Determinants of Habitat Use in Cleaner Gobies (*Elacatinus prochilos* and *E. evelynae*) in Barbados

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Outline

- Elacatinus group
  - Cleaner gobies
- Previous work
- Objectives
- Methods
  - Mapping
  - Monitoring
- Preliminary Trends
- Proposed work

About Cleaner Gobies
Elacatinus group

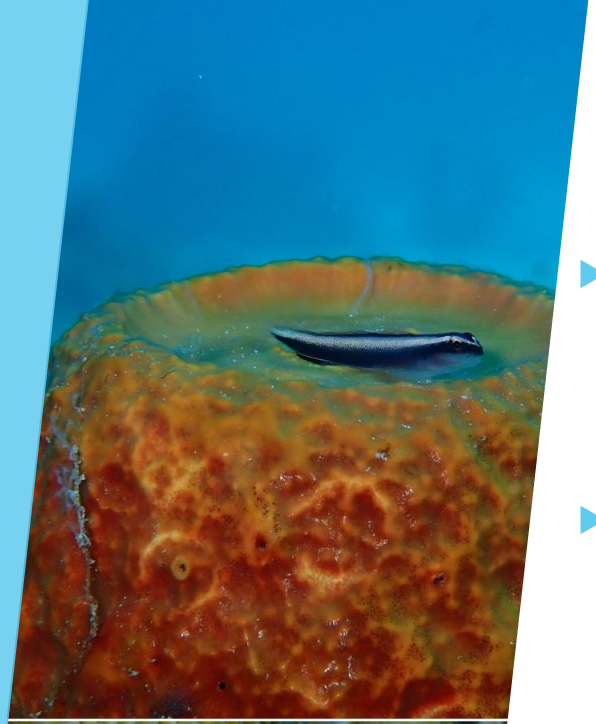
- Elacatinus group
  - Species rich group-28 species
- Includes cleaners
  - Small (2-3.5cm) reef fish, that feed on ectoparasites of other fish (clients)
  - Obligate or facultative cleaners
- Importance
  - Improve client health
  - Possible indirect effect on diversity

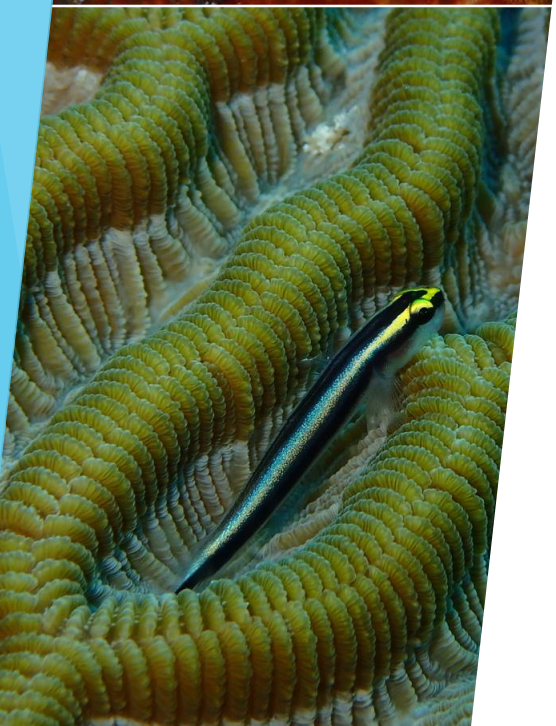
About Cleaner Gobies

- **Where do they live?**
  1. Flexibility in microhabitat use:

     - Sponges: Large groups, Non-cleaner diet
     - Corals (cleaning stations)- single/couples, Client gleaned material
     - **What are the causes and consequences of habitat choice?**

  2. The distribution of both species often overlaps over small spatial scales:
     - **They are very similar ecologically, so how can they co-exist?**





Previous work

Causes and consequences of habitat choice…

- Whiteman and Cote (2004)
  - *E. prochilos*, Barbados
  - Inconclusive as to preferred substrate

- White Grigbsy and Warner (2007)
  - *E. evelynae*, St. Croix
  - Sponges are better habitat
    - Higher survivorship and faster growth rates

…and how do they co exist?

- Wilson (2004)
  - *E. prochilos* and *E. evelynae*, St. Croix
  - Introduced idea of habitat quality
  - Both species ecologically and competitively similar
    - Both used corals
    - Co-exist because of temporal partitioning

Objectives:

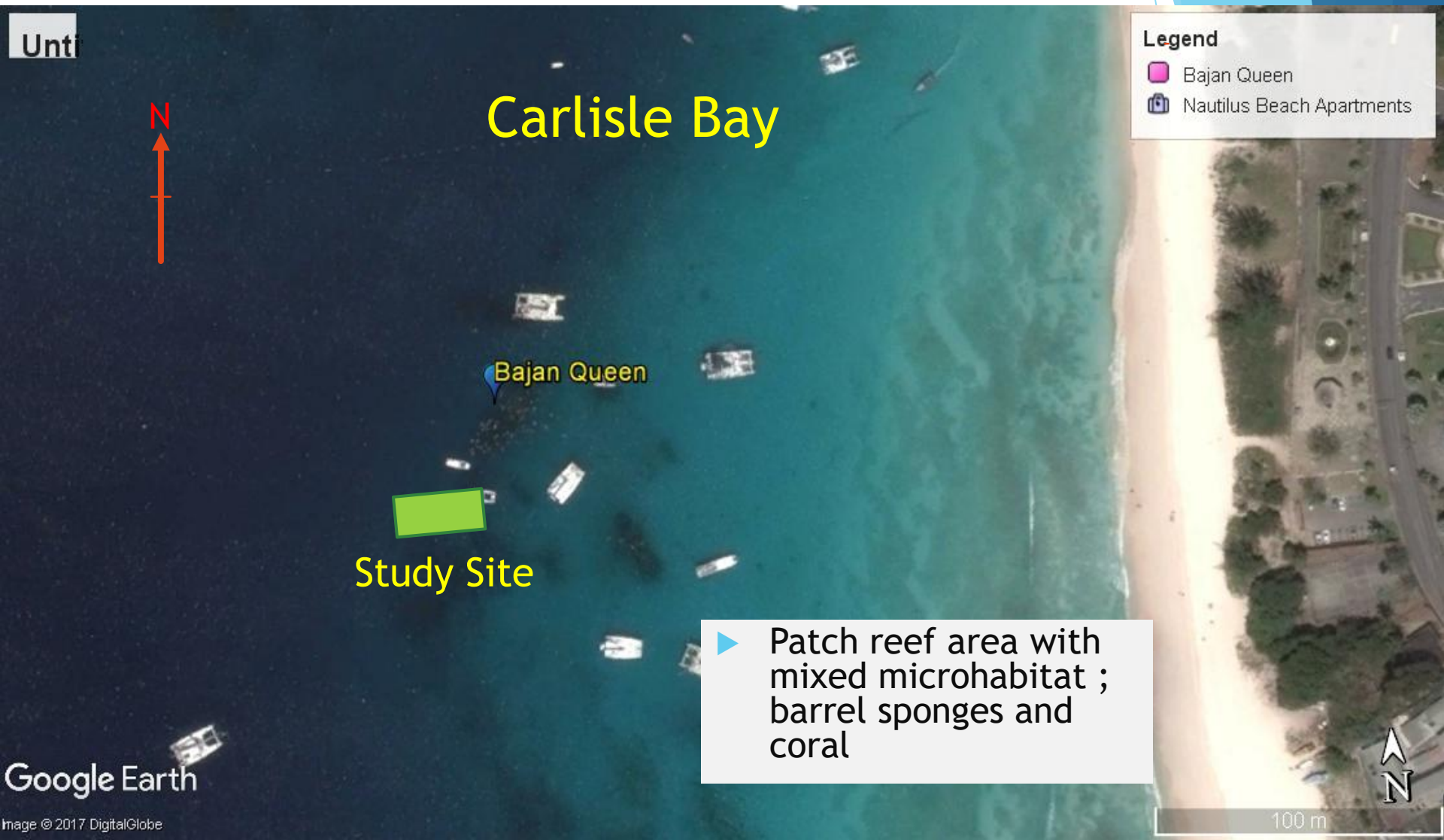
1. **To describe long term population dynamics of *E. prochilos and E. evelynae*:**
   - Timing and magnitude of settlement peaks / seasonal patterns
   - Changes in size-structure over time
   - Small scale movement patterns

