

CONSERVING

CAPE COD

The Cape encompasses a diverse array of resources, including heathlands, pine barrens, ponds, marshes, bays, inlets, dunes, and of course, the beach. The Atlantic side of Cape Cod, sometimes called The Great Beach, is one of the longest continuous stretches of uninterrupted shoreline on the East Coast.

Humans have lived on Cape Cod for more than 9,000 years. Continuous human occupation over this vast time period has generated indigenous lifeways/traditions; whaling, fishing, and shell-fishing industries; maritime traditions including lighthouses and the U.S. Lifesaving Service; architectural styles of the Cape Cod house and the Cape Cod Modern design; and boundless opportunities for recreation and conservation.

Cape Cod's unique beauty, ethereal light, peaceful solitude, and other artistic values have inspired generations of writers, poets, painters, actors, and other creators for generations. The Cape continues to serve as a respite for people and a haven for wildlife.

Vital Cape Cod ecosystems extend throughout rivers, streams, marshes and woodlands, and are connected to our oceans and bays.



Environmental Factors Threatening Cape Cod

Negative impacts come from many sources and affect land, water, and the air we breathe.

Changing Water Temperatures

Warming water can push marine species and their prey northward into new territories. The encroachment of these moving species can disrupt the balance of an established ecosystem. Warmer water holds less oxygen than colder water, so as the water warms animals have less oxygen to breathe.

Water Quality

Excess nutrients threaten water quality. Nitrogen and phosphorus cause increased growth of phytoplankton and depletion of oxygen, which can lead to fish kills, less sunlight filtering through the water column to marine plants, and a buildup of decomposing matter on the bottom of a body of water.

Excess nutrients are largely from human sources and lifestyles. Fertilizers, the burning of fossil fuels, septic system discharge, and poorly treated wastewater are large contributors.

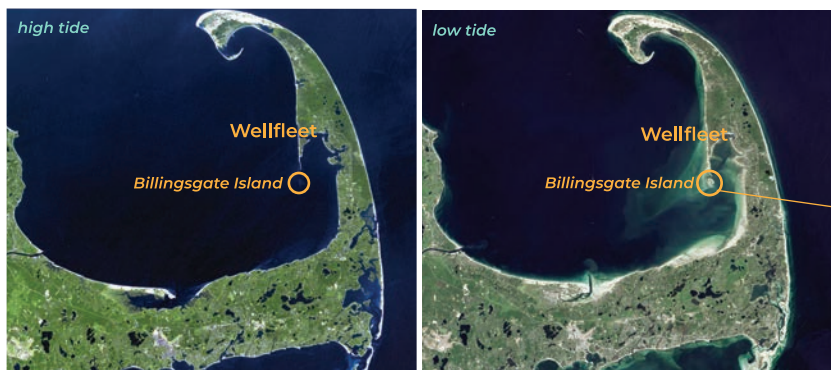
Coastal Erosion

Coastal erosion is a natural process of constant change, driven by wind, water, and storms. Cape Cod consists of sand, gravel, silt, clay, and boulders and its edges are continuously eroded away and redeposited. Sand that has eroded from one area can be deposited in another area, adding to areas like Race Point/Hatches Harbor and Monomoy.

Coastal storms bring intense energy through wind and water. Storms can move large amounts of sand, opening and closing coastal inlets, shifting shoals and dunes, and collapsing cliffs. Barrier beaches and salt marshes play critical roles in buffering Cape Cod from powerful storms.

The Case of Billingsgate Island:

Once a thriving fishing community of 30 homes, a school, church, store, lighthouse, oilworks, and baseball team, Billingsgate exists today as a shoal beneath the waves of Cape Cod Bay.



Foundation stones of Billingsgate Lighthouse are visible at low tide.



Photo by Abby Geisen

Coast Guard Beach: Visitors at Coast Guard Beach in Eastham navigate around significant coastal erosion from a recent storm.



Protections In Place:

1956 Fish and Wildlife Act
Established comprehensive fish, shellfish, and wildlife resource policy with regard to commercial and directs a program of research, extension, and information services on fish and wildlife matters, both domestically and internationally.

