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(2001
May)

Fish and Benthic Monitoring Workshop Summary Report
May 12-20, 2001
La Parguera, Puerto Rico

FINAL REPORT

Submitted by:

The Reef Environmental Education Foundation
and
The Ocean Conservancy
(formerly the Center for Marine Conservation)

July 23, 2001

Fish and Benthic Monitoring Workshop Summary Report
May 12-20, 2001
La Parguera, Puerto Rico
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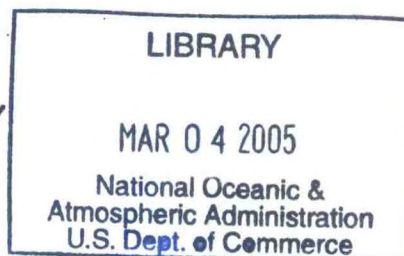
Workshop Overview

Through a partnership between the Reef Environmental Education Foundation (REEF), The Ocean Conservancy (formally known as the Center for Marine Conservation), and NOAA's Coastal Zone Management (CZM) Program, a series of coral reef monitoring workshops are being coordinated in Caribbean U.S. Island Territories and other Caribbean nations. These weeklong programs are targeted at local stakeholders, and participation is free of charge through CZM funding sponsorship. The workshops feature classroom and field training in taxonomic identification of local fishes, corals, algae, and key invertebrates and in the survey methodologies of two volunteer monitoring programs, REEF's Fish Survey Project and The Ocean Conservancy's Reef Ecosystem Condition Program (RECON). The purpose of the workshops are three-fold: 1) to enable a local corps of divers to provide on-going fish and benthic condition data for local reefs, 2) to collect a baseline of information on the fish populations of the area using a REEF Advanced Assessment Team, and 3) to establish long-term RECON survey sites and to collect baseline data at these sites.

The first training workshop was held in La Parguera, Puerto Rico May 12-20, 2001. Thirty people attended, and participants included educators, college/graduate students, dive industry professionals, staff from conservation groups/NGOs, and pro-active sport divers, and they came from throughout the island. The workshop was taught by 2 REEF and 2 RECON staff. In addition, three local RECON certified instructors assisted in RECON training and data collection. Six members of REEF's Advanced Assessment Team (AAT), REEF's most experienced surveyors, also participated. The AAT conducted surveys in conjunction with the field training and were assisted the workshop leaders with field and classroom training.

Participants attended two evenings of classroom sessions, went on two 2-tank boat dive trips (conducting 2 REEF surveys and 2 RECON training dives), and took the RECON exam. Many also took the Level 3 REEF exam, the highest level of the novice experience level. Throughout the week, three REEF/RECON 1 classes and three REEF/RECON 2 classes were held, allowing for scheduling flexibility. Two local dive boats were chartered from which participants conducted two, 2-tank boat dives for 6 days. Toward the end of the week, several participants were able to do extra dives to conduct RECON surveys and additional REEF surveys.

Participants conducted 37 RECON surveys and 40 REEF surveys. The REEF staff and AAT collected 185 expert surveys during the week and reported just over 200 fish species. A total of 17 sites were visited (Figure 1).



