Monitoring Potential Changes in Macroalgal Communities on Nearshore Hardbottom Habitats Following Beach Nourishment in Indian River County, Florida

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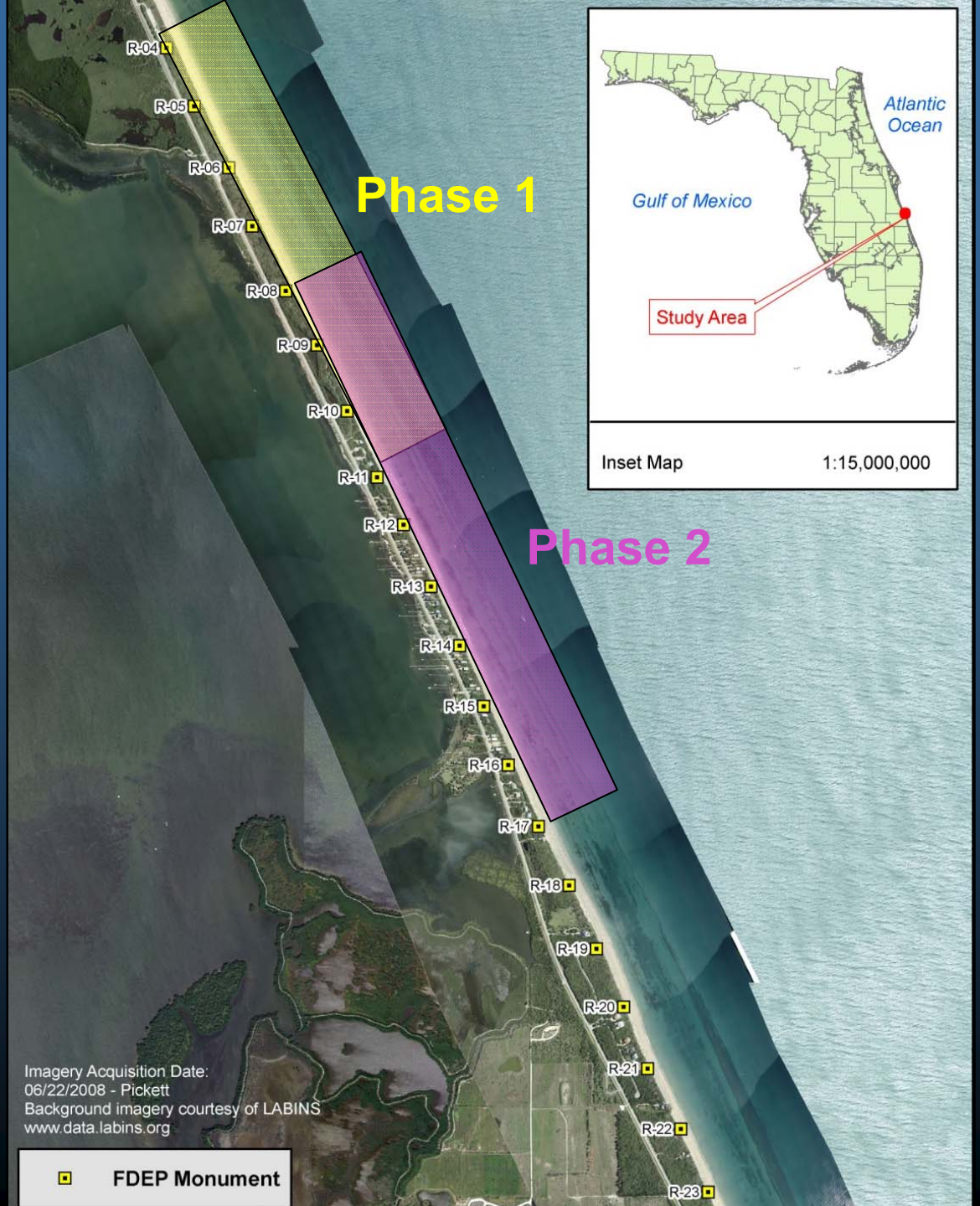
