

14-069394

~~EXPLOITERS~~  
FRIENDS  
of ANIMALS

February 6, 2020

VIA USPS & E-MAIL (chris.w.oliver@noaa.gov)

Wilbur Ross  
Secretary of Commerce  
U.S. Department of Commerce  
1401 Constitution Ave., NW  
Washington DC 20230

Chris Oliver  
Asst. Administrator for Fisheries  
NOAA Fisheries Service Headquarters  
1315 East West Highway  
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Re: Petition to List the Giant Devil Ray as Endangered or Threatened

Dear Secretary Ross and Assistant Administrator Oliver:

Friends of Animals hereby petitions the Secretary of Commerce, acting through the National Marine Fisheries Service (NMFS), an agency within the National Oceanic and Atmospheric Administration (NOAA), to list the giant devil ray (*Mobula mobular*) as "endangered" or "threatened" under the U.S. Endangered Species Act, 16 U.S.C. §§ 1531 *et seq.* We request that NMFS list the species throughout its entire range and designate critical habitat for the species in Mediterranean waters.

The International Union for Conservation of Nature (IUCN) has determined that a population reduction of at least 50% of this species has occurred over three generations, and 60 years. (IUCN Red List 2015). Population reduction of the species has largely been caused by several threats including increases in fishing for meat consumption, harvest of gill plates for commercial use, and driftnet bycatch. Female giant devil rays have a low reproductive rate and increased water pollution have continued to degrade their nursing and spawning habitats. This species aids in balancing nutrient levels of ecosystems, and loss of the species may cause drastic changes in Mediterranean ecosystems, as well as changes in marine species compositions.

There are several threats to the giant devil ray. First, utilization for commercial and recreational purposes endangers the species. Indeed, the primary cause of the species' decline is human exploitation, primarily through fishing. Second, inadequate regulatory mechanisms around the world have allowed exploitation of the species to go unchecked. Third, destruction, modification, or curtailment of its habitat or range also

endanger the giant devil ray. Finally, other natural or manmade factors such as low reproductive rates make the giant devil ray more susceptible to exploitation and human population growth, threatening the continued survival of this species.

This petition, filed pursuant to 5 U.S.C. § 553(e) and 50 C.F.R. § 424.14, consists of this cover letter and the attached petition, as well as all material cited within which are hereby incorporated by reference.

Please do not hesitate to contact me at (720) 949-7791 if you need more information. My address appears below and on the cover sheet of the petition.

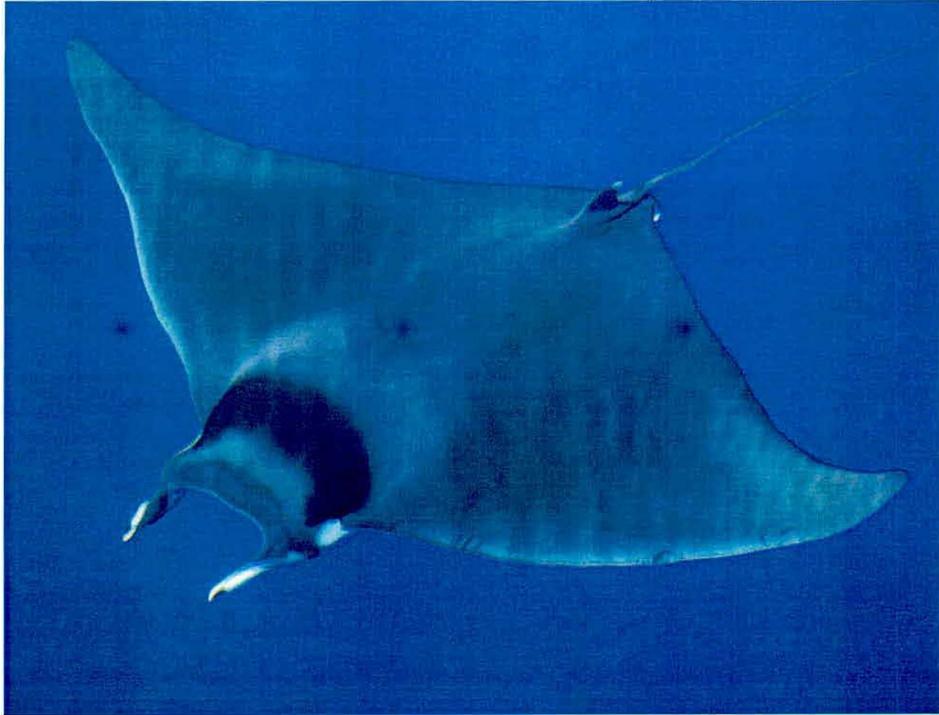
Sincerely,

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**PETITION TO LIST THE  
GIANT DEVIL RAY (*MOBULA MOBULAR*)  
AS AN ENDANGERED, OR ALTERNATIVELY AS A THREATENED,  
SPECIES PURSUANT TO THE ENDANGERED SPECIES ACT**



Photograph by Fabrizio Serena/Institute for the Coastal Marine Environment of the Italian National Research Council and courtesy of IUCN Red List

**Petition Submitted to the Secretary of Commerce  
And the NOAA Fisheries Service**

**Petitioner**

Friends of Animals  
Wildlife Law Program  
7500 East Arapahoe Road, Suite 385  
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720-949-7791

February 6, 2020

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## I. EXECUTIVE SUMMARY

The giant devil ray (*Mobula mobular*) is a ray species found throughout the Mediterranean Sea and is on the verge of extinction. The giant devil ray is especially vulnerable to mortality due to its range being limited to the Mediterranean Sea and its habitat of roaming at shallow depths thus leaving it exposed to both targeted and bycatch fisheries. The giant devil ray has a very low reproductive rate and slow population growth, with a currently unknown gestation period and the birth of just one pup.

Several of the factors identified in the Endangered Species Act are contributing to the decline of the giant devil ray: the present or threatened destruction of its habitat due to water pollution and human development; overutilization for commercial and recreational purpose from targeted and bycatch fisheries; inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence such as climate change, and disease from ingestion of microplastics. The combination of the giant devil rays' low growth rate, low productivity, and low maximum population growth rate imply a slow population recovery time, emphasizing the threat of driving the rays to extirpation by the above factors.

Therefore, this petition requests that the U.S. Secretary of Commerce, acting through the National Oceanic and Atmosphere Administration National Marine Fisheries Service (NOAA Fisheries), list the giant devil ray as an endangered, or alternatively as threatened, species under the Endangered Species Act (ESA).

