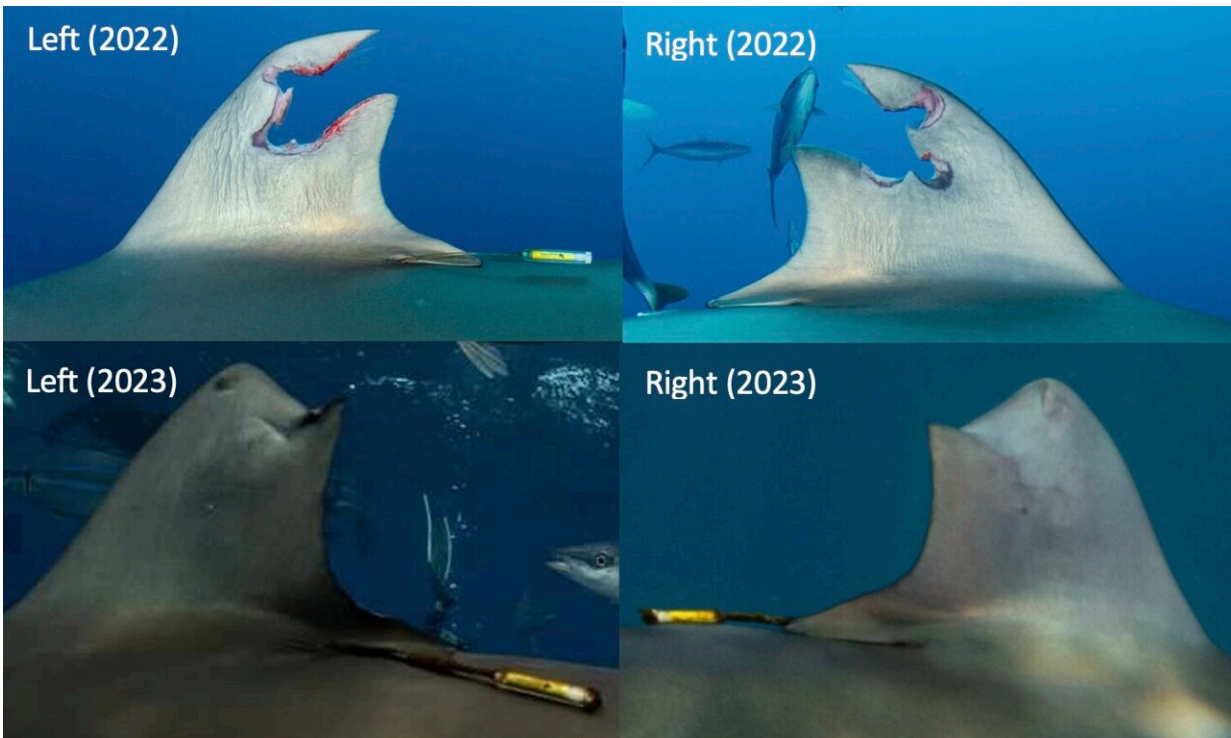


# Resilience in the depths: Silky shark regenerates wounded dorsal fin

January 9 2024, by Chelsea Black

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Progress of dorsal fin healing over 332 days. Credit: Chelsea Black with photos by Josh Schellenberg and John Moore

A skin resembling armor, rapid healing abilities, continuous tooth renewal and the capability for limb regeneration—this might sound like the description of a creature from a superhero film. Surprisingly, these are standard features of a well-known animal: sharks.

These remarkable adaptations contribute to their prowess as formidable predators and their resilience as inhabitants of aquatic environments. Although these distinct traits may seem straight out of a superhero narrative, they are widespread among [shark species](#) in our oceans. I documented the first case of dorsal fin regeneration in a silky shark (*Carcharhinus falciformis*), a rare phenomenon in [sharks](#).

## Millions of years of evolution

So how did sharks become so specialized? Sharks have been evolving on Earth for more than 400 million years and even pre-date trees. Of course, the sharks you know today are vastly different from those roaming the ocean millions of years ago, but one thing remains stable—sharks continue to evolve to endure and thrive in a challenging environment.

