

Summer Research 2011

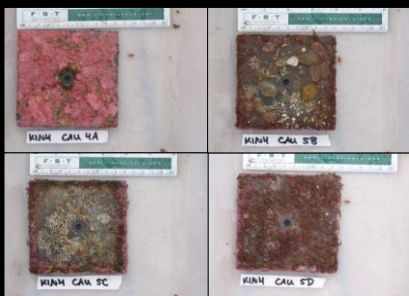
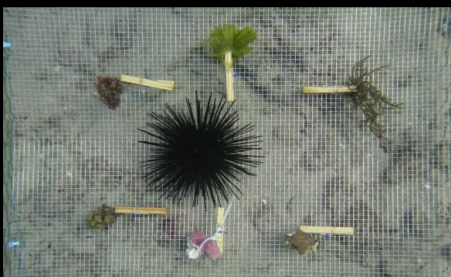
Levi Lewis
June 2, 2011



Lab Meeting

Four Research Projects

- 1) Cryptic Invert Density & Diversity
- 2) Urchin Grazing Assays
- 3) Urchin Diversity Experiment
- 4) Effect of water quality & grazing on CAU succession/accretion



1. Cryptic Inverts

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Cryptic Inverts: *are they important?*

Orth and van Montfrans 1984

Jernakoff et al. 2006

Kiting et al. 1984

Duffy et al. 2001, 2003, 2006

Heck et al. 2000, 2006

Williams and Ruckelshaus 1993

Heck and Valentine 2007

Neckels et al. 1993

Hauxwell et al. 2001

Davenport and Anderson 2007

Hughes et al. 2003

Duffy and Hay 1991

Paine 1980

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Cryptic Inverts: *are they important?*

1

Dr. Robert Carpenter 1997

“The sheer **number** and **diversity** of mobile invertebrates ...are especially **daunting**...”

Cryptic invertebrates have “**minor effects**” due to their small size & abundance.

