Virgin Islands National Park Reef Fish Monitoring Project
St. John, US Virgin Islands
1988-2014

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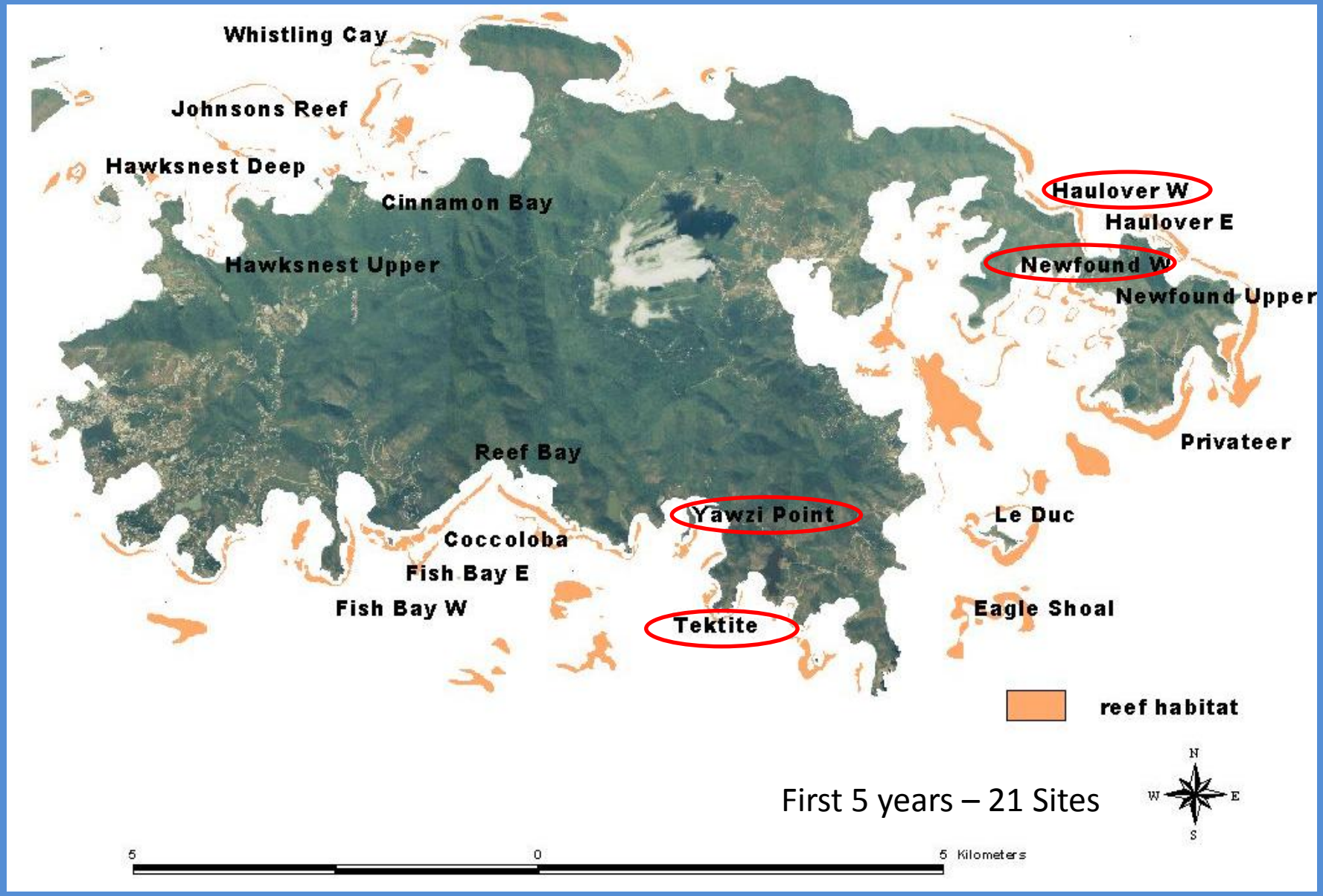
Purpose:

Reef Fish Monitoring of Biodiversity at Diversity Hot Spots (1989)

St. John Coral Reef Habitat – early 1990s



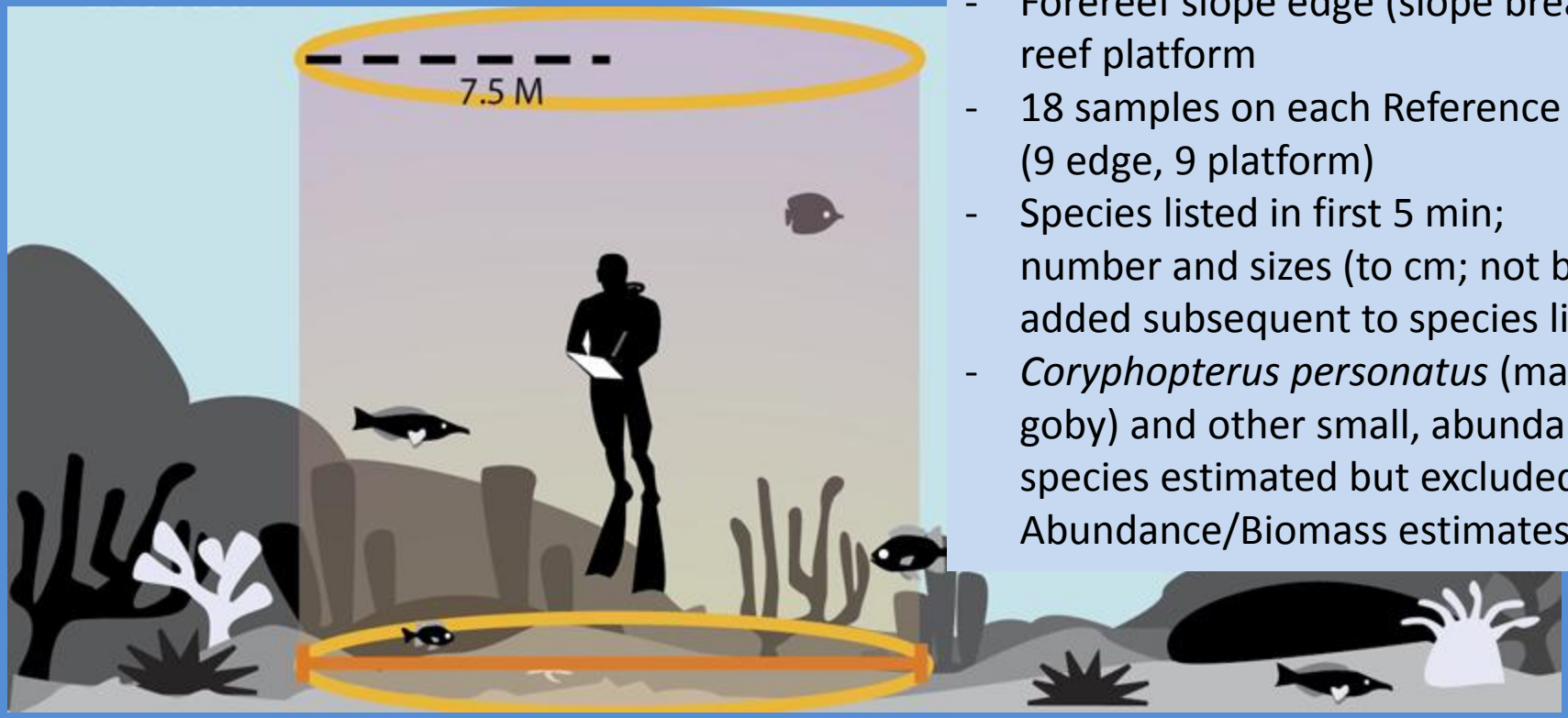
First 5 years – 21 Sites

Monitoring Project Characteristics

- Objective: Monitoring Long-terms Trends of Assemblage Characteristics, Trophic Groups, Families
- Experimental Design: Stratified, haphazard sampling on Four Reference Reefs (2 North, 3 South)
- Annual sampling (July – August)
- Spatial coverage of sampling: 5-10% per reef (insignificant total reef cover of park and St. John)
- Several reef types not included in sampling
  - **Classic 'data-poor/data-limited' monitoring**

