PREHISTORIC SHARKS

Paleontological Society of Austin

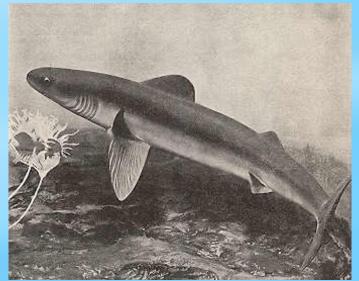
Sharks are a group of fish characterized by a skeleton composed of cartilage rather than bone, five to seven gill slits on the sides of the head, and pectoral fins that are not fused to the head. Unlike most fish, sharks do not have a swim bladder; instead they maintain buoyancy with large livers rich in oil. The subclass known as Elasmobranchii includes fossil and modern sharks as well as rays, skates and sawfish. The earliest known sharks date back more than 420 million years ago (MYA).

Full shark fossils are rare because cartilage is softer than bone and does not fossilize well. By far the most common shark fossils are teeth. Sharks shed teeth during their lives, sometimes in the thousands, which is one reason why they can be so abundant in some formations. Vertebrae are the second most common shark fossils. Paleontologists have also found shark skin scales (called denticles) and a few impressions of ancient shark skin.

New species of shark are still being found. The dwarf lantern shark was discovered in 1985. Scientists don't always find new shark species in the sea – they can be seen in fish markets or reported by local people.

EVOLUTION & EXTINCTION

The first true sharks were cartilaginous fish that appeared around 420 MYA, 200 million years before dinosaurs. The world's oldest, intact shark fossil is known as *Doliodus* problematicus¹. The specimen was found in New Brunswick, Canada and is estimated to have grown to be 20-30 inches long, the size of a large trout.



Cladoselache ²

360 MYA was 'golden age of sharks'. Many shapes and sizes developed. *Cladoselache* was the first abundant genus of primitive shark, appearing about 370 MYA. It grew to 6 feet long, and had features similar to modern mackerel sharks. At the end of the Jurassic (150 MYA) many species died out and the ancestors of modern sharks began to take over. Fossil teeth from relatives of today's mackerel sharks can be found in rocks dating to 100 MYA.

Sharks survived the dinosaur extinction at the end of the Cretaceous, when 70% of all species were wiped out.

Some sharks today, such as goblin and frilled, look very similar to their prehistoric cousins and have hardly changed in millions of years. And the basic streamlined body shape of many other modern sharks goes way back. See for example *Squalicorax*, a Cretaceous shark whose teeth can be found in many places in Texas.

Many modern sharks are in trouble due to overfishing. The demand for shark fin soup in parts of Asia is responsible for the deaths of millions of sharks every year, including hammerheads, which have large fins. Often, only the fins are kept, with the rest of the shark thrown back into the sea to die. According to the International Union for the Conservation of Nature and Natural Resources 30% of sharks and rays are threatened with extinction in the wild. Well-known sharks at risk include: great whites, whale sharks, makos, and thresher sharks.



Goblin Shark³



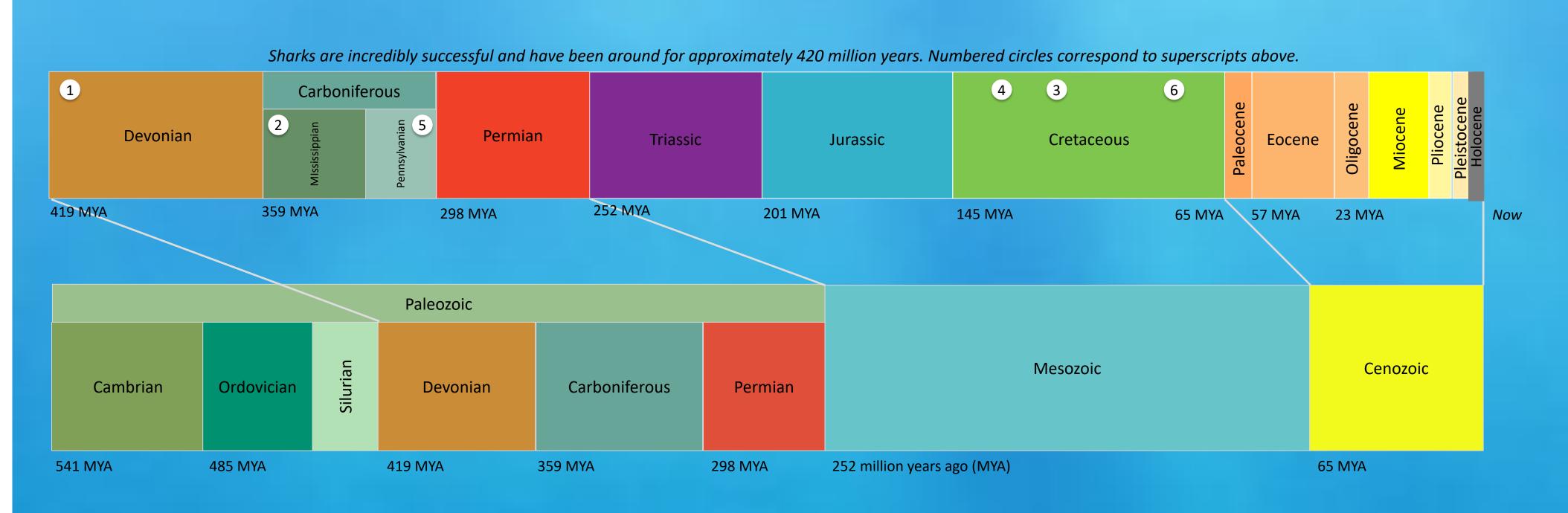
TEXAS SHARKS

We find shark fossils in deposits where seas used to be. Since Texas was at many times covered by an inland sea, there are places here where shark teeth are fairly common.

Texas sharks include ancient sharks of Pennsylvanian age, numerous Cretaceous sharks, and more recent ones from the Eocene. Sadly, there are no megalodon teeth to be found in Texas. The few formations of Miocene age in Texas are not marine sediments.



We did have some giants, however. Researchers from the Dallas Paleontological Society recently discovered a pair of fossil braincases from a massive, extinct shark species dating to 300 million years ago. Researchers estimated that these specimens belonged to an ancient shark that would have measured between 18 and 26 feet in length - 25 percent bigger than the modern great white. These sharks may be members of an extinct species known as *Glikmanius occidentalis*, or they may represent an entirely new relative.



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2. WC/6/69/Cladoselache_fyleri.jpg (11/4/2016). By Lankester, Edwin Ray (Guide to the Gallery of Fishes) [Public domain]. 3. WC/0/0e/Mistukurina_owstoni_museum_victoria.jpg (11/7/2016). By Dianne Bray / Museum Victoria [CC BY 3.0].

4. WC/5/5b/Kansas_sea2DB.jpg (11/7/2016). By Creator: Dmitry Bogdanov (dmitrchel@mail.ru) [CC BY 3.0]. 5. WC/a/ae/Glikmanius1DB.jpg (11/6/2016). By Creator: Dmitry Bogdanov (dmitrchel@mail.ru) [CC BY 3.0]. 6. Petolodus ohioensis, Michael K. Smith. Used by permission. 7. Cretalamna sp., Squalicorax sp.. Lance Hall. http://www.northtexasfossils.com. Used by permission. 8. Ptychodus annonymous, David Lindberg. Used by permission.

9. http://oceansofkansas.com/Ptychodus2.html, Oceans of Kansas website, Mike Everhart. Used by permission