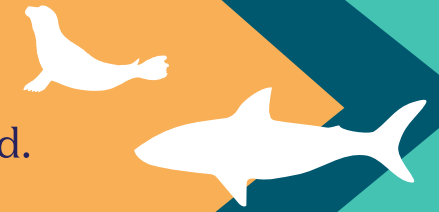
1961 Cape Cod National Seashore
President John F. Kennedy establishes Cape Cod National Seashore (CCNS). As the first national seashore in the U. S., CCNS preserves and protects natural landscapes, cultural and historic sites, areas of scientific interest, and offers a variety of recreational opportunities.

1972 Marine Mammal Protection Act
Helps protect and prevent population loss of all marine mammals, from whales and dolphins, to seals and manatees, to sea otters and polar bears. This federal act allowed the seal population, historic to Cape Cod to rebound from becoming locally scarce. As a food source for white sharks, the rebound in seal populations is one of the contributing factors to the increase in white shark population.

Created by ice, shaped by wind and water, and protected on land and sea, Cape Cod grew into the unique environment you see today. Cape Cod is a place of wildlife refuge and conservation success stories, like the resurgence of the great white shark, and serves as an inspiration for areas around the world.

Start a **conservation conversation**: How can you help your area become a conservation success story?

While acts and protections may seem to have a singular focus, their effects ripple through the entire **connected ecosystem** and beyond.



1976 Magnuson-Stevens Fishery Conservation and Management Act

This is the primary law that governs marine fisheries management in U.S. federal waters. Its objectives are to prevent overfishing, rebuild overfished stocks, increase long-term economic and social benefits, and ensure a safe and sustainable supply of seafood. This act made it unlawful to remove the fins or tail of a shark and discard the remaining carcass in the sea, and possess or land shark fins without the corresponding carcass.

1992 Stellwagen Bank National Marine Sanctuary

Designated by President George H.W. Bush, this sanctuary begins 3 miles from Provincetown and supports an incredible diversity of ocean life. Primarily known for whale watching, Stellwagen Bank also hosts a variety of sharks including basking, blue, porbeagle, spiny dogfish, thresher, and great white.



What's the difference between a National Marine Sanctuary and a Marine National Monument?

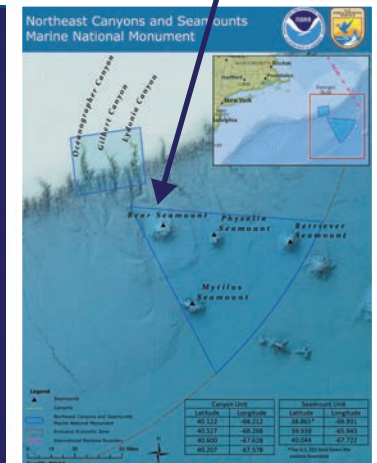
The main difference is the designation process and laws under which each is established.

Sanctuaries are designated by NOAA or Congress and are managed by NOAA using the National Marine Sanctuaries Act (NMSA).

The **Marine National Monument** was established by President Barack Obama under the authority of the Antiquities Act of 1906, and is jointly managed by the U.S. Fish and Wildlife Service (USFWS) and NOAA.

2016 Northeast Canyons and Seamounts Marine National Monument

Designated by President Barack Obama, this is the only marine national monument in the Atlantic Ocean and was designated to protect the fragile deep-sea ecosystems of the pristine underwater mountains and canyons. The creation of this national monument by President Obama led to more than 20 countries announcing the creation of 40 significant new marine protected areas, totaling nearly 460,000 square miles of ocean.



A Vertical Movement Study

WHITE SHARKS

IN SHALLOW WATERS

Sharks spend
nearly half
of their time in
water less than
15 feet
deep

AWSC Staff Scientist Megan Winton and the research team wanted to know how much time sharks spend in shallow water hunting seals—therefore potentially overlapping with people recreating in the water. To do so, the research team tagged 8 sharks with both PSAT and acoustic tags to record the temperature and depths visited by sharks when they are here. The study was conducted over several months during summer and fall of 2017.

Here Is What They Found:

White sharks spent the majority (95%) of tracked time at depths of 0-31 meters (about 101 feet) and at temperatures ranging from 8.9°C to 20.7°C (about 48°F to 69°F), which spans the range of water temperatures that typically occur off Cape Cod during the summer and fall. During the study period, individual sharks spent almost half (47%) of their time at depths of less than 4.5 meters (about 15 feet). They made frequent trips between the surf zone and deeper offshore waters. Variations in depth-use suggest that individual sharks may patrol certain areas preferentially. Shallow depths reflect white sharks' predatory strategy regarding seals.

