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Overfishing- Fact or Fiction?

Introduction:

Fishing is a common practice across the globe, both on an industrial and recreational level. The sustainability of our fishing methods is most certainly questionable; however, humans have always had their impact on the population of fish species that are generally caught and consequently their ecosystem and other members of their food chain (Jackson, 2001). Constant and excessive fishing in certain areas combined with further advances in fishing equipment have led to a significant noticeable decrease, over several years, in the size of fish species and hence signs of overfishing are apparent (Daniel Pauly, 2002) (Orensanz, 1989) (Jackson, 2001). Overfishing may be defined as catching vast quantities of fish, such that the rate that they are removed is faster than the rate that stocks can rebuild themselves and hence resulting in low numbers of fish species. (http://www.fishwatch.gov/features/overfishing_overfished_same_thing.htm, 2013). The aim of this report is to examine overfishing and the subsequent problems that it causes, specifically; in relation to the target fish species and by-catch. I am going to do this by undertaking a literature search.

Methods and materials:

In order to understand the issue of overfishing I collected information through a literature search on the topic. I made use of google scholar and web of knowledge to find scientific journals and papers that I thought were relevant to this report. I also utilised internet sources.

Results and discussion:

Overfishing is a growing problem that has been on the rise for many years now. It has not instantly come to our attention. However, huge enhancements in fishing gear occurred shortly after the Second World War (Daniel Pauly, 2002). Although it was thought that the El Niño event was the principal reason and causes for the drastic

drop in numbers of the Peruvian anchoveta, however, further, more modern research, mainly through catch data, which amounts to around 18 million tonnes, along with other evidence suggests that it is actually overfishing which was the underlying problem (Castillo, 1987). In recent years, developments in fishing equipment have facilitated a substantial increase in industrialised fishing. New complex ships and fishing gear have provided researchers with an increased number of difficulties in monitoring catch analysis. It is hard to precisely monitor the depletion of fish stocks and to carefully assess their populations. Many fisheries haul in far more fish than they are legally allowed to, despite strict quotas being put in place. Hence, this takes the problem of overfishing to another level (Daniel Pauly, 2002) (David J. Agnew, 2013). Worldwide, the human population makes use of the sea as a valuable resource to sustain their communities, especially in some parts of Western Africa where fishing an essential sector of employment and is an important food source. Therefore in this area of the world the sea is an indispensable resource to the Western African population (Garcia, 2012). Certain fish are more commercially desirable than others. Some of these fish may be slow to mature or difficult to catch or even locate (Sadovy, 2001). People didn't and still do not realise the threats they place on these fish species by routinely catching them for trade. It may seem like these fish are in abundance but, in reality, stocks are depleting very rapidly and there has been a sizable decrease of 90% in large predatory fish species particularly in the last 50-100 years. This includes those species that are most commonly recognised such as Tuna or Billfish. In fact, it was recorded that by the turn of the millennium that over two-thirds of commercial fisheries across the globe were in danger and had been classified as fully exploited, overexploited or seriously depleted (Ransom A. Myers, 2003). Fish stocks will definitely end up becoming smaller and harder to manage, if action is not taken. Management schemes such as restrictions in breeding season and quotas must be put in place to attempt to rebuild these stocks (Hutchings, 2000) (Gislason, 2000). Fishery management committees will also have to enforce more rules and regulations for fishing fleets and put in place fishing bans in sensitive areas, these may be areas where fish stocks are recovering or in marine protected areas (these are zones in the sea which contain certain species that are

