Commentary

Global Threat Status of the World's Sharks, Rays and Chimaeras

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The status of the world's 1000 or more species of sharks, rays and chimaeras (chondrichthyans) will soon be known when the Global Shark Red List Assessment draws to a close at the end of 2009. The GSRLA is the product of ten workshops and a decade-long concerted effort by more than 300 scientists coordinated by the World Conservation Union (IUCN) Shark Specialist Group. Even without the benefit of the complete results, the conclusions published so far suggest concerted action is required to stabilize and recover many chondrichthyan populations. There are two main findings: sharks rays and chimaeras include similar proportion of threatened species as other vertebrate animals and a large number of chondrichthyans are so poorly known that they were categorized as Data Deficient. Both underscore the need for shark fishing nations to develop an International Plan of Action for the Conservation and Management of Sharks.

Sharks, rays and chimaeras are as threatened as other vertebrate groups, such as mammals, birds and amphibians. Here, "threatened" means that a species has qualified for one of three IUCN Red List categories: Critically Endangered, Endangered or Vulnerable. Species are assigned to one of these threatened categories based on their past or past, current and projected trends in population size. To qualify as Vulnerable, a species has to have declined (or experience an ongoing decline or projected to decline into the future) in adult abundance of greater than or equal to 50% over the time period of either ten years or the time spanning three generation lengths, whichever is greater. The three-generation long time span accounts for the different life histories of species and their capacity to cope with and recover from elevated mortality, such as from fishing. The qualifying decline thresholds for Endangered and Critically Endangered are 70 and 90% respectively.

By the end of 2007, almost half (591) of all chondrichthyans had been evaluated at a global scale and 126 species or 21.3% of the known chondrichthyans were threatened. As far as we can tell no chondrichthyans have become globally extinct, however a number of species are classified Critically Endangered and have not been seen for decades. An example is the Pondicherry shark Carcharhinus hemiodon, known only from 20 museum specimens captured from the heavily-fished inshore waters of Southeast Asia, and not seen since 1979. A small proportion of species has been assigned with Endangered status (29 species or 5%), and 75 species (12.7%) have been found to be Vulnerable. A further 117 species (18%) were listed as Near Threatened, largely because past declines were not quite severe enough to qualify them as Vulnerable and on the basis of the ongoing or increasing potential threat faced by these species. The regional Red List status of the sharks, rays and chimaeras has been completed for the NE Atlantic Ocean, Mediterranean Sea and Australasia: around thirty species are threatened (classified as Critically Endangered, Endangered or Vulnerable) in each region. The threatened species include inshore sharks and rays with relatively shallow depth distributions that are highly accessible to and catchable by inshore trawl, net and longline fisheries, such as skates, angel sharks, guitarfishes and sawfishes. These species have declined because they are caught as a byproduct of fisheries focusing on other more abundant and productive fish species. The types of fishing gears used in coastal waters tend to be fairly indiscriminate and tend to catch all species larger than the net mesh size. Consequently, sharks and rays can decline almost unnoticed provided the catches of other targeted more productive fishes remain relatively high. In Australian waters, however, many inshore endemics (found only in Australian waters) are Least Concern, where fishing pressure is low and fisheries tightly regulated.

Fisheries have long since moved beyond the narrow confines of the shallow coastal waters of continental shelves. Trawlers and longliners are now fishing the deep waters of the continental slopes beyond the shelf edges. Here exist numerous poorly-known species of skate and dogshark, many of which have slow life histories and low capacity to cope with the mortality imposed by fishing fleets. Where scientific data exist some dogfishes have declined by over 99% in a quarter century of fishing (less than three generation spans) and are Critically Endangered, such as Harrison's dogfish (Centrophorus harrissoni). These fisheries and these species are poorly understood, consequently many deepwater species were assigned Data Deficient categorizations by the IUCN Shark Specialist Group.

Fishing fleets have also expanded out over the surface of the high seas of the world's oceans. The number of true oceanic pelagic sharks is low, comprising around 6% of all chondrichthyans; however they are mostly large charismatic predators, such as hammerheads, threshers and mako sharks and many swim alongside the tuna and billfishes targeted by ocean-wide fisheries. Once caught, the shark fins are removed and sold on to feed growing Asian demand for shark fin soup. The relatively low productivity of most of these oceanic pelagic sharks, the high value of fins and increasing demand for shark fin soup means that, unless specific action is taken to manage the incidental shark catch, they will inevitably decline at a faster rate than the more productive tunas and billfishes. It is estimated that 23-73 million sharks, mainly oceanic pelagic sharks, are killed each year to supply the Hong Kong-based trade in soup fin. The large tunas of the world are in decline, so it is little surprise that many of the largest oceanic sharks are also threatened. According to the consensus of scientists that undertook the IUCN Red List assessments of these 64 oceanic sharks

and rays over half (54%) face an elevated risk of extinction – 31% or 20 species are threatened (16 species are Vulnerable, four are Endangered) and an additional 15 species (23%) lie just outside the threatened categories and were assigned a Near Threatened status, including the manta ray (Manta birostris) and the blue shark (Prionace glauca). A number of species appear to be safe: 12 species were assigned a Least Concern listing, not least the large salmon shark (Lamna ditropis), which appears to have benefited from improved fisheries management, the bizarre goblin shark (Mitsukurina owstoni) and the ectoparasitic cookie cutter sharks (Isistius spp.).

The scientific community has known the nature and scale of the problems facing chondrichthyans for a couple of decades now. The global status assessment provides more badly-needed detail: (1) to compare the states and fate of sharks alongside mammals, birds, amphibians and corals – the poster children of the past decade of global change, and (2) to prioritize species and populations, geographic locations and specific fisheries for management action. A decade ago, in 1999, the Food and Agriculture Organisation of the United Nations recognized the high priority of shark fisheries management by adopting and promoting the International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks). Nevertheless, few (˜10%) shark fishing nations are managing their shark fisheries and the great majority have yet to make significant progress towards the development of shark fishery management plans. The Global Shark Red List findings underscore the need to urgently develop and implement IPOAs for sharks rays and chimaeras.

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