

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/231337953>

Coastal dolphins in north-western Australia: The need for re-evaluation of species listings and short-comings in the Environmental Impact Assessment process

Article in *Pacific Conservation Biology* · January 2012

DOI: 10.1071/PC120022

CITATIONS

43

READS

451

4 authors:



Lars Bejder

University of Hawai'i at Mānoa

201 PUBLICATIONS 6,901 CITATIONS

SEE PROFILE



Amanda Jane Hodgson

Murdoch University

32 PUBLICATIONS 705 CITATIONS

SEE PROFILE



N. R. Loneragan

Murdoch University

234 PUBLICATIONS 8,064 CITATIONS

SEE PROFILE



Simon J. Allen

University of Bristol

88 PUBLICATIONS 1,902 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Shark fisheries and shark fishing livelihoods in eastern Indonesia [View project](#)



Octopus as predators of abalone [View project](#)

Coastal dolphins in north-western Australia: The need for re-evaluation of species listings and short-comings in the Environmental Impact Assessment process

LARS BEJDER*¹, AMANDA HODGSON¹, NEIL LONERAGAN¹ and SIMON ALLEN¹

¹Cetacean Research Unit, Centre for Fish, Fisheries and Aquatic Ecosystems Research, School of Biological Sciences and Biotechnology, Murdoch University, South St, Murdoch W.A. 6150

*Corresponding author: l.bejder@murdoch.edu.au

INTRODUCTION

LITTLE is known about the distribution, abundance and behavioural ecology of dolphins in the tropical north-west of Australia. This region is remote, and until recently, has had a relatively low human population. Two of Australia's tropical coastal dolphin species, the Australian Snubfin *Orcaella heinsohni* and Indo-Pacific Humpback Dolphins *Sousa chinensis* ("Snubfin Dolphin" and "Humpback Dolphin", hereafter) are known to occur in the region. Australia-wide, the only scientific publications on these two species come from a few studies from eastern Queensland, where both species live in "populations" of 50–100 individuals (Parra *et al.* 2006a; Cagnazzi *et al.* 2009) that are genetically isolated from one another (Parra 2011); have small home ranges; and are found in near-shore areas, typically within 3–5 km of the coastline (Parra 2006; Parra *et al.* 2002, 2004, 2006a,b; Cagnazzi *et al.* 2009). In eastern Australia, both species forage on coastal/estuarine fish and cephalopods, which is further evidence of their reliance on the near-shore environment (Parra and Jedensjö 2009). According to population sizes in Queensland, and the extent of potentially suitable habitat along the north-west coast, the total numbers in Western Australia are likely to be in the low thousands of individuals (i.e., < 5 000). The combination of these life-history characteristics may render Snubfin and Humpback Dolphins particularly vulnerable to local extinctions due to human activities such as habitat modification and increased shipping and boating

activity (Frankham 2005; O'Grady *et al.* 2006).

In this Essay, we review the current extent of coastal developments in the waters of north-west Australia. Then we discuss the conservation and management implications of this in relation to coastal dolphins, particularly Snubfin and Humpback Dolphins. We also appraise the current, non-targeted methods being used to survey marine mammal populations for environmental impact assessments (EIAs), highlighting their inadequacy for coastal dolphins. Finally, we make recommendations that should improve government decision making processes for the long term conservation of these two species.

Scale of coastal development and implications for coastal dolphins in north-western Australia

The scale of coastal development in north-west Australia, through the expansion and exploration activities of the mining and petroleum industries, is massive. In 2010, these industries achieved record growth in Western Australia (WA), exceeding an export value of \$AUD102 billion, with a further \$AUD250 billion of projects either underway or scheduled (Prospect 2011a, b). Concurrently, large-scale infrastructure has been, and is being, built to allow the transport of extracted resources from these industries. For example, between Exmouth and Broome, existing industrial ports have been greatly expanded, and numerous ports are approved and awaiting commencement, or are currently being reviewed under approval processes. These ports

require large volumes of dredging; for example, 200 million cubic metres of dredging is underway or approved for the Pilbara ports (Exmouth to Port Hedland) alone (W. Young, Environment Manager, Dampier Port Authority, pers. comm.). The near-shore environment of north-west Australia is thus undergoing unprecedented, large-scale habitat modification through rapid coastal development to support the resource industry. This habitat modification clearly threatens to impact species, such as coastal delphinids, that are dependent on the same near-shore environment.

