Reef Check Australia – GBR Project Report

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The Australian Great Barrier Reef (GBR) is one of the most important natural assets on Earth. Covering 350 000 km^2 and containing approximately 2,900 reefs this extensive reef ecosystem extends more than 2,300 km along the Queensland coast. The GBR Marine Park is managed by the Great Barrier Reef Marine Park Authority (GBRMPA). The park is a multiple use area. Most reasonable activities such as tourism, fishing, boating, diving and research are permitted to occur but are controlled using a spectrum of zones ranging from General Use Zones to Preservation Zones.

Although Australia's coral reefs remain in general good condition and impacts are minimal, there is rising concern about the increasing threats from land run-off, nutrient pollution (*Bartley R. et al, 2005; Brodie J. E., 2005)*, climate change (*Johnson J. et al, 2005; Marshall P. and Williams S., 2005*) and increasing pressure from fishing *(Mapstone B. et al, 2004*). Other major stresses are 'natural' disturbance events, such as cyclones, floods, and crown-of-thorns starfish (COTS) outbreaks. Whilst COTS outbreaks are likely to be a natural phenomenon there remains some uncertainty over the possible role of certain human activities that may affect both the frequency and intensity of outbreaks. Overfishing of the starfish's natural predators (humphead wrasse and triton shell) and possibly increased food supplies for COTS larvae due to higher nutrient levels in coastal waters have been suggested as possible links between human activities and these outbreaks we see (CRC Reef, 2004, Brodie et al 2005).

Australia's coral reefs are among the best managed in the world, and have had world-class coral reef monitoring programs in place through the Australian Institute of Marine Science (AIMS) since the 1980s. Monitoring programs on the GBR include:

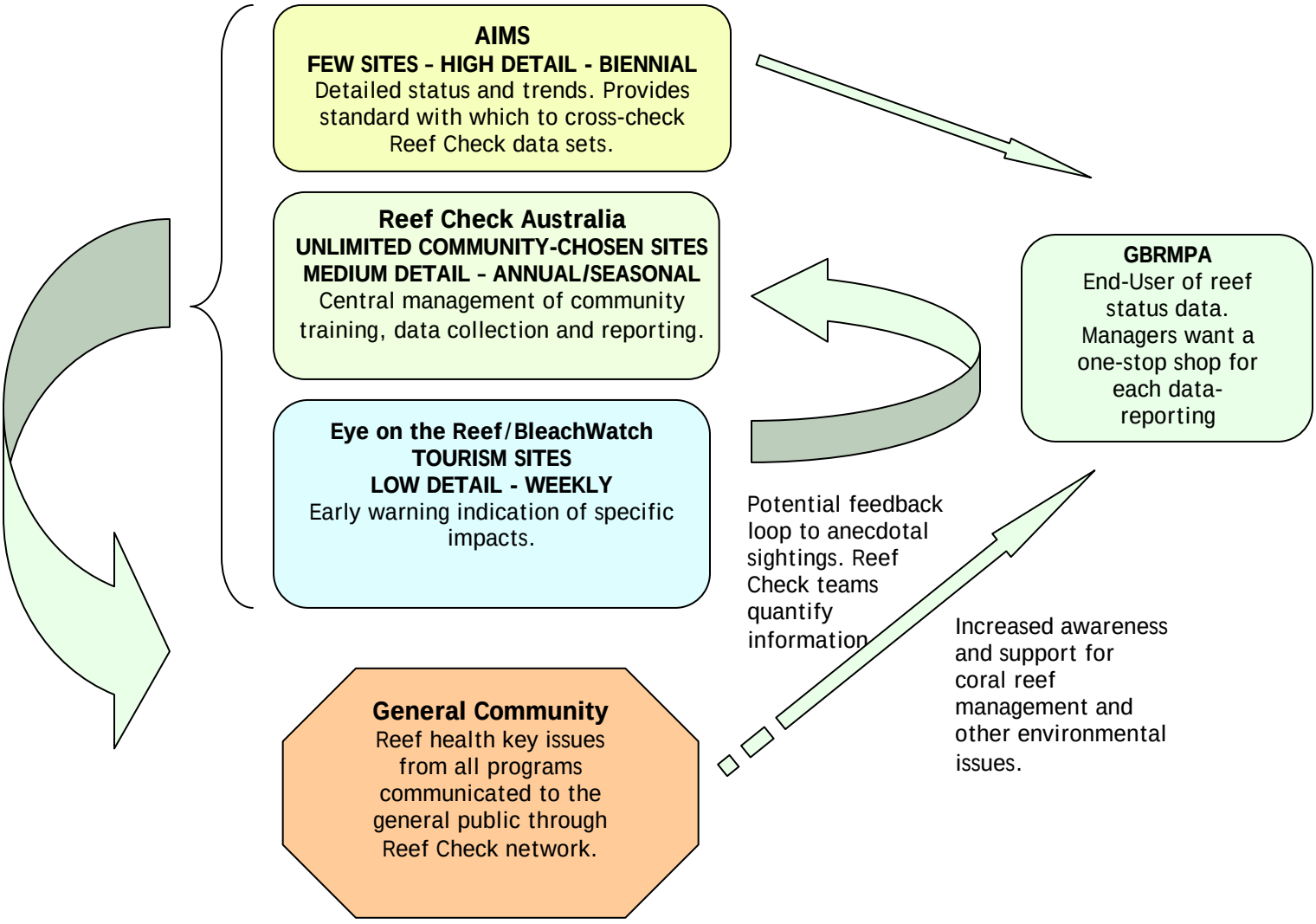
1. Broadscale monitoring of 150 sites by manta tow for estimations of crown-of-thorns outbreaks and coral cover.
2. Detailed status and trends of 47 reef sites and 27 inshore reef sites..
4. Weekly anecdotal sightings of iconic or protected species (e.g. humphead wrasse or whales) of reef health indicators (e.g. coral bleaching or coral disease) and other emerging issues at 25 dive sites in the Cairns and Port Douglas region by dive staff. This information provides a qualitative seasonal insight into patterns of abundance of key species and impacts.
5. Weekly reports of bleaching status during the summer – mostly by tour operators.

