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Over three quarters of large open ocean shark and ray species have a heightened risk of extinction.

GLOBAL STATUS OF OCEANIC PELAGIC SHARKS AND RAYS

A Summary of New Scientific Analyses:

Dulvy, N.K., Baum, J.K., Clarke, S., Compagno, L.J.V., Cortés, E., Domingo, A., Fordham, S., Fowler, S., Francis, M.P., Gibson, C., Martínez, J., Musick, J.A., Soldo, A., Stevens, J.D., and S. Valenti. (Accepted pending revisions). You can swim but you can't hide: the global status and conservation of oceanic pelagic sharks and rays. *Aquatic Conservation*.

PELAGIC SHARKS AND RAYS such as the shortfin mako, salmon shark, blue shark, and pelagic stingray, live in the open ocean away from the boundaries of individual countries. For many decades these species have been caught incidentally by fishing vessels seeking tuna and other open ocean fish. Increasingly, pelagic sharks and rays are also directly targeted by fisheries for their meat and their fins.

Many of the world's foremost shark experts met in February 2007 to review the status of these sharks and rays. This workshop of experts, convened by the Shark Specialist Group (SSG) of the IUCN-World Conservation Union, used IUCN Red List criteria to assess the extinction risk for 21 oceanic pelagic shark and ray species captured in high seas fisheries. The authors found that 76 percent of these species have a heightened risk of extinction ("Threatened" or "Near Threatened" according to these criteria). Only two of the species were classified as "Least Concern". These levels of extinction risk are much higher than the average for all marine sharks and rays evaluated so far, reflecting the vulnerable nature of these open ocean species. This *Lenfest Ocean Program Research Series* report is a summary of the expert group's findings.

CASE STUDY: SHORTFIN MAKO

Shortfin mako—a highly-valued, globally threatened species with little management

The shortfin mako is a large shark that occurs in all tropical and temperate oceans. It is the second most abundant oceanic shark throughout much of its range. This species is targeted for its meat and fins and is a highly prized recreational gamefish. In addition, when these sharks are caught as bycatch, they are usually retained.

Shortfin makos live relatively long and reproduce late in life so their productivity is low. This combination of low productivity and intense, targeted fishing pressure has led to major declines in their abundance in parts of their range. In the eastern Mediterranean Sea, they are now rarely seen. In the North Atlantic Ocean, population declines of up to 70% have been estimated.

Poor information about this species, including how many are caught, has limited attempts to monitor and manage shortfin mako sharks. There has been some domestic management within national Exclusive Economic Zones (in less than 5% of range States), but no international management is in place. The International Commission for the Conservation of Atlantic Tuna has requested that management recommendations for this species be developed for consideration in 2008.

PELAGIC SHARKS AND RAYS

Oceanic pelagic sharks and rays are highly mobile species that are not associated closely with the sea floor and primarily live in the open ocean away from continental landmasses. The workshop focused on large species that are affected by high seas or open ocean fisheries. Many of these species reproduce relatively late (between 2–21 years) and have long life spans (between 8–65 years), with long pregnancies and few offspring. As such, many of them are especially vulnerable to overfishing because they have a slow rate of population growth.

These sharks and rays face a multitude of threats. Many of these animals are regularly taken as incidental “bycatch” from fisheries targeting tuna and swordfish. Increasingly, as new markets develop and traditional food fish decline, they are targeted. Shark fishing is still driven by the high demand for shark fins, which are traded internationally for use in the Asian delicacy, shark fin soup. The number of sharks and rays caught has been poorly reported, however, primarily because domestic or international regulations for reporting catch and bycatch are not in place, not enforced, or ineffective. In addition, finning bans are often implemented through complicated fin to carcass ratios aimed at ensuring that the weight of shark carcasses and the weight of fins landed correspond. This shortage of information limits the assessments of these species’ status.

Although the United Nations Food and Agriculture Organization (FAO) adopted the International Plan of Action for Sharks (IPOA-Sharks) in 1999, implementation has been slow and its provisions are voluntary. Finning bans have been introduced in many countries and in most Regional Fisheries Management Organizations (RFMOs), but enforcement measures tend to be lacking. To date, no international catch limits for sharks have been adopted by the RFMOs that manage fisheries catching sharks.