## II. SPECIES ACCOUNT

### A. TAXONOMY

This petition will refer to *Mobula mobular* by the common name “giant devil ray” throughout.<sup>1</sup> There are eleven species of manta and devil rays, known as mobulids.<sup>2</sup> There are nine different species of devil ray: giant devil ray (*Mobula mobular*); Lesser Guinean devil ray (*Mobula rochebrunei*), Chilean devil ray (*Mobula tarapacana*), pygmy devil ray (*Mobula eregoodootenkee*), Smoothtail Mobula (*Mobula munkiana*), Bentfin Devil Ray (*Mobula thurstoni*), spinetail devil ray (*Mobula japonica*), Atlantic devil ray (*Mobula hypostoma*), and the shortfin devil ray (*Mobula kuhlii*).<sup>3</sup> The giant devil ray is within the genus *Mobula*.<sup>4</sup> The full taxonomic classification of the giant devil ray is listed below in Figure 1.

**Figure 1.** Taxonomy of *Mobula mobular*

Kingdom	Animalia
Phylum	Chordata
Class	Chondrichthyes
Subclass	Elasmobranchii
Order	Rajiformes
Family	Mobulidae
Genus	<i>Mobula</i>
Species	<i>Mobula mobular</i> (Raia mobular Bonnaterre, 1788)

<sup>1</sup> *Taxonomy*. IUCN RED LIST (2015), <https://www.iucnredlist.org/species/39418/48942228>.

<sup>2</sup> Julia Lawson et al., *Sympathy for the Devil: A Conservation Strategy for Devil and Manta Rays*, PEERJ LIFE & ENVIRONMENT (March 14, 2017), <https://peerj.com/articles/3027/#fig-3>.

<sup>3</sup> Elsayed Mohamed, *Appendix II Listing for Devil Rays for More Protection at CITES*, INTERNATIONAL FUND FOR ANIMAL WELFARE (Sep. 1, 2016), <https://www.ifaw.org/canada/news/appendix-ii-listing-devil-rays-more-protection-cites>.

<sup>4</sup> Lawson, *supra* note 2.

(Notarbartolo di Sciara, G., Serena, F., Mancusi, C. 2015. *Mobula mobular*. The IUCN Red List of Threatened Species 2015: e.T39418A48942228. <http://dx.doi.org/10.2305/IUCN.UK.2015-1.RLTS.T39418A48942228.en>. [hereinafter *Mobula mobular*. IUCN Red List of Threatened Species]).

The Giant Devil Ray is a distinct species with a limited range throughout the Mediterranean Sea.<sup>5</sup> The only other mobula species that may occur within the same range portion is the *M. japonica*, known as the Spinetail Devil Ray.<sup>6</sup> Expert examination is needed to distinguish the *M. mobular* from *M. japonica* but a mature Giant Devil Ray is distinctly larger than a Spinetail Devil Ray.<sup>7</sup> Past reports of Giant Devil Rays from the Atlantic may have been due to incorrect identification of the Spinetail Devil Ray.<sup>8</sup>

#### B. PHYSICAL CHARACTERISTICS

The giant devil ray is the largest species of ray in the genus *Mobula*, growing up to 20 feet in length and a wingspan of up to 17 feet.<sup>9</sup> It is slightly smaller than the giant manta ray, genus *Manta*, which is the largest living ray in the world and can grow to more than 23 feet across.<sup>10</sup> The weight of a full-grown giant devil ray can exceed 1.5 tons or 3,502 pounds.<sup>11</sup> The cephalic fins, pointing forward, give it the distinctive appearance and common name of “devil ray.”<sup>12</sup> The cephalic fins are about one-half as broad at the base as they are long, with thin lower edges and thick fleshy upper edges with rounded tips.<sup>13</sup> The

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<sup>5</sup> *Geographic Range*. IUCN RED LIST (2015), <https://www.iucnredlist.org/species/39418/48942228>.

<sup>6</sup> *Id.*

<sup>7</sup> *Id.*

<sup>8</sup> *Id.*

<sup>9</sup> Henry Bigelow & William Schroeder, *Devil Ray*, FISHERY BULLETIN OF THE FISH AND WILDLIFE SERVICE, Volume 53, (2002), [http://www.gma.org/fogm/Manta\\_birostris.htm](http://www.gma.org/fogm/Manta_birostris.htm).

<sup>10</sup> *Giant Manta Ray*, NOAA Fisheries (April 2019), <https://www.fisheries.noaa.gov/species/giant-manta-ray>.

<sup>11</sup> Bigelow, *supra* note 3.

<sup>12</sup> *Id.*

<sup>13</sup> *Id.*

disc, not counting the cephalic fins, is a little more than twice as broad as long, with tapering corners.<sup>14</sup> The tail measured from the top of the body is at least as long as the body or longer if not damaged.<sup>15</sup> The mouth is very wide, extending across almost one half the whole breadth of the front of the head.<sup>16</sup> The teeth, only on the lower jaw, are very small but numerous and the gills are on the underside of the body.<sup>17</sup> The upper side varies from reddish or olive brown to bluish slate or black colors.<sup>18</sup> The lower side is white toward the center of the disc and gray around the margins with various dark blotches in the region of the gills and abdomen.<sup>19</sup> The rear part of the tail is gray and usually transitions to a black tip.<sup>20</sup>

#### C. HABITAT AND RANGE

The giant devil ray occurs throughout the Mediterranean Sea and nearby Northeast Atlantic but is absent from the Black Sea.<sup>21</sup> It has been discovered from the coast of Northwest Africa (Morocco to Senegal), the Canary Islands, Madeira, the Azores, Portugal, and as a vagrant off of Southern Ireland.<sup>22</sup> The giant devil ray is considered native to Albania; Algeria; Bosnia and Herzegovina; Croatia; Cyprus; Egypt (Egypt (African part), Sinai); France (Corsica, France (mainland)); Gibraltar; Greece (East Aegean Is., Greece (mainland), Kriti); Israel; Italy (Italy (mainland), Sardegna, Sicilia); Lebanon; Libya; Malta;

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<sup>14</sup> *Id.*

<sup>15</sup> Bigelow, *supra* note 3.

<sup>16</sup> *Id.*

<sup>17</sup> *Id.*

<sup>18</sup> *Id.*

<sup>19</sup> *Id.*

<sup>20</sup> *Id.*

<sup>21</sup> *Geographic Range*. IUCN RED LIST (2015), <https://www.iucnredlist.org/species/39418/48942228#habitat-ecology>.

