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Shark Conservation: The Need for Increased Efforts to Protect Shark Populations in the Twenty-First Century

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Comments

Shark Conservation: The Need for Increased Efforts to Protect Shark Populations in the Twenty-First Century

I. Introduction

The release of the movie "JAWS"[1] over twenty-five years ago created a renewed fear and fascination with sharks.[2] However, as we learn more about sharks, we are learning that our fear towards these amazing creatures is unfounded. We have also realized that sharks are an important and vital part of the oceanic environment.[3] Peter Benchley, the author of the 1974 novel that would become the blockbuster movie "JAWS,"[4] is, along with many environmental groups, currently leading a push toward understanding and protecting sharks.[5]

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1. *See* JAWS (Universal Studios 1975).
2. *See* Peter Benchley, *Great White Sharks*, NAT'L GEOGRAPHIC, Apr. 2000, at 24. This article presents information about the great white shark. The purpose of the article is to raise awareness about the reduction of great white shark populations around the world. Benchley wrote the article in an attempt to de-demonize the fish that he created into a monster with his book, JAWS. This article is one of Peter Benchley's many attempts to educate people about sharks, their current situation, and their importance to the oceanic environment. *See id.*
3. *See id.* at 12.
4. *See* Peter Benchley, JAWS, (Fawcett Crest 1992) (1974).
5. *See* Benchley, *supra* note 2, at 5.

As our knowledge of sharks has increased over time, we have recognized a disturbing trend of decreasing shark populations worldwide.[6] Even though many species have no natural predators,[7] man has decimated shark populations by commercial over-fishing,[8] sport and recreational fishing,[9] and habitat modification.[10]

This comment is intended to inform the reader about the plight of shark populations and analyze current legislation proposed by Congress to protect sharks. The second section provides background information describing the current situation facing sharks. The third section is broken into three parts. The first part states the current trend in the law and the steps currently underway by Congress to protect sharks. The second part will analyze whether this legislation can help shark populations. The third part sets forth additional proposals to help protect and replenish shark populations. The final section concludes the comment and offers some suggestions and insight for the future.

II. Background

Sharks have inhabited the earth for over four hundred million years.[11] Today, nearly three hundred fifty shark species have been classified.[12] However, many shark species have been and are being depleted at alarming rates.[13] Practices such as commercial over-fishing, recreational fishing, habitat modification and "finning"[14] are responsible for the decline.[15] The effect of these practices is even more alarming given the relative inability of shark populations to replenish lost stocks.[16]

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6. *See id.* at 12.
7. *See* TIMOTHY C. TRICAS ET AL., SHARKS & RAYS, 110 (1999).
8. *See id.* at 34-35.
9. *See id.* at 39.
10. *See id.* at 42-43.
11. *See id.* at 94.
12. *See* TRICAS, *supra* note 7, at 92.
13. *See id.* at 44.
14. *See id.* at 38. "Finning" is the practice of catching a shark, either on a line or in a net, hauling the still living shark aboard the fishing vessel and subsequently removing the fins and, at times, the tail of the shark. The shark is then thrown back into the ocean and is usually alive when discarded. After the shark is discarded it will die. *Id.*
15. *See supra* notes 8-10.
16. *See* TRICAS, *supra* note 7, at 106. The term "stock" refers to a population of any given shark species. *Id.*

Sharks are extremely vulnerable for several reasons.[17] First, most species of sharks are near the top of their respective food chains and, therefore, they are not abundant.[18] Also, sharks have a long life cycle, mature reproductively late in their life cycle, do not reproduce every year and produce only a few young sharks per litter.[19] Merry Camhi, a senior scientist of the National Audubon Society, has stated that "[u]nlike most bony fishes (sic) in which the survival of millions of eggs and larvae are often dependent on environmental variables, (sharks) exhibit a much closer relationship between the number of young produced and the number of breeding adults."[20]

A. Commercial Over-Fishing

Shark populations are feeling the crunch from commercial fishing.[21] The mid-1980s saw an increase in the demand for shark products.[22] These products have included shark meat and shark fins used in soup.[23] Furthermore, it is estimated that the trade of shark products worldwide exceeds two hundred forty million United States dollars per year.[24]

The exact number of sharks that humans actually kill each year is not known.[25] The United Nations Fishery and Agriculture Organization (UN/FAO) has released figures stating that humans kill approximately twelve million sharks annually.[26] Other accepted estimates range as high as one hundred million sharks killed each year by humans.[27] Sharks, however, on average attack[28] only fifty humans a year worldwide[29] and kill only six.[30]

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17. *See* Peter Klimley, *Sharks Beware*, AMERICAN SCIENTIST, Nov. 1999, at 488-491.
18. *See id.*
19. *See id.*
20. *See id.*
21. *See* TRICAS, *supra* note 7, at 38.
22. *See id.* at 35.
23. *See id.* at 36-37.
24. *See id.* at 35.
25. *See id.* at 34.
26. *See* TRICAS, *supra* note 7, at 34.
27. *See* Peter Benchley, *Misunderstood Monsters*, FIELD & STREAM, Mar. 1995, at 32-35.
28. People going to the beach should not fear being attacked or killed by a shark. The odds of being attacked by a shark are one in one hundred million. The odds of being killed by a shark are one in three hundred million. The odds of being audited by the IRS are one in sixty-six. *See id.*
29. *See* TRICAS, *supra* note 7, at 52.

