The Ecological Effects of Whaling

Human activities have caused a significant reduction in many marine species. Exploitation by fisheries and whaling industries has caused some species to become extinct or endangered. According to Chapin III and others (2000), "extinction is a natural process, but it is occurring at an unnaturally rapid rate as a consequence of human activities"[1]. In this section, human impact on whales will be discussed and the relationship between whales and their prey will be explored.

Whaling Technology[2]

A millennium ago, people began to organize large-scale whaling at the Bay of Biscay, located at the open sea of modern France and Spain. In 1860s, rapid development of technology after industrial revolution made numerous technological advancements, including the first modern whaling ship launched in 1863. It was steam-powered and equipped with harpoon cannon. Steam power eased maneuverability and harpoon cannon increased the range and killing power of the whaler and prevented the whales sinking to the bottom of the ocean. In 1925, a Norwegian factory ship was equipped with a platform that allowed an entire whale to be processed at sea.

Whaling Statistics[3]

According to Butman and others (1993), the whaling industry killed more whales between 1860s and 1900s than in the previous four centuries. From 1920 to 1986, over a million of whales were killed by commercial whaling. The Atlantic gray whale is now extinct and the population of humpback whale has been reduced by 95% of its historic population. Overhunting of whales has caused a change in deep-sea biodiversity and the potential ecological consequences are unknown.

Predator-prey Relationship

According to Clark and Lamberson (1982), there is a high correlation between areas of high krill density and areas of high whale catches. The predator-prey relationship enables whalers capture their target more easily[2]. Another aspect of predator-prey relationship is that when whales feed on poisoned or ill prey, this may cause death to the whales.

Disturbed Food Chain[4]

Commercial whaling and human impact have caused the depletion of marine species, especially the top level in food web. It is logical to generalize that if the predator is removed, the population of the prey should experience a growth. According to Stevens and others (2000), most marine ecosystems are extremely diverse with complex inter-relationships between species and predator-prey interactions are less tightly coupled due to factors such as prey switching, ontogenetic changes in diet, and cannibalism. They suggest that the depletion of a large predator may have serious and unforeseen consequences in the ecosystem.

International Whaling Commission

In December 1946, International Whaling Commission (IWC) was established at Washington. Its mission was to regulate whaling activities of different nations. It adopted the concept of Blue Whale Unit (BWU) to limit each nation to capture whales in Antarctica[5]. One BWU is equivalent to one blue whale, two fin whales, two and a half humpbacks, or six sei whales[6]. The defect of the BWU is that it allows whales to capture the most abundant, valuable, and convenient species at the time. In 1972, IWC abandoned the use of BWU and began to regulate catching by species and stocks[2]. Starting from 1986, the limit for whale catching was set to zero. Industries may resume whaling if the stock of a species is recovered to above 54% of historical abundance[7]. However, there is currently debate over historic whale population sizes. Roman and Palumbi (2003) state that DNA evidence indicates that before commercial whaling began, whale populations were 10 times larger than scientists previously believed[8]. According to traditional estimates (based on whaling log records), many whale populations have nearly recovered to the required 54% of their historic levels, but the new genetic analysis suggests it will take at least another 50 -100 years.

Sources

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