These monitoring programs are run by government organisations and are designed to serve management needs but do not engage community members nor effectively communicate the results of monitoring to Australia's general public. The need for community engagement has been identified as important and Reef Check Australia has formed a partnership with the GBRMPA whereby Reef Check data is fed into the management of the GBR and Reef Check promote key management messages through its network.

Impacts on the GBR are more subtle than in other countries with higher populations and increased coastal and marine resource use. Therefore, Australia's Reef Check data needs to be of a high and known quality in order to pick up more subtle status and trends for indicators that are of interest to the GBRMPA and other data user groups. Reef Check Australia responded by developing a volunteer training and survey program which has been "upgraded" to detect finer scale trends in hard coral cover, digital images of algae in order to permanently record the types of species which may occasionally bloom and digital images of other impacts such as

disease which can be cross-checked by researchers. National standardisation in training and testing also provides the government with a measure and assurance of the quality of Reef Check Australia data.

Reef Check Australia works by providing the GBRMPA with a cost effective quantitative report of coral reef health from both dive sites as well as other reef sites of community interest that are mostly not monitored by other government programs. Those sites that are monitored by multiple programs provide opportunities to cross-check data. Figure 1 outlines the way Reef Check works with GBRMPA.



Reef Check data has been collected at a small number of sites at Osprey Reef in the Coral Sea since 1997 by Undersea Explorer, whose vision it was to facilitate the expansion of Reef Check through the GBR. During 2001 Undersea Explorer and later the Low Isles Preservation Society provided seed support for the program to be expanded to partner with other dive operators. Since 2001, 220 surveys at over 60 sites have been monitored on the GBR and at Osprey Reef in the Coral Sea by Reef Check volunteers. For the purpose of this report we have selected a few of our long-term monitoring sites. These sites include inshore fringing reefs, mid and outer reefs of the GBR system, which are managed by the GBRMPA, and sites at Osprey Reef in the Coral Sea, which are currently not under a management scheme (See Figure 2). Importantly the only data available on reef health for Osprey is that collected by Reef Check Australia - supported and initially driven by Undersea Explorer.

The GBR Marine Park is a multiple use area with a zoning plan defining what activities can occur in which locations, both to protect the marine environment and to separate potentially conflicting activities. The Reef Check long-term monitoring sites selected for this report are in the following zones:

- **The Marine National Park (green) Zone** is a "no-take" area and extractive activities like fishing or collecting are not allowed.
- **The Conservation Park (yellow) Zone** allows most extractive activities.
- **The Habitat Protection (dark blue) Zone** protects and manages sensitive habitats from potentially damaging habitats (ie. trawling is not allowed).

Theses sites have also been grouped into specific headings depending on their natural and human impact rating (see Table 1.):

1. **The Ribbon reefs,** which include dive sites called Tracy's Wonderland, Clam Beds and Challenger Bay are far from human activity.

2. **Cairns reefs** which include Saxon and Hastings Reefs. These reefs are near to cane farming and coastal development, and have a high number of divers visiting them.

3. Keeper and John Brewer Reefs off Townsville are post **COTS outbreak reefs**.

4. **Inshore fringing reefs** include Low Isles in the Cairns region, Nelly Bay in the Townsville region and Blue Pearl Bay in the Airlie region. These reefs are subject to high silt levels.

5. **Osprey Reef** which includes North Horn and Admiralty Anchor. These reefs are not located in the GBRMPA. They are located 330 km from shore and receive low diving pressure.