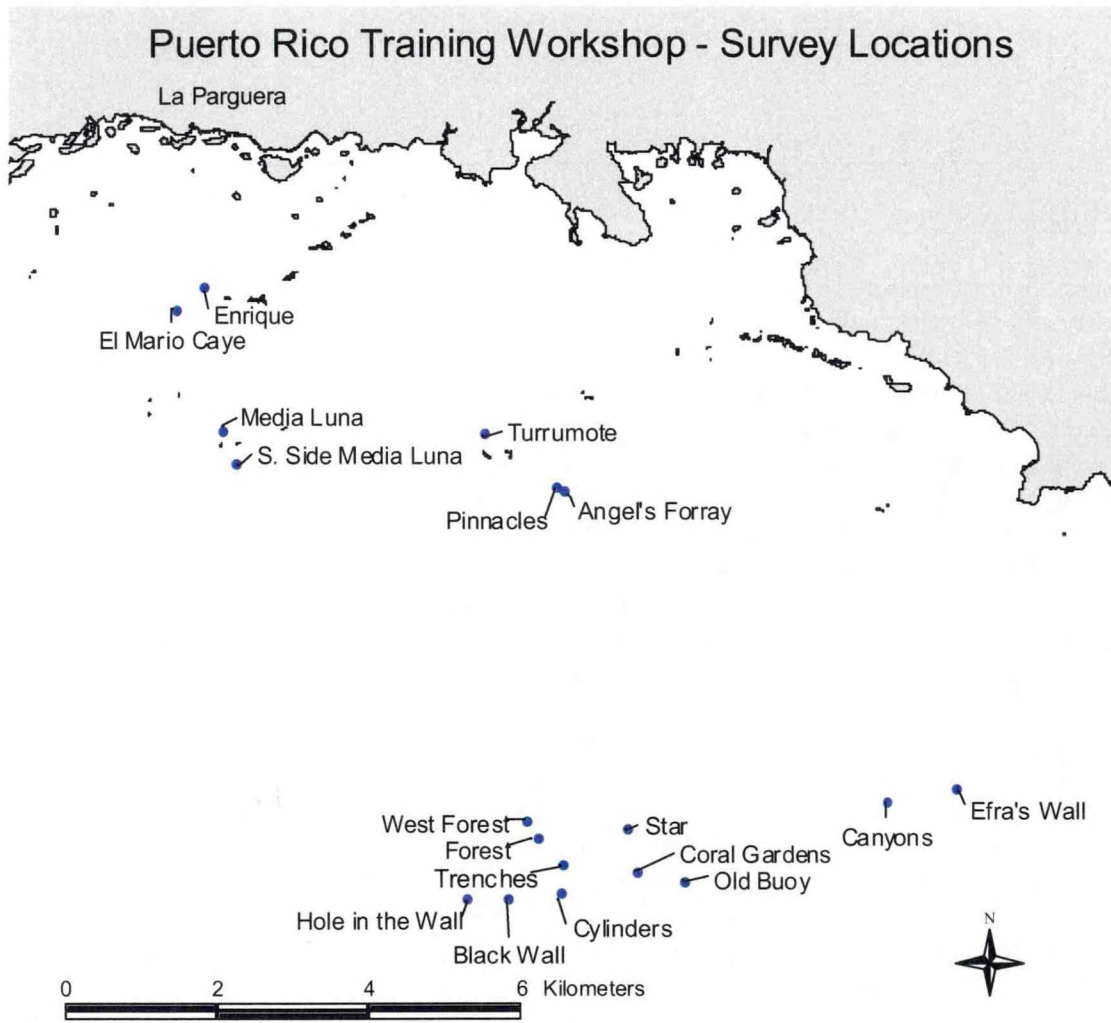


Figure 1. Survey sites.



RECON Summary Report

Two RECON program staff led the training workshop at La Parguera, Puerto Rico, with assistance from three local RECON certified instructors. Of the 30 people who participated in the workshop, 12 divers fulfilled all requirements to become certified RECON divers and 8 divers need only to complete two RECON surveys to receive their RECON diver certification. In addition, the workshop has helped to achieve an important goal of the RECON program – to promote closer ties between the diving community and others willing to promote stewardship of coral reefs.

For logistical reasons, five dive sites were utilized as RECON survey sites during the workshop. Participants conducted a total of 37 RECON surveys (Table 1). Note: RECON surveys are conducted only at designated RECON survey sites. Sites are located within a narrow (~3 m/10 ft.) depth range, in one type of habitat, and are restricted to a maximum depth of 18 m/60 ft. for safety, and to give the diver enough time to complete the survey. Two of these, El Mario and The Forest, will be the initial RECON survey sites in La Parguera, Puerto Rico. The El Mario site is a patch reef with scattered stony corals located at approximately 10-15 feet near an inshore, sandy cay. The Forest survey site is a low-relief, spur-and-groove, shelf-edge bank reef at depths of 40-50 feet.

Table 1: The number of RECON surveys conducted by workshop participants at each dive site.

Survey Site	# RECON Surveys Conducted
El Mario	13
The Forest	14
Forest West	2
Coral Gardens	3
Hole in the Wall	5

Two weeks after the workshop, six RECON divers accompanied a local RECON instructor to conduct RECON surveys off Mona Island, Puerto Rico. The divers conducted seven surveys at the RECON survey site established by the RECON instructor.

RECON is still in its evaluation stage, and therefore, the data generated during this workshop and the input from the participants will be used to help improve the training materials and protocol. Evaluation forms were distributed to all divers upon completion of the RECON examination. A summary of the evaluation and comments submitted is presented in an appendix to this report.

RECON Data Summary

Data were analyzed for brain corals at the El Mario and The Forest survey sites. Beginning RECON divers are required to work in buddy pairs, surveying the same colonies, as well as the same line and belt transects. Data for buddy pairs were averaged prior to further analysis.

Relative to the patch reef (Figures 2, 3 and 4), brain corals at the deeper, offshore site were somewhat larger and showed slightly less partial colony mortality, but had recently incurred substantially more parrotfish bites (32% versus 3%, respectively). Long-spined sea urchins (*Diadema antillarum*), a key herbivore, were only found at the shallow site (Figure 5).

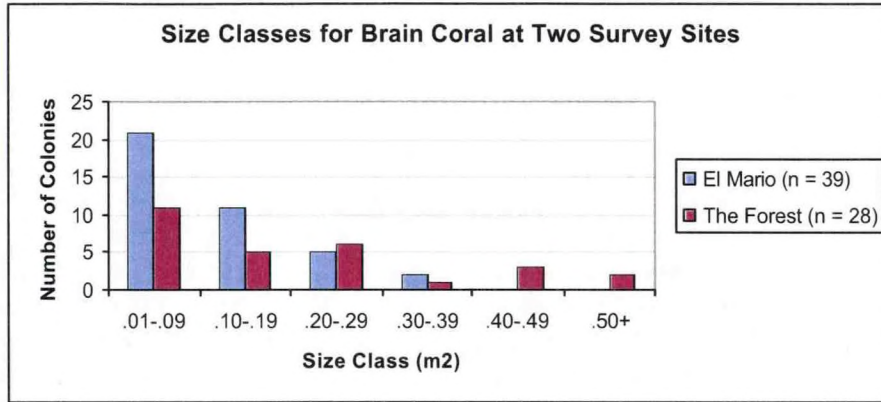


Figure 2: The number of brain coral colonies per size class at the El Mario and The Forest dive sites.

