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### **Great White Sharks: What to do About the Increasing Population in Cape Cod**

Since the gray seal population returned to the shores of Cape Cod and Massachusetts in the early 2000s, the area has seen a sharp increase in its Great White Shark population. This population continued to grow, eventually resulting in someone being bit in 2012. In 2018, a man was fatally wounded by a great white off the coast of Cape Cod— the first in 82 years for Massachusetts. This incident showed how real the dangers of these sharks are to an area many people inhabit and travel to. There are multiple groups with a vested interest in this issue. Lifeguards have an increasingly difficult job of protecting beachgoers while also looking out for sharks. They would like to protect visitors as much as possible while also respecting the sharks and their environment. The Atlantic White Shark Conservancy is a group dedicated to preserving the white shark populations of the Atlantic. They place high value on the benefits an apex predator like the great white provides to the biodiversity of the marine ecosystems they inhabit. As such, they hope to maintain this shark population and boost collaboration with other organizations to better understand their behavior.

Fishermen find a lot of work in the dense fishing populations of Cape Cod. While the sharks have the potential to eat some of the fish that would otherwise be caught, their preying of the gray seal population is of great benefit to the fishermen. Though feelings are somewhat mixed due to the increased risk to their job, the fishermen on a whole agree that the presence of great white sharks can benefit them and thus the population should be preserved. Finally, the

local residents of Cape Cod have reason for concern after the shark attacks over the past decade. Despite this, the tourism boost the sharks generate from people going on charter boats to view them is very beneficial to the Cape Cod residents. They have become proud of their great white shark hotspot and want to protect and support the population.

Tourism is the third largest industry sector in Massachusetts, and a disproportionate chunk of that comes from the Cape. Much of the appeal is the beaches, which need to maintain an air of safety. All public beaches are staffed by lifeguards and tend to be money-making opportunities for the state. To maintain the ecosystem service to its fullest extent, it is in the best interest of the state to prevent any shark attacks on the public beaches in the Cape.

Historically, sharks weren't a significant element in the Cape ecosystem. They tend to live where their prey is, and prior to the resurgence of seals, there was no real shark presence along the Cape Cod national seashore. There have been incidences in the past, and there is a global perception of sharks, in large part due to movies like *Jaws*. It doesn't have to be all that dangerous, and we can definitely coexist, and even positively benefit one another. As these sharks move in to capitalize on the opportunity, we need to adapt our recreation management and refine our practices to maintain a safe relationship with the shark population.

One of the main issues that arises amid the increased white shark population is the safety risk posed to beachgoers. Due to the fact that scientists are finding that even large sharks spend time closer to shore than previously thought, there is higher potential for swimmers and surfers to have overlapping locations with white sharks (Winton et al., 2021). Lifeguards help look out for sharks from shore and share safety tips, but there is only so much they alone can do to protect people from these apex predators thriving in their natural habitat. This safety risk creates an

obstacle that each of the stakeholders did not have to worry much about in the past when shark populations were low.

Moving forward, there are several potential options for managing the increasing Great White Shark population off Cape Cod. One approach involves the culling or hunting of seals, which are a primary food source for these sharks. By managing the seal population, it may be possible to reduce the attraction of sharks to the area, subsequently minimizing the risk to beachgoers. However, this approach must be carefully considered, taking into account the ecological impact and ethical considerations, as seals play a vital role in maintaining marine ecosystems.

Alternatively, a more conservation-oriented strategy involves learning to coexist with Great White Sharks. This approach would focus on enhancing public awareness and education about shark behavior, implementing advanced monitoring technologies to provide real-time information on shark locations, and developing innovative shark deterrent measures to enhance beach safety. Similarly, there is research being conducted to explore the advantages of using electromagnetic systems to deter these sharks from the Massachusetts coastlines. The black pipes filled with electromagnetic stimuli have been said to have “‘successfully manipulated the sharks’ swim patterns’” and that “‘this is a very reliable technology, and that this technology shows great promise for the future’” (Sobey, 2023). Nonetheless regardless of the particular management strategy, collaboration between stakeholders, including lifeguards, the Atlantic White Shark Conservancy, fishermen, and local residents, would be crucial in developing comprehensive management plans that prioritize both human safety and the preservation of the ecosystem. Striking a balance between proactive safety measures and respecting the role of sharks as apex predators in their natural habitat is essential for sustainable coexistence.