Method: Stationary Point Count

Bohnsack and Bannerot 1986

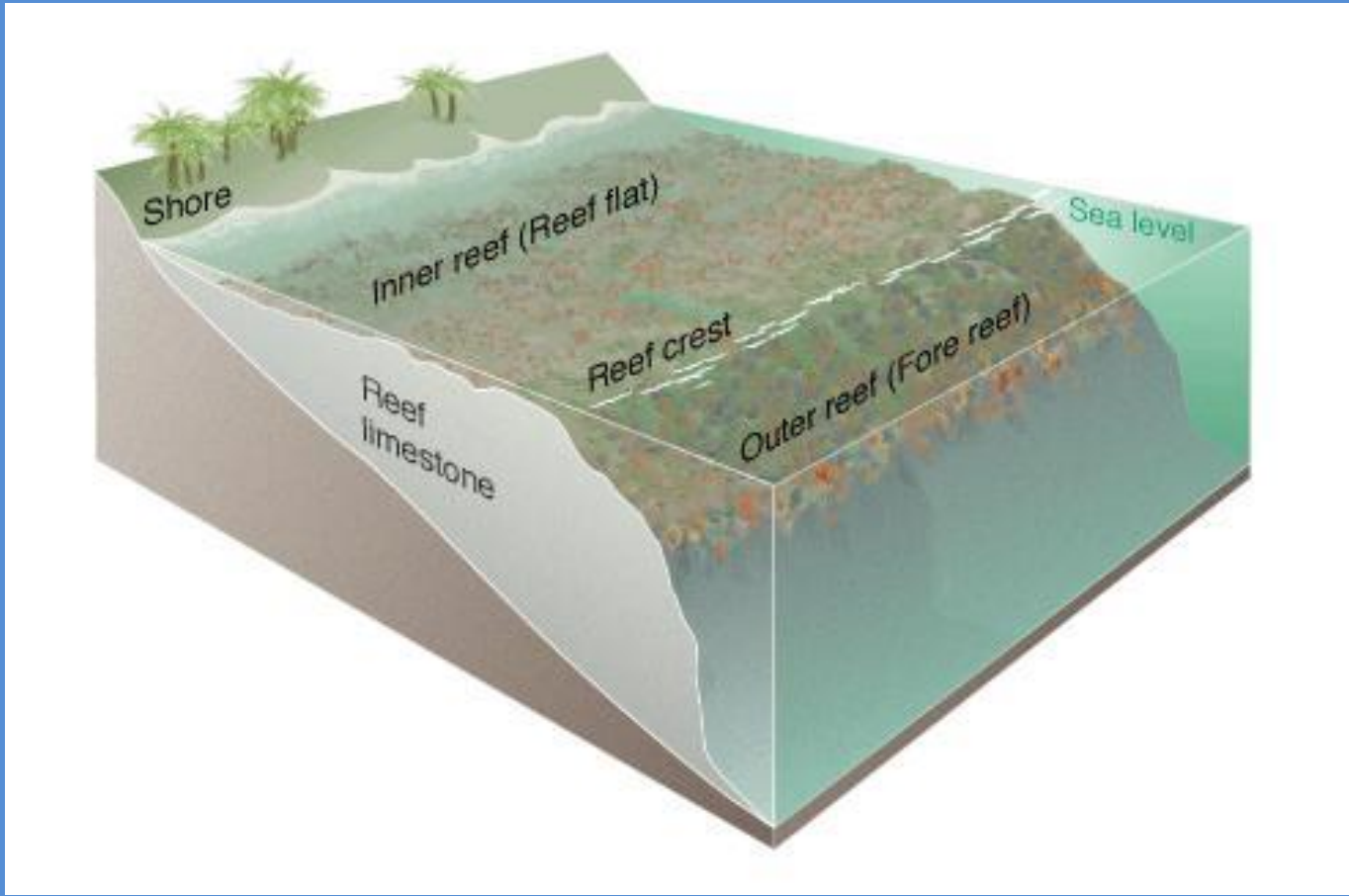


- Haphazard samples on hard-bottom (>50%)
- Forereef slope edge (slope break) and reef platform
- 18 samples on each Reference Reef (9 edge, 9 platform)
- Species listed in first 5 min; number and sizes (to cm; not bins) added subsequent to species listing
- *Coryphopterus personatus* (masked goby) and other small, abundant species estimated but excluded from Abundance/Biomass estimates