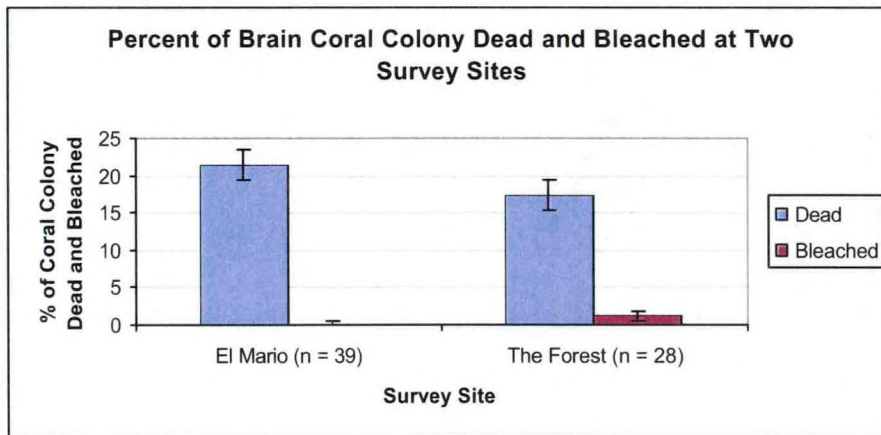


Figure 3: Percent of brain coral colony dead and bleached (as mean \pm standard error) at the El Mario and The Forest dive sites.

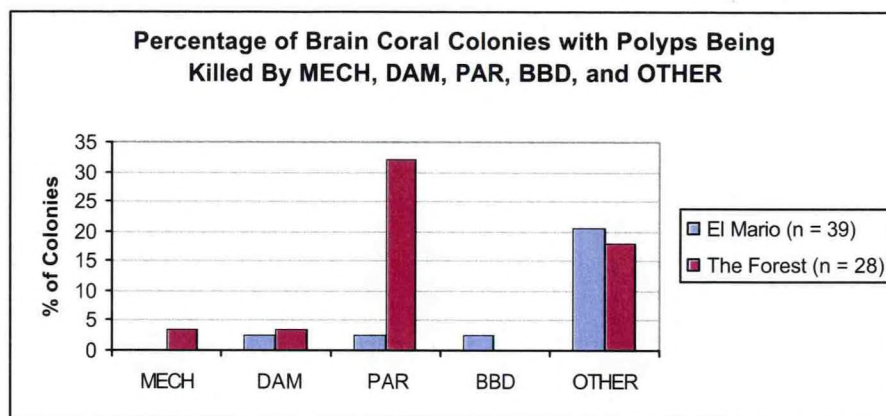


Figure 4: The percentage of brain coral colonies with polyps being killed by mechanical damage (MECH); damselfish bites/algal gardens (DAM); parrotfish bites (PAR); black band disease (BBD); and other diseases, predation or competition (OTHER).

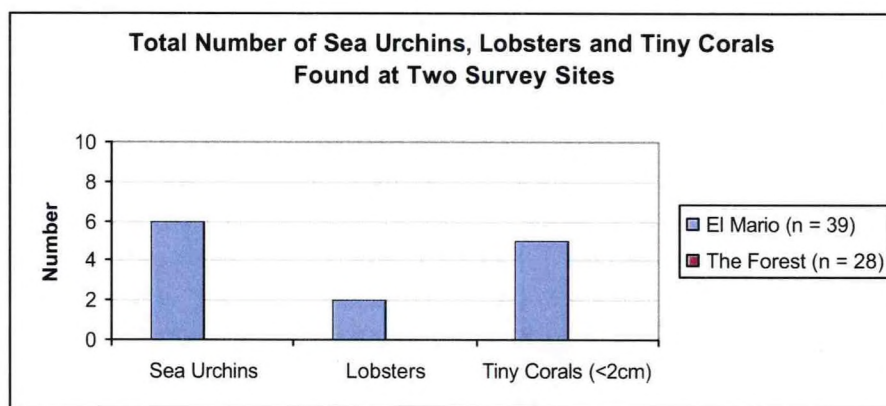


Figure 5: Total number of long-spined sea urchins (*Diadema antillarum*) and spiny lobsters (*Panulirus spp.*) found in crevices or at the base of the brain colonies surveyed, and tiny corals (<2 cm) found growing on dead areas of the brain colonies surveyed at the El Mario and The Forest dive sites.

Patches of sand or mud were nearly four times more common at the shallow reef than on the shelf-edge reef lobes (Figure 6). The cover of live stony corals was more than twice as high (22% versus 10%) on the shelf-edge lobes, where macroalgae were also somewhat more abundant (18% versus 11%). Whereas *Halimeda* and *Dictyota* were respectively the most abundant, and second most abundant, genera of macroalgae at El Mario, their relative abundance was reversed at The Forest (Table 2). The only human effects recorded at the survey sites were abandoned fishing line and tires (El Mario) and PVC pipes (The Forest).

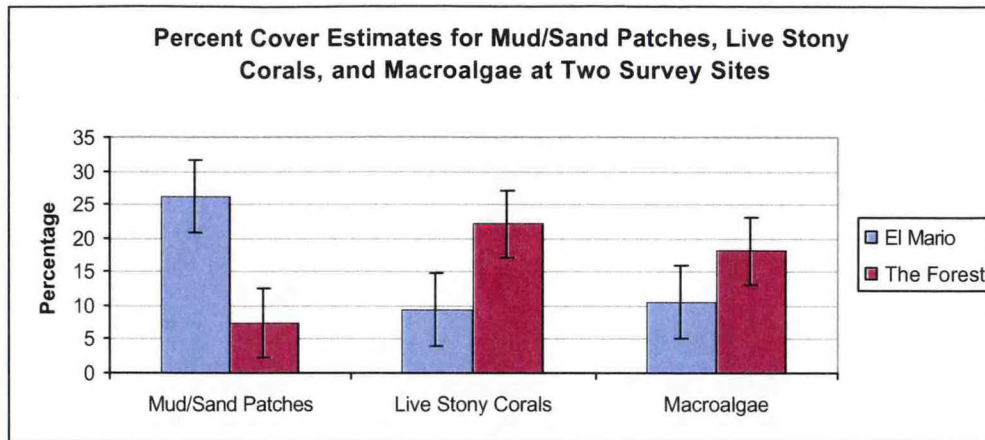


Figure 6: Percent cover estimates (as mean \pm standard error) for mud/sand patches, live stony corals, and macro algae at the El Mario and The Forest dive sites.

