

A re-evaluation of gray whale records in the western North Pacific

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ABSTRACT

While recent observations have documented gray whales (*Eschrichtius robustus*) identified in the western North Pacific migrating to areas off the coast of North America (Vancouver, California, Mexico) during the winter/spring, the past and present occurrence of gray whales off Japan and China (and the Korean Peninsula historically) suggest that not all gray whales identified in the WNP off Sakhalin share a common wintering ground. Observed genetic differentiation between western and eastern gray whales, in combination with sighting/stranding records from Japan and China during the winter/spring cause us to believe that a relic WNP gray whale population still exists. Thus, the number of whales in the WNP population is substantially smaller than currently estimated and is therefore of increased conservation concern.

KEYWORDS: GRAY WHALE; PACIFIC OCEAN; POPULATION STRUCTURE; MIGRATION

INTRODUCTION

Gray whales (*Eschrichtius robustus*) are recognized as comprising two populations in the North Pacific Ocean. Significant mitochondrial and nuclear genetic differences have been found between whales in the western North Pacific (WNP) and those in the eastern North Pacific (ENP) (Lang *et al.*, 2011). The ENP population ranges from calving areas in Baja California, Mexico, to feeding areas in the Bering, Beaufort, and Chukchi Seas. The WNP population feeds in the Okhotsk Sea off Sakhalin Island, Russia, and in nearshore waters of the southeastern Kamchatka Peninsula (southwestern Bering Sea).

The historical distribution of gray whales in the Okhotsk Sea greatly exceeded what is found today (Reeves *et al.*, 2008). Whales associated with the Sakhalin feeding area can be absent for all or part of a given feeding season (Bradford *et al.*, 2008), indicating they probably use other areas during the summer and fall feeding period. Some of the whales identified feeding in the coastal waters off Sakhalin, including reproductive females and calves, have also been documented off the southern and eastern coast of Kamchatka (Tyurneva *et al.*, 2010). Further, whales observed off Sakhalin have been sighted off the northern Kuril Islands in the eastern Okhotsk Sea and Bering Island in the western Bering Sea (Weller *et al.*, 2003).

Recently, mixing of whales identified in the WNP and ENP has been observed. Lang (2010) reported that two adult individuals from the WNP, sampled off Sakhalin in 1998 and 2004, matched the microsatellite genotypes, mtDNA haplotypes, and sexes (one male, one female) of two whales sampled off Santa Barbara, California in March 1995. Mate and colleagues (Mate *et al.*, 2011) satellite-tracked a whale from the WNP to the ENP in 2010/2011. Finally, photographic matches between the WNP and ENP, including resightings between Sakhalin and Vancouver Island and Laguna San Ignacio, have further confirmed use of areas in the ENP by whales identified in the WNP (Weller *et al.*, 2011; Urban *et al.* 2012). Despite this level of mixing, significant mitochondrial and nuclear genetic differences between whales in the WNP and ENP have been found (Lang *et al.*, 2011).

Although it is clear that some whales feeding off Sakhalin Island during the summer/fall migrate to the west coast of North America during the winter/spring, observations of gray whales in the WNP off Japan, Korea and China during the winter/spring suggest that not all gray whales in the WNP share a common wintering ground. Little is known about the current migratory routes and wintering areas in the WNP, but historical evidence indicates that the coastal waters of eastern Russia, the Korean Peninsula and Japan were part of the migratory route and that areas in the South China Sea were used as wintering grounds (see review in Weller *et al.*, 2002). Summarized herein are relevant gray whale records from the WNP,

including two recent sightings from China in 2011 and Japan in 2012.

DATA RECORDS

Japan

Nambu *et al.* (2010) reported only 13 known sighting or stranding records in Japanese waters between 1990 and 2007. Between 2005 and 2007, four female gray whales were fatally entrapped in set nets along the Pacific coast of Honshu, Japan. One of these females, entrapped in January 2007, was matched to earlier photographs of it as a calf (with its mother) while on the Sakhalin feeding ground in July and August 2006 (Weller *et al.*, 2008). This match provided the most contemporary link between the summer feeding ground off Sakhalin and a winter location along the coast of Asia. More recently, the Japan Times (3 May 2012) reported that in March 2012 a gray whale was sighted and photographed in Mikawa Bay (Aichi Prefecture), east of Ise Bay near Nagoya on the Pacific coast of Honshu.¹

While observations of gray whales in Japan have been made between November and August, most records are concentrated between March and May. This March to May period coincides with when a majority of the whales matched between the WNP and ENP have been sighted in the ENP (Weller *et al.*, 2011), suggesting that not all gray whales identified in the WNP off Sakhalin share a common wintering ground.

