically endangered population.

There was a perfunctory protection policy about gray whale in Korea. Korean Cultural Heritage Administration had declared its migration route lying along the eastern coast of Korea as a natural monument No. 126, named "Ulsan Gray Whale Migration Waters" in 1962. However the population was extremely depleted already at that time. The last sighting record of gray whale in Korea was 2 individuals that had been migrating to southward on 3rd January, 1977, 5 miles in front of Bang-eo jin, Ulsan city (Park, 1995).

The International Whaling Commission (IWC) and the International Union for Conservation of Nature (IUCN) have each expressed serious concern about the status of this population and have called for urgent measures to be taken to help ensure its protection (Hilton-Taylor, 2000; IWC, 2002a, 2002b, 2004a; Baillie et al., 2004; IUCN, 2005). Scientific Committee of IWC requests range states for this population and the other stocks noted in "Resolution 1999-7" to report to the Scientific Committee at its 2002 Annual Meeting, and annually thereafter, on progress made on the above conservation and management recommendations." in "Resolution 2001-3" and 'Western Gray Whale Workshop' was held on October 2002 in Ulsan, Korea for talking about the research and monitoring needs on the whales (IWC, 2004b). After that, we have been conducting observations for the gray whale since 2003.

The Science committee recommended that the ongoing Republic of Korea national programs on western gray whale research and monitoring continues and expands into the future and all range states develop or expand national monitoring and research programs on western gray whale (IWC, 2004).

SURVEY AND METHODS

Shore based gray whale sighting surveys December, 2003 ~ January, 2006

Shore based gray whale sighting surveys were conducted in southeastern part of Korean peninsula where gray whales were frequently hunted by whaling ship in former times. Survey period was determined when southbound gray whales mostly occurred on southeastern coast of Korea (Park, 1995).

Daily survey was conducted from 30min. after sunrise to 30min. before sunset. Environmental conditions were noted for every hour during conducting survey. The Beaufort scale, sea state, visibility, glare, cloud cover, wind direction, wind speed and temperature were recorded. If the environmental parameters hampered observations caused by poor weather, high Beaufort scale, low visibility, our research was stopped until the conditions were acceptable.

The first surveys were made at Cape Homi (36° 04'N, 129° 34'E, Figure 1), located in eastern end point of the Korean peninsula, and, has lighthouse that we can use for research activities. The height of the lighthouse is 29.2m, and eye height of the observer was about 26.4m. Research operated from 24th December 2003 to 6th January 2004. Five researchers participated the survey and 2-3 observers occupied the survey with naked eyes and 7×50 Nikon binoculars.

New location for survey was sought in 2004 winter season because of some problems, like as unexpected big ship traffic and short sighting distance, which revealed from Cape Homi's experience. We travelled along the East coast of Korea before the season's survey for searching survey station better than Cape Homi. The Sunrising Park (36° 25'N, 129° 26'E, Fig.1) located in Young-Deok county, was chosen as second survey station. The park is designed for watching rising sun from the sea, therefore has high elevation, good visibility and well designed observation platform. The height of the station is about 70m above sea level. Research operated between 21st and 30th December 2004. Five researchers participated the survey and three of them operate observation at same time in 3 parts (left, centre and right) of the research platform. Observers started his search from the right side for 30 minutes then move to centre and left consecutively. Monopod-mounted 7×50 Nikon binoculars and hand-held 10×42 Leica binoculars were used to search the whales in this survey season.

The survey on January 2006 made at same place with second survey, Sunrising park. Research operated between 5th and 14th January 2006. A team of three people participated in this survey and 2 of them operate observation at same time in 2 parts (Left and Right) of the research station. Observers started their search from the right side for 30 minutes then move to left consecutively within non-overlapping parallel scans. Observers used monopod-mounted 7×50 Nikon binoculars or tripod-mounted 18×70 Nikon binoculars.

