Atlantic and Gulf Rapid
Reef Assessment Program

Monitoring for Management: the AGRRA network

ICRI Workshops:

Community based monitoring & management

Belize, October 15, 2013

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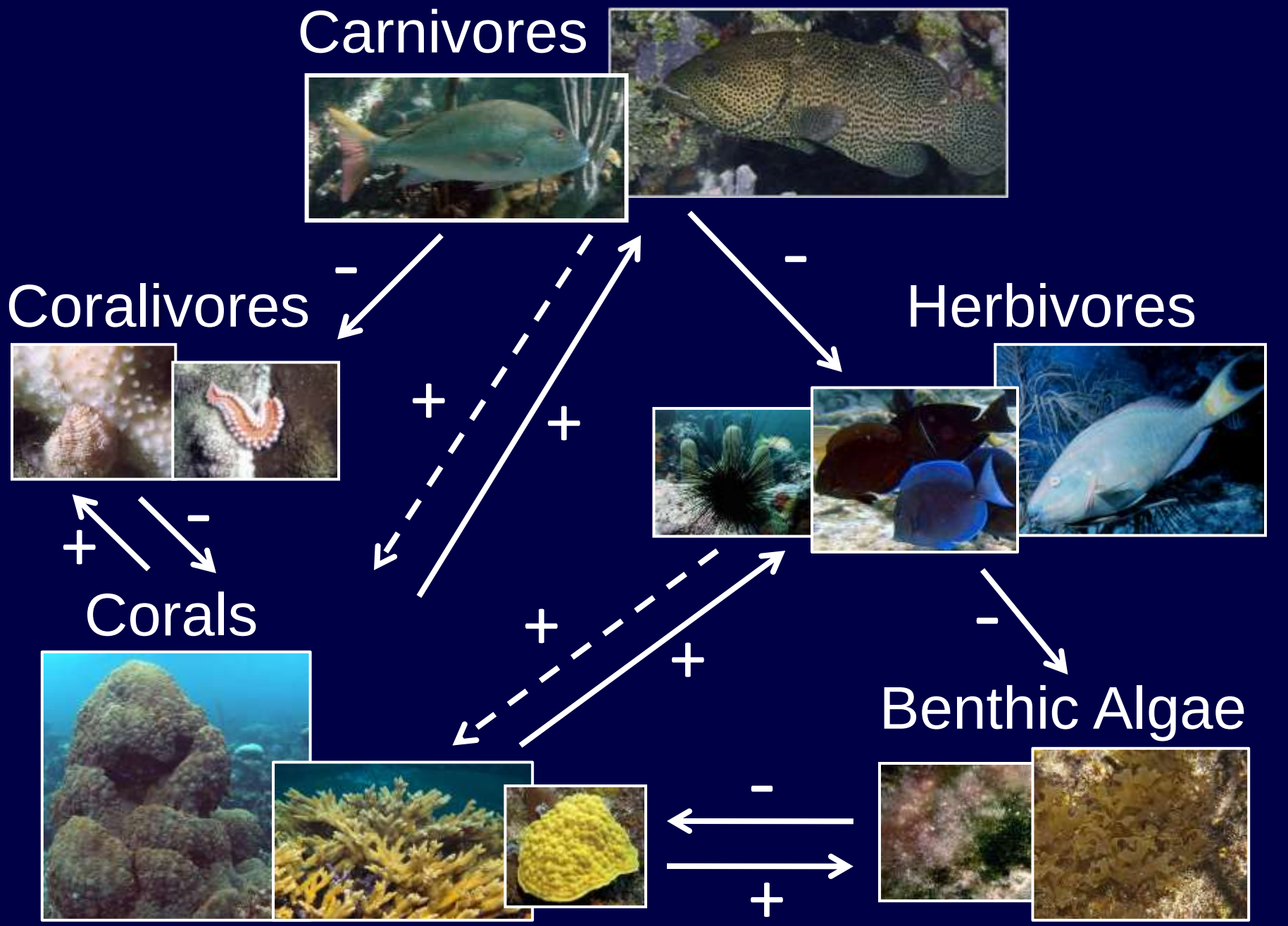


Modified from P.R. Kramer; © photos: A. Bruckner, R. Ken, J. Lang, K. Marks, M. Moe, J. Schulke, R. Steneck

V5 Protocols

Benthos

Cover: major groups of sedentary organisms

Density: coral recruits (< 2 cm) & small (2 - <4 cm) corals

Diadema, other echinoids, spiny lobster, queen conch

Corals (≥ 4cm)