Table 2: The two most abundant genera of macroalgae found at the El Mario and The Forest survey sites.

Survey Site	Most Common Macroalga	2 nd Most Common Macroalga
El Mario	<i>Halimeda</i>	<i>Dictyota</i>
The Forest	<i>Dictyota</i>	<i>Halimeda</i>

In summary, we are optimistic that the RECON protocols are an effective tool by which important attributes of benthic reef habitats can be distinguished with data collected by volunteer divers. RECON-collected data will help serve as an early warning system to reef managers and scientists during mass bleaching events, disease outbreaks, blooms of nuisance bacteria or algae, etc. RECON data can also be used to augment information that is routinely gathered by government agencies and conservation groups.

REEF Summary Report

DATA

During the workshop, REEF surveys were conducted at 17 sites in three main regions – the wall (average depth 60', high profile reef and droff-off), the shelf-edge (average depth 40', moderate profile with spur and groove) and inshore (average depth 15', low profile patch reefs and sand) (Table 3, Figure 1). Twenty workshop participants submitted REEF surveys, and a total of 40 were conducted. The REEF AAT and staff conducted 185 surveys and documented 217 fish species (see attached Survey Report; www.reef.org/cgi-bin/batchrep.pl?region=TWA&file_name=aatpr0105.dat). These data represent a valuable addition to the REEF database; prior to the workshop there were 63 surveys from Puerto Rico in the database and only 5 were from the La Parguera area.

Table 3: REEF AAT and staff survey effort.

REEF Zone Code	Site Name	AAT Survey Effort
<i>Wall</i>		
63020011	Black Wall	12
63020012	Old Buoy	8
63020013	Efra's Wall	8
63020014	Canyons	6
63020015	Coral Gardens	11
63020016	Cylinders	7
63020017	Hole in the Wall	6
<i>Shelf-edge, Spur and Groove</i>		
63020018	Trenches	10
63020019	Forest	25
63020020	West Forest	4
63020021	Star	6
<i>Shallow Inshore Reefs</i>		
63020022	El Mario Caye	14
63020023	Enrique	26
63020024	Media Luna	12
63020026	Turumote	9
63020027	Pinnacles	12
63020028	Angel's Forray	8

The coral reefs of the La Parguera region support a fairly high number of fish species. However, large carnivores (grouper, snapper, grunt) were noticeably rare or absent. Unique sightings included two-spot bass (*Serranus flaviventris*), leopard goby (*Gobiosoma saucrum*), pirate blenny (*Emblemaria piratula*), and sea bream (*Archosargus rhomboidalis*).

The fish assemblages of the 17 sites were relatively distinct among the three habitat types (wall, shelf-edge, inshore). A hierarchical cluster analysis was used to create a visual picture of similarity in assemblages among sites (Figure 7). The joint of each cluster corresponds to the x-axis; the

smaller the distance the more similar the sites are in fish presence and relative abundance. Three distinct clusters formed, corresponding to the three reef locations (see Figure 1). There also appeared to be a pattern corresponding to the longitudinal axis of the wall (East to West).

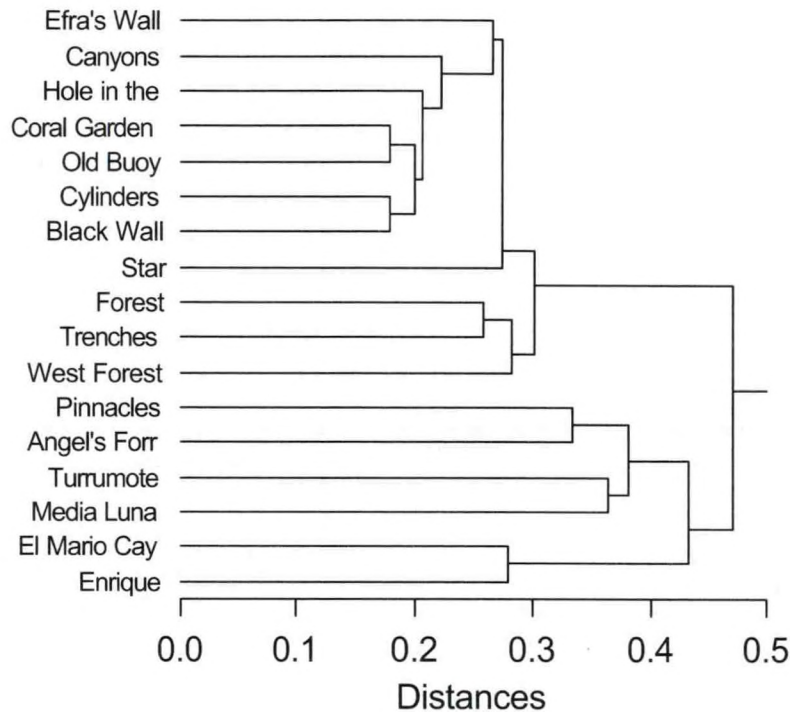


Figure 7: Cluster analysis results. The analysis used REEF's 2001 Advanced Assessment Team data, collected at 17 sites in the La Parguera region of Puerto Rico. Analysis used rank of the abundance score. Distance of the clusters are 1-Gamma. Only species that were seen with a %SF of at least 20% (108 species) were included in the analysis. Sites clustered together by reef type/location.

