

Giant and Reef Manta Ray Status Review Report: ID353

Peer Review Comments

We solicited review of the Draft *Endangered Species Act Status Review Report: Giant Manta Ray (Manta birostris) and Reef Manta Ray (Manta alfredi)* from five potential reviewers. Three people agreed to be reviewers and two provided reviews. Reviewer comments are compiled below from comments on the draft report and are not in the order of the reviewer identification list below.

Reviewers (listed alphabetically):

Dr. Anne-Marie Kitchen-Wheeler
Project Manager for Manta Ecology Project
Marine Biologist/Cruise Director for Maldives Scuba Tours
United Kingdom

Mr. Frazer McGregor
Postgraduate Student/Scientific Advisor for Manta Ray of Hope Project
Coral Bay Research Station
Murdoch University
Western Australia

Responses to Terms of Reference Questions

Reviewer #1:

Evaluate the adequacy, appropriateness and application of data used in the Status Review document.

- 1. In general, does the Status Review include and cite the best scientific and commercial information available on each species, including information on the biology, stock structure, habitats, threats, and risks of extinction?*

Yes. I have made some minor recommendations for corrections, some queries and suggestions for better references where I thought appropriate.

- 2. Are the scientific conclusions factually supported, sound, and logical?*

Generally, yes (see 3 below)

- 3. Where available, are opposing scientific studies or theories acknowledged and discussed?*

The problem here is the relative lack of data available on which to draw conclusions, particularly with respect to estimated local and global populations of the two species. Knowledge on the lifespan, movements, ecology and behavior etc. of these species is still lacking.

I did not note any opposing scientific studies or theories. I have commented where I believed the facts have been misrepresented or misunderstood and suggested opposing fact and references

4. *Are the results and conclusions of the Extinction Risk Analysis supported by the information presented?*

Yes

5. *Are uncertainties assessed and clearly stated?*

I do not think the document goes far enough in stating how many uncertainties there are because of lack of data

Reviewer #2:

Evaluate the adequacy, appropriateness and application of data used in the Status Review document.

1. *In general, does the Status Review include and cite the best scientific and commercial information available on each species, including information on the biology, stock structure, habitats, threats, and risks of extinction?*

It is my belief that the status review provides a comprehensive, up to date synopsis on the state of manta spp. globally. Given that realization of anthropogenic threats to manta spp. is a relatively recent event, there is little published data on most aspects of manta spp. ecology and biology even though research has increased by an order of magnitude. As this report is being reviewed there is a mass of current research being done to address the many unanswered questions, some of which may show the state of manta spp. affairs to be more dire than anticipated! As such it may be prudent to re-evaluate the status of manta spp. in the near future.

2. *Are the scientific conclusions factually supported, sound, and logical?*

As cited data and research comes from globally peer reviewed journals and documentation the conclusions drawn in this review are as factual as possible and represent the broader scientific communities understanding and knowledge of manta spp. The presentation of this information in this review follows a logical path and is easily interpreted.

3. *Where available, are opposing scientific studies or theories acknowledged and discussed?*

I believe that the authors have taken adequate care to include the range of available information pertaining to manta spp. Given the narrow scope of the review there are few if any conflicting views or data on manta ecology and biology. If anything the global research on manta spp. appears complimentary, supporting similar findings between populations.

4. *Are the results and conclusions of the Extinction Risk Analysis supported by the information presented?*

The ERA is adequately supported by the current data and how this data has been presented in this review. Whilst the lack of historical distinction between the two species of manta has made it difficult to definitively use some historical data, the alarms raised by the historical surveys has catalyzed the current explosion in research, leading to this accurately supported ERA. For *M.birostris* the moderate level of extinction risk is of immense concern given the additive effect of the global threats and must be addressed immediately. *M.alfredi* with a low level of extinction risk globally must be monitored locally for regional depletions to prevent escalation to the level of *M.birostris*.

5. *Are uncertainties assessed and clearly stated?*

Throughout the document uncertainties are constantly stated, as is the nature of research on large migratory and pelagic animals. The uncertainties however are not sufficient to prevent an informed ERA. As stated there are many research programs currently addressing these and suggestions for additional programs to reduce these uncertainties further. Future reviews will capture this data and help to refine the ERA for both species.

Overall the review is a sound document accurately representing the current published information pertaining to manta rays and is an appropriate document with which to address the petitioning of Manta spp on your domestic Endangered Species Act.

Editorial Comments

Page 9-

Chevron manta ray is not exclusively *M. birostris* but describes the color type exhibited in both species where a chevron is typically present on the dorsal surface. Please correct.

There also appears to be a misunderstanding in the Adnet et al. 2012 paper as in the main body of the paper it clearly states that *M. birostris* has teeth in both jaws quote: Dignathic heterodonty (morphological differences between lower and upper teeth) was not conspicuous in the material examined here. In both jaws, teeth are higher than wide. This is in agreement with Marshall et al.

2009. Please note that *M. alfredi* does NOT have teeth in the upper jaw reference Marshall et al. 2009.

Page 10 –

There are two distinct color types in both species: chevron and black (melanistic). You have not described the black type here which is important as very common in most populations of both species. The description of coloration the two species appears to ignore the common melanistic variety. As the melanistic variety can constitute 50% of local populations this paragraph is misleading. I suggest it is rewritten to explain that the majority of the characteristics described here are only relevant to the chevron version and then also describe the melanistic versions of each species. The information you require is in Marshall et al. 2009 or Kitchen-Wheeler 2013.