2. **To assess factors associated with microhabitat use by *E. prochilos and E. evelynae*:**
   - Size-dependent habitat use
   - Substrate preference?
     - Occupation and availability of substrate
   - Features of regularly occupied substrates
     - Characterization of physical/biological features

3. **To evaluate effects of habitat use on fitness of *E. prochilos and E. evelinae* :**
   - Survivorship
   - Growth rates- sponge vs other

4. **To use the above from the above to asses how these two species co-exist.**
   - Temporal/Spatial partitioning

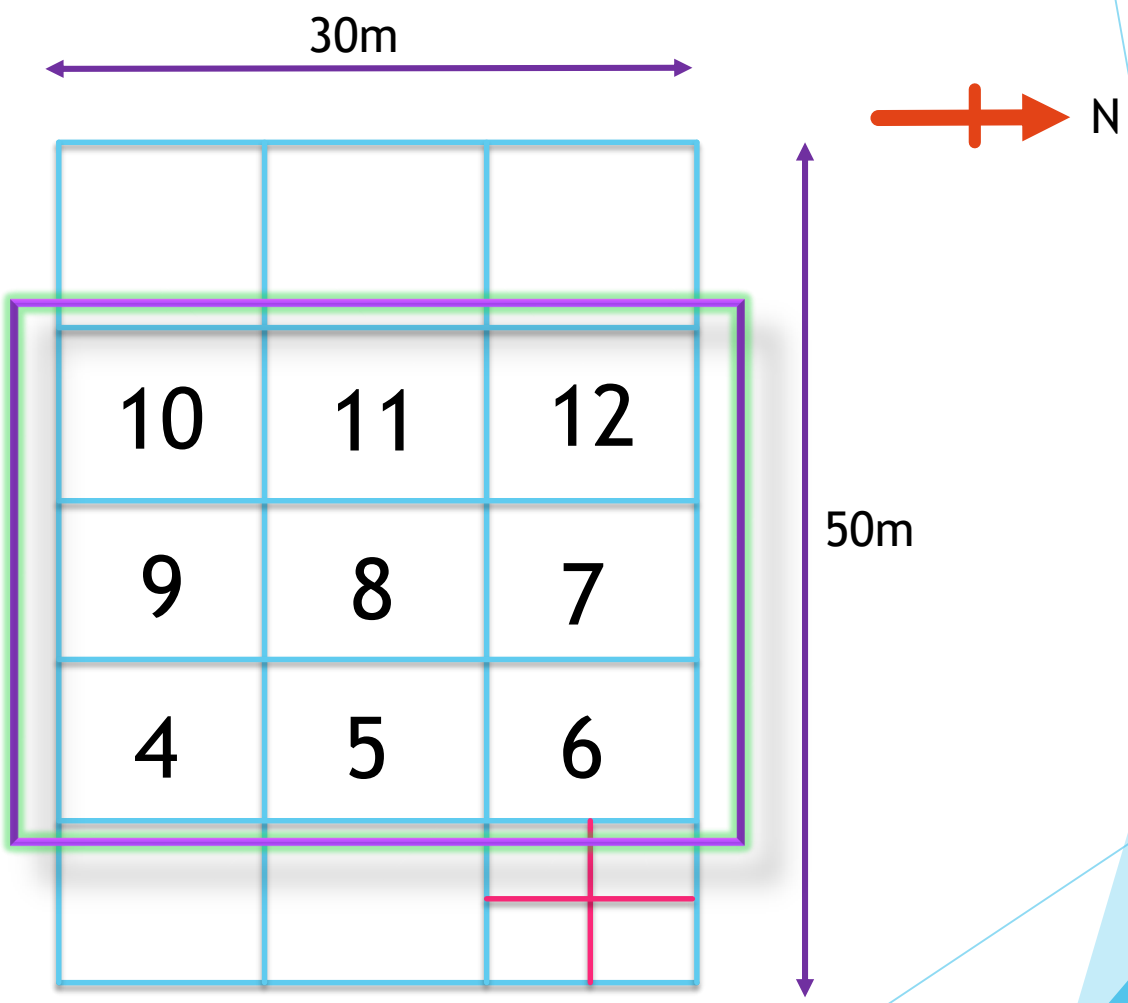
Methods
Study Area