Sharks caught as bycatch[31] by commercial fishers are also beginning to receive international attention.[32] Usually, sharks caught as bycatch die in nets or on fishing lines and are subsequently discarded back into the ocean.[33] In these instances, sharks are viewed as a nuisance by fishers, since the sharks are caught on lines or in nets meant to catch other types of more commercially valuable fish.[34]

B. Sport and Recreational Fishing

People around the world also fish sharks for sport and recreation.[35] The reasons behind the actions of many sport and recreational fishers are that these creatures are monsters of the deep, the so-called "enemy of man" and, therefore, ripe to be preyed upon.[36] Sharks are relatively easy to catch and some

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SHARK ATTACK NUMBERS

Area	Average Number of attacks/year	Average Number fatal attacks/year
World	50	6
Australia	6	1
New Zealand	1	0
Brazil	5	<1
South Africa	4	<0.5
Hong Kong	1	1
Japan	1	<0.5
California, USA	3	<0.2
Florida, USA	15	0
Hawaii, USA	3	<0.5
Other Areas	10	<3

Id.

30. *See id.*

31. "Bycatch" is the fish or objects unintentionally caught in fishing nets or on fishing lines. When sharks are unintentionally caught as "bycatch," they either die as a result of the capture or are killed when brought aboard the ship. The shark carcass is then usually discarded at sea. However, in rare instances the still living shark is released into the ocean unharmed. *See id.* at 38-39.

32. *See id.* at 38.

33. *See* TRICAS, *supra* note 7, at 38.

34. *See id.*

35. *See* SHARKS, *infra* note 37.

36. *See* Elise MacGregor, *Beyond Jaws*, WINDSURFING MAGAZINE, Sept./Oct. 1993, at 45-49. This article deals with modern day myths about sharks and the facts to disprove those myths. A myth addressed is that sharks have terrible eyesight; in fact, sharks have excellent eyesight and the corneas of sharks have been used as transplants for human corneas. Another myth addressed is that sharks are nothing more than "brainless eating machines." However, sharks' brains are physically large and young nurse sharks have been trained to touch and retrieve objects on command. The article also describes how to protect yourself from being attacked by a shark if you are a swimmer, surfer or windsurfer. *See id.*

consider the jaws of a shark to be a great and valuable trophy.[37] The sharks most often affected are those sharks living inshore where many sport and recreational fishers spend the majority of their time.[38] The effects of sport and recreational fishing on shark populations vary among species, since sport and recreational fishers do not use the same techniques used by commercial fishers.[39]

Sport and recreational fishers also employ other means to catch sharks. These fishers hunt sharks through the use of illegally set nets.[40] The sharks caught in the nets subsequently die due to suffocation.[41] Most sharks need to continue to swim in order to keep water moving over their gills and to keep from sinking, since sharks do not have swim bladders like other fish.[42] Swim bladders keep fish from sinking and allow them to "hover" in the water.[43]

The sand tiger shark,[44] for example, with its characteristically menacing and toothy appearance, has been hit especially hard by spear fishing, a form of sport and recreational fishing.[45] These sharks are relatively easy to catch and their menacing toothy jaws are a popular trophy among sport and recreational fishers.[46] Another example is the great white shark, where fishers can receive up to five thousand United States dollars for a set of jaws.[47]

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37. *See* SHARKS (Nat'l Geographic Video 1982). This video details the common myths and truths about sharks. The video also discusses the use of shark products and how the demand for these products is affecting shark populations. *See id.*

38. *See* TRICAS, *supra* note 7, at 39.

39. *See id.*

40. *See id.* at 39.

41. *See id.*

42. *See id.* at 98.

43. *See* SHARKS, *supra* note 37.

44. *See* TRICAS, *supra* note 7, at 152. The scientific name of the sand tiger shark is *Odontaspis taurus*. *See id.*

45. *See id.* at 45. Spear fishers use spears with charges placed at the end of the spear. The spears detonate upon making contact with the shark, and the shark is killed by a shot-gun type blast which destroys the sharks brain. *See also* SHARKS, *supra* note 33.

46. *See* SHARKS, *supra* note 37. This section of the video details how recreational fishers have slaughtered many sharks for the jaws. This section also discusses how some species of sharks are relatively easy to hunt and kill by describing how spear fishers kill sharks for sport. *See id.*

47. *See* Todd Preston, *Who's the real killer?*, THE ENVIRONMENTAL MAGAZINE, Nov. 1995, at 18-19. This article discusses how commercial fishers are affecting millions of sharks each year. The reason behind the enormous trade in shark products is that fishers can receive up to fifty United States dollars for a pound of shark meat. In addition to their meat, sharks are also valuable to commercial fishers since their skin is used to make cowboy boots, the oil from their liver is used in Preparation H, and sharks skulls are used in making beauty creams. *See id.*

Another hazard faced by sharks is the use of beach nets.[48] Beach nets are placed along coastal areas which are popular tourist attractions for such activities as swimming and surfing.[49] When sharks in these waters encounter the nets, they usually become entangled in the nets and suffocate.[50] The number of sharks affected each year by beach nets is not known, but these nets could have a profound effect on the populations of coastal sharks.[51]

C. Habitat Modification

The modification of shark habitat is often overlooked when examining the plight of sharks.[52] Due to the research documenting the decline in the number of sharks attributed to over-fishing, the effect on sharks from habitat modification has not been readily explored.[53] Pollution, oil spillage, shipping discharge, and the spread of marine organisms are producing a devastating effect on the world's oceans and, therefore, upon the world's shark population.[54]

Pollution is affecting the world's oceans, but its effect on sharks is not known or understood.[55] An example of a pollutant affecting sharks is an organic pollutant known as "environmental estrogens."[56] These "environmental estrogens" can suppress the number of male sharks born in each litter.[57] The suppression of the reproduction of male sharks can be especially damaging to a species, since sharks have naturally low reproductive rates.[58] With fewer male sharks, shark reproduction will be further stifled.[59]

Oil spillage and shipping discharge[60] have increased the amount of foreign chemicals in the water.[61] The shark habitats most prone to harm from oil escaping into the environment are shark nurseries