OUTREACH

In an effort to increase long-term local participation, REEF distributed four sets of training materials at no cost. The materials included 'Introduction to Fish Identification for the Caribbean', REEF's slide-based curriculum, and survey materials. Recipients included a local dive shop, an independent dive instructor from the north coast, a University of Puerto Rico professor, and an environmental education organization. Since the workshop, several workshop participants have sent in additional surveys from other parts of Puerto Rico. The dive instructor from the north coast has also begun offering REEF training seminars and coordinating regular survey dives.

In conclusion, this project enabled REEF to strengthen and expand its volunteer program to an area that was under-surveyed by REEF members, while engaging local divers to participate in a meaningful activity. Data generated during the workshop and beyond will be a valuable addition to REEF's growing fish database, which currently contains over 30,000 surveys from the Caribbean region.

Acknowledgments

The Ocean Conservancy and REEF would like to express our gratitude to Paradise Scuba & Snorkeling Center and Parguera Divers for their support and assistance during this workshop. We would also like to express our sincere gratitude to Karen Whall and Terry Burkholder for assistance before, during and after the workshop. The assistance of Samuel Suleimán, Gerardo Cabrera, Reinaldo Rios (RECON Instructors), the REEF AAT (Jessica Armacost, Cathy Coughlin, Ken Deaver, Douglass Rankin, Brice Semmens, and Will Ruggles), and of Chris Rilling and Ruth Kelty (NOAA) in the field is particularly appreciated.

Funding provided by the National Oceanic & Atmospheric Administration (NOAA), Office of Ocean and Coastal Resource Management, Coastal Programs Division (Work Order #40AANC001279 and #NCND3000000008). We would also like to offer special thanks to Ed Kruse, CZM Team Leader Southern Caribbean Region for his support and the opportunity to conduct this workshop.



THE REEF ENVIRONMENTAL EDUCATION FOUNDATION

REEF HOME \ ABOUT REEF || DATA || MEMBER SERVICES || WEB RESOURCES || SEARCH

**Tropical Western Atlantic Data
Field Survey and Special Project Summaries**

**REEF Trip Report For:
AAT Puerto Rico - May 2001 (2001-05-13 - 2001-05-20)**

Survey Members Participating:

Julie Dutcher	Christy Semmens	Brice Semmens	Cathy Coughlin
Douglass Rankin	Will Ruggles	Ken Deaver	Jessica Armacost

Code	Site	Surveys				Bottom Time (H:M)
		Expert		Novice		
		SA	SO	SA	SO	
63020011	Black Wall, La Parguera	12	0	0	0	9:59
63020012	Old Buoy, La Parguera	8	0	0	0	6:54
63020013	Efra's Wall, La Parguera	8	0	0	0	7:03
63020014	Canyons, La Parguera	6	0	0	0	4:15
63020015	Coral Gardens, La Parguera	11	0	0	0	8:51
63020016	Cylinders, La Parguera	7	0	0	0	5:29
63020017	Hole in the Wall, La Parguera	6	0	0	0	4:08
63020018	Trenches, La Parguera	10	0	0	0	9:46
63020019	Forest, La Parguera	25	0	0	0	20:16
63020020	West Forest, La Parguera	4	0	0	0	3:23
63020021	Star, La Parguera	6	0	0	0	4:36
63020022	El Mario Caye, La Parguera	14	0	0	0	13:42
63020023	Enrique, La Parguera	26	0	0	0	23:28
63020024	Media Luna, La Parguera	12	0	0	0	11:18
63020026	Turrumote, La Parguera	9	0	0	0	7:25
63020027	Pinnacles, La Parguera	12	0	0	0	11:23
63020028	Angel's Forray, La Parguera	8	0	0	0	7:01
63020031	Caracoles, La Parguera	1	0	0	0	1:05
TOTALS		185	0	0	0	160:02

http://www.reef.org/cgibin/batchrep.pl?region=TWA&file_name=aatpr0105.dat

Rank	SP#	Common Name	Total		Expert		Novice	
			SF%	DEN	SF%	DEN	SF%	DEN
1	206	Ocean Surgeonfish	98.3%	2.7	98.3%	2.7		
2	152	Redband Parrotfish	95.6%	2.7	95.6%	2.7		
3	031	Foureye Butterflyfish	94.5%	2.3	94.5%	2.3		
4	201	Longspine Squirrelfish	94.5%	2	94.5%	2		
5	156	Striped Parrotfish	93.5%	2.8	93.5%	2.8		
6	155	Stoplight Parrotfish	93.5%	2.6	93.5%	2.6		
7	213	Bluehead	91.8%	3.2	91.8%	3.2		
8	204	Blue Tang	89.1%	2.3	89.1%	2.3		
9	048	Bicolor Damselfish	88.6%	3.1	88.6%	3.1		
10	047	Beaugregory	88.6%	2	88.6%	2		
11	431	Sharknose Goby	87%	2	87%	2		
12	054	Yellowtail Damselfish	86.4%	2.1	86.4%	2.1		
13	108	French Grunt	85.4%	2.1	85.4%	2.1		
14	220	Yellowhead Wrasse	79.4%	2.6	79.4%	2.6		
15	117	White Grunt	78.9%	1.8	78.9%	1.8		
16	133	Bar Jack	76.2%	2.1	76.2%	2.1		
17	197	Yellowtail Snapper	75.6%	2.3	75.6%	2.3		
18	167	Sharpnose Puffer	75.1%	1.7	75.1%	1.7		
19	053	Threespot Damselfish	74%	2.4	74%	2.4		
20	095	Graysby	74%	1.8	74%	1.8		
21	105	Bluestriped Grunt	71.8%	1.8	71.8%	1.8		
22	052	Sergeant Major	70.8%	2.3	70.8%	2.3		
23	149	Princess Parrotfish	69.7%	2.5	69.7%	2.5		
24	077	Yellow Goatfish	69.1%	2.2	69.1%	2.2		
25	042	Blue Chromis	68.6%	3.1	68.6%	3.1		
26	004	Gray Angelfish	68.6%	1.5	68.6%	1.5		
27	198	Blackbar Soldierfish	66.4%	2.2	66.4%	2.2		
28	043	Brown Chromis	64.8%	2.7	64.8%	2.7		
29	010	Fairy Basslet	64.3%	2.3	64.3%	2.3		
30	079	Bridled Goby	64.3%	2.1	64.3%	2.1		
31	076	Spotted Goatfish	61.6%	1.7	61.6%	1.7		
32	207	Black Durgon	56.7%	3	56.7%	3		