- Patch reef area with mixed microhabitat ; barrel sponges and coral

Methods

Year long monitoring of goby populations



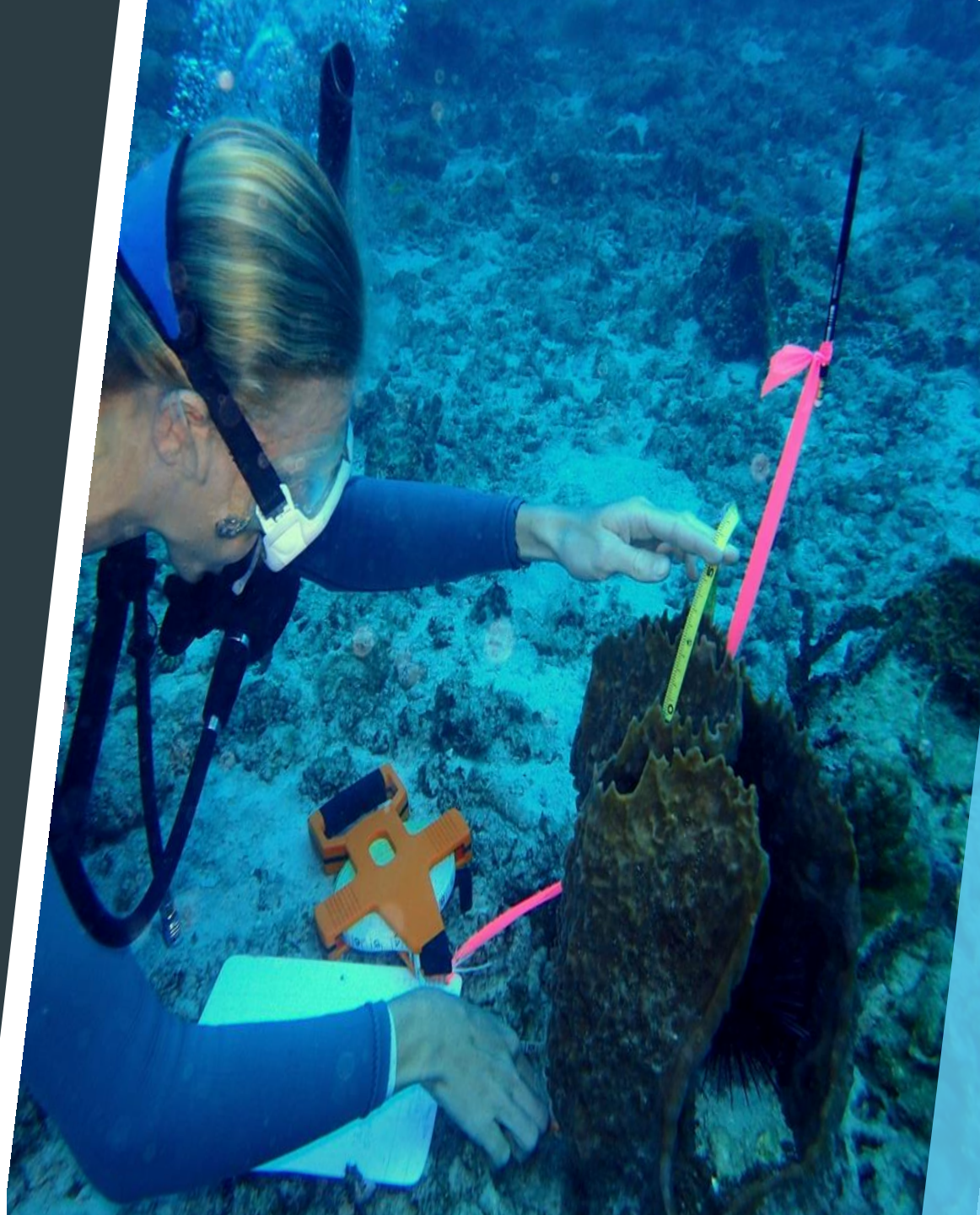
Methods
Monitoring

- Bi-weekly Surveys
  - Recording abundance
  - Size determination-
    - <15mm, 15-20mm, 20-25mm, 25-30mm, >30mm

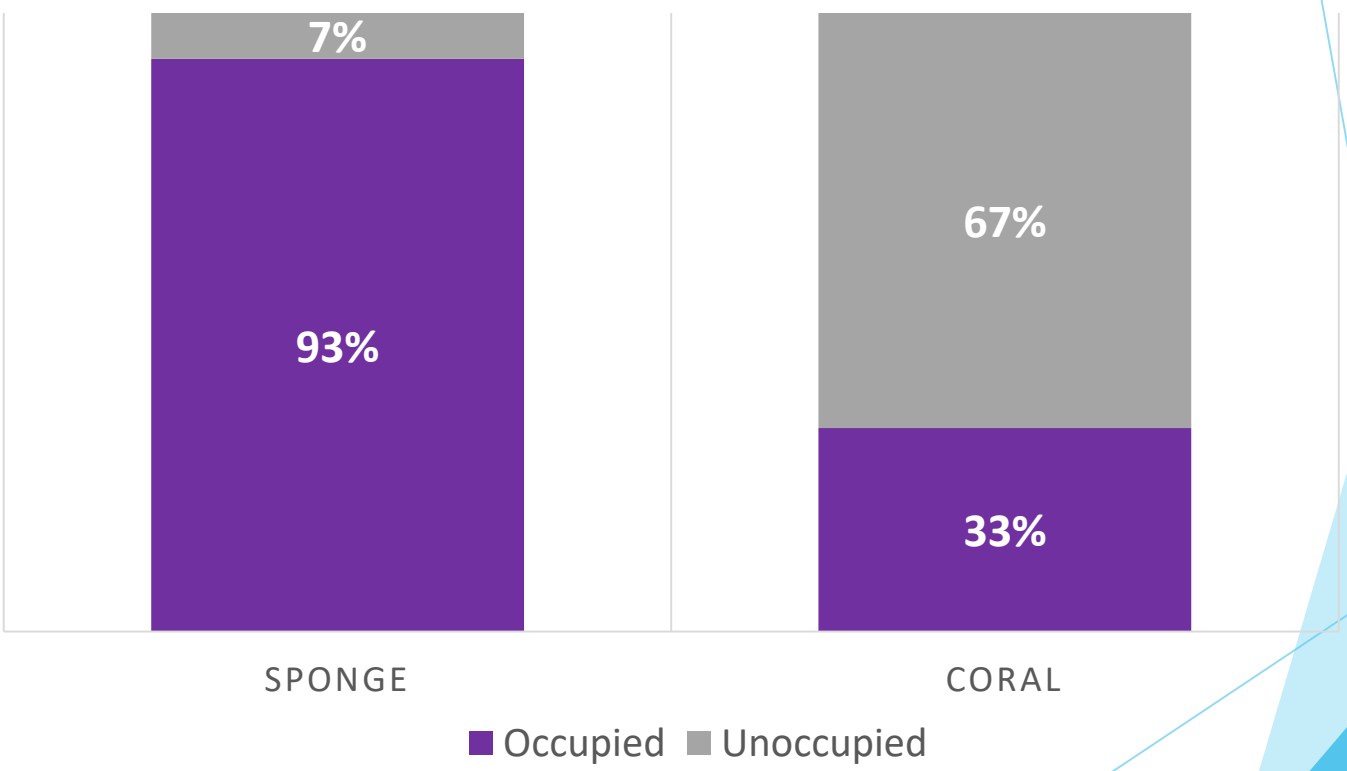
Tape post-movement method*

Methods
Monitoring

- Substrate Measurements
  - Coral
    - Length
    - Width
    - Height from substrate
    - Height coral
  - Sponge
    - Base circumference
    - Base diameter
    - Osculum length
    - Osculum width
    - Spongecoel height
    - Height