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## **Cape Cod Lifeguards**

Lifeguards on Cape Cod's National Seashore in Massachusetts value beachgoer safety as a top priority. While lifeguards greatly value the ability for residents and visitors to enjoy the waters of Cape Cod during warm summer months, they also stress shark safety tips and the fact that the ocean is the shark's home which humans are visitors to, so we must treat it as such. There are many dangers faced by people who recreate in the ocean, but one hazard that is increasing along Cape Cod's shorelines are great white shark interactions. Although shark attacks are rare, with an increasing population of these apex predators in the area, extreme caution should be emphasized by lifeguards (Winton et al., 2021).

The protocol for shark safety in Cape Cod is currently heavily dependent upon the presence of lifeguards, awareness and cooperation of beachgoers, and education from volunteers with groups such as the Atlantic White Shark Conservancy. Shark safety tips provided by lifeguards include staying close to shore, avoiding seals, staying in groups, limiting splashing, avoiding murky water, and other preventative measures that reduce the risk of sharks mistaking people for their primary prey animal, seals (National Park Service, 2023). Lifeguards' primary duties are to search for sharks they can see from shore, immediately alerting beachgoers to get out of the water for at least one hour. During a recent fatal great white shark attack in Cape Cod in September of 2018, a 26-year-old man named Arthur Medici was killed while swimming close to shore. Lifeguards were not on duty when this tragic event occurred as it was the end of the summer season. This event caused widespread fear of white sharks around Cape Cod, but for lifeguards in particular it stressed the importance of their position and the need for improved safety measures (*After the Bite*, 2023).

The lifeguarding job itself has become much higher stress and now involves more extreme risks than in the past when white sharks were not as prevalent in this area. Taking on a position as a lifeguard now involves a commitment to looking out for sharks at all times alongside typical lifeguard duties of water and swimming safety. With this being said, any way that we can increase the safety of beachgoers in Cape Cod helps lifeguards immensely. The implementation of technology such as drones to search for sharks from shore and live receivers tracking sharks to transmit real-time information is extremely useful. These practices help assist lifeguards in preventing unwanted interactions between people and sharks, allowing the two to better coexist amid population increases.

## **The Atlantic White Shark Conservancy**

The Atlantic White Shark Conservancy (AWSC) firmly believes in the importance of preserving biodiversity, recognizing the critical role that Great White Sharks play in maintaining the health of marine ecosystems. These apex predators help regulate prey populations, contributing to the overall balance of the oceanic food web. The organization emphasizes the need to protect these species, not only for their intrinsic value but also for the indirect benefits they bring to the marine environment. According to research, apex predators, including Great White Sharks, help control the populations of smaller marine species, preventing cascading effects throughout the ecosystem (Heithaus et al., 2008). The AWSC argues that a thriving shark population contributes to a healthier and more resilient marine ecosystem, ultimately benefiting both marine life and the communities dependent on the ocean for their livelihoods.

While advocating for the preservation of the Great White Shark population, the AWSC acknowledges the legitimate concerns surrounding public safety, especially in the wake of a fatal shark attack off Cape Cod. The organization recognizes the need for a balanced approach that safeguards both human lives and the marine environment. A comprehensive strategy is essential to address these concerns effectively. The "After the Bite" HBO Max documentary sheds light on the complexities of managing the coexistence of humans and sharks in shared spaces. It underscores the importance of understanding shark behavior, implementing early warning systems, and educating the public about best practices for minimizing the risk of shark encounters. By drawing lessons from real-life incidents documented in the film, the AWSC emphasizes the importance of developing a proactive and informed response.

Another key aspect of the AWSC's proposed strategy involves extensive education and outreach programs. By increasing public awareness about shark behavior, risk mitigation

strategies, and the importance of sharks in marine ecosystems, the AWSC aims to foster a better-informed and shark-respecting community. The organization believes that an educated public is more likely to embrace responsible behaviors, reducing the likelihood of dangerous interactions between sharks and beachgoers.

Additionally, the AWSC advocates for increased investment in research and technology to better understand Great White Shark behavior and migration patterns. By leveraging advancements in tracking technologies and ecological research, scientists can provide more accurate information about shark movements, enabling authorities to implement timely and effective safety measures. A study published in the *Journal of Data Analysis and Information Processing* highlights the importance of real-time tracking data in predicting shark movements and reducing the risk of shark-human interactions (Valenti et al., 2023). The AWSC contends that incorporating such technological advancements into prevention strategies can enhance public safety without compromising the conservation goals for Great White Sharks.