<sup>22</sup> *Id.*

Montenegro; Morocco; Palestinian Territory; Portugal; Slovenia; Spain (Balears, Spain (mainland)); Syrian Arab Republic; Tunisia; Turkey (Turkey-in-Asia, Turkey-in-Europe).<sup>23</sup>

The species occurs in the neritic zone and offshore waters which range in depth from a few tens of meters to several thousand meters.<sup>24</sup> This species is known as an epipelagic batoid which refers to the part of the oceanic zone where enough light penetrates for photosynthesis, but it can dive up to 600-700 meters.<sup>25</sup>

**Figure 2. Geographic Range**



*Mobula mobular*. IUCN Red List of Threatened Species

#### D. FEEDING

All mobulids are planktivorous with a very specialized diet, feeding primarily on microzooplankton and small schooling fish, which become trapped in the specialized branchial filter plates.<sup>26</sup> In the Mediterranean Sea, the most common prey for the giant devil ray are euphausiid shrimps, commonly known as krill.<sup>27</sup> Giant devil rays are known as

<sup>23</sup> *Id.*

<sup>24</sup> *Habitat and Ecology*. IUCN RED LIST (2015). <https://www.iucnredlist.org/species/39418/48942228#habitat-ecology>

<sup>25</sup> *Id.*

<sup>26</sup> *Biology*. MARINE CONSERVATION SOCIETY (2017). <https://www.mcsuk.org/goodfishguide/fish/502>.

<sup>27</sup> *Id.*

filter feeders and help control organic matter and nutrient levels in their ecosystems.<sup>28</sup> Removal of large planktivorous species from ecosystems may cause drastic changes in marine species compositions.<sup>29</sup>

#### E. REPRODUCTION AND LIFESPAN

Giant devil rays are aplacental, live-bearing matrotrophs which means the neonate receives nourishment from uterine milk secretion.<sup>30</sup> Female rays only have a single ovary giving birth to a single pup, in rare cases two pups, which contribute to their low reproductive rate.<sup>31</sup> They give birth usually during the summer months in the Northern Mediterranean Sea.<sup>32</sup> The pup could exceed 160 centimeters (cm) disc width at birth.<sup>33</sup> The gestation period for giant devil ray is unknown, but most mobulids have an approximate gestation period of one year and a resting period of two years between pregnancies.<sup>34</sup>

The lifespan of a giant devil ray is difficult to determine but considering mobulids are a very slow-growing species, scientists suspect they have a long lifespan.<sup>35</sup> Although the lifespan of the giant devil ray has not been directly determined, scientists have estimated the lifespan of a similar species, the giant manta ray, to be almost 40 years old with natural mortality expected to be low.<sup>36</sup>

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<sup>28</sup> Ostroumov, S. A. 2005. Developments in hydrobiology, some aspects of water filtering activity of filter-feeders. *Hydrobiologia* 542: 275-286.

<sup>29</sup> Ostroumov, *supra* note 28, at 276.

<sup>30</sup> *Habitat and Ecology*. IUCN RED LIST (2015), <https://www.iucnredlist.org/species/39418/48942228#habitat-ecology>

<sup>31</sup> *Id.*

<sup>32</sup> *Id.*

<sup>33</sup> *Id.*

<sup>34</sup> Couturier, L. I. E., et al., 2012. Biology, ecology and conservation of the Mobulidae. *Journal of Fish Biology* 80: 1075-1119.

<sup>35</sup> *Id.*

<sup>36</sup> *Id.*

## F. POPULATION STATUS

The International Union for Conservation of Nature (IUCN) has determined that the population trend of giant devil rays is decreasing.<sup>37</sup> A population reduction of at least 50% of this species has occurred over the last three generations, 60 years.<sup>38</sup> There are no overall regional population estimates for this species as it appears to occur in low densities, with group sizes of one to four individuals, throughout its range.<sup>39</sup> Although a recent capture of a large group of rays in March 2013, captured off the coast of Gaza, indicates that the species may occasionally occur in large aggregations.<sup>40</sup> Global media erroneously reported the capture as a “mass stranding” event, over 500 giant devil rays were captured with a local type of purse seine, called “shinshula”, and butchered on the beach for local human consumption.<sup>41</sup>

The main reason for population reduction over the years has been the increased fishing for consumption and harvest for gill plates and incidental take from bycatch. Between 1998 and 2009, mobulid captures increased more than double, from 200 to 500 metric tons per year, which may suggest a decrease in mobulid populations globally.<sup>42</sup> The population trend of the giant devil ray will likely further decrease in the future as new targeted fishing operations have emerged in the Mediterranean Sea, probably to satisfy the gill plate market demand.<sup>43</sup>

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<sup>37</sup> *Population*. IUCN RED LIST (2015), <https://www.iucnredlist.org/species/39418/48942228#population>.

<sup>38</sup> *Population*, *supra* note 37.

<sup>39</sup> *Id.*

<sup>40</sup> Mohammed Abudaya, et al., *Speak of the Devil Ray (Mobula mobular) Fishery in Gaza*. *Reviews in Fish Biology and Fisheries* (July 2017),

[https://www.researchgate.net/publication/318668116\\_Speak\\_of\\_the\\_devil\\_ray\\_Mobula\\_mobular\\_fishery\\_in\\_Gaza](https://www.researchgate.net/publication/318668116_Speak_of_the_devil_ray_Mobula_mobular_fishery_in_Gaza).

<sup>41</sup> *Id.* at 4.

<sup>42</sup> Croll, D. A., et al.. 2016. Vulnerabilities and Fisheries Impacts: The uncertain future of manta and devil rays. *Aquatic Conservation: Marine and Freshwater Ecosystems* 26: 562-575.

<sup>43</sup> *Id.*

### III. THE GIANT DEVIL RAY SATISFIES THE STATUTORY CRITERIA FOR LISTING AS AN ENDANGERED SPECIES

In 1973, Congress enacted the Endangered Species Act to conserve the ecosystem of endangered and threatened species and provide a program for the conservation of threatened and endangered plants and animals.<sup>44</sup> These ESA protections apply only to species that have been listed as endangered or threatened under the provisions of the Act.

The ESA defines an endangered species as one that is “in danger of extinction throughout all or a significant portion of its range.”<sup>45</sup> A “threatened species” is one that “is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”<sup>46</sup> The NOAA Fisheries must consider the following five listing factors set forth in 16 U.S.C. § 1533(a)(1) in evaluating whether a species is threatened or endangered:

- A. The present or threatened destruction, modification, or curtailment of its habitat or range;
- B. Overutilization for commercial, recreational, scientific, or educational purposes;
- C. Disease or predation;
- D. The inadequacy of existing regulatory mechanisms; or
- E. Other natural or manmade factors affecting its continued existence.

