

The world's industrial fisheries



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The world's industrial fisheries can be considered predatory, as they hunt fish and other marine life on the behalf of flesh-eating humans. Therefore, these fisheries can be considered as competitors of the natural predators that exist among marine wildlife, and the activities they perform adversely affect the population by reducing the number of fish available as prey. Industrial fisheries' role as predator has been the cause of a major decline in the number of kittiwakes that exist in the North Sea (Frederiksen, 2004).

Since the beginning of the 1990's the population of these pelagic birds has declined by over 50%, and the black legged creatures (known scientifically as *Rissa tridactyla*) are thought to have succumbed as a result of a reduction in their food supply caused by an interruption of the food chain (2007). Another factor that has been instrumental in affecting the population of these black-legged kittiwakes in the North Sea has been the change in oceanographic variables. Such factors as sea levels and temperature in the North Sea have been monitored, and their changes have been shown to correlate with the general changes in the kittiwake population (2004; Wanless, et al., 2007). Specific research done over a 15-year period from 1986 to 2002 has confirmed that not only has significant increase in industrial fishing of kittiwakes' prey taken place, but also that significant oceanographic changes also occurred alongside these demographic changes. Kittiwakes and other pelagic birds demonstrate the existence of complex relationships between their feeding levels and their ability to produce offspring (Ollason et al., 1997). The most common form of prey for the black-legged kittiwakes is the sandeel, and it has been shown that during the most active period of sandeel (also known as sandlance) fishery (between 1991

and 1998) the survival of the adult population of kittiwakes showed a sharp and sustained decline (Frederiksen, 2004; Wanless, 2007).

The harvesting of sandeel has affected the population of kittiwakes in other ways, as the breeding of the species also declined for subsequent generations. Since the longitudinal monitoring of the black-legged kittiwake population has pned several years before and after this sandeel-harvest period, research has been able to demonstrate that the kittiwake population was actually on the rise before industrial fishing of sandeel (*Ammodytes marinus*) began. The change registered a 19% fall in the growth rate of the population, from +8% to -11% in just eight years (2004).

However, sandeel fishery has had more than just an immediate effect on the population of the kittiwakes. In recent years, this form of industrial fishing has experienced a decline that has proven favorable for the population of black-legged kittiwakes in the North Sea. Nevertheless, the current decline in industrial fishing of sandeel has failed to improve the situation for the kittiwake to a significant degree, as the population continues to fall.

Even the newly elevated breeding rates have still proven insufficient to bring the population growth back up to what it was before it was adversely affected by industrial fishery (Frederiksen, 2004). In statistical models developed by researchers, the population decline promises to continue even if sandeel harvesting is low (2004). In order for the kittiwakes to flourish, such industrial fishing would need to cease altogether for an extended period of several years.

More recently, it has been demonstrated through research that the sandeel that do survive have also been undergoing changes that may reduce their

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quality and nutritional usefulness to the kittiwake population (Wanless, 2007). This is particularly important, as kittiwakes tend to go through an extensive and technical, yet very critical feeding stage prior to breeding (Ollason et al., 1997). Analysis of the body composition of these sandeel has rendered low levels of lipids.

The sandeel have also been appearing significantly later in the season than usual, and their body sizes have shown significant decline in the past three years (2007). While it is not clear to what extent these changes may be attributed to industrial fishing, it might be hypothesized that pollution may have a bearing on these variables. Oceanographic factors may also come into play in this area.

The global warming changes to climate have affected oceanographic factors, and these effects have also resulted in a decline in the kittiwake population of the North Sea (Frederiksen, 2004; Wanless, 2007). The correlation between the survival of adult kittiwakes and the increased temperature of the winter seas has been negative. In fact, the success of kittiwake breeding has been recorded as showing a one-year delay (2004). The fact that the decline in industrial fishing of sandeel has been only minimally successful in causing the recovery of the kittiwake population indicates that the increased winter sea temperatures have taken a heavy toll on these pelagic birds.

The association of the decline in kittiwakes with warm winter sea temperatures and increased industrial fishery has led to some difficult choices for humans. Since it is unlikely that global warming can be reversed quickly or easily enough to decrease winter ocean temperatures and improve the condition of black-legged kittiwakes, changes to industrial

fishery is the most feasible solution. These changes will have to be drastic in order to garner any improvement in the kittiwake populations, considering that the damage to the population and its breeding processes have proven to be extensive.

Therefore, the complete closure (for now) of the section of the fishery industry that harvests sandeel has been considered the only measure that will lead to the recovery of the kittiwake population (Frederiksen, 2004; Wanless, 2007). It might also be considered that reduction in marine pollution is likely to lead to the improvement of the condition of the sandeel, which may in turn aid the growth of the kittiwake population by providing them greater nutrition. Therefore, decreasing its use of pollutants is another way in which the fishing industry may help the recovery of the black-legged kittiwake population in the North Sea.

References

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