



National Environmental  
Research Program

**TROPICAL ECOSYSTEMS** *hub*

## **NERP Tropical Ecosystems Hub Conference 2013**

**Wednesday 8 May 1330-1500  
Forum Synopsis**

**Drivers of Biodiversity on the GBR, COTS  
Outbreak Dynamics and Population Control**

Convener: Doug Baird  
Environment & Compliance Manager, Quicksilver Group



**Australian Government**

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**Department of Sustainability, Environment,  
Water, Population and Communities**

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## Forum: Drivers of Biodiversity on the GBR, COTS Outbreak Dynamics and Population Control

Convener: Doug Baird, Environment & Compliance Manager, Quicksilver Group  
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The crown of thorns starfish (COTS) is a multi-armed echinoderm coral predator, found on most tropical reef systems globally. When in "normal" population densities, deemed to be less than 30 mature animals per hectare, they are believed to contribute to maintaining the biodiversity of reefs due to their preference for consuming fast growing *Acropora* species. However, their populations occasionally boom to more than 30 mature animals per hectare, and at these "outbreak" densities they can overwhelm reefs, severely reducing coral cover and compromising the reef's ability to bounce back from other disturbances such as cyclones.

Temperature changes have little effect on COTS' survival yet have a major effect on the survival of coral, and, with climate change predicted to make the oceans more stressful for corals, outbreaks have the capacity to considerably reduce coral cover GBR-wide, and reduce the resilience of reefs.

Studies have been undertaken on these animals since the first recorded outbreak on the GBR at Green Island in 1962, and a variety of theories put forward regarding causes of outbreaks, most looking for some human-induced trigger. An alternative school of thought suggests that COTS' biology predisposes the animals to population outbreaks and that they are part of a natural cycle.

There have also been nearly as many ideas for controlling COTS as there have been theories for their outbreaks, from using giant triton shells, to injecting COTS with swimming pool chemicals. Control efforts require highly trained staff and an awareness of scale and reef topography to stand any chance of success.

In this session two AIMS researchers will lead off, with Dr Hugh Sweatman setting the scene, talking about the history and status of COTS on the GBR, including their role in the 27-year decline in coral cover. Dr Katharina Fabricius will then outline recent work on the link between COTS outbreaks and water quality. She will review the relationships between flood events and the timing and location of subsequent outbreaks, and summarise new eReefs results on the relative contributions of each of the main rivers to the high-risk area north of Cairns where outbreaks begin. Scott Firth of AMPTO will then describe current COTS mitigation programs, highlighting the technical aspects, limiting factors, costs and logistics. Dr Peter Doherty, again of AIMS, will describe the use of funds released by Minister Burke from the NERP Emerging Priorities program for tactical research into the current outbreaks and more efficient control agents.

### Focus questions:

- With the Marine Tourism Industry generating somewhere in the region of \$5 Billion into the Australian economy and employing around 60,000 people there is a great need for early warning of outbreaks, are we really any closer to establishing a trigger for these outbreaks and if so does it allow predictions of when and where the outbreak will occur?
- Are the current broad scale surveys sensitive enough to detect sub adult populations or should resources be put into fine scale surveys that will detect these much more cryptic animals?
- As AMPTO has successfully secured government funding to run an eradication program is the current strategy giving the best bang for the buck?
- How can we make a COTS eradication dive more efficient? A large proportion of each eradication dive is spent hunting for animals, and, when found, trying to ensure that the each is suitably injected. Can we make the COTS come out of hiding by developing attractants?
- What else can we do?