National Environmental Research Program

TROPICAL ECOSYSTEMS hub

Milestone Report

Project 11.1 – Building resilient communities for Torres Strait futures

Preliminary identification and valuation of ecosystem goods and services underpinning Torres Strait livelihoods

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Australian Government
Department of Sustainability, Environment, Water, Population and Communities

Reef & Rainforest RESEARCH CENTRE

NERP Tropical Ecosystems Hub Project 11.1
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1. Description of method

Determining the impact on Torres Strait communities from future changes to ecosystems requires an understanding of the natural resource base that underpins their livelihoods. To do this, we estimate the relative importance of ecosystem goods and services (EGS) to local livelihoods, which in turn is a function of the relative 'Production' of those EGS (amount in volume or weight), and their relative value to human well-being. Applying the Millennium Ecosystem Assessment's (2005) framework and definitions for EGS, our approach is focused on 'provisioning' and 'cultural' EGS, which have a direct link to local livelihoods. At this stage of the analysis we do not consider 'regulating' or 'supporting' EGS, which are the ecosystem processes that generate provisioning and cultural EGS. During the participatory scenario planning workshops we also combine the value of EGS by asking participants to score each according to the Millennium Ecosystem Assessment's (2005) indicators of human well-being: income, food security, health and social cohesion.

This report considers only the Production of EGS to each of the 14 Torres Strait Protected Zone communities (plus Hammond Island). These were quantified through ranking on a scale of 0 (does not exist) to 5 (largest quantity or volume) with the input of TSRA Land & Sea Management Unit officers with experience of the Torres Strait region's communities: Vic McGrath and Frank Loban. This is a preliminary estimate of the EGS that underpin community livelihoods, and also provides the basis for determining community "typologies" (i.e. communities that have a similar natural resource base). This in turn will help inform the selection of community case studies as being representative of the full range of community types, and potentially reduce the complexity of analysis and interpretation of future impacts.

Using information from the literature on Torres Strait Island communities' livelihoods, plus the TSRA expert knowledge, we formulated a list of 27 significant EGS and the habitat types from they are generated. These were then ranked for each community by the TSRA team. This information was then used to produce an overall average EGS Production ranking for all communities, and for determining community typologies in terms of their EGS resource base.

Note that this analysis is focused on the Production rankings alone, and only presents a preliminary list and results. The full set of EGS Production values will be re-assessed at the regional scenario planning workshop in October 2012, and also during each community case study workshop.

2. Results

2.1 Overall Torres Strait EGS Production rankings

The overall average Production ranking for all 14 Torres Strait Protected Zone communities (plus Hammond Island) is shown in Figure 1. Coastal, pelagic and reef associated finfish, and green turtles have the greatest EGS Production values. Apart from fresh (surface) water, the top 9 ranked EGS were marine resources, highlighting the strong connection between Torres Strait communities and their "sea country".