1. Cryptic Inverts - Questions



1. How do abundance and diversity vary?
2. What factors determine abundance & diversity?

EMPHASIS: Non-destructive sampling methods



Cost: \$285
Depth: 30ft
TimeL: Hacked

\$250
180ft
Standard

\$500
180ft
Standard

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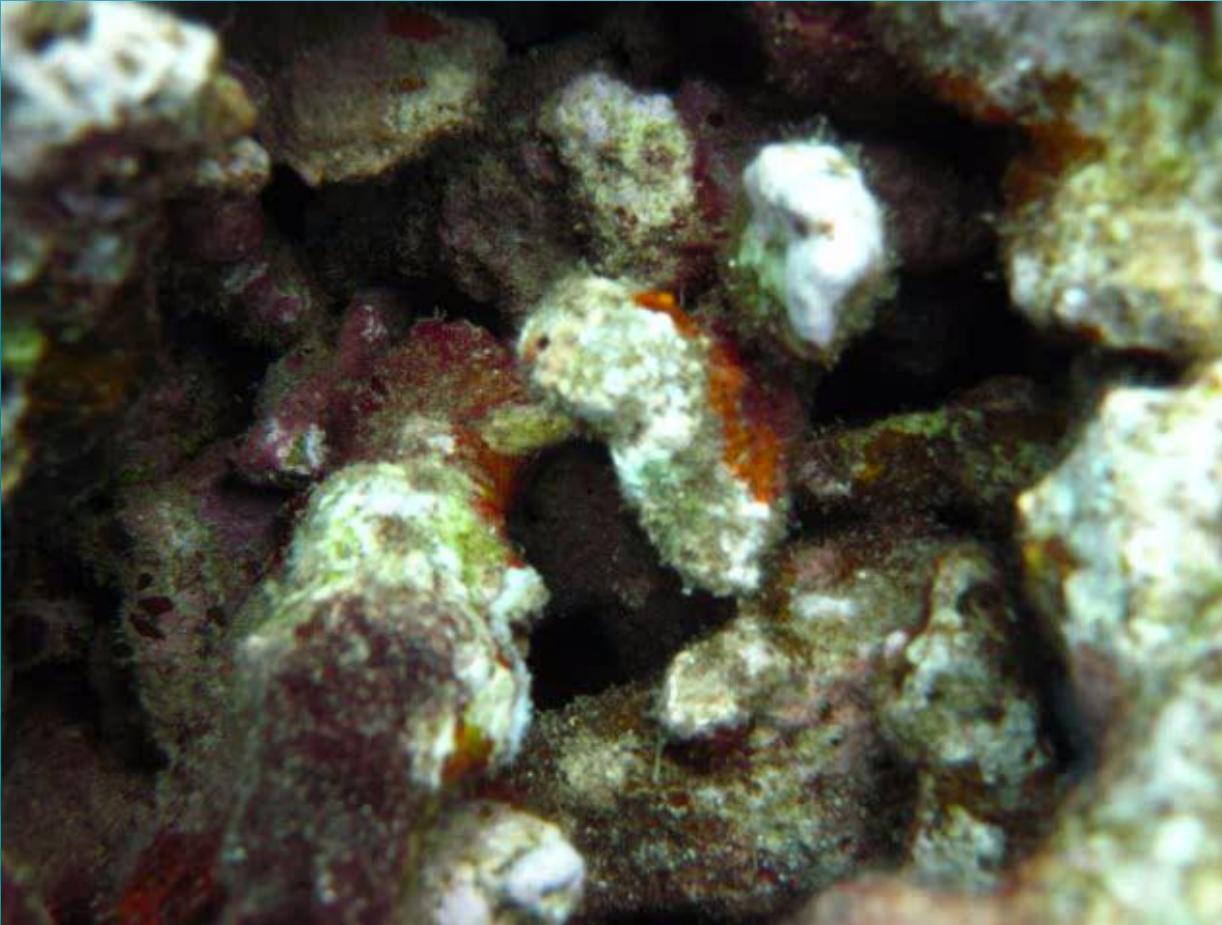


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\$250
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1. Cryptic Inverts – Methods



- **Time-Lapse Imaging**
- **100-200 cm² areas**
- **18:00-24:00**
- **Habitat Types**
 - Rubble
 - Mixed Reef
 - Live Coral
 - Pavement
 - Sand
 - “Dead Zone”
- **Depths**
 - 5 m, 10 m
- **Taxonomic IDs**
 - Brittle Stars
 - Cryptic Fishes
 - Shrimps
 - Spaghetti Worms
 - Hermit Crabs