A species needs to be impacted by one, or any combination of, the above listing factors to qualify for federal listing as an endangered or threatened species.<sup>47</sup> NOAA fisheries is required to make a listing determination “solely on the basis of the best

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<sup>44</sup> 16 U.S.C. § 1531(b)

<sup>45</sup> *Id.* § 1532(6)

<sup>46</sup> *Id.* § 1532(20)

<sup>47</sup> 50 C.F.R. § 424.11(c)

scientific and commercial data available to [it] after conducting a review of the status of the species and after taking into account” existing efforts to protect the species.<sup>48</sup>

Upon receipt of a listing petition, NOAA fisheries is required to determine “whether the petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted” within 90 days.<sup>49</sup> For purposes of the 90-day finding, the ESA defines “substantial information” as “that amount of information that would lead a reasonable person to believe that the measure proposed in the petition may be warranted.”<sup>50</sup> If NOAA fisheries concludes that the listing of a species may be warranted, NOAA fisheries has 12 months, from the date the petition was received, to institute a status review and determine whether the species will be listed.<sup>51</sup> If not warranted, the listing process ends and the ESA authorizes judicial review of both the 90-day and 12-month findings.<sup>52</sup>

From the listing factors above, several factors are contributing to the decline of the giant devil ray: the present or threatened destruction, modification, or curtailment of its habitat or range; overutilization for commercial, recreational, scientific, or educational purpose; inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence.

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<sup>48</sup> 16 U.S.C. § 1533(b)(1)(A); *see also* 50 C.F.R. §§ 424.11(b), (f)

<sup>49</sup> 16 U.S.C. § 1533(b)(3)(A)

<sup>50</sup> 50 C.F.R. § 424.14(b)(1).

<sup>51</sup> 16 U.S.C. § 1533(b)(3)(B).

<sup>52</sup> *Id.* § 1533(b)(3)(C)(ii).

A. THE PRESENT OR THREATENED DESTRUCTION, MODIFICATION, OR CURTAILMENT OF ITS HABITAT OR RANGE

The pressure from increased population growth and development in the countries surrounding the Mediterranean Sea is likely to negatively affect the giant devil ray, as increased development could lead to water pollution and vulnerability to nearshore manmade infrastructure. Rapid urban and industrial development has drastically contributed to water pollution and have degraded critical coastal habitats, such as nursery and spawning areas.<sup>53</sup> Coastal reefs in tropical and subtropical water are preferred habitats for mobulid species and have been ruined from water pollution.<sup>54</sup> Giant devil rays are susceptible to ingesting marine pollutants and contaminants such as persistent organic pollutants and heavy metals because they are filter feeders.<sup>55</sup> Pollutants enter the marine environment through wastewater, poor industry practices, and degradation of marine debris.<sup>56</sup>

Since giant devil rays prefer pelagic and epipelagic zones for feeding, the species is vulnerable to collision with nearshore infrastructure such as moorings, beach protection nets, and offshore aquaculture facilities.<sup>57</sup> Also, as new fisheries are created in the Mediterranean Sea due to human development, the giant devil ray has less habitat that is free of fishing lines and gear.<sup>58</sup> The increased human development has also created heavy boat traffic in a relatively small area which causes frequent collisions with the rays.<sup>59</sup>

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<sup>53</sup> Joshua Stewart, et al., *Research Priorities to Support Effective Manta and Devil Ray Conservation*, FRONTIERS IN MARINE SCIENCE (Sept. 18, 2018), <https://www.frontiersin.org/articles/10.3389/fmars.2018.00314/full>.

<sup>54</sup> Stewart, *supra* note 53, at 8.

<sup>55</sup> *Id.*

<sup>56</sup> *Id.*

<sup>57</sup> Croll, *supra* note 42, at 565.

<sup>58</sup> *Id.*

<sup>59</sup> *Id.*

Anthropogenic injuries resulting from these interactions are evident in the monitored population in the Mediterranean Sea, including severe injuries such as amputation, deformity of cephalic and pectoral fins, and damage to eyes.<sup>60</sup> Therefore, as this human development and growth will likely increase in the future, the giant devil ray will likely be negatively affected by these destructions and modifications to its habitat.

B. OVERUTILIZATION FOR COMMERCIAL, RECREATIONAL, SCIENTIFIC, OR EDUCATIONAL PURPOSE

Fishing operations both for consumption and for the harvest of gill plates for the market demand in Asia target the giant devil ray.<sup>61</sup> Additionally, the giant devil ray is significantly affected from commercial fishing bycatch throughout its range.<sup>62</sup> Due to many aspects of the mobulids' life characteristics, the harvest rates of the giant devil ray are likely unsustainable and are the most prominent factor driving population declines.<sup>63</sup>

1. *Targeted Fishing for Consumption*

Giant devil rays are historically exploited for meat consumption, fresh or dried, and cartilage for shark fin soup filler.<sup>64</sup> The giant devil ray's skin is also dried and used to create various leather products.<sup>65</sup> In the past, subsistence fishing for mobulids occurred in isolated areas with simple fishing gear, which restricted the distance and time fisheries could fish for mobulids.<sup>66</sup> There were only several recorded small catches of giant devil rays, 3 to 4 individuals annually, that occurred in a few locations such as off the coasts of

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<sup>60</sup> *Id.*

<sup>61</sup> Croll, *supra* note 42, at 563.

<sup>62</sup> *Id.*

<sup>63</sup> *Id.* at 572.

<sup>64</sup> Lawson, *supra* note 2, at 2.

<sup>65</sup> *Id.*

<sup>66</sup> Croll, *supra* note 42, at 565.

Algeria and Sicily.<sup>67</sup> Between 1996 and 2001, 21 giant devil rays were collected at a fish market in Algeria after they were captured through trawling off the Algerian coast.<sup>68</sup>

However, due to advancements and improvements in fishing gear, fisheries have recently been targeting mobulids resulting in more efficient captures and greater capture quantities.<sup>69</sup> According to the Food and Agriculture Organization, a total of 20,707 metric tons of mobulid species were caught by four countries between 1998 and 2010, averaging 1,593 metric tons per year.<sup>70</sup> The most prominent fishery targeting giant devil rays is in Palestine in the Levantine Sea off of Gaza. Between January and April from 2005 to 2014, an annual mean catch of 83.2 rays were taken using purse seines.<sup>71</sup> There were some years where upwards of hundreds of rays were caught, in 2006 with 363 rays and in 2013 with 500 rays, as mentioned above.<sup>72</sup> Since Gaza is a significant congregation area for giant devil rays, it could pose a significant threat to the population if the fishery continues.