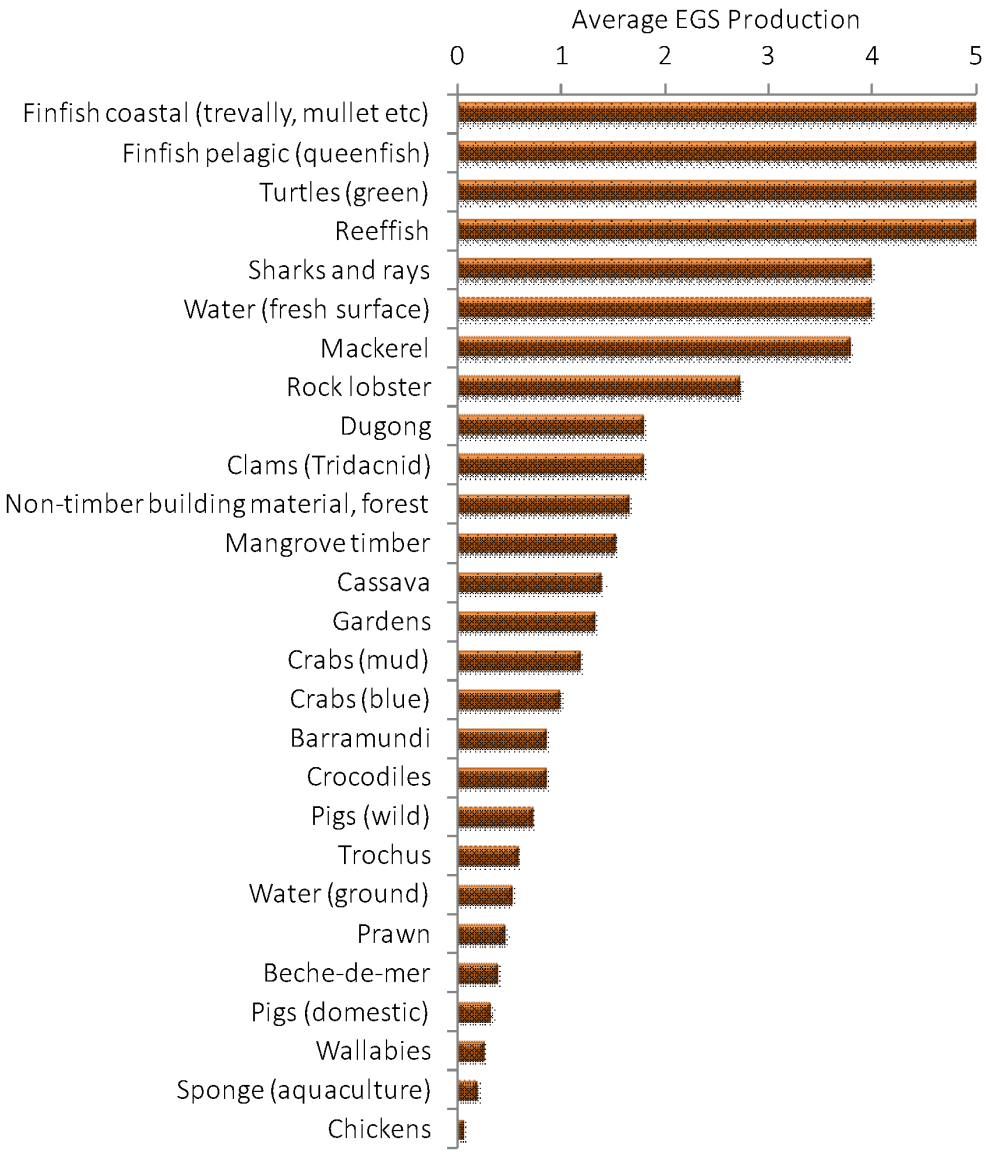

Figure 1. The overall average Production ranking for all 14 Torres Strait Protected Zone communities (plus Hammond Island)

2.2 Typology of communities by EGS Production rankings

The six top-ranked Torres Strait EGS (Figure 1) had the same ranking across all Torres Strait communities. However, all other EGS listed varied across communities (Figure 2), with estuarine EGS in particular varying greatly across Torres Strait. This is understandable, given the wide variation in the occurrence of estuarine (transition and mangrove) habitats between the islands.

Clustering of EGS Production values produced four community types at a distance metric of approximately 1 (Figure 3). These were:

1. A group mostly made up of eastern and central islands (excluding Erub), and strongly separated from the remaining Torres Strait communities due to a relatively high production of Reef EGS (Figure 2, Figure 4), and low Production of Estuarine EGS;
2. A group consisting of Badu and Hammond Island only, characterised by high production of all EGS, and relatively low for reef associated EGS;
3. A group consisting of Boigu and Saibai, with high estuarine and marine EGS production, but low for most others;
4. A large (and diverse) group of six widespread islands with medium production values for all EGS.

These groupings were reasonably similar to conventional Island groupings (Table 1), but with some interesting differences: Eastern and Central Islands mixed in Cluster 1, Erub and Yam clustered with Western communities, and Badu clustered with Hammond Island (Figure 5).