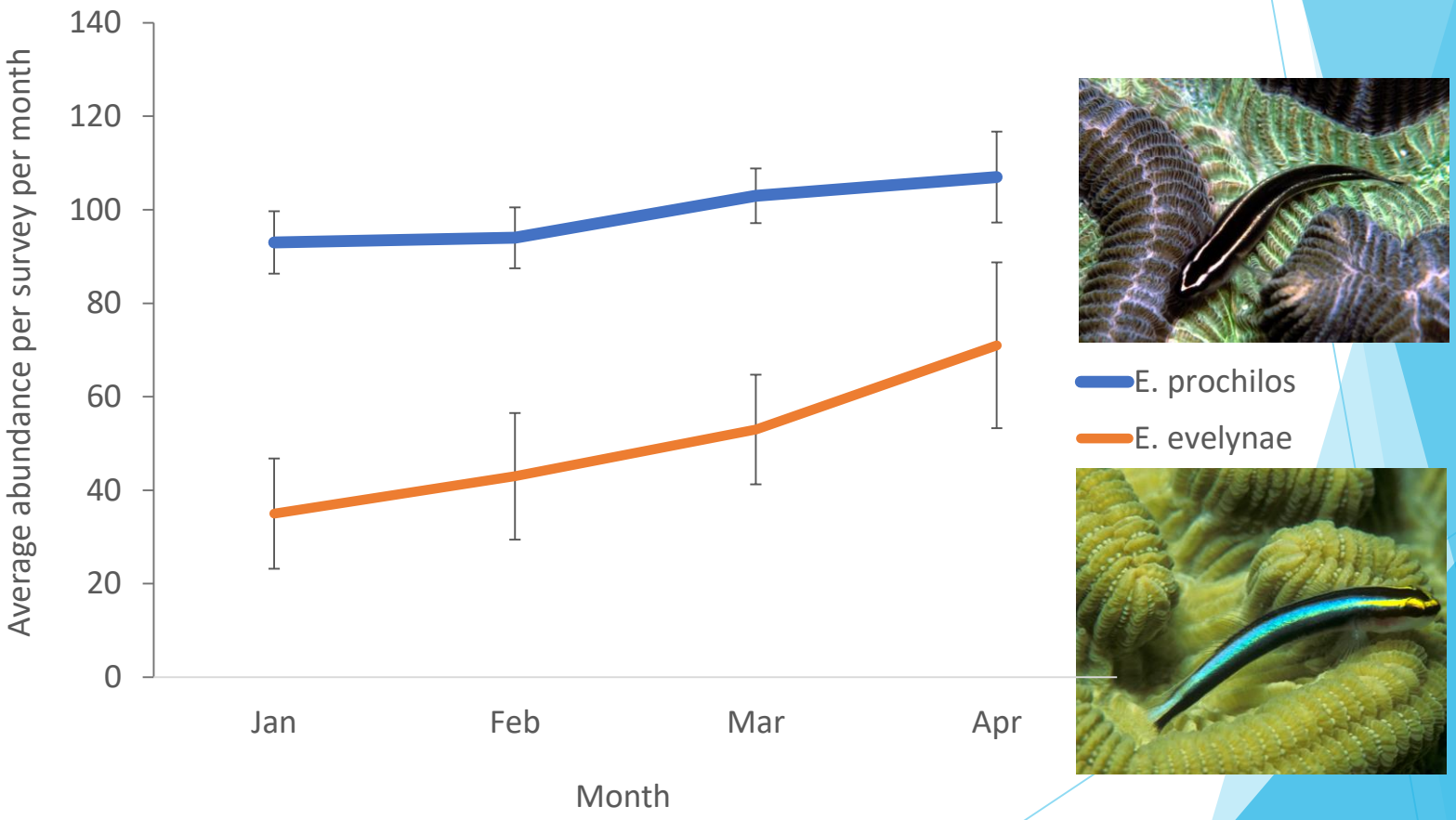


Preliminary Trends
Overall habitat use



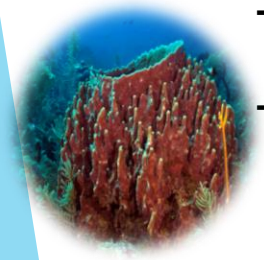
Preliminary Trends

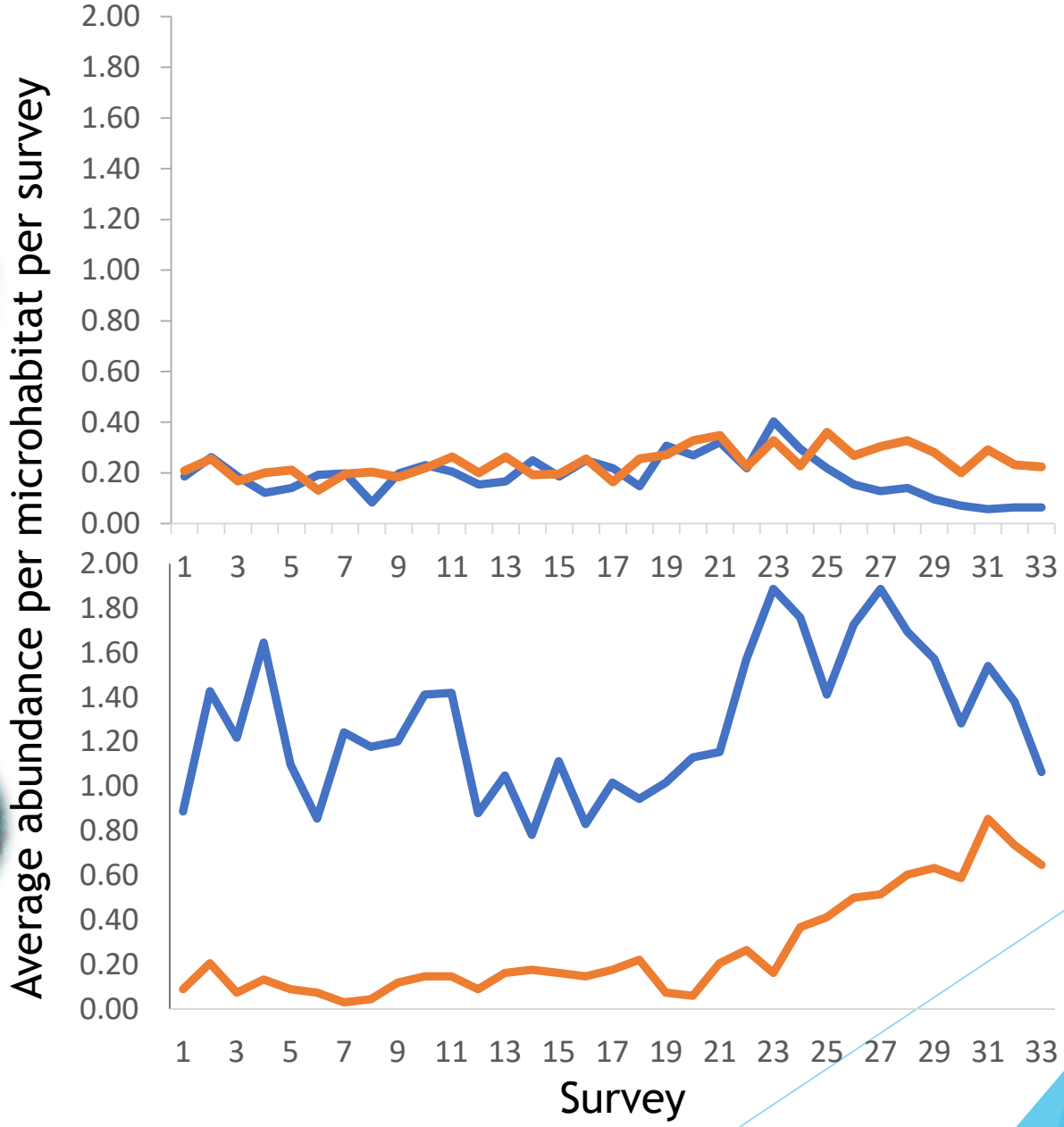