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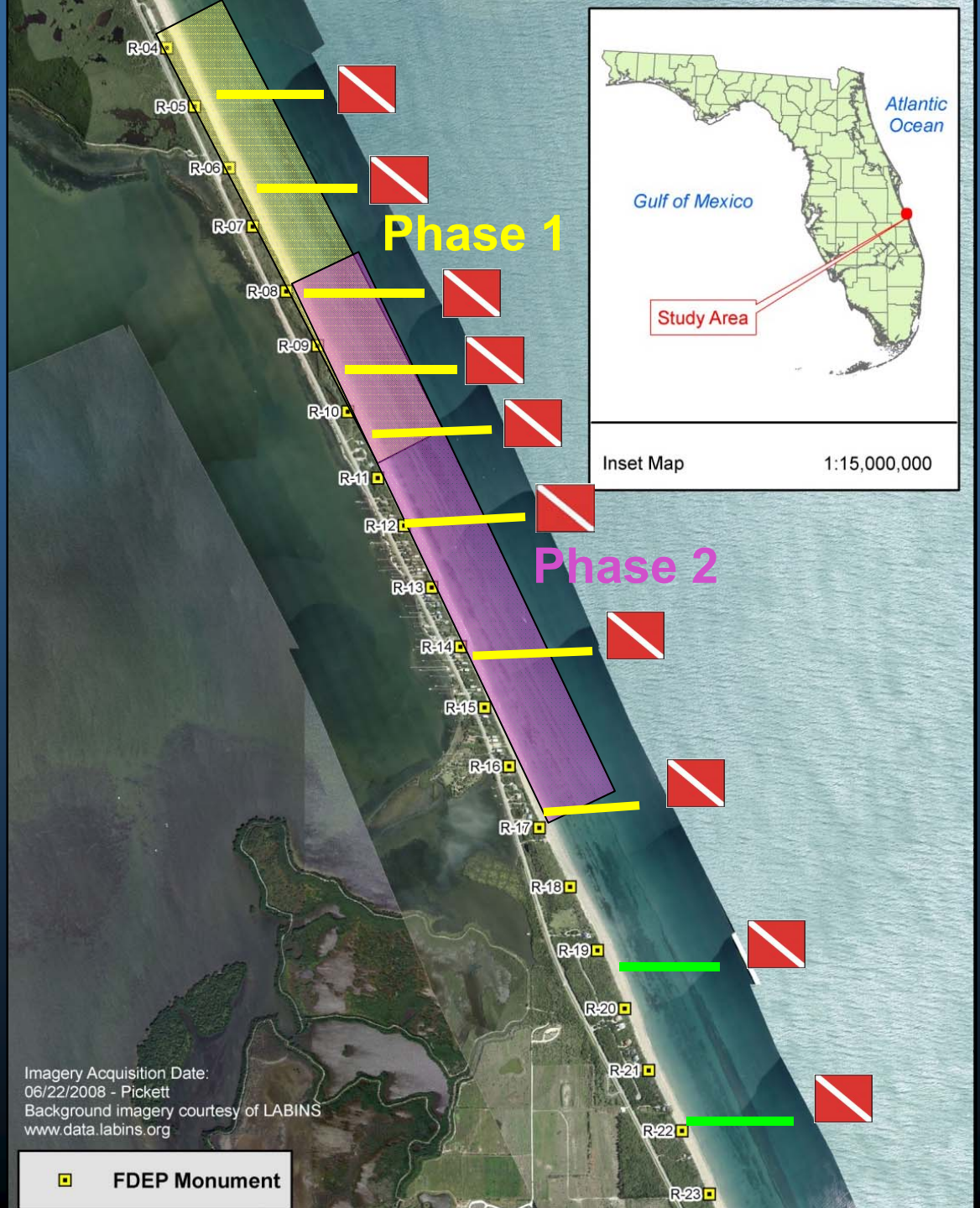
Phase 1
Phase 2
Atlantic Ocean
Gulf of Mexico
Study Area
Inset Map
1:15,000,000
Imagery Acquisition Date:
06/22/2008 - Pickett
Background imagery courtesy of LABINS
www.data.labins.org
FDEP Monument

