Navy vs. Whales: The Impacts of Sonar

July 3, 2004, 7:30 a.m. Around 200 melon-headed whales, normally deep-water whales, were spotted in the shallows of Hanalei Bay, Hawaii (Parsons, Dolman, Wright, Rose, & Burns, 2008, pg. 125). This incident is just one of many in which marine animals, particularly whales, are forced out of their natural habitats due to the use of active sonar technology. The use of active sonar by the United States Navy and other naval forces across the globe has become increasingly popular in the last decade. However, some people argue that sonar equipment is extremely hazardous to marine life and may cause serious harm to animals within its range. According to John Slocum (2009), the world's loudest rock bands produce sound that reaches no higher than 130 decibels. The 130 decibels experienced at a rock concert may cause damage when one is standing in the first few rows. However, when one is standing a few hundred feet away, the sound waves dissipate dramatically. The same cannot be said for the waves emitted from sonar equipment underwater. Navy submarines generate waves around 235 decibels that can maintain a 140-decibel wave 300 miles from the source (Slocum, 2009, para. 1). A wave this strong traveling for hundreds of miles underwater will surely encounter at least one marine animal if not more. Whether those waves harm the animals is debatable. Although the Navy has claimed to be taking precautionary measures to protect marine animals and legislation has been enacted to try to protect them, the overall impact of sonar has proven to have a negative effect on animals that depend on echolocation for food and navigation.

Sonar systems have been known to cause confusion in whales and other marine animals, leading to a loss of hearing and possible death. According to the National Resources Defense Council (2008), the dangers of using active sonar were exemplified when whales from four

different species were beached along the shoreline in the Bahamas in March of 2000 (para. 7). After investigation, the government found that the whales, specifically beaked whales, had gas in the form of bubbles in their organs in addition to signs that the whales suffered trauma to the brain and ears (NRDC, 2008, para. 9). Finding gas in the organs of underwater animals is the primary symptom of decompression sickness, a sickness suffered when the animal either ascends or descends too quickly (Jolly, 2012, para. 3). Previously, decompression sickness was only known to occur in human divers, but recent studies have shown that the sickness can be seen in marine animals as well (NRDC, 2008, para. 10).

Damage to the ears and brain of the animals, due to sonar technology, disorients them, causing them to swim in sporadic, unorthodox patterns away from the source of the sonar, sometimes inhibiting them from finding food. There have been many other circumstances in which a large number of whales have been beached or forced into shallow waters with injuries to their ears and brain, often times bleeding from the trauma. In 2001, Earthwatch Institute conducted an interview with Kenneth Balcomb, the founder of the Center for Whale Research in the State of Washington, following the stranding of 17 whales from four different species in the Bahamas in 2000. Balcomb has worked with Earthwatch teams in the Bahamas since 1992 and was one of the first who inspected the whale carcasses after the 2000 stranding (Earthwatch Institute, 2001, para. 3). In the interview, Balcomb explains how the beaked whales hear. He states that beaked whales are "jaw-hearers," meaning that the fat on their lower jaw serves as a pathway for the sound to travel from the jaw to the ear (Earthwatch Institute, 2001, para. 7). Since beaked whales have substantially more fat on their jaws than other whales, the incoming sound is amplified to twice that other whales, making them more susceptible to injuries and death from sonar use (Earthwatch Institute, 2001, para. 7). When asked how the sound

specifically affects the inner workings of the marine animal, Kenneth Balcomb responded by explaining resonance in an air chamber:

> A sound vibration produces an acoustic pressure wave that goes through an air chamber, expanding and contracting a millimeter or a micron or so if that vibration is not in resonance. But if the sound wave is in resonance, it will expand and contract many times that. An air chamber, like a whale's lung or a fish's swim bladder, shrinks in volume the deeper the animal goes . . . At the same time, since the air chamber is getting smaller, its resonance frequency will increase. So will any sound wave's amplitude when it is in resonance.
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> (Earthwatch Institute, 2001, para. 6)

Balcomb goes on to state that this type of shrinking and expanding causes hemorrhaging to occur, affecting the ears and their ability to hear and echolocate, a serious problem for animals whose lives depend on their ability to hear.

The incident in the Bahamas was just the beginning. Since then, many other strandings have occurred ranging from small to large quantities of whales. Parsons et al. (2008) cited many other times when whales were stranded due to low- and mid-frequency sonar use around the world. One series of strandings occurred in Japan, where 11 mass strandings amounted to 51 total whale carcasses found in 2004. In 2006, numerous beaked whales were found dead after a sonar exercise off of the Spanish coast occurred (p. 1249). Although these numbers are alarming, the negative effects of active sonar are far more extensive than solely whale strandings.