Image from: NOAA Fisheries - PIFSC

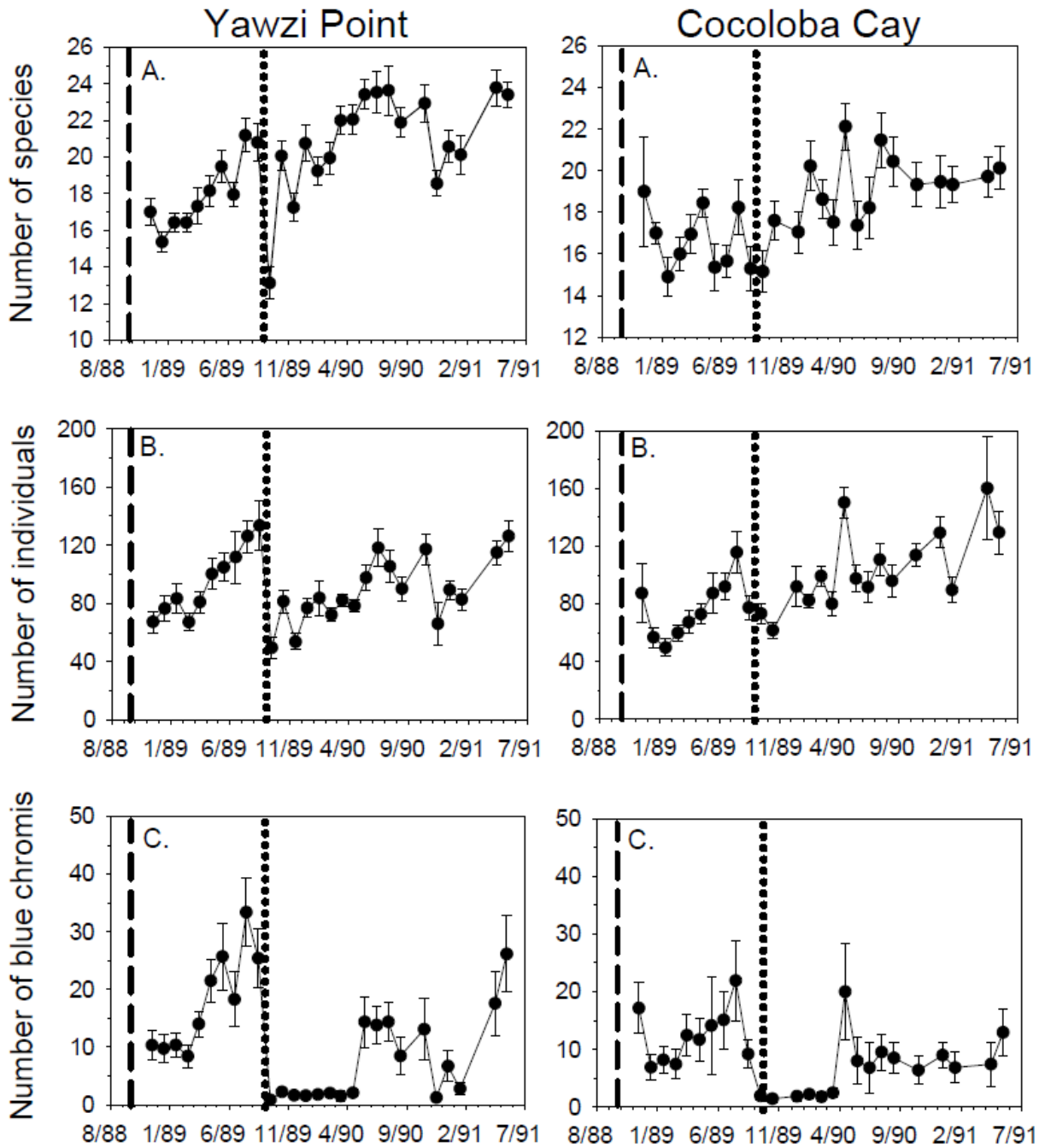
Reef Topography and Location of Samples

Sampling depth: 3-20m

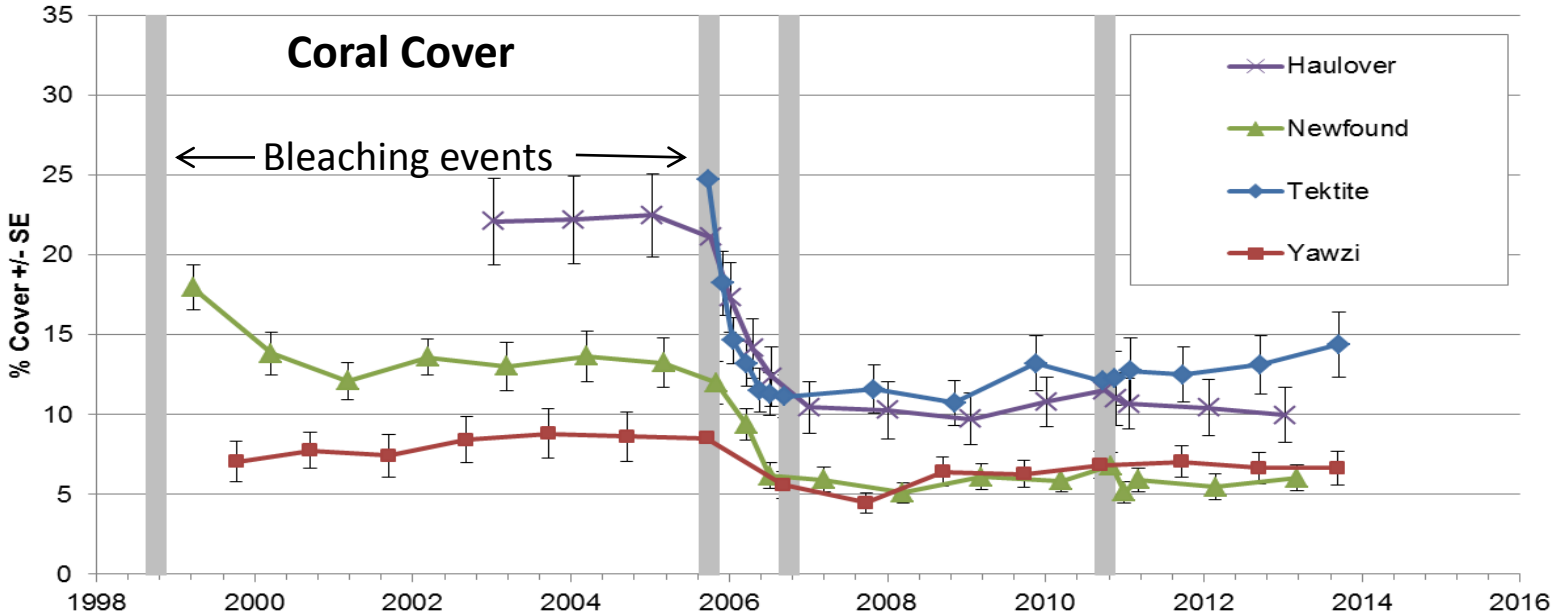


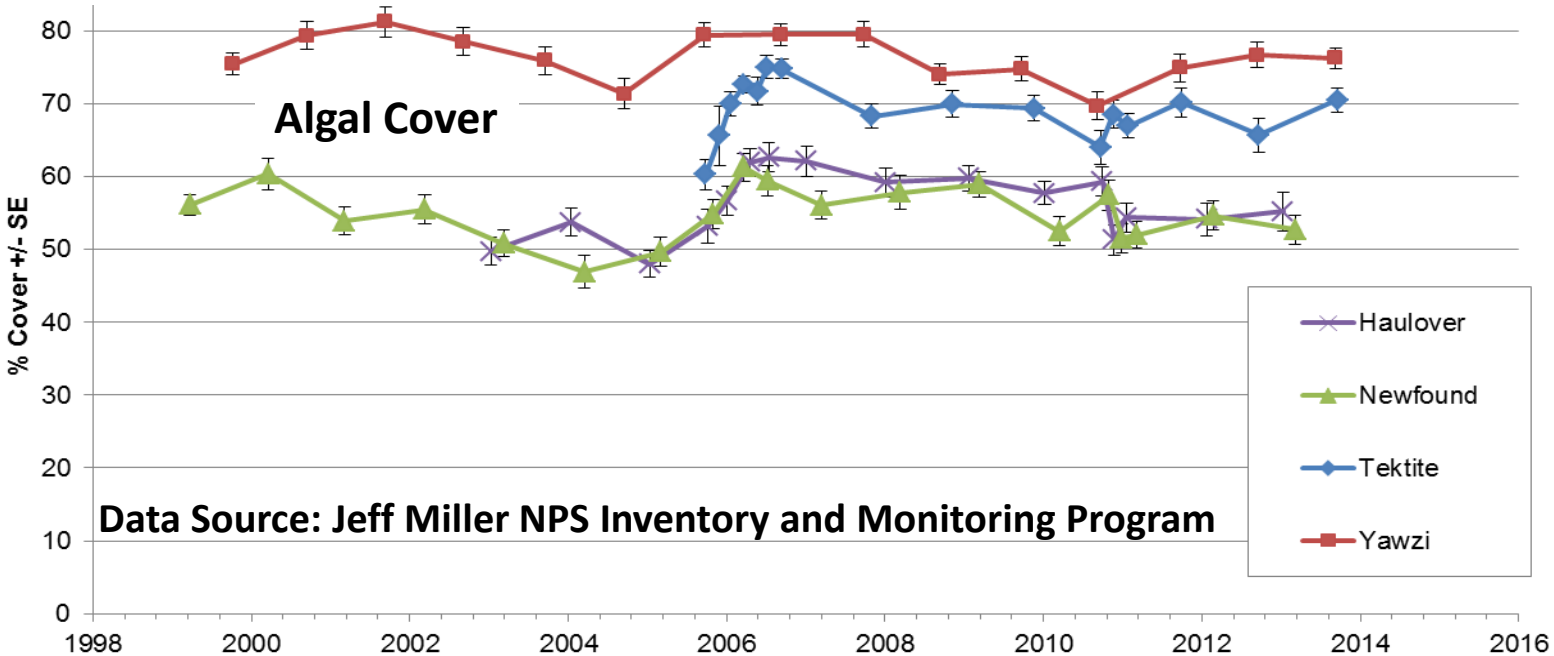