33	239	Trumpetfish	56.7%	1.3	56.7%	1.3		
34	081	Goldspot Goby	56.2%	2.1	56.2%	2.1		
35	196	Schoolmaster	56.2%	1.6	56.2%	1.6		
36	150	Queen Parrotfish	53.5%	1.8	53.5%	1.8		
37	128	Yellowtail Hamlet	53.5%	1.7	53.5%	1.7		
38	215	Creole Wrasse	52.9%	3.1	52.9%	3.1		
39	083	Masked Goby/Glass Goby	49.1%	2.5	49.1%	2.5		
40	181	Harlequin Bass	48.6%	1.6	48.6%	1.6		
41	006	Rock Beauty	46.4%	1.6	46.4%	1.6		
42	218	Slippery Dick	45.9%	2.3	45.9%	2.3		
43	030	Banded Butterflyfish	45.9%	1.8	45.9%	1.8		
44	194	Mahogany Snapper	45.4%	1.8	45.4%	1.8		
45	238	Sand Tilefish	44.3%	1.5	44.3%	1.5		
46	200	Longjaw Squirrelfish	43.7%	1.4	43.7%	1.4		
47	093	Coney	43.2%	1.6	43.2%	1.6		
48	131	Spanish Hogfish	43.2%	1.5	43.2%	1.5		
49	337	Secretary Blenny	42.7%	1.5	42.7%	1.5		
50	118	Barred Hamlet	42.7%	1.3	42.7%	1.3		
51	051	Longfin Damsel fish	39.4%	2	39.4%	2		
52	147	Greenblotch Parrotfish	36.7%	1.7	36.7%	1.7		
53	214	Clown Wrasse	36.2%	1.6	36.2%	1.6		
54	005	Queen Angelfish	35.1%	1.5	35.1%	1.5		
55	154	Redtail Parrotfish	35.1%	1.4	35.1%	1.4		
56	153	Redfin Parrotfish	34.5%	1.5	34.5%	1.5		
57	088	Shortstripe Goby	32.4%	1.9	32.4%	1.9		
58	111	Porkfish	31.8%	1.4	31.8%	1.4		
59	087	Peppermint Goby	31.3%	1.8	31.3%	1.8		
60	017	Redlip Blenny	27.5%	1.7	27.5%	1.7		
61	185	Tobaccofish	27.5%	1.4	27.5%	1.4		
62	203	Squirrelfish	27%	1.4	27%	1.4		
63	159	Pluma	26.4%	1.2	26.4%	1.2		
64	226	Redspotted Hawkfish	25.9%	1.3	25.9%	1.3		
65	230	Sand Diver	25.9%	1.2	25.9%	1.2		
66	193	Lane Snapper	25.4%	1.5	25.4%	1.5		
67	050	Dusky Damsel fish	24.8%	2.4	24.8%	2.4		

68	116	Tomtate	24.8%	2.2	24.8%	2.2		
69	121	Butter Hamlet	24.3%	1	24.3%	1		
70	099	Red Hind	23.7%	1.2	23.7%	1.2		
71	205	Doctorfish	22.7%	1.7	22.7%	1.7		
72	228	Yellowhead Jawfish	22.1%	1.8	22.1%	1.8		
73	427	Orangespotted Goby	21.6%	2.1	21.6%	2.1		
74	113	Smallmouth Grunt	21%	1.9	21%	1.9		
75	123	Indigo Hamlet	20%	1.2	20%	1.2		
76	114	Spanish Grunt	20%	1.1	20%	1.1		
77	027	Smooth Trunkfish	20%	1.1	20%	1.1		
78	129	Hybrid Hamlet	19.4%	1.5	19.4%	1.5		
79	003	French Angelfish	19.4%	1.3	19.4%	1.3		
80	012	Glasseye Snapper	19.4%	1.3	19.4%	1.3		
81	069	Orangespotted Filefish	19.4%	1.2	19.4%	1.2		
82	216	Puddingwife	17.8%	1.5	17.8%	1.5		
83	160	Saucereye Porgy	17.8%	1.2	17.8%	1.2		
84	106	Caesar Grunt	17.2%	1.2	17.2%	1.2		
85	210	Queen Triggerfish	15.6%	1.1	15.6%	1.1		
86	180	Creole-fish	15.1%	2.1	15.1%	2.1		
87	361	Sponge Cardinalfish	15.1%	1.7	15.1%	1.7		
88	049	Cocoa Damsel fish	14.5%	1.1	14.5%	1.1		
89	145	Bluelip Parrotfish	14%	1.8	14%	1.8		
90	183	Peppermint Bass	14%	1.6	14%	1.6		
91	080	Colon Goby	14%	1.5	14%	1.5		
92	059	Spotted Drum	14%	1.1	14%	1.1		
93	425	Leopard Goby	13.5%	1.6	13.5%	1.6		
94	023	Boga	11.8%	3.2	11.8%	3.2		
95	452	Bigeye Scad	11.8%	2.9	11.8%	2.9		
96	130	Hogfish	11.3%	1	11.3%	1		
97	336	Roughhead Blenny	10.8%	1.6	10.8%	1.6		
98	500	Sea Bream	10.8%	1.6	10.8%	1.6		
99	086	Pallid Goby	10.8%	1.3	10.8%	1.3		
100	319	Blackhead Blenny	10.8%	1.2	10.8%	1.2		
101	019	Saddled Blenny	10.2%	1.4	10.2%	1.4		
102	199	Dusky Squirrelfish	10.2%	1.4	10.2%	1.4		

