Sightings of cetaceans in the Western Antarctic Peninsula during the first joint Turkish–Ukrainian Antarctic Research Expedition, 2016

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Abstract: During the cetacean surveys of the first Turkish–Ukrainian Antarctic Research Expedition conducted on 5–8 April 2016 in Lemaire Channel, Penola Strait, Flanders Bay, southern Gerlache Strait, and southern Neumayer Channel in the Western Antarctic Peninsula, 74 humpback whales (Megaptera novaeangliae) in 24 sightings and 11 Antarctic minke whales (Balaenoptera bonaerensis) in 6 sightings were recorded. The overall encounter rate (number of sightings/survey effort in nautical miles) was 0.333 (0.266 for humpback whale, 0.066 for Antarctic minke whale). According to the sighting distribution, the Lemaire Channel and Penola Strait are important migration and feeding habitats for whales. Five humpback whales were photo-identified individually by natural features on their flukes; one of them had a match in the Antarctic Humpback Whale Catalogue. The matched individual was first recorded on 30 August 2007 at Salinas, Ecuador.

Key words: Western Antarctic Peninsula, Argentine islands, humpback whale, Antarctic minke whale
The cetacean observations took place between 5 and 8 April, mostly at the Lemaire Channel and Penola Strait (Figure 1b). Ship-based observations continued towards Galindez Island and the southern Neumayer Channel, southern Gerlache Strait, and Flanders Bay. The average speed of the vessel was 10 nautical miles/h. During the survey (4 track lines), a total of 90.1 nautical miles was covered and 8 h and 43 min of observational effort were made (Table).

During the study, 30 sightings (85 individuals) of the two baleen whale species humpback whale (*Megaptera novaeangliae*) and Antarctic minke whale (*Balaenoptera bonaerensis*) were recorded. The numbers of individuals and sightings were as follows: 74 humpback whales in 24 sightings and 11 Antarctic minke whale in 6 sightings. The overall encounter rate (number of sightings/survey effort in nautical miles) was 0.332 (0.266 for the humpback whale, 0.066 for the Antarctic minke whale). The group size ranged between 1 and 9 (mean 3.08 ± SD 2.34) for the humpback whale and 1 and 3 (mean 1.8 ± SD 0.98) for the minke whale. The actual number of individuals may have been lower, because the same whales may have been recounted over the 4 days, especially in Lemaire Channel and Penola Strait. Therefore, the maximum number of individuals is more important, as it was the number of whales encountered in 1 day (actually 1 h) on the third track line, i.e. 35 whales all together (32 humpback whales and 3 minke whales).

Five humpback whales were identified individually using photographs of natural features on their flukes (Figures 2a–2e). One of them (Figure 2c) had a match in the AHWC (Figure 2f), which was first photographed on 30 August 2007 at Salinas, Ecuador (a4484, by Joffrey Mandersloot).

The encounter rates in previous studies showed that humpback whales are the most common species in the area in early autumn as in the Gerlache Strait, for which the encounter rate for humpback whales (mean estimated for 3 surveys between 1997/1998 and 1999/2000 summers) was 0.42 (Secchi et al., 2001). Humpback whale density was 0.22 whales/per survey mile in April 1986 in the Gerlache Strait and the highest densities were found inside bays (Stone and Hamner, 1988). In another study during autumn, the encounter rate was 0.27 km⁻¹ in the Gerlache Strait, but the highest number in bays, especially in Wilhelmina Bay, was 1.87 km⁻¹ (Johnston et al., 2012). Our findings support those of Stone and Hamner (1988) and Johnston et al. (2012), who reported increased humpback densities in small bays of the region. The inshore regions of the Western Antarctic Peninsula are important feeding areas for humpback whales in autumn and early winter (Johnston et al., 2012). In autumn, a high density of humpbacks feeding on a superaggregation of Antarctic krill (*Euphausia superba*) was observed in Wilhelmina Bay, Gerlache Strait (Nowacek et al., 2011). Johnston et al. (2012) suggested that many humpback whales aggregate in these small bays and channels in late autumn to forage. During late summer and autumn, humpback whales were found in high concentrations at the ice boundaries. Minke whales, on the other hand, increased during wintertime, while following and populating ice-covered areas along the entire shelf edge (Thiele et al., 2004). According to Friedlaender et al. (2014), Antarctic minke whales feed mostly under the sea ice, often skimming just below the frozen water while rapidly catching krill swarms due to the advantage of their smaller size. This can explain their presence in autumn in the area. According to the sighting distribution (Figure 1b), Lemaire Channel and Penola Strait can be considered important areas for the feeding and migration of these two whales species.

Shirihai (2007) reported that the humpback whale takes small schooling fish and krill as its diet. Therefore,
Figure 1. Study area: (a) cruise of expedition and (b) cetacean survey track lines and sightings.
krill abundance and sustainable population has vital importance for the humpback whale. It is already known that krill is a key species for the entire higher food chain in the Antarctic ecosystem. The largest krill predators found in the nearshore waters around the Antarctic Peninsula are humpback whales. According to Curtice et al. (2015), humpback whales are known to feed between 300 to 900 times each day and night and must recover the energy used by feeding on high concentrations of krill. Rational use of krill stocks is also important for the sustainability of the humpback whale population in the Antarctic and its surrounding waters.

One of the photographed humpback whales was recorded first on 30 August 2007 at Salinas, Ecuador. The Ecuadorean waters are known as a breeding area for humpback whales (Scheidat et al., 2000). Our observations support those of Stevick et al. (2004) and Rasmussen et al. (2007) on the migration between these breeding and feeding areas in the Western Antarctic Peninsula.

