

Jonathan Eber

The Right Solution: Examining the Plight of the North Atlantic Right Whale, and Exploring Our Options

There is no mystery as to why, in 1935 when North Atlantic right whales were put under international protection (Kraus, Brown, p. 561 2005), their population had declined to so few individuals. North Atlantic right whales had been heavily hunted during the whaling era, and were driven to near extinction during the 18th and 19th centuries (Knowlton & Kraus, p. 193, 2001). The one piece of trivia that everybody seems to know about right whale is the origin of the creature's name. During whaling days, it was the "right" whale to catch, because they spent a lot of time near the surface, yielded large amounts of oil, and, because of their low density, floated after being killed (Knowlton & Kraus, p. 193, 2001). However, this does not explain why after decades of protection, North Atlantic Right Whales are still extremely endangered and have made almost no recovery. Unlike the South Atlantic Right Whale, which has flourished since becoming protected, the North Atlantic Right Whale's growth rate has hovered below 2% for years, and its current population of around 500 individuals is not getting noticeably larger (Kraus, Brown, p. 561, 2005). There are plenty places to point fingers, but there are no easy solutions to the frail condition of the North Atlantic Right Whale. The plight of the North Atlantic Right Whale is a direct result of their ecology, their current low population, and the nature of their coastal habitat. This habitat often proves fatal when it comes into contact with human fishing and shipping practices.

Whaling for Right Whales in the United States is almost completely unheard of nowadays. Under the 1972, Marine Mammal Protection Act, it is illegal for anyone residing in the United States to "kill, hunt, injure or harass all species of marine mammals" regardless

of population status. The sale of whale products is also prohibited (Lang, 2002). Nine indigenous Alaskan Communities have been certified to carry out subsistence whaling, but these communities hunt only Bowhead Whales. Even though humans are not killing North Atlantic Right Whales on purpose, they are still being killed, and that is OUR problem.

Right whales are the most likely species of any whale to be involved in an incident or collision with a ship (Parks et al, p. 57, 2012), and they also have the highest overall mortality rate of any whale (Kraus, Brown, p. 561, 2005). In a 1990 Document by Scott Kraus, data indicated that around 20% of documented right whale deaths were caused by collisions with ships, and an additional 7% were killed by entanglement in fishing gear. This means that 27% of right whale deaths were caused by humans in 1990 (Knowlton & Kraus, 2001, p. 193). Plus, 64% of all well documented right whales have evidence of entanglement and scars from collisions (Knowlton & Kraus, p. 193, 2001)

Not only are a large percentage of right whale deaths human induced, but mortality rates are actually increasing. The most recent study on the subject estimates a 4% mortality rate, give or take a few tenths of a percentage. If there are 350 right whales left, this means an average of 14 right whales die per year, 17% of which (2.4 whales) are reported and documented by scientists (Kraus, Brown p. 561, 2005). However, from Kraus' study in 2005, there were eight recorded whale deaths in the 16 months before the study, which is 2.9 times the average rate (Kraus 2005, p. 561)! Some have been attributing this rise of recorded deaths to better recording methods or even higher populations of whale, but that seems unlikely. Yes, the calf production among right whales has increased a fair amount since the year 2000, but the increased births have a small positive impact.

Right Whales are k-selected species, which means that there is a large amount of parental investment in offspring, low birth rates, and relatively few offspring at a time (Friedland, Relyea, Courard-Hauri, 2012) On average, the female Right Whale only gives

birth to 5.25 whales over the course of a lifetime (Kraus, Brown, p. 561, 2005). Births only increase whale populations by 1.6% per year, which means the birth rate is completely overshadowed by the death rate. Plus, this birth rate is entirely dependent on life expectancy, which has been on the decline recently (Fujiwara& Caswell, p. 538, 2001). In 1980, the average female life expectancy was around 51.8 years, but in 1995 it had dramatically been reduced to 14.5 years. Meaning many females produced 1.8 offspring, instead of the usual 5.25 (Fujiwara& Caswell, p. 538, 2001). Furthermore, the birth rate is hindered even more by the “allee effect,” which proposes a positive correlation between population size and growth rate, asserting that small, splintered populations, like the North Atlantic Right Whale, have a smaller chance of recovering (Norse, Crowder, pg 47, 2005).

