

Brief Communication

Potential collision risks of large whales and fast ferries traveling between Korea and Japan

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Abstract

Although in recent years collisions between large whales and fast ferries have frequently occurred on the fast ferry route between Korea and Japan, little has been done to prevent these collisions. The risk of such collisions tends to increase in certain areas where whale habitat and the fast ferry route overlap. Thus, it is necessary to understand the characteristics of the whale occurrences on this route in order to try to avoid collisions. A report of incidental whale sightings on the fast ferry route from 2007 to 2009 was analyzed to understand these characteristics. Sightings of large whales uniformly occurred along the route regardless of year. The number of large whale sightings per crossing ranged from 0.017 to 0.038 with the mean of 0.028 during this period and continuously increased from 2007 to 2009. Regarding seasonal occurrence of large whales, the number of large whale sightings per crossing in spring (March-May) was relatively higher than that of other seasons. Although the possibility of collisions between large whales and fast ferries on the fast ferry route between Korea and Japan is probably low based on this study, it would be considered prudent to navigate carefully to prevent collisions, especially in spring. Furthermore, prevention measures to avoid collisions between whales and fast ferries would not only contribute to the conservation of large whales, but also to the safety of vessels and mariners. [JMATE. 2013;6(1):6-10]

Keywords: Occurrence, cetacean, fast ferry route, incidental sighting, collision

Introduction

Collisions between whales and ships (ship strikes) have been continuously reported all over the world (2,7). Specifically, collisions between whales and the fast ferries that travel between Korea and Japan have been noted in recent years. The first confirmed collision between a whale and fast ferry occurred on 16 December 2004 in the southeastern part of Tsushima Island along the fast ferry route between Korea and Japan. The whale that was associated with this collision was confirmed as a minke whale by genetic analysis using tissue samples which were attached on the surface of the fast ferry. In spite of the lack of information on the fate of this minke whale, this individual was probably seriously injured or killed by this ship strike because large amounts of skin

from this individual was attached on the surface of the the ferry, and also large amounts of blood was spread out in the area. During this ship strike, the underwater wing and bottom part of the hull of the fast ferry were seriously damaged. Fortunately no serious injuries to either mariners or passengers were reported, although many passengers were knocked down to the floor of the ferry when it collided with the minke whale. Four other collisions between whales and fast ferries were thought to have occurred along this fast ferry route from 2004 to 2007 (5 April 2004, 1 April 2005, 29 April 2005 and 12 April 2007). Unfortunately, the last one reported in 2007 was associated with the death of one passenger.

Although collisions between whales and fast ferries have frequently occurred on the route between Korea and Japan in recent years, little has been done to prevent these collisions until now. In addition to the severe injuries to the whale, the collisions can seriously affect vessel and mariner safety (2,7). Therefore, it is necessary to prepare measures to prevent the collisions not only for the conservation of large whales but also for the safety of vessels and its passengers.

Generally, the risk of collisions tends to increase especially in areas where whale habitat and fast ferry routes overlap. Thus, it is necessary to better understand the characteristics of the cetacean occurrences in these areas to prevent or lessen collisions. If information on the spatial and temporal characteristics of cetacean occurrences on the fast ferry route was obtained, it would be possible to predict or even prevent collisions.

Unfortunately, to date there has been no systematic sighting surveys done along the fast ferry route between Korea and Japan. Several sighting surveys have been conducted in Korean waters, which incidentally include a portion of the fast ferry route, to investigate cetacean distribution and abundance. On the other hand, incidental sightings of large whales along the fast ferry route have been reported in recent years and these have been examined to try to understand the



characteristic of the cetacean occurrence on this route. However as it was not specifically done with a focus on the fast ferry route between Korea and Japan, the information is not specific enough to provide clarity.

The objective of this study is to focus and understand the characteristic of the cetacean occurrence on the fast ferry route between Korea and Japan. This information can be used to understand the possibility of collisions between whales and fast ferries. Using fast ferries as a means to obtain information of cetacean occurrence on the fast ferry route between Korea and Japan was also explored.

Material and Methods

The study area is the fast ferry route located in the Korea Strait between Korea (Busan) and Japan (Fukuoka) (Figure 1). Generally, this route is operated with several fast ferries (5-7 navigations per day) at an average speed of about 46 knots. The propulsion system of these fast ferries is a jet foil engine, which is generally used in airplanes, and makes a high level of ship noise. Total length of this route ranges from 115 to 136 nautical miles (nm), depending on weather conditions.