## 2. Targeted Fishing for Gill Plates

One of the most rapidly emerging wildlife trade issues is the demand for, and consumption of, the gill plates of giant devil rays. Since at least the 1990s, a market emerged for mobulid gill plates which are the cartilaginous pill plate filaments that filter

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<sup>67</sup> Giuseppe Notarbartolo di Sciara, et al., *The Devil We Don't Know: Investigating Habitat and Abundance of Endangered Giant Devil Rays in the North-Western Mediterranean Sea*, PLOS ONE (Nov. 18, 2015), <https://www.un.org/documents/ga/docs/55/a55386.pdf>.

<sup>68</sup> *Id.* at 2.

<sup>69</sup> *Id.*

<sup>70</sup> Ward-Paige, C. A., Davis, B., Worm, B. 2013. Global population trends and human use patterns of manta and mobula rays. PLOS ONE 8(9): 1-11.

<sup>71</sup> Giuseppe Notarbartolo di Sciara, et al., *The Devil We Don't Know: Investigating Habitat and Abundance of Endangered Giant Devil Rays in the North-Western Mediterranean Sea*, PLOS ONE (Nov. 18, 2015), <https://www.un.org/documents/ga/docs/55/a55386.pdf>.

<sup>72</sup> *Id.*

plankton and small fishes.<sup>73</sup> Gill plates are in high demand in Eastern Asian countries such as China, receiving up to \$400 per kilogram at final point sale.<sup>74</sup> The demand trade favors the large gill plates of the two manta ray species and the three largest devil ray species.<sup>75</sup> The gill plates are marketed under the trade name *Peng Yu Sai* and are the key ingredient in a tonic medicine that is purported to prevent sickness by improving the immune system and enhancing blood circulation.<sup>76</sup> However, evidence of its health benefits are lacking as noted in recent interviews with practitioners in Guangzhou, China, and Singapore stating that *Peng Yu Sai* has no health benefits.<sup>77</sup> Furthermore, toxicological studies suggest there are health risks from consuming the high levels of heavy metals in *Peng Yu Sai*.<sup>78</sup> It appears that industry marketing of *Peng Yu Sai*, rather than any credible medical research, is responsible for its rise in popularity.<sup>79</sup>

Gill plates are currently sold for higher prices in Asian markets than shark fins, resulting in a rapid expansion in targeted fisheries globally for mobulid gill plates.<sup>80</sup> According to a 2011 study, 82% of sellers in Guangzhou reported an increase in demand for gill plates despite a rise in prices.<sup>81</sup> Another study in 2013, reported that only 55% of Guangzhou sellers alleged a decrease in the supply of gill plates, while 75% confirmed a continued increase in demand for gill plates.<sup>82</sup> Furthermore, as shark cartilage is becoming

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<sup>73</sup> *Turning the Tide for Devil Rays*. INTERNATIONAL UNION FOR CONSERVATION OF NATURE (Mar. 30, 2017), <https://www.iucn.org/news/species/201703/turning-tide-devil-rays>.

<sup>74</sup> *Id.*

<sup>75</sup> *Id.*

<sup>76</sup> *Id.*

<sup>77</sup> Lawson, *supra* note 2, at 1.

<sup>78</sup> Lawson, *supra* note 2, at 1.

<sup>79</sup> *Id.*

<sup>80</sup> Croll, *supra* note 42, at 565.

<sup>81</sup> Mary O'Malley, et al., *Characterization of the Trade in Manta and Devil Ray Gill Plates in China and South-East Asia through Trader Surveys*. AQUATIC CONSERVATION (June 01, 2016), <https://onlinelibrary.wiley.com/doi/full/10.1002/aqc.2670>.

<sup>82</sup> *Id.* at 4.

more difficult to source due to exploitation, mobulid fisheries are expanding to ray cartilage as it provides a cheap substitute.<sup>83</sup> Now with a recent ruling to list the giant manta ray as threatened under the ESA, the demand for gill plates from giant devil rays will most likely drastically increase.

### 3. Bycatch

Another major threat to the giant devil ray is bycatch, the incidental capture of rays in various gear types including driftnets, purse seines, gillnets, traps, trawls, and longlines.<sup>84</sup> The highest level of bycatch rates are reported from driftnet fishing.<sup>85</sup> Driftnets are composed of a series of mesh panels totaling several miles in length and about 30 feet high, and are set out to drift near the surface, with anchors fixed to the bottom and buoys on the top to maintain a vertical orientation.<sup>86</sup> Driftnets are essentially massive walls built from netting in the ocean, with targeted species composing only 5 to 7% of the total catch and non-targeted bycatch composing the remaining 95 to 97%.<sup>87</sup> The giant devil ray has been reported in bycatch from driftnet fishing throughout the Mediterranean. The species has been found deceased in net walls caused by entanglement and suffocation, due to the ray having to swim to breathe.<sup>88</sup>

Purse seines and gillnets are also a widespread practice in the Mediterranean and negatively affect the giant devil ray population. Seine nets are wide fishing nets that close

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<sup>83</sup> Heinrichs, S., O'Malley, M., Medd, H., Hilton, P. 2011. The Global Threat to Manta and Mobula rays. Shark Savers and Wild Aid. 1-39.

<sup>84</sup> Lawson, *supra* note 2, at 5.

<sup>85</sup> Croll, *supra* note 42, at 564.

<sup>86</sup> Croll, *supra* note 42, at 564.

<sup>87</sup> Sergi Tudela, S. 2004. Ecosystem effects of fishing in the Mediterranean: An analysis of the major threats of fishing gear and practices to biodiversity and marine habitats. General Fisheries Commission for the Mediterranean, Studies and Reviews 74: 1-44.

<sup>88</sup> Croll, *supra* note 42, at 564.

around a school of tuna fish with the net cinching together like a draw string.<sup>89</sup> The tuna often swim with devil and manta rays and fishers will set nets around a large group of rays to capture the tuna hidden beneath.<sup>90</sup> The edge of the net can be lowered to allow dolphins and whale sharks to escape, but unfortunately the rays dive to the bottom of the net and consequently get hauled on board.<sup>91</sup> Tuna and swordfish are the largest fisheries by value in the Mediterranean Sea, nearly 15,000 tons are caught annually.<sup>92</sup>

For the giant devil rays caught and released from purse seine nets, tagging studies indicate moderate to high rates of post-release mortality, especially for large individuals due to the difficulty in releasing without causing physical damage.<sup>93</sup> Physical and biological traits of rays make them particularly vulnerable to handling while out of the water.<sup>94</sup> Therefore, with the intensity of fishing in the region and the species' low reproductive rate and inability to quickly recover from low populations, bycatch from commercial fishing significantly threatens the giant devil ray.

