

Project Update: September 2017

Over the past year my research has focused entirely on laboratory analysis and writing, as we have done extensive fieldwork already.

For starters, a pre-print is now available focusing on a characterisation of the *Symbiodinium* communities of corals we collected in 2014, as part of my first RSG (<https://www.biorxiv.org/content/early/2017/06/22/154179>). Look for the full publication in the coming months.

In addition to that, I spent the last year or so analysing data from coral cores we collected in 2015.

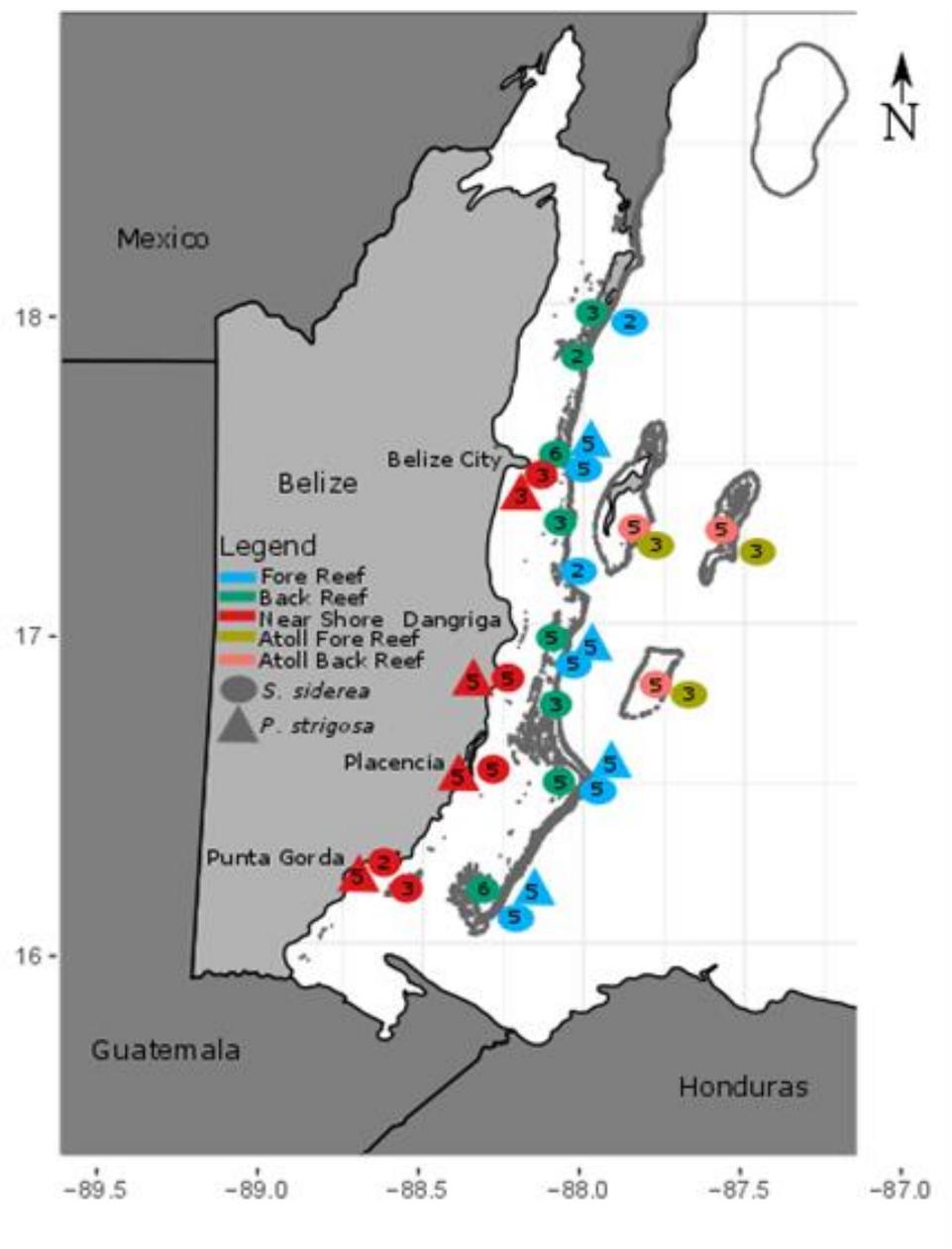


Fig 1: A map of core collection sites.