02/19/2011 17:04



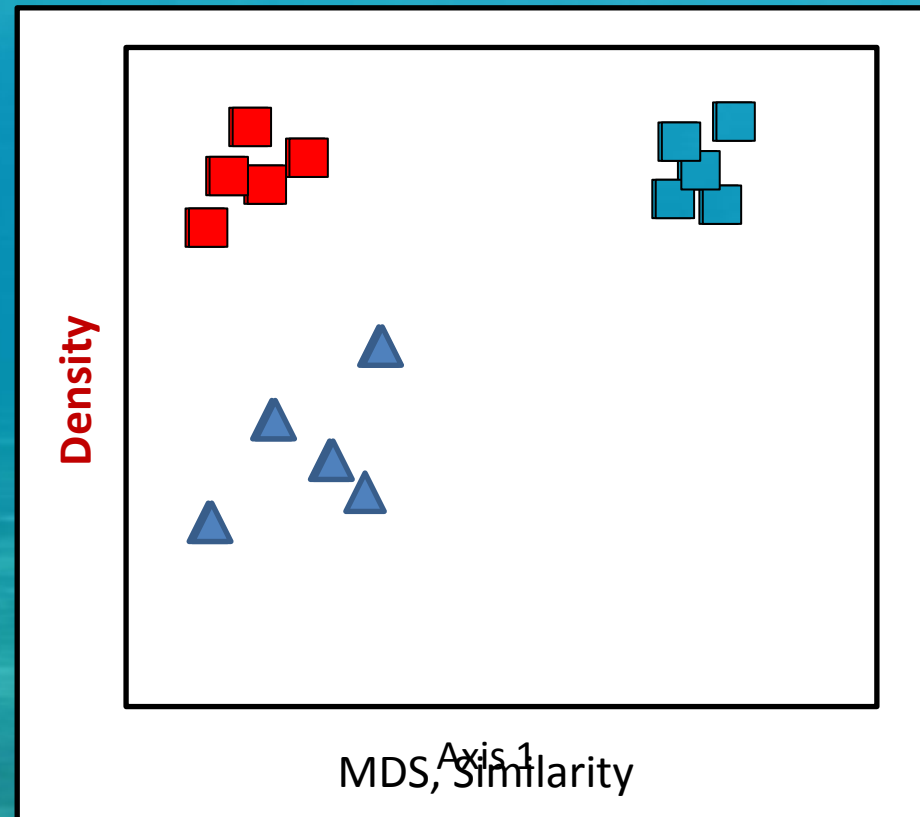
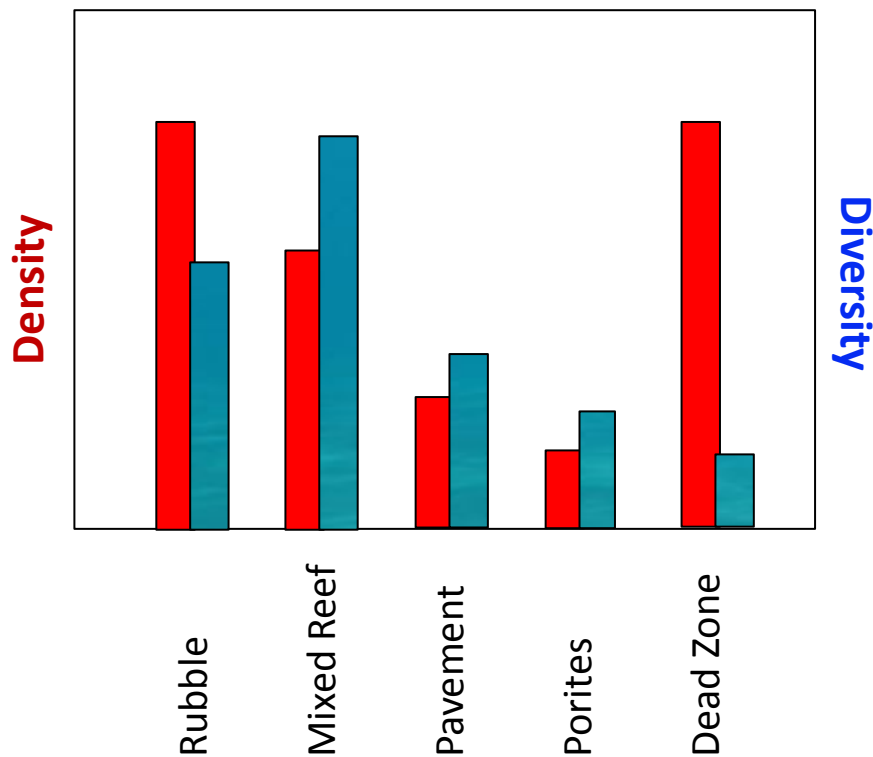