### C. INADEQUACY OF EXISTING REGULATORY MECHANISMS

The giant devil ray is not adequately protected by national, regional or international regulatory mechanisms. Current regulations still allow for fishing and exportation of the giant devil ray and there is currently no national or international monitoring program of the population of the species.

#### 1. CITES

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<sup>89</sup> Lawson, *supra* note 2, at 5.

<sup>90</sup> *Id.*

<sup>91</sup> *Id.*

<sup>92</sup> *Population*. IUCN RED LIST (2015), <https://www.iucnredlist.org/species/21860/9331546#population>.

<sup>93</sup> Lawson, *supra* note 2, at 5.

<sup>94</sup> *Id.*

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) regulates international trade in over 35,000 species by implementing a permit system attempting to prevent the international trade of protected species in unsustainable, illegal, and untraceable means.<sup>95</sup> CITES has 183 member countries including the countries surrounding the Mediterranean Sea such as France, Spain, Italy, Algeria, Libya, Egypt, and Turkey.<sup>96</sup>

All species of mobulids, including the giant devil ray, were listed in Appendix II at the seventeenth meeting of the Conference of the Parties in Johannesburg, South Africa, held from September 24 to October 5, 2016.<sup>97</sup> A listing on Appendix II means the trade of the species should be controlled to avoid extinction.<sup>98</sup> The Food and Agriculture Organization of the United Nations (“FAO”) had determined that an Appendix II listing for all mobulids was warranted due the similarities in dried gill plates and inability to distinguish between gill plates of different mobulid species.<sup>99</sup>

Although listing all species of mobulids is a triumph, CITES is likely insufficient to fully protect the giant devil ray because Appendix II listing still allows trade in the species and the listing may not be fully effective in preventing unsustainable harvests.<sup>100</sup> An Appendix II listing for the giant devil ray does not ban trade but rather regulates exports via a permit system.<sup>101</sup> These permits require the exporting country to have obtained the species through sustainable means.<sup>102</sup> Due to the lack of population data for the giant devil ray, it is

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<sup>95</sup> *How CITES Works*. CITES (April 2019), <https://www.cites.org/eng/disc/how.php>.

<sup>96</sup> *List of Contracting Parties*. CITES (April 2019), <https://www.cites.org/eng/disc/parties/chronolo.php>.

<sup>97</sup> CoP17 Prop. 44, at 1.

<sup>98</sup> CITES, *supra* note 71.

<sup>99</sup> CoP17 Prop. 44, at 1.

<sup>100</sup> CITES, *supra* note 71.

<sup>101</sup> *Id.*

<sup>102</sup> *Id.*

difficult to determine the sustainable fishing harvest levels for the species.<sup>103</sup> Furthermore, there is no explicit standard for the “non-detriment findings,” demonstrating that harvest of a particular species was sustainable.<sup>104</sup> Rather, individual countries are left to determine their own implementation devices.<sup>105</sup> Additionally, Palestine is not a signatory to CITES and is known as a targeted fishery for giant devil ray as mentioned above, meaning CITES has no effect on these targeted captures.<sup>106</sup> The giant devil ray is significantly at risk of overexploitation under Appendix II since the species has a slow population growth and low reproductive rates.<sup>107</sup>

## 2. *Bern Convention*

The Bern Convention was adopted in 1979 and aims to ensure conservation and protection of wild flora and fauna and their natural habitats.<sup>108</sup> The giant devil ray is listed in Appendix II, strictly protected fauna species, of the Bern Convention.<sup>109</sup> Fifty countries and the European Union have signed the convention and are committed to promoting national conservation policies, considering the impact of planning and development on the natural environment, promoting education and information on conservation, and coordinating research.<sup>110</sup>

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<sup>103</sup> *Threats*. IUCN Red List (2015), <https://www.iucnredlist.org/species/39418/48942228#threats>.

<sup>104</sup> CITES, *supra* note 71.

<sup>105</sup> CITES, *supra* note 71.

<sup>106</sup> Abudaya, *supra* note 38, at 9.

<sup>107</sup> IUCN, *supra* note 79.

<sup>108</sup> *About*. Council of Europe (2018), <https://www.coe.int/en/web/bern-convention/presentation>.

<sup>109</sup> *Appendix II – Strictly Protected Fauna Species*. CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE AND NATURAL HABITATS (1979), <https://rm.coe.int/168078e2ff>.

<sup>110</sup> *About*. COUNCIL OF EUROPE (2018), <https://www.coe.int/en/web/bern-convention/presentation>.

Although this convention provides some protection for the giant devil ray, it does not provide adequate regulatory protection for the species. First, there are other Mediterranean and African countries that are not part of the Bern Convention such as Syria, Lebanon, Israel, Egypt, Libya, and Algeria.<sup>111</sup> These countries can therefore still deliberately capture and kill the giant devil ray without being subjected to any regulatory mechanisms. Second, there are no disciplinary actions outlined for the countries that are part of the convention that do not establish their own protective regulations for the listed species.<sup>112</sup> Since the convention went into effect in 1979, Malta and Croatia are the only Mediterranean countries that have provided national legal protections for the giant devil ray.<sup>113</sup> If only two countries out of the fifty have created their own regulations to protect the giant devil ray, it is clear that the Bern Convention has lacked any incentive for countries to institute their own protection plan.

### 3. *Barcelona Convention*

The Convention for the Protection of the Mediterranean Sea Against Pollution, known as the Barcelona Convention, was adopted in 1976 and aims to eliminate pollution in the Mediterranean Sea thereby protecting the marine environment.<sup>114</sup> There are twenty-two contracting parties including Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, the European Community, France, Greece, Israel, Italy, Lebanon, Libya,

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<sup>111</sup> *Id.*

<sup>112</sup> *Id.*

<sup>113</sup> Sciara, *supra* note 51, at 2.

<sup>114</sup> *The Barcelona Convention*. EUROPEAN COMMISSION (August 06, 2016), [http://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/barcelona-convention/index\\_en.htm](http://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/barcelona-convention/index_en.htm).