103	166	Porcupinefish	10.2%	1.2	10.2%	1.2		
104	078	Blue Goby	9.1%	2	9.1%	2		
105	127	Yellowbelly Hamlet	9.1%	1.4	9.1%	1.4		
106	032	Longsnout Butterflyfish	9.1%	1.4	9.1%	1.4		
107	063	Green Moray	9.1%	1.2	9.1%	1.2		
108	034	Spotfin Butterflyfish	8.6%	1.8	8.6%	1.8		
109	035	Barred Cardinalfish	8.6%	1.7	8.6%	1.7		
110	007	Great Barracuda	8.6%	1.4	8.6%	1.4		
111	142	Cero	8.6%	1	8.6%	1		
112	229	Yellowfin Mojarra	8.1%	1.3	8.1%	1.3		
113	338	Spinyhead Blenny	8.1%	1.1	8.1%	1.1		
114	018	Rosy Blenny	7.5%	1.6	7.5%	1.6		
115	173	Green Razorfish	7.5%	1.2	7.5%	1.2		
116	066	Spotted Moray	7.5%	1	7.5%	1		
117	164	Bandtail Puffer	7.5%	1	7.5%	1		
118	235	Atlantic Spadefish	7%	2	7%	2		
119	217	Rainbow Wrasse	7%	1.8	7%	1.8		
120	221	Bermuda Chub/Yellow Chub	7%	1.6	7%	1.6		
121	119	Black Hamlet	6.4%	1.1	6.4%	1.1		
122	126	Tan Hamlet	6.4%	1	6.4%	1		
123	072	Whitespotted Filefish	5.9%	1.1	5.9%	1.1		
124	211	Sargassum Triggerfish	5.4%	1.8	5.4%	1.8		
125	109	Black Margate	5.4%	1.3	5.4%	1.3		
126	463	Dusky Jawfish	5.4%	1.1	5.4%	1.1		
127	041	Whitestar Cardinalfish	4.8%	1.6	4.8%	1.6		
128	341	Yellowface Pikeblenny	4.8%	1.4	4.8%	1.4		
129	033	Reef Butterflyfish	4.8%	1.3	4.8%	1.3		
130	020	Sailfin Blenny	4.8%	1.3	4.8%	1.3		
131	026	Scrawled Cowfish	4.8%	1	4.8%	1		
132	045	Sunshinefish	4.3%	2.1	4.3%	2.1		
133	192	Gray Snapper	4.3%	1.5	4.3%	1.5		
134	212	Blackear Wrasse	4.3%	1.1	4.3%	1.1		
135	028	Spotted Trunkfish	4.3%	1	4.3%	1		
136	100	Rock Hind	4.3%	1	4.3%	1		
137	232	Silversides, Herrings, Anchovies	3.7%	3	3.7%	3		

138	451	Atlantic Leatherjack	3.7%	2.1	3.7%	2.1		
139	175	Rosy Razorfish	3.7%	1.7	3.7%	1.7		
140	343	Lofty Triplefin	3.7%	1.2	3.7%	1.2		
141	182	Lantern Bass	3.7%	1.2	3.7%	1.2		
142	014	Diamond Blenny	3.7%	1.1	3.7%	1.1		
143	137	Horse-Eye Jack	3.2%	2.1	3.2%	2.1		
144	146	Bucktooth Parrotfish	3.2%	1.6	3.2%	1.6		
145	036	Belted Cardinalfish	3.2%	1.5	3.2%	1.5		
146	603	Tusked Goby	3.2%	1.3	3.2%	1.3		
147	317	Barfin Blenny	3.2%	1.3	3.2%	1.3		
148	075	Peacock Flounder	3.2%	1	3.2%	1		
149	070	Scrawled Filefish	3.2%	1	3.2%	1		
150	062	Goldentail Moray	3.2%	1	3.2%	1		
151	236	Glassy Sweeper	2.7%	1.8	2.7%	1.8		
152	209	Ocean Triggerfish	2.7%	1.6	2.7%	1.6		
153	102	Tiger Grouper	2.7%	1.6	2.7%	1.6		
154	058	Reef Croaker	2.7%	1.2	2.7%	1.2		
155	195	Mutton Snapper	2.7%	1.2	2.7%	1.2		
156	234	Greater Soapfish	2.7%	1	2.7%	1		
157	231	Sharksucker	2.7%	1	2.7%	1		
158	190	Cubera Snapper	2.7%	1	2.7%	1		
159	097	Nassau Grouper	2.7%	1	2.7%	1		
160	340	Bluethroat Pikeblenny	2.1%	1.7	2.1%	1.7		
161	613	Island Goby	2.1%	1.5	2.1%	1.5		
162	313	Pearl Blenny	2.1%	1.2	2.1%	1.2		
163	015	Hairy Blenny	2.1%	1.2	2.1%	1.2		
164	151	Rainbow Parrotfish	2.1%	1.2	2.1%	1.2		
165	421	Dash Goby	2.1%	1	2.1%	1		
166	542	Two-spot Bass	2.1%	1	2.1%	1		
167	039	Flamefish	2.1%	1	2.1%	1		
168	065	Sharptail Eel	2.1%	1	2.1%	1		
169	459	Redtail Scad	1.6%	3.3	1.6%	3.3		
170	060	Brown Garden Eel	1.6%	2.3	1.6%	2.3		
171	082	Hovering Goby	1.6%	1.6	1.6%	1.6		
172	056	Highhat	1.6%	1.6	1.6%	1.6		