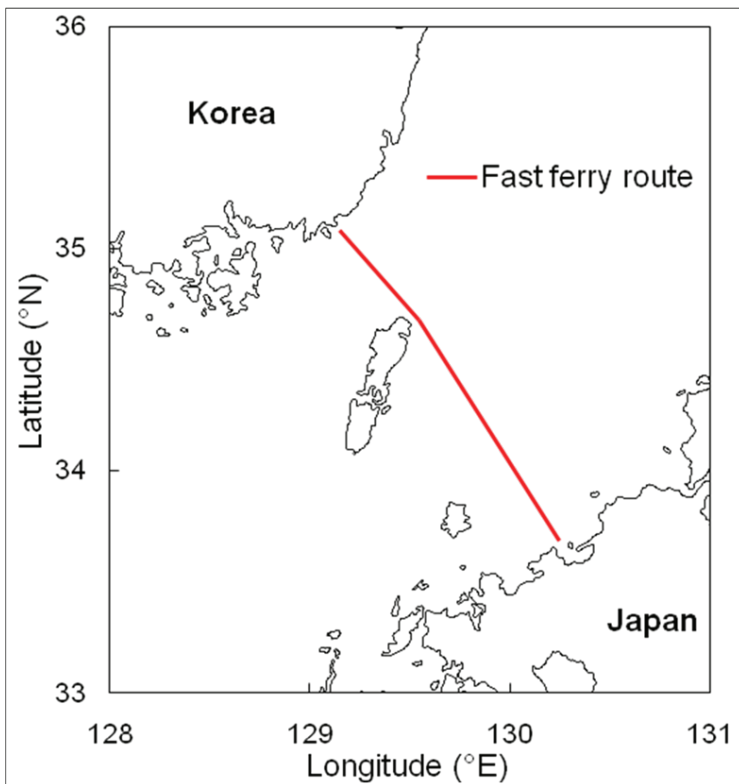


Figure 1: Fast ferry route between Korea and Japan.

The information on the sighting location, sighted species and number of individuals was obtained from the *Mirae Jet Corporation*, which is the only high speed vessel corporation operating this route. The frequency of cetacean occurrences on this fast ferry route was reported from 2007 to 2009. Each separate sighting reported in this study consisted of only one individual whale. Also, the actual number of sailings in every month was reported. Thus, the number of large whale sightings per crossing (= the number of sightings of whales / the number of actual navigations) on the fast ferry route between Korea and Japan was calculated based on the frequency of the cetacean occurrence and the actual number of sailings in every month.

Results

When looking at the spatial distribution of the cetacean occurrences, most sightings were made relatively far from shore between Tsushima Island and Fukuoka (Figure 2). In particular, the majority of sightings of large whales (32.3%) occurred at the latitude between 34.20°N and 34.30°N.

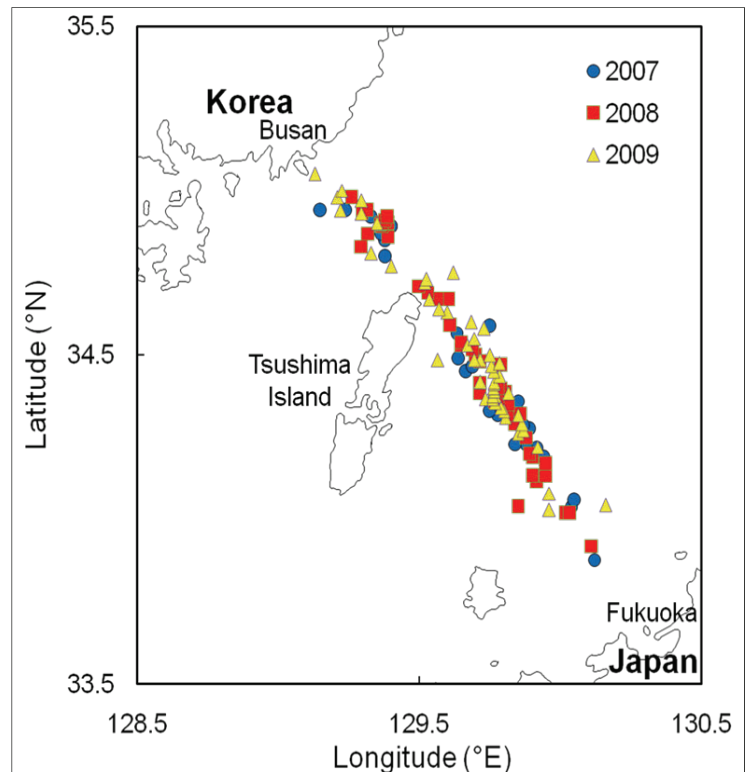


Figure 2: Sighting positions of cetaceans on the fast ferry route in 2007, 2008 and 2009.