Malta, Monaco, Montenegro, Morocco Slovenia, Spain, Syria, Tunisia, and Turkey.<sup>115</sup> In 1995, the Barcelona Convention added a protocol obligating member countries to preserve notable environmental areas and to protect threatened or endangered species.<sup>116</sup> The countries are not required to prohibit the taking or killing of a listed species, rather they can decide if a prohibition is appropriate on their own accord.<sup>117</sup> The giant devil ray is listed as an endangered or threatened species under Annex II of the Barcelona Protocol.<sup>118</sup>

The Barcelona Convention does not provide adequate protection for the giant devil ray because the convention does not establish a prohibition for the taking or killing of listed species, but rather allows countries the option to promulgate such a regulation.<sup>119</sup> This has proven to be an ineffective measure to protect the species as illustrated above in the Bern Convention with only two out of fifty countries instituting protections for the giant devil ray.<sup>120</sup> Also, a study that was conducted in Gaza in 2017 interviewed local fisherman and all were unaware that the giant devil ray is listed as endangered by the IUCN and in the Barcelona Convention Protocol.<sup>121</sup> Only one out of five governmental employees were aware of the species' endangered status after recently researching the matter

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<sup>115</sup> *The Barcelona Convention*. EUROPEAN COMMISSION (August 06, 2016), [http://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/barcelona-convention/index\\_en.htm](http://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/barcelona-convention/index_en.htm).

<sup>116</sup> *Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean*, EUROPEAN COMMISSION (June 10, 1995) [http://wedocs.unep.org/bitstream/handle/20.500.11822/7096/Consolidated\\_BC95\\_Eng.pdf?sequence=1&isAllowed=y](http://wedocs.unep.org/bitstream/handle/20.500.11822/7096/Consolidated_BC95_Eng.pdf?sequence=1&isAllowed=y).

<sup>117</sup> *Id.*

<sup>118</sup> *Annex II*. EUROPEAN COMMISSION (August 06, 2016), [http://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/barcelona-convention/pdf/Annex\\_II.pdf](http://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/barcelona-convention/pdf/Annex_II.pdf)

<sup>119</sup> *Annex II*, *supra* note 129.

<sup>120</sup> Sciara, *supra* note 51, at 2.

<sup>121</sup> Abudaya, *supra* note 38, at 9.

himself.<sup>122</sup> Therefore, the Barcelona Convention does not provide adequate regulatory protection for the giant devil ray.

#### 4. *Ban on Driftnet Fishing*

In 1992, the United Nations placed a global moratorium on all large-scale pelagic driftnet fishing.<sup>123</sup> After this decision, the General Fisheries Commission for the Mediterranean adopted a provision limiting driftnet fishing to nets no greater than 2.5 kilometers in length.<sup>124</sup> Later in 2002, the European Union decided to ban all driftnet fishing, when intended for the capture of highly migratory species such as tuna and swordfish, within waters under the jurisdiction of the member states.<sup>125</sup>

However, the current European Union legislative framework has shown weakness and loopholes. The small-scale nature of the fishing vessels involved and the fact that they do not operate together in the same areas has made it easier to escape monitoring, control, and proper enforcement. There are still European Union member states that use illegal driftnet fleets throughout the Mediterranean such as Italy and France, as well as other Mediterranean countries like Turkey and Morocco.<sup>126</sup> In April 2013, the European Commission published a Roadmap reviewing the EU driftnet fisheries regime and launched two studies, "Identification and Characterization of the Small Scale Driftnet Fisheries in the Mediterranean, DRIFTMED" and "Study in Support of the Review of the EU Regime on the

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<sup>122</sup> *Id.*

<sup>123</sup> *Important of New Agreement to Regulate High Seas Fishing Stressed as Assembly Discusses Sea Law, Sustainable use of Marine Living Resources*, United Nations (Dec. 05, 1995), <https://www.un.org/documents/ga/docs/55/a55386.pdf>.

<sup>124</sup> *Id.*

<sup>125</sup> *Id.*

<sup>126</sup> Cavanagh, R. D., Gibson, C. 2007. Overview of the conservation status of cartilaginous fishes (Chondrichthyans) in the Mediterranean Sea. IUCN, Gland, Switzerland and Malaga, Spain. i-32.

Small-Scale Driftnet Fisheries.”<sup>127</sup> The first study revealed that the vessels involved in the Small Scale Driftnet fisheries in EU Mediterranean waters are operative only in Italy and Slovenia.<sup>128</sup> During the investigation, 100 vessels, almost all in Italy (one in Slovenia), involved in nine small scale driftnet fisheries, were identified.<sup>129</sup> This number is likely higher due to the vessels not active or not identified in the monitored period, because they are located in very small and isolated mooring places.<sup>130</sup> While the bycatch to targeted species percentage was smaller compared to bycatch percentage in larger driftnets, bycatch was still accounted for in some of the fisheries, such as the presence of Atlantic bonito and two species of cephalopods were recorded in the “occhiataro” fishery.<sup>131</sup>

The second study identified current small scale driftnet fisheries and then did an internal analysis of the current EU legal framework on driftnets.<sup>132</sup> The study found that there are currently 44 active driftnet fisheries, these fisheries accounted for around 3,000 fishing vessels both in marine and inland waters, targeting over 20 different species, including marine, anadromous, and catadromous species.<sup>133</sup> Based on the qualitative review of reported bycatch/interaction data available and a comparison of the general fishery locality, 33 out of the 44 small-scale driftnet fisheries identified could be classified as posing a potential risk to protected species.<sup>134</sup> The study also concluded the following

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<sup>127</sup> *Fisheries: European Commission Proposes Full Ban on Driftnets*. European Commission (May 13, 2014), [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_14\\_563](https://ec.europa.eu/commission/presscorner/detail/en/IP_14_563).

<sup>128</sup> *Identification and Characterization of the Small-Scale Driftnets Fisheries in Mediterranean (DRIFTMED)*, MAREA (Apr. 14, 2014).

<sup>129</sup> *Identification and Characterization of the Small-Scale Driftnets Fisheries in Mediterranean (DRIFTMED)*, MAREA (Apr. 14, 2014).

<sup>130</sup> *Id.*

<sup>131</sup> *Id.*

<sup>132</sup> *Study in Support of the Review of the EU Regime on the Small-Scale Driftnet Fisheries*, DG MARE (May 8, 2014).