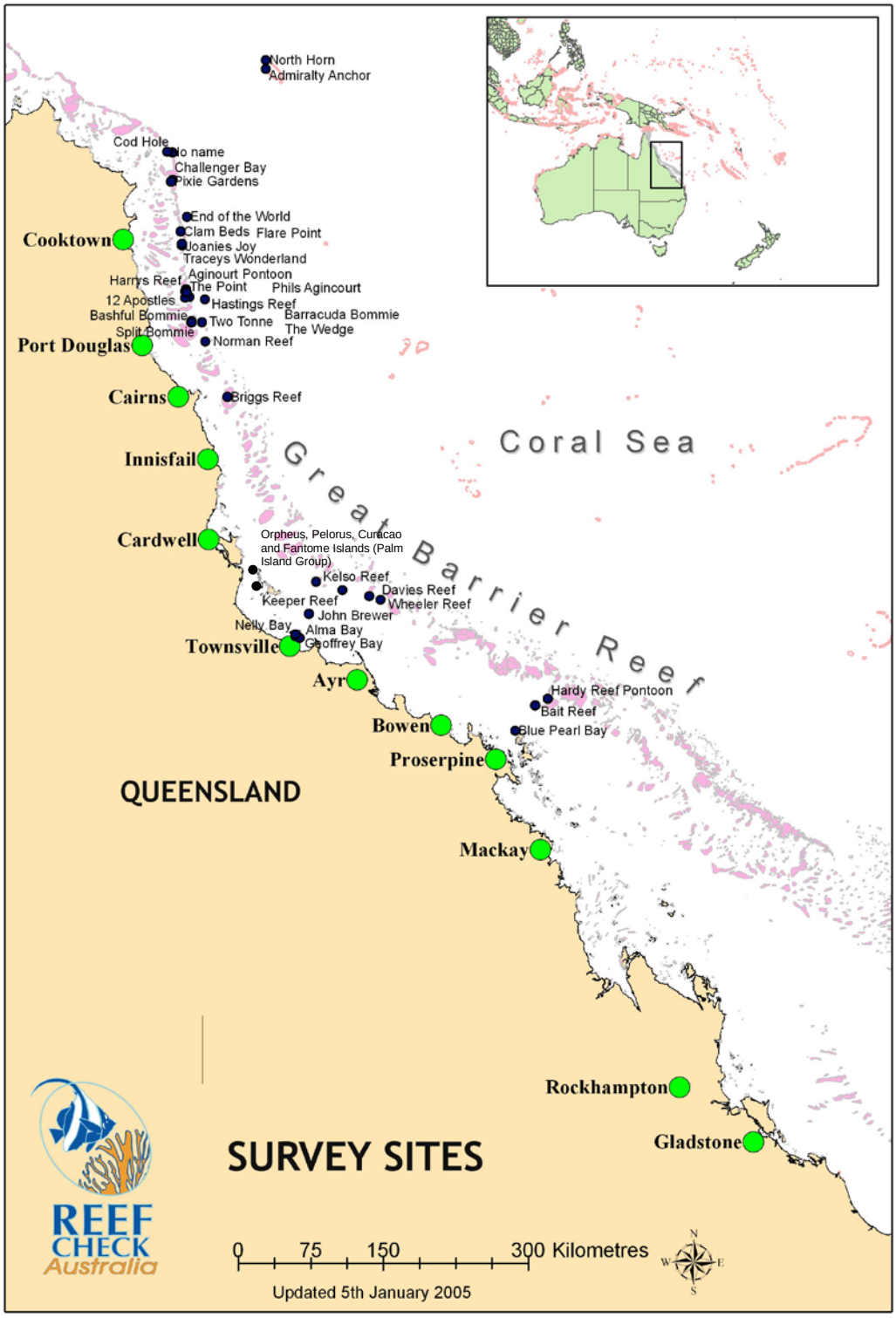


Figure 2. Map to show location of Reef Check Australia long-term monitoring sites.

Table 1: Table to show Reef Check Australia long-term monitoring sites on the Great Barrier Reef and at Osprey Reef in the Coral Sea. Natural and human impact ratings collected from Reef Check site description forms. For diver impact rating, Low = 1-5 individuals per day, Medium = 6-20 individuals per day and High = more than 20 individuals per day.

Site name	Location	Type of reef	Years monitored	Natural and human impact rating from Site Description Survey	% HC 2006 or 07	% NIA 2006 or 07	% SI 2006 or 07 (visibility)
Challenger Bay	Ribbon Reef 10	Back Reef on outer barrier reef	2002, 2003, 2004, 2005 & 2006	▪ Low anthropogenic impact; ▪ Low water quality pollution; ▪ Medium diving impact; ▪ 110-190 km from population centre; ▪ Green Zone; ▪ Sheltered reef site.	63.8	4.4	0 (15m)
Tracy's Wonderland	Ribbon Reef 3	Back Reef on outer barrier reef	2003, 2004, 2005, 2006		50	1.3	0.6 (20m)
Clam Beds	Ribbon Reef 5	Back Reef on outer barrier reef	2002, 2003, 2004, 2005, 2006		44.4	1.9	0 (20m)
Saxon Reef	Cairns	Back Reef on outer barrier reef	2002, 2003, 2004 & 2005	▪ Medium to high anthropogenic impact; ▪ High water quality pollution; ▪ High diving impact; ▪ 45-50 km from population centre; ▪ Green zone; ▪ Sometimes sheltered.	35	1.3	8.8 (10-15m)
Hastings Reef	Cairns	Back Reef on outer barrier reef	2003 & 2006		21.9	8.1	14.4 (10-15m)
John Brewer Reef	Townsville	Back reef on mid-shelf reef	2004, 2005 & 2006	▪ Low anthropogenic impact; ▪ Moderate water quality pollution; ▪ Low to medium diving impact; ▪ 40 km from population centre; ▪ Yellow (JB), Blue zone (Keeper); ▪ Sometimes sheltered; ▪ Crown of Thorns Starfish Outbreak.	3.1	11.9	0 (10-15m)
Keeper Reef	Townsville	Back reef on mid-shelf reef	2003, 2004 & 2006		0.6	25.6	0 (10-15m)
Wheeler Reef	Townsville	Back reef on mid-shelf reef	2003, 2004, 2005, 2006 & 2007	▪ Low anthropogenic impact; ▪ Low water quality pollution; ▪ Medium diving impact; ▪ 90 km from population centre; ▪ Green zone; ▪ Sometimes sheltered.	66.3	3.1	0 (10-15m)
Nelly Bay	Magnetic Island	Inshore fringing reef	2003, 2005, 2006 & 2007	▪ Low anthropogenic impact; ▪ High silt loads from coastal development and boat traffic. ▪ Low water quality pollution; ▪ Medium to high diving impact; ▪ Green (LI and BPB), Blue zone (Nelly) ▪ Always sheltered.	74.4	8.1	5.6 (<5m)
Low Isles	Port Douglas	Inshore fringing reef	2002, 2004, 2005 & 2006		23.1	1.9	3.1 (<5m)
Blue Pearl Bay	Airlie	Inshore fringing reef	2001, 2003, 2005 & 2006		77.5	0	1.9 (5m)

