Applied Strategic Tools and Conservation Innovation

Centre for Conservation Geography

CCG BRIEFING PAPER ON THE ECONOMICS OF THE TERRITORY MARINE AND COASTAL ENVIRONMENT

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NON-MARKET BASED ECONOMICS

Key Findings:

- The unaccounted for environmental services of the Territory coastal and marine environment are worth greater than $420 million per annum.
- Territorians are likely to place a high value on initiatives that result in improvements in the health of the Territory's coastal and marine environment. This value is likely to be more than $34 million per annum.

Recommendations:

1. The Territory Government should include consideration of unaccounted for ecosystem services as part of the Territory's Economic Summits Economic Framework, as well as the Coastal and Marine Management Strategy.
2. The Territory Government should commission a detailed valuation of the unaccounted for ecosystem services of the Territory coastal and marine environment. This valuation should include ecosystem services from additional key habitats like estuaries and mangroves.
3. The Territory Government should commission updated habitat mapping of Territory coastal waters, particularly for seagrasses and reefs.
4. As part of the Territory's Economic Summits and Coastal and Marine Management Strategy, the Territory Government should undertake choice modelling to identify the value that Territorians, other Australians, and international tourists place on initiatives to improve the health of the Territory's marine environment.

The Territory Government's *Healthy Environment, Strong Economy* [1] policy identifies the Territory's *"unique natural environment"* [1] as a key asset for Indigenous and non-Indigenous Territorians alike. It highlights a healthy environment as being the *"key to a happy, healthy, and prosperous community."* [1]

Many of the core community values associated with a healthy environment lack a market that clearly represents their economic value. Without clear economic indicators, discussions of economic value (like those conducted at the Territory Economic Summits) can fail to take these important community values into account. For example, how do you measure the economic value of *"ensuring future generations can experience the natural beauty and wonder the territory has to offer"*? [1] This question and others like it that represent so-called "non-market values", have importance for long-term economic valuation and planning.

Two mechanisms economists have developed to address these non-market values are ecosystem services and choice modelling.

ECOSYSTEM SERVICES

In 2011 the Centre for Policy Development estimated that unaccounted services to the Australian economy from our oceans exceeded $25 billion per annum. [2] The CPD conservatively valued the unaccounted services of coastal waters at $48 AUD, [3] coral reefs at $258 AUD, [3] and seagrasses at $318 [3] AUD. These figures refer to the combined value per hectare per annum of the services outlined in Table 1. Accounted for services are those like commercial fishing, mining, and tourism for which figures are available in official accounts.

Current mapping of the NT shows 29,200 hectares seagrasses, 62,700 hectares of reefs, 374,600 hectares of mangroves, 1,286,700 hectares of estuaries and other coastline habitats and 6,726,500 hectares of coastal waters for a total estimated ecosystem services value of $428 million per annum (Table 2, Figure 1).

This is likely an under-estimate due to the conservative nature of the Centre for Policy Development figures, the lack of specific figures for mangroves and estuaries, and the incomplete mapping for reefs and seagrasses. For example, available mapping for seagrasses covers parts of the Gulf of Carpentaria and Arnhem Land but not the rest of the NT coastline.

The Centre for Policy Development report [2] did not document the unaccounted ecosystem services for many key habitats in the Territory. For example, no figures are available for mangroves, estuaries and non-coral reefs. This brief uses the generic coastal waters valuation for these habitats. The actual value of these habitats is likely to be significantly higher.

Key finding:

- The unaccounted for environmental services of the Territory coastal and marine environment are worth greater than $420 million per annum.

[1] https://territorylabor.com.au/Portals/territorylabor-staging/docs/HealthyEnvironmentStrongEconomy.pdf

[2] Eadie, L., and Hoisington, C., 2011. *Stocking Up: Securing our marine economy*, Centre for Policy Development, Sydney, New South Wales, Australia.

[33] Figures in Eadie and Hoisington (2011) inflation adjusted to 2017 values.

TABLE 1: RANGE OF UNACCOUNTED FOR SERVICES CONSIDERED BY EADIE AND HOISINGTON (2011) [2]. ASPECTS LIKE COMMERCIAL FISHING THAT ARE INCLUDED IN OFFICIAL ACCOUNTS ARE EXCLUDED TO AVOID OVERLAP.