Nearshore Hardbottom Resources

Embedded Video Clip of Nearshore Hardbottom in Indian River County - Removed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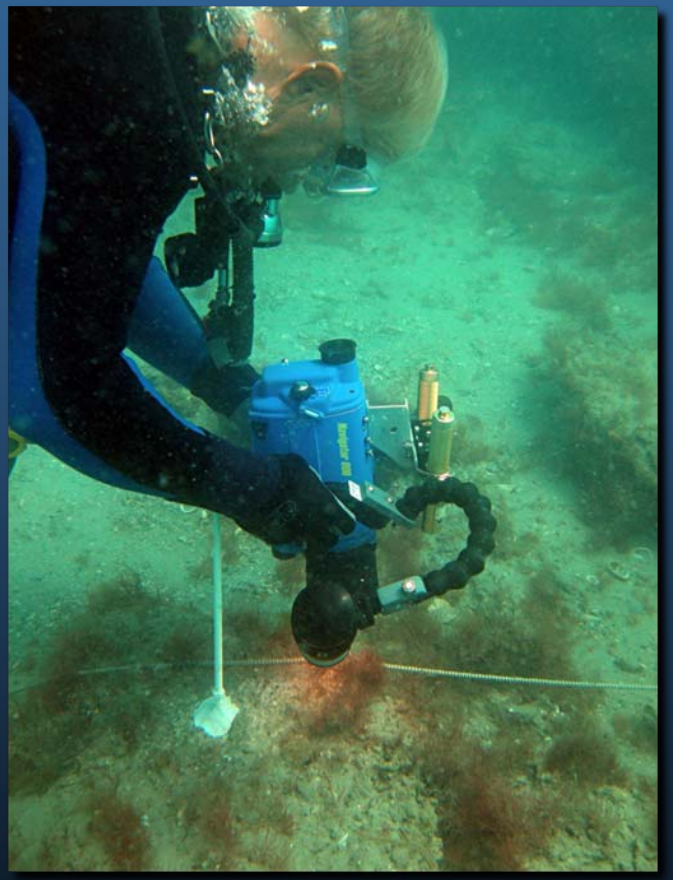
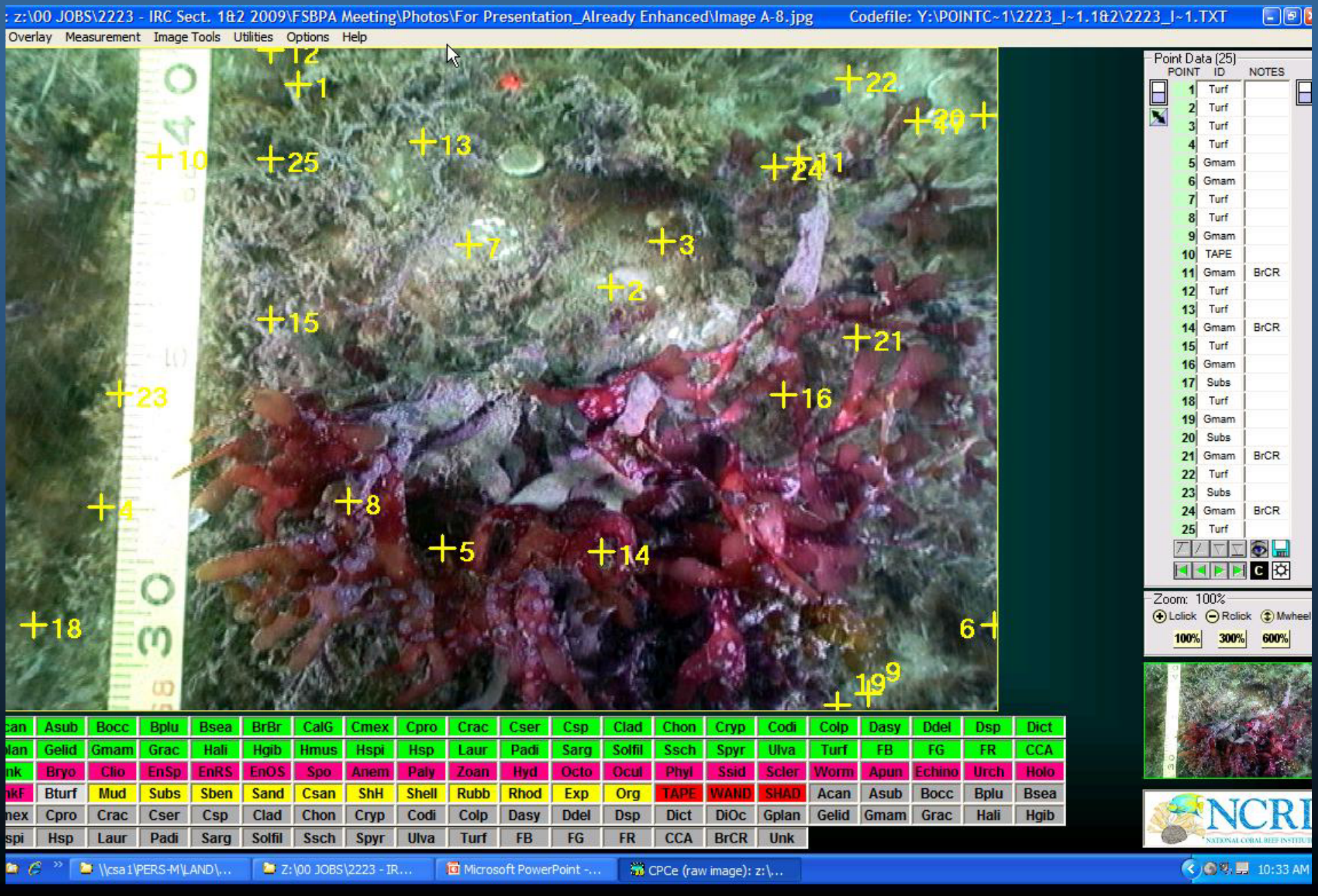
Monitoring Methods

I. Quantitative Video

- Nearshore & Offshore segments (20 m length each)
- Digitize video and create non-overlapping still frames
- Analyze each frame using point count method



