

## **Supervisory Committee**

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## **ABSTRACT**

The 2004 Indian Ocean tsunami created a catastrophic disturbance at several scales along the entire Andaman Sea coast. As the first large-scale tsunami occurring in recent history, this event provided a unique opportunity to use modern instrumentation and *in situ* observation to study tsunami dynamics and effects on coastal systems. Along Thailand's coast, consequences of this disturbance were highly variable in space and time, with pronounced changes to certain coral reefs and human communities. This thesis outlines two case study-based research projects designed to gain some understanding of the ecological and social dynamics of the tsunami in Thailand. From a Geographical perspective, responses to this massive disturbance may support an incentive-based direction for marine conservation in Thailand.

The first project occurred within Mu Koh Surin Marine National Park, Thailand. Variability in the physical response of fringing hard coral reefs to the tsunami was examined using SCUBA surveys. Patterns in variability were distinct from typical hard coral responses during tropical storms suggesting differences in the nature of these

hydrodynamic disturbances. Coral colony morphologies and reef shape mainly did not influence variability in tsunami response; however, unique effects were observed on reef slopes over 45°. There was no detected influence of reef depth. Variability in effects based on the spatial location of reefs was observed: proximity to bathymetrical constrictions accounted for substantial variability, while reef aspect did not. Overall, just over 10% of sampled reef area was affected, with evidence of rapid coral recovery in the form of tissue re-growth and apical skeletal growth within four months of the event at most sites.

The second project explored the effects of the tsunami on Phuket's diving industry. The response of industry members and recreational divers to tsunami effects was examined using interviews and questionnaires as well as observational dives with dive guides and clients on chartered trips during the 2004-5 post-tsunami diving season.

A short-term reduction in the number of diving companies and diving tourism in Phuket was observed immediately following the tsunami; this can be attributed to terrestrial damage and trip cancellations. Although there were expectations for high levels of dive site damage, most recreational divers did not perceive any damage on dive sites in 2005 – even while diving on surveyed sites with as much as 76-100% of reef area reportedly affected. This low rate of perception may be partially explained by diving ability, but was more likely due to site variability and variability in tsunami response within dive sites allowing guides to preferentially avoid acutely damaged areas.

During the post-tsunami low tourism period, industry members contributed substantial resources to rescue, relief and restoration efforts along Thailand's Andaman Sea Coast. Industry members also participated in several government and university-led

tsunami monitoring and rehabilitation efforts. While measurable changes to Phuket's diving industry seem to have been short-term, this response of industry members to the event may have increased potential for long-term collaboration with government and universities. Enhanced communication among these parties could facilitate future incentive-driven industry contributions toward marine conservation in Thailand.