Admiralty Anchor	Osprey Reef	Seamount - leeward side (crest of wall)	2002, 2003, 2004, 2005 & 2006	▪ Low anthropogenic impact; ▪ Very low water quality pollution; ▪ Low diving impact; ▪ 330 km from population centre; ▪ Sometimes sheltered - subject to wave exposure.	56.9	0.6	0 (30m)
North Horn	Osprey Reef	Seamount - leeward side (crest of wall)	2001, 2002, 2003, 2004, 2005 & 2006		34.4	0.6	0 (40m)

Substrate

The Ribbon reefs which are located on the outer barrier reef north of Cooktown are away from any major population or agricultural centres and are therefore not exposed to much water quality pollution. They also have a low tourism impact, which may account for the high coral cover and low algae and silt cover recorded (Figure 3). In comparison Saxon and Hastings Reefs which are closer to mainland Cairns in the Wet Tropics Region which, along with the Whitsundays region are the areas at highest risk from land run-off (see: Reef Futures). These reefs have a much lower coral cover and algae and silt were higher (Figure 4). These reefs also support an important and busy diving industry

In 2002 there was a dramatic increase of algae, which appeared to subside at Reef Check sites in the following years. Interestingly concern regarding blooms of "golden noodle" alga (*Chrysocystis fragilis)* were reported at dive sites in the Cairns region during 2003-2004 which sparked a research project to investigate the effects of this algae and it was discovered that these algae have the potential to impede recovery of disturbed reefs (*Schaffelke et al., 2004*). Unfortunately, there is very limited information on its biology and distribution on the GBR. Reef Check Australia's link with the government and dive industry make it a valuable monitoring tool in reporting the incidence of blooms of this alga as far south as Airlie Beach. This interest to know the species of algae that may be dominant on a reef at any one time was met with an update to Reef Check Australia's protocol to take digital images of the 3 dominant algae at each site. This information can be used by scientists and managers to track trends in algal blooms and coral reef health in the future.

Figure 3. Mean percent cover of substrate for Ribbon reefs Challenger Bay, Tracy's Wonderland and Clam Beds from 2002 to 2006.

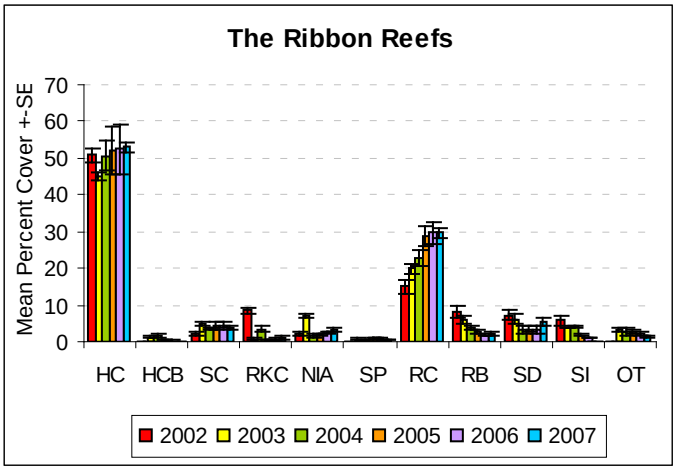
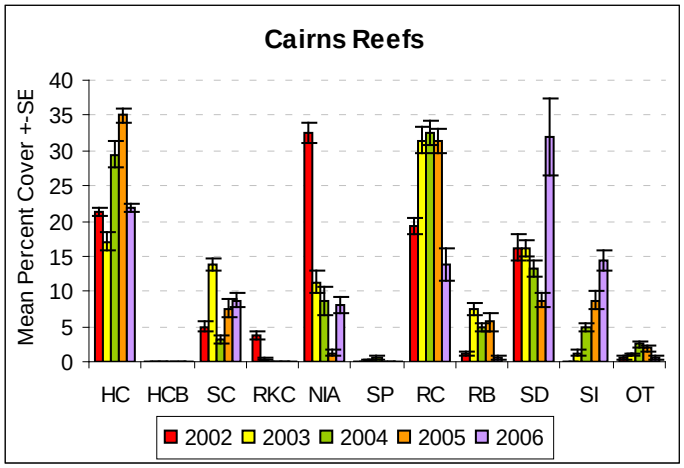


Figure 4. Mean percent cover of substrate for Saxon and Hastings Reefs (Cairns) from 2002 to 2006.