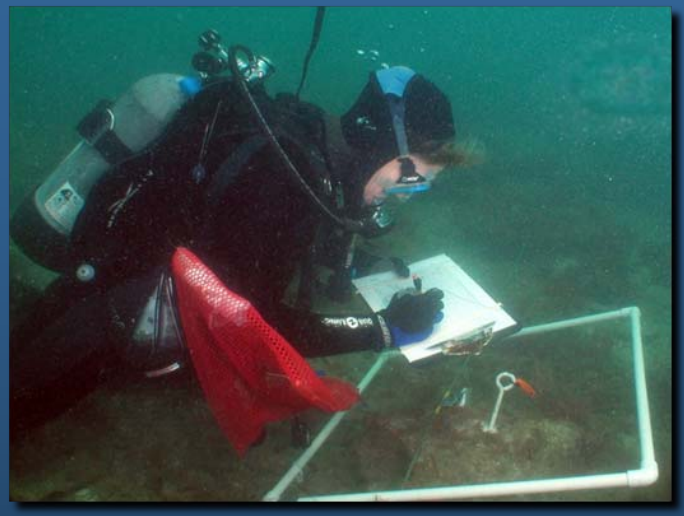
Point Count Analysis

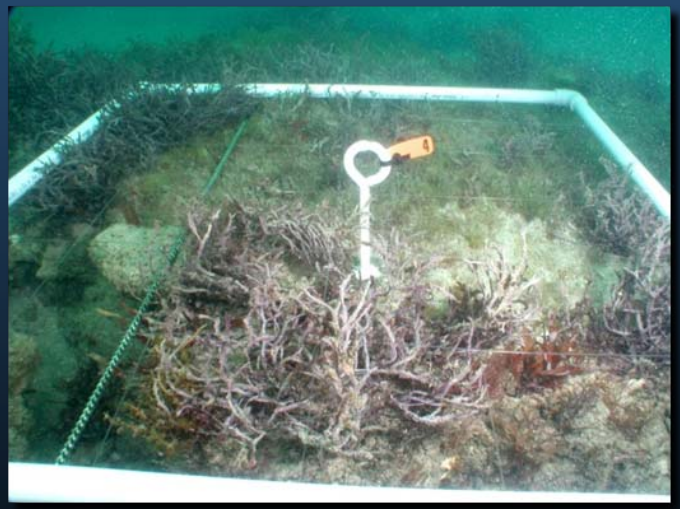


Monitoring Methods

I. *In-Situ* Quadrat Sampling

- 10 quadrats per transect at fixed locations
- Visual estimates of percent cover of macroalgae, fauna, and substrates
- Nearshore = 0-40 m
  Offshore = >40 m





Multivariate Statistical Analyses

H_{01}: No significant difference in the composition of the macroalgal community among surveys.

H_{02}: No significant difference in the composition of the macroalgal community between Primary and Reference (Nearshore and Offshore) areas.

Construct Bray-Curtis similarity matrices (Primer 6.1.6)

Apply multi-dimensional scaling (MDS) and cluster analysis

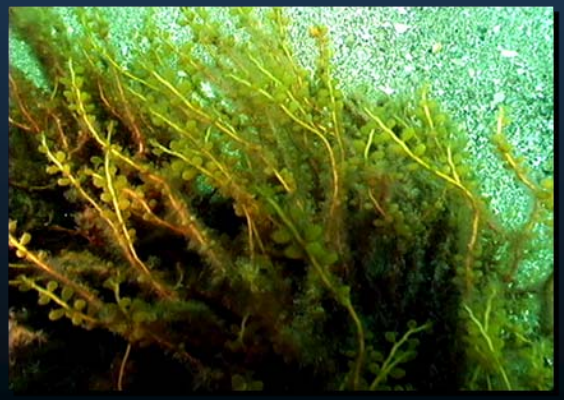
Run analysis of similarities (ANOSIM)

Run similarity percentage routines (SIMPER).

Results -Taxonomic Richness

- **33 genera and 27 species have been identified to date.**

Taxa	2007		2008		2009	
	Video	Quadrat	Video	Quadrat	Video	Quadrat
Chlorophyta	6	4	8	6	6	6
Phaeophyta	3	4	5	4	5	3
Rhodophyta	7	13	14	19	12	14
Turf	1	1	1	1	1	1
Total	**17**	**22**	**28**	**30**	**24**	**24**



Common Taxa

Caulerpa prolifera
Caulerpa spp.
Cladophora prolifera
Ulva spp.

Sargassum platycarpum
Spatoglossum schroederi

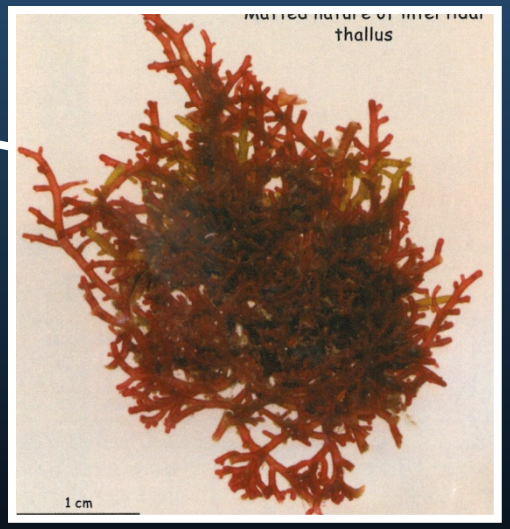
Agardhiella subulata
Botryocladia occidentalis
Bryothamnion seaforthii
Gelidiopsis planicaulis
Gracilaria spp.
Hypnea spp.
Laurencia spp.


Photo – D. Snyder

Preferred Species?