Vessel based WGW sighting surveys December, 2006 ~ January, 2011

Five vessel based sighting surveys were conducted on the east coast of Korean peninsula during the period December, 2006 to January, 2011. The survey area was determined by considering the whaling position in this area. Most surveys were carried out on continental shelf. The surveys were conducted in the good weather condition with two or longer nautical miles visibility and three or smaller Beaufort scale. The research vessel, *Tamgu 12* (69 G/T) cruised on predetermined area at the speed of 9 to 12 knots in accordance with sea states and weather conditions. Closing mode was used through the cruises for species identification, school size estimation, taking photos and videos. The Beaufort scale, sea state, visibility, glare, cloud cover, wind direction, wind speed and temperature were recorded every one hour during. Three to five observers conducted sightings at the top bridge of the research vessel. 7×50 Nikon binoculars and 10×42 Leica binoculars were used to search the whales.

RESULTS AND DISCUSSION

The shore based gray whale sighting surveys were conducted for total 34 days from 2003 to 2006. 30 days were completed for the surveys and 226 hours were spent on the two stations (Table 1). There was no cetacean sighting for the first survey in cape Homi. Around 200 individuals of common dolphins in 2 schools were found in front of the Sunrising park on December, 2004 survey. 200 common dolphins in 2 schools, 240 Pacific white-sided dolphins in 5 schools and 90 unidentified delphinidae in 4 schools were found from the park on January, 2006 survey (Table 2).

During the vessel based surveys, 808.5 n. miles were navigated for 32 days from 2006 to 2011. Only 23 days were completed for the surveys due to poor environmental conditions. 3 individuals of minke whales in 3 schools, 1,200 individuals of common dolphins in 7 schools, 1,200 individuals of Pacific white-sided dolphins in 4 schools, 34 individuals of Dall's porpoise in 4 schools and 1 individuals of unidentified Ziphiidae were observed from the vessel based surveys (Table 3, Figure 2).

Unfortunately, there was no gray whale sighting from the shore based surveys and vessel based surveys for finding the whales between 2003 and 2011. Gray whales also have not being reported by reporting system of bycaught and stranded marine mammal that have been come into effect since 1996 and several systematic sighting survey in Korea so far.

Only 205 different individual whales were photographically identified between 1994 and 2011 on northeastern Sakhalin feeding area by a joint Russian-U.S. investigation team (Urbán et al., 2012). The identified whales does not correspond to the size of the population due in part to the low survival of young whales (Bradford et al., 2006) and several death due to entanglement and stranding (Zhu , 2002; Kato et al., 2003, 2005, 2008). Many study show some of whales associated with the Sakhalin feeding area migrate to the Eastern North Pacific during the winter/spring season. The realistic population size of the western gray whale is smaller than 150 individuals (Weller et al., 2012).

Because of the low population size, it is hard to observe gray whale individuals from the survey. Therefore we need to make an effort to search gray whales continuously to figure out existence of the gray whales in Korean water. Opportunistic survey will be attempted into the future instead of scheduled surveys.

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Table 1. Effort of shore based surveys form 2003 to 2006

Survey Period (YYYY-MM-DD)	Day of Surveys	Hours of Surveys	Numbers of Researchers Observers (1 turn)
2003-12-24 ~ 2004-01-06	14	97	5 (3)
2004-12-21 ~ 2004-12-30	9	68	5(3)
2006-01-05 ~ 2006-01-14	7	41	3 (2)
overall	30	226	13 (8)

Table 1. Encounter cetacean pods and estimated number of the individuals during the shore based surveys.

Date (YYYY-MM-DD)	Common Dolphin Pod (Indiv.)	Pacific White-sided Dolphin	Unidentified species
2004-12-27	2 (200)		
2006-01-05	2 (200)	3 (140)	
2006-01-06		2 (100)	1 (20)
2006-01-07			2 (40)
2006-01-11			1 (30)
Total	2 (400)	5 (240)	4 (90)