Temporal patterns-monthly variation



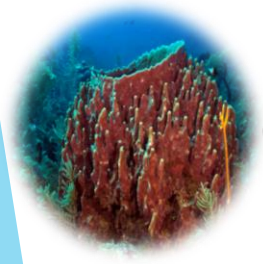
Spatio-temporal Trends

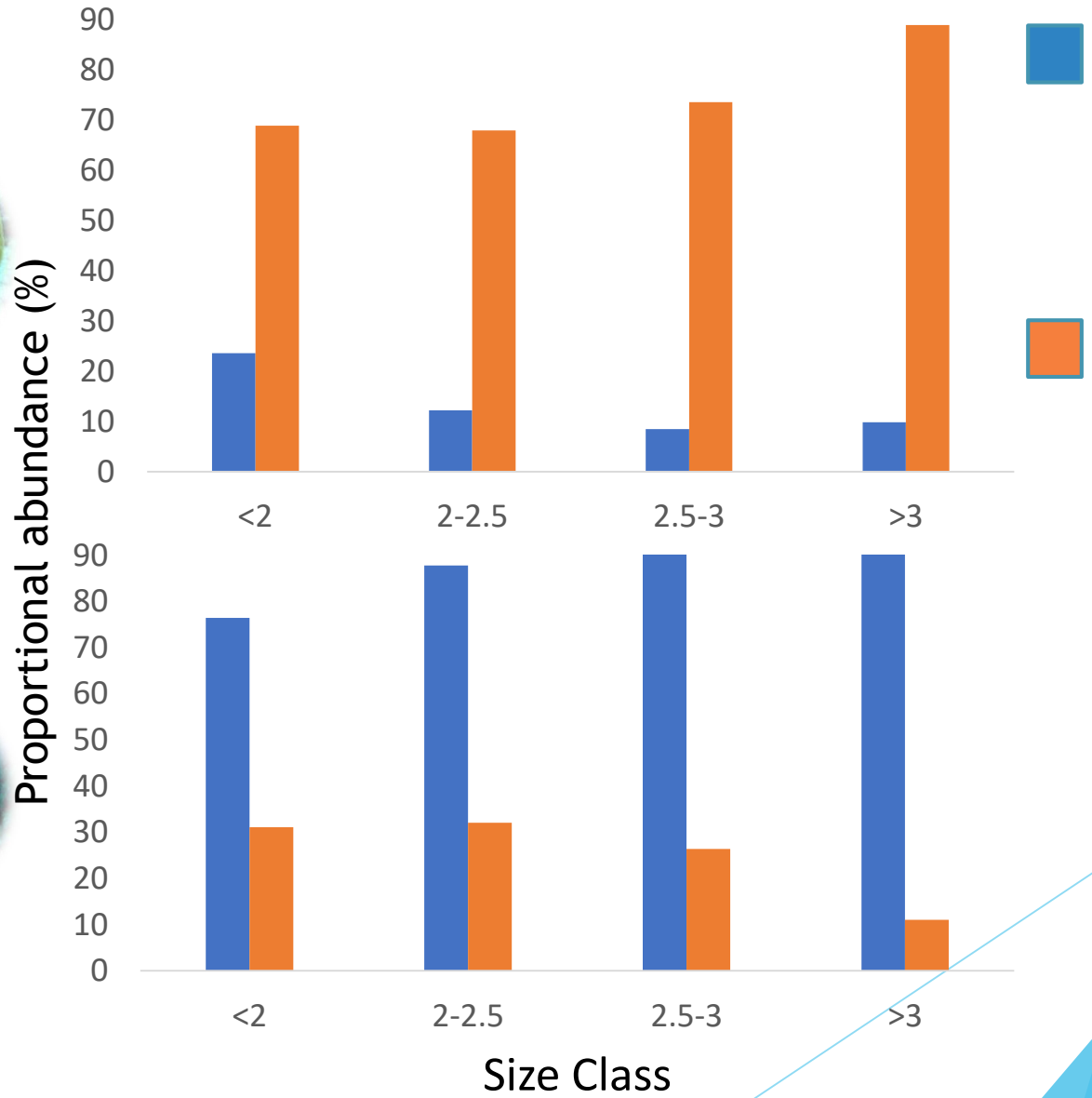
Habitat use of coral and sponge over 4 months