Photo - IRG

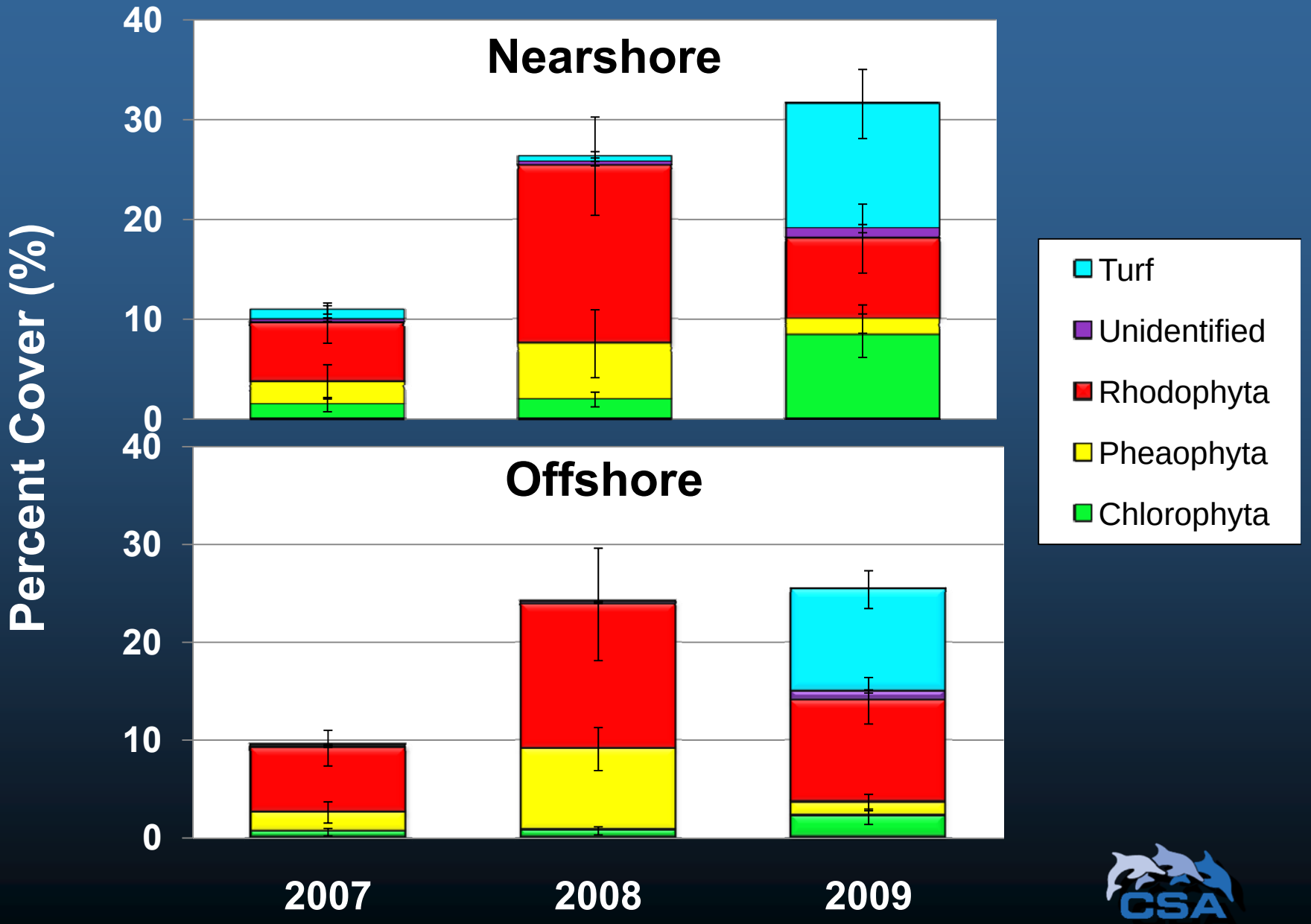
Bryothamnion seaforthii



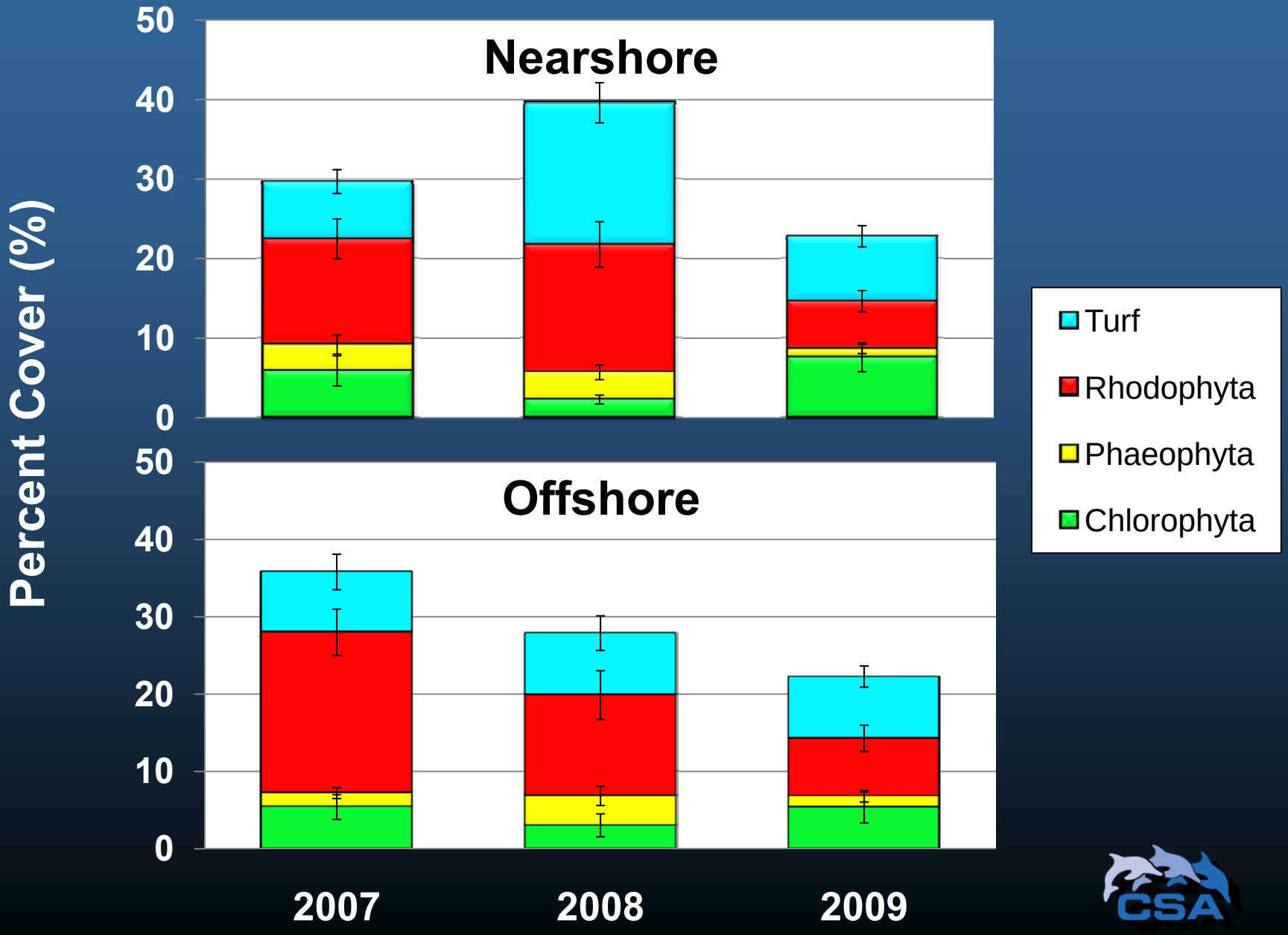
Laurencia poiteaui

Algae photos from Litter, Litter, and Hanisak, 2008

Results - Video



Results - Quadrat



Results - Video Data

Community Composition - ANOSIM

- Project = Reference
- Nearshore ≠ Offshore
