

## VESSEL COLLISION WITH A LARGE WHALE OFF SOUTHERN CHILE

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A cruise vessel, *Radiance of the Seas (Radiance)*, with a length of 293 m, docked in Puerto Montt, Chile at 0800 on 30 January 2009. The *Radiance*, owned by Royal Caribbean International, departed from Punta Arenas at 19:00 on 27 January. It probably traveled south in the Magallanes Straits and then north until it departed the Straits through the Sarmiento Channel, and then west to Pacific Ocean in the Gulf of Penas. It continued through the Ana Pink or Darwin Channel east into the Moraleda Channel and then between the eastern side of Isla Grande de Chiloe and the mainland of Chile north to Puerto Montt. After the ship docked in Puerto Montt, a dead baleen whale was found on its bow and reported to the local naval base (Gobernacion Maritima de Puerto Montt). Naval personnel authorized the company to tow the floating whale 12 miles offshore from Punta Quillagua (41°33'S – 74°11'S) and release it on the same day. We obtained photographs of the dead whale, taken soon after it was removed from the bow of the vessel, from Gobernacion Maritima de Puerto Montt.

Based on the photographs from the Gobernacion Maritima, we identified the animal as a female sei whale (*Balaenoptera borealis*) and estimated its total length at *ca.* 13.7 m (Figure 1). The species identification is based on the ventral coloration and specifically the characteristic irregular white coloration of the throat region. Also, the number of ventral grooves appears to be in the range for sei whales (32-60), rather than the 55 to 88 for blue whales and the 56 to 100 for fin whales (Geraci and Lounsbury 2005). In Figure 2, we counted 17 ventral pleats on the visible part of the right half from the approximate midline to the level of the anterior insertion of the flipper. From this we estimated the half count to be 24 for a total of approximately 48 grooves.

We estimated the total length of the whale by measuring the distance between the anterior insertion of the flipper and the genital opening. We measured this distance as 6 m by using the water line depths on the bow of the *Radiance*. Based on a stranded female sei whale with a total length of 15.3 m from near Concepcion, Chile on 5 October 2003 [see details on this whale below], the length between the anterior insertion of the flipper and the genital opening is about 43.8 % of the total length.

The tissue extending from the genital groove is not the penis as its diameter is greater at the distal end than at the base (Figure 1). The tissue in the various photographs appears too large and massive to be intestine. This tissue mass is most likely the distal end of the uterus. Therefore, we believe the specimen is a female.

The condition of the carcass was good (fresh) and not bloated but the whale floated after it was removed from the bow of the *Radiance*. The skin appeared to be in good condition and was not sloughing except where it had been in contact with the *Radiance*. Moderate decomposition was observed in the tissue extending from the genital region. The only external body scar that we could determine from the available photos were a cut in the ventral surface near the end of the ventral grooves. We also observed old, healed cookie cutter shark bites on the ventral surface posterior to the ventral grooves. Based on these observations, we believe the whale was most likely alive when hit by the *Radiance* but one to two days old when it arrived in Puerto Montt.

Figure 3 shows the contact or strike area on the left side of the whale. Figure 4 shows a cut on the left lateral side of this whale. Figure 5 shows the contact area on the right side of the whale where the flipper and ventral grooves were rubbing on the skin of the whale after the initial impact. The right side of the whale was in contact with the bulbous bow below the surface of the water. This lower section of the vessel was painted blue.

Sei whales are known to occur in the region transited by the *Radiance*. Pastene and Shimada (1999) reported sei whales from two areas between around 53-55° S on 15 February 1994 and again near 33°S on 20 February. Several hundred sei whales were recorded in March 1968 off Peninsula Tres Montes (*ca.* 47°S), which is the outer northern edge of the Golfo de Penas. We occasionally have observed sei whales off the northwestern end of Isla de Chiloe in 2004-2006 and 2008-2009 during our blue whale field season in February and March (Galletti Vernazzani *et al.* 2005; Galletti Vernazzani *et al.* 2006; Galletti Vernazzani unpublished sightings in 2008 and 2009). Therefore, the

summer range of sei whales includes various parts of the area transited by the *Radiance* in late January between Punta Arenas and Puerto Montt.