1. Cryptic Inverts – Analyses

Diversity = $f(\text{habitat type, depth})$

Density = $f(\text{habitat type, depth})$

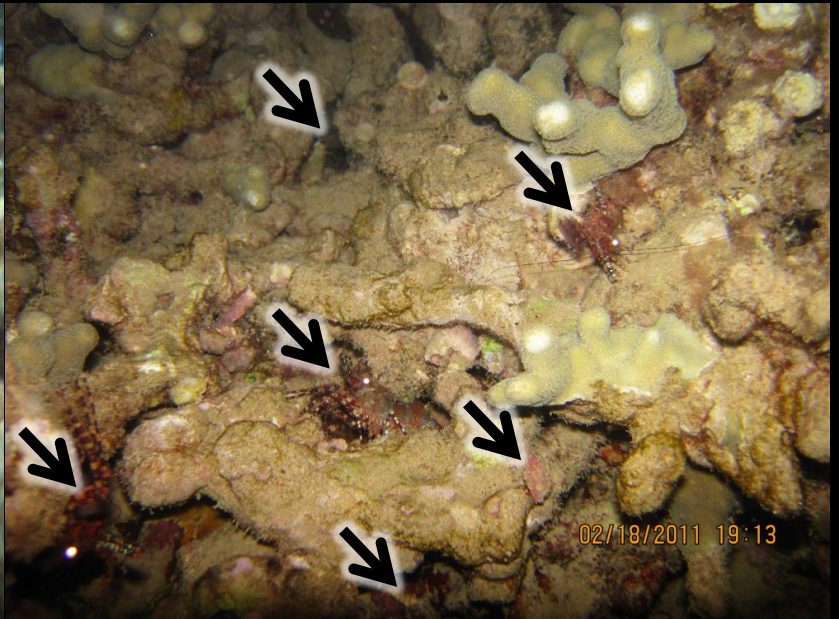
Composition = $f(\text{habitat type, depth})$