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48. *See* TRICAS, *supra* note 7, at 52-53.
49. *See id.*
50. *See id.*
51. *See* SHARKS, *supra* note 37.
52. *See* GREAT WHITE! (Discovery Channel Video 1998). This video describes the Great White Shark. The video also discusses problems facing all shark species. *See id.*
53. *See* TRICAS, *supra* note 7, at 40.
54. *See id.* at 43.
55. *See id.* at 42.
56. *See id.*
57. *See id.*
58. *See* TRICAS, *supra* note 7, at 106.
59. *See* Klimley, *supra* note 17, at 488-491.
60. *See* TRICAS, *supra* note 7, at 42.
61. *See id.*

and shallow water habitats.[62] With most commercial and recreational fishers taking their catches from shallow water and inshore areas,[63] the additional reduction of populations from areas damaged by oil spillage and shipping discharge will compound the current situation.[64]

The spread of foreign marine organisms is another problem affecting the oceans.[65] As foreign organisms move into new environments, they affect the organisms already living in that oceanic habitat.[66] Sharks are affected when these foreign marine organisms damage their normal diet.[67] Their diets are damaged, for example, when plankton levels are reduced and the fish upon which the sharks feed no longer have a viable food supply.[68] When sharks lose their food supply, the food chain and oceanic ecosystem will crumble.

D. Shark "Finning"

Many sharks are killed each year only for their fins.[69] Finning is the practice of severing the fins and possibly the tail from a live shark.[70] The still living, now finless, body is then discarded back into the ocean.[71] The shark will eventually suffocate[72] or die from attacks by other sharks or marine creatures.[73] The fins removed from the body of the shark comprise only one to five percent of the shark's entire bodyweight.[74]

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62. *See id.* at 43.
63. *See id.* at 38-39.
64. *See id.* at 42-43.
65. *See* TRICAS, *supra* note 7, at 43.
66. *See id.*
67. *See id.* at 43.
68. *See id.*
69. *See supra* note 14 and accompanying text.
70. *See id.*
71. *See* TRICAS, *supra* note 7, at 38. *See also supra* note 14 and accompanying text.
72. *See* TRICAS, *supra* note 7, at 98-99. Sharks extract oxygen from the water for respiration. In sharks, water is pumped over their gills as they swim. If the shark cannot continue to swim, water will not move across its gills and the shark will, therefore, suffocate. Bottom-dwelling species have well developed spiracles that serve as water inlets when they are feeding or resting. These spiracles allow bottom dwelling sharks to lie on the ocean floor for extended periods of time, without the need to swim to keep water moving across the sharks' gills. *See id.*
73. *See* GREAT WHITE!, *supra* note 52.
74. *See* Jennifer Viegas, *Shark Conservation Bill Stalls In Senate*, Discovery.com News, *at* http://www.discovery.com/news/theme/sharknews/an_sharkfin.html (July 27, 2000).

The practice of shark "finning" is primarily a result of the Asian market demand for shark-fin soup.[75] Shark-fin soup is considered a delicacy in Asia and is served at weddings in both China and Hong Kong.[76] A bowl of shark fin soup can cost up to one hundred fifty United States dollars.[77]

E. The Shark's Inability to Recover

Sharks have not shown the ability to recover from their widespread depletion.[78] Unlike bony fish,[79] sharks do not have the ability to replenish populations at a fast rate.[80] Most sharks produce very few offspring during their lives,[81] and unlike other fish, sharks do not become reproductively mature until much later in their life.[82] For example, it is believed that a female great white shark, probably the most recognized shark after its staring role in the movie, "JAWS,"[83] does not begin breeding until reaching the age of twelve to fourteen.[84] In addition, it is also believed that each infant shark born faces a mortality rate of up to eighty percent.[85]

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75. *See Sharks Face Extinction Around the Globe*, REUTERS, *at* http://www.discovery.com/news/theme/sharknews/an_jaws.html (Aug. 1, 2000). Shark fin soup is made by boiling the fins in vinegar, starch and flavoring. *See id.*

76. *See id.*

77. *See* Michael D. Lemonick, *Under Attack*, TIME, Aug. 11, 1997, at 58-64. This article describes how humans have little to fear from sharks. More people are killed each year by bees, poisonous snakes, elephants, bathtub falls, and lightening strikes. Lemonick also states that it is "much more dangerous to drive to the beach than to venture into the water once you get there." The article also documents how humans are destroying shark populations worldwide. *See id.*

78. *See* TRICAS, *supra* note 7, at 96. Unlike bony fish, a shark's skeleton is composed of cartilage. A cartilage skeleton allows "a high degree of body flexibility, provides protection and support for organs and reduces total body mass." *Id.*

79. The term "bony fish" refers to any group of fish that have a bony rather than a cartilaginous skeleton. A shark's skeleton is composed of cartilage. Most other creatures that are commonly thought of as fish have a skeleton composed of bone. Other characteristics of bony fish include scales, a swim bladder, a covering over the fish's gills and scales on the fish's skin. *See* TRICAS, *supra* note 7, at 96.

80. *See id.* at 106. Unlike bony fish, female sharks do not lay thousands of eggs. Female sharks only produce a few eggs per reproductive cycle. In addition, unlike bony fish, eggs are fertilized inside the body of the female shark and most sharks give birth to live young, like mammals. At times, only one shark is born, since the shark born has killed and devoured the other sharks developing in the female shark's womb. The gestation period inside the female shark can be up to two years. *See id.*

81. *See id.*

82. *See id.*

83. *See* JAWS *supra* note 1.

84. *See* Benchley, *supra* note 2 at 24.

85. *See* Preston, *supra* note 47, at 18-19.