Wheeler Reef which is located 90km away from Townsville was found to be very different from Cairns reefs which are located 50km from shore. This reef was found to have the highest mean coral cover compared to all other sites monitored. Algae cover was also very low (<3%) and silt was negligible (Figure 5). Townsville is not a major cane farming region therefore Wheeler reef is subject to less water quality pollution and lower diver impact compared to Cairns reefs.

Hard coral cover was lowest at John Brewer and Keeper Reef (Figure 6). In contrast the dominant substrate categories were algae and rock. These reefs have been subject to Crown of Thorns starfish (COTS)

outbreak during 1997-1998 and 2001-2003. John Brewer Reef was particularly devastated after the last outbreak, the coral cover was very low and reclassified as Active Outbreak. In 2004, no COTS were observed during AIMS surveys and the reef was reclassified as Recovering (Sweatman H et al., 2005). It is important that these reefs continue to be monitored to learn how they recover through the next decade.

Figure 5. Mean percent cover of substrate for Wheeler Reef from 2003 to 2007.

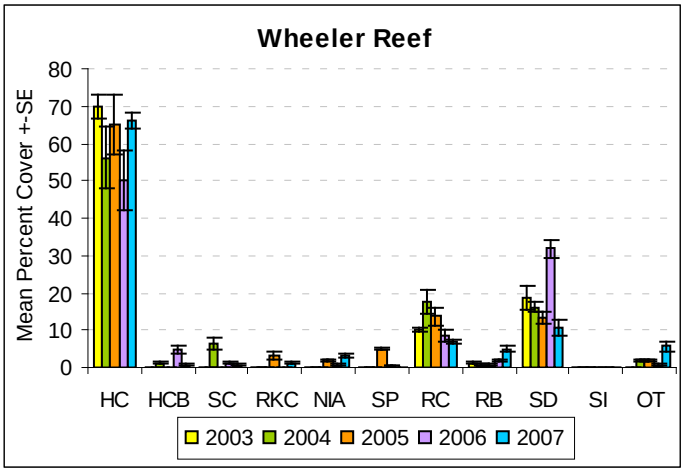
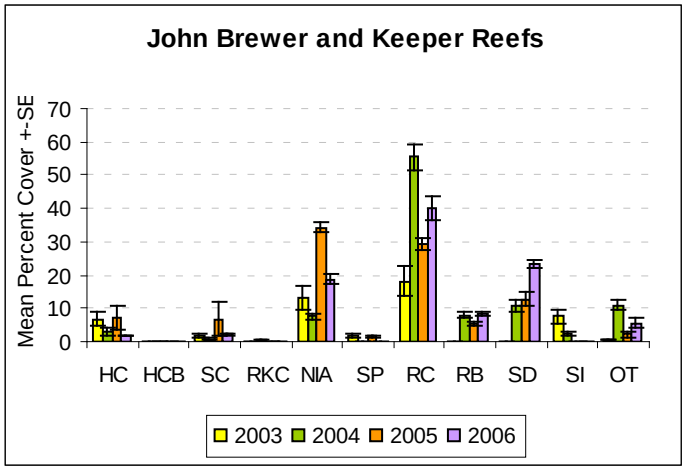


Figure 6. Mean percent cover of substrate for John Brewer and Keeper Reefs from 2003 to 2006.



The Low Isles site is an inshore fringing reef off Port Douglas. Low Isles was the chosen site for the Great Barrier Reef Committee collaborated with the Royal Society of London to co-ordinate the first major biological expedition to the Great Barrier Reef in 1928-9. The expedition spent a full year investigating Low Isles' coral reefs, seagrasses, mangroves and cay. They reported a rich and typical coral reef system despite its proximity to the mainland and freshwater run-off. Nowadays, Low Isles supports a very high amount of boat traffic and a booming tourism industry to view its reefs and islands. Low Isles reef shows substantial ecological degradation since the 1928-9 study, losing many of its earlier rich hard coral communities largely and overgrown with soft coral and algae. High silt levels were recorded by Reef Check volunteers with visibility recorded between 1-6 m (figure 7). Popular belief is that intensive agriculture in the region is a contributing factor to this decline, although recent studies of past storm regimes suggest these a major factor in the changed sediment regimes that have affected its reefs (Frank and Jell 2006). The high level of boat traffic stirring up the silt has been suggested as a contributing factor inhibiting recovery of hard corals.

The Low Isles Preservation Society (LIPS), a local community group, works to maintain the health of the islands and its reefs. LIPS initiated the tourism industry Eye on the Reef Program now run by GBRMPA and Reef Check Australia's GBR Project was operated through LIPS prior to the establishment of the Australian Reef Check Foundation in 2004.

