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: Reef Rescue Program

REFERENCE: Question on Notice (Hansard, 21 November 2013, page 43)

QUESTION No.: SI-11

Senator WATERS: Okay, that is appropriate. I am happy with that. Lastly, can you talk a little bit about whether your organisation has been doing any study into the success of the Reef Rescue program in constraining some of those sediment and pesticide loads. I am particularly interested in whether any of your scientists have looked at the comparative loads that have been saved by Reef Rescue versus the loads that are, sadly, now being dumped as a result of the dredging and offshore dumping. Is there anyone that is looking at that? My back-of-the-envelope calculations are that about 200 times as much sediment is actually being dumped into the marine park and the World Heritage area as has been saved and constrained by the Reef Rescue program. So I am interested in whether anyone is looking at that in your organisation.
Dr Gunn: AIMS's role—and it is a rather large effort, as I am sure you are well aware—in the Reef Rescue monitoring and fates and flows analysis is largely in monitoring the condition of inshore environments. The earlier comment on the relative health of inshore environments over time is AIMS's work. The type of work you are talking about is largely done by universities. If you would like me to take it on notice, I can provide you with some of that information.

ANSWER

The monitoring and modelling of river loads is undertaken by the Queensland Government and scientists from universities and CSIRO. The recent Reef Plan Scientific Consensus Statement gives an update of this research (chapter with references available at: http://www.reefplan.qld.gov.au/about/scientific-consensus-statement/sources-of-pollutants.aspx):
"*The most recent estimates show that mean annual total suspended solids loads to the lagoon have increased 3.2 to 5.5 times compared to pre-European loads. An estimated 6000 to 14,000 kilotonnes per year of current loads are of anthropogenic origin. (…)Measured annual total suspended solids loads are highly variable over time and between catchments. (…)Fine sediment particles (less than 16 micrometres) are the total suspended solids fraction most likely to reach the GBR lagoon. These particles comprise a greater proportion of the monitored total suspended solids in the Burdekin, Fitzroy, Plane, Burnett and Normanby catchments compared to other monitored catchments, suggesting that they are likely to contribute proportionally more fine particles to the GBR lagoon.*"
Recently, a few researchers have made an attempt at comparing the sediment loads from the land with the inputs from dredging (see e.g., http://theconversation.com/dredging-set-to-swamp-decades-of-great-barrier-reef-protection-20442). However the dispersal and movement of suspended sediment from these two sources in the marine environment is complex and the pattern of delivery and impact will differ depending on factors such as particle sizes, hydrodynamic conditions in the receiving marine waters (flushing rate, current strength, water depth) as well as the mechanism and pattern of release, (location of dredging and plume behaviour, dispersal of dredge spoil). Hence, to simply compare catchment sediment loads with quantities of dredged material may not provide an accurate picture of the relative impacts of the two sediment sources. The fine suspended sediments

exported from the catchment influence the water turbidity in the GBR lagoon for periods of weeks to months and are repeatedly resuspended by wind and currents (Fabricius et al. 2013, Fabricius et al. in review) until settled in accumulation areas or transported into deeper water outside the main resuspension zone (Lambrechts et al. 2010). On the other hand, dredged sediments are already in the marine system and their release into the water column is sudden and over a smaller area compared to wind or current-driven resuspension of existing bottom sediments. The dispersion and cumulative impact of sediments from various sources is a current critical research gap that could be addressed using recently developed modelling tools (see response to SI-9), but this research has not been done.

Fabricius KE, De'ath G, Humphrey C, Zagorskis I, Schaffelke B (2013) Intra-annual variation in turbidity in response to terrestrial runoff on near-shore coral reefs of the Great Barrier Reef. Estuarine, Coastal and Shelf Science 116:57-65
K. E. Fabricius KE, Logan M, Weeks S, Brodie J (in review) Assessing inter- and intra-annual changes in water clarity in response to river run-off on the central Great Barrier Reef from 10 years of MODIS-Aqua data. Marine Pollution Bulletin
Lambrechts J, Humphrey C, McKinna L, Gourge O, Fabricius KE, Mehta AJ, Lewis S, Wolanski E (2010) Importance of wave-induced bed liquefaction in the fine sediment budget of Cleveland Bay, Great Barrier Reef. Estuarine, Coastal and Shelf Science 89:154-162