With regard to their reproductive capacity, sharks have been considered to be similar to marine mammals and large land mammals.[86] Therefore, since sharks cannot reproduce like bony fish, the loss of one shark of any species will have an enormous affect on the population of that species.[87] Gregor Cailliet of Moss Landing Marine Laboratories has stated that "[t]op predators (like sharks) are not used to mortality threats and (therefore) do not respond rapidly."[88]

F. The Importance of Sharks to the Oceanic Environment

Sharks play an extremely important role in the oceanic environment.[89] Sharks winnow out the sick and unfit members of predatory species.[90] This action ensures that only the healthy members of predatory species survive to reproduce.[91] According to Samuel Gruber of the University of Miami, sharks "play an important role in the evolution of prey species, taking the sick and unhealthy fish, leaving the more fit to breed."[92] Sharks, which have their own niche in an ecosystem, help to keep that ecosystem in balance.[93]

G. Sharks Currently Protected in the Waters of the United States

At this time, the United States has published plans to protect thirty-nine species of sharks.[94] The large coastal sharks that are listed include the sandbar,[95] silky,[96] tiger,[97] blacktip,[98] bull,[99] great

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86. *See* Larry O'Halon, *Scientists Call for New Approach to Shark Fisheries*, Discovery.com News, *at* http://www.discovery.com/news/theme/sharknews/an_fisheries.html (July 21, 2000). Sharks are considered to have a similar reproductive capacity to mammals. Like mammals, most sharks produce few offspring and do not produce these offspring until late in the shark's life cycle. *Id.*

87. *See* Preston, *supra* note 47, at 18-19.

88. *See id.*

89. *See id.*

90. *See id.*

91. *See id.*

92. *See* Preston, *supra* note 47, at 18-19.

93. *See id.*

94. *See Atlantic Highly Migratory Species (HMS) Fisheries; Fishery Management Plan (FMP), Plan Amendment, and Consolidation of Regulations*, 15 C.F.R § 902 (1999). This regulation contains the list of thirty-nine species of sharks protected by federal regulation. The thirty-nine species are the only species currently protected in the United States. *Id.*

95. *Id.* The scientific name of the sandbar shark is *Carcharhinus plumbeus. Id.*

96. *Id.* The scientific name of the silky shark is *Carcharhinus falciformis. See* 15 C.F.R § 902, *supra* note 94.

hammerhead,[100] lemon,[101] nurse,[102] scalloped hammerhead,[103] smooth hammerhead,[104] and spinner[105] sharks. The small coastal sharks that are listed include the Atlantic sharpnose,[106] blacknose,[107] bonnethead,[108] and finetooth[109] sharks. The Pelagic[110] sharks that are listed include the blue,[111] oceanic whitetip,[112] porbeagle,[113] shortfin mako,[114] and thresher[115] sharks. The other protected sharks include the Atlantic angel,[116] basking,[117] bigeye sand tiger,[118] bigeye sixgill,[119] bigeye thresher,[120] bignose,[121] Caribbean reef,[122] Caribbean sharp-

97. *Id.* The scientific name of the tiger shark is *Galeocerdo cuvieri. Id.*

98. *Id.* The scientific name of the blacktip shark is *Carcharhinus limbatus. Id.*

99. *See* 15 C.F.R § 902, *supra* note 94. The scientific name of the bull shark is *Carcharhinus leucas. Id.*

100. *Id.* The scientific name of the great hammerhead shark is *Sphyrna mokarran. Id.*

101. *Id.* The scientific name of the lemon shark is *Negaprion brevirostris. See* 15 C.F.R § 902, *supra* note 94.

102. *Id.* The scientific name of the nurse shark is *Ginglymostoma cirratum. Id.*

103. *Id.* The scientific name of the scalloped hammerhead is *Sphyrna lewini. Id.*

104. *See* 15 C.F.R § 902, *supra* note 94. The scientific name of the smooth hammerhead is *Sphyrna zygaena. Id.*

105. *Id.* The scientific name of the spinner shark is *Carcharhinus brevipinna. Id.*

106. *Id.* The scientific name of the Atlantic sharpnose shark is *Rhizoprionodon terraenovae. See* 15 C.F.R § 902, *supra* note 94.

107. *Id.* The scientific name of the blacknose shark is *Carcharhinus acronotus. Id.*

108. *Id.* The scientific name of the bonnethead shark is *Sphyrna tiburo. Id.*

109. *See* 15 C.F.R § 902, *supra* note 94. The scientific name of the finetooth shark is *Carcharhinus isodon. Id.*

110. "Pelagic sharks" live in the deep waters of the ocean.

111. *See* 15 C.F.R § 902, *supra* note 94. The scientific name of the blue shark is *Prionace glauca. Id.*

112. *Id.* The scientific name of the oceanic whitetip shark is *Carcharhinus longimanus. Id.*

113. *Id.* The scientific name of the porbeagle shark is *Lamna nasus. See* 15 C.F.R § 902, *supra* note 94.

114. *Id.* The scientific name of the shortfin mako shark is *Isurus oxyrinchus. Id.*

115. *Id.* The scientific name of the thresher shark is *Alopias vulpinus. Id.*

116. *See* 15 C.F.R § 902, *supra* note 94. The scientific name of the Atlantic angel shark is *Squatina dumerili. Id.*

117. *Id.* The scientific name of the basking shark is *Cetorhinus maximus. Id.*

118. *Id.* The scientific name of the bigeye sand tiger shark is *Odontaspis noronhai. See* 15 C.F.R § 902, *supra* note 94.

119. *Id.* The scientific name of the bigeye sixgill shark is *Hexanchus vitulus. Id.*

120. *Id.* The scientific name of the bigeye thresher shark is *Alopias superciliosus. Id.*

121. *See* 15 C.F.R § 902, *supra* note 94. The scientific name of the bignose shark is *Carcharhinus altimus. Id.*

122. *Id.* The scientific name of the Caribbean reef shark is *Carcharhinus perezi. Id.*

nose,[123] dusky,[124] Galapagos,[125] longfin mako,[126] narrowtooth,[127] night,[128] sand tiger,[129] sevengill,[130] sixgill,[131] smalltail,[132] whale,[133] and white[134] sharks.