Density, size & condition *(e.g.*,disease, bleaching, mortality)

Fish

Density & size of major predators and herbivores

V5 Protocols

Each protocol is available at two levels:

Basic: managers and students

Detailed: researchers

Posted online:

protocols, training materials, coral IDs, coral & fish flash cards, memory aids, UW data cards, data entry spreadsheets, *etc.*

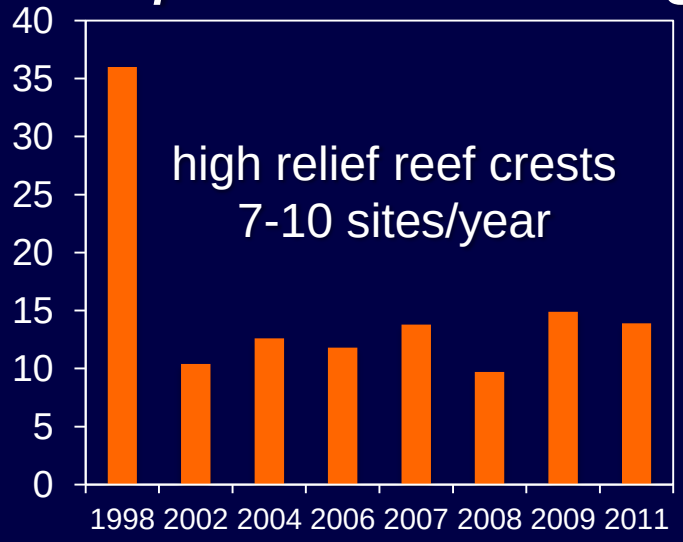
Access Database for processed data.

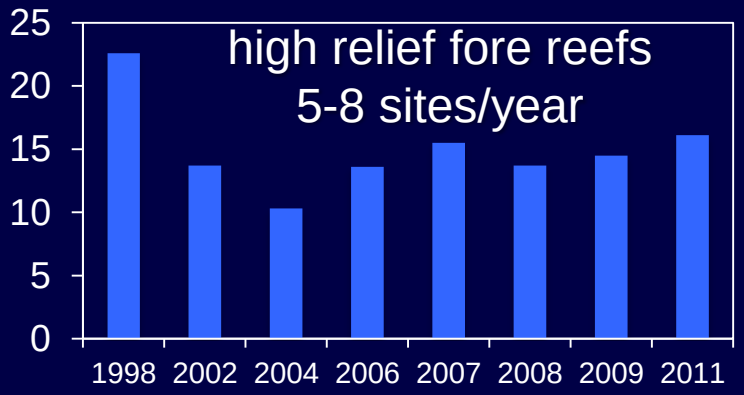
Sampling Design

Representative (stratified random) sampling can be augmented by surveys of **strategically** located sites. Sites can be **repetitively** sampled for trend analyses.

Example of Monitoring for Management with AGRRA

P.R. Kramer (in prep.)



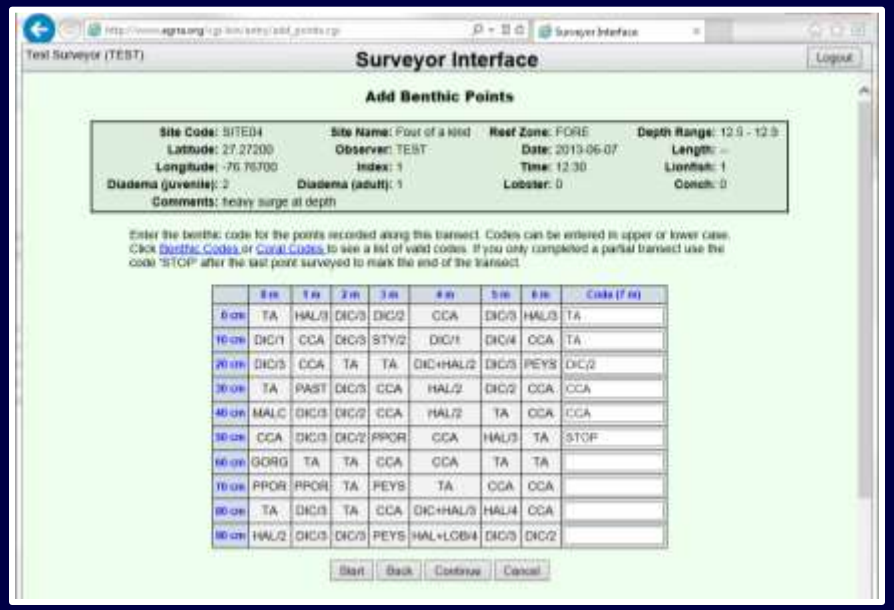


% Live Coral Cover, Central Andros, The Bahamas.