These biological constraints explain why the North Atlantic Right Whale is not recovering as quickly as it should be, but these high mortality rates are very specific to the right whale. They are being killed off in far higher rates than other whales, and most other species of whale are not plagued by as many constant run-ins with humans.

This is due to Right Whale ecology and habitat. Right Whales spend most of their time relatively close to the shore, on the continental shelf in what is considered a coastal zone. The coastal zone, due to runoff from the land and from human activity, is the most productive and nutrient rich part of the ocean (Thorne-Miller, Earle, p. 59, 1991). In an 2009 study conducted by Susan Parks of Penn State, it was found that during the spring and summer months, large concentrations of zooplankton, the right whale’s main food source, are found in the top five meters of the water column. These patches of zooplankton quickly wear thin the deeper down you go. The zooplankton tend to stay near the surface and spread out for kilometers for hours during the daytime (Parks et al, p. 58, 2012) The study also tracked whale movement, and the results made perfect sense. These studies are often conducted through the use of a suction cup archival recording tag and are meant to document subsurface

behavior of right whale. In the 2009 Study by Parks et al and her team, 13 North Atlantic Right Whales were tracked for periods of around two hours at a time, and their location and depth were accurately recorded (Parks et al, p. 57, 2012) The study concluded that right whales spend around 84% of their time between .5-2.5 meters from the waters surface (Parks et al, 2012, pg. 59). At these depths, the whales are particularly prone to vessel collisions.

The chief problem facing the right whale is the fact that it spends so much time in busy areas that are used by humans. Living close to shore means the whales often become entangled in fishing nets and have an increased risk of ship collisions. Because numbers are so low to begin with thanks to centuries of whaling, the slow birth rate and high mortality rates make it impossible for the North Atlantic Right Whale to recover with current conditions. We cannot change the birth rate, because that is part of the whale's biology, but perhaps we can lower the death rate.

The Federal Government, and the National Oceanic and Atmospheric Administration work under the Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972 to prevent human induced whale death (Kraus, p. 561, 2005). But overall more has to be done. It is important to study and understand whale ecology, because it will provide hints into behavior and location of whales at certain times. For example, the State of Massachusetts uses PAM (passive acoustic monitoring) in buoys to monitor right whale vocalization off the coast. If a right whale is heard, its location is found and extra caution is used in that area (Parks et al, pg. 59, 2012). This is a good idea, but it turns out right whales do not vocalize when they are actively feeding, so ironically they are EVEN more vulnerable when close to the surface, because they do not vocalize (Parks et al, pg. 59, 2011). Acoustic echosounders should be put in place for zooplankton, as well as for whales themselves, because if large patches of whale prey can be identified, we can probably identify where the whales are going

to be. It is also important to know the feeding habits of whales. Seasonal behavior makes right whales particularly active during the month of April, so extra caution should be used.

Any space, from the inland extent of areas affected by tides and sea spray, to the outer limits of the continental shelf, can be considered part of a “coastal zone” and coastal ecosystems (Thorne-Miller, Earle, p. 59, 1991). To put things into perspective, habitats classified as Coastal Marine Ecosystems only occupy 10% of total open ocean space, and less than 20% of total land space (Thorne-Miller, Earle, p. 59, 1991). At the same time, its the most productive part of the ocean, and therefore, a very important piece of the carbon cycle as well as the cycles of many other nutrients and chemicals (Thorne-Miller, Earle, p. 60, 1991). It is also the home to this paper’s flawed protagonist, the North Atlantic Right Whale. Right Whales spend most of their time close to the surface, along the Atlantic Coast of North America, from Florida to Canada (Kraus, p. 56, 2005). This basically gives us two options when it comes to conservation. Are we planning on protecting this one individual species? Or is our goal to focus on the ecosystem itself. Ultimately, we should want to protect our coastal ecosystems, but where should we focus our efforts? Broadly? Or on this one endangered poster child?