Of particular concern are the potential impacts upon both Snubfin and Humpback Dolphins, as we have little knowledge of their abundance, distribution or critical habitats in WA waters. In May 2010, the Commonwealth-funded "Tropical Inshore Dolphin Workshop" identified coastal zone development as "the major threat" to tropical and inshore dolphins and made the following recommendations:

- "...rapidly establish the distribution of tropical inshore dolphins... [to be determined on available and incoming information]"
- "...identify 'hotspots' of inshore dolphin distribution [to be determined on available and incoming information]"
- "...identify population structure... (local and large scale)... to determine the degree of isolation amongst areas"
- "...ensure scientific independence in the industry development referral process by facilitating a

“peer-review” approach in which proponents must consult with scientific experts on environmental assessment reports” (DEWHA 2010).

Coastal dolphin conservation listing in Western Australia

In 2010, submissions were made to the Commonwealth Threatened Species Scientific Committee to have the Snubfin and Humpback Dolphins listed as “Vulnerable” in Commonwealth waters under the *Environmental Protection and Biodiversity Conservation (EPBC) Act 1999*. However, both were rejected on the grounds that insufficient information was available to justify changing their status. In response to these submissions, the Federal Minister of the Environment prioritized collecting the information required to conduct an assessment of the Snubfin Dolphin in the waters of Queensland, the Northern Territory and WA under the National Environmental Research Program and the Australian Marine Mammal Grants Program (Ministerial Press Release 2011). This initiative will help inform future species’ assessments in Commonwealth waters under the EPBC Act.

In the state waters of WA, both Snubfin and Humpback dolphins are protected under the *Wildlife Conservation Act 1950*. This legislation also has provisions to list species facing identified threats or impacts as Threatened or Specially Protected. However, given the lack of information on the population status and distribution of these two species in WA waters, the Department of Environment and Conservation (DEC) in WA is currently unable to assess their status or list these species under WA State legislation.

DEC has formulated a Priority Fauna List where fauna are listed against a priority code from 1 to 5. This List does not have legislative power, but assists DEC in considering which fauna are most in need of research and monitoring to establish their status in the wild. Furthermore, DEC uses this List to prioritize its conservation plans and actions. Under this scheme, Snubfin and Humpback Dolphins are listed as ‘Priority 4 Fauna’, defined as: “[T]axa which are considered to have been adequately

surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change”. The current Priority Fauna List specifies that Snubfin Dolphins are present in the Kimberley Region and Humpback Dolphins in the Kimberley and the Pilbara Regions. However, recent research has documented that these species can be found further to the south-west (see below and Allen *et al.* 2012).

As we have stated above, no peer-reviewed scientific publications are available on any population of either Snubfin or Humpback Dolphins in north-west Australia. Furthermore, we do not know of any reports to support the assertion that these species have been “adequately surveyed” throughout WA. Boat-based photo-identification surveys and sightings reported by the community have shown that Roebuck Bay is an important area for Snubfin Dolphins (Thiele 2010). However, this is the only location for which we have more than just opportunistic sightings in WA. Both Snubfin and Humpback Dolphins were assessed by DEC and assigned a Priority 4 Fauna ranking in 1995, when north-west Australia was under much less pressure from human impacts relative to the current activities associated with large scale coastal developments. However, the current and projected coastal developments across the region mean that the pressures on these two species have increased significantly and research to assess their status is needed urgently. We urge the Western Australian Government to take similar action to the Commonwealth Government and prioritize the collection of data that will enable the species listings of both Snubfin and Humpback Dolphins to be re-assessed under the WA State *Wildlife Conservation Act 1950*. Furthermore, we recommend that DEC immediately reassess their internal listings of Snubfin and Humpback Dolphins on the Priority Fauna Species List.

Triggers in the Environmental Impact Assessment process: why coastal dolphins are missed

The EIA process within WA goes through several stages before public

review. During these stages, the potential impacts of a development on coastal dolphins could be identified. The stages in the review process include:

- (1) The Referral document developed by the proponent and submitted to the Office of the Environmental Protection Authority (OEPA), to determine whether an EIA is required,
- (2) The Scoping document submitted by the proponent and identifying “the environmental issues/factors arising from the project and their relative significance”, and
- (3) The Public Environmental Review document prepared by the proponent detailing all potential impacts on the environment (*Environmental Impact Assessment (Part IV Division 1) Administrative Procedures 2002*).

