



Shark and ray crisis: Overfishing drives a third of species toward extinction

Media Points for new IUCN Red List status paper in *Current Biology*, **Embargo ends 11 am EST, 6th Sept. 2021**

Key messages:

- One-third of chondrichthyan fish species (sharks, rays, and chimaeras) are threatened with extinction; three may well be already gone.
- Depletion jeopardizes entire ecosystems and the livelihoods they support, particularly in the tropics.
- Fishing is the main threat and should be urgently restricted to sustainable levels.

Findings: In a new global analysis, experts assessed 1,199 shark, ray, and chimaera species against International Union for Conservation of Nature (IUCN) Red List criteria and found 391 (32%) qualify as *Critically Endangered*, *Endangered*, or *Vulnerable*. Species classified in these three IUCN categories are considered threatened with extinction. . That statistic increases to more than one-third (37.5%) if *Data Deficient* species are assumed to be threatened in the same proportion as assessed species. This second global assessment of chondrichthyan fishes finds twice as many species threatened as found in the first analysis in 2014 (181). Chondrichthyans now rank second among vertebrates (after amphibians) in terms of extinction threat. Specifically:

- 90 chondrichthyan species (7.5%) are *Critically Endangered*.
- 121 chondrichthyan species (10.1%) are *Endangered*.
- 180 chondrichthyan species (15%) are *Vulnerable*.
- Less than half of all species (44.1%) are considered to be of low conservation concern (*Least Concern*).

Rays are the most threatened of the three chondrichthyan fish groups:

- Rays: 41% of the 611 assessed species are threatened.
- Sharks: 35.9% of the 536 assessed species are threatened.
- Chimaeras: 9.3% of the 52 assessed species are threatened.

Risk is greatest for warm-water, coastal sharks and rays; more than three-quarters of tropical and subtropical species are threatened. Three species not reported for many decades and are now considered *Possibly Extinct*:

- The Java Stingaree, *Urolophus javanicus*, has not been recorded for 153 years.
- The Red Sea Torpedo Ray, *Torpedo suessii*, has not been recorded for 123 years.
- The Lost Shark, *Carcharhinus obsoletus*, has not been recorded for 87 years.

The most threatened chondrichthyan families include sawfishes, wedgefishes, giant guitarfishes, devil rays, pelagic eagle rays, and hammerhead sharks. The status of six species (Blacknose shark, Shorttail Nurse Shark, Japanese Tope, Lusitanian Cownose Ray, and two guitarfishes) worsened by two or more categories since 2014.

The population status of three species (all skates) improved with the help of conservation action:

- The New Zealand Smooth Skate (*Dipturus innominatus*) moved from *Near Threatened* to *Least Concern* based on population growth attributed to science-based quotas.
- Canadian and US Atlantic fishing limits are considered key factors in the rebuilding of previously *Endangered* Barndoor Skate (*Dipturus laevis*) and Smooth Skate (*Malacoraja senta*), now classified as *Least Concern* and *Vulnerable*, respectively.

Threats:

- Almost all (99.6%) chondrichthyans are affected by fishing.
- Overfishing is main risk for all (100%) of the 391 threatened chondrichthyans.
- About one-third of threatened species are also imperiled by habitat degradation, primarily resulting from development (25.8%) and agriculture/aquaculture (9.5%). Pollution is a key risk for 6.9%.
- Climate change currently affects 10.2% of threatened chondrichthyan species through the degradation of coral reefs and/or ranges shifting toward the poles as waters warm.

Changes since the previous (and first) assessment: The new analysis benefits from a doubling of scientific output over the last ten years. Its 1,199 assessments cite nearly 20 sources each, including unique and unpublished information. In 2014, the first global chondrichthyan fish Red List assessment classified 181 species (17.45%) as threatened with extinction; nearly half were classified as *Data Deficient*. New data helped to significantly reduce the percentage of *Data Deficient* species to just about 13% (155 species) today, while more than twice as many species (391) are classified as threatened now, as compared to 2014.

Scientists “discover” about 20 new chondrichthyan species a year and amend taxonomy over time. The 2021 analysis includes 171 species not previously evaluated that are either newly described or the result of species being split. One-quarter of these species have been classified as *Data Deficient* while more than a quarter (26.3%) are assessed as threatened.

Core problem: Sharks, rays, and chimaeras are exceptionally susceptible to overfishing because they tend to grow slowly and produce few young, relative to other fish. Overfishing has far outpaced effective resource management for these species. Governments have fallen far short in fulfilling commitments under international treaties, primarily Regional Fisheries Management Organizations and the Convention on the International Trade of Endangered Species of Wild Fauna and Flora. Most governments have yet to prioritize chondrichthyan protection. Conservation action is urgently needed to prevent population collapses and myriad negative consequences for associated systems.

So what?: Chondrichthyan fishes are important to ecosystems and economies. Many species serve as important predators in marine food webs, transferring nutrients onto coral reefs from the surrounding ocean, as well as into deep sea from surface waters. Depletion of their populations not only risks extinction and ocean imbalance, but squanders opportunities for sustainable fishing, tourism, and food security over the long term.

Remedies: Conservation action is urgently needed to reverse declining trends and prevent further extinction, ecosystem damage, and food insecurity. In particular, concrete limits on fishing based on scientific advice and the precautionary approach are urgently needed to minimize mortality of imperiled species and ensure sustainable exploitation of others. Area closures to further restrict fishing and protect habitats can augment catch limits and improve chances for recovery. Rebuilt populations are better positioned to withstand climate change.

Immediate first steps include restricting landings, protecting important habitats, and implementing fisheries and wildlife treaty obligations.

As a general rule, retention of shark and ray species categorized by IUCN as *Endangered* or *Critically Endangered* should be prohibited. Species classified as *Near Threatened* or *Vulnerable* may be able to sustain some fishing, if strictly limited to safe levels. Most chondrichthyan species would benefit from programs to minimize incidental catch and associated mortality.

Full publication: The paper can be accessed using this [link](#).