And lastly, the AWSC emphasizes the need for collaborative efforts between the government, scientific community, and local stakeholders to develop and implement effective policies. A coordinated approach, informed by the latest scientific research, is crucial to strike the right balance between public safety and conservation. It is important that they investigate and replicate successful examples from other regions, such as Australia, where collaborative initiatives between government agencies, researchers, and the public have led to the implementation of robust shark mitigation strategies. By learning from these international experiences, the AWSC believes that Cape Cod can develop a model that considers the unique characteristics of its ecosystem and community.



## **Fishermen**

Historically, great white sharks were a rare sight off Cape Cod, and their sudden resurgence has triggered concerns among local communities. It needs to be objectively assessed for its merits. Great white sharks, worldwide, are suffering. They are classified by the IUCN as vulnerable, and have been protected for over 20 years. Massachusetts followed through with these protections in 2005, and the population has remained. An observable trait from these sharks is that they will live in whatever region their prey lives, and are less bound by climate than lots of ocean species. As oceans have warmed, we've seen new animals move into the Cape. We have seen both gray seals and great white shark populations increase over time.

We, the fishermen on the cape, agree with the current management practices. There are multiple categories of fishermen in and around the Cape, and we may have different relationships with the sharks. However, holistically, the sharks benefit the fisherman. The sharks primary prey on the Cape is the gray seal, and currently gray seal populations are at a record high. These gray seal prey on the same fish that the fishermen are catching, and thus the sharks and fishermen are inherently on the same team. There are instances of conflict, including altered catch patterns, increased competition for fish stocks, and concerns about personal safety while out at sea, but at large, we, the fishermen, don't think it is our place to throttle the population of the great whites.

Despite great white sharks typically preying on gray seals, they of course will also eat some of the same fish that we hunt. There are instances where we, the fishermen, have had our catch taken, or at least dampened, by the presence of sharks, but more often than not the result of having sharks around leads to a better catch for us anyway. And, smaller-scale fishermen tend to love the sharks. Those taking tourists on fishing tours have been quoted saying customers are

thrilled if they lose a fish to a shark. The net of having a population of sharks has positive connotations.

It is worth mentioning fishermen are not a uniform group of people. We certainly do not all believe that the sharks are essential to our livelihood. If anything, it adds needless randomness and risk into our already challenging job. But the sharks and our livelihood do have a possibility of peaceful coexistence. It could also lead to more research happening in our area, and could potentially result in new work for some fishermen. Regardless, the shark population deserves preservation and can exist in tandem with fisheries.

## **Local Residents**

The presence of great white sharks in Cape Cod is a recent development, beginning in the 2000s. This occurrence is credited to the resurgence of the gray seal population in and around the area. Shark sightings have increased in the area since then, so encounters with them increased as well. People have been bitten by these sharks over the past decade, with the first occurring in 2012. Only two more have occurred since then, however one of these was the first fatal encounter in Massachusetts in 82 years since the shark population was initially culled in the mid-1900s (Behnke, 2023). As a result, the threat of a shark attack is ever looming in Cape Cod.

New safety measures have been implemented by a team including members of the Massachusetts Department of Marine Fisheries and the Atlantic White Shark Conservancy, such as new beach signs, a flag warning system, and increased public outreach. A tracking app, Sharktivity, was even created for people to report sightings in Cape Cod and raise awareness (Behnke et. al., 2022). Thanks to these safety measures, as well as proper education on how to deal with the sharks, their presence has not had a negative impact on the locals. In fact, the sharks have become a symbol of pride for the people of Cape Cod (Owens, 2023). Tourism has been greatly boosted by people hoping to catch a glimpse of one of the sharks. Hotels and beaches have increased foot traffic, and local ecotourism companies are booming. These tours are also occurring sustainably: the sharks can only be viewed by boat (no underwater cages) and without baiting them. Instead, they use spotter planes to guide the boats so the sharks can be viewed in their natural state, not a forced feeding frenzy. Tourists are also encouraged to snap pictures and record videos of the sharks, helping researchers in the area to keep track of the population.

Despite the danger the great white shark presents to the people of Cape Cod, the residents are proud of the unique destination for sharks they have become. There are a wealth of research organizations conducting research on their own and with the help of everyone who visits Cape Cod (Sobey, 2023). The residents would like to keep the sharks, as they benefit from their presence and are able to maintain the shark population sustainably.

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