under observation and need protected from danger) (Russ, 2005) Apart from the obvious depletion in the stock levels of the target fish species, due to non-selective and destructive fishing methods, over fishing has a negative effect on many other species which are innocently caught as by-catch. By-catch is a major issue of conservation for the ocean. Taking the definition of by-catch as 'unused or poorly managed', data from marine fisheries shows that by-catch amounts to 40.4% of global catches. This highlights the absolute necessity for management in this area. Occasionally by-catch may be sold but in many cases by-catch is dead or dying even before it manages to reach the deck so is usually discarded, and unfortunately it has been estimated that between 17.9 and 39.5 million tonnes (averaging 27 million tonnes) of fish are discarded each year in commercial fisheries, which is a diabolical waste. It is difficult to believe that such a huge proportion of our catches from fisheries worldwide originate from by-catch. Bangladesh trawl fleets are given guidelines to follow to filter the fish that they catch. These may include certain sized nets, denied access to waters which are shallower than 40m and zero discards, but despite these restrictions being put in place they are not strictly followed. For the shrimp fisheries a ratio of 4:1 catches to discards is given but in reality, shrimp catches only reach 4.8% in depths over 30m and 1.5% in depths less than 30m. The amount of by-catch is therefore 20.8% times larger in deep water and 67% greater in the shallow water (Davis, 2009). Bottom trawling causes a devastating effect on the ocean as it acts in a similar way to ploughing a field or clear cutting forests. Organisms found on the sea bed and many producers of the food webs (which are of vital importance in order for sufficient reproduction of the fish stocks and to maintain the ecosystem) are wiped out (Hall, 1998). This may hinder the survival of juveniles and hence leads to a decrease in numbers in the population of that (and many other) species (Turner, 1999). Trawl nets are usually huge and therefore are able to catch a large amount of species at one particular time. This is particularly worrying for commercially valuable and endangered species such as sea turtles, many of their eggs are caught as by-catch and this decreases the animals chances of survival due to a consequent decrease on the numbers of surviving young (A. Biju Kumar, 2006). The by-catch species are usually directly related to the target species being caught.

In many cases the by-catch species is much larger than the target species and the target species is its selected prey. For example, research off North-West Africa has shown that the diet of local dolphins and minke whales overlap the catches of the commercial fish and hence they are in greater danger of being caught as by-catch by fisheries interested in the target species. Also, if the number of the commercially important target fish species was to decrease the number of dolphins and minke whales would likely decrease soon after. (Morissette L, 2010). It may be surprising that incidental capture is the most common cause of death for cetaceans worldwide. (Reeves R.R, 2003). Seabirds are also highly threatened by Longline fisheries. In Japanese longline tuna fisheries in the Southern Ocean, 44000 albatrosses have been killed each year. This problem is also apparent with the Southern Ocean Patagonian toothfish fisheries which have led to the death of over 25000 seabirds. These figures show that fisheries have shown a negative impact on the growth and survival of the population of these birds in different areas. This problem is so large that approximately 60 petrel species and 16 albatross species have currently been classified as threatened species. Although the true extent of the problem is still being investigated and several fishing methods are being assessed, it is evident that the management of fisheries must be improved (Bull, 2007). While in most countries by-catch is seen as useless and is discarded, in India, by-catch is kept, sorted and used in a number of different ways because of its economic value. In Gujarat, the largest marine fishing location in India, by-catch is mainly used for fish meals and the production of fish manure (Zynudheen, 2004). The shrimp trawlers follow a logical sorting process in order to made the best possible use of the by catch. Firstly, species with high economic value such as shrimp, lobster, large crabs and edible fishes etc. are separated from the haul and stored in ice. Shell fish in the by-catch are marketed fresh at local markets. Species such as anchovies, sardines, sole or mackerels found in abundance are sun-dried or salt-dried so they can be used for local consumption or exportation (George, 2004). However, the rest of the world has a lot of work to do to catch up to this level and to decrease its high percentage of by-catch and over fishing. As most fisheries are catching by-catch in vast amounts this makes over fishing much more serious as effectively target species and by-catch

species are ‘over fished’. Analysis into the accurate catches and percentage by catch must be undertaken as fishery management is usually centred around the target species and hence the depletion of by-catch species may not be monitored and could go completely unnoticed (Brander, 1981) (Casey, 1998) (Baum, 2004).

Conclusion:

When we look at the problem of over fishing it is apparent that some important and necessary management is needed to prevent the problem from deteriorating further. We may need to change the way we obtain our fish or the location of our fisheries across the globe, in order to protect our precious marine ecosystems. Despite many hard efforts our seas are continuing to battle a number of varying pressures. Overfishing in fact is not the only problem that leads to these serious declines in our fish stocks. We may be convinced from data provided that overfishing alone is emptying our seas but we must understand that climate change and pollution have an undeniable effect alongside over fishing. Therefore, we need to take this into account for future years if our fisheries are to be effectively managed and continue to provide for humanity.

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