I have seen this 9 m (max growth size) speculated size many times but both of the largest measured specimens were 6.8 m. There have been no larger specimens described despite considerable worldwide fishing so be wary of continuing this legend of the 9 m manta. It is only speculation and my personal experience does not support it. Please use only the two references of measured size which are Kunhipalu and Boopendrath 1981 (6.8 m) and La Gorce 1953 (6.7 m)

Page 12-

Suriname is in the middle of its range (central W. Atlantic) so no need to include this reference or sentence as common throughout Caribbean, Gulf of Mexico, Venezuela etc. Instead you could write that the range extends from Gulf of Mexico to the E. Atlantic islands of the Canaries then South Africa and the E African coast across the Indian and Pacific oceans to the Revillagigedos and Sea of Cortez.

Page 15-

Manta alfredi is *only* observed in the Indian Ocean and western and southern Pacific.

Correct errors in the known aggregation areas for *M. alfreid* (E. Australia; use Couturier 2014 or Jaine 2014 references; not known in Mexico or Brazil)

Page 20 –

For the known manta feeding areas summarized in Table 1 -- This looks somewhat misleading. Generally, wherever mantas are seen, they are likely to be feeding nearby. This Table is just a list of locations where mantas have been seen feeding and reported in scientific literature. My area of expertise is the Maldives and the section on that area is 'wrong' in that many of the main feeding areas are missing from this list including the world famous Hanifaru simply because it has not been reported in scientific literature. I believe this table somewhat irrelevant.

Page 22 -

What about the excellent reference Tomita et al. 2012? (for histotroph reference)

Page 24 –

Sex ratio in western Australia should be 1.3:1 (for Ningaloo Reef) (McGregor 2008).

Page 25 –

The “Kitchen-Wheeler (2013) reported sexual maturity for female *M. alfredi* at 4.1 m DW and 3.7 m DW for males in the Maldives” is a misquote as these sizes were of measured individuals, i.e. a pregnant female manta was 4.1m DW a mature male was measured at 3.7m DW, not the minimum size of maturity within the Maldives population.

Page 26 –

Age of *M. alfredi* is speculated by Marshall et al. 2009 and confirmed by actual example by Kitchen-Wheeler 2013.

Page 40 –

The status of manta rays was assessed as “Good” in 2013 within Ningaloo Marine Park –should identify them as “reef” manta rays.

Page 44 –

Add acidification as an example of a change in oceanographic conditions

Page 54 –

Manta rays off Lakshadweep Islands are likely *M. alfredi* based on the proximity of the Maldives to Lakshadweeps and the relative abundance of species and that the paper was written pre-separation of species in 2009. This was likely to have been a resident population of *M. alfredi* annihilated by the spearfishing. This period coincides with the SW monsoon when mantas are seen on the E sides of atolls in the Maldives. Kalpeni atoll is on the E side of the Lakshadweeps.

Page 73 –

“Essentially, fishing for the species and retention of bycatch is allowed except within the Republic of Maldives EEZ and within the specific marine parks of Western Australia” - Only Ningaloo Marine Park has blanket protection, others only within ‘sanctuary’ zones.

Page 75-

For the statement “While the prior lumping of all manta rays as *M. birostris* may account for these findings” you could use Raje et al. 2007 as a possible reference here.

Page 77 –

In terms of fishery protections and regulatory measures in place in the Indian Ocean – may add the following: Whilst the Commonwealth of Australia has now listed both species of *Manta* and three species of *Mobula* on its list of migratory species under the EPBC Act, it is unclear how this equates to regulatory protection throughout Western Australian waters, with no listing on that states protected species list. *Manta* spp. are only explicitly protected from targeted fishing within Ningaloo Marine Park and collectively with all species in small green zones along the WA coast

Page 78 –

The actual reference for the story about the manta ray hotel in Hawaii is Neil, D. (2007). Night diving with manta rays on Hawaii's Big Island. Los Angeles Times March 14th 2007.

Page 90 –

For deep channels being barriers to movement - Movements reported in Germanov, E. S. and A. D. Marshall (2014). "Running the gauntlet: regional movement patterns of *Manta alfredi* through a complex of parks and fisheries." PLoS ONE 9(10): e110071 and Kashiwagi et al. 2010 contradict this. My own unpublished work agrees that this species is capable of traversing deep water so the behaviour in Hawaii is not typical.

Page 93 –

“Low Risk to *M. alfredi* for Overutilization” - Fortunately in the areas where this species is abundant it is because there is no targeted fishery. If this was to change then the species would be under severe threat because individuals do not travel great distances? This document does not reflect this potential risk.

Page 95 –

For the statement “Within the Indian Ocean, national protections exist” – but if this were to change

Page 101 –

Foreseeable is 50 years. The caveat that unless local fishing policies change should be added. The political situation in many of these countries is unstable and human. Local policy could change within this period

Page 123 –

Mantas in Eastern Australia are protected from fishing only within green zones. Listed as migratory species under EPBC Act – not as protected species.