Changes in Resources

Hurricane Effect on Assemblage



Trends in Benthic Cover: 1998-2014

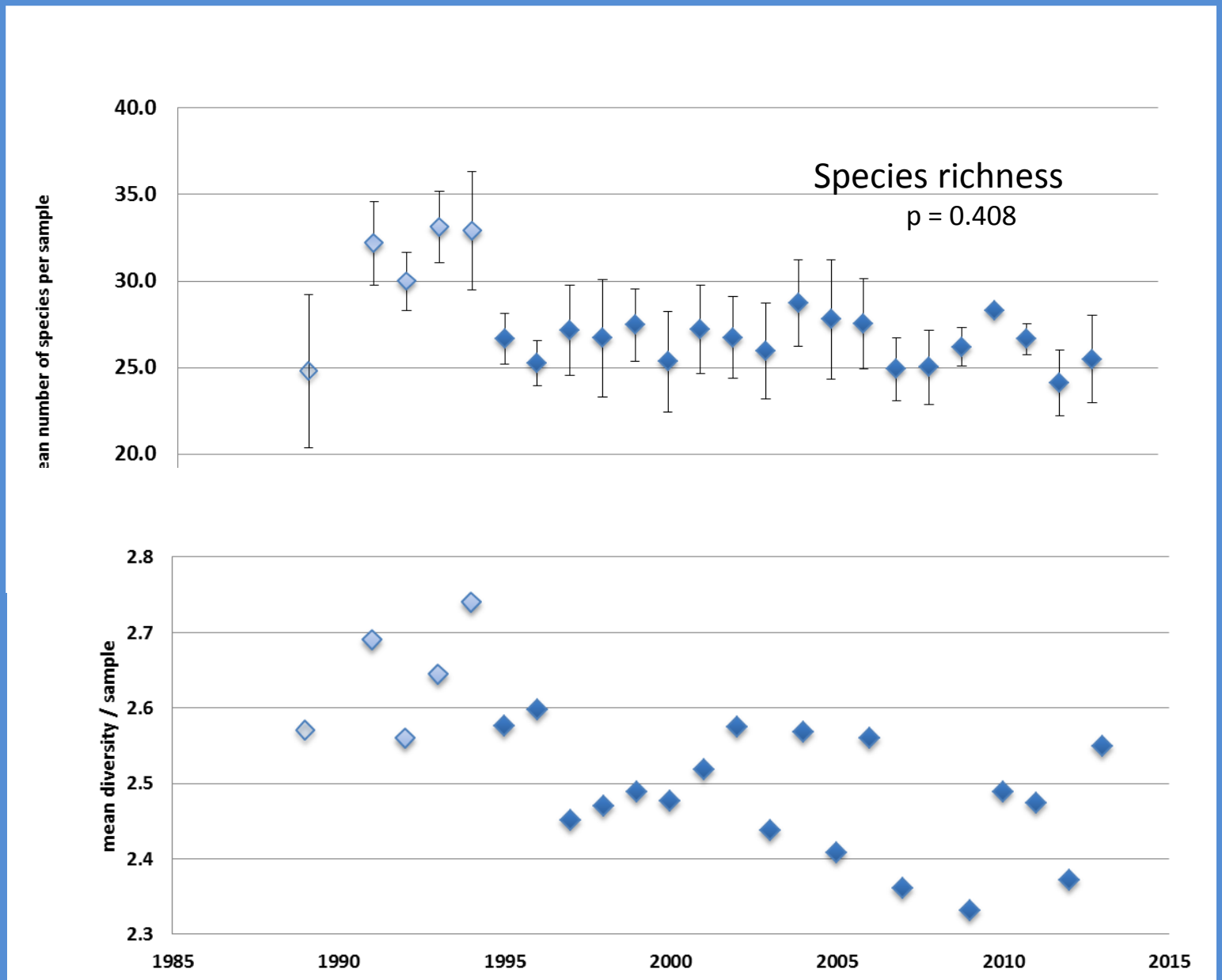




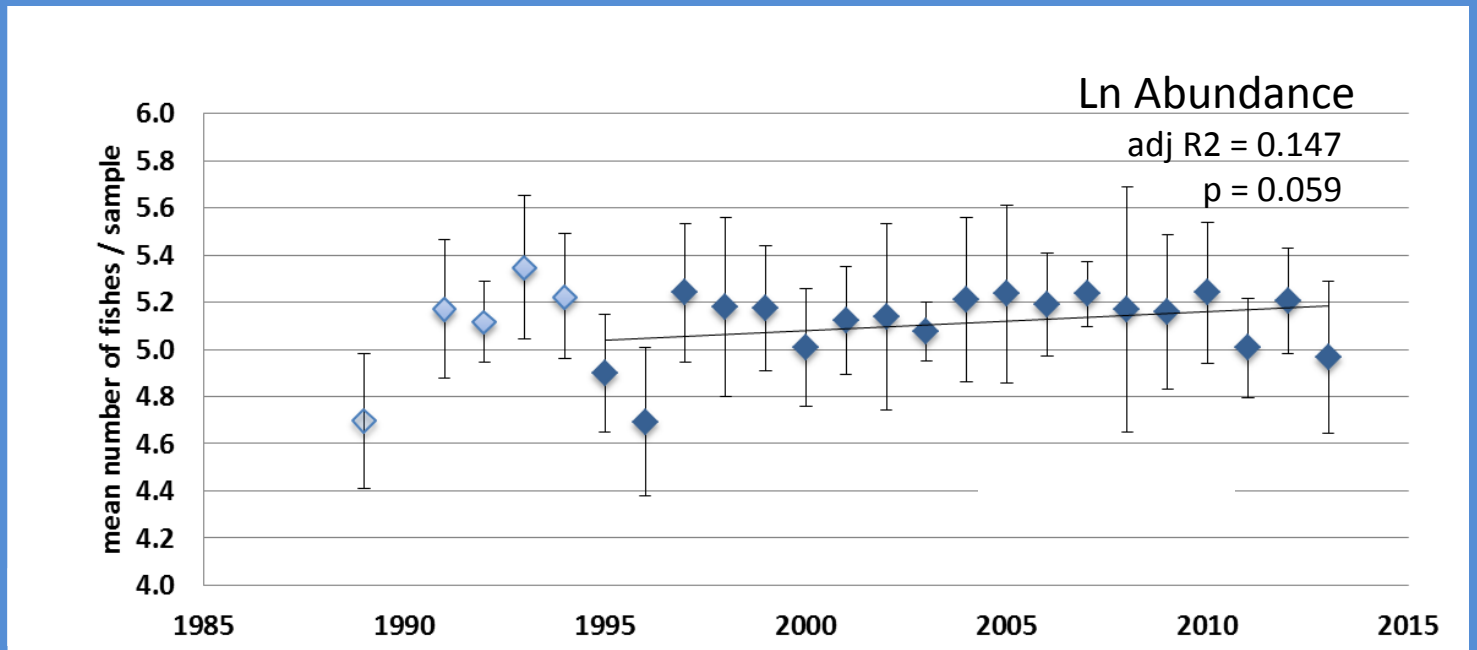
Data Source: Jeff Miller NPS Inventory and Monitoring Program