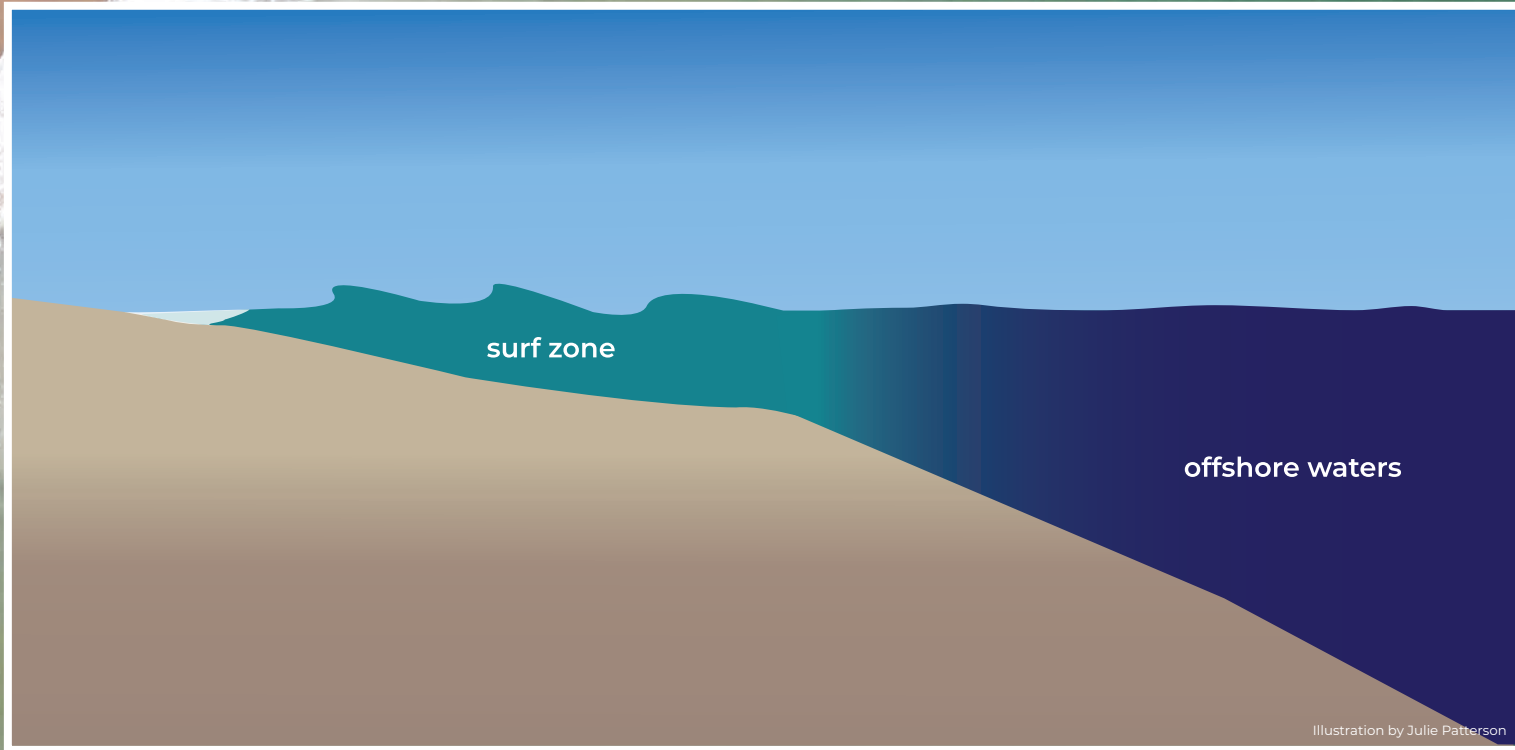
Megan's team concluded that while the overall risk posed to humans by white sharks is low, there is a high potential for overlap between white sharks and recreational water users off Cape Cod. White sharks patrol the shoreline for seals at all times of day. The risk of shark-human interaction is highest in summer and fall, when the waters off Cape Cod provide suitable thermal habitat for white sharks and beach visitation numbers peak. The effectiveness of non-invasive education-based shark mitigation campaigns depends on an understanding of shark habitat use near popular swimming beaches.

Another cool fact:

Over the course of the past decade, Cape Cod's coastal waters have emerged as the only known aggregation site for white sharks in the western North Atlantic.