In comparison, Nelly Bay is another inshore fringing reef, which has been exposed to recent development and channel dredging over the past few decades at Magnetic Island and Townsville Port. Boat traffic, such as ferries enter to one side of Nelly Bay leaving the far end of the bay, a popular dive site, relatively free from boat traffic at this stage. Contrary to Low Isles, Nelly Bay has high coral cover, which has increased over the years (Figure 8). Visibility at this site is also poor (1-5m) as a result of high silt levels.

Blue Pearl Bay has an inshore island fringing reef located in the Whitsundays region, which has also been flagged as an area at highest risk from land run-off (see: Reef Futures). Coral cover is high and has increased since 2001 to 2006 whereas algae cover remain low (Figure 9). Visibility at this site was also low

(<5m) as a result of high silt levels. Near shore and coastal reef systems such as Low Isles, Nelly Bay and Blue Pearl Bay have evolved in relatively turbid environments where suspended sediment and turbidity are primarily influenced by local wind and wave action (*Larcombe and Woolfe, 1999*). Despite high turbidity levels and sedimentation rates, a number of inshore reefs sustain high and healthy coral cover and diversity, suggesting local adaptation to intense sedimentation regimes *(Ayling and Ayling 1998)*. In contrast, offshore coral reef environments are generally regarded as being adapted to low turbidity and low-nutrient conditions.

Osprey Reef is the northern most reef on the coral sea. Its remoteness means it is away from human disturbances and water quality pollution. The Reef Check sites are subject to significant wave exposure for much of the year. Visibility is high (40+m) and the substrate is dominated by rock and robust forms of hard coral (Figure 10). In 2004 a mild bleaching event, coral bleaching was recorded at 11% however this appeared to recover without significant mortality (figure 11).

Interestingly many of the corals at Osprey Reef have fluorescent pigments in them, which are believed to protect the corals from the effects of bleaching (*Salih et al 2006*). When bleached, the reefs are a mixture of ghost white from common stands of fire coral (*Millepora* sp.) and flurorescent *Acropora* sp. and *Pocillopora* sp.

Figure 7. Mean percent cover of substrate for Low Isles from 2002 to 2006.

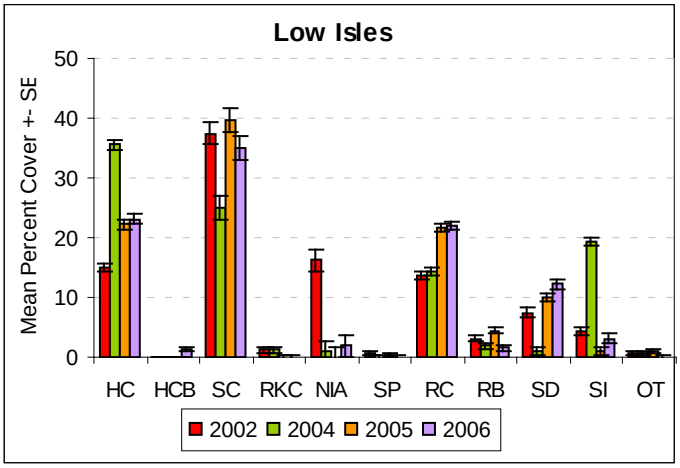


Figure 8. Mean percent cover of substrate for Nelly Bay from 2003 to 2007.

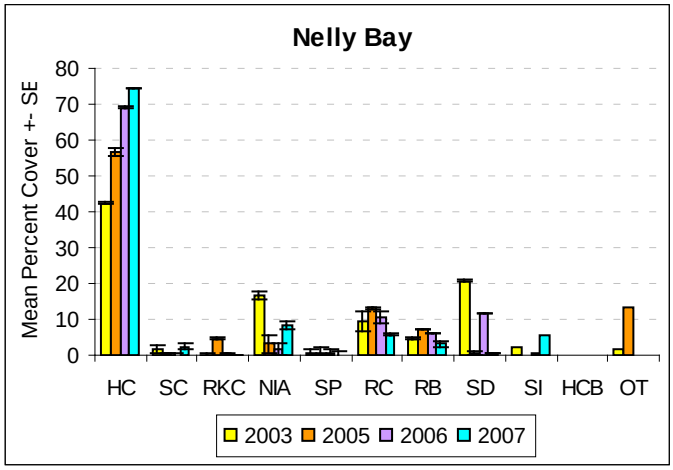


Figure 9. Mean percent cover of substrate for Blue Pearl Bay from 2001 to 2006.

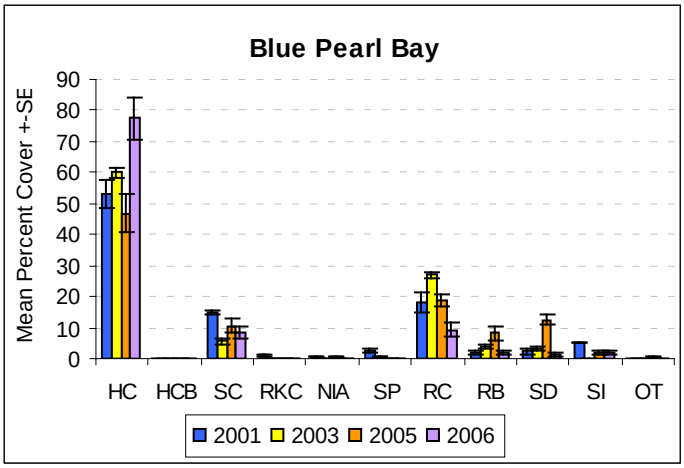


Figure 10. Mean percent cover of substrate for Admiralty Anchor and North Horn (Osprey Reef) from 2001 to 2006.