Table 1. Conventional Island groupings for Torres Strait communities

Island Group	Communities
Eastern Islands:	Mer, Erub and Ugar
Top Western:	Biogu, Siabai, Dauan
Western:	Badu, Mabuiag, St Pauls, Kubin
Central Islands:	Iama (Yam Island), Poruma, Warraber and Masig (Yorke Island)

3. Next steps

The current typology and resulting implications will be refined by counseling further expert opinion, and during the participatory workshops. The Asset-interaction Impact model, which will simulate the potential effects of future climate and human pressures on ecosystems and EGS (Skewes et al. 2011) is being designed to analyse the current EGS list. However, it will be possible to integrate any changes from ongoing expert refinement and the forthcoming workshop processes.

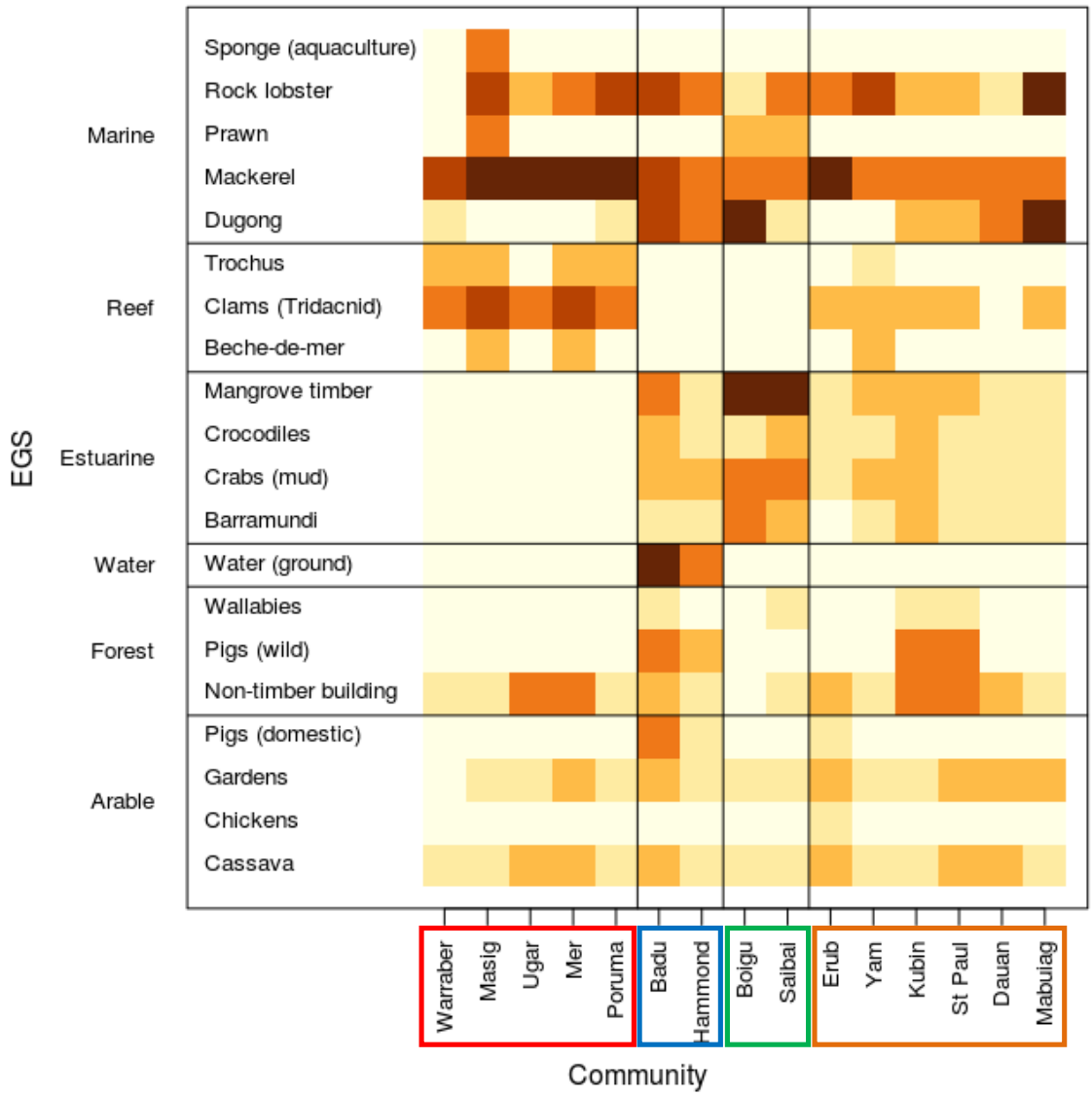

Figure 2. EGS production ranks (white = 0, dark brown = 5) for 14 Torres Strait Protected Zone communities (plus Hammond Island). Note: only those EGS that showed variation between communities are included. For the full list, see Figure 1. Community groupings from the cluster analysis are shown as coloured boxes.

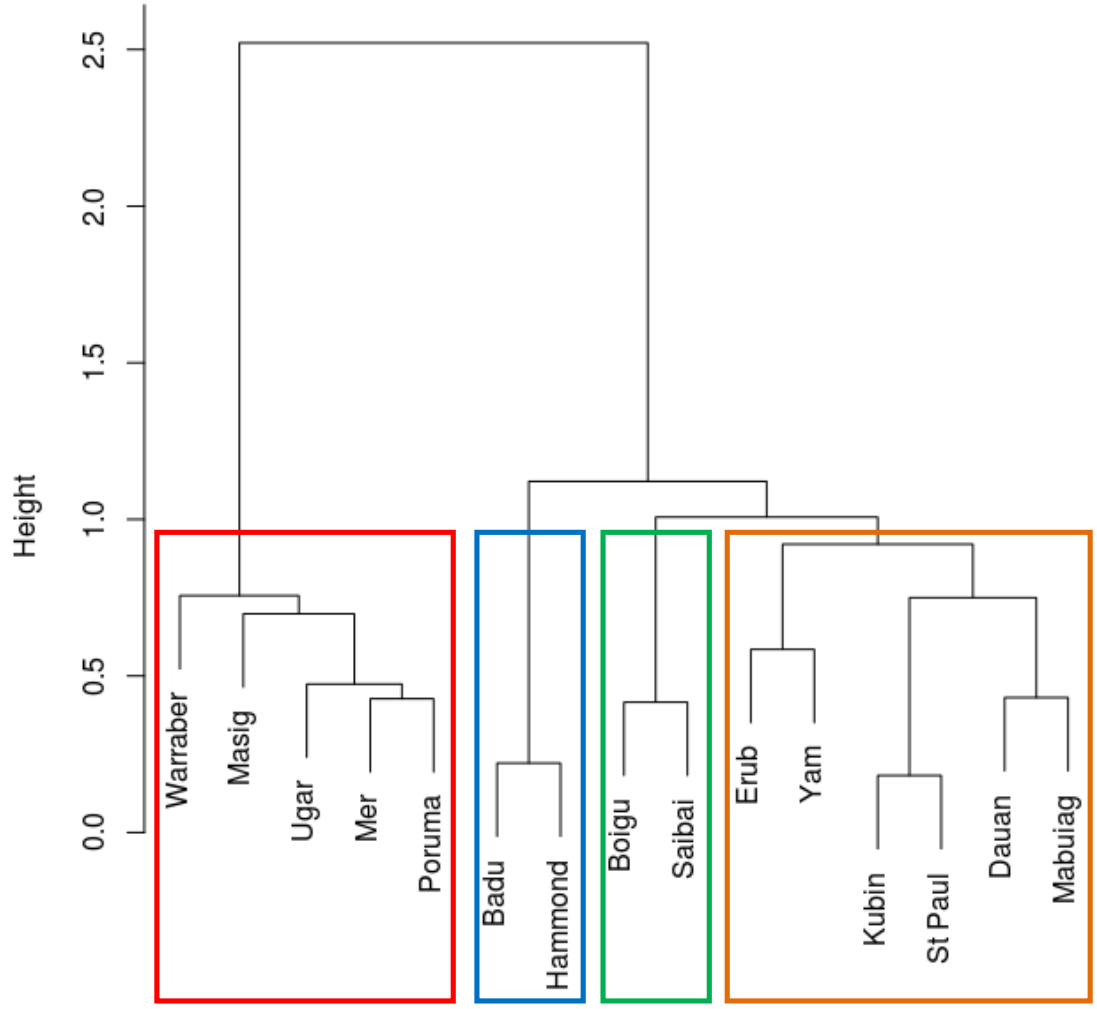

Figure 3. Cluster dendrogram of 14 Torres Strait Protected Zone communities (plus Hammond Island) based on EGS production scores