In 2021, Megan published a paper with her findings from this study. You can access her paper at www.atlanticwhiteshark.org/white-shark-research.

Photos by Wayne Davis



Do you know the difference between the surf zone and offshore waters? The **surf zone** begins where waves start to form as they approach the shoreline and extends toward the beach. On Cape Cod, the size of the surf zone varies based on topography and tides. **Offshore waters** lie beyond the surf zone extending out into the ocean.

Coexisting With White Sharks

The inshore waters off many Cape Cod and South Shore beaches are preferred feeding grounds for white sharks. White sharks hunt and feed on seals in shallow water close to shore. This presents a risk to those recreating in ocean waters. While white shark bites on humans are rare, they have occurred off Cape Cod. The most recent bite in September of 2018 resulted in a fatality.

Local municipalities in the Cape and Islands, and the Cape Cod National Seashore are responsible for beach management and for temporarily closing the beach to swimming when a shark sighting is confirmed. AWSC works closely with these entities, along with the Massachusetts Division of Marine Fisheries, to produce shark advisory signs for beaches, flags, and brochures that provide education and tips for beach users.

Nonetheless, the only way to completely eliminate the risk of an encounter with a shark is to remain on shore.

If you choose to enter the water:

- **Be aware sharks hunt for seals in shallow water**
- **Stay close to shore where rescuers can reach you**
- **Swim, paddle, kayak and surf in groups – don't isolate yourself**
- **Avoid areas where seals are present**
- **Avoid areas where schools of fish are visible**
- **Avoid murky or low-visibility water**
- **Limit splashing**
- **Adhere to all signage and flag warnings at beaches**
- **Follow instructions of the lifeguards**



