

Wild life Ecology

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“The effect of natural predation on whales and other marine mammals in comparison to the effect of whaling”

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Introduction

Since 1986, due primarily to public pressure, culminating in demonstrations in Trafalgar Square in London, an International ban on commercial whaling, introduced by the International Whaling Commission or (IWC), has been in effect. Currently, numerous species of the Great whales, including Minke, Humpback, and Fin Whales are threatened with extinction, and categorized as CITES (Convention for International Trade in Endangered Species) appendix I (www.CITES.org). However, due to a concession by the IWC which allows for the controlled harvest of certain whale species by aboriginal peoples by traditional hunting methods and by the scientific community for the purpose of research, these species continue to be exploited. This “loophole” in whaling law remains an extremely controversial issue within the scientific, political and public domains, as the Japanese continue to harvest around 950 whales annually in the Southern Ocean, close to the Antarctic, in the name of “science.” This quota is self imposed by the Japanese and believed by many to be superfluous, and a violation of international law by disguising a resumption of Japanese commercial whaling as science.

In 2009 the whale harvest was tallied as 510 Minke, 390 Fin and 50 Humpback whales (www.icrwhale.org). The stipulation within this concession is that no part of an animal taken for scientific research can go to waste and as such the whales are slaughtered and sold as meat products in Japan, where they fetch between 500,000 and 750,000 per animal. Prevailing opinion is that this continued harvesting of whales is a commercial venture and not in the name of research at all.

According to the Institute of Cetacean Research, an organization that is the Scientific face of the Japanese whaling fleet, Minke and Fin whale population and distribution via slaughter in the Southern Ocean, prevents a population boom which is necessary for the continued revival of the critically endangered Antarctic Blue whale (*Balaenoptera musculus intermedia*). Through Branch et al, I will examine this claimed resurgence of the Blue whale.

Parallel to this, Springer et al 2003 hypothesizes that the over hunting of these species has had detrimental effect on other marine species, such as causing *Orcinus orca*, commonly known as killer whales, to change feeding habits to contend with the loss of its prey species. Lastly, I will

examine Lance et al study on the feeding habits of the Killer whale, specifically its effect on the Stellar sea lion, allowing for the confirmation of a divergence - What does this mean? from what is believed to be its primary food source.

Findings.

The findings of Branch et al put forward evidence of the apparent resurgence of the blue whale in its natural range in the Southern Ocean. Prior to the implementation of the international ban on commercial whaling, the harvest peaked at 29,409 whales in 1931. However, from this point on, the numbers of the harvest drop dramatically, reaching to only three whales in 1973. This was calculated to be in the region of .34% of its original abundance prior to implementation of commercial whaling (Branch et al). In the year 1981 there were 546 recording sightings of blue whales, the year 1988 (post ban) documented 680, and in 1996 there were a total of 1891 sightings. The work of Branch et al is based on direct observation but, as I will explain below, is problematic.

There are a multitude of discrepancies with the research. Firstly, the authors acknowledged that the direct observation of the blue whale is inherently difficult due to their elusive nature including fear of man and their poorly studied migratory patterns. This in itself is indicative of a poorly constructed and ill conceived study. Additionally, the authors indicate that the observation of blue whales could in fact be a misidentified as Fin or Humpback whales. The authors site increases in population of Bowhead whales, Sei, and Right whales, due to the implementation of the International ban on commercial whaling. However this does not negatively affect the Antarctic blue as they examine populations of these species outside of the natural range of their investigation. However, they do proffer that a similar increase in the population of Minke and Fin whales within the borders of the blue whales range could have a detrimental effect on its continued recovery. However, no statistical data is supplied as no such surveys have been conducted.

The main hypothesis put forward by Springer et al is that the over hunting of whales has led to the collapse of populations of seals, seal lions and sea otters. Killer whales are cited as a primary reason for such a collapse in that these animals are known to predate on other species of whale such as the Right whale, Minke whales, Gray and Fin whales. As these whales were, and

continue to be harvested by man, the paper suggests that the over harvesting has caused the Killer whales to switch from their normal prey to smaller but more prevalent prey in the form of pinnipeds, smaller cetaceans, fish, birds and crustaceans. However there are a number of problems with such an explanation as indicated by Lance et al.

The paper does not readily discriminate between resident, transient and off shore groupings of killer whales as described by Lance et al. Transient killer whale populations are known to kill predate mainly on pinnipeds and whales whilst in contrast, resident populations are known to be primarily piscivores and regularly inhabit the same habitat as Stellar sea lions with no detrimental interactions occurring. Studies by Deeke et al (2002) show that the seals respond differently to the acoustic behaviour of transient and resident killer whales. Therefore estimates of pinniped eating killer whales densities made by Springer et al would be over estimates. Furthermore, whilst it is recognised that transient killer whales now predate frequently on pinnipeds which has been caused by a removal or decrease of a primary food source, such as great whales, Lance et al conclusively prove that the predation of these whales was far inferior to that of harbour seal, Dall's porpoise and others irrespective of numbers in the habitat.

The paper does not look at the populations of killer whales over prior and post whaling periods. It is proposed that killer whales predate on harbour seals in shallow water, as they are less agile and slower than other prey types. If killer whales are predating on such a large volume of pinnipeds, as proposed, then their own population should respond accordingly with an increased reproductive output. Yet this is not addressed in the paper.