Currently, the main threats for humpback whales are accidental entanglement in fishing gears, collision with marine vessels, and acoustic interference resulting from discovery and use of marine resources (Bastida and Rodriguez, 2009). Due to their slow movement, they used to be easy targets for whalers. It is predicted that approximately 200,000 whales were hunted in the Southern Ocean, but since the moratorium in 1966, some stocks have increased by up to 10% in this region (Shirihai, 2007). Currently, this species is classified as Least Concern on the IUCN Red List (Reilly et al., 2008a). However, there are no accurate assessments of the current whale population in the Western Antarctic Peninsula.

The Antarctic minke whale has been one of the most important commercial whales in recent years, having been exploited for over 50 years. After the moratorium went into force in 1986, Japan continued whaling under a special permit until 2014, which now continues as the New Scientific Whale Research Program in the Antarctic Ocean (NEWREP-A) (FAJ & MFAJ, 2015).

Ruegg et al. (2010) underlined that in the Antarctic the krill surplus is directly related to krill-eating species like the Antarctic minke whale. It is currently classified as Data Deficient on the IUCN Red List (Reilly et al., 2008b).

The Antarctic Sea has been a popular whale-watching spot in recent years. Williams and Crosbie (2007) reported that Antarctic shipboard visitors are routinely rewarded with whale sightings. Lynch et al. (2009) showed that commercial shipborne tourism along the Antarctic Peninsula grew incrementally between 1989–1990 and 2007–2008, raising concern about the impact on the ecosystem. The highest marine traffic has been reported in the Gerlache Strait/Errera Channel, Neumayer Channel/ Peltier Channel, and Lemaire Channel/Penola Strait regions. During the 2016–2017 season, tourism was estimated to increase, with 43,885 visitors in the Antarctic Peninsula (IAATO, 2016). Although the International Association of Antarctica Tour Operators (IAATO) has prepared cetacean watching guidelines, stronger measures are needed for the protection of the whales from the impacts of massive tourism.

To protect whale populations in the entire Antarctic Sea, citizen science can help to attract more attention. In that manner, webpages like Happywhale (www.happywhale.com) and the AHWC (Allen et al., 2011) are

### Table. Details of the cetacean observations from each track line.

<table>
<thead>
<tr>
<th>Track line</th>
<th>Date</th>
<th>Area</th>
<th>Effort (nm)</th>
<th>Speed avg.</th>
<th>Effort (h:min)</th>
<th>Sea state/Beaufort</th>
<th>Weather</th>
<th>Humpback whale: number of sightings/individual group size</th>
<th>Minke whale: number of sightings/individual group size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 April</td>
<td>Gerlache Strait, Lemaire Channel, Penola Strait</td>
<td>42.1</td>
<td>11</td>
<td>03:50</td>
<td>Snowing</td>
<td>6/17/1–6</td>
<td>1/3/3</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>6 April</td>
<td>Flanders Bay, Southern Neumayer Channel</td>
<td>26.5</td>
<td>9.6</td>
<td>02:45</td>
<td>Snowing</td>
<td>1/1/1</td>
<td>2/2/1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>7 April</td>
<td>Lemaire Channel, Penola Strait</td>
<td>11.9</td>
<td>12.1</td>
<td>00:58</td>
<td>Overcast</td>
<td>8/32/1–9</td>
<td>1/3/3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>8 April</td>
<td>Penola Strait</td>
<td>9.6</td>
<td>8.2</td>
<td>01:10</td>
<td>Fair</td>
<td>9/24/1–5</td>
<td>2/3/1–2</td>
<td></td>
</tr>
</tbody>
</table>

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**Table.** Details of the cetacean observations from each track line.
examples of initiatives to collect information from the general public, as the information on the distribution and number of whales around the Antarctic Peninsula is still scarce. The fact that one of the whales we photographed had a match in the above catalogue shows the importance of such initiatives.

Nevertheless, the number of humpback and minke whales in the Peninsula remains unknown, and more long-term studies are needed. It is known that humpback and minke whales are the most abundant baleen whale species in the western Antarctic Peninsula (Friedlaender et al., 2006; Thiele et al., 2004). Our 24 sightings in a 4-day survey in a limited area show that these areas are significant and critical habitats for humpback whales.

Recent climate oscillation and its impacts on the distributional changes of cetaceans should be monitored in the peninsula. Nicol et al. (2008) reported that changes in the sea ice patterns will directly affect the distribution of cetacean species. Additionally, these whales are vulnerable to changes in the marine environment, mainly due to

Figure 2. (a–e) Photographs of flukes with distinctive marks of 5 humpback whale individuals (TR16001–5); (f) photograph of an individual, ‘a4484’ (photo taken by Joffrey Mandersloot, AHWC) in Ecuador, Salinas in 2007, which matched with TR16003 (c).
food shortages, and are threatened by various types of pollution and the possible alteration of fish stocks as a result of climate change in the peninsula. Whales are invariably and predictably related to the distribution of zooplankton and krill (Friedlaender et al., 2006). Periodic zooplankton/krill monitoring is also important for evaluating the health of whale populations in the area.

Regular ecosystem monitoring, habitat mapping, and determination of the distribution of cetacean species are needed along the Antarctic Peninsula. Marine protected areas around Antarctica for cetaceans have been also discussed for many years (Hoyt, 2005). Within this concept, all proposals for the designation of protected areas need accurate scientific evaluation of habitat and should be evaluated with ecosystem-based management principles. The 35th Annual Meeting of the Commission for the Conservation of Antarctic Marine Living Resources and its scientific committee declared a 1.55-million-km² area of the Ross Sea as a marine protected area. This will become the world’s largest second-high-sea marine protected area (www.ccamlr.org/eng/news). Initiatives of this kind should be encouraged to protect the pristine environment of Antarctica and its surrounding sea.

Acknowledgments

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References


