

# **Project 1.1.3 ext a. Condition trend and risk in coastal habitats: Seagrass Indicators, distribution and thresholds of potential concern. Intertidal Seagrass Monitoring – Reef Rescue Marine Monitoring Program**

## **REPRODUCTIVE HEALTH 2008/2009**

*For the 2008/09 Reef Rescue Marine Monitoring Program*

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*Project 1.1.3 Condition trend and risk in coastal habitats: Seagrass Indicators, distribution and thresholds of potential concern.*

### **Summary**

The reproductive health of seagrasses across the Reef Rescue Marine Monitoring Program sites is predominantly variable although some sites are categorized as being in ‘good’ health indicating a resilience to change. Three sites are categorized as in poor reproductive health. These sites, Green Island, Luggar Bay and Urangan, should all be assessed for the cause of their ongoing inability to produce seeds and evaluate if this indicates system decline.

### **Background**

The Reef Rescue Marine Monitoring Program incorporates assessment of reproductive health of seagrasses as an indication of the resilience of seagrasses to recover from the loss of an area of seagrass through the recruitment of new plants. Simply put, without evidence for the production of seeds the capacity of a seagrass meadow to recover will be impacted. As it is well recognized that coastal seagrasses are prone to small scale disturbances that cause local losses and then recover in relatively short periods of time, the need for a local seed source is considerable.

This report is intended as an attachment to the more comprehensive report on the condition and trends in coastal seagrasses of the Great Barrier Reef and was unable to be submitted with that report due to external factors.

### **Protocols**

Samples were collected during monitoring activities for the seagrass monitoring component of the Reef Rescue Marine Monitoring Program across all sites (Table 1). Samples were processed according to standard methodologies. In the field, 15 haphazardly placed cores of seagrass were collected from an area adjacent, of similar cover and species composition, to each Seagrass-Watch monitoring site.

In the laboratory, reproductive structures (spathes, fruit, female flower or male flowers) of plants from each core were identified and counted for each samples and species. If *Halodule uninervis* seeds (brown green colour) were still attached to the rhizome, they were counted as fruits. Seed estimates are not recorded for *Halophila ovalis* due to time constraints (if time is available post this

first pass of the samples, fruits will be dissected and seeds counted). For *Zostera capricorni*, the number of spathes are recorded, male and female flowers and seeds will be counted during dissection if there is time after this initial pass of the samples. Apical meristems were not recorded as they were too damaged by the collection process to be able to be identified correctly. All flowers and spathes and fruits /fruiting bodies were kept and re-frozen in the site bags for revalidation if required (see QA/QC Manual).

Reproductive effort was calculated as the number of reproductive structures per node (leaf cluster emerging from the rhizome) as each of the three species examined (*Halophila ovalis*, *Halodule uninervis* and *Zostera capricorni*) have different reproductive structures. For comparative purposes only the presence of a reproductive structure per node was counted rather than the relative number of flowers, fruits or seeds. The number of nodes counted reflects the number of shoots found in the core. Thus cores with larger numbers of nodes contained more shoots. The average number of reproductive structures per node reflects the per unit area occurrence of reproductive output and this is the reproductive effort (i.e. average number of flowers, seeds or fruits per core).