  ($R = 0.119$, $p = 0.017$)
- 2007 = 2008
- 2007 ≠ 2009 ($R = 0.385$, $p = 0.0002$)
- 2008 ≠ 2009 ($R = 0.457$, $p = 0.0002$)

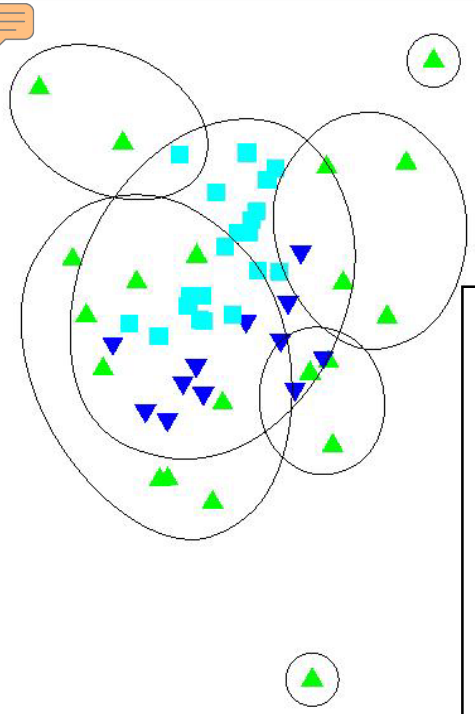
Results - Video Data

Compositional Differences - SIMPER

	Offshore
Nearshore	*Caulerpa prolifera* and Turf Algae (nearshore) *Bryothamnion seaforthii* (offshore)