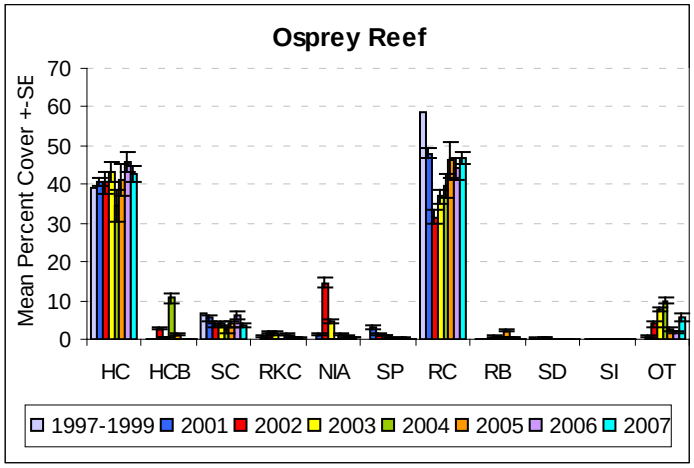


Figure 11. Bleaching at Osprey Reef in the Coral Sea.

Invertebrates and impacts

An increase in recently killed coral was observed at the same time as an increase in *Drupella* sp. scars at the Ribbon Reefs (Challenger Bay and Clam Beds) and also at Nelly Bay on Magnetic Island (see Table 2). When high levels of this coral-eating snail are observed they can cause extensive loss of coral tissue and colony mortality have been recorded (*Turner, 1994*). In response to GBRMPA's interest of the effects of *Drupella* sp. on coral reefs and also because it is monitored by AIMS, Reef Check Australia added *Drupella* sp. and *Drupella* sp. scars to its protocol in 2003-2004.

Fish

Fish counts were not conducted at all tourism sites due to limited time available to conduct surveys at these sites (see figure 12). Contrary to other countries in the Indo Pacific, the species listed on Reef Check's standard survey are not targeted for food. The most popular food-fish is the coral trout (*Plectropomus leopardus*) For which Reef Check Australia is developing a specific monitoring program in collaboration with GBRMPA.

Figure 12. Mean percent of fish for the Ribbon Reefs and Osprey Reefs from 2001 to 2006

Conclusion and looking forwards
Reef Check data from a number of our long-term sites is starting to provide coral reef managers and scientists with an insight into local trends on reef sites that were otherwise unmonitored. Reef Check Australia's recent partnerships with the GBRMPA and other government agencies ensure community information is integrated with the management of Australia's coral reefs. Our novel means to engage and communicate with the general public will expand general awareness of coral reef issues with an aim to increasing the effectiveness of management on the future health of Australia's coral reefs.

Reef Check Australia Projects
Great Barrier Reef Project (since 2001)
Monitoring of dive sites in the GBR. Supported by Queensland's dive industry since 2001 and the Reef and Rainforest Research Centre and GBRMPA since 2006.

Reef Check Townsville (since 2005)
Monitoring of Magnetic Island and Palm Island Group coral reefs. Supported by Townsville City Council, Reef Safari, Pleasure Divers and Tanscar Cruises.

Reef Check SE Queensland (since 2006)
Community monitoring of coral reefs in the Sunshine Coast, Moreton Bay and Gold Coast Regions. Supported by the SEQ Catchments, Griffith University and Noosa Shire Council.

Reef Check Ningaloo (since 2007)
Community monitoring of key sites at Ningaloo Reef, Western Australia. Supported by Envirofund and in collaboration with North West Research Association.

Recreational Fish Monitoring (since 2007)
Coral trout is Queensland's favourite fish. Our new project is to establish both a scuba and snorkel coral trout monitoring protocol which can be used by both Reef Check scuba divers as well as spearfishers to monitor fish populations at additional sites to those monitored by a GBRMPA-JCU project. Since the GBRMP was rezoned to incorporate an increase in no-take zones from 4.6 to 33% during 2004 we are particularly interested in the response of fish populations in new no-take zones and surrounding fished zones. Supported by GBRMPA, JCU, Orpheus Island Research Station, PADI Aware and the George Alexander Foundation.

Reef Check Education (since 2007)
Through our partnerships with the GBRMPA and Townsville City Council, we are developing an education unit for launch in the International Year of the Reef 2008.

Reef Check Australia is supported by the following:
Adrenalin Dive, Affordable Charters, Association of Marine Park Tourism Operators, Calypso, Canon, Creek to Coral, Cruise Whitsundays, New Horizon, Down Under Dive, Envirofund, Ergon Energy, Fantasea Cruises, Queensland Gambling Community Benefit Fund, Great Barrier Reef Marine Park Authority, Haba Dive, Hayman Island Resort, James Cook University Dive Club, Ocean Dive, Pleasure Divers (Magnetic Island), Poseidon Dive, Pro Dive Cairns, Pro Dive Townsville, Quicksilver Connections, Quiksilver International, Reef Magic Cruises, Reef and Rainforest Research Centre, Reef Safari (Magnetic Island), Remote Area Dive, Scuba Schools International, Sunferries, Sunsea Cruises, Sunshine Foundation, Tanscar Charters, Townsville City Council, Townsville Scuba Club, Tropical Diving, Tusa Dive, and Undersea Explorer.