Indeed, there have been many instances in which whales have been beached or spotted dangerously close to shore, out of their natural habitat. Marine Connection (2012) that many of the whales and other animals affected are not even recognized because they have sunken to the

bottom of the ocean before making it to shallow water and the shoreline (para. 4). Since the animals have sunken to the depths of the ocean, it is impossible to estimate properly the damage being caused by the sonar equipment.

In an effort to protect marine life, multiple organizations including the National Resources Defense Council (NRDC) filed, and initially won, a lawsuit against the Navy, wanting to set restrictions on its right to use mid-frequency sonar in certain areas off the coast of California in 2003 (Slocum, 2009, para. 3). However, in 2008, the Supreme Court overruled the previous ruling from the U.S. Court of Appeals for the Ninth Circuit, which ordered the Navy to shut down the use of sonar only when within 2,200 yards (1.25 miles) of a spotted animal. The Ninth Circuit Court also ruled in favor of requiring the Navy to shut down completely all sonar during surface ducting (Acosta, 2008, para. 2). With the Supreme Court reversing the ninth circuit's decision, the risk to animals within 2,200 yards of the sonar jumped considerably. As Miyoko Sakashita, the Oceans Director at the Center for Biological Diversity, states, the "[w]hales and other marine animals don't stand a chance against the Navy" (Mashuda, 2012, para. 8). The same article goes on to explain that the visual detection of marine animals is inaccurate, stating that visual detection can miss up to 95 percent of animals in an area (Mashuda, 2012, para. 2). The Navy, on the other hand, takes a different stance on the topic, insisting that its efforts to survey the bottom of the ocean are not harmful to marine life.

In certain circumstances, the Navy has admitted that its sonar equipment could have a negative impact on the health of marine animals, but finished its statements by assuring the public that it practices safe sonar use and the numbers given were only released as precautionary measures to protect it from any future lawsuits in case something were to go wrong (McAvoy, 2012, para. 7). The Navy has stressed the importance of using its mid-frequency sonar because

of the fact that the vast majority of the ocean floor has yet to be explored. The Navy uses the side-scan sonar technology, allowing it to locate and map objects and structures on the ocean floor (Labbe, 2011, para. 8). Often times this type of sonar is used for detecting shipwrecks or seamounts (Labbe, 2011, para. 10). The Navy makes the argument that using sonar is the only way to gain knowledge about the sea floor, locate sunken ships, and protect submarines from seamounts. According to an article in the scientific journal *Nature*, "[l]ess than 1% of 47,000 known seamounts standing taller than 500 meters have been mapped in detail" (Dalton, 2009, para. 1). Seamounts are underwater mountains that are usually between 500 and 1000 meters but can be found over 1000 meters tall. If these seamounts go uncharted, submarines can hit them, causing death of the passengers and destruction of the submarine, as was the case in a 2005 collision between the submarine and a seamount off the coast of Guam (Dalton, 2009, para. 2). Nearly 100 passengers aboard were injured in the crash that damaged the bow section of the *USS San Francisco.* At the point of impact, the *USS San Francisco* was traveling at around 38 miles per hour, a speed fast enough to cause serious structural damage to the submarine (Drew, 2005, para. 12). If underwater maps had been drawn using sonar technology, this crash could have been easily avoided; instead, the lives of over 100 passengers were put in danger. According to Kendall et al. (2005), taking the images recorded by the side-scan sonar in the North-South and East-West directions makes it possible to create mosaics that vividly depict the ledges, slopes, overhangs, and other structures on the ocean floor (p. 1155). This type of mapping is only made possible with the use of side-scanmid-frequency sonar, and taking away the Navy's right to use the sonar increases the likelihood of another submarine crashing.

Although many environmental agencies claim that the sonar equipment used by the Navy is harmful to marine life, causing hearing problems or death in mammals that use echolocation,

the Navy insists that its use of sonar has not and will not cause harm to any marine animals. Due to the loose regulations placed on the sonar testing by the Navy post lawsuits and court rulings, many animals' lives are at stake. However, the use of sonar may save many human lives, especially those of the sailors aboard submarine vessels that might have otherwise collided with uncharted underwater mountains. The question lies in the hands of the Supreme Court. Are we willing to sacrifice the lives of thousands of marine animals in order to protect the lives of United States Navy personnel?

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