

Predators In Our Ocean

Sharks and seals are both predators in the ocean food chain and, as such, play an important role in maintaining the integrity and stability of the marine ecosystem. White sharks are apex predators, positioned at the top of food chain. Seals are mesopredators, and are both predator and prey.



Gray Seal

Halichoerus grypus

Diet: sandlance, winter flounder, and hake
Identifying features: up to 800 lbs, long straight snout, ink blot pattern on fur



Harbor Seal

Phoca vitulina

Diet: sandlance, atlantic herring, silver hake, redfish
Identifying features: spaniel dog-like face, pronounced forehead, patchy spots on fur



White Shark

Carcharodon carcharias

Diet: squid, seals, whales, other sharks and fishes
Identifying features: Sharp apex on dorsal fin, grey back and white stomach

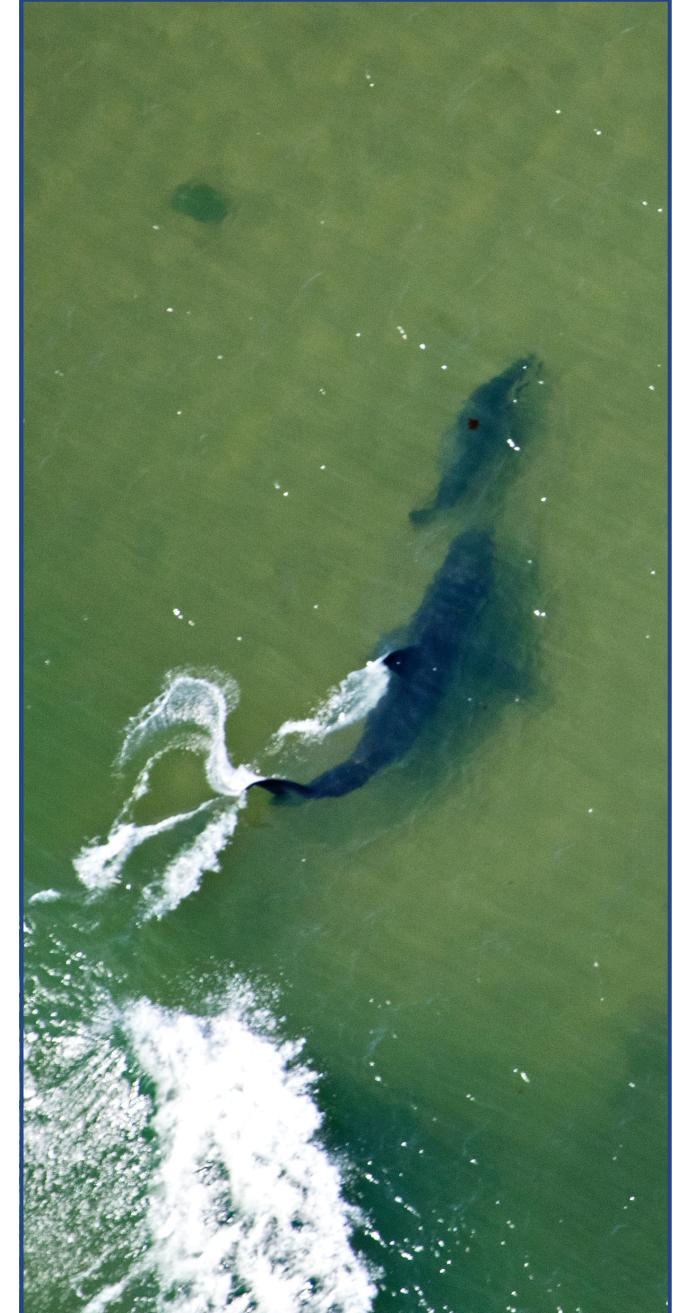
A Healthy Ocean

Between 1888-1962, 72,284 to 135,498 seals were killed in bounty hunts in Maine and Massachusetts (Lelli et al 2009). After 1962 there were rare sightings of harbor seals, and gray seals were extirpated from Cape Cod entirely. Bounties became prohibited in New England and the Marine Mammal Protection Act was passed in 1972 protecting marine mammals across the U.S. A decline in white shark numbers also occurred during this time, which lead to their protection in 1997. For nearly three generations, New Englanders lived without seeing seals on Cape Cod, but today we have the opportunity to observe them regularly. Protection of both of these important predators has become one of the great conservation success stories of our times.

Our ocean's ecosystem is all connected from the tiniest zooplankton to the largest apex predator. White sharks are an asset to our marine environment. If the top predators within our ecosystem disappear, predator-prey balance could become disrupted, thereby compromising the health of the world's oceans and negatively impacting other marine species.