The management plan for the thirty-nine sharks listed is designed to reduce the commercial and recreational fishing of sharks in the coastal waters of the United States.[135] The plan attempts to achieve this reduction in commercial and recreational fishing through the use of catch quotas and licensing requirements for the number and size of sharks that can be taken from the ocean each year.[136]

III. Proposed Legislation to Protect Shark Populations in the Waters of the United States

The Congress of the United States has determined that shark populations are in danger and need protection by both the United States and other countries around the world.[137] For years, many

123. *Id.* The scientific name of the Caribbean sharpnose shark is *Rhizoprionodon porosus. See* 15 C.F.R § 902, *supra* note 94.

124. *Id.* The scientific name of the dusky shark is *Carcharhinus obscurus. Id.*

125. *Id.* The scientific name of the Galapagos shark is *Carcharhinus galapagensis. Id.*

126. *See* 15 C.F.R § 902, *supra* note 94. The scientific name of the longfin mako shark is *Isurus paucus. Id.*

127. *Id.* The scientific name of the narrowtooth shark is *Carcharhinus brachyurus. Id.*

128. *Id.* The scientific name of the night shark is *Carcharhinus signatus. See* 15 C.F.R § 902, *supra* note 94.

129. *Id.* The scientific name of the sand tiger shark is *Odontaspis Taurus. Id.*

130. *Id.* The scientific name of sevengill shark is *Heptranchias perlo. Id.*

131. *See* 15 C.F.R § 902, *supra* note 94. The scientific name of sixgill shark is *Hexanchus griseus. Id.*

132. *Id.* The scientific name of smalltail shark is *Carcharhinus porosus. Id.*

133. *Id.* The scientific name of whale shark is *Rhincodon typus. See* 15 C.F.R § 902, *supra* note 94.

134. *Id.* The scientific name of the great white shark is *Carcharodon carcharias. Id.*

135. *See id.*

136. *See id.*

137. *See* S. 2831, 106th Cong. § 2 (2000). (This section sets forth the findings of the Senate in regard to shark conservation and management). This proposed amendment to the Magnuson-Stevens Fishery Conservation and Management Act is before both the United States House of Representatives and the United States Senate. At the time this comment was written, both houses where considering similar versions of the bill. Therefore, since both versions are similar, the concentration of this comment is an examination of the Senate's version of the proposed amendment. The Senate's version is more encompassing than the House of Representatives' version of the amendment. *See also* H. R. 3535, 106th Cong. § 2 (2000). Applicable language set forth in the House version includes that "to remove any of the fins of a shark (including the tail) and discard the carcass of the

environmental groups have lobbied for the creation of legislation designed to protect sharks from further population reduction.[138] The proposed legislation would amend the Magnuson-Stevens Fishery Conservation and Management Act.[139] The purpose of the amendment is to "improve conservation and management of sharks and establish a consistent national policy toward the practice of shark finning."[140] Congress has stated that the practice of shark finning is a gross waste of resources and that it is leading to undesired population decimation in both United States waters and international waters.[141] Furthermore, this amendment is viewed as an important addition to the Magnuson-Stevens Fishery Conservation and Management Act[142] because sharks have not been afforded the special protection in the past that they will need to survive in the twenty-first century.[143]

A. *The Proposed Amendment to the Magnuson-Stevens Fishery Conservation and Management Act Designed to Curtail the Needless Reduction in Shark Populations and the Practice of Shark Finning*

1. The Findings of Congress—The amendment to the Magnuson-Stevens Fishery Conservation and Management Act[144] sets forth the findings of Congress regarding shark populations.[145] These findings are generally identical to the concerns affecting sharks set forth above in the background section of this comment.[146]

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shark at sea" is prohibited. The House version also includes language prohibiting any fishing vessel from having "custody, control, or possession" of any fins without the corresponding carcass. *See id.*

138. *See* Dunn, *infra* note 175.

139. *See* Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. § 1801 (1996). *See also Maine v. Kreps*, 563 F.2d 1043 (1st Cir. 1977) (stating the purpose of the Magnuson-Stevens Fishery Conservation Act is the development by the United States of America of a controlled fishing conservation and management program designed to end commercial over-fishing and to allow depleted stocks to rebuild).

140. *See* S. 2831, *supra* note 137, at § 2.

141. *See id.*

142. *See* Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. § 1801, *supra* note 139.

143. *See* Dunn, *infra* note 175.

144. *See* S. 2831, *supra* note 137, at § 2.

145. *See id.*

146. Additional findings set forth in S. 2831, at § 2 include that the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982, Relating to the Conservation and Management of Straddling Stocks and Highly Migratory Species requires states to adopt measures to ensure long-term sustainability of highly migratory fish stocks.