Oceanic white tip shark



Pelagic thresher sharks

THE EXPERT GROUP'S ANALYSES

The Shark Specialist Group used the IUCN Red List Criteria and the best available scientific data to assess the global status of 21 oceanic pelagic shark and ray species captured in high seas fisheries. The IUCN Red List classifies species according to their risk of extinction, with categories for extinct species, threatened species, species that are close to meeting criteria for threatened status, and species at low risk of extinction (see Figure 1). For some species, there are insufficient data to assess their status. These are listed as “Data Deficient.” The criteria for determining the relative extinction risk within the various categories can include the estimated size of the population, the reduction in population over a specified period of time (this criterion is used to assess extinction risk for wide-ranging species), and the area of the species’ geographic range. For the purposes of this study of pelagic sharks and rays, the experts used reduction in population size over time to estimate extinction risk.

The authors used available data from a number of regions around the world and determined the global extinction risk for each species. However, some world regions lack adequate data for some species. Thus, the final IUCN Red List designation for each species reflects a balance between higher threat categories in heavily fished data-rich regions and lower threat or “Data Deficient” classification in data-poor regions. For example, several species, including bigeye thresher and oceanic whitetip sharks, were assessed as being regionally “Endangered” (in one or more oceans), but received lower threat categories globally (i.e., “Vulnerable”) because of insufficient information, or information indicating lower threat categories from other regions where catches and fisheries impacts are poorly recorded but considered less severe.

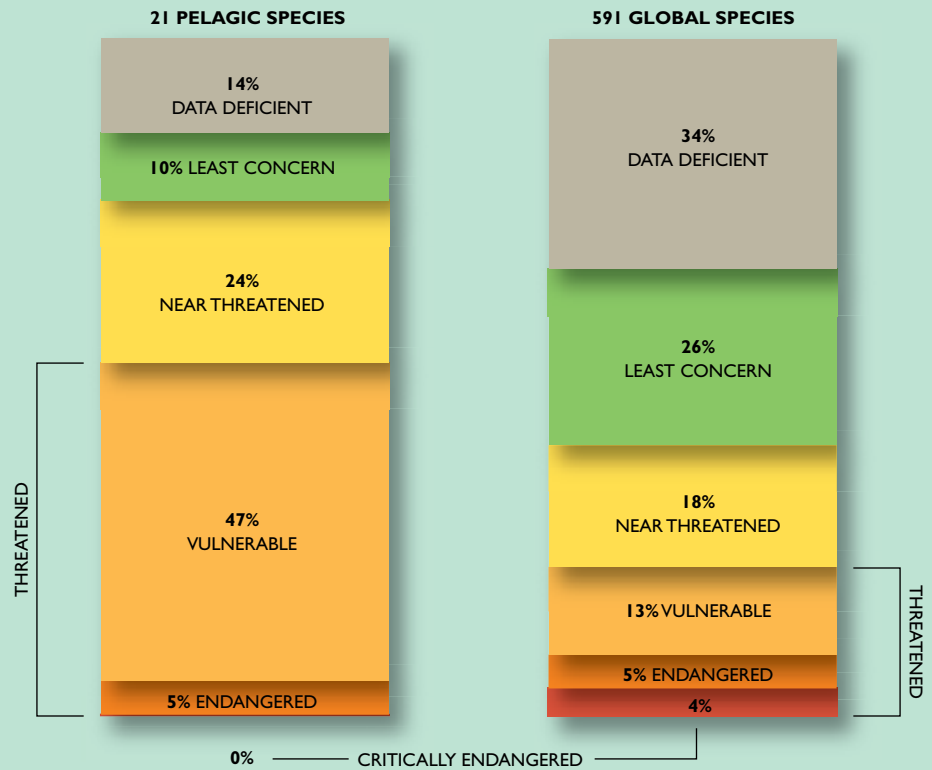
IUCN encourages governments to make use of the Red List when considering priorities for species protection and resource management. The Convention on Biological Diversity has also identified the Red List as a provisional indicator for the 2010 global target for reducing biodiversity loss. The workshop conclusions will be incorporated into the “Global Shark Assessment,” scheduled to be launched in 2008.