According to the Direccion General del Territorio Maritimo y de Marina Mercante (DIRECTEMAR) from the Chilean Navy, the general route used by cruise ships in the coastal waters of southern Chile is shown in Figure 6. The waters in the Golfo de Penas regions are generally rough and therefore if a vessel transited this region with a dead whale on its bow the carcass would probably become dislodged. Therefore, we believe it most likely that the *Radiance* struck the sei whale after departing the Golfo de Penas.

There are published records of three possible vessel strikes of large whales from Chilean waters (Sanino and Yanez 2005). The first is their case number 3, a sperm whale (*Physeter macrocephalus*) from near Boyeruca (34°42'S, 72°04'W) on 21 September 2003, the second specimen or case number 4 was reported as either a sei whale or Bryde's whale (*Balaenoptera edeni*) from Talcahuano on 5 October 2003, and the third is case number 6, a fin whale (*Balaenoptera physalus*) from the Bahia de Quintero on 9 July 2004. The sperm whale was reported to have been hit by a local artisanal fishing boat and live-stranded with propeller cuts. After the necropsy, it was thought to have hemorrhaged to death. In the sei or Bryde's whale, the authors reported based on pictures that the whale has a blunt area. We examined their specimens 4 and 6 but we did not find any evidence of vessel collision. However, external injuries are not always present on whales hit by vessels. We determined that their specimen number 4 was a female sei whale that stranded in Talcahuano (36°45'S, 73°08'W) with a total length of 15.3 m. We also examined their whale specimen number 6 that was released offshore after it first stranded at Quintero (32°47'S, 71°32'W) on 9 July 2004 and then again stranded on 17 July 2004 at Tunquen (33°15'S, 71°40' W). We could determine that it was a fin whale but we could not determine the cause of death when we examined it at Tunquen. Sanino and Yanez (2005) reported that the fin whale probably died from a vessel strike because the region around the left flipper was more decomposed than the rest of the carcass. However, when we examined the carcass, we did not observe any difference in the extent of decomposition around the flipper and the rest of the carcass. Therefore, we believe the cause of death for this specimen cannot be determined.

Number of sei whale hit by vessels are low compared to fin and humpbacks (Laist *et al.* 2001, Jensen and Silber 2004), and only four suspected or confirmed reports exist for the waters of the Southern Hemisphere (Van Waerebeek *et al.* 2007), but underreporting is expected (Van Waerebeek *et al.* 2007). The sei whale recorded as whale number 4 of Sanino and Yanez (2005) is not considered by Van Waerebeek. According to the DIRECTEMAR, 212 large vessels transited from northern Chiloe to southern Chile between December 2006 and May 2007 or approximately 1.2 vessels per day. A better reporting system is needed to collect additional details on any vessel strikes in Chile and this can best be accomplished through cooperation with the public and the naval regional offices. If any hotspots of vessel/whale occurrence were identified, these data then could be used to develop plans to reduce the possibility of these types of collisions.

## Conclusions

We believe that the sei whale reported here is the first confirmed vessel strike of a large whale in Chilean waters. The whale was a female sei whale with an estimated total length of 13.7 m. We also believe the whale was alive when it was hit by the large vessel (293 m) which was in transit between Punta Arenas and Puerto Montt. This determination is based largely on the relative freshness of the carcass when it was discovered in the port of Puerto Montt. It is important to develop plans to reduce the possibility of collisions with large whales as well as contingency plans to respond and collect data after a collision occurs. A new law in 2008 for the protection of cetaceans in Chile (Law 20293), now makes it legally possible to develop these contingency plans.

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Figure 1. Puerto Montt sei whale discovered on bow of vessel on 29 January 2009. The species identification is based on the ventral coloration and specifically the characteristic irregular white coloration of the throat region.



Figure 2. Ventral pleats of the Puerto Montt sei whale. We counted 17 ventral pleats on the visible part of the right half from the approximate midline to the level of the anterior insertion of the flipper.



Figure 3. Puerto Montt sei whale showing the contact or strike area on the left side of the carcass.



Figure 4. Puerto Montt sei whale showing cut on left lateral side.



Figure 5. Puerto Montt sei whale showing blue paint on right flipper.





Figure 6. General route taken by cruise ships along the southern coast of Chile provided by the DIRECTEMAR.