In a 1999 paper, Brian Bowen of the University of Florida highlights a few different ways of conservation. One is taxonomic importance, where genetically unique and devious creatures should be given the most attention; for example, isolated species and “living fossil” species that give insight into evolutionary biology (Bowen, p. 7, 1999). Right Whales are not great candidates for this type of conservation, as there are many other types of more abundant whale, and there is also the South Atlantic Right Whale, and both North Atlantic and South Atlantic are subspecies of Right Whale. Then there is the classic, Single Species conservation vs. ecological conservation. The two practices are connected, as single species obviously fill an important niche in an ecosystem, and both practices seem to work for certain situations

(Bowen, p. 8, 1999). For example, reintroducing the Florida panther to the Everglades will not really help biodiversity all that much, but they still fill the role as top predator, so to repair the ecosystem in this case, a single species must be focused on to repair to repair the ecosystem (Bowen, p. 6, 2005) Meanwhile, there are thousands of varieties of African cichlids, so protecting ONE such species does not do much, and efforts should be more broad because the cichlids as a whole are important for evolutionary potential (Bowen, p. 7, 2005)

So what is the right answer for the Right Whale? I would say we should focus more on ecosystem, rather than right whale specific ecology. Morally, I am torn by this. It is not satisfying to say, "forget the right whale," but honestly with only 400-500 individuals, what difference does it make really? Of course, I would prefer to see the right whale exist rather than not exist, but I do not think we should focus our efforts so much on such a broken species with such a small chance of survival. It does not contribute to biodiversity that much. Of course the right whale teaches a valuable lesson. And many of the problems facing the right whale, such as overly active fishing and shipping practices, are problems that affect the wider coastal ecosystem. We have seen the severity of our overfishing practices. The fishing nets that kill so many right whales are also killing other marine mammals, as well as sea turtles. So we should learn from our mistakes from the right whale, and try to prevent similar things from happening from other species, instead of frantically trying to rectify our mistakes.

Works Cited

Friedland, Andrew J., Rick Relyea, and David Courard-Hauri. *Environmental Science for AP**. New York: W. H. Freeman, 2012. Print.

Thorne-Miller, Earle,, Boyce, and John G. Catena. "Coastal Marine Ecosystems." *The Living Ocean: Understanding and Protecting Marine Biodiversity*. Washington, D.C.: Island, 1991. N. pag. Print.

Lang, Angela. "Navigation." *Overview of Laws Protecting Whales*. Animal Legal and Historical Center, 2002. Web. 23 May 2013.

Fujiwara, Masami, Caswell,. "Demography of the Endangered North Atlantic Right Whale." *Letters to Nature* 414 (2001): 537-41. Print.

Parks et al, Susan. "Dangerous Dining: Surface Foraging of North Atlantic Right Whales Increase Risk of Vessel Collisions." *Biology Letters* (2011): 57-60.

Knowlton, Amy, Krauss, Scott. "Mortality and Serious Injury of Northern Right Whales in the Western North Atlantic Ocean." *J Cetacean Res Manage* 2 (2001): 193-208. Web.

Kraus, Brown, Caswell, Clark, Fujiwara, Hamilton, Kenney, Knowlton, Landry, Mayo, Mclellan, Moore, Nowacek, Pabst, Read, Rolland "North Atlantic Right Whales in Crisis." *Science* 309 (2005): 561-62. Web.

Bowen, B. (1999). Preserving Genes, species, or Ecosystems? Healing the Fractured Foundations of Conservation Policy. *Molecular Ecology*, 8, s6-s10.

Anderson, Noelle. *The Right Whale Urbanizes*. N.d. Television.