Provisioning Services	Regulating Services	Habitat Services	Cultural Services
Food Fresh water supply Raw materials Genetic resources Medicinal resources Ornamental resources	Influence on air quality Climate regulation Moderation of extreme events Regulation of water flows Waste treatment / water purification Erosion prevention Nutrient cycling and maintenance of fertility Pollination Biological control	Lifecycle maintenance (esp. nursery services) Gene pool protection (conservation)	Aesthetic information Opportunities for recreation Inspiration for culture, art and design Spiritual experience Information for cognitive development

Recommendations:

1. The Territory Government should include consideration of unaccounted for ecosystem services as part of the Territory's Economic Summits Economic Framework, as well as the Coastal and Marine Management Strategy.
2. The Territory Government should commission a detailed valuation of the unaccounted for ecosystem services of the Territory coastal and marine environment.
3. This valuation should include ecosystem services from additional key habitats like estuaries and mangroves.

TABLE 2: ESTIMATED VALUE (PER ANNUM) OF UNACCOUNTED ECOSYSTEM SERVICES PROVIDED BY SOME OF THE TERRITORY'S COASTAL AND MARINE HABITATS.

Habitat	Area (ha) [4, 5, 7, 9, 10]	Estimated per hectare, per annum value of ecosystem services ($) [2]	Estimated per annum value of ecosystem services ($)
Seagrasses [4]	29,200	318	$9,285,600
Reefs [5]	62,700	258 [6]	$16,176,600
Mangroves [7]	374,600	48 [8]	$17,980,800
Estuaries [9]	1,286,700	48 [8]	$61,761,600
Coastal waters [10]	6,726,500	48	$322,872,000
Total			**$428,076,600**

[4] Seagrass meadows of Arnhem Land and Gulf of Carpentaria (2009) Department of Environment and Natural Resources. Available at- http://www.ntlis.nt.gov.au/metadata/export_data?type=html&metadata_id=7553EF80CEBC2D57E040CD9B214416DC

[5] Geoscience Australia (2006) GEODATA TOPO 250K Series 3. Bioregional Assessment Source Dataset. Available at- http://data.bioregionalassessments.gov.au/dataset/a0650f18-518a-4b99-a553-44f82f28bb5f.

[6] No figures provided in Eadie and Hoisington (2011) for non-coral reefs and the reef mapping used does not distinguish between coral and non-coral reefs.

[7] Mangroves of the Northern Territory, 1:100,000 (2002) Department of Environment and Natural Resources. Available at- http://www.ntlis.nt.gov.au/metadata/export_data?type=html&metadata_id=BA86AB6CD3EBA0EEE040CD9B214440E1

[8] No figures provided in Eadie and Hoisington (2011) so generic figure for coastal waters used. Actual figure is likely to be significantly higher.

[9] Based on 7 and Northern Territory Coastal Waterways Geomorphic Habitat Mapping. Version 2 (1:100 000 scale digital data). Available at- http://www.ga.gov.au/metadata-gateway/metadata/record/61876/

[10] Based on: Coastal Waters (State/Territory Powers) Act 1980 - Australian Maritime Boundaries 2014a - Geodatabase, Geoscience Australia. Available at http://www.ga.gov.au/metadata-gateway/metadata/record/gcat_83172

CHOICE MODELLING

The Northern Territory contains numerous coastal communities with strong connections to their marine environment. This is reflected in the Territory Government's policy on protecting the Territory's marine environment which states:

> *"The Territory's coasts are unique, natural and culturally significant. They are an important part of our identity, and way of life."*

Popularity of the marine reserves established in 2012 in adjacent federal waters highlights the significance of Territorians' connection with, and desire to protect the unique Top End coastal and marine environment. Of the more than 10,000 submissions to the public consultation process for the North Marine Reserve Network, over 99% of submissions called for more protection of Territory marine life.[11]

Surveys assessing a community's willingness to pay for some future environmental change are one method for measuring non-market economic and social benefits to communities. [12] This method is called choice modelling.