Full surveys only needed every 5-10 years.

Data Plans

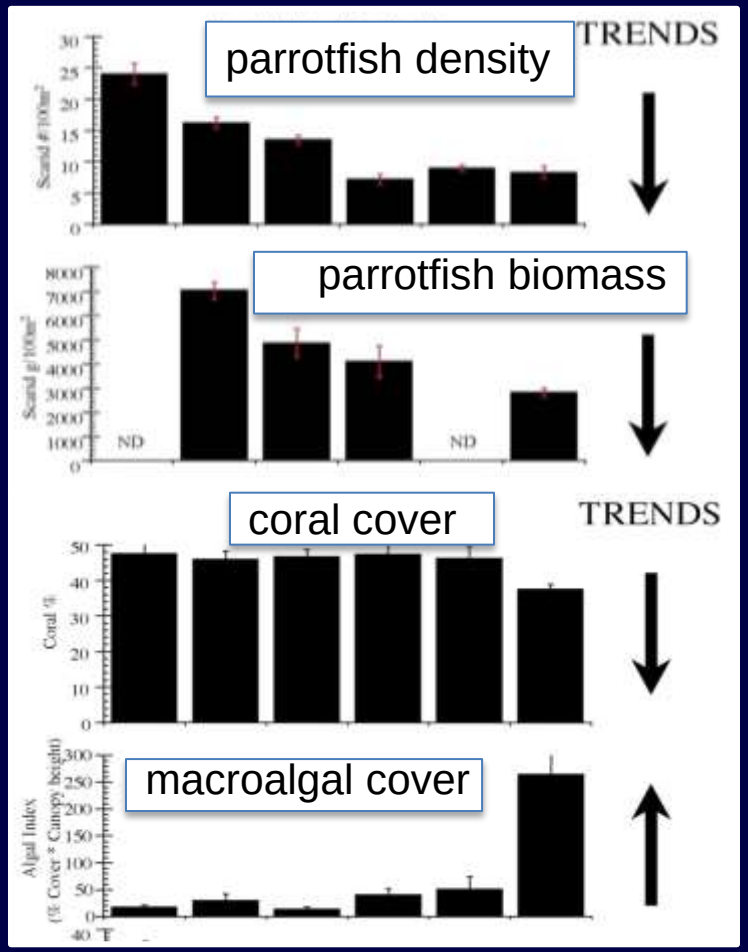
Online data-entry in prep.



Add graphics to PORT

Currently a simple, web-based interface to quickly generate individually customized reports using the early AGRRA data.

