

## Recovery and Management in Surin Marine National Park, Thailand

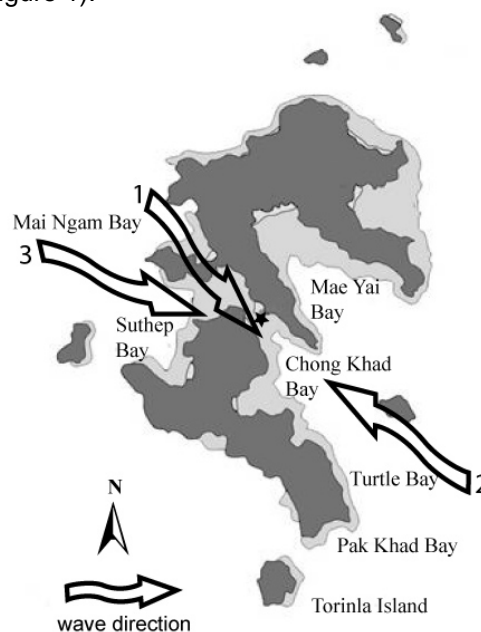
Suchai (Yo) Worachananant, R.W. (Bill) Carter, Marc Hockings  
Kasetsart University & The University of Queensland  
e-mail: s.worachananant@gmail.com

Surin Marine National Park is under the administration of the Thailand Ministry of Natural Resources and Environment and has an area of 135 square kilometres. Seventy six percent of the area (102 square kilometres) is the marine component and the balance (33 square kilometres) is terrestrial. Surin consists of five granitic islands (North Surin, South Surin, Torinla, Pachumba and Stork Islands) and two exposed pinnacles (Pae and Kong). The largest islands, North and South Surin, are aligned in a north-south axis.

Notwithstanding the destructive effects of the 2004 tsunami, there are few natural threats to the reefs of Surin. Strong waves seasonally batter the reefs during stormy monsoons and El Niño effects, particularly in 1998, have caused deterioration of reefs in some areas, especially Mae Yai bay. However, the park is remote from the mainland and all the islands are covered with healthy forest, so sedimentation and pollution are not major issues. Most researchers suggest that the major threat is from human related activities. Pollution sources of concern were found to be the park's accommodation facilities, oil spillage from travel boats and detergent use: all tourism related.



Reefs around Surin were affected by the 26 December tsunami differently depending on the marine topography, the dominant coral types and the direction of striking waves. Major waves struck Surin three times. The first was from the north-west to southeast, the second was the reverse, from southeast to northwest and the third was again from the northwest to southeast (Figure 1).



*Figure 1 Direction of waves struck Surin Marine National Park*

A survey of the impact of the tsunami on Surin's reefs was undertaken using the same method applied to monitoring the site since 1998 (Department of Marine Science, Kasetsart University). Living coral coverage data was collected from seven sites around Surin. The surveys were conducted by Life from intersect transect technique with 30 metre long per line, 5 lines per sample and 4 samples per sites. The result was calculated by length of various form of substrates that covered by lines. Statistical analysis had been used to compare the change. While individual coral forms were effected (Table 1), long lasting effects were generally minor. The scale of impact on individual coral colonies was high but the colonies were not destroyed. Large massive corals were up-turned but were not killed, branching coral colonies were move but survived the shift and many colonies were covered by sand but rapidly uncovered by current with minimal detriment.

**Table 1 Impact value of various sites around Surin Marine National Park**

Types	Mae Yai Bay		Mai Ngam Bay		Pak Khad Bay		Suthep Bay		Torinla Island		Turtle Bay	
	Mean	Affected value	Mean	Affected value	Mean	Affected value	Mean	Affected value	Mean	Affected value	Mean	Affected value
CB	5.45	0.063	15.52	0.030	32.39	0.059	29.27	0.048	44.87	0.313	11.66	0.285
CB*	0.37		0.48		2.03		1.47		20.40		4.65	
CE	0.35	0.959	1.52	0.316	4.00	0.000	1.42	0.336	0.75	0.000	4.36	0.000
CE*	8.23		0.70		0.00		0.72		0.00		0.00	
CF	0.00	1.000	0.48	0.793	1.42	0.000	0.40	0.000	0.18	0.000	1.24	0.000
CF*	0.55		1.85		0.00		0.00		0.00		0.00	
CM	9.38	0.556	13.15	0.340	15.50	0.000	22.28	0.146	4.96	0.000	27.15	0.002
CM*	11.75		6.78		0.00		3.80		0.00		0.05	
CS	32.34	0.025	7.77	0.111	4.38	0.000	4.37	0.222	1.65	0.000	15.09	0.004
CS*	0.82		0.97		0.00		0.10		0.00		0.07	
CT	0.77	0.687	3.85	0.297	4.72	0.014	4.40	0.208	3.86	0.021	4.80	0.027
CT*	1.68		1.63		0.07		1.16		0.08		0.13	
LC	48.29	0.326	42.28	0.227	62.41	0.033	62.13	0.104	56.27	0.267	64.30	0.071
LC*	23.40		12.41		2.10		7.24		20.48		4.90	

Legend: CB (Coral Branching), CE (Coral Encrusting), CF (coral Foliose), CM (Coral Massive), CS (Coral Submassive), CT (Coral Tabulate), LC (living Coral), \* (affected by Tsunami)

Note: 1. Chong Khad Bay changed considerably with the tsunami – current became be very strong. The rapid manta tow survey was undertaken in January and March with the earliest identifying that more than 85% of area was covered by sand.

2. The impact of the tsunami on different reef areas was calculated by the formula: **Impact = affected/ (affected + unaffected)**.

## Conclusion

While some sites were severely affected by the tsunami, overall the reefs of Surin can be considered to be a minor affected area. Good environmental factors before the tsunami appear to have reduced the impact of the tsunami. Tolerant coral types (massive, submassive, encrusting) were more resistant to direct impact than fragile forms (branching, tabulate and foliose), while fragile forms had more tolerant of coverage by sand than massive types. Submassive coral is the most tolerant life form. It was both resistant and resilient to disturbance including being covered by sand, breakage and being up-turned.

Impact assessment, which was done shortly after the disaster gave an indication of the level of damage but on-going survey indicates the real (long-term) impact of the disturbance, including identification of errors which can occur in identifying affected colonies immediately post the perturbation when the reef is in an unsteady state.

Sporadic catastrophic events can rapidly alter the expression of the rationale for marine park zoning, requiring a change in zones, with potential confusion for and conflict with users. For island-centred marine national parks, if total protection zones are used as a strategy for biodiversity protection, then topography and hydrography must be used as additional criteria for site selection to account for sporadic catastrophic events (in this case a tsunami). Of greater concern is the slow re-establishment of a management presence to control tourism use and illegal fishing. Unfettered, both have the potential to result in a greater decline in reef condition than that identified from the tsunami.