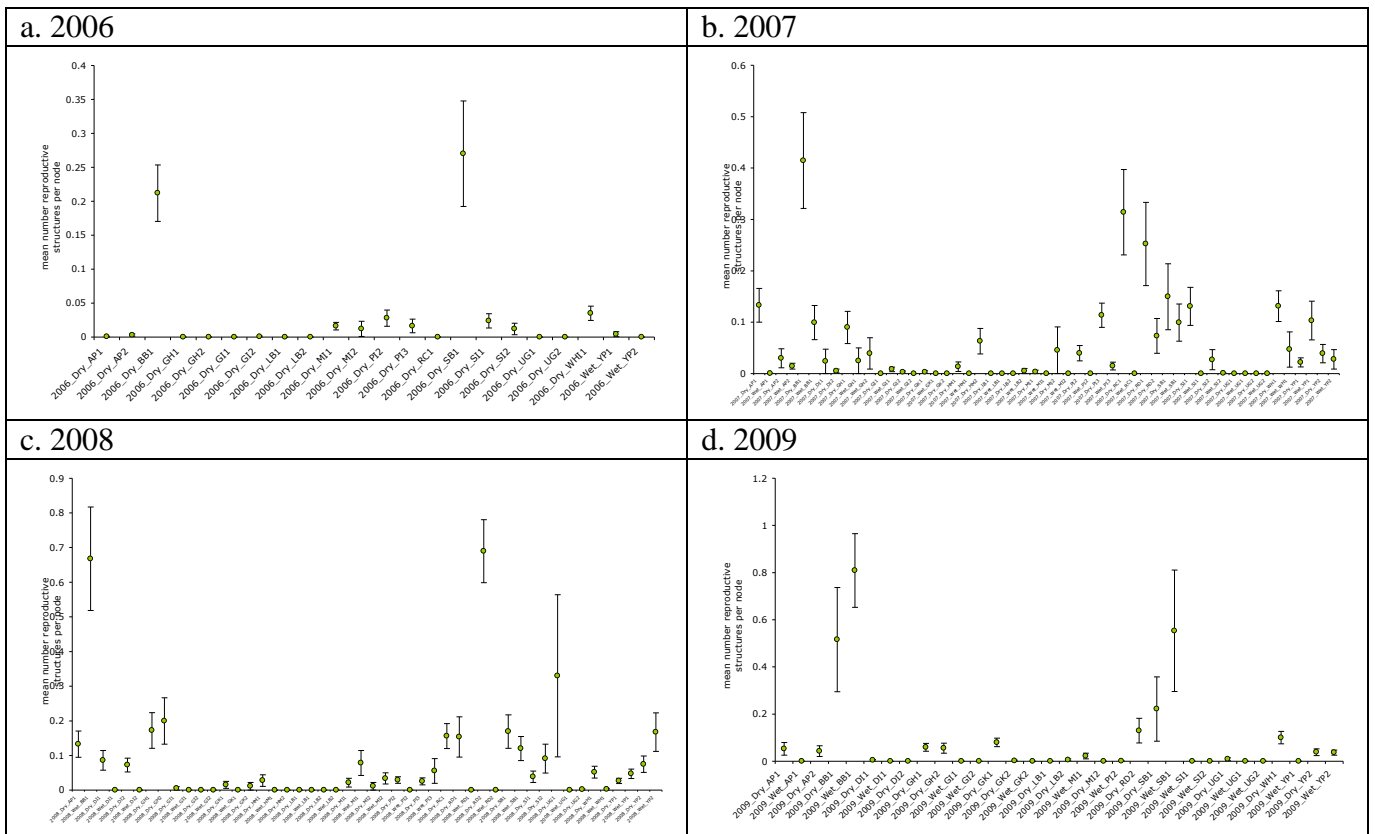
[Note: detailed documentation of methods was provided to GBRMPA in a separate report in October 2005: *Water Quality and Ecosystem Monitoring Programs - Reef Water Quality Protection Plan: Methods and Quality Assurance/Quality Control Procedures.*]

Table 1. Sites surveyed for reproductive health 2006-2009 for the Reef Rescue Marine Monitoring Program.

GBR region	NRM Board	Catchment	Seagrass monitoring location	Site Code/s	Habitat type	<i>H. ovalis</i>	<i>H. uninervis</i>	<i>Z. capricorni</i>
Far Northern	Cape York	Endeavour	Cooktown	AP	<i>Reef</i>	■	■	
Northern	Terrain (Wet Tropics)	Daintree	NA					
		Russell / Mulgrave Johnstone	Green Island	GI	<i>Reef</i>	■	■	
			Yule Point	YP	<i>Coast</i>	■	■	■*
		Tully	Lugger Bay	LB	<i>Coast</i>	■*	■	
			Dunk Island	DI	<i>Reef</i>	■*	■	
Central	Burdekin Dry Tropics	Herbert	NA					
		Burdekin	Magnetic Island	MI	<i>Reef</i>	■	■	■ <sup>+</sup>
			Townsville	BB, SB	<i>Coast</i>	■	■	
	Mackay Whitsunday	Proserpine	Whitsundays	PI	<i>Coast</i>	■	■	■
			Whitsunday Islands	HM	<i>Reef</i>	■	■	■
		Pioneer	Mackay	SI	<i>Estuary</i>	■		■
Southern	Fitzroy	Fitzroy	Shoalwater Bay	RC, WH	<i>Coast</i>	■*	■*	■
			Keppel Islands	GK	<i>Reef</i>	■	■	
		Boyne	Gladstone	GH	<i>Estuary</i>	■	■*	■
	Burnett Mary	Burnett	Rodds Bay	RD	<i>Estuary</i>			■
		Mary	Hervey Bay	UG	<i>Estuary</i>	■*		■