In a recent choice modelling study, McCartney (2009) [13] estimates an average willingness to pay $140 per annum for a modest set of environmental outcomes for the Ningaloo Marine Park. No equivalent modelling exercise exists for the Territory. If the results from Ningaloo in Western Australia are used as a lower bound and extended to the Territory, then the community valuation of the social benefit of protecting the Territory's marine environment is upwards of $34 million per annum. [14] This is the projected value to a current population of 245,000 [15] Territorians. It does not include the potential value to Australians living outside the Territory, which could be significantly larger.

Key finding:

- Territorians are likely to place a high value on initiatives that result in improvements in the health of the Territory's marine environment. This value is likely to be more than $34 million per annum.

[11] Commonwealth of Australia, 2012. *Marine Bioregional Planning in the North-west marine region: Overview of Public Consultation (August-November 2011),* Department of Sustainability, Environment, Water, Population and Communities, Commonwealth Government, Canberra, Australia.

[12] Borger, T., Hattam, C., Burdon, D., Atkins, J.P., and Austen, M.C., 2014. Valuing conservation benefits of an offshore marine protected area, *Ecological Economics,* Vol. 108: 229-241.

[13] McCartney, A., 2009. *The Policy Relevance of Choice Modelling: An Application to the Ningaloo and Proposed Capes Marine Parks.* Research Paper, School of Agricultural and Resource Economics, University of Western Australia. Not seen. Referenced in: The Allen Consulting Group, 2009. *The economics of marine protected areas,* The Allen Consulting Group, Melbourne, Victoria.

[14] The Allen Consulting Group, 2009. *The economics of marine protected areas,* The Allen Consulting Group, Melbourne, Victoria.

[15] http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0

Recommendations:

4. As part of the Territory's Economic Summits and Coastal and Marine Management Strategy, the Territory Government should undertake choice modelling to identify the value that Territorians, other Australians, and international tourists place on initiatives to improve the health of the Territory's coastal and marine environment.

APPENDIX A: ABOUT THE AUTHORS

CENTRE FOR CONSERVATION GEOGRAPHY

The Centre for Conservation Geography is a research group established in June 2011 to provide expert technical support and advice to government and non-government decision-makers and stakeholders.

The centre applies world's best practice in decision support to biodiversity conservation planning. Based in Australia, our goal is to build a multi-disciplinary team capable of providing support to conservation decisions being made across the world's ecoregions.

The Centre for Conservation Geography currently has projects in Australia and in the Southern Ocean. Our areas of expertise are in marine and terrestrial protected area planning, including protected area performance assessment, cost-efficient conservation priority setting and planning for multiple objectives (e.g. carbon sequestration and biodiversity protection).

http://www.conservationgeography.org/

BRIEF BIOGRAPHIES:

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Daniel is the director of the Centre for Conservation Geography, a visiting scholar at San Francisco State University's Marine & Coastal Conservation and Spatial Planning Lab, and an adjunct research fellow at the Centre for Biodiversity and Conservation Science at the University of Queensland.

He has over 15 years of experience in the theory and practice of systematic conservation planning both on land and in the ocean, and has been engaged in planning for marine protected areas and marine sanctuaries in Australia since 2004.

THOMAS KEILY

Thomas Keily graduated with first-class honours and a university medal in economics from the University of Queensland in 2000 and spent 6 years working at the Reserve Bank of Australia. Since then, Tom has consulted to a range of industries, including the public sector, transport and real estate, specialising in market analysis, economic modelling and forecasting.

JOEL TURNER

Joel completed a Bachelor of Science (environmental) with honours in 2006 and a Masters in Conservation Biology in 2013 and has been engaged in research with the Centre for Conservation Geography since 2008. In that time his major areas of research have been the review and analysis of Australia's National Representative System of Marine Protected Areas (NRSMPA) and the classification of benthic marine environments in the Southern Ocean.

KATE FRITZ

Kate Fritz is a writer and communications professional whose work focuses on the intersection of the environment and social change. Kate holds a BA degree in Chinese and Environmental Policy from The Gallatin School at New York University. She lived in Kunming, China from 2009 to 2011, where she studied land rights policy affecting nomadic people in China's first national park. She is a recipient of the Morris K Udall award for environmental leadership granted by the US congress.

