DR. STEPHEN BAN

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PhD 2009 to 2013
ARC Centre of Excellence for Coral Reef Studies, APA, GBRMPA Science for Management Award
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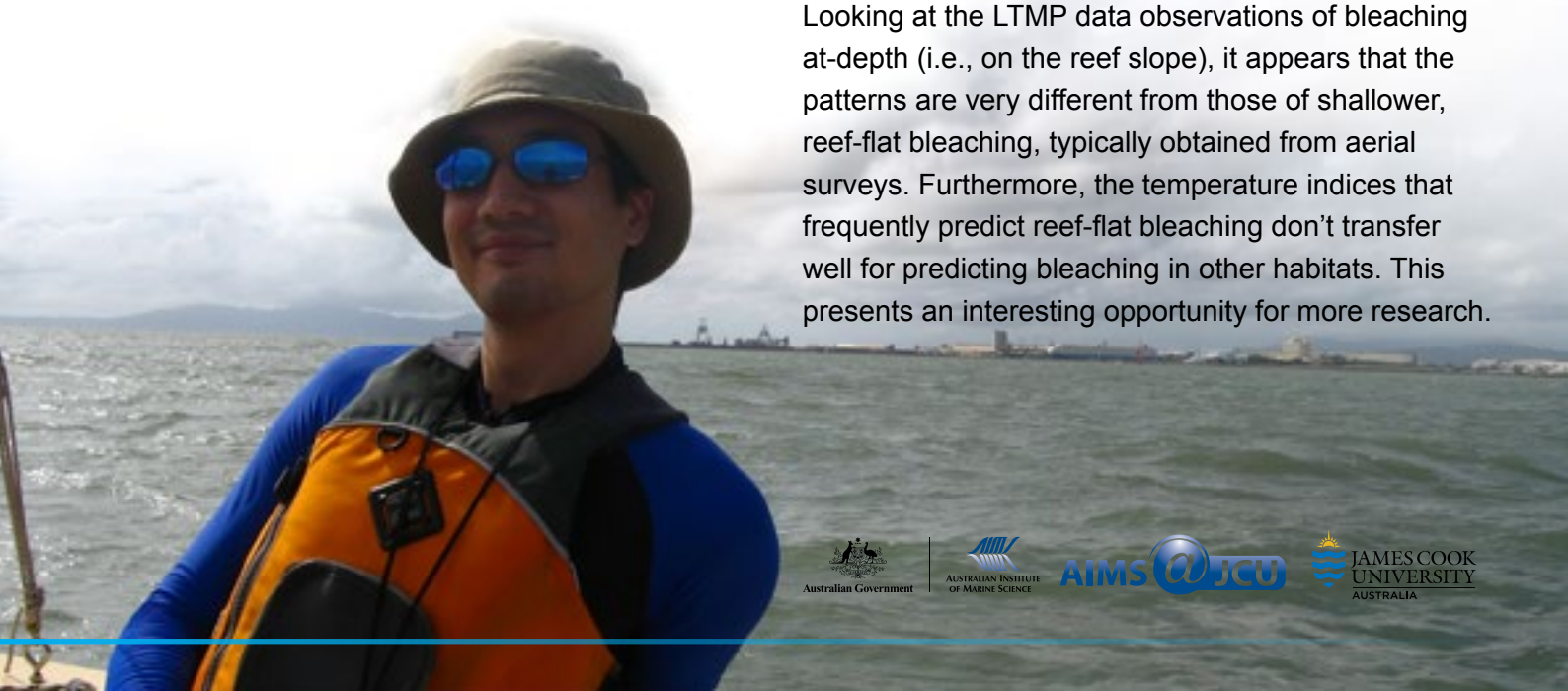
Modelling and management of multiple stressors on coral reefs

Stephen's marine biology background encompasses a broad range of scales, taxa, and ecosystems, ranging from test-tube phytoplankton to coral reefs to ocean-basin pinnipeds (and aquarium belugas). He completed his BSc at McGill University in Montreal before completing a diploma in GIS at the British Columbia Institute of Technology and a MSc at the University of British Columbia with the Marine Mammal Research Unit. His current research interests include spatial ecology, multiple stressor impacts, the role of expert opinion in data-poor environments, and modelling the impacts of climate change on marine ecosystems.

The literature regarding multiple stressors and potential synergistic effects between stressors has been marked by considerable confusion and sometimes contradictory findings. Stephen's research aims to clarify what we know about multiple stressors on coral reefs and how we might model their interactions in cases where insufficient data limits more traditional methods of analysis. This knowledge can be meaningfully applied in a management context to minimize the occurrence of long-term unintended consequences in an ecosystem, as well as to maximize the long-term benefit of short-term management decisions. Outputs will be directly relevant to conservation planners and environmental managers by providing a means to visualize and compare the effects of novel management strategies under different climate change scenarios.

Stephen's research looks at the issue of multiple stressors on the Great Barrier Reef (GBR) from a number of angles, including a meta-analysis of the coral reef literature, using AIMS long term monitoring (LTMP) data to determine whether mass bleaching and white syndrome outbreaks are related, and using expert elicitation to help construct a Bayesian model of stressor interactions on the GBR. The goal is to produce methods and results that are usable by coral reef managers who are confronted with decisions on multiple threats to coral reefs at multiple scales, often with incomplete or inadequate data.

Looking at the LTMP data observations of bleaching at-depth (i.e., on the reef slope), it appears that the patterns are very different from those of shallower, reef-flat bleaching, typically obtained from aerial surveys. Furthermore, the temperature indices that frequently predict reef-flat bleaching don't transfer well for predicting bleaching in other habitats. This presents an interesting opportunity for more research.



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Publications

Ban, S.S., 2012. Expert elicitation of a Bayesian Belief Network for the Great Barrier Reef. In *Society for Conservation Biology Oceania "People and Conservation in Land and Sea Country"* 21-23 September. Darwin, Australia.

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Ban, S.S., 2011a. An Integrated Bayesian Model of Coral Bleaching and Disease. In *International Marine Conservation Congress*.

Ban, S.S., 2011b. Bayesian decision networks applied to management of multiple stressors in coral reefs. In *International Congress of Conservation Biology*. Auckland, New Zealand.

Ban, S.S., 2011c. Exploring management scenarios for the Great Barrier Reef (GBR) using Bayesian Belief and Decision Networks. In *Third Annual Conference of the Australasian Bayesian. Network Modelling Society*. Brisbane.