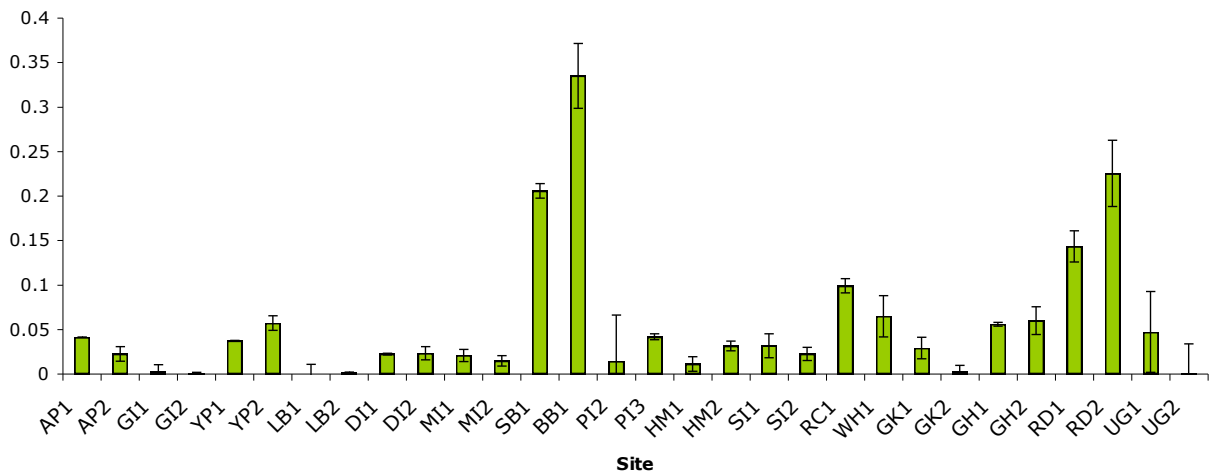
## Outcomes

- Over the entire period of the currently available data all sites showed some evidence of reproductive effort (Figure 1, 2). However, the sites at Green Island (Cairns), Lugger Bay (Tully River/Mission Beach) and Urangan (Mary River/Hervey Bay) showed virtually no production of reproductive structures across the entire sampling period.
- A continued absence of flowering and fruiting in these sites will result in poor capacity to recover from disturbance. Inter-annual differences in sexual reproduction are evident (Figure 1). These differences principally relate to the decline of meadows (see Seagrass status report 2008/2009).
- The status of the sites listed in poor reproductive health, where little evidence of seed set over the entire monitoring period has been seen, is such that careful attention should be paid as to the cause of their failure to sexually reproduce.



**Figure 1.** Reproductive effort for seagrass sites sampled in the Reef Rescue Marine Monitoring Program 2006–2009. Points are plotted as the mean number of reproductive structures per node and errors are the standard error across all cores sampled. Note sites listed alphabetically by site code.

**2006–2009 overall reproductive health**



**Figure 2.** Overall reproductive effort for seagrass sites sampled in the Reef Rescue Marine Monitoring Program across the period 2006–2009. The data represents the mean number of reproductive structures per node across all years and seasons and errors are the standard error across all cores sampled. Note sites listed north-south following Table 1.

**Table 2.** Current reproductive health status considered over the period 2006–2009 of the sites surveyed for reproductive health 2006-2009 for the Reef Rescue Marine Monitoring Program:  
■ = poor, ■ = variable, ■ = good.

GBR region	NRM Board	Catchment	Seagrass monitoring location	Site Code/s	Habitat type	Status
Far Northern	Cape York	Endeavour	Cooktown	AP	<i>Reef</i>	
Northern	Terrain (Wet Tropics)	Daintree	NA			
		Russell / Mulgrave Johnstone	Green Island	GI	<i>Reef</i>	
			Yule Point	YP	<i>Coast</i>	
		Tully	Lugger Bay	LB	<i>Coast</i>	
			Dunk Island	DI	<i>Reef</i>	
Central	Burdekin Dry Tropics	Herbert	NA			
		Burdekin	Magnetic Island	MI	<i>Reef</i>	
			Townsville	BB, SB	<i>Coast</i>	
	Mackay Whitsunday	Proserpine	Whitsundays	PI	<i>Coast</i>	
			Whitsunday Islands	HM	<i>Reef</i>	
		Pioneer	Mackay	SI	<i>Estuary</i>	
Southern	Fitzroy	Fitzroy	Shoalwater Bay	RC, WH	<i>Coast</i>	
			Keppel Islands	GK	<i>Reef</i>	
		Boyne	Gladstone	GH	<i>Estuary</i>	
	Burnett Mary	Burnett	Rodds Bay	RD	<i>Estuary</i>	
		Mary	Hervey Bay	UG	<i>Estuary</i>	