A total of 30, 47 and 50 sightings of large whales on the fast ferry route between Korea and Japan were reported in 2007, 2008 and 2009, respectively. The percentage number of large whale sightings per crossing ranged from 1.7% to 3.8% with the mean of 2.8% during this period (Table 1). The number of large whale sightings per crossing has continuously increased from 2007 to 2009.

Year	Number of crossings	Number of whale sightings	Number of whale sightings per crossings (%)
2007	1735	30	1.73
2008	1575	47	2.98
2009	1308	50	3.82

Table 1: Number of large whale sightings per crossing (= the number of sightings / the number of actual crossings) on the fast ferry route between Korea and Japan from 2007 to 2009.

The number of large whale sightings per crossing varied monthly and seasonally. In a monthly pattern, the number of large whale sightings per crossing was relatively high from March to May (Figure 3).

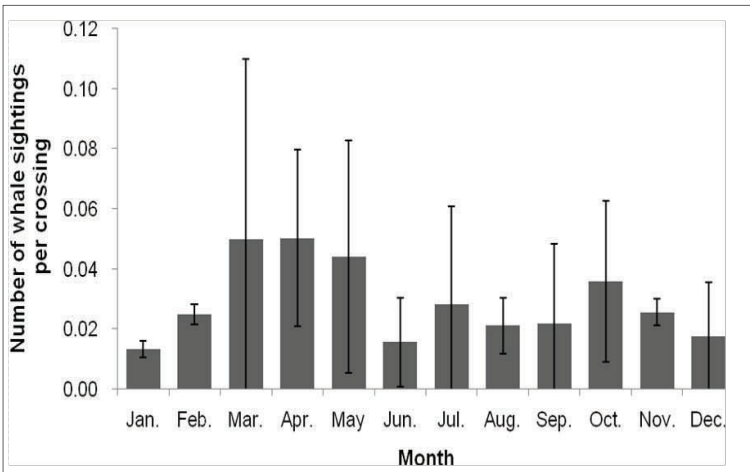


Figure 3: Number of large whale monthly sightings per crossing on the fast ferry route between Korea and Japan from 2007 to 2009.

In seasonal occurrence of large whales, the number of large whale sightings per crossing in spring (March-May) was relatively higher than that in other seasons (Figure 4).

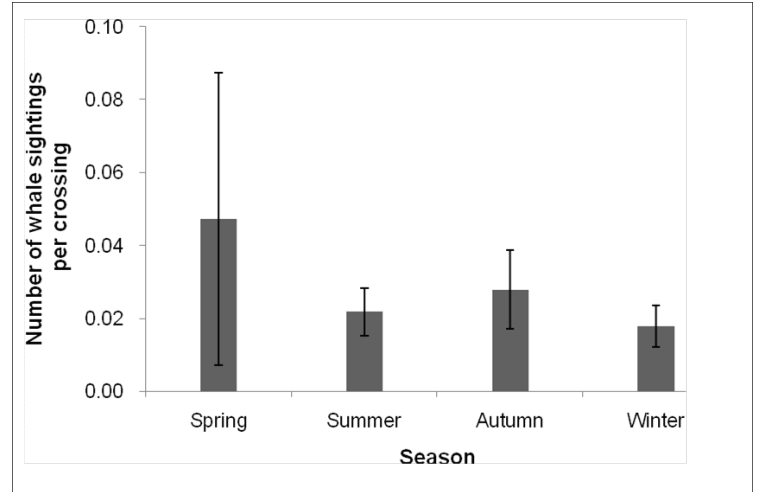


Figure 4: Number of large whale seasonal sightings per crossing on the fast ferry route between Korea and Japan from 2007 to 2009.

Discussion

Understanding the characteristics of cetacean occurrences along the fast ferry route between Korea and Japan is probably difficult because of the lack of survey effort. The only relevant information available is the report on the number of anecdotal large whale sightings per crossing by the fast ferry. This report only contains the number of large whale sightings per crossing on the fast ferry route from 2007 to 2009. Although the information on the cetacean distribution around the fast ferry route was investigated in several sighting surveys, there is no exact information on the cetacean distribution on the fast ferry route in these sighting surveys. Therefore, the report on the number of large whale sightings per crossing can be used as valuable data for understanding the characteristics of the cetacean occurrence in this area. In other words, the report on the number of large whale sightings per crossing appears to be suitable data to obtain information of the characteristics of the cetacean occurrences along the fast ferry route between Korea and Japan.