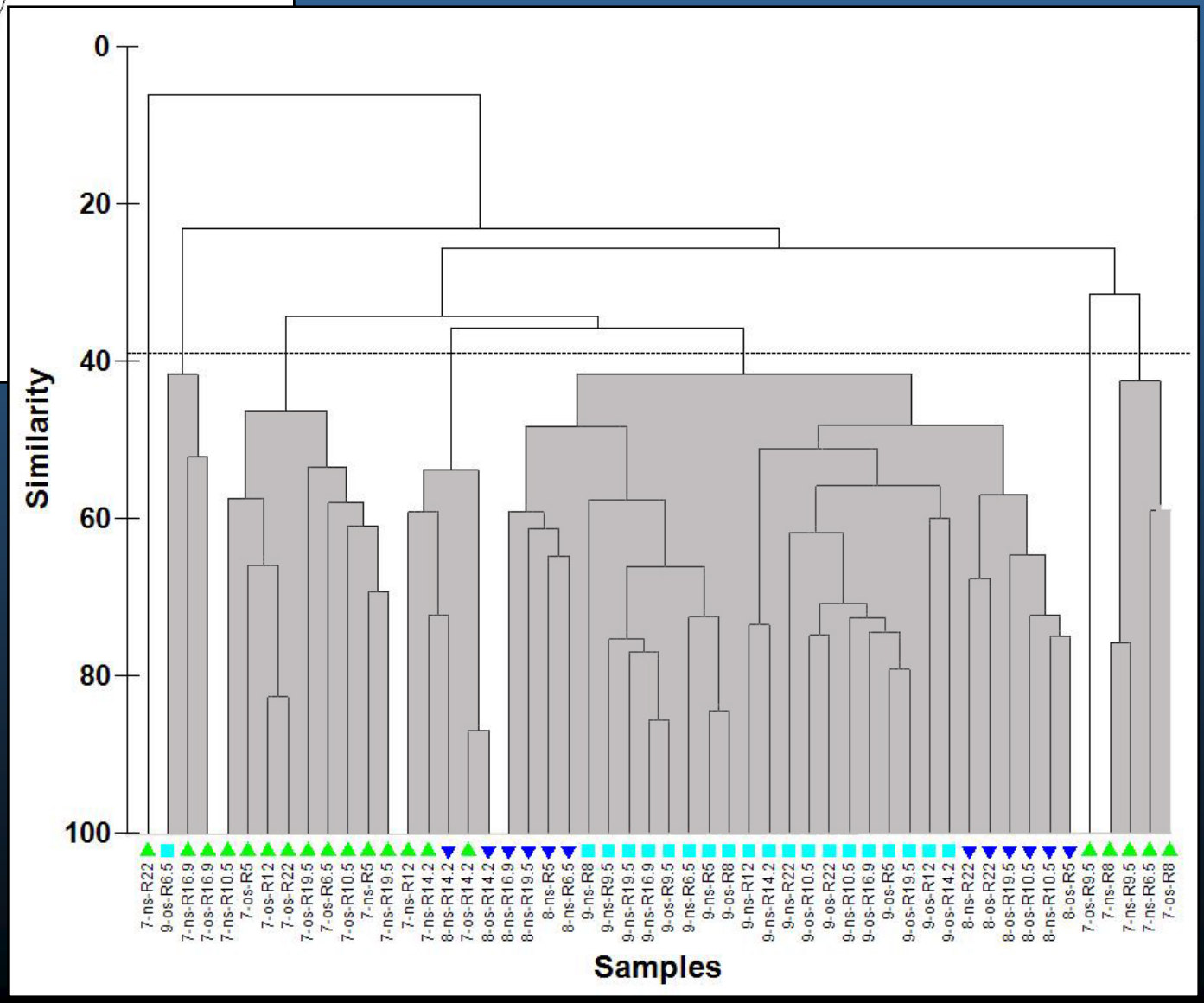
	2009
2007	Turf Algae, *Caulerpa prolifera, Bryothamnion seaforthii* (2009)
2008	*B. seaforthii, Spatoglossum schroederi. Sargassum platycarpum* (2008) *Caulerpa prolifera* ,Turf Algae (2009)

Video Data - Year



Similarity
39

Year
2007
2008
2009



Results - Quadrat Data

Community Composition - ANOSIM

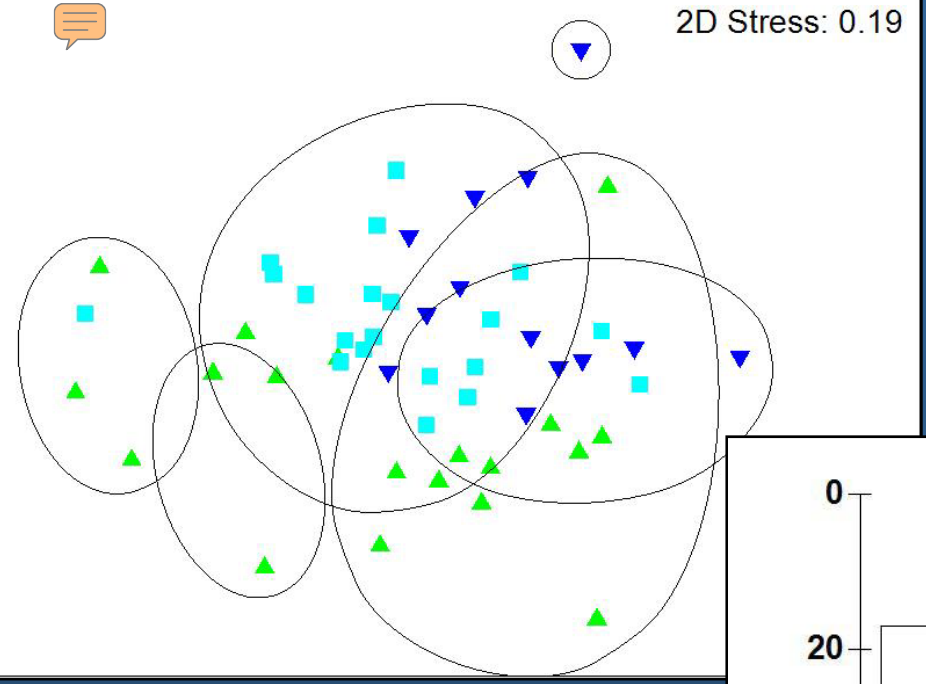
- Project = Reference
- Nearshore = Offshore
- 2007 ≠ 2008 (R = 0.218, p = 0.009)
- 2007 ≠ 2009 (R = 0.202, p = 0.001)
- 2008 ≠ 2009 (R = 0.338, p = 0.001)