In preparation and evaluation of these documents, the proponents of development, environmental consultants, and the State and Commonwealth assessment officers seek information on the fauna which could be impacted by proposed developments. However, as limited information is available on north-west Australian Snubfin and Humpback Dolphins, literature searches do not adequately identify where these species occur in the region. Indeed, the Australia-wide ranges of Snubfin and Humpback Dolphins are incorrectly portrayed on the Western Australian and Commonwealth Governments’ distribution maps (DEC 2011; DSEWPac 2011, respectively, see also Allen *et al.* 2012). Recent research, using boat-based photo-identification methods and relatively little time in the field, found that Snubfin and Humpback Dolphins occur further south-west than shown on these maps in WA (Allen *et al.* 2012). These recent findings highlight that both species are present in areas that are not currently recognized in State and Commonwealth distribution maps. During the EIA process, the lack of accurate presence/absence data, or assessment of their status for potential threatened species listing, is precluding the inclusion of these species in assessments of potential impacts.

If a particular development has the potential to impact upon Snubfin and/or Humpback Dolphins, whether in State or Commonwealth waters, the EPBC Act should be triggered, because although neither is listed as threatened, both species are listed as “Migratory” under this Act. Any development that is considered likely to have a significant impact on a matter of national environmental significance (i.e., any “listed” species under the EPBC Act) is classed as a “controlled action” and needs to be assessed by the Commonwealth Government. However, the EPA of WA conducts most EIAs under a bilateral agreement between WA State and Commonwealth Governments.

The “Migratory” listing consistently triggers detailed assessments of potential impacts on Dugongs, also listed as “Migratory”, despite the fact that a similar lack of data exists on the distribution and abundance of Dugongs anywhere north of Exmouth Gulf in WA (Gales *et al.* 2004). This inconsistency in the treatment of Dugongs and the two species of dolphins in triggering assessments under the EPBC Act may be due to the clear and direct relationship between dredging operations, often required for these developments, and the Dugong’s reliance on seagrasses for feeding (e.g., Heinsohn *et al.* 1977). However, Snubfin and Humpback Dolphins also rely on the coastal environment, and the loss of fish nursery habitat through the destruction of near-shore habitats, including seagrass beds, may reduce fish stocks and areas of suitable habitat available to dolphins. In addition, because of their restricted home ranges, small population sizes, genetic isolation between populations and their reliance on a diet composed of coastal/estuarine fishes and cephalopods (Parra and Jedensjö 2009), these dolphin species also vulnerable to the impacts of coastal development as Dugongs. We therefore argue that coastal dolphins should also trigger assessments under the EPBC Act in the same manner as Dugongs.

Methodological shortcomings to detect coastal dolphins in the EIA process

Methodological shortcomings in marine fauna surveys typically

employed by proponents exacerbate the limited information on the distribution and abundance of inshore dolphins. In general, proponents of developments are not required by the State or Commonwealth Governments to carry out dedicated baseline studies on coastal dolphins in Scoping and Referral assessments (e.g., Department of State Development 2010). In contrast, focussed and more comprehensive assessments of potential impacts are required for other marine mammals, including Humpback Whales (*Megaptera novaeangliae*) and Dugongs (e.g., Department of State Development 2010). When proponents do provide information on coastal dolphins in a proposed area of development, this generally consists of opportunistic dolphin sighting data collected during aerial surveys designed for whales or Dugongs. However, the use of data collected during such surveys, to assess the presence of and/or abundance and composition of coastal dolphin communities or populations, has severe limitations. Firstly, aerial surveys that are not specifically designed to detect dolphins typically provide unrepresentative estimates of dolphin densities or even relative abundance, greatly limiting the inferences that can be drawn from the data. Only raw counts of dolphins are obtained, with no attempt to correct for detection probability, including availability corrections that account for dolphins missed because they were too deep to be visible from the air (Marsh and Saalfield 1989). Furthermore, availability corrections have yet to be established for either Snubfin or Humpback Dolphins. Secondly, dolphins detected during aerial surveys are often recorded as “unidentified dolphin species”, because surveys designed for Humpback Whales and Dugongs are either flown at altitudes too great to differentiate between dolphin species, or do not include a circling protocol to confirm the identity of dolphin species (e.g., Prince *et al.* 2001; Hodgson 2007; Department of State Development 2010). The aerial survey methods employed for estimating Humpback Whale and Dugong abundance are thus unsuitable for documenting the presence/absence and relative abundance of multi-species assemblages of coastal dolphins.