	Cluster			
Habitat	1	2	3	4
Agricultural	0.60	1.25	0.50	0.88
Estuarine	1.00	2.08	3.00	1.83
Forest	0.60	1.50	0.33	1.11
Marine	2.71	2.93	2.86	2.60
Reef	2.96	1.80	1.80	2.23
Water	2.00	4.00	2.00	2.00

Figure 4. Average EGS Production scores for each Habitat. The dark brown in each habitat represents the cluster in which it had the highest average score, and the white the lowest average score

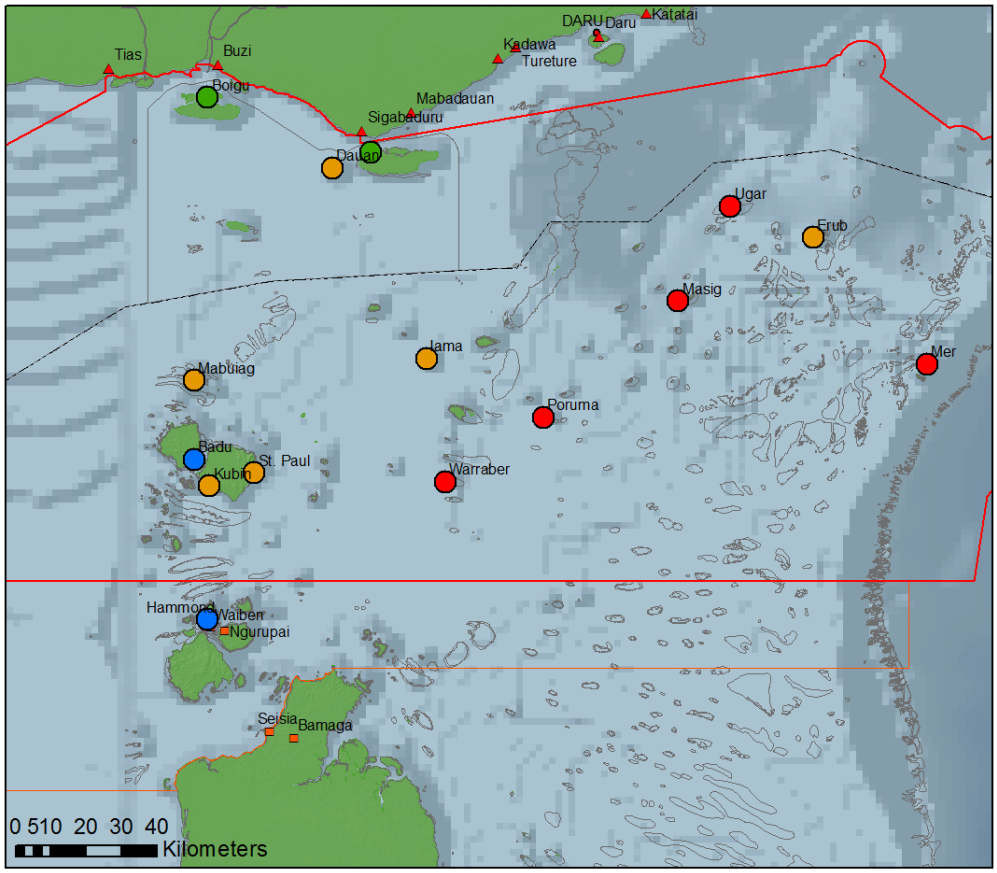

Figure 5. Typology of the 14 Torres Strait Protected Zone communities (plus Hammond Island) based on EGS production scores. See Figure 3 and 4 for typology characteristics

References

Millennium Ecosystem Assessment 2005. Ecosystems and Well-being: A Framework for Assessment. Island Press, Washington D.C.

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