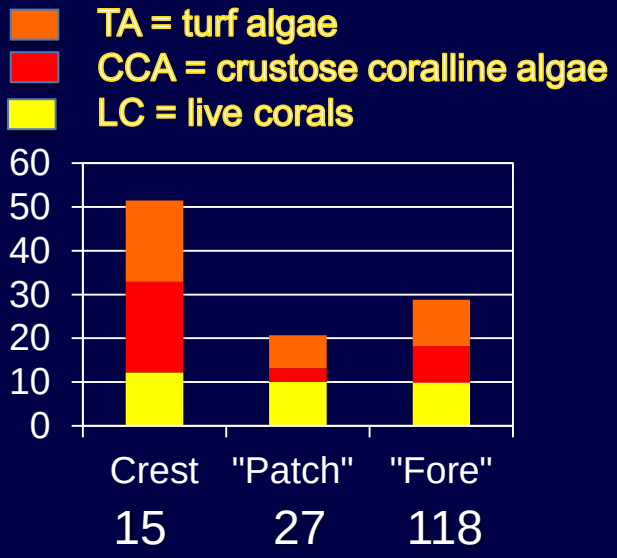
Graphics for Managers

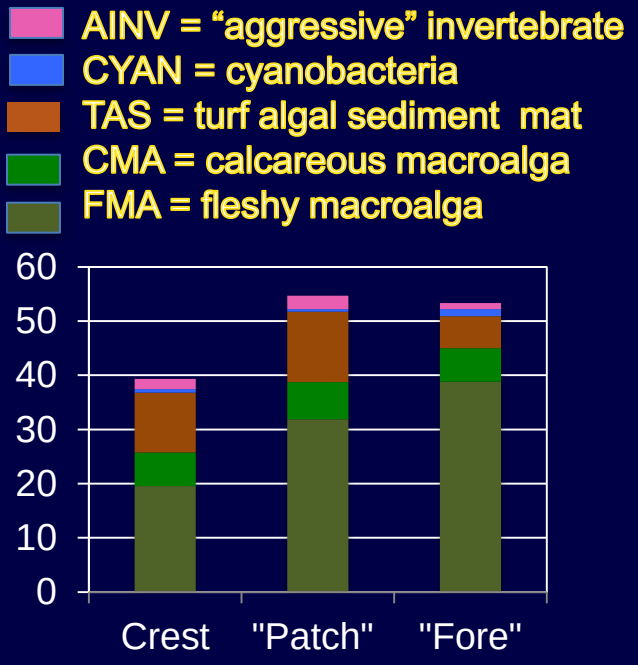


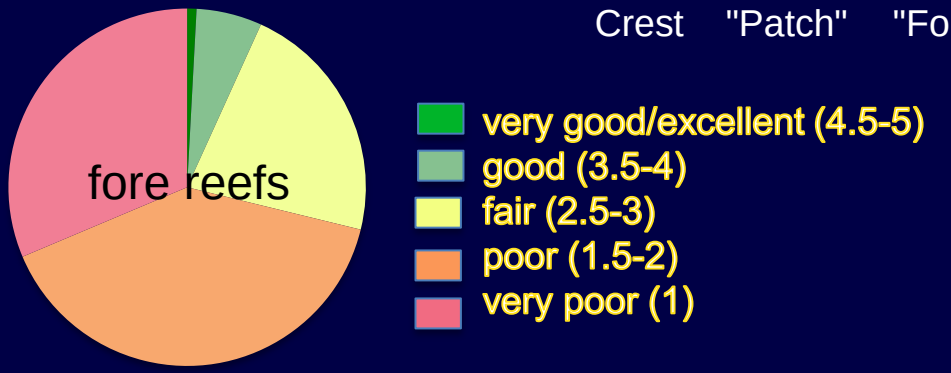
Steneck *et al.* (2011), 10 sites,
4-6 survey periods, 1999 - 2011