CONCLUSIONS AND RECOMMENDATIONS

Data on the distribution and abundance of Snubfin and Humpback Dolphins in north-west Australia are very limited. State and Commonwealth Government agencies therefore do not have the baseline information required to identify the potential impacts of human activities on either species. Subsequently, proponents of coastal developments are not required to collect the data suitable for assessing impacts on these species. As the legislation now stands, proponents of development and the consultants they employ conduct surveys on marine fauna using methods that are inappropriate for identifying species of dolphins and for assessing dolphin distribution and abundance. The conclusions drawn from the data on coastal delphinids collected from surveys designed for whales and Dugongs should therefore be treated with great caution and should not be used to establish patterns of coastal delphinid distribution, abundance or the potential impacts of development thereon. The issues outlined in this essay highlight the urgent need for more rigorous assessments of the distribution and abundance of coastal dolphins in north-west Australia before further large-scale coastal developments are approved.

We recommend that (a) the DEC immediately reassess their internal listings of Snubfin and Humpback Dolphins on the Priority Fauna Species List; (b) the State and Commonwealth Governments, particularly the WA EPA, and proponents of development, recognize the potential impact of coastal developments on coastal dolphins; (c) State and Commonwealth Governments review the methods being used by proponents of development to assess coastal dolphins, develop best practice protocols for dolphin survey techniques, and ensure compliance with these protocols during the EIA scoping and reporting process; and (d) as new information becomes available, the species’ status of Snubfin and Humpback Dolphins, under both WA State legislation and Commonwealth legislation, be re-assessed. The implementation of these recommendations will elevate our knowledge

of these species, lead to more rigorous assessments of potential impacts and provide a sound basis for better-informed management for the conservation of these species.

ACKNOWLEDGEMENTS

We thank Helene Marsh for fruitful discussions on the issues presented in this Essay, as well as Guido Parra for providing comments on an earlier version of the manuscript. We also thank the participants in the Marine Wildlife workshop held at Murdoch University in December 2010 for valuable discussions on the industrial developments across north-western Australia and priorities for management, industry and research (for report see <http://mucru.org/latest-news/workshop-building-long-term-research-capacity/>). In particular, we thank Paula Tompkins from the Department of Sustainability, Environment, Water, Populations and Communities; and Paul Vogel, Darren Foster and Ray Masini of the Office of the EPA in Western Australia, for discussions on the impact assessment process and conservation listing process for species. We are grateful to the DEC Environmental Management Branch for discussions on the impact assessment process and to Mike Calver, Graham Fulton, Harry Recher and Kelly Waples for their insightful reviews that greatly improved the manuscript.