These cores were CT scanned in order to see the semi-annual growth bands. We then use these growth bands and some tricky maths to measure the extension rate, density, and calcification rate of each coral during each year. The CT scanned corals look like this:

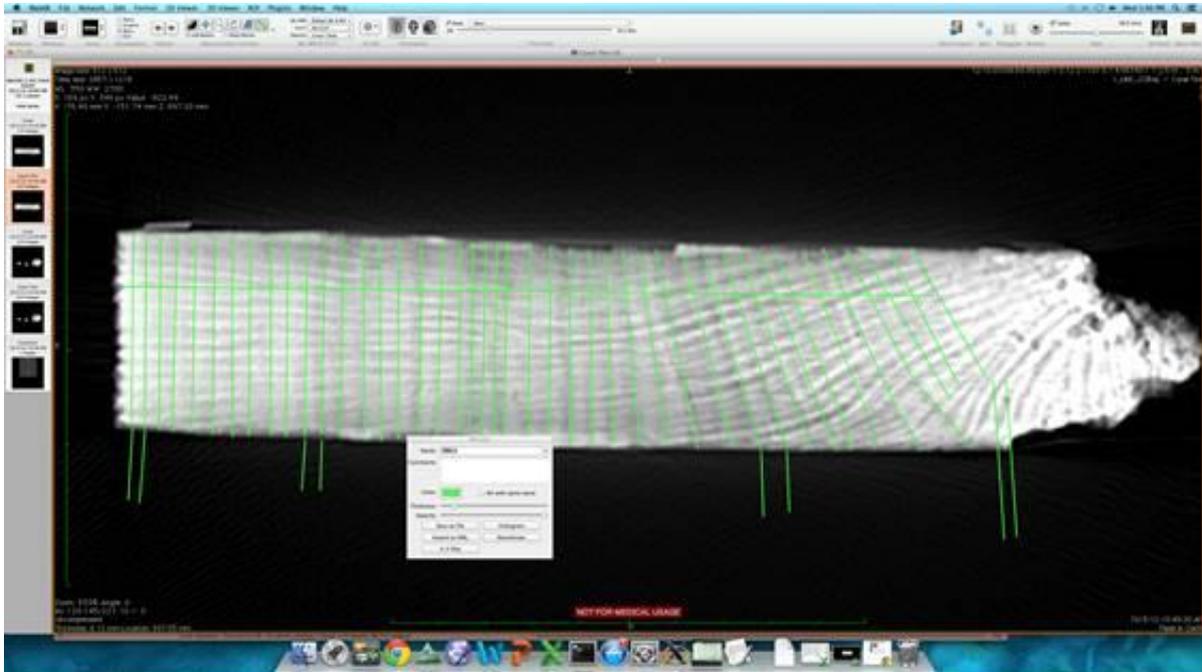


Fig 2: A CT scan of a coral core. Green lines are drawn in by hand to visualize the annual banding patterns.

We have found that corals that grow nearer to the shore, although they are subjected to hotter summers, more time above the bleaching threshold, and probably more runoff and land based stress actually grow faster than offshore counterparts. We also know from our previous two grants that the coral communities inshore are much less diverse and that the corals present in those communities do not appear to preferentially partner with a thermally tolerant species of *Symbiodinium*. This leads us to believe that there is some sort of host genetic advantage to living inshore (local acclimatization or adaptation) or that the inshore environment is providing more heterotrophic food for growth, or that warmer temperatures increase metabolism, which in turn increases growth. In order to answer this questions we have proposed a tank based experiment. However, due to some travel difficulties and a difficult hurricane season we have delayed our field research until December 2017. We have also altered our experimental design in order to partner with an NGO called Fragments of Hope. Fragments of Hope is doing coral restoration throughout Belize and already has structures in place that would allow us to do reciprocal transplants of corals from inshore to offshore and vice-versa. This will allow us to test the possibility of local acclimatization and/or adaptation. We are very excited about the partnership and are looking forward to our upcoming field trip in December 2017.

