



# Sharks: Key to Healthy Oceans



IMAGE C/O STUART COVE'S DIVE BAHAMAS WWW.STUARTCOVE.COM

## Ecosystem Benefits

**G**lobally, sharks are in trouble. But the waters around The Bahamas present a rare situation where shark populations still thrive.<sup>1</sup> As a result, The Bahamas provides a unique opportunity to conserve shark populations before it is too late. Healthy and biologically diverse shark populations are important to maintaining balance in marine ecosystems, including healthy habitats and fisheries. By establishing comprehensive protections for sharks, not only will sharks be permanently safeguarded, but the marine ecosystem and the economy of The Bahamas will be conserved for generations to come.

## Keeping the Balance

As top predators in the food chain, sharks help maintain the balance of marine life in the ocean. They regulate the variety and abundance of the species below them in the food chain, including commercially important fish species.<sup>2</sup> In addition, sharks help to maintain the health of their marine habitats, including seagrass beds<sup>3</sup> and coral reefs.<sup>4</sup> Declines in shark populations can result in negative, broad cascading effects throughout the marine ecosystem.

The decline in shark populations could lead to unpredictable consequences, including the collapse of commercially important fisheries. In the northwest Atlantic,



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populations of sharks have declined to the point where they are no longer fulfilling their role as a top predator in the ecosystem.<sup>5</sup> On the U.S. east coast, for example, without sharks to keep the ecosystem in balance, the cownose ray population exploded in North Carolina. With more cownose rays eating the scallops, clams and oysters, the bay scallop population collapsed and with it, an important North Carolina commercial fishery was terminated.<sup>6</sup>

<sup>1</sup> Ward-Paige, C.A., Mora, C., Lotze, H.K., Pattengill-Semmens, C., McClenachan, L., Arias-Castro, E. and Myers, R.A. 2010. Large-scale absence of sharks on reefs in the greater-Caribbean: A footprint of human pressures. PLOS ONE 5(8): 1-10.

<sup>2</sup> Stevens, J.D, Bonfil, R., Dulvy, N.K. and Walker, P.A. 2000. The effects of fishing on sharks, rays and chimaeras (chondrichthyans), and the implications for marine ecosystems. ICES Journal of Marine Science 57: 474-494.

<sup>3</sup> Wirsing, A.J., Heithaus, M.R. and Dill, L.M. 2007. Living on the edge: dugongs prefer to forage in microhabitats that allow escape from rather than avoidance of predators. Animal Behavior 74:93-101.

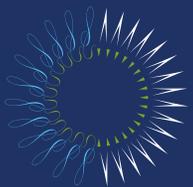
<sup>4</sup> Bascompte, J., Melian, C.J., and Sala, E. 2005. Interaction strength combinations and the overfishing of a marine food web. PNAS 102(15): 5443-5447.

<sup>5</sup> Myers, R.A., Baum, J.K., Shepherd, T.D., Powers, S.P. and Peterson, C.H. 2007. Cascading effects of the loss of apex predatory sharks from a coastal ocean. Science 315: 1846-1850.

<sup>6</sup> Myers, R.A. et al. 2007.



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## Keeping Coral Reefs Healthy

The loss of sharks can be felt throughout the entire system, including through habitat shifts. In coral reef ecosystems, corals depend on herbivorous fish, such as parrotfish, to eat the algae, which allows space for coral to settle and grow.<sup>7</sup> When sharks are removed from the system, the larger fish, which feed on herbivorous fish, increase in abundance.<sup>8</sup> Without the smaller fish to eat the algae, coral can no longer compete for space. As a result, the ecosystem switches to an algae-dominated system, corals cannot thrive and the entire ecosystem changes to one lacking the diversity and abundance of species once found within the coral reef ecosystem.<sup>9</sup>

## Sharks under Threat

Sharks have been swimming the world's oceans for more than 400 million years. They have survived multiple mass extinctions, but they are not equipped to withstand the threats now posed by humans. Their life history characteristics, such as slow growth, late maturation and production of few offspring, make them vulnerable to overfishing and slow to recover from decline. As a result, shark populations are in trouble globally.

The demand for shark fins, meat, liver oil and other products has driven numerous shark populations to the brink of extinction. The growing demand for the Asian delicacy, shark fin soup, has led to the killing of up to 73 million sharks a year and is impacting shark populations worldwide, which could potentially affect The Bahamas. The International Union for Conservation of Nature (IUCN) Red List of Threatened Species has assessed that 30 percent of shark and ray species around the world are threatened or near threatened with extinction. The loss of sharks could cause irreversible damage to the ocean—and to economic activities, such as dive tourism, that benefit from healthy marine habitats.



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## Permanent Protection for Sharks

Time is of the essence – giving sharks permanent protection in The Bahamas will help to keep its coral reefs, fisheries and the economy healthy.

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<sup>7</sup> Mumby, P.J., Harborne, A.R., Williams, J., Kappel, C.V., Brumbaugh, D.R., Micheli, F., Holmes, K.E., Dahlgren, C.P., Paris, C.B. and Blackwell, P.G. 2007. Trophic cascade facilitates coral recruitment in a marine reserve. *PNAS* 104(20): 8362-8367.

<sup>8</sup> Bascompte, J., Melian, C.J. and Sala, E. 2005. Interaction strength combinations and the overfishing of a marine food web. *PNAS* 102(15): 5443-5447.

<sup>9</sup> Bascompte, J., et al. 2005.