Simpler Graphics for Public

e.g., working with managers,
Benthic Cover, The Bahamas







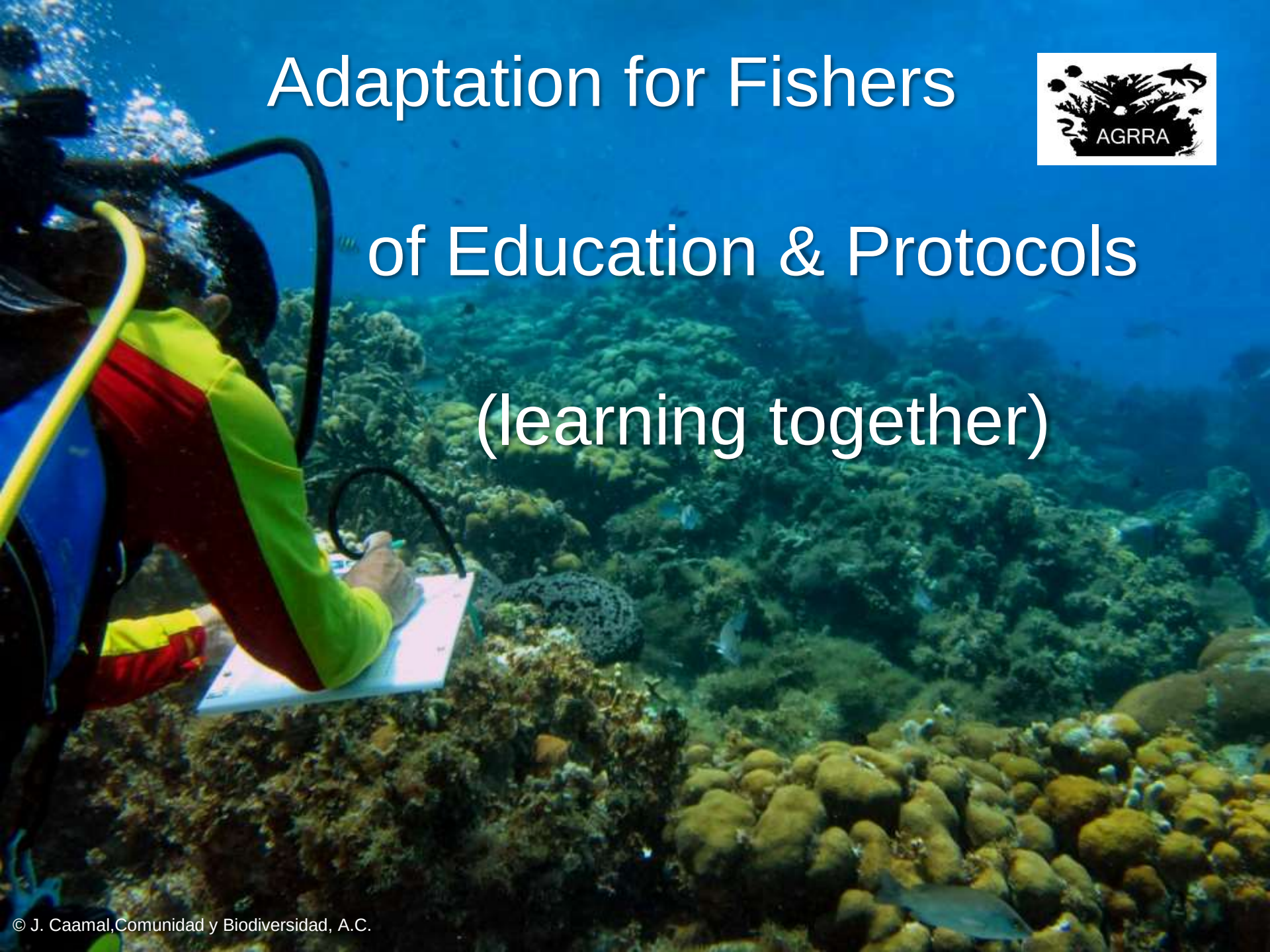
Education Plans

Formalize “train the trainer”

Adaptation for Fishers

of Education & Protocols

(learning together)



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Special Thanks to My Colleagues…

Philip Kramer

Robert Ginsburg

Patricia Kramer

Ken Marks

…to Our Partners, and the Wonderful AGRRA Teams!

BAHAMAS NATIONAL TRUST

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TODAY'S SCIENCE FOR TOMORROW'S OCEANS