Healthy ecosystems rely on naturally balanced populations of apex predators, like the gray seal and the white shark. Although we do not know the historical baseline population levels for these species, we do know that humans dramatically altered these levels over the course of time. Now that both sharks and seals have responded favorably to conservation and populations are rebounding, it is best to allow nature to dictate population levels for a healthy ecosystem without additional human intervention. The ecosystem has a natural carrying capacity for every species. Therefore, if allowed to, nature will determine the size of a healthy population and what the ecosystem can sustain. If any wildlife population exceeds the capacity of the ecosystem, population growth tends to plateau because resources are limited. This is quite different from trying to control seal and shark population levels, which has been done in the past with negative impacts on the ecosystem. As the majority of the oxygen humans breathe comes from the oceans, our own health is put at risk when our oceans are unhealthy. The presence of predators along the coast of Cape Cod indicates the restoration of a healthy ecosystem.

To Learn More Visit:
www.atlanticwhiteshark.org
<http://nasrc.whoi.edu/>



A compilation of information by:



The Northwest Atlantic
Seal Research
Consortium

Population Dynamics

Seals Based on the most recent estimates provided by the National Marine Fisheries Service, there are approximately 76,000 harbor seals in the US population. There is no current official estimate for the number of gray seals in US waters, but a recent study estimated that the southeastern Massachusetts population numbers between 30,000 - 50,000 (Moxley et al. 2017). Surveys of pups on Muskeget Island, the largest breeding site in the US, found that at least 3,037 pups were born during the 2013 - 2014 breeding season.

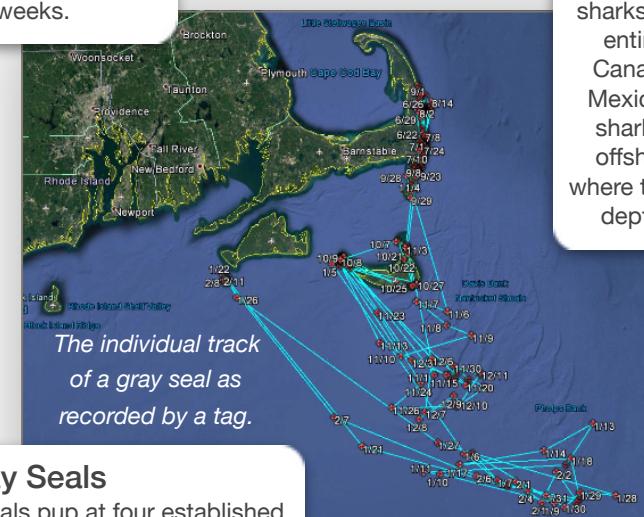
White Sharks The emergence of Cape Cod as a seasonal aggregation site for white sharks provides the unique opportunity to apply mark-recapture methods to generate the first robust estimate of white shark abundance in the western North Atlantic. Previous attempts to assess the status of the white shark population in the Atlantic have proven challenging due to the species' migratory patterns, sparse distribution, and historical lack of known aggregation sites. In 2014, the Massachusetts Division of Marine Fisheries, working in collaboration with the University of Massachusetts Dartmouth and the Atlantic White Shark Conservancy, began a five-year mark-recapture study to estimate the abundance of white sharks off Cape Cod. The results of the mark-recapture study will be combined with tagging and aerial survey data to provide additional insight into the population status of white sharks throughout the western North Atlantic. The Atlantic White Shark Conservancy is funding this important research.

Movement and Behaviors

The now-predictable summer presence of white sharks in the region has largely been attributed to the recovery of the local gray seal population, which has recolonized the protected beaches of Cape Cod. The presence of both predators has allowed researchers to study the natural history, movement ecology, and population dynamics of the species.

Harbor Seals

Harbor seals occur seasonally in southern New England to Virginia from September through May and move north towards Maine in April and May to pup and breed. Harbor seals are able to swim at birth and are dependent on their mothers for 4-6 weeks.



The individual track of a gray seal as recorded by a tag.

Gray Seals

In US waters, gray seals pup at four established colonies, including two small islands off Maine and two islands off Massachusetts. The largest US breeding grounds are on Muskeget Island and Monomoy Island off Cape Cod, MA. Pups are born in January and February and stay with their mothers for less than 3 weeks. During the summer months, gray seals on Cape Cod stay close to shore where food is abundant, then follow their prey further offshore in the winter.



Shark photo by the MA Division of Marine Fisheries.

White Sharks

In the US Atlantic, tracking white shark movement is still in its infancy, and more research is needed to better understand migration patterns. However, tagging data indicate that white sharks move seasonally along the entire eastern seaboard from Canadian waters to the Gulf of Mexico. In addition, some white sharks have been tracked well offshore into the open Atlantic where they make dramatic dives to depths as great as 3000 feet.



To stay up to date on white shark sightings and movements, download the Atlantic White Shark Conservancy's *Sharktivity* App for free from the app store. If you would like to follow the movement of the various seal species visit main.whoi.edu.