FIGURE 1: IUCN RED LIST CATEGORIES

Oceanic pelagic sharks and rays and their global IUCN Red List Status

| EXTINCT OR EXTINCT IN THE WILD | | | |
|--------------------------------|---|--|---|
| THREATENED | | | |
| | Critically Endangered | Endangered | Vulnerable |
| | | Giant devilray <i>Mobula mobular</i> | Basking shark <i>Cetorhinus maximus</i> Bigeye thresher <i>Alopias superciliosus</i> Great white shark <i>Carcharodon carcharias</i> Longfin mako <i>Isurus paucus</i> Oceanic whitetip shark <i>Carcharhinus longimanus</i> |
| | | | Pelagic thresher <i>Alopias pelagicus</i> Porbeagle shark <i>Lamna nasus</i> Shortfin mako <i>Isurus oxyrinchus</i> Thresher shark <i>Alopias vulpinus</i> Whale shark <i>Rhincodon typus</i> |
| NEAR THREATENED | Blue shark <i>Prionace glauca</i> Crocodile shark <i>Pseudocarcharias kamoharai</i> Manta ray <i>Manta birostris</i> | Silky shark <i>Carcharhinus falciformis</i> Spinetail devilray <i>Mobula japonica</i> | |
| LEAST CONCERN | Pelagic stingray <i>Pteroplatytrygon violacea</i> | Salmon shark <i>Lamna ditropis</i> | |
| DATA DEFICIENT | Bigeye sand tiger <i>Odontaspis noronhai</i> | Chilean devilray <i>Mobula tarapacana</i> | Megamouth shark <i>Megachasma pelagios</i> |

FIGURE 2: PERCENTAGE OF SPECIES ASSESSED WITHIN EACH IUCN RED LIST CATEGORY



LEFT: Percentage of pelagic sharks and rays (21 species) within each IUCN Red List Category

RIGHT: Percentage of all globally assessed sharks and ray (591 species) within each IUCN 2007 Red List Category

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WORKSHOP RESULTS

The findings of the workshop analyses are summarized in Figure 1. The expert group found that 16 of the 21 oceanic pelagic shark and ray species are considered “Threatened” or “Near Threatened,” according to IUCN Red List Criteria. Of these, ten species are “Vulnerable” globally, five are “Near threatened,” and one species, the giant devil ray, is globally “Endangered.” Threat status depended on the species’ life history characteristics and the intensity of fishing pressure on that species. Most threatened species produced few young over a lifetime and were exposed to high fishing mortality. Some are assessed as “Critically Endangered” in regions with intensive fisheries.

Of the 21 species, only two were classified as “Least Concern,” with a low risk of extinction—the pelagic stingray and the salmon shark. These species tended to have either resilient life histories (i.e., produce many young) or have fisheries management plans in place. Three species had insufficient information available and were classified as “Data Deficient.”

The experts also compared the 21 pelagic species to the 591 shark and ray species assessed to date and found that a much higher proportion of the pelagic group are considered “Threatened” (Figure 2). This difference may be due to the intense fishing pressure in open ocean fisheries for high-value large pelagic fishes, the lack of management of pelagic shark catches, or the increasing value of shark products.



Blue shark

MANAGEMENT AND CONSERVATION RECOMMENDATIONS

To reduce the extinction risk for oceanic pelagic sharks and rays, the expert group recommended that individual countries and management institutions:

- Implement existing scientific advice for preventing overfishing of pelagic shark and ray populations, including stock assessments, precautionary shark catch limits, and gear modifications aimed at mitigating shark and ray bycatch;
- Draft and implement Plans of Action pursuant to the International Plan of Action for Sharks and include, where possible, binding, science-based management measures for pelagic sharks;
- Improve observer coverage, monitoring, and enforcement in fisheries catching pelagic sharks;
- Strengthen finning bans by requiring sharks to be landed with fins attached;
- Initiate programs to reduce overcapacity and associated subsidies in pelagic fisheries;
- Adopt and ensure active membership in bilateral and multilateral agreements for conservation of oceanic pelagic sharks and rays; and
- Develop and promote options for new international and global conservation agreements for migratory sharks.

About the Authors

The February 2007 workshop was attended by a group of international shark experts. This Lenfest Ocean Program Research Series report is a summary of a scientific paper prepared by the expert group at and following the February 2007 meeting. The scientific paper has been accepted for publication pending revisions in the scientific journal, *Aquatic Conservation*. A full list of workshop attendees and the scientific paper are available at www.lenfestocean.org.

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Blue shark



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