

Crown-of-thorns Starfish Funding from Program 1.1, 2012-13 to 2017-18

Since the current crown-of-thorns starfish outbreak was detected in 2012, the Australian Government has been working in partnership with the tourism industry, researchers and the Queensland Government to minimise the impact of the outbreak on the Great Barrier Reef and associated tourism industry.

The Australian Government is addressing the current outbreak of crown-of-thorns starfish on high value tourism reefs in the Great Barrier Reef through five integrated initiatives:

- Direct management of crown-of-thorns starfish through culling starfish on specified high value tourist reefs to provide short term protection of coral cover and maintain the biodiversity of these reefs.
- Funding research to inform improvements in crown-of-thorns starfish management, including understanding the biology and spread of crown-of-thorns starfish, investigations into repellants and attractants and development of integrated management approaches to minimize the opportunities for COTS reaching outbreak proportions. The single injection COTS culling process is just one outcome of this research.
- Building public awareness of the causes of crown-of-thorns starfish outbreaks and building industry capacity manage crown-of-thorns starfish on a business-as-usual basis.
- Addressing poor water quality, a significant factor giving rise to crown-of-thorns starfish outbreaks, through encouraging land managers to reduce sediment, nutrient and pesticide losses from their land.
- Managing fisheries and other marine harvesting industries.

This integrated approach is essential to provide short and long term management responses for this naturally occurring coral predator.

Table 1 – funding from Program 1.1 2012-13 to 2017-18 (\$ millions)

	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Control -NHT/Reef Programme	2	3.1	2				7.1
Control - Trust - Phase1			1.8	0.2			2
Control - Trust - Phase 2			0.8	1.6	2.3	2.3	7
Control Total	2	3.1	4.6	1.8	2.3	2.3	16.1
NERP R&D	0.3						0.4
NHT/Reef Programme R&D	0.1	0.55	0.45				1.1
R&D total	0.4	0.55	0.45				1.4
Grand Total	2.4	3.65	5.05	1.8	2.3	2.3	17.5

Table 2 – R&D funding breakdown from Program 1.1

Reef Programme R&D Projects	Funding Recipient	2013-14	2014-15	Total
Crown-of-thorns starfish Population Size Estimation	Australian Institute of Marine Science	\$250,000.00	-	\$250,000.00
Crown-of-thorns starfish Secretome: Towards a Control Technology	Australian Institute of Marine Science	\$150,000.00	\$200,000.00	\$350,000.00
Crown-of-thorns starfish Research – Population Genetics Study to Elucidate the Initiation and Spread of Outbreaks of Crown-of-Thorns Starfish on the Great Barrier Reef	James Cook University	\$150,000.00	\$250,000.00	\$400,000.00
Total		\$ 550,000.00	\$ 450,000.00	\$ 1,000,000.00

Note: Secretome and Genetics projects received project extensions for their final research outcomes report to Dec and Nov 2015 respectively.

The Australian Government's approach to managing predation has been to target specific sites on coral reefs selected for their priority tourist and/or biodiversity values. The focus of the culling program is on protecting the coral cover on these specific sites on coral reefs rather than focusing on the catch per unit effort. Through continued management of these specific sites, it is not expected that a consistent level of crown-of-thorns starfish will be culled on an annual basis. The number of crown-of-thorns starfish culled in each year has varied as a result of:

- the effectiveness of culling techniques (this was greatly enhanced by the single injection method)
- the abundance of starfish on individual reefs (which varies significantly as individual reefs vary greatly in size)
- the availability of surveillance information to target culling campaigns
- weather conditions (cyclones and high winds can limit safe diving)
- the number of vessels and trained divers available.

The increase in crown-of-thorns starfish culled between the first and second year of investment was largely a result of the introduction of a one-shot method for crown-of-thorns starfish control using Ox-bile salts and the extensive surveillance work undertaken by the GBRMPA and Queensland Parks and Wildlife Service Joint Field Management Program. This greatly increased the capacity for culling teams to focus on high concentrations of crown-of-thorns starfish adults.

The development and introduction of the one-shot technique, assessment of reefs for crown-of-thorns starfish abundance and coral health and the identification of high priority 'super spreader' reefs have all been underpinned by research that has been funded to inform the culling program.

In the 2014-15 financial year the tactical culling efforts were refocused on 21 reefs that identified as being of critical value to tourism in the Cairns region and/or of ecological importance in terms of their capacity to amplify the outbreak as a result of the connectivity between those reefs.

Given that the current outbreak is now well established advice from the scientific community is that the best course of action is to focus culling activities on the 21 high priority reefs already identified.

To date the culling work has resulted in average coral cover remaining above critical ecological thresholds at 98% of the control sites.

Table 3 – Crown-of-Thorns Starfish Culled 2012-13 to 2017-18

Financial Year	Funding source	# COTS culled vessel Hero	# COTS culled vessel Venus	# COTS culled vessel Escape	# COTS culled vessel Venus	Total per FY
1 July 2012 - 30 June 2013	NHT	76,477	0	13514	0	89991
1 July 2013 - 30 June 2014	Reef Programme	146,857	29369	11075	0	187301
1 July 2014 - 30 June 2015	Reef Programme + Reef Trust Phase I	50,055	3759	0	38499	92313
1 July 2015 - 30 June 2016	Reef Trust Phase II	11,860	0	0	0	11,860
1 July 2016 - 30 June 2017	Reef Trust Phase II					
1 July 2017 - 30 June 2018	Reef Trust Phase II					
Total		285,249	33,128	24,589	38,499	381,465