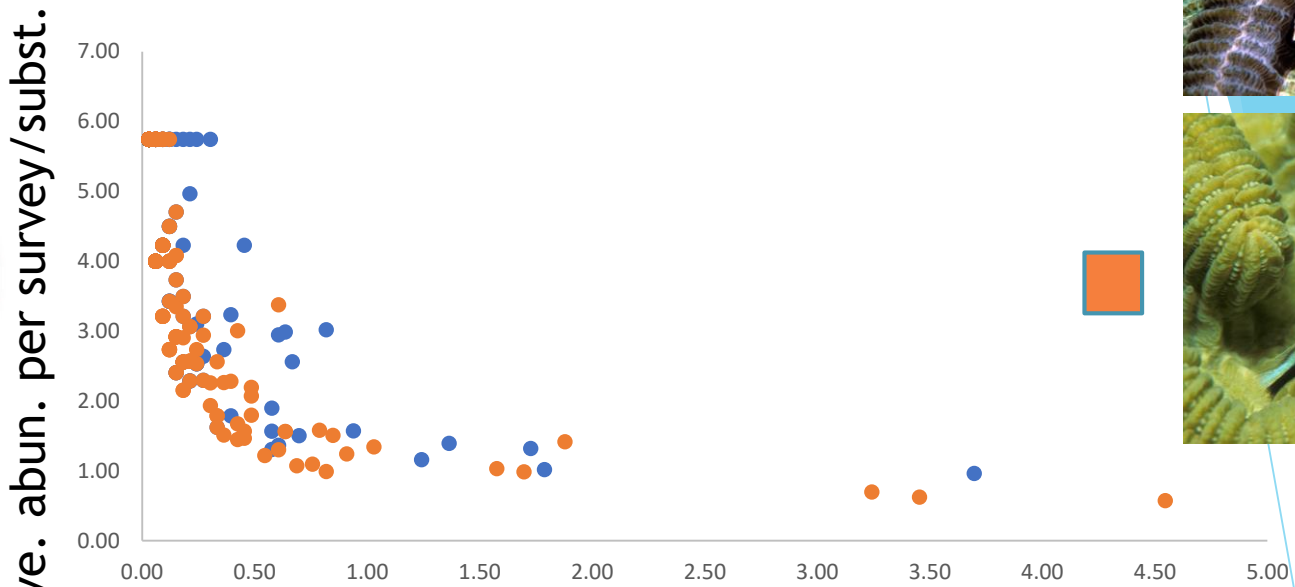
Spatial trends
Size dependent microhabitat use