First, the Senate has found that the biological characteristics of most sharks include slow growth, late life reproductive maturity, and the production of few offspring; these characteristics make sharks particularly vulnerable to overfishing.[147] Second, shark species could be managed under current domestic and international management approaches that govern other highly migratory species.[148] Third, sharks, captured incidentally, are common in fisheries that will remain economically viable even after shark species are depleted to endangered levels.[149] Fourth, inadequate information about highly migratory shark populations, shark harvesting practices, the extent of incidental catch or bycatch of sharks, and the trade of shark products (including shark fins) makes management of shark populations difficult.[150] Fifth, the global shark fin trade involves at least 125 countries, including the United States; the demand for shark fins and other shark products has perpetuated dramatic increases in shark fishing and shark mortality around the world.[151] Sixth, the purpose of the Magnuson-Stevens Fishery Conservation and Management Act is to avoid unnecessary waste of fish.[152] The Magnuson-Stevens Fishery Conservation and Management Act also requires the United States to establish

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These measures need to be based on the best scientific information available about sharks and how shark stocks relate to other highly migratory fish stocks. The findings also include that a precautionary approach must be taken by the United States and that fishers need to minimize waste, discards, and catch of non-target species. In addition, the Senate found that "[t]he Food and Agriculture Organization Code of Conduct for Responsible Fisheries provides that countries should adopt management measures that minimize waste, discards, and catch of non-target species." The Food and Agriculture Organization's International Plan of Action for the Conservation and Management of Sharks requests that states develop shark conservation plans that minimize waste and discards from shark catches (for example requiring retention of sharks from which fins are removed). The International Plan of Action for the Conservation and Management of Sharks ensures that shark catches from directed and non-directed fisheries are sustainable and calls for submission of such plans by the year 2001. Finally, the Senate determined that the establishment of a prohibition of shark finning by United States flag vessels and in the waters of the United States will not reduce the number of sharks finned by international fishing fleets. Foreign fleets land approximately 180 metric tons of shark fins annually through United States vessels or through ports in the Pacific. Therefore, shark finning and the trade in shark fins harvested through shark finning must be addressed comprehensively at both the national and international levels. *See* S. 2831, *supra* note 137, at § 2 and accompanying text.

147. *See* S. 2831, *supra* note 137, at § 2.
148. *See id.*
149. *See id.*
150. *See id.*
151. *See id.*
152. *See* S. 2831, *supra* note 137, at § 2.

fishery conservation and management measures to minimize bycatch and, to the extent it is unavoidable, minimize the mortality of such bycatch.[153]

Congress also made some additional findings including that, while some shark species are potentially managed internationally under arrangements for highly migratory species, sharks are not currently subject to specific conservation and management measures by international or regional organizations or arrangements.[154] Finally, Congress stated:

> Shark-finning and trade in fins harvested in this manner must be addressed comprehensively at both the national and international levels. Shark finning must be prohibited in the United States, and, as a global leader in fisheries conservation and shark management, the United States should lead efforts at the United Nations and through regional agreements, such as the International Convention for the Conservation and Management of Highly Migratory Species and new shark-specific regional management bodies or agreements, to achieve coordinated international management of sharks, including an international ban on shark-finning on the high seas and in the exclusive economic zones of all nations.[155]

2. Shark Finning Defined—The amendment to the Magnuson-Stevens Fishery Conservation and Management Act begins by defining the term "shark finning." The amendment defines shark finning for the purpose of the Act as "the taking of a shark, removing the fin or fins (whether or not including the tail), and returning the remainder of the shark to the sea."[156]

3. Shark Finning Prohibited—Section Three of the amendment adds shark finning to the activities prohibited by the Magnuson-Stevens Fishery Conservation and Management Act.[157] This section creates a rebuttable presumption that any shark fins

153. *See id.*
154. *See id.*
155. *See id.*
156. *See* S. 2831, 106th Cong. § 8 (2000). This section establishes the definition of shark finning to be used throughout the entire amendment to the Magnuson-Stevens Fishery Conservation and Management Act. *See id.*
157. *See* S. 2831, 106th Cong. § 3(a) (2000). This section of the proposed amendment is titled "Prohibition on Shark-Finning and The Landing of Shark Fins Taken by Shark-Finning." In this section the amendment language is added to the Magnuson-Stevens Fishery Conservation and Management Act prohibiting shark finning. *See also* Magnuson-Stevens Fishery Conservation and Management Act 16 U.S.C. 1857 (2000).

found aboard a fishing vessel were taken through the act of shark finning.[158]

4. Establishment of Regulations to Protect Sharks—In Section Four, a mandate to establish regulations protecting sharks is created.[159] The first set of regulations must "establish shark fin landing requirements that consider (each) species' identification needs, shark processing methods, and the nature and availability of markets for shark products in the region in which the shark fins are landed."[160] In addition, regulations must "contain procedures governing (the) release of sharks caught but not retained by a fishing vessel," thereby ensuring the maximum probability of survival of these sharks after release.[161] Furthermore, regulations must be established to "assure the timely and adequate collection of data to support shark stock assessments, conservation, and enforcement efforts."[162] Finally, regulations must be established defining how an individual may rebut the presumption that is established by Section Three of the amendment to the Magnuson-Stevens Fishery Management and Conservation Act.[163]

5. Research Program—The amendment also requires the Secretary of Commerce to establish a research program for Atlantic and Pacific sharks.[164] The research program is required to engage in six different tasks.[165] The first task is to collect data to support stock assessments of highly migratory shark populations subject to incidental or directed harvesting by commercial vessels.[166] Second, research must be performed to identify fishing gear and practices that will prevent or minimize the incidental catching of sharks by commercial and recreational fishers.[167] Third, fishing methods must be devised to maximize the likelihood of survival of captured sharks

158. *See* S. 2831, *supra* note 157, at § 3(a).

159. *See* S. 2831, 106th Cong. § 4 (2000). This section establishes the standards which must be followed by the Secretary of Commerce when promulgating regulations mandated by this amendment to the Magnuson-Stevens Fishery Conservation and Management Act. *See id.*

160. *See id.* at § 4(1).

161. *See id.* at § 4(2).

162. *See id.* at § 4(3).

163. *See* S. 2831, *supra* note 159, at § 4(4).

164. *See* S. 2831, 106th Cong. § 9 (2000). This section of the proposed amendment to the Magnuson-Stevens Fishery Conservation and Management Act requires that the Secretary of Commerce must establish a research program for Pacific and Atlantic sharks so that a better understanding can be formed on how to protect these creatures as well as keeping the fishing industry strong. *See id.*

165. *See id.*

166. *See id.* at § 9(1).