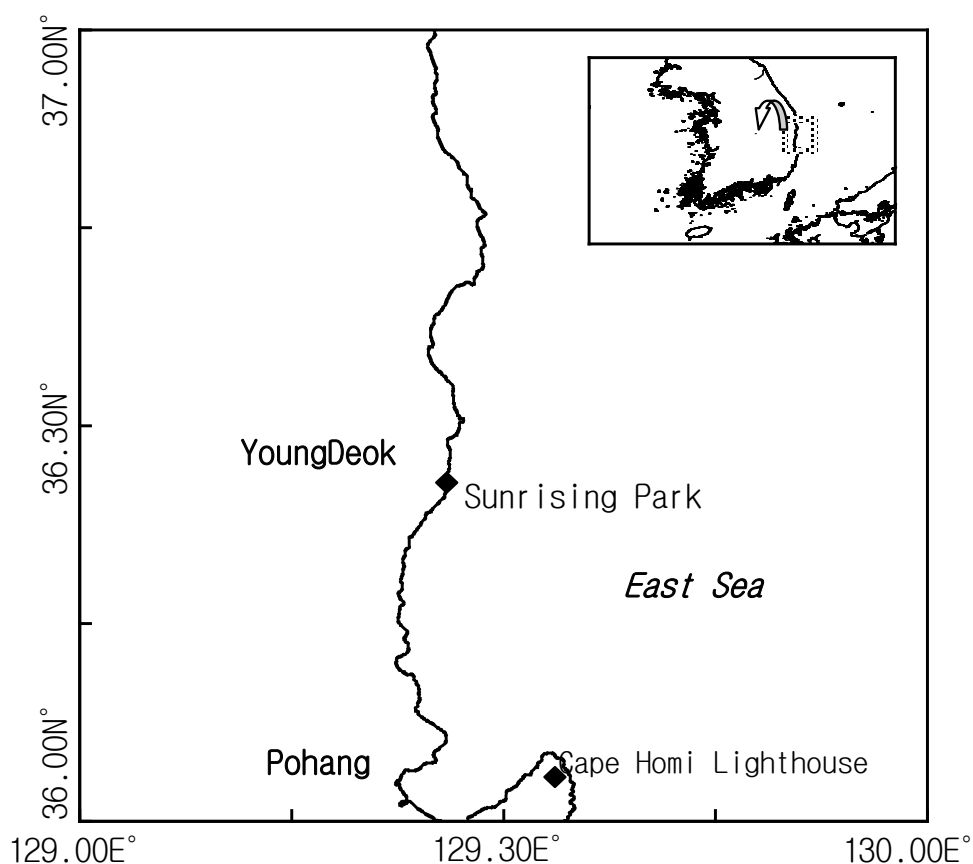


Figure 1. Survey stations, Cape Homi Lighthouse and Sunrising Park in southeastern part of Korea

Table 3. Encountered cetacean pods and estimated number of the individuals during the surveys from the vessel based surveys.

Date (YYYY-MM-DD)	Minke whale Pod (Indiv.)	Common dolphin	Pacific white sided dolphin	Dall's porpoise	Unidentified species	Survey effort (n.mile)
2006-12-14						30.5
2006-12-15	1 (1)		1 (150)			61.3
2006-12-16		1(50)				75.4
2006-12-19	1(1)					50.1
2006-12-20		1(5)	2 (350)			62.2
Total	2 (2)	2 (55)	3 (500)			279.5
2007-12-10			1 (700)			29.1
2007-12-11						2.9
2007-12-12						38.8
2007-12-13						11.1
Total			1 (700)			82.0
2008-01-07						26.1
2008-01-08						47.2
2008-01-09						43.1
2008-01-10						32.1
Total						148.6
2009-01-17		1 (200)				43.6
2009-01-18		1 (150)				6.9
2009-01-19						14.0
2009-01-21		2 (500)				82.5
2009-01-22						8.2
Total		4 (850)				155.1
2011-01-10						17.7
2011-01-11	1 (1)					18.2
2011-01-13		1 (300)		2 (25)		81.8
2011-01-14				2 (9)	1 (1)	22.4
2011-01-18						3.3
Total	1 (1)	1 (300)		4	1 (1)	143.4

