DOC was sampled at 12 sites to compare DOC export in native and non-native canopies, though this sample size was deemed too small to try to model DOC concentrations under the future transformation scenario. Sites were chosen to represent different parts of the atoll, shorelines facing different directions (N, S, E, W), different canopy types and different C. nucifera removal schedules. Because metabolism by marine organisms can alter DOC flux, and respiration and photosynthesis are affected by temperature and light, three HOBO Pendant® Temperature/Light Data Loggers were place on the shoreline for 24 hours at each DOC site, and at least one logger returned air temperature and lux each minute for each site (we report the average daily value per site across all functioning loggers). Lux was converted to relative lux by dividing values at a site by values at an unshaded site. To confirm that shading reduced water temperature in the nearshore, we compared four submerged shaded loggers with two submerged unshaded loggers.

Two samples were taken 50 m apart at each site. Three comparison samples (expected to be low in terrestrial influence) were taken from surface waters offshore of the atoll, on the forereef and from lagoon away from shore. Water samples were collected in new quart Ziploc bags with powder free gloves and put on ice after collection. To process DOC, Luer lock syringes were filled with 5% HCl for > 1 hour, then rinsed 2 more times with acid, then rinsed with distilled water before use. Filter holders were similarly soaked in 5% HCl and rinsed. The DOC filtering procedure involved drawing 60 ml of water from the sample bag into a syringe as a rinse and then then drawing a second 60 ml for the sample. A combusted GF75 filter was loaded into a clean 25 mm plastic filter holder and connected to the syringe. The syringe was used to filter 30 ml of sample to rinse an acid-washed collection vial three times. The last 30ml was inserted into the vial and the vial was capped. One filter was used per site. Filtered samples were acidified to pH 2- by adding 50ul 4N HCl, then agitated to mix. Samples were stored and shipped to Dr. Craig Carlson’s lab at the University of California, Santa Barbara for analysis. Samples were analyzed via high temperature combustion method on a modified Shimadzu TOC-V or Shimadzu TOC-L using the standardization and referencing approaches described in (Carlson et al., 2010); detection limit was roughly 1 μmol C L–1.