167. *See id.* at § 9(2).

after release.[168] Fourth, the Secretary must develop practices for releasing sharks from fishing gear.[169] These practices should minimize the risk of injury to fishing vessel operators and crews.[170] Fifth, the Secretary must determine methods that maximize the utilization of sharks not taken in violation of a fishing management plan.[171] These methods should also include the funding of a plan to develop the market for sharks taken legally.[172] And finally, the Secretary of Commerce must perform research regarding the international shark fin trade.[173]

B. Analysis of Proposed Law

The amendment to the Magnuson-Stevens Fishery Conservation and Management Act[174], as proposed by Congress, is a step forward in the protection of shark populations. Environmentalists have rightfully praised Congress for the actions it is taking to help protect sharks.[175] By taking steps to protect shark populations, Congress has come to the realization that sharks cannot protect themselves, and current conditions, if not changed, will lead to many species becoming threatened, endangered, or extinct in the near future.

The definition used in the amendment is an accurate and practical definition of the practice of shark finning. This definition is clear and concise. Therefore, by establishing a clear definition of shark finning, both commercial, sport and recreational fishers are on notice of the type of actions prohibited by the amendment.

The findings established by the Senate are a true and realistic measure of the current atmosphere surrounding sharks. However, these findings do not deal with the effect of habitat degradation on the shark's ability to survive into the future. In order to truly protect some species of sharks, their habitat must be protected and preserved.

In the third section of the amendment, shark finning is listed as a prohibited act under the Magnuson Stevens Fishery and

168. *See* S. 2831, *supra* note 164, at § 9(3).
169. *See id.*
170. *See id.* at § 9(4).
171. *See id.* at § 9(5).
172. *See id.*
173. *See* S. 2831, *supra* note 164, at § 9(6).
174. *See id.*
175. *See* Russell Dunn, *Environmentalists Praise House for Passing Shark Finning Prohibition Act*, NAT'L AUDUBON SOCIETY, *at* http://audubon.org/campaign/lo/ow/sharkfinning2.html (June 7, 2000).

Conservation Act.[176] This section is the real strength of the proposed amendment. First, Congress has set forth a policy decision stating that shark finning and the landing of shark fins taken by shark finning will no longer be tolerated. By establishing this policy, Congress has determined that sharks are not an inexhaustible resource and must be cared for like any other natural resource on earth. Furthermore, by creating a rebuttable presumption that fins landed from a fishing vessel or found aboard a fishing vessel have been taken by shark finning, fishers should feel pressure to comply with all regulations prohibiting such practices. However, without enforcement, this section will do nothing to protect shark populations.

The research provision of the amendment will help everyone in the United States and worldwide learn more about sharks, their behavior and their interaction with the environment. However, trying to determine stock assessments may be a futile effort. Thus far, scientists have been unable to accurately determine the size and range of all shark stocks.[177] Many estimates have been made, but present scientific knowledge about sharks is too limited to determine if any individual shark stock can survive incidental or directed harvesting.

The research on better fishing gear and practices may help to protect sharks from being incidentally taken. However, once it has been determined that better gear does exist, the issue becomes getting fishers to use this gear. Efforts must be made in this research not only to develop better fishing gear, but also to determine how to make the fishing gear readily available and cost effective for fishers.

Along the same lines as the potential problems that could be encountered with new fishing gear, new fishing methods to help protect sharks must also be feasible. New fishing methods will help fishers to comply with the new regulations protecting sharks. However, if the new methods prove to be prohibitive to effective and efficient fishing or too costly to implement, fishers will not use them.

176. *See* S. 2831, *supra* note 137, at § 2.
177. *See* TRICAS, *supra* note 7, at 44.

The research on protecting fishing vessel operators and crews should be received enthusiastically by the fishing industry.[178] Methods that protect the crew may help with the release of sharks that are accidentally caught as bycatch by commercial, sport and recreational fishers. In addition, methods to increase the use of sharks that are legitimately caught should be met with open arms by the fishing industry. Today, additional uses of products derived from sharks include, the use of cartilage taken from sharks for use in plastic surgery, and the use of shark corneas in human eye surgery.[179] As the above uses demonstrate, sharks may have many uses we have yet to learn.

Finally, research on the international fin trade may expose the United States as well as other countries to methods that will either stop or curtail the fin trade. Accurate figures as to the number of sharks finned worldwide will allow the United States to lead the fight against this horrendous and wasteful act.

C. Additional Proposals

1. Use of Hatcheries to Replenish Shark Populations—In addition to what Congress has designated as important procedures to help protect shark populations, there are other possible proposals. For instance, more research should be conducted to determine if it is possible to create hatcheries similar to those used to breed and grow other commercially viable fish. Hatcheries would allow sharks to be grown for commercial uses as well as helping to breed sharks believed to be threatened or endangered. However, the live birth of most sharks and the length of their gestation period may make the use of hatcheries impractical.[180]

Shark species that have not survived in captivity up to this point would not be likely candidates for the hatchery proposal. For

178. *See* SEBASTIAN JUNGER, THE PERFECT STORM, (Harper Torch 1997). This book details Hurricane Grace and its convergence with another unnamed storm to create the worst storm on record. *The Perfect Storm* is an interesting and informative book detailing the hardships and problems that are encountered by sword boat fishers. Each day commercial fishers face the potential of their vessel sinking or being lost at sea. In addition, hazards aboard the vessel itself can either kill or severally injure the crew on the boat. *See id.* The creation of protocols in the amendment to the Magnuson-Stevens Fishery Conservation and Management Act to help protect fishers can alleviate some of the hazards that are faced by commercial fishers.