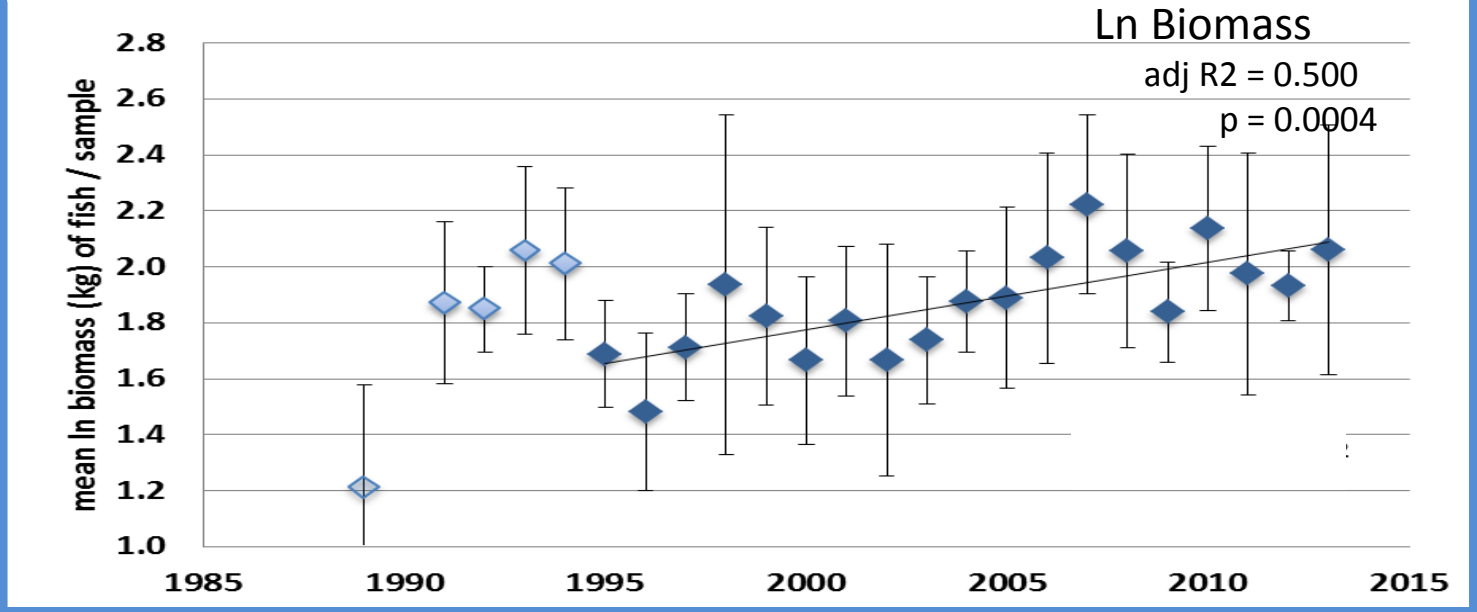
Trends in Reef Fish Assemblages

all reference sites pooled; light markers denotes plot method

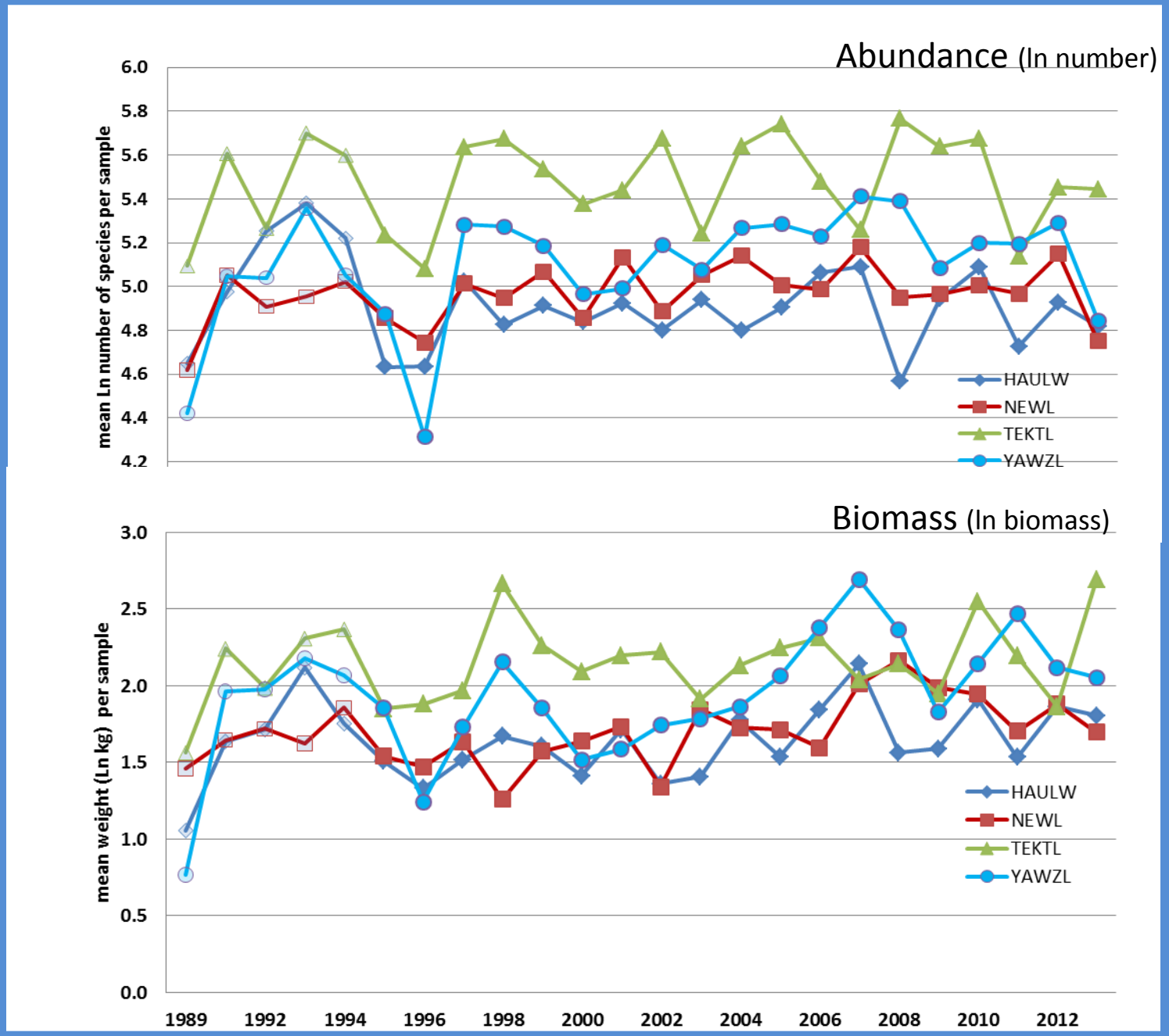


Trends in Reef Fish Assemblages

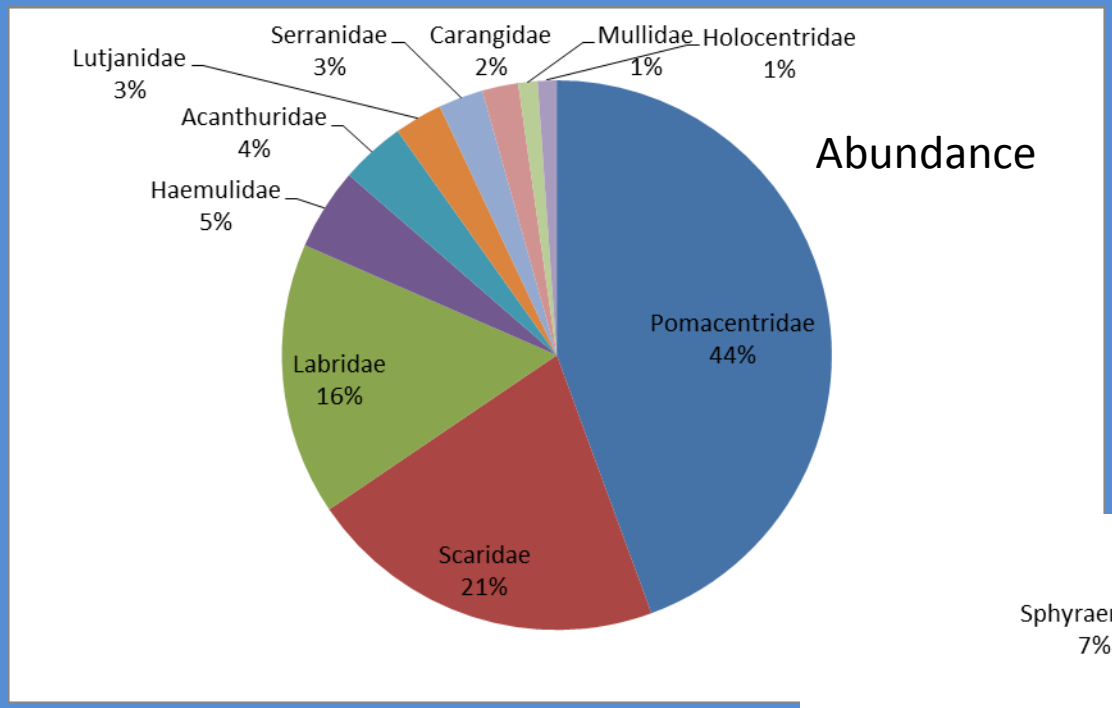


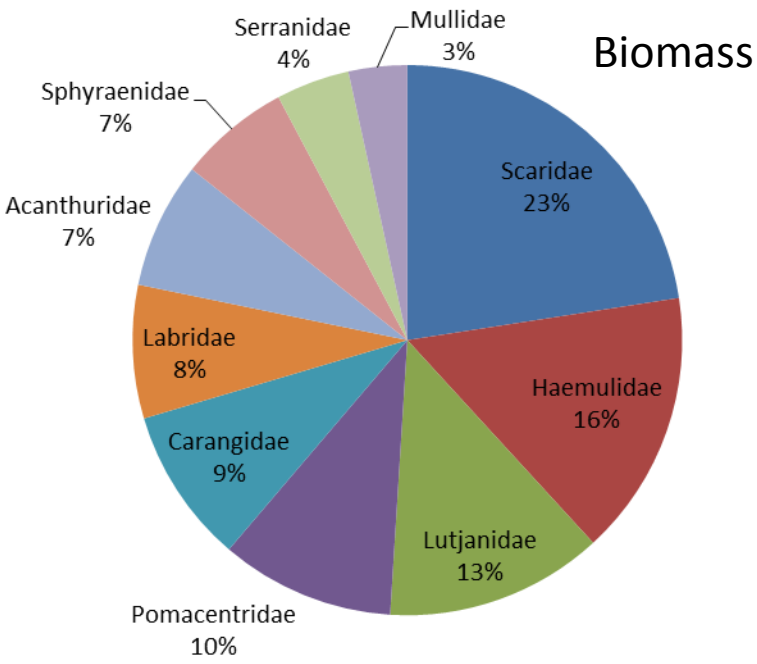


Trends – Variation among Reference Sites



Assemblage Composition





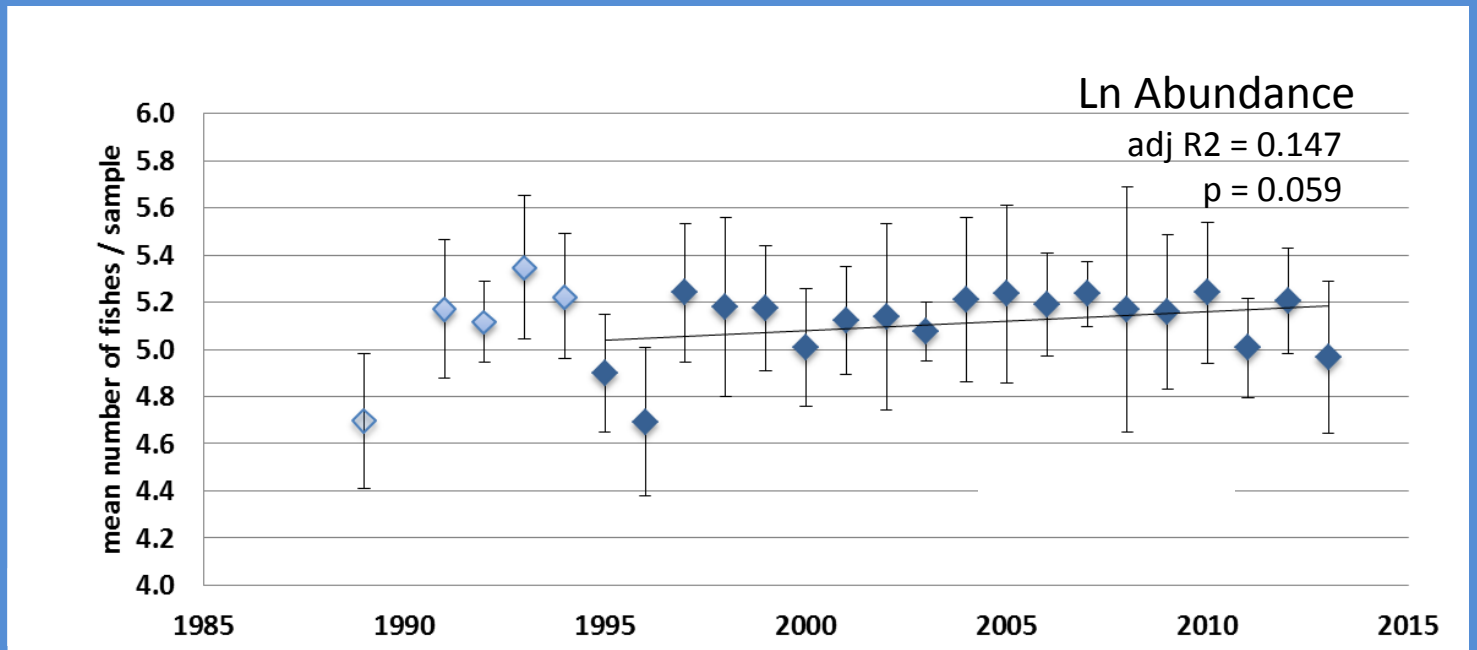
Trends – Commercial, Trophic Groups and Families

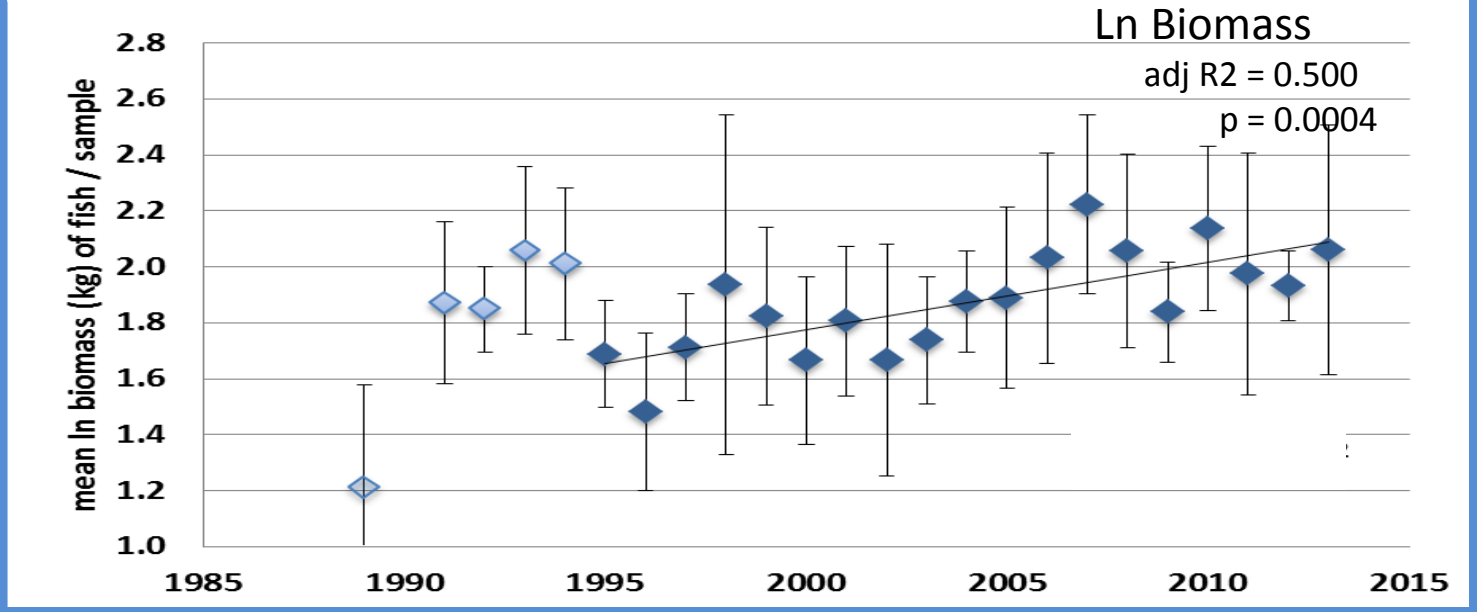
		1995 thru 2013		
		trend	R^2 Adj	p =
Non-Commercial Species	**Abundance**		0.0275	0.2309
	Biomass		-0.031	0.521
Commercial Species	**Abundance**	increase	0.3879	0.002
	Biomass	increase	0.5742	<0.0001

		1995 thru 2013		
		trend	R^2 Adj	p =
Herbivores	**Abundance**		0.039776	0.1979
	Biomass (Ln+1)	increase	0.498273	0.0003
Planktivores	**Abundance**		0.023053	0.2444
	Biomass (Ln+1)		0.001259	0.3250
Secondary Consumers	**Abundance**	increase	0.250021	0.0144
	Biomass (Ln+1)	increase	0.50463	0.0003
Predators	**Abundance**		-0.02078	0.4437
	Biomass (Ln+1)	increase	0.365468	0.0028