There are several traits that make sharks stand out in the marine world as highly evolved predators. Sharks can regenerate an endless supply of functional teeth for hunting and feeding, possess unique blood clotting mechanisms that allow them to quickly recover from [blood loss](#), and their skin is even made up of tiny, armor-like scales that protect them from bio-fouling and outside infection. Although sharks have been around longer than humans, scientists are still discovering new, unique adaptations that contribute to their rapid wound healing.

## Silky shark regenerates mutilated fin

Recently, I documented the first case of dorsal fin regeneration in a silky shark (*Carcharhinus falciformis*) in a study [published](#) in the *Journal of Marine Sciences*. The discovery came after satellite tags (small GPS trackers) were placed on 10 silky sharks in Jupiter, Florida, for part of my [Ph.D. research](#) in the summer of 2022.

Shortly after the tagging expedition, a local diver and photographer contacted me with photos of a shark with a large wound in the dorsal fin. The wound was the exact shape of a satellite tag and looked like a person had carefully cut around it and removed the tag. Each satellite-tagged shark also received a plastic ID tag that sits underneath the dorsal fin, which remained on this shark and allowed me to confirm the individual as one from the tagging study. I never expected to see the shark again as silky sharks are only seen in Florida in the summer months, and I had now lost the ability to track him.

To my surprise, I did see this shark again. In the summer of 2023, nearly one year after he was seen with a wounded dorsal fin, the same silky shark returned to Florida. This time, he was photographed by both John Moore and Josh Schellenberg. Through the photographs provided by both divers, I measured the healing of the dorsal fin through specialized software. My study concludes that the dorsal fin increased in size by 10.7% since the previous summer—new tissue had regenerated to compensate for the large loss.

Previously, dorsal fin regeneration has been documented only one other time in a shark—a whale shark in the Indian Ocean in 2006. While other marine animals, such as starfish or crabs, are known for their regenerative limb capabilities, this phenomenon in sharks, to scientists' knowledge, is rare. While there may be other examples of [dorsal fin](#) regeneration in sharks, these cases are extremely difficult to monitor as it is unlikely to see the injured shark multiple times.

## **Silky sharks are protected in Florida**

In Florida waters, it is illegal to retain or harvest silky sharks, a law that likely saved this shark from being killed. Silky sharks are commonly caught in Florida waters by commercial and recreational fishermen, and the most recent photographs of the silky shark in this study show several

hooks in both sides of his jaw, indicating he has been caught and released multiple times over a year. The reason for someone removing the satellite tag remains unknown, but I can say for certain that there is no other explanation for this type of wound than [human intervention](#), based on how the satellite tags are attached.

Commonly spotted in Jupiter, Florida, during [summer months](#), the migration routes for the remainder of the year for this species remain a mystery. While the other nine silky sharks in the tagging study continue to collect data on their movements, I will never know where this injured shark spends his time.

## **How the public can help**

While the silky shark in this story was originally being studied to monitor his migration route, he ended up as an example of true resilience for this species. While the incident of injury remains disheartening, the outcome has provided an extraordinary opportunity to investigate the healing and regenerative abilities of silky sharks following both natural and human-induced injury. This finding also has implications for the other silky sharks tagged in the same study. As their satellite tags eventually dislodge from their fins, it is now demonstrated that they possess the potential to heal from wounds left behind from the tags.

This study also serves as an example of how underwater photographers and the public can work with scientists to advance research. This situation highlights the need to further educate the public about satellite tagging studies, to potentially avoid citizen interference with research due to lack of understanding, as well as elicit the help of divers and photographers to monitor healing from tagging studies.

Although scientific research and [data collection](#) are integral to

conservation, the success of such studies hinges on fostering strong ties with local communities. Engaging the public in research studies can bridge the gap between community awareness and scientific research, providing more eyes to monitor changes that scientists would otherwise miss.

Hopefully, in the summer of 2024, this silky shark returns to Florida and can be photographed again to assess his healing process. Given the [environmental challenges](#) confronting sharks, witnessing the resilience of this silky shark instills a sense of hope.

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**More information:** Chelsea Black et al, Resilience in the Depths: First Example of Fin Regeneration in a Silky Shark (*Carcharhinus falciformis*) following Traumatic Injury, *Journal of Marine Sciences* (2023). [DOI: 10.1155/2023/6639805](https://doi.org/10.1155/2023/6639805)

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