179. *See* TRICAS, *supra* note 7, at 44.

180. *See id.* at 43.

example, great white sharks have been unable to live in captivity.[181] Great white sharks need large facilities in which to live.[182] These facilities have yet to be created and are not currently feasible.[183] Also, there is little understanding of the quality of food that a great white shark requires to survive in captivity.[184] Other examples of sharks that have not performed well in captivity are the whale shark and the basking shark.[185] These large fish need an enormous environment in which to live.[186] Whale and basking sharks[187] feed on plankton.[188] Plankton is difficult and expensive to provide as a food supply.[189] Unfortunately, at this time, there is little interest in creating hatcheries.[190] However, as more research is conducted, the use of hatcheries may become a more feasible alternative.

2. Protection of Habitat—Congress could also establish regulations regarding the protection of shark habitat. Unfortunately, as is evidenced by the Endangered Species Act,[191] habitat protection is not always viewed as a paramount issue when protecting species. However, the habitats which sustain most shark species, also sustain many species of fish commercially fished every year.[192] By preserving shark habitats, commercial fish habitats will also be protected, thereby protecting the worldwide fishing industry.

With the degradation of many shallow areas and inshore shark nurseries, sharks are facing an extremely difficult quest to replenish current stocks. Therefore, more inshore areas such as Biscayne National Park, located off the Southern Atlantic Coast of Florida,

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181. *See id.* at 58.
182. *See id.*
183. *See id.*
184. *See* TRICAS, *supra* note 7, at 58.
185. *See id.* at 59.
186. *See id.*
187. *See id.* at 151. Whale sharks can grow up to forty-six feet in length. Basking sharks can grow up to thirty-three feet in length. *See id.* at 157. Due to the immense size of these two sharks, it is extremely difficult to build a containment unit which is large enough to allow the shark to survive.
188. *See* TRICAS, *supra* note 7, at 59.
189. *See id.*
190. *See id.* at 43.
191. *See* Endangered Species Act 16 U.S.C. § 1533 (1973). The Secretary of Commerce can determine critical habitat for species that are designated as threatened or endangered species under this section of the Endangered Species Act. This protection of habitat is rarely done and requires that the species be either designated as threatened or endangered. Since the size of many shark populations is not known, it is difficult to determine which species are threatened or endangered. At this time, the best estimates are the data received from fishing boats that have experienced decreasing numbers of sharks in their catches.
192. *See* TRICAS, *supra* note 7, at 38-39.

need to be created to protect known shark nurseries and areas where many inshore species of sharks are known to live.[193] Biscayne National Park is an almost entirely underwater national park.[194]

3. State Protection—Congress could also give incentives to the coastal states to protect shark populations, since states are in the best position to protect sharks. For example, the state of Florida, which has the largest shark population of any state in the United States, has extremely tough regulations in place to protect sharks.[195] In Florida, the practice of finning has been prohibited.[196] Also, Florida state law allows sport and recreational fishers the right to catch only one shark per day in Florida waters.[197] Commercial vessels may take only two sharks per day from Florida waters.[198] Since commercial fishers are limited to two sharks per day in Florida waters, George Burgess, director of the International Shark Attack File at the University of Florida, has stated Florida's regulations are "about as tough as it gets."[199] These regulations help to protect sharks since commercial fishers cannot make a living by catching only two sharks a day.[200] Commercial fishers must catch

193. *See National Geographic's Guide to the National Parks of the United States*, NAT'L GEOGRAPHIC, 1989 at 28-29. Biscayne National Park, established in 1980, encompasses 181,500 acres. Of the 181,500 acres, only 4% are land. Biscayne National Park was created to protect a living system which was about to be destroyed due intense development in Southern Florida. The coral reefs protected by the park are part of the only living coral reefs in the continental United States. *See id.* John Pennekamp Coral Reef State Park in Key Largo, Florida, was the world's first undersea park. The park encompasses 55,000 acres. *See id.* at 35.

194. *See id.* at 28.

195. *See* Lane Kelley, *Florida is Rated No. 1 For Shark Protection*, SUN-SENTINEL, July 14, 1998, at 1B. This article discusses the State of Florida's methods for protecting sharks. Florida is the first state to develop stringent laws and regulations to protect sharks in the waters off the coast of the state. The laws and regulations in Florida are a model to all other states for protecting sharks in the states' coastal waters. By following this model, more states would be using a proven tool to help reduce the number of sharks taken each year by both commercial, sport and recreational fishers. *See id.* If Florida's regulations are considered to be as tough as possible on commercial and recreational fishers, then Congress should possibly examine implementing these laws and regulations on a national scale in order to protect sharks in all United States coastal waters. These protections would allow shark species to begin a slow climb to replenish lost stocks that may be too damaged to ever reach the pre-1980's levels.

196. *See id.*

197. *See id.*

198. *See id.*

199. *See* Kelley, *supra* note 195.

200. *See id.*

many more than two sharks in order to make enough money to merit their expenditure of time and money to catch the sharks.[201]

IV. Conclusion

Much has changed for shark populations since "JAWS" terrified movie audiences over twenty-five years ago. As shark populations continue to decrease worldwide, we all need to take a more proactive approach to saving these creatures. Sharks have thrived on earth for millions of years, yet man has the ability to destroy many species of sharks within the near future. Current and proposed laws and regulations which help to reduce the number of sharks taken by finning and through illegal catches are a start, but more needs to be done. These laws will help protect sharks in United States coastal waters, but more must be done on the international stage. Furthermore, since most sharks are at the top of their respective food chains, evidence of a healthy shark population will allow everyone to rest assured that the entire oceanic ecosystem is continuing to thrive and flourish. With education, research and increased protection, sharks can survive and thrive along with man and the commercial fishing industry.

Mark D. Evans

201. *See id.*