Department of Marine Resources
The Commonwealth of The Bahamas

CORAL REEF ALLIANCE

Healthy Reefs
for healthy people

USC
UNIVERSITY OF SOUTH CAROLINA UNDERWATER SYSTEMS CENTER

Khaled bin Sultan
Living Oceans Foundation

kerzner marine foundation
PARTNERS FOR THE OCEANS

Benthic Cover Index

Assign Grades to ∑ "Desirable" Organisms

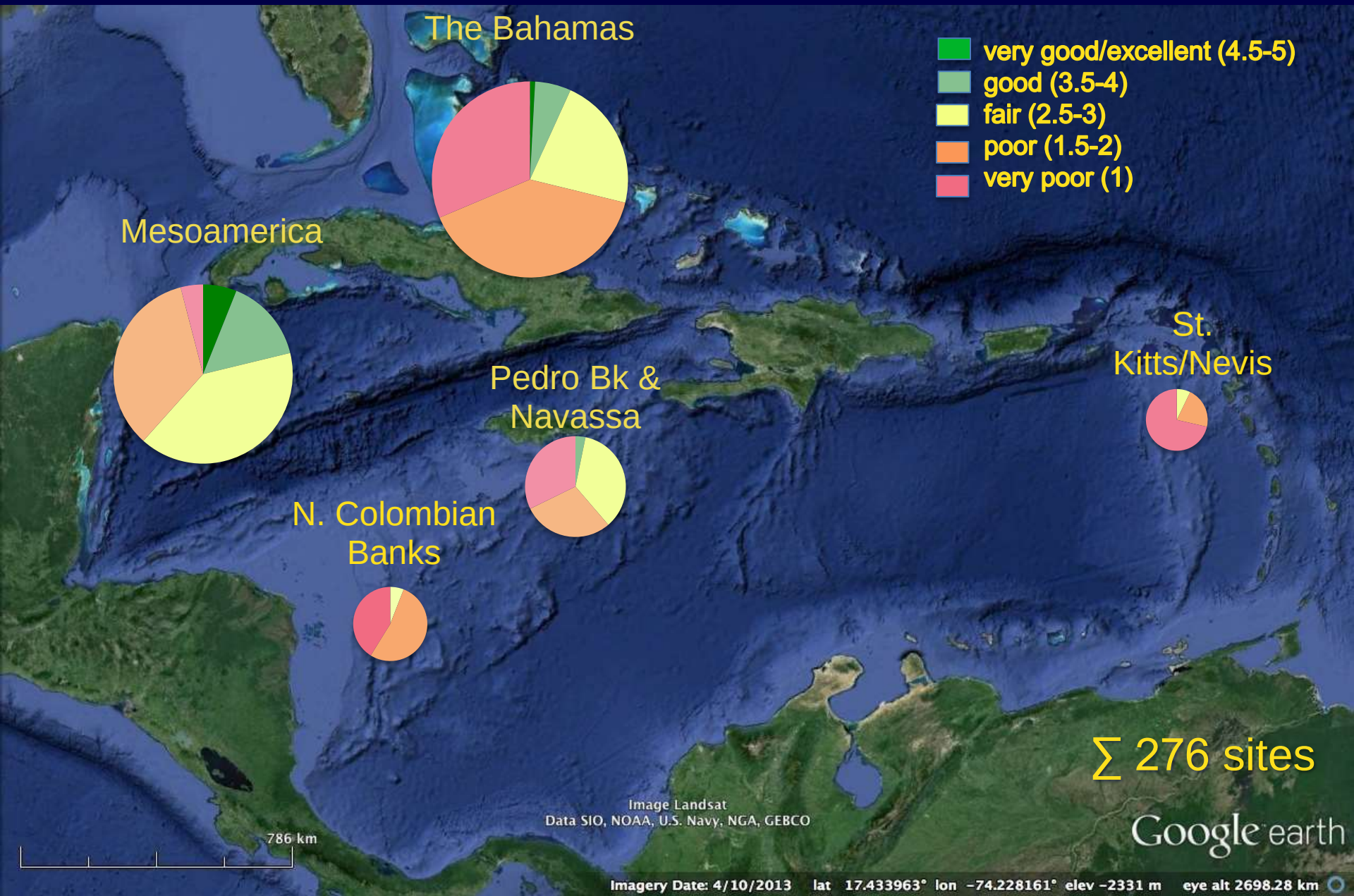
Grade	(LC+CCA+TA) %
5	≥ 80
4	60-79.9
3	40-59.9
2	20-39.9
1	<20

Assign Grades to ∑ "Undesirable" Organisms

Grade	(FMA+CMA+TAS+CYAN+AINV) %
5	<12.5
4	12.5-24.9
3	25 – 37.4
2	37.5- 49.9
1	≥ 50

Benthic Cover Index = ("Desirables" + "Undesirables") Grades/2

Benthic Cover Indices–fore reefs



Reef Types by Ecoregion

Wider Caribbean Ecoregion	Number					
	Surveys	Sites	Intertidal	Subtidal		
			Crest	"Back"	"Fore"	"Patch"
Northern Gulf of Mexico	2	2			**2**	
Southern Gulf of Mexico	6	6			6	
Floridian	70	70	12		29	29
Bahamian	483	300	56		199	45
Western Caribbean	670	520	133	1	316	70
Great Antilles	373	371	111		252	8
Eastern Caribbean	117	113	12	2	92	7
Southwestern Caribbean	130	129	53	1	56	19
Southern Caribbean	33	30	6		23	1
TOTAL	1897	1541	383	4	975	179

I. Kenny

© I. Drysdale

© M. Charteris

Proposing *Baseline Surveys each 5-10 years for a Coral Reef Report Card with a single-scale*

Benthos Cover Index

Calcifiers & Space 4 Larvae	∑ live corals + crustose coralline algae + turf algae (TA)
Coral "Killers"	∑ macroalgae (MA) + TA sediment mats + cyanobacteria + "aggressive" invertebrates

+ habitat-specific scales (in development) for

Reef Structural Index

Max. Relief, Substratum Type, Coral Height & Density

Coral Index

Composition, Size, Health, Partial Mortality, Recruits

Motile Animals Index

Herbivores	∑ fish + echinoids + conch + MA height?
Carnivores	∑ spiny lobster + fish (including lionfish)

Proposing *Biannual survey and*

Coral Reefs – selected AGRRA indicators of concern

e.g., macroalgae, herbivores, Nassau grouper, lionfish, sharks

+ new indicators in development

Proactive Reef Management Actions

e.g., MPAs, management plans & implementation re 20/20 goal; fishing regulations & enforcement; lionfish markets; coral nurseries/outplantings; wetlands & seagrass protection

Other Proactive Coastal Actions

e.g., controls on feral animals + infrastructure & port development

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If a disease outbreak or mass bleaching event

Perturbation-specific Surveys