Table 2: Mean invertebrate percentage of the Reef Check Long Term monitoring program on the Great Barrier Reef and Coral Sea, from 2001 to 2007
X: absent

		Banded coral shrimp	Long-spine black urchin	Pencil urchin	Prickly redfish	Prickly greenfish	Crown of Thorns	Giant Clams	Giant Clams <10 cm	Giant Clams 10-20 cm	Giant Clams 20-30 cm	Giant Clams 30-40 cm	Giant Clams 40-50 cm	Giant Clams >50 cm	Collector urchin	Triton shell	Lobster	Trochus	Drupella	Drupella scars	Crown of Thorns scars	Other scars
Ribbon Reefs	2002	X	X	X	0,12	X	X	3,62	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	2003	X	0,5	X	X	X	X	2,75	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	2004	X	0,12	0,25	0,12	X	X	8,37	2,25	2,25	1,62	0,93	1,06	1	X	X	X	0,25	5,37	2,68	X	0,32
	2005	X	2,41	X	0,08	0,08	X	6,83	3,75	3,5	3	0,5	1	1,25	X	X	X	0,25	6,58	4,25	X	0,5
	2006	X	0,58	X	X	X	X	2,16	1,5	4,25	1,25	0,75	1	0,25	X	X	X	0,83	5,25	10,25	X	0,75
	2007	X	0,18	X	0,08	X	X	3,93	0,53	1,64	0,5	0,22	0,47	0,55	X	X	0,08	0,36	1,08	0,33	X	0,56
Osprey Reef	2001	X	1	X	X	X	X	1,66	X	X	X	X	X	X	0,25	X	X	X	X	X	X	X
	2002	X	0,25	X	0,25	X	X	0,87	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	2003	X	1,87	X	X	X	X	0,75	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	2004	X	X	X	X	X	X	16	4,25	8	3,75	X	X	X	X	X	X	0,5	3	0,5	X	1
	2005	X	3	X	X	X	X	13,62	3,75	4,12	3,62	1,5	0,62	X	X	X	X	0,37	4,5	2	X	0,37
	2006	X	5,5	X	X	X	X	16,25	4,25	8,37	2,75	0,87	X	X	X	X	X	0,5	8,25	2	X	0,25
	2007	X	1,1	X	X	X	X	9,3	3,62	4,43	1,06	0,16	X	X	X	X	X	0,43	1,04	0,18	X	0,56
Cairns	2002	X	4	X	X	X	X	X	X	X	X	X	X	X	X	X	2,75	X	X	X	X	X
	2003	0,12	7,625	0,13	X	X	X	1,5	X	X	X	X	X	X	X	X	X	X	X	X	X	9,31
	2004	X	7,875	X	X	X	X	0,625	0,25	0,25	0,25	X	0,12	X	X	X	X	X	1,75	0,5	X	18,1
	2006	X	0,75	X	X	X	X	3,75	3,25	X	X	0,5	X	X	X	X	X	X	X	X	X	X
Townsville COTS	2003	X	0,25	X	0,5	X	0,5	0,5	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	2004	X	0,33	X	0,33	1,25	2,58	10,58	X	X	X	X	X	X	X	X	0,08	0,33	1,83	0,5	3,58	1,5
	2005	X	3,87	X	X	0,75	X	5,12	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	2006	0,12	1,37	0,12	0,25	0,75	X	3	X	X	X	X	X	X	X	X	X	X	X	X	X	0,37
Townsville not COTS	2003	X	0,25	X	1	X	3	1,25	X	X	X	X	X	X	0,25	X	X	X	X	X	X	X
	2004	X	0,75	X	0,25	0,5	0,25	4,75	X	X	X	X	X	X	X	X	X	X	3,25	4,5	0,25	5,75
	2005	X	0,5	X	X	0,25	X	7	X	X	X	X	X	X	X	X	X	X	2,5	1	X	1,25
	2006	X	X	X	1,25	0,5	X	0,75	X	X	X	X	X	X	X	X	X	X	0,25	1	X	2,75
Inshore Reefs	2001	X	X	X	X	X	X	2	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	2002	X	X	X	X	X	X	2,75	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	2003	X	0,25	X	X	X	X	1,5	X	X	X	X	X	X	X	X	X	0,25	23,25	1,75	X	8
	2004	X	X	X	X	X	X	1	X	0,5	0,25	0,25	X	X	X	X	X	X	0,25	0,25	X	1,5
	2005	X	0,06	X	X	X	X	13,65	2,34	2,37	1,46	0,46	0,03	0,15	X	X	X	X	1,56	1	X	0,93
	2006	X	X	X	X	X	X	7,75	1,06	2,28	0,96	0,09	0,03	0,06	X	0,06	X	X	2,43	0,12	X	0,31

Note: Giant Clam percentage does not represent the sum of all the different Giant Clam size categories

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