**Developing a predictive model of coral disease: analyzing the results of the Rapid Status Assessment (RaStA) project**

The coral disease white plague is a significant source of coral mortality in Caribbean coral reef systems. Despite its importance, developing predictive models of its incidence and dynamics has been difficulty due to the rarity and patchiness of this disease in natural environments. The situation is further complicated by limited observations because of SCUBA diving constraints and low host abundances in reef systems that have seen significant declines in coral abundances.

In February of 2012, my laboratory began applying drop camera technology to perform high frequency, spatially extensive surveys for white plague across large populations of corals. Approximately monthly drop camera video surveys were performed at 12 reef sites distributed across an area of approximately 600 km2 on the south shelf of St. Thomas Island, U.S. Virgin Islands. Sites occurred across a range of depths (5-40 m) and host population abundances (coral cover ranged from 7-35%). CTD casts were performed in conjunction with video transects to collect data on temperature, salinity, chlorophyll, dissolved oxygen, and turbidity for each survey. Video transects were analyzed to quantify disease prevalence (% of the coral population affected by disease) for each survey.

The objective of this study is to quantify the temporal and spatial dynamics of disease in relationship to environmental factors that may be important in disease outbreaks. The ultimate goal of this work is a predictive model of white plague disease across heterogeneous reef communities. In Pacific reef systems, a similar disease has been identified to be driven by thermal dynamics and host abundances. It is hypothesized, therefore, that Caribbean white plague disease dynamics are also driven by temperature and host density. Preliminary analysis of the first 8 months of data suggest that disease was highest at deep (>30 m) sites and was positively associated with salinity and negatively associated with turbidity. Surprisingly, disease was not associated with coral density or temperature and its temporal dynamics were variable across sites. However, these data are complicated by an abundance of low or zero prevalence data and the “traditional” frequentist statistical techniques that I have applied may not be the most powerful or appropriate.