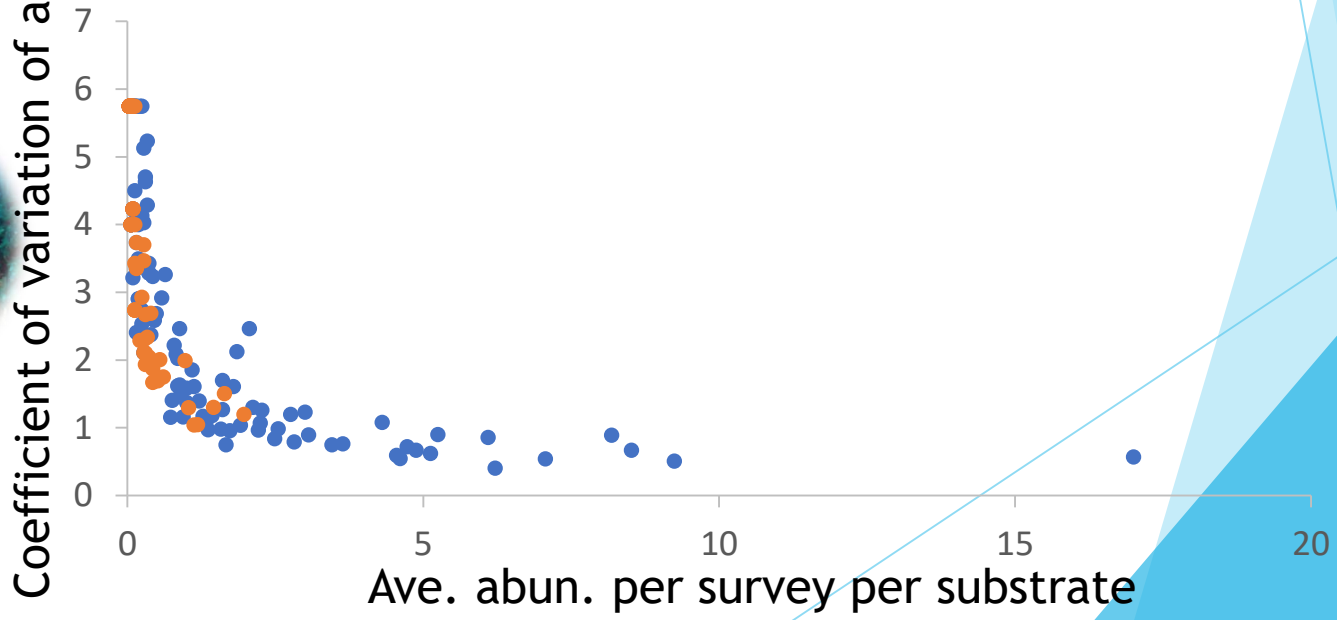




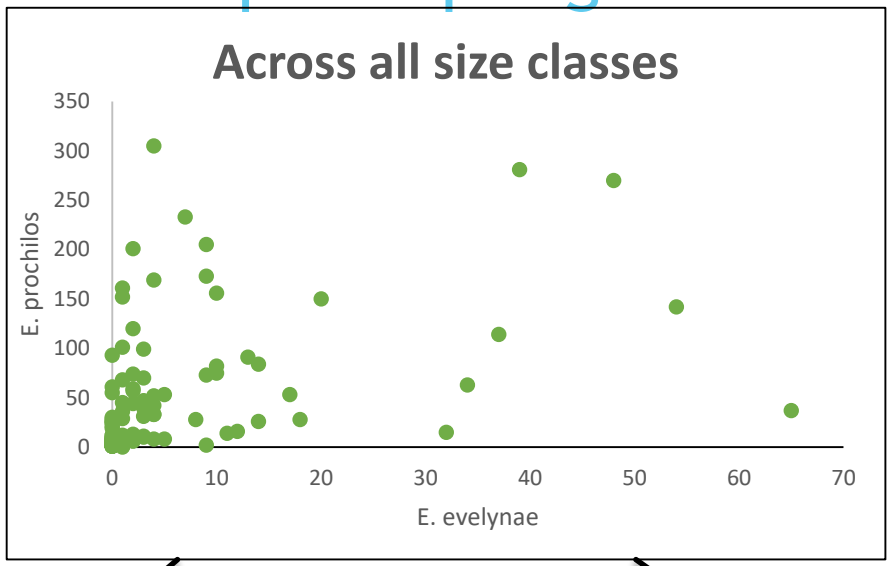
Spatial trends

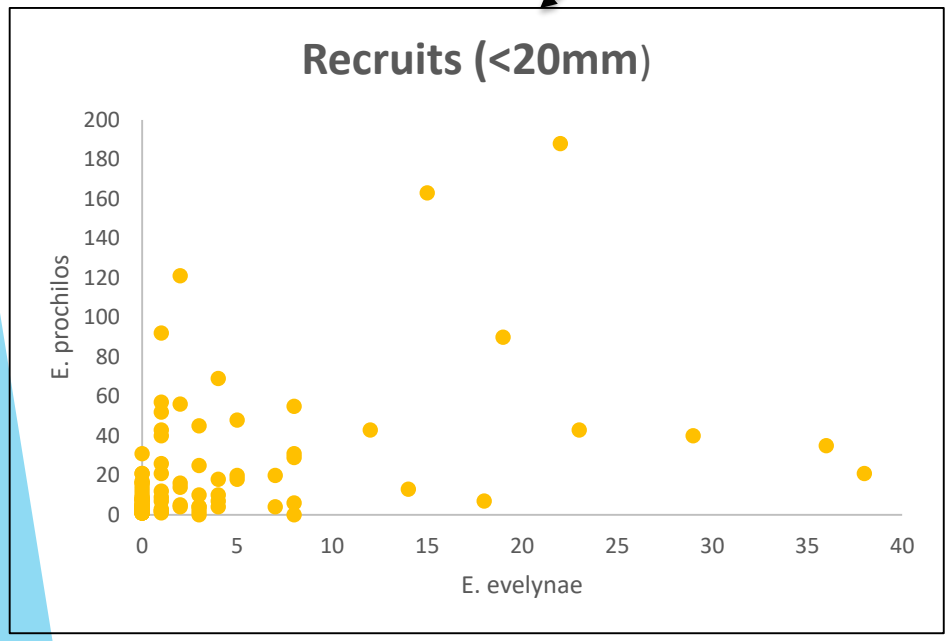
Habitat quality of coral and sponge

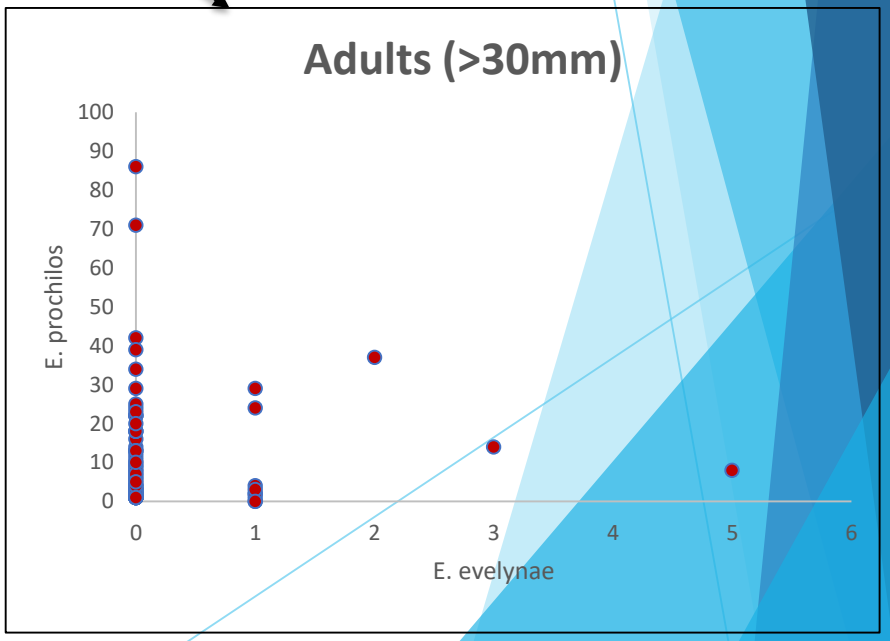




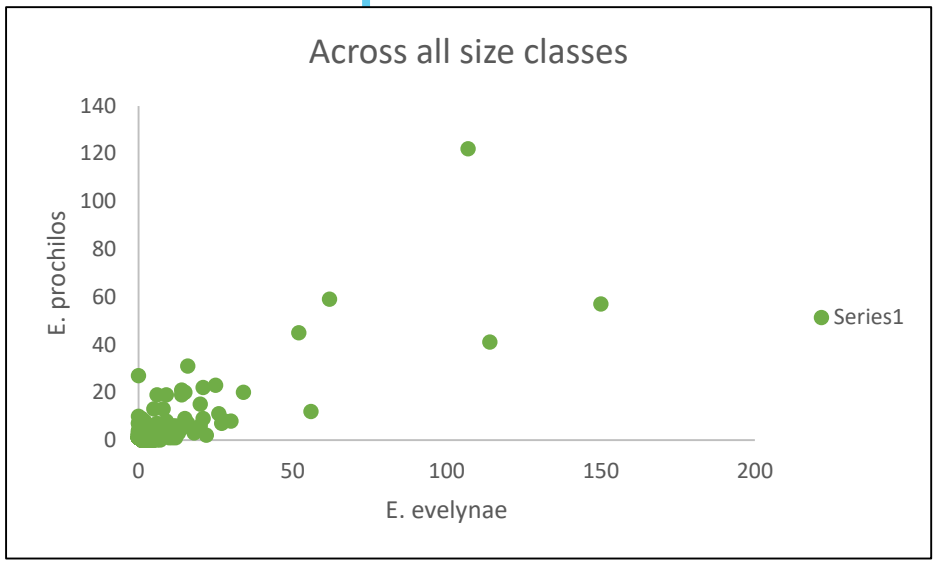
Habitat use overlap on Sponges

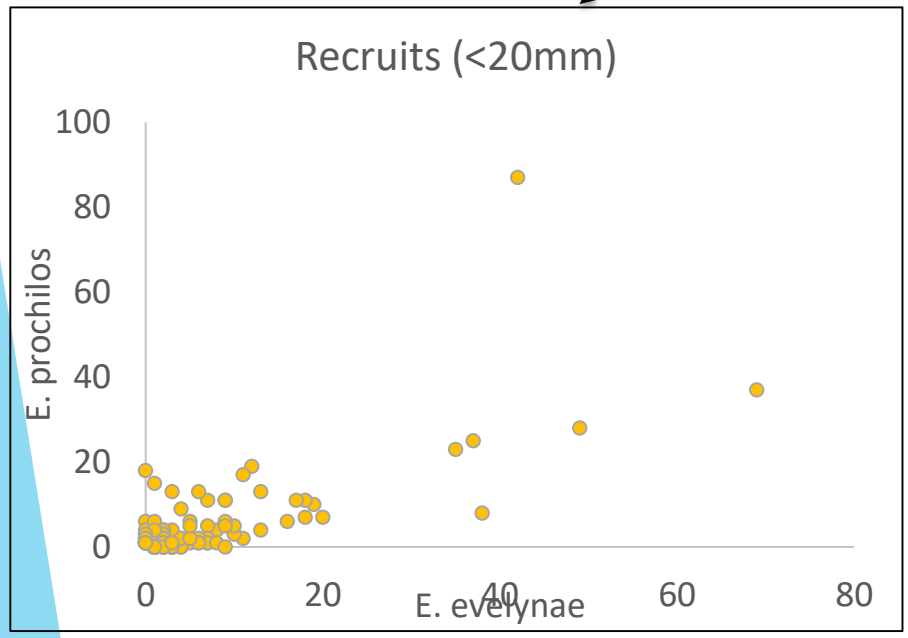


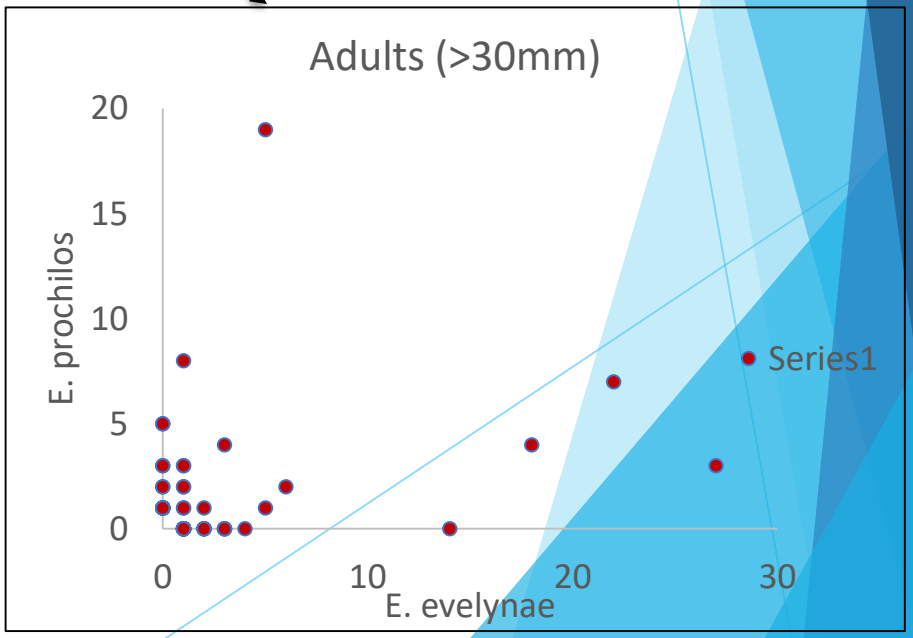