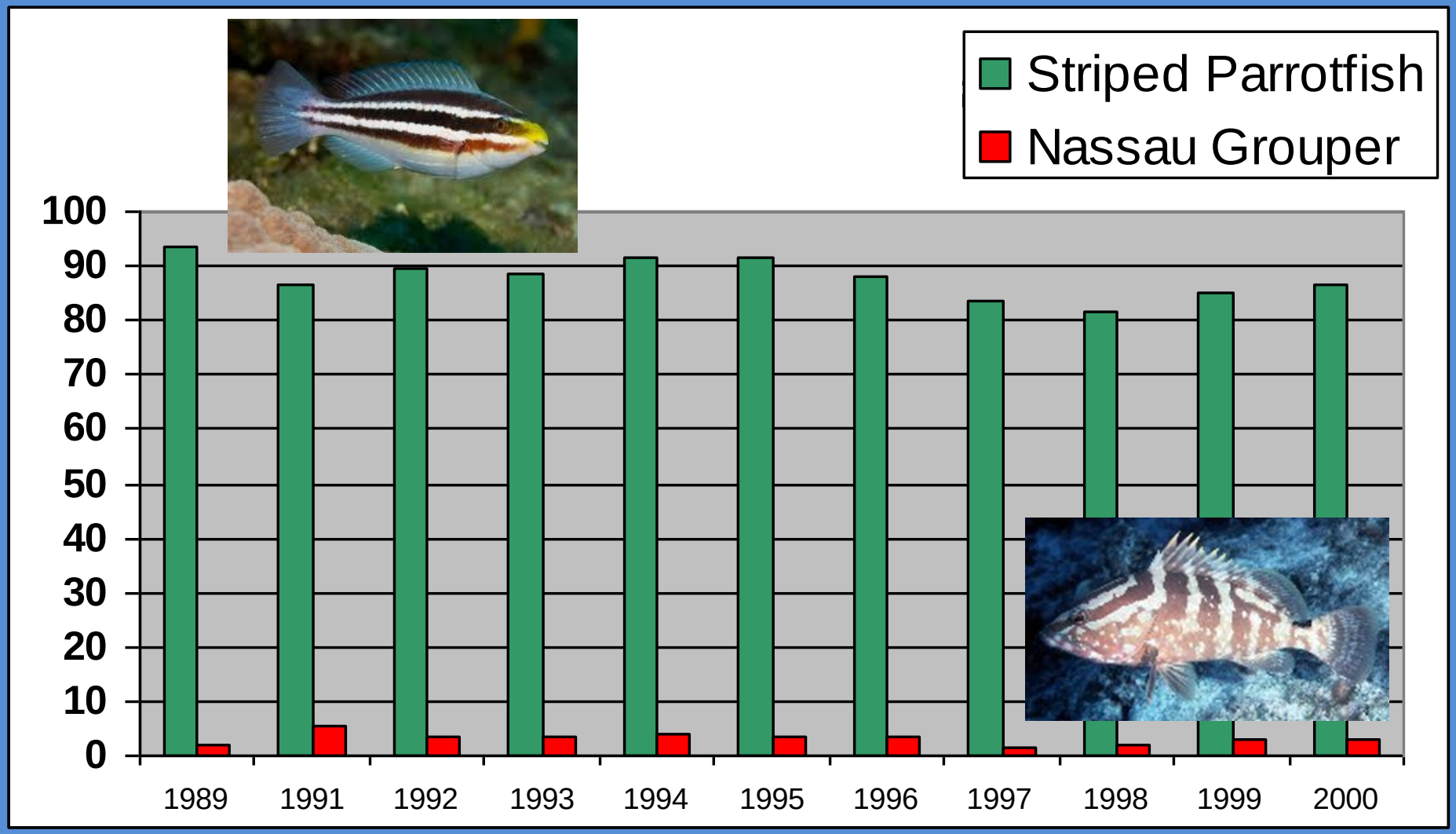
		1995 thru 2013		
		trend	R2 Adj	p =
Benthic Herbivores	**Abundance**		0.235998	0.1185
	Biomass	decrease	0.25058	0.0143
Mobile Herbivores	**Abundance**	increase	0.34846	0.0036
	Biomass	increase	0.588944	<.0001
Large Groupers	**Abundance**	decrease	-0.00517	0.3541
	Biomass	increase	-0.02089	0.4377
Small Groupers	**Abundance**	increase	0.17013	0.0448
	Biomass	increase	0.326181	0.0063
Scaridae	**Abundance**			0.997
	Biomass	increase		0.006
Acanthuridae	**Abundance**			0.996
	Biomass			0.275
Haemulidae	**Abundance**			0.598
	Biomass	decrease		0.009
Lutjanidae	**Abundance**	increase		0.05
	Biomass	increase		0.0006

Trends in Reef Fish Assemblages





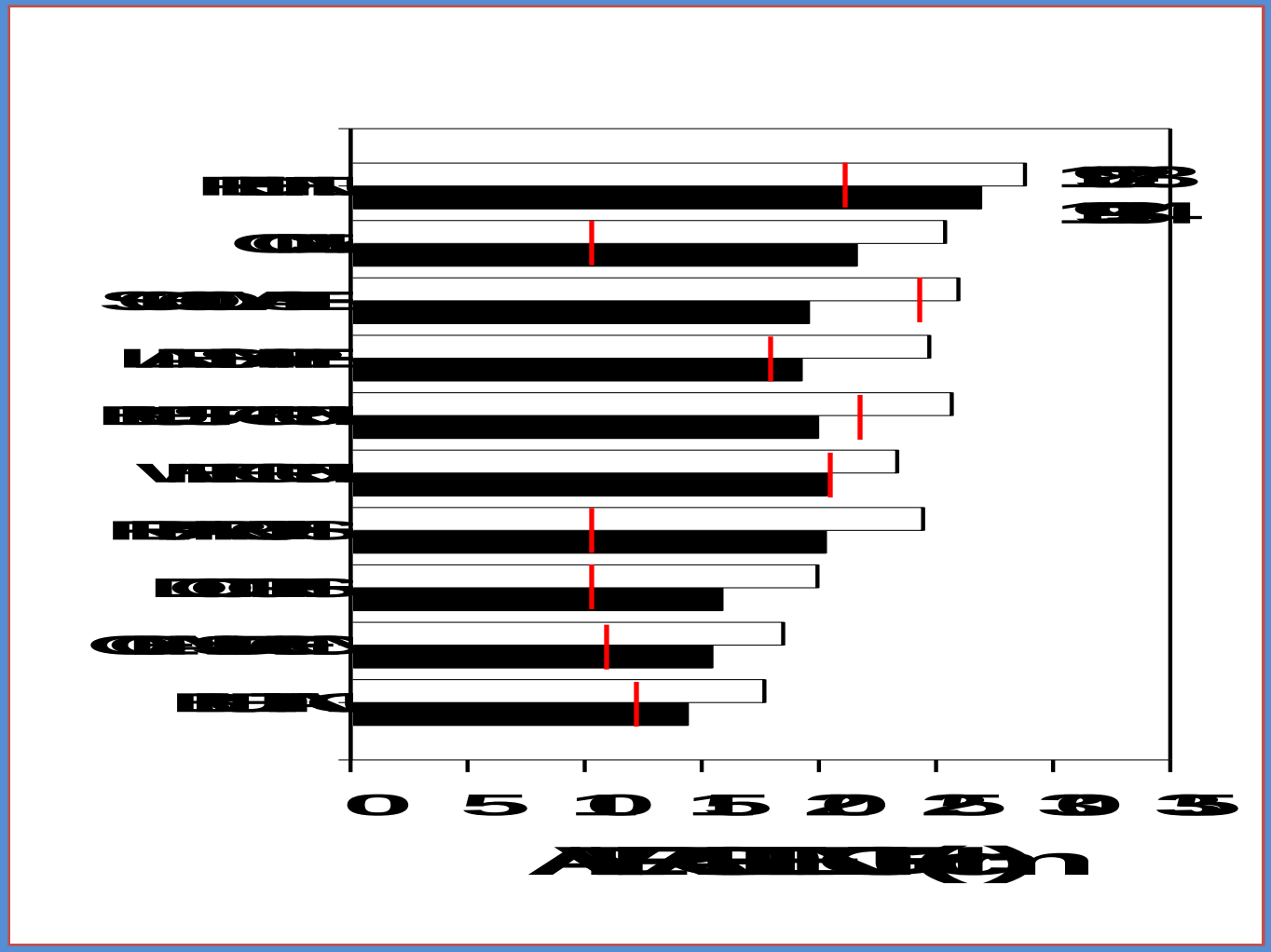
Frequency of Occurrence in Visual Samples



