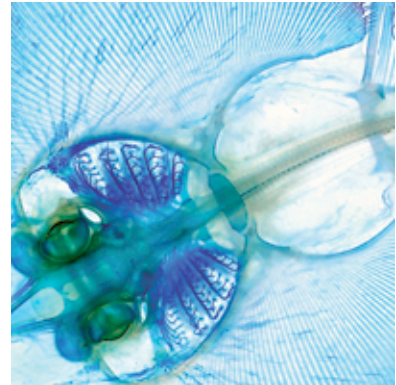


Sharks and Rays

Long featured in myths and legends, sharks may be one of the most readily recognized marine species. But did you know that rays are one of their closest relatives? Join Museum scientist Dr. Marcelo Carvalho in his study of fossil and living sharks and rays to find out how they're related, how they navigate in the dark seas, what other extraordinary sensory and reproductive features are shared by sharks and rays, and why shark conservation is critical.



Key Science Concepts:

- Sharks and rays are **ancient**, first appearing about 450 million years ago.
- Sharks and rays may have the most **advanced sensory systems**—hearing, smelling, vision and electrical sensing—of all vertebrates.
- As **top predators**, sharks and rays maintain the stability of many marine ecosystems.
- In general, rays live on the bottom of the ocean and sharks in open water. A continuum of body shapes and lifestyles reflects the adaptation of these **cartilaginous fish** to a range of environments.
- Scientists study the form and structure of fossils and living organisms in order to determine the **diversity and evolutionary relationships** of species.
- Shark and ray **reproduction** varies, with some species laying eggs and some giving birth to live young.
- Many shark and ray populations are **endangered**. All reproduce rather slowly, which makes them vulnerable to threats such as overfishing and the destruction of coastal breeding areas. Conservation efforts are underway, but populations are difficult to manage because much about these fishes remains unknown.

Authoring Scientists:

Dr. Marcelo Carvalho is a researcher in the Department of Biology at the Ribeirão Preto campus of the Universidade de São Paulo in Brazil. He is also a Research Associate of the Department of Ichthyology at the American Museum of Natural History. He studies the anatomy and systematics of sharks and rays, both fossil and recent, in order to better understand which species exist or have existed, their characters and evolutionary relationships, and how they have evolved over time.



Dr. Ian Harrison is English by birth and an ichthyologist by training. He received his B.S. in Zoology at the University College of North Wales and his Ph.D. from the University of Bristol. Ian attributes his early interest in marine life to family vacations spent at the coast of Cornwall, in southwest England. "My dad would always make sure that we had a good supply of shrimping nets and a mask and snorkel," recalls Ian, "so as a kid I always had a great time just wandering along the seashore and fishing around in rock pools."