REFERENCES

- Allen, S. J., Cagnazzi, D. D. B., Hodgson, A. J., Loneragan, N. R. and Bejder, L., 2012. Tropical inshore dolphins of north-western Australia: Unknown populations in a rapidly changing region. *Pacific Conservation Biology* **18(1)**: 56-63.
- Cagnazzi, D. D. B., Harrison, P. L., Ross, G. J. B. and Lynch, P., 2009. Abundance and site fidelity of Indo-Pacific Humpback dolphins in the Great Sandy Strait, Queensland, Australia. *Marine Mammal Science* **27**: 255-281.
- DEC 2011. Department of Environment and Conservation 2011. Naturemap *Orcaella heinsohni*. Website: <http://naturemap.dec.wa.gov.au/default.aspx>. Accessed on 22 January 2012.
- Department of State Development. 2010. Browse Liquefied Natural Gas Precinct — Strategic Assessment Report. Appendix C-10. December 2010. Draft for Public Comment. Government of Western Australia.
- DEWHA 2010. Tropical Inshore Dolphin Workshop report. Townsville, 4-5 May 2010.
- DSEWPaC 2011. Department of Sustainability, Environment, Water, Populations and Communities 2011c. *Orcaella heinsohni* – Australian snubfin dolphin. Website: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=81322. Accessed on 22 January 2012.
- Environmental Impact Assessment (Part IV Division 1) Administrative Procedures* 2002.
- Frankham, R., 2005. Genetics and extinction. *Biological Conservation* **126**: 131-140.
- Gales, N. J., McCauley, R. D., Lanyon, J. M. and Holley, D. K., 2004. Change in abundance of dugongs in Shark Bay, Ningaloo and Exmouth Gulf, Western Australia: evidence for large scale migration. *Wildlife Research* **31**: 283-290.
- Heinsohn, G. E., Wake, J., Marsh, H. and Spain, A. V., 1977. The dugong (*Dugong dugon* (Muller)) in the seagrass system. *Aquaculture* **12**: 235-248.
- Hodgson, A., 2007. The distribution, abundance and conservation of dugongs and other marine megafauna in Shark Bay Marine Park, Ningaloo Reef Marine Park and Exmouth Gulf. Report submitted to the Department of Environment and Conservation.
- Marsh, H. and Saalfeld, W. K., 1989. Aerial surveys of sea turtles in the Northern Great Barrier Reef Marine Park. *Australian Wildlife Research* **16**: 239-249.
- Ministerial Press Release, 2011. <http://www.environment.gov.au/minister/burke/2011/mr20110914b.html>. Accessed 22 January 2012.
- O'Grady, J. J., Brook, B. W., Reed, D. H., Ballou, J. D., Tonkyn, D. W. and Frankham, R., 2006. Realistic levels of inbreeding depression strongly affect extinction risk in wild populations. *Biological Conservation* **133**: 42-51.
- Parra, G. J. 2006. Resource partitioning in sympatric delphinids: Space use and habitat preferences of Australian snubfin and Indo-Pacific humpback dolphins. *Journal of Animal Ecology* **75**: 862-874.
- Parra, G. J., 2011. Population genetics and phylogeography of Australian snubfin and humpback dolphins: defining appropriate management units for conservation-Stage 1. Unpublished Final Report to the Australian Marine Mammal Centre. 39pp.
- Parra, G. J., Azuma, C., Preen, A. R., Corkeron, P. J. and Marsh, H., 2002. Distribution of Irrawaddy dolphins, *Orcaella brevirostris*, in Australian waters. *Raffles Bulletin of Zoology Supplement* **10**: 141-154.
- Parra, G. J., Corkeron, P. J. and Marsh, H., 2004. The Indo-Pacific humpback dolphin, *Sousa chinensis* (Osbeck, 1765), in Australian waters: a summary of current knowledge. *Aquatic Mammals* **30**: 197-206.
- Parra, G. J., Corkeron, P. J. and Marsh, H., 2006a. Population sizes, site fidelity and residence patterns of Australian snubfin and Indo-Pacific humpback dolphins: Implications for conservation. *Biological Conservation* **129**: 167-180.
- Parra, G. J., Schick, R. S. and Corkeron, P. J., 2006b. Spatial distribution and environmental correlates of Australian snubfin and Indo-Pacific humpback dolphins. *Ecography* **29**: 396-406.
- Parra, G. J. and Jedensjö, M., 2009. Feeding habits of Australian Snubfin (*Orcaella heinsohni*) and Indo-Pacific humpback dolphins (*Sousa chinensis*). Cairns: Project Report to the Great Barrier Reef Marine Park Authority, Townsville and Reef & Rainforest Research Centre Limited. 19pp.
- Prince, R. I. T., Lawler, I. R. and Marsh, H., 2001. The distribution and abundance of dugongs and other megavertebrates in Western Australian coastal waters extending seaward to the 20 metre isobath between North West Cape and the De Grey River Mouth, Exmouth, Western Australia, April 2000. Canberra: Report for Environment Australia. 46pp.
- Prospect, 2011a. Western Australia's International resources development magazine. April/May 2011. 36pp.
- Prospect, 2011b. Western Australia's International resources development magazine. September/November 2011. 36pp.
- Thiele, D., 2010. Collision course: Snubfin dolphin injuries in Roebuck Bay. Report to the WWF — Australia, Sydney. 15pp.