<sup>133</sup> *Id.*

<sup>134</sup> *Id.*

weaknesses in the current EU regulatory regime for driftnets: (1) there is lack of clarity in regime objectives, (2) there is a lack of clarity in the definition and scope of a driftnet, (3) there is a lack of coherence with regulations in force for other passive net fisheries, and (4) there are insufficient regulatory requirements to ensure effective monitoring and mitigation of impacts on protected species.<sup>135</sup> Clearly, the current EU regulatory framework for driftnet fishing is lacking and therefore does not provide adequate protection for the giant devil ray.

#### D. OTHER NATURAL OR MANMADE FACTORS AFFECTING ITS CONTINUED EXISTENCE

##### 1. *Climate Change*

Climate change is expected to cause further disturbances in marine ecosystems, affecting the reproductive biology, abundance and survival of many marine species.<sup>136</sup> The warming of the ocean can cause changes in ocean acidity, oxygen content, oceanic circulation, and primary productivity dynamics, ultimately affecting food web structures.<sup>137</sup> The major impact of climate change on mobulids will likely be the projected decline in zooplankton biomass in tropical waters, mobulids main food source.<sup>138</sup> Biogeochemical models project a decline in zooplankton biomass in about 10% globally, but some regions, particularly in the tropics, could experience more than 50% decline in zooplankton biomasses.<sup>139</sup> The giant devil ray is likely endemic to the Mediterranean Sea and therefore the species will likely not be able to migrate outside the Mediterranean to seek for new food sources.

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<sup>135</sup> *Id.*

<sup>136</sup> Stewart, *supra* note 51, at 9.

<sup>137</sup> *Id.*

<sup>138</sup> Stewart, *supra* note 51, at 9.

<sup>139</sup> Stewart, *supra* note 51, at 9.

Also, the rising sea temperatures will likely negatively affect giant devil rays' habitat in the Mediterranean Sea. Scientists speculate that the small enclosed size of the Mediterranean Sea will likely be drastically affected with rising sea temperatures and could consequently negatively impact marine species in the Mediterranean Sea.<sup>140</sup> Evidence already shows that fish and benthic species from warmer waters of the southern parts of the Mediterranean are extending their distribution range to the north due to climate change.<sup>141</sup> The giant devil ray relies on temperature of the surrounding water to regulate its body temperature and a change in water temperature could therefore drastically impact the ray's ability to regulate its body temperature.<sup>142</sup> Clearly, climate change will likely negatively affect the giant devil ray with rising sea temperatures affecting the availability of its food source and destroy its habitat in the Mediterranean Sea.

## 2. Microplastics

The giant devil ray is further threatened by manmade factors such as oceanic microplastics in the Mediterranean Sea. The consumption of these microplastics may accumulate within the organism resulting in physical harm such as internal abrasions and blockages. In addition, toxicity can arise from leaching constituent contaminants such as monomers and plastic additives, capable of causing carcinogenesis and endocrine disruption.<sup>143</sup>

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<sup>140</sup> Eva Calvo, et al., *Effects of Climate Change on Mediterranean Marine Ecosystems: The Case of the Catalan Sea*, CLIMATE RESEARCH (2011), <https://www.int-res.com/abstracts/cr/v50/n1/p1-29/>.

<sup>141</sup> *Id.* at 17.

<sup>142</sup> Bigelow, *supra* note 3.

<sup>143</sup> Stephanie Wright, *The Physical Impacts of Microplastics on Marine Organisms: A Review*, ENVIRONMENTAL POLLUTION (Feb. 13, 2013), <https://www.deepdyve.com/lp/elsevier/the-physical-impacts-of-microplastics-on-marine-organisms-a-review-RAFjJ5uLks?>.

Annual plastic production has increased dramatically from 1.5 million tons in the 1950s to approximately 280 million tons in 2011.<sup>144</sup> Through accidental release and indiscriminate discards, plastic waste has accumulated in the environment at an uncontrollable rate, particularly accumulating in oceans worldwide over the last four decades.<sup>145</sup> Plastic waste and microplastics are significantly higher in the Mediterranean Sea than compared to any other segment of the ocean.<sup>146</sup> A 2010 study performed in the Northwestern Mediterranean Basin revealed a mean value of 0.116 particles/m<sup>2</sup> which is significantly higher than those obtained from 20 years of monitoring the Caribbean Sea (0.001 particles/m<sup>2</sup>) and in Gulf of Maine (0.020 particles/m<sup>2</sup>) as well as in the North Atlantic Gyre (0.020 particles/m<sup>2</sup>).<sup>147</sup> The high microdebris abundance obtained in this assessment may be due to the specific configuration of the semi-enclosed Mediterranean system.<sup>148</sup> The Mediterranean is also subject to permanent waste inputs, such as the continental shelf of the Golf du Lion which is affected by the outflow from the Rhone River and Northwest winds that flush wastes towards offshore waters.<sup>149</sup>

The level of microplastic particles is only suspected to increase in the coming years making it a major threat to plankton eating organisms, such as the giant devil ray.<sup>150</sup> The giant devil ray is highly susceptible to physical impacts such as starvation and physical deterioration which in turn can lead to reduced reproduction fitness, drowning, and

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<sup>144</sup> *Id.*

<sup>145</sup> Wright, *supra* note 45, at 1.

<sup>146</sup> Amandine Collignon, et al., *Neustonic Microplastic and Zooplankton in the North Western Mediterranean Sea*, MARINE POLLUTION BULLETIN (2012), <https://www.deepdyve.com/lp/elsevier/neustonic-microplastic-and-zooplankton-in-the-north-western-mediterranean-sea>.

<sup>147</sup> Collignon, *supra* note 100.

<sup>148</sup> *Id.*

<sup>149</sup> *Id.*

<sup>150</sup> *Id.*

ultimately death.<sup>151</sup> Therefore, microplastics should be considered a threat that endangers the giant devil ray population.

#### **IV. REQUESTED DESIGNATION**

Petitioners hereby request the NOAA fisheries list the giant devil ray (*Mobula mobular*) as “endangered” or “threatened” under the ESA. Listing is warranted, given the species is in danger of extinction due to multiple listing factors under the ESA: the present or threatened destruction its habitat due to water pollution and human development; overutilization for commercial and recreational purpose from targeted and bycatch fisheries;; inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence such as climate change, and microplastics.

The loss of this species population would represent a significant loss of biodiversity. Federal listing of this species would help ensure the recovery of the giant devil ray species considering the mobulids’ low growth rate and slow population recovery time. Listing of this species is also crucial considering the giant manta ray was recently listed as threatened under the ESA which will increase the pressure to capture giant devilr to meet market demand.