However, there are some limitations of this report. First, a fast ferry is often unsuitable for sighting whales because the observer's eye height is an important element of whale sightings. Also, cetacean sightings are strongly affected by weather conditions and thus cruises under unfavorable weather conditions (≤ 2 nm visibility and \geq Beaufort 4 sea state) should be excluded from any analyses. However, it was difficult to investigate how many transits were actually evaluated in suitable

conditions that observed large whales because of a lack of information on weather conditions. Thus, the findings represent a minimum density and future efforts to collect this data should try to incorporate these criteria. Finally, only the number of large whale sightings per crossing along the fast ferry route was reported, and therefore the exact information on specific cetacean species that make up these sightings is lacking. This is probably a result of the lack of education on the classification of cetaceans of the fast ferry crews. At present, there is no education program on the classification of cetaceans. Therefore, it would be beneficial to create and conduct educational programs for all parties involved, on the classification of cetaceans for the improvement on the quality of the reporting of large whale sightings per crossing. This improved reporting could contribute valuable data not only for understanding of cetacean distribution in this area but also for the conservation and management of these large whales in this area. Therefore, the possibility of using fast ferries as a means to obtain information of cetacean distribution along the fast ferry route between Korea and Japan is very high if the quality of reporting was improved through such an educational program.

There has been no systematic sighting surveys done along the fast ferry route between Korea and Japan until now. Historically, previous sighting surveys for cetacean distribution and abundance in Korean waters, included only a very small part of the fast ferry route (9,10,15). According to these reports, a total of 3 species including minke whale, common dolphin and finless porpoise were commonly sighted around the fast ferry route. Minke whales are the most commonly sighted of the 3 species. Minke whales and common dolphins were sighted very closely along the fast ferry route in 2003, 2005 and 2006. Therefore, the area of sighting surveys along the fast ferry route is too small to cover the entire area of the fast ferry route and to understand the characteristics of the number of large whale sightings per crossing on the fast ferry route. Although the information on the number of large whale sightings per crossing on the fast ferry route from 2007 to 2009 was reported, it is difficult to classify sighted large whales at the species level because of the lack of professional knowledge. This results in limited accurate information on the characteristics of the cetacean occurrence on the fast ferry route between Korea and Japan. In order to

resolve this problem, cetacean researchers should periodically conduct systematic sighting surveys on this route. Through these systematic sighting surveys, the characteristics of the cetacean occurrences along the fast ferry route will be better understood.

The possibility of collisions between whales and fast ferries on the fast ferry route between Korea and Japan is probably minimal based on the low number of large whale sightings per crossing on this route each month. Despite this, there have been confirmed or suspected collisions between whales and fast ferries that have occur in recent years. In addition, based on the previous information from whaling activity and a higher documented encounter rate in March to May (Figure 3) in this route (8), it is necessary to navigate carefully to prevent the collisions. Interestingly, the whaling season matches up to known past collisions between large whales and fast ferries.

Collisions between whales and ships is considered as the most significant threat to the survival of critically endangered large whales such as the North Atlantic right whale (5,6). Similarly, it can significantly affect other highly endangered populations such as the western gray whale that may migrate through the Korea Strait (3,14). Therefore, it is necessary to prepare measures to prevent the collisions in the future. The following measures to prevent collisions have been proposed (2,7): 1) limitation of vessel speed and changing of sailing routes; 2) development of a whale detection system; 3) aircraft and vessel sighting surveys; 4) establishment and operation of a calling center for the exchanging of information on cetacean occurrences; 5) education for the crew of fast ferries. It is hoped that these recommended actions will result in both immediate and longer term benefits through prevention of whale/ferry collisions.

The Revised Management Procedure (RMP) in the management of large whales, which is new management procedure of large whales by the International Whaling Commission (IWC), decides a catch limit after considering human-induced mortalities such as bycatches and collisions between whales and ships (ship strikes). Therefore, ship strikes play an important part in the conservation and management of large whales. Although many bycatches in Korean waters have been continuously reported through a bycatch/stranding reporting system in Korea (1,4,11,12,13,16), until now,

few ship strikes have been reported because of the absence of obligatory reporting. Thus, it is necessary to make a mandatory ship strike reporting system for the route between Korea and Japan similar to the IWC bycatch/stranding reporting system, to obtain the exact information on collisions or ship strikes. Consequently, this information can be used as important data for the conservation and management of large whales.

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