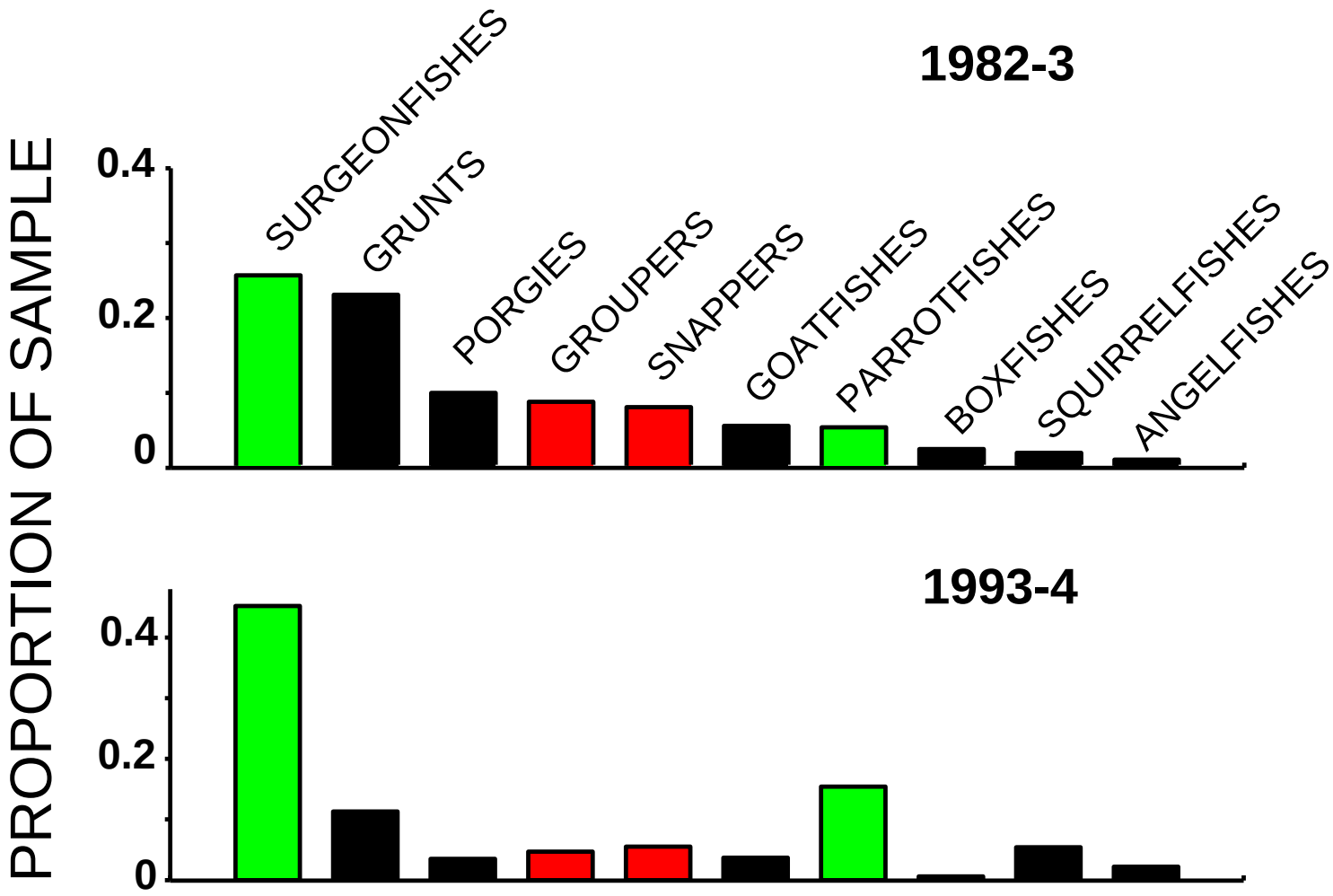
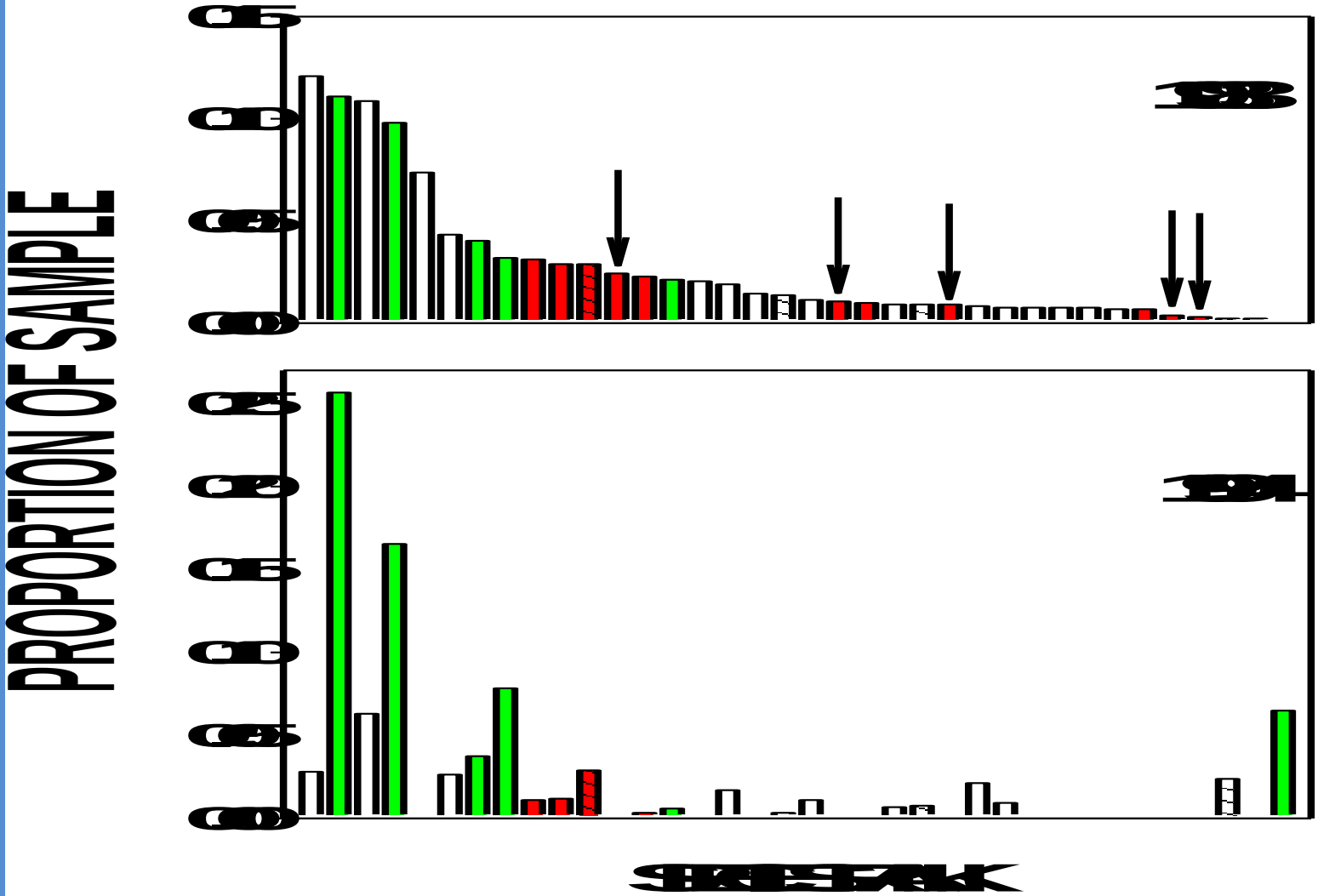
Fish Trap Studies within Virgin Islands National Park
Yawzi Point Study

- 8 traps place around reef (~10K m2)
- Conducted over 2 periods
  - 1982-3
  - 1993-4
- 5-7 day soak time

Trap Sample Results for 10 Abundant Species



Trap Sample Results – Family Proportions



Trap Sample Results – Species Proportions