Economics Legislation Committee
ANSWERS TO QUESTIONS ON NOTICE
Industry Portfolio
Supplementary Budget Estimates Hearing 2013-14
21 November 2013

AGENCY/DEPARTMENT: AUSTRALIAN INSTITUTE OF MARINE SCIENCE (AIMS)

TOPIC: Research on Crown of Thorns Starfish

REFERENCE: Question on Notice (Hansard, 21 November 2013, page 41)

QUESTION No.: SI-9

Senator WATERS: Can I ask whether AIMS has looked into any additional impacts of turbidity on crown of thorns, given that they are susceptible to poor water quality? For example, what is the influence of the additional dredging that has occurred for many ports and that is projected to occur and the offshore dumping likewise. Does that compound the water quality situation?
Dr Gunn: I will take that on notice. Certainly turbidity is part of the nutrient recycling into the coastal zone. Crown of thorns impacts are largely on the mid-shelf and outer-shelf reefs, as far as we can see right now, but I will take it on notice in terms of impacts of dredging impacts on crown of thorns population.

ANSWER

There is now strong evidence that outbreaks of crown of thorns starfish are fuelled by discharges of excess nutrients into the Great Barrier Reef (Brodie et al. 2005, Fabricius et al. 2010). All of the four initial outbreaks since the 1960s have followed the largest river floods in Queensland on record (Brodie et al. 2013). After the initiation of these outbreaks, only low to moderate levels of nutrients are needed to maintain the outbreaks on reefs away from the river plumes. This is because the outbreak population produces extremely high numbers of larvae, so moderate to low survival is sufficient to maintain the outbreak waves.

Unfortunately, very little information is available on the nutrients released from the offshore disposal of dredge spoil. In nature, one way to remove nutrients from the marine system is burial in the sediment (Furnas et al. 2011) and there is general information on the nutrient content of GBR lagoon sediments (Alongi et al. 2007). Detailed information of the sediment nutrient content at coastal sites where dredging takes place is scarcer in the scientific literature- this information would be held by consultancy firms conducting Environmental Impact Assessments for dredging operations. If dredge spoil consists of fine clays and silts and is deposited in shallow water, then some of it will be transported away from the disposal site. The resuspension of this dredge spoil material not only reduces water clarity but it likely remobilises some of these historically accumulated nutrients. However, there are currently no published studies on (a) the amount of nutrients released by this process, (b) the distance these nutrients will travel in both particulate and dissolved forms, and (c) the amount of time they will affect downstream water quality, for example by promoting the growth of phytoplankton. AIMS and other research partners are involved in a relatively new project called “eReefs” that aims to model fine sediment transport regimes in the Great Barrier Reef, and its associated biogeochemical processes (www.ereefs.org.au). These tools could be deployed to independently model the resuspension and transport of dredge spoil related nutrients, but that work has not yet been conducted.

References:

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Fabricius KE, Okaji K, De'ath G (2010) Three lines of evidence to link outbreaks of the crown-of-thorns seastar *Acanthaster planci* to the release of larval food limitation. Coral Reefs 29:593-605

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