Habitat use overlap on coral

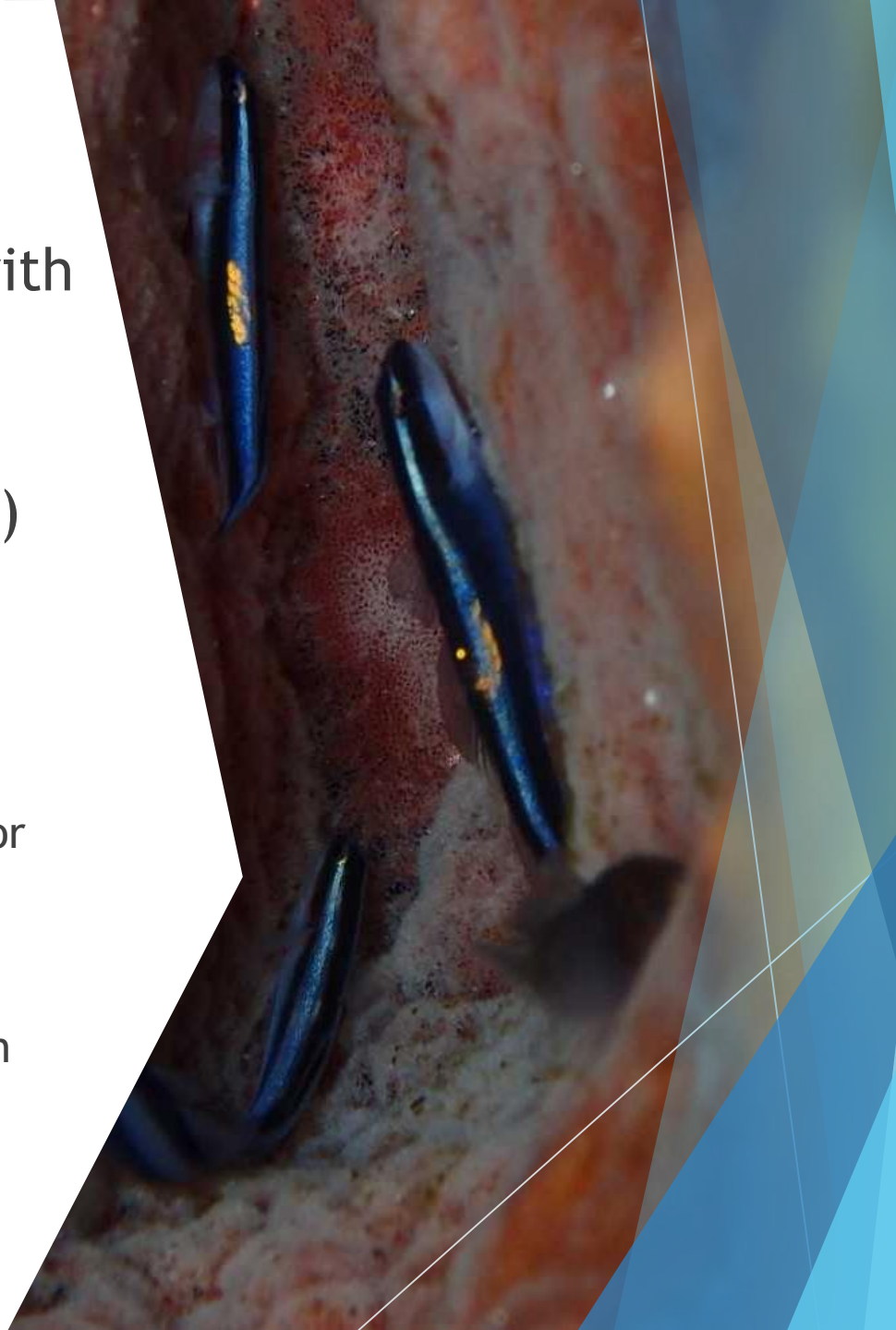






Further work

- Correlate occupancy with substrate features
- Experiments (removals)
  - Small scale movement monitoring
  - Otolith and Survivorship analysis
    - Good, average and poor quality habitat
- Observations
    - Determine competition



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Thank you for listening!