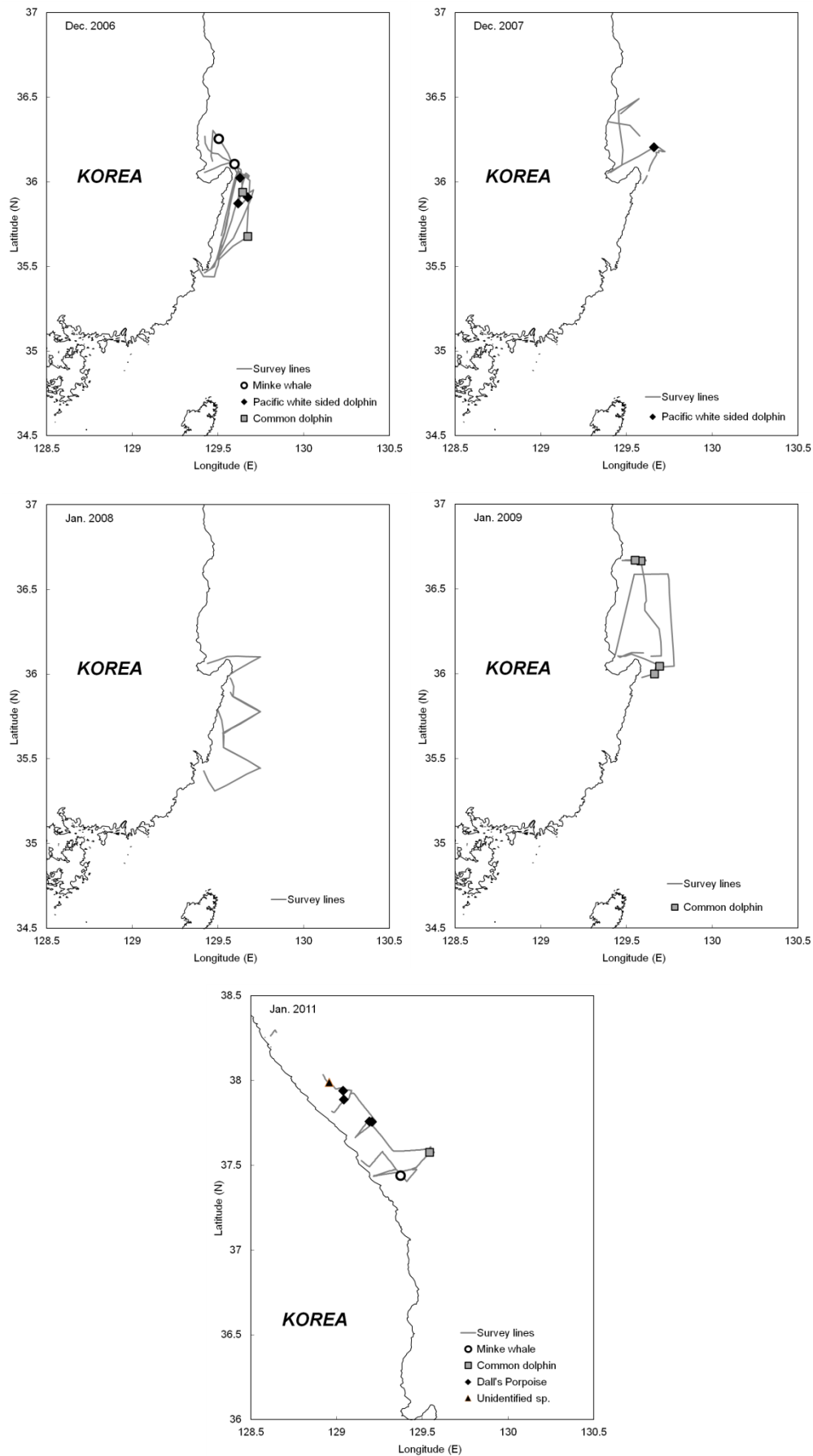


Figure 2. Survey lines and sighting positions of cetacean from the vessel based survey between 2006 and 2011.