Changing Perspectives

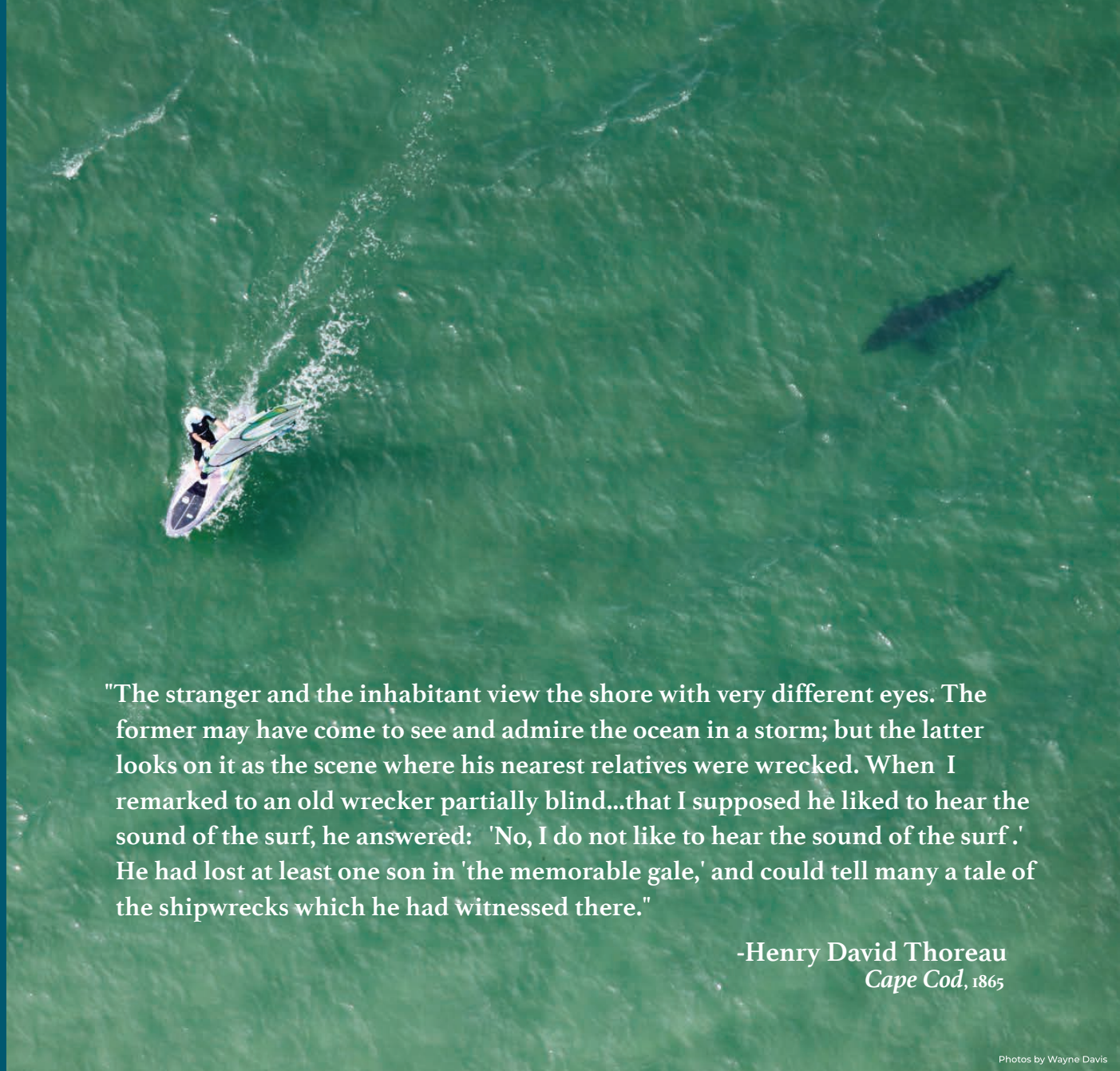


Library of Congress/Edwin Rosskam, 1940, *Untitled*

In this image from 1940 by Edwin Rosskam, visitors to New Beach (now Herring Cove) enjoy the seashore. However, until the early 1900s, people rarely ventured into the ocean for recreation. The ocean and the creatures within were more often feared than understood.

Thoreau took note of his conversation with a local man who did not like the sea (quoted at right). Shipwrecks and storms touched lives in ways that colored the ocean with the lonely feeling of loss; shorelines were not viewed as places of lively enjoyment.

Ease of access to the ocean and better transportation methods led to the growth of seaside tourism in different areas, as well as the increasing popularity and invention of recreational water sports like surfing and scuba diving. Today, as we spend more time than ever in the waters surrounding Cape Cod, we must maintain awareness and respect for the wildlife so that we may preserve and enjoy the natural beauty of the Cape for generations to come.



"The stranger and the inhabitant view the shore with very different eyes. The former may have come to see and admire the ocean in a storm; but the latter looks on it as the scene where his nearest relatives were wrecked. When I remarked to an old wrecker partially blind...that I supposed he liked to hear the sound of the surf, he answered: 'No, I do not like to hear the sound of the surf.' He had lost at least one son in 'the memorable gale,' and could tell many a tale of the shipwrecks which he had witnessed there."

-Henry David Thoreau
Cape Cod, 1865

History of Sharks on Cape Cod

Sharks have been in our waters for about 420 million years, including the massive, extinct Megalodon, and the ancestor of the great white shark of today. Throughout history, many sharks have been both feared and revered but very little was known or recorded about them until recently. We are learning more about these elusive apex predators every day through various research efforts. This timeline highlights significant dates in research and conservation on and around Cape Cod.

Today

2005

2004

1997

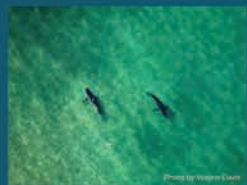
1972

1948

420 million years ago



Multiple white shark research projects, led by Massachusetts Division of Marine Fisheries, are taking place in the region to better understand the movement, behavior, and population of white sharks in the Northwest Atlantic



Massachusetts designates white sharks as a prohibited species, reinforcing the federal guidelines in this area



Great white sharks designated as a federally prohibited species in the US Atlantic Ocean, meaning they cannot be commercially or recreationally harvested



Fishermen encounter a white shark caught as bycatch in Barnstable Harbor



The Massachusetts Division of Marine Fisheries begins its white shark program after a 14' white shark, later named Gretel, becomes trapped in a salt pond on Naushon Island



Marine Mammal Protection Act enacted, protecting seals, whales, and all marine mammals

