

Crown of Thorns Starfish (COTS) Outbreak Assessment South Shore Oahu

Brett D. Schumacher, Matthew Parry, and Paul Murakawa



January 2013

On November 1, 2012, Matt Parry, Glenn Cambra, James (Brad) Stubbs and Paul Murakawa conducted an assessment of a location described by Matt Parry. He stated that the area was a boulder habitat with corals growing on the boulders. The GPS coordinates for the location are 21° 17.579' North, 157° 55.800' West. The area can be positively identified based on the presence of a hydraulic floor jack on the bottom. Numerous pieces of cement are also found in this area.

The survey team deployed a marker float at the GPS point and descended to the bottom. The depth was 23m (76 feet) and the habitat was predominantly a field of basalt boulders that were approximately the size of cinderblocks. The survey team swam around the field and took digital photographs. These photographs were later georeferenced. During this survey, divers noticed an abnormal density Crown of Thorns Starfish (*Acanthaster planci*) or COTS.

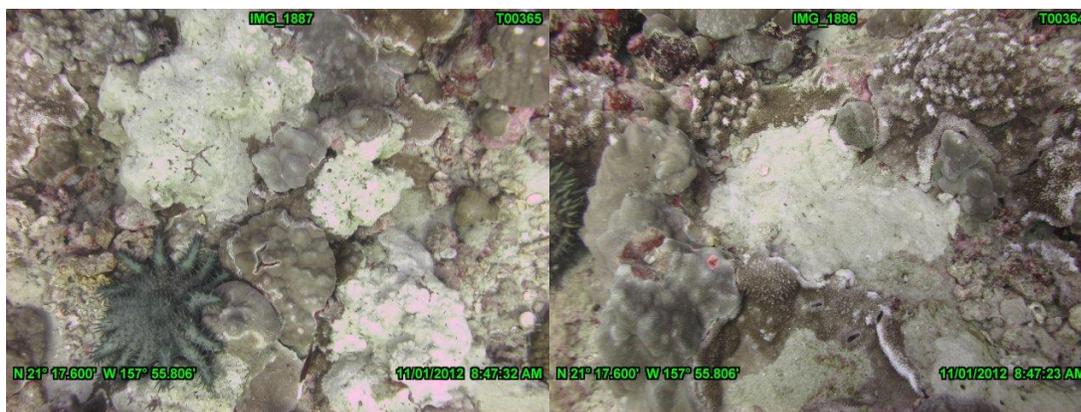


Figure 1. Photos showing COTS and scars from where they were feeding on the coral.

The survey team next swam inshore and observed more COTS. Approximately 100 COTS were observed during the dive. The density of COTS decreases towards shore. The team reached a seagrass bed (21 degrees 17.646N, 157 degrees 55.851W) and then sand, so the team proceeded southwest (offshore) to where there was hard bottom and coral growth. No COTS were observed after making the course adjustment.

After the dive the survey team discussed the unusual density of COTS, and whether a removal effort should be initiated. Prior to beginning such an effort, the team contacted several scientists with expertise working with COTS outbreaks. Dr. Charles Birkeland stated that previous COTS removal efforts programs may have prolonged the outbreaks. These results may seem counterintuitive, but it is theorized that removal efforts frequently miss small or hidden COTS. The remaining COTS have less competition, more food and greater reproductive rates. Based on this information, it was decided not to do a removal. However, an additional survey was planned to conduct a systematic count of the COTS.

On November 28, 2012, Matt Parry, Brett Schumacher, Kazuki Kageyama, James (Brad) Stubbs, Andrew Purves and Paul Murakawa went out to do the second assessment.

Method:

Divers divided into three teams. Two teams conducted a census of COTS, and a third team attempted to swim a perimeter around the area where COTS were found. This team would take photos that would be geo-referenced.

The method used for the COTS census was to survey along several belt transects. Transects were started at a central point laid out along cardinal and inter-cardinal headings. Each team surveyed 4 transects. One team did surveys along cardinal headings (north, east, south, west) and the other team conducted surveys along inter-cardinal headings (northeast, southeast, southwest, northwest). The first 5m by the central point were not counted to avoid partial overlap of transects. Beyond this point, all COTS in a 5m swath were counted for 50m. On the return count (as the transect line was being rolled up), scars (where COTS ate the coral) were counted and sized, and coral impacted were identified to species.

Results:

Quantitative surveys covered 2000 m² of habitat. A total of 21 COTS were recorded in this area, so their mean density is 0.0105 animals per m² in the survey area (Table 1). Thirty coral colonies with possible damage from COTS were identified, or a density of 0.015 damaged colonies per m². Seventy percent of the damaged colonies were *Montipora capitata*, while smaller percentages of *Pocillopora meandrina*, *Porites compressa*, *P. lobata*, and *P. lutea* colonies showed damage. Overall density of coral and relative abundance of coral species along the survey transects was not measured.

Table 1. Results of Crown of Thorns Starfish (COTS) surveys.

	COTS	Poc_mean	Por_comp	Por_lob	Por_lut	Mont_capt	Coral_total
Total	21	4	2	2	1	21	30
Percent	-	13.3	6.7	6.7	3.3	70.0	100
Density/m	0.0105	0.002	0.001	0.001	0.0005	0.0105	0.015

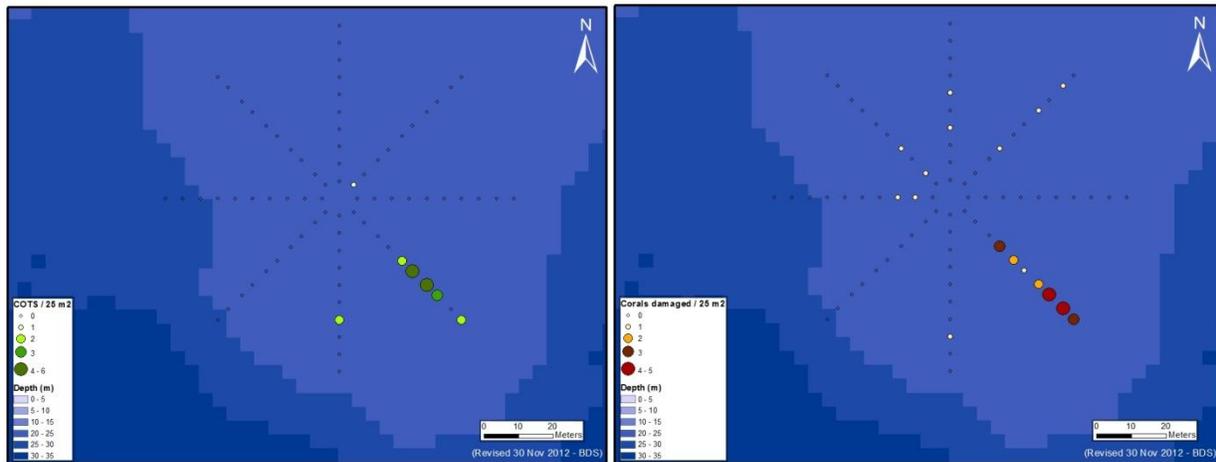


Figure 2. Map of Crown of Thorns Starfish (COTS) and coral damage. Data from surveys is pooled in 5 m segments. Right pane shows number of COTS observed. Left pane shows the number of coral colonies damaged.

The teams doing the transect surveys did not observe as many COTS as on the previous assessment. Greater numbers of COTS and coral damage were recorded along the southeast transect (Figure 2). The third team recorded more COTS to the east of the location than were seen previously. Unfortunately, the GPS unit failed so it was not possible to geo-reference the photographs. It appears the COTS may have moved east from the location where they were originally observed.