Many papers have suggested that no single factor is responsible for the declines of populations. Hence, increased predation pressure by Killer whales on such a diverse range of species including dolphin and herring may contribute to a decline of a particular species but it may not be the sole factor. The paper clearly states that because the mammal eating killer whales, or transient population feed on a variety of marine mammals, and alter their diets with changing prey availability, prey whale species decline could have lead to increased consumption by "at least some" of the whale eating killer whales.

The estimated density of killer whales, 3.6-7.6 individuals per 1000km², seems too low to cause such a detrimental impact on such a diverse range of species. Lance et al emphasise the need for refinement of killer whale population estimates and the percentage of Stellar sea lions and other marine mammals in the killer whale diet. The paper further states that it is unlikely that

killer whales played a role in the initial decline of populations of sea lions and this statement further reinforces the point made above that it is rare in nature for a single factor to cause such a dramatic decline in a large and diverse range of populations. However this could be caused predominantly by the continued over hunting of whale species by man, precipitating an ecological imbalance. It is clear from studies that sea lion decline is independent of nutritional factors and can only be attributed to increased adult mortality. Springer et al briefly include factors such as purposeful shooting and incidental mortality in fishing gear yet fail to carry either factor forward for further analysis. Such omissions are likely to effect later estimations in the paper and mortality relating to other factors apart from Killer whales are wholly excluded from examinations. The paper states that causes of pinniped decline are poorly known: “except that incidental mortality from commercial fishing activities and intentional harvesting in the 1960s and early 1970s appear to explain substantial portions of the initial decline”. In fact few studies have actually addressed human harvesting and environmental oscillations as probable causes of pinniped decline. Losses of whales to harvesting by man is based as mentioned on the International whaling commissions records, but such records do not reflect the true catch rate as it is estimated that up to 60% of the Blue whale catch of the Japanese fleet between 1949 and 1971 went unreported. Therefore the resurgence of the Blue whale and indeed, whales in general is presently caused more so by the ban on human harvesting than allowed for by both Springer et al and Branch et al.

Springer et al claim that great whales were/are the main prey type for killer whales yet there has been debate over the nature and importance of killer whale predation on the great whales and is seen very well in the research of Lance et al. Furthermore the rate of scarring on the great whales from killer whale attacks vary by region and species implying that predation rates vary between pods of killer whales. Conversely the point may imply that no single species of great whale, namely the blue whale, fin and Minke whales in the Southern ocean and gray whales in the North was a stable diet of the killer whales overall. Some species of whale have shown remarkable recoveries in recent years, and to a lesser extent the Blue, however the numbers of Fin and Minke whales have remained relatively static in the same period. Therefore why would killer whales not respond to such a large prey source by switching from excessive pinniped predation back to say, an enlarged population of blue whale?

George et al postulate that seasonal migrations by species of great whales to areas that are comparatively nutrient poor are an effort to reduce predation pressure on newborn calves by killer whales. If indeed killer whales are the primary factor associated with pinniped declines then surely the predation rate on such species would increase during migration seasons of great whales such as the blue, as this is the period where the major food source is removed from the killer whales range. However neither Springer et al nor Branch et al approach this point.

Sadly, no effort is made to include the evident overlap between pinniped decline and intentional harvesting by man in the 1970s. Hence the paper of Springer et al appears to be quite narrow in its approach and fails to consider an array of factors, such as pollution and global warming effects in favour of citing the decreased numbers of great whales as a direct factor in the citing of the killer whale as the sole culprit.

Conclusions:

My conclusions from these studies are unfortunately that the resounding public opinion in regard to the intentions of the Institute for Cetacean research appears to be well founded. Members of the institute are authors amongst Branch et al. They cite the pressures applied by an increasing Minke and Fin whale population on the Blue whale, yet fail to indicate why this would be so, as the numbers of these whales have not undergone a radical enlargement in recent years to the degree of other species. Coincidentally then, the authors mark the species which are currently the object of the Japanese whaling fleet as a veritable pest species, while in fact still being listed as CITES appendix I.

The study by Springer et al would appear to be based without the knowledge of the recognised three groupings of killer whale populations. While there is undoubted evidence to support the claim that Killer whales have and do continue to predate members of the great whale species, it is acknowledged that a minority of the killer whale population engage in this activity naturally, as indicated by Lance et al. As such it could be presumed there has not been a major shift in the feeding habits of the Killer whale population due to the exploitation during the early 20th century, as there has been no known movement back to their primary prey targets as shown by the findings of the stomach contents of the animals in the study. But by way of logic it would appear to me that if the Minke and Fin whale populations were allowed to flourish

unabated, then according to Springer et al, this would alleviate the pressure of killer whale predation on a wide variety of mammal, fish and

My feeling is that the behaviour of Killer whales is far less influenced by the populations of the great whales than Springer et al hypothesise. Hence, due to the low number of animals that actually engage in great whale predation and the numbers of animals on which they would predate, the collapse of smaller marine mammal stocks is neither the cause directly of killer whale predation nor of diminished whale stocks indirectly.

As such, by way of logic, it would appear to me that if the Minke and Fin whale populations were allowed to flourish unabated, without the yearly cull by the Institute of Cetacean Research, then according to Springer et al, this would alleviate the pressure of killer whale predation on a variety of great whale species including the blue whale, and also on other marine mammals, birds, fish and crustaceans, as indicated by Lance et al. It is admirable that the Blue whale, the largest animal on the planet, continues to fight its way back from the brink of extinction. However I can't help but feel it would continue on its path, regardless of the helpful intervention of the Japanese Whaling fleet, disguised as the Institute for Cetacean Research as long as the International ban on commercial whaling remains in place. As is the case with a multitude of other Great Whale species.

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