China

Observations of gray whales in China are also exceptionally rare. Although 24 capture, sighting or stranding records exist since 1933 (Wang, 1984; Zhu, 2002), including observations of two mother-calf pairs, some of these (especially the sightings) have not been reported in sufficient detail to validate species identification. More recently, an 11.5 m female stranded live at Zhuanghe (Bohai Sea *ca.* 39°N) in December 1996 (Zhao, 1997) and a 13 m female gray whale was taken in fishing gear offshore of Baiqingxiang (Pingtan County), in the Taiwan Strait in November 2011 (Zhu, 2012). Henderson (1990) summarized information from the 1869 logbooks of the New Bedford whaleships *Cornelius Howland* and *Onward* while they were on the “Chinese whale grounds” (also see Reeves *et al.*, 2008). The *Cornelius Howland* reported gray whales being sighted in February at nearly an identical location (Pingtan County) as the aforementioned November 2011 Baiqingxiang specimen. The *Onward* reported gray whales off the northern coast of Taiwan, but no subsequent records are known from Taiwanese waters (Yang, 1964).

While the 2011 gray whale specimen confirms the continued occurrence of gray whales off China, the low latitude location (~25°30'N 119°47'E) of this record in November 2011 (equivalent to the latitude of the ENP wintering lagoons in Baja California, Mexico), is early for the southbound migration. In his summary of whaling in Chinese waters, Henderson (1990) noted that whalers recorded gray whales arriving to waters south of Hailing Island (near Yangjang, Guangdong Province), China (north end of the island at 21°51'N 111°58'E) in January and February (before 1874). Wang (1984) reported fishermen noting a small number of gray whale sightings in June and July, but the method of species identification was not mentioned. Based on the varied timing of these observations, Henderson (1990) hypothesized that some gray whales may remain in Chinese waters all year and that the southern most whales occurred as far south as Hainan Island (between 18°30'N and 20° N).

Korea

Gray whales were once common and hunted off the coast of South Korea (Andrews, 1914; Mizue, 1951) and off Yushin (*ca.* 40°N 129°E), North Korea (Tago, 1922). The last reported commercial catches were in 1966 off Ulsan, South Korea (Brownell and Chun, 1977). Despite systematic annual sighting surveys conducted since 1999 during May and June when gray whales would be expected to be present off South Korea, no sightings have been reported (Kim *et al.*, 2002). In fact, there is no recent evidence from any source (stranding, sighting, bycatch) to confirm the occurrence of gray whales off the Korean Peninsula in the past 35 years. The last known sighting of a gray whale off Korea was in 1977 (Park, 1995; Kim, 2007). Given the absence of gray whales off the coast of Korea in recent times, we suggest that WNP gray whales have abandoned the once heavily used migration corridor along the Korean Peninsula or that the gray whale subpopulation using the Korean Peninsula is extinct.

¹ <http://www.japantimes.co.jp/text/nn20120503a7.html>

CONCLUSIONS

The past and present occurrence of gray whales off Japan and China (and the Korea Peninsula historically) suggest that not all gray whales identified in the WNP off Sakhalin share a common wintering ground. Despite the recently documented interchange of whales between the WNP and ENP, showing that some whales identified off Sakhalin migrate to the ENP during the winter/spring, the observed genetic differentiation between western and eastern gray whales (Lang *et al.*, 2011) in combination with sighting/stranding records from Japan and China during the winter/spring migratory period leads us to conclude that a relic WNP gray whale population still exists. That being said, the number of whales in the WNP population is probably substantially smaller than the currently estimated ~150 whales that use the Sakhalin summer feeding area. Thus, the status of gray whales in the WNP may be of greater conservation concern than is currently recognized.

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