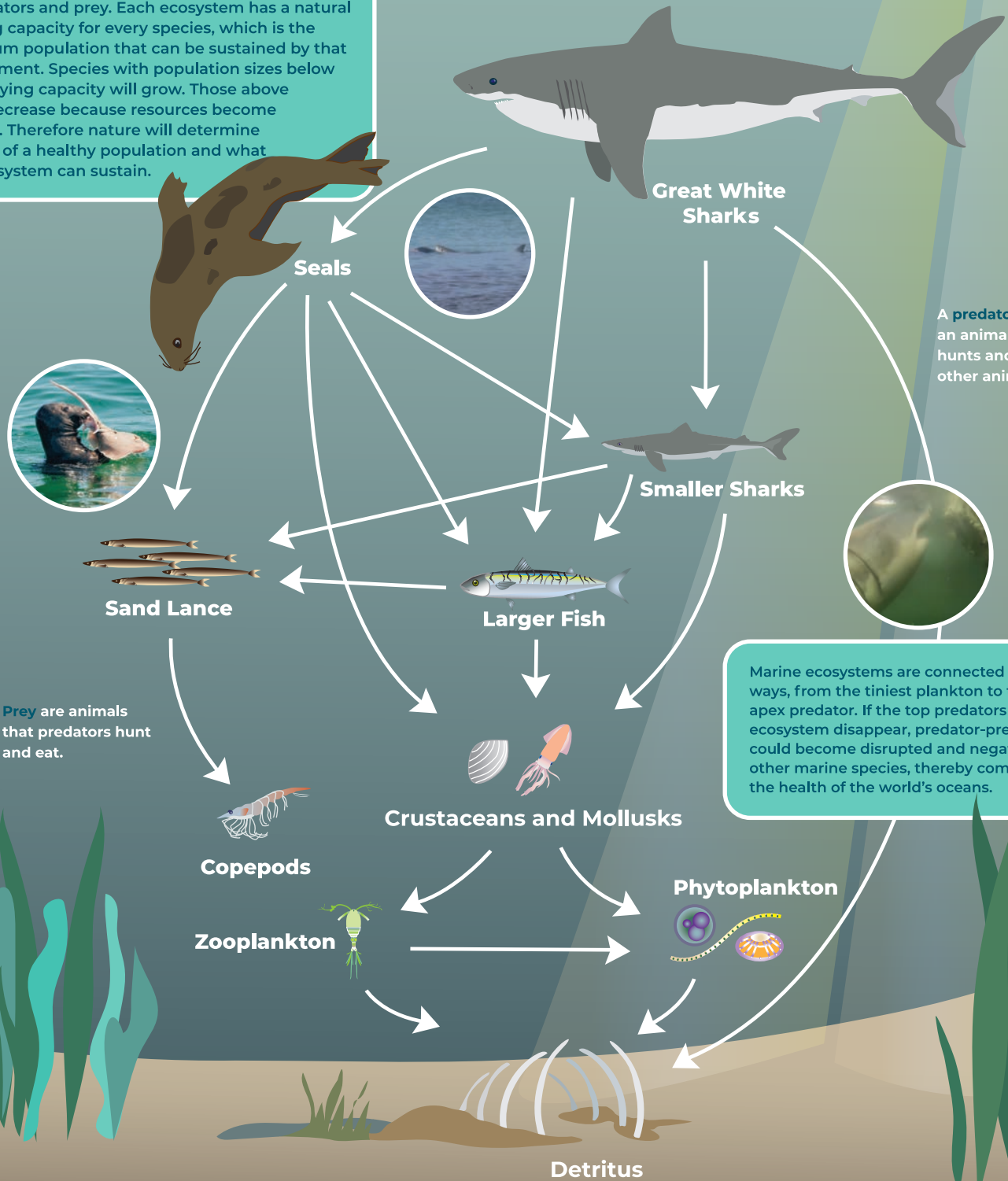
Earliest sharks appear (approximately 177 million years before dinosaurs)



The Value of Sharks in Our Ecosystem

Sharks are predators in the ocean food chain, and play an important role in maintaining the integrity and stability of the marine ecosystem. White sharks are apex predators, which means they are positioned at the top of the food chain. As top predators they play a critical regulatory role by influencing the abundance, distribution, and behavior of prey species.

Healthy ecosystems rely on balanced populations of predators and prey. Each ecosystem has a natural carrying capacity for every species, which is the maximum population that can be sustained by that environment. Species with population sizes below the carrying capacity will grow. Those above it will decrease because resources become limiting. Therefore nature will determine the size of a healthy population and what the ecosystem can sustain.



A **predator** is an animal that hunts and eats other animals.

Prey are animals that predators hunt and eat.

Marine ecosystems are connected in complex ways, from the tiniest plankton to the largest apex predator. If the top predators within an ecosystem disappear, predator-prey balance could become disrupted and negatively impact other marine species, thereby compromising the health of the world's oceans.