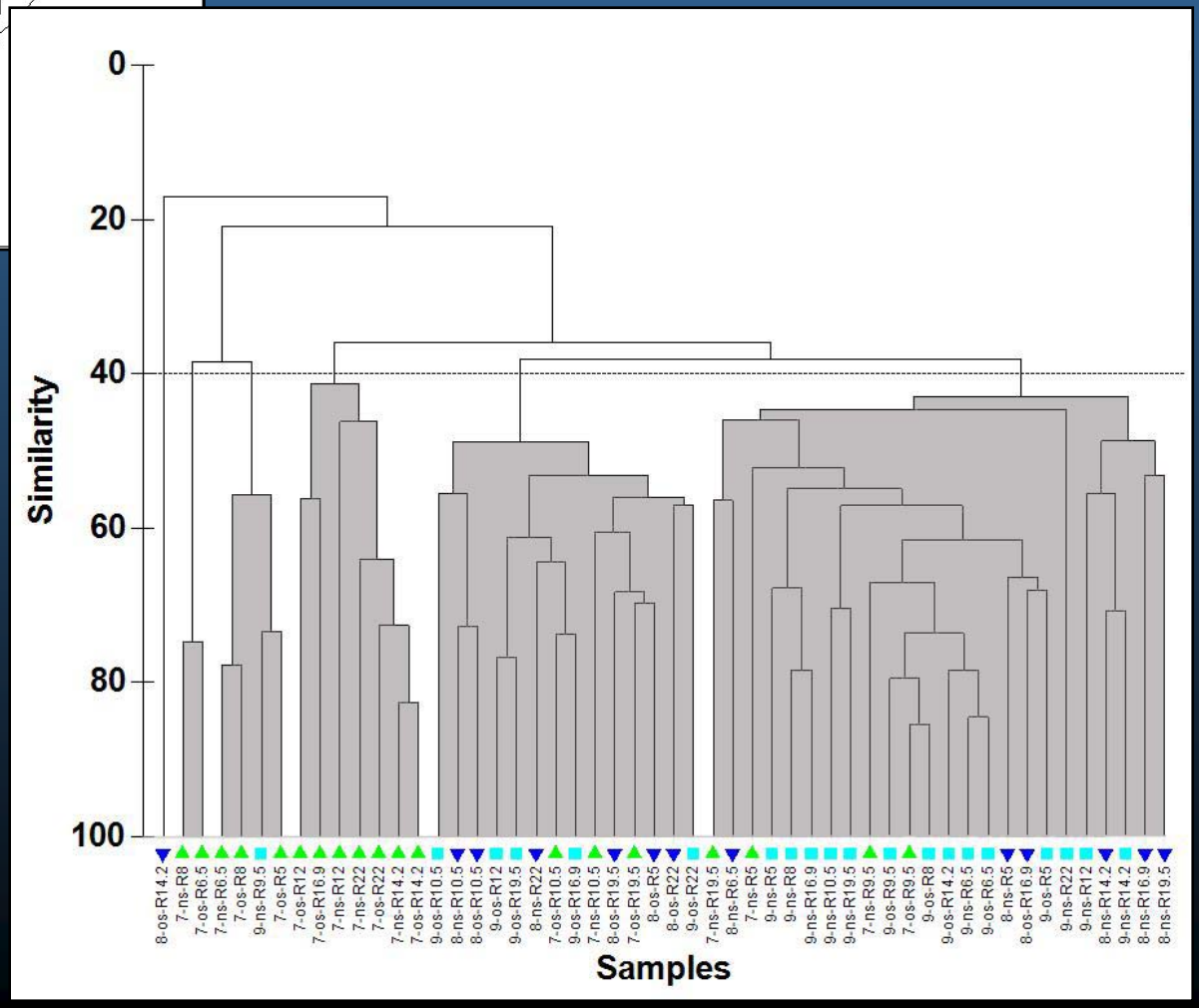
Results - Video Data

Compositional Differences - SIMPER

	2007	2009
2007		Turf Algae, *Caulerpa prolifera*, *Gracilaria mammillaris* (2009)
2008	*Caulerpa prolifera* (2007) Turf Algae *and B. seaforthii (*2008)	*Spatoglossum schroederi, Sargassum platycarpum, and B. seaforthii* (2008) *Caulerpa prolifera* (2009)

Quadrat Data - Year





Similarity

40

Year

2007

2008

2009

Conclusions

- Annual variations in the macroalgal community are stronger than spatial variations.
- Fluctuations in proportional percent cover of several dominant species driving differences among surveys (Turf algae, *B. seaforthii*, *C. prolifera*).
- Taxonomic richness among surveys is similar.
- Turtle favorites *Bryothamnion seaforthii* and *Laurencia poiteaui* are common in Sectors 1 & 2. Monitoring these species may be important for juvenile Green turtle habitat management and conservation.
- No significant difference between project and reference areas.

Acknowledgments

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