Project 3 Proposal

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Research Question

One research question I could ask myself is how humans are a contributing factor to the decline of shark population. This is a question that’d help me define multiple reasons for the situation. Both direct and indirect causes need to be accounted for in order to be completely informative. Another question is how much has the shark population decreased. This puts into perspective what the situation is. This would inform the audience what the future of these species is. Such an important statement will inform people of the dangers of our actions. Through my research of the topic so far, I’ve concluded that humans are a major contributing factor to the sharp decline of the richness and abundance of the shark species. However, I need to research what specific actions are leading to this drastic conclusion. Is it pollution, fishing, finning, or a completely different action that is harming the population of sharks?

So What

The population of sharks is decreasing at an alarming rate and humans are the leading cause for this course of devastation. Ignorance to this issue can be diverted as awareness is spread. Fisheries in eastern countries are ignorant to the conservation problems regarding sharks. This ignorance quickens the endangering of sharks. We shouldn’t let a whole species die out just because of the ignorance of the masses. Consumption and demand for shark products is ridiculously high. This species can be saved. We shouldn’t be the reason an entire species is dead. The abundance of sharks has drastically declined and almost at the point of no return. Stricter conservation efforts can lag if not prevent the extinction of this species.

Organizer

Shark Population is dying

1. Degradation of Habitat
   1. Pollution to open oceans
   2. Pollution to coral reefs
      1. Would this kill many species
      2. Why is this important to sharks?
   3. Sharks dependency to coral reefs
      1. Is it a shelter?
      2. How much do they rely on coral reefs?
2. Fishing and finning
   1. Sharks hunted and consumed
   2. Shark fin soup is a delicacy in Asia
   3. Any current regulations to prevent overfishing
3. Who is doing it
   1. Major contributors to shark fishing
   2. What are they being hunted for
      1. Where are they being exported?

Literature Review

Images from decades ago presented the sharks as an abundant species roaming around coral reefs and all oceans across the world. Recent observations demonstrate a concerning decline in shark species richness and abundance. Several contributing factors are present through multiple scientific observations. Such observations revealed that the sharks’ habitat of coral reefs have been degrading through the years. Through her research, Dr. Espinoza has emphasized the essentials attributes of shark habitats. Dr. Espinoza and her colleagues have studied five major shark species and their associations with their environment in regards to the Great Barrier Reef. Through extensive observation they found that some sharks were observed more in northern sites with high coral cover while other shark species preferred southern sites with high coral cover (Espinoza, Cappo, Heupel, Tobin & Simpfendorfer, 2014). This distinguishing analysis proved to also indicate other species that were specific to distinct sites with certain types of coral reefs cover. Thus the research has determined the specific needs for the distinct shark species in terms of their habitat. However, some shark species do venture away from these habitats as well. This study doesn’t mention these outliers too much. Dr. Espinoza has also emphasized that more sharks were present in sites of higher complexity in the coral reefs than the sites with lower complexity (Espinoza et al., 2014). This complex diversity of the coral reef cover and species is crucial to the survival of shark species. Although sharks do venture away from coral reefs, Dr. Espinoza has concluded that their presence in coral reefs in severely consistent through years of observation (Espinoza et al., 2014). This extreme diversity is, however, threatened by land based pollution.

Dr. Kroon and Dr. Thorburn have stated the varying factors of pollution that have been degrading the Great Barrier Reef and other coral reef systems that sharks rely on. Through their environmental analysis, they’ve discovered three major factors that are causing pollution in the coral reef system. Dr. Kroon explained that surface and subsurface erosion as one of the reasons for the pollution (Kroon, ThorBurn, Schaffelke & Whitten, 2016). Surface erosion is when the soil, byproducts of cattle grazing, and farming is drained down to waters by rainfall (Kroon et al., 2016). This leads to Dr. Kroon’s next major emphasis on pesticides. The use of these pesticides and fertilizers used for crops is sometimes unintentionally drained into oceans as well (Kroon et al., 2016). This study does show the causes of pollution but doesn’t mention how much fertilizer or pesticide is introduced to coral reef systems. Such an important factor may decide if this is a significant problem. Another reason stated by Dr. Kroon is the increases of the biomass of phytoplankton due to increased availability of nitrogen (Kroon et al., 2016). This combined with fine sediment resulted in “reduces light availability for photosynthesis” (Kroon et al., 2016). The reduced energy then degrades the coral reefs. This then results in the crucial habitat of sharks being destroyed. The study doesn’t mention the area these phytoplankton affect. It might be an insignificant area of water that may not affect the reefs. Nonetheless, Coral reefs are very important to the survival of sharks.