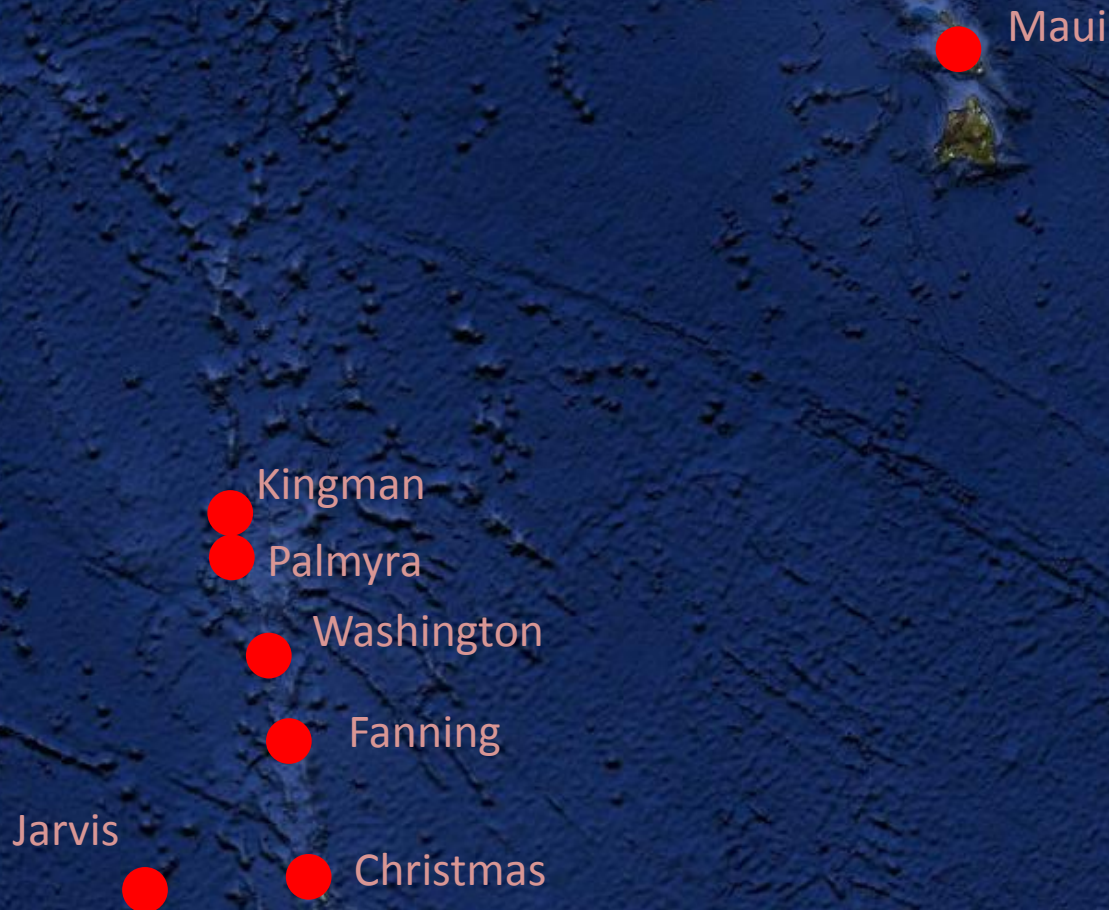
1. Cryptic Inverts – Methods

ISSUES:

- Camera framing/deployment
- Angles & quantification
- Securing to substrate
- Distance from substrate & focus
- Attachment in different habitats
- Data analysis (frame selection, processing, time, expertise)



1. Cryptic Inverts - *Future Directions*



Dr. Forest Rohwer
SDSU

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Data SIO, NOAA, U.S. Navy, NGA, GEBCO
14°45'13.28" N 174°42'55.62" W elev -5441 m

©2010 Google

Eye alt 3226.38 km

1. Cryptic Inverts - *Future Directions*



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Motion Detection in Coral Reef Assessment

A. Scotland
University of Tuebingen, Germany
San Diego State University



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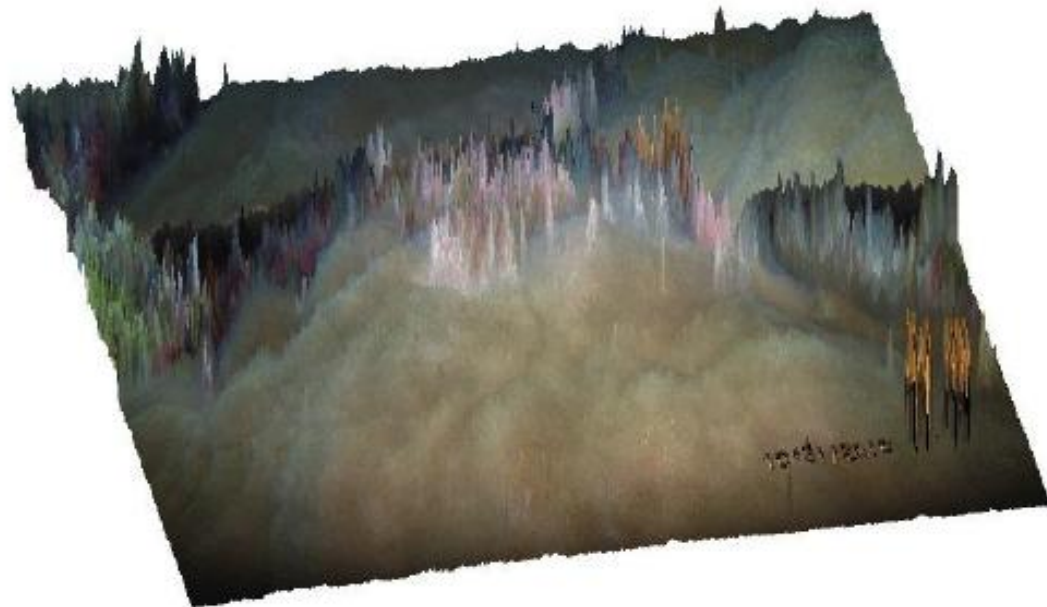


Figure 2: Standard deviation of background image b shown in Figure 1.

1. Cryptic Inverts - *Future Directions*



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Figure 5: Figure shows a small region from a frame demonstrating the highlighting method. Foreground objects are highlighted with a green border.