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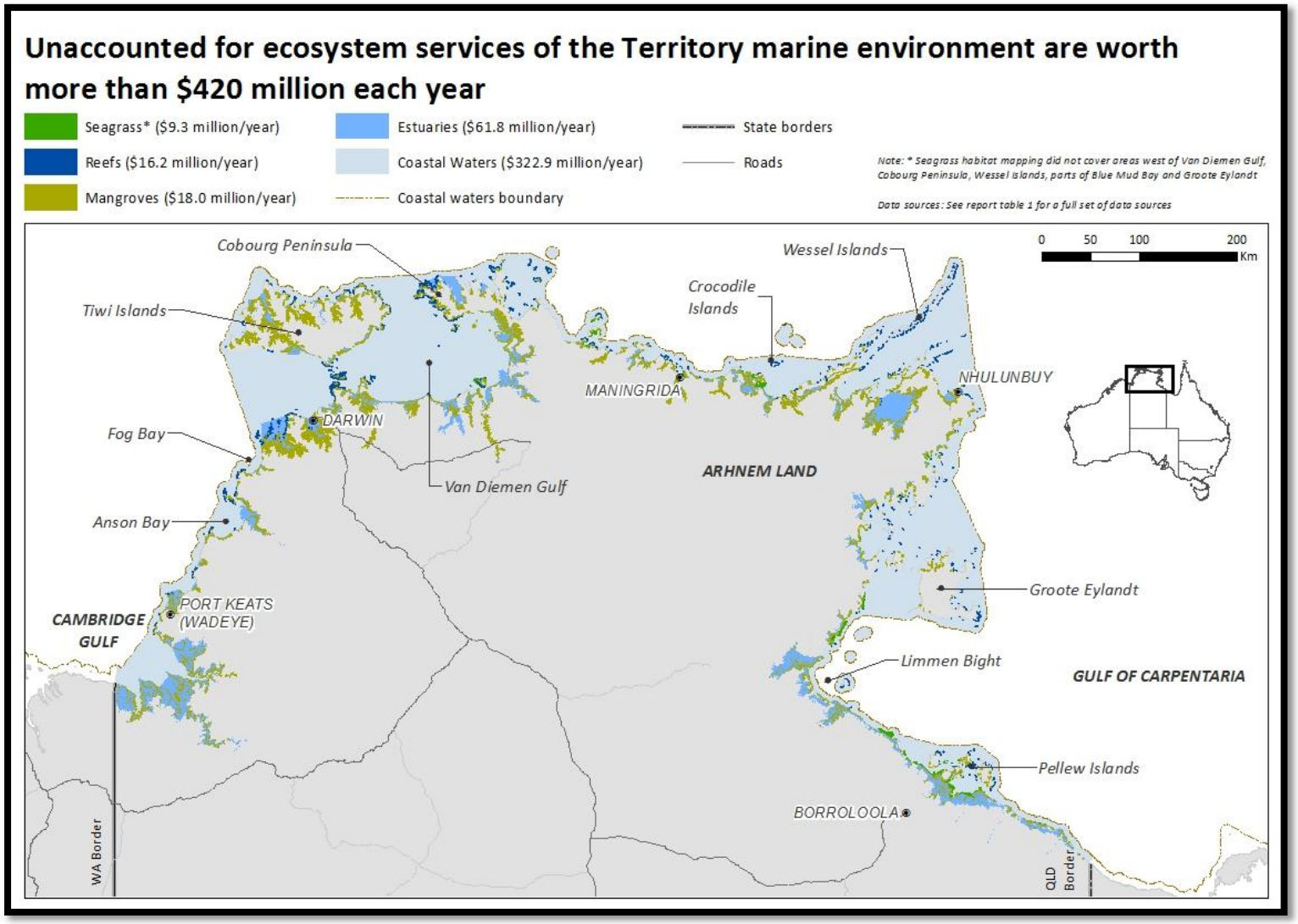

FIGURE 1: LOCATION AND VALUE OF UNACCOUNTED FOR ECOSYSTEM SERVICES OF THE TERRITORY COASTAL AND MARINE ENVIRONMENT.