Dr. Simon P. Oliver has conducted a study to analyze the mutualistic relations of sharks and cleaner species that “forge on ectoparasites” (Oliver, Hussey, Turner & Beckett, 2011). These cleaner fish consist of species such as cleaner wrasse and lobroides dimidiatus (Oliver et al., 2011). In their study Dr. Oliver and colleagues observed the behavior of sharks through coral reef systems and their interactions with these small cleaner fish or shrimp. Dr. Oliver observed that the cleaning species would more often feed from the side of the sharks that had ectoparasites (Oliver et al., 2011). Often times the sharks were seen to approach areas where these small fish or shrimp gathered and waited for them to feed on the parasites if there were any. This interesting interaction is diminished as the habitat is being degraded. Dr. Oliver has explained that sharks infected by these parasites suffer from health consequences such as “anemia, the deteriorated development of reproductive organs, reduced respiratory efficiency, and chronic and debilitating skin disease (Oliver et al., 2011).” I think it’s incredible how such drastically different species as this shrimp can play a vital role in the health and survival of sharks. This relationship seems to be crucial to the survival of sharks. I wonder how quickly we’d see the consequences to the sharks after these small cleaner species die due to their loss of habitat in the coral reefs. Just as how humans contribute to the loss of the habitat of these cleaner fish and sharks, they also contribute to another major reason for the declining population of the shark species.

Another reason for the decline of the shark species is shark fishing and shark finning as indicated by a study done by Dr. Po-Shun Chuang. In his study Dr. Chuang “DNA barcoding method to identify the species of sharks entering through the fishing ports” (Chuang, Hung, Chang, Huang & Shiao, 2016). Dr. Chuang has stated that “Asia imports 10,000-20,000 tons of shark fins per year” (Chuang et al., 2016). This ludicrous number was reached in order to satisfy the demand for the infamous shark fin soup served all across Asia. I think it’s insane that this many sharks are dying just for the consumption of their fins in a soup. It doesn’t seem to be a sane course of action. After analyzing the imported goods Dr. Chuang and his colleagues have identified 23 different shark species from the 231 port landings sample and 24 shark species from the 316 shark fin products (Chuang et al., 2016). This insane number of species already lowers the already vulnerable population. It seems as if the fisheries are catching and killing sharks indiscriminately regardless of their threat of endangerment. Moreover, Dr. Chuang and his colleagues found in his samplings that there were 12 near threatened species, 13 vulnerable species, and only nine least concerned species (Chuang et al., 2016).

It seems alarming that the species most prevalent in the catches are the ones that are more threatened. Dr. Chuang concluded that 22.1% of all the samples found on the ports were categorized as threatened (Chuang et al., 2016). These alarmingly high numbers were justified by the act of bycatching that most fisheries take part in (Chuang et al., 2016). This is when, in this case, sharks are caught unintentionally with other intended targets. The equipment used is a major contributing factor to bycatching. Using inefficient and unreliable equipment would only lead to injured sharks that die due to immobility. Catching more sharks than intended will lead to endangering sharks more than they already are. Apparently, fisheries have little regards to the conservation efforts of sharks. So, these unintended bycatching don’t alter their decisions in the slightest causing more unnecessary shark deaths over the years.

References

Chuang, P-S., Hung, T-C., Chang, H-A., Huang, C-K. & Shiao, J-C. (2016). The species and origin of shark fins in Taiwan’s fishing ports, markets, and customs detention: A DNA barcoding analysis, *PLOS ONE,* 11(1): e0147290. doi: 10.1371/journal.pne.0147290

Espinoza, M., Cappo, M., Heupel, M.R., Tobin, A. J. & Simpfendorfer, C. A. (2014). Quantifying shark distribution patterns and species-habitat associations: Implications of marine park zoning, *PLOS ONE,* 9 (9): e106885. doi: 10.1371/journal.pone.0106885

Kroon, F.J., ThorBurn, P., Schaffelke B. & Whitten S. (2016). Towards protecting the Great Barrier Reef from land-based pollution, *Global Change Biology*, 22, 1985-2002. Doi: 10.1111/gcb.13262

Oliver, S. P., Hussey, N. E., Turner, J. R. & Beckett, A. J. (2011). Ocianic Sharks Clean at Coastal Seamount, *PLOS ONE,* 6(3): e14755. doi: 10.1371/journal.pone.0014755