173	073	Eyed Flounder	1.6%	1.6	1.6%	1.6		
174	091	Black Grouper	1.6%	1.3	1.6%	1.3		
175	163	Balloonfish	1.6%	1	1.6%	1		
176	179	Chalk Bass	1.6%	1	1.6%	1		
177	332	Pirate Blenny	1.6%	1	1.6%	1		
178	469	Bluestriped Lizardfish	1.6%	1	1.6%	1		
179	008	Southern Sennet	1%	3	1%	3		
180	429	Rusty Goby	1%	2	1%	2		
181	112	Sailors Choice	1%	2	1%	2		
182	372	Night Sergeant	1%	2	1%	2		
183	090	Yellowline Goby	1%	2	1%	2		
184	323	Downy Blenny	1%	1.5	1%	1.5		
185	324	Dusky Blenny	1%	1.5	1%	1.5		
186	326	Goldline Blenny	1%	1.5	1%	1.5		
187	495	Shortfin Pipefish	1%	1	1%	1		
188	359	Roughlip Cardinalfish	1%	1	1%	1		
189	219	Yellowcheek Wrasse	1%	1	1%	1		
190	143	Spanish Mackerel	1%	1	1%	1		
191	473	King Mackerel	1%	1	1%	1		
192	025	Honeycomb Cowfish	1%	1	1%	1		
193	457	Mackerel Scad	0.5%	3	0.5%	3		
194	134	Blue Runner	0.5%	3	0.5%	3		
195	141	Yellow Jack	0.5%	3	0.5%	3		
196	450	Atlantic Bumper	0.5%	3	0.5%	3		
197	478	Silver Jenny	0.5%	3	0.5%	3		
198	477	Mottled Mojarra	0.5%	3	0.5%	3		
199	140	Rainbow Runner	0.5%	2	0.5%	2		
200	064	Purplemouth Moray	0.5%	2	0.5%	2		
201	162	Sheepshead Porgy	0.5%	2	0.5%	2		
202	138	Palometa	0.5%	2	0.5%	2		
203	383	Chestnut Moray	0.5%	1	0.5%	1		
204	191	Dog Snapper	0.5%	1	0.5%	1		
205	587	Dwarf Wrasse	0.5%	1	0.5%	1		
206	125	Shy Hamlet	0.5%	1	0.5%	1		
207	011	Bigeye	0.5%	1	0.5%	1		

208	436	White-eye Goby	0.5%	1	0.5%	1		
209	437	Yellownose Goby	0.5%	1	0.5%	1		
210	157	Jolthead Porgy	0.5%	1	0.5%	1		
211	148	Midnight Parrotfish	0.5%	1	0.5%	1		
212	420	Crested Goby	0.5%	1	0.5%	1		
213	532	Candy Bass	0.5%	1	0.5%	1		
214	360	Sawcheek Cardinalfish	0.5%	1	0.5%	1		
215	622	Triplefin species	0.5%	1	0.5%	1		
216	184	Sand Perch	0.5%	1	0.5%	1		
217	568	Cardinal Soldierfish	0.5%	1	0.5%	1		
Total Species				217		217		0

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Appendix - RECON Training Evaluation Summary

As RECON is still in its evaluation stage, the data generated during this workshop and the input from the participants is helping us to improve the training materials and protocol. Evaluation forms were distributed to all divers upon completion of the RECON examination. Below is a summary of the evaluation along with comments submitted by the divers.

RECON Training as a Whole

1. In general, the training was:

[# Respondents = 24]

Rating: 67% Excellent 33% Good _____ Fair _____ Poor _____ N/A

Comments:

- ~~/~~ Everyone is knowledgeable and are quick to answer questions. The instructors are good.
- ~~/~~ I liked the way the trainings were taken first functional (?) then practical. Keep it up!
- ~~/~~ It is very short.
- ~~/~~ Overall, program good to get "novice surveyors" involved.
- ~~/~~ Could have been better organized.
- ~~/~~ Communication of needs/goals needs improvement to support endeavors.
- ~~/~~ Although fast the information was given with clarity and concision.
- ~~/~~ Had a great time, very informative.
- ~~/~~ The classes and dive can be a little more organized in schedule.

2. What would you like to see done differently in future training?

[# Respondents = 19]

- ~~/~~ More data information in class.
- ~~/~~ That you handcuff me and make me read the materials as soon as I arrive in town.
- ~~/~~ More dives!
- ~~/~~ Maybe more time to discuss material and see more pictures, different examples, then we can be familiar with them.
- ~~/~~ All is very good.
- ~~/~~ Feel that more diving should be done to gain more confidence and accuracy in surveying. Possibly 1 dive for ID or corals and algae, etc. (measuring), 1 dive for "mock survey", 1 dive for actual survey.
- ~~/~~ If you can do a video with the mechanics of the survey. Both sides of the paper survey.
- ~~/~~ Yes, I learn enough to be a RECON diver.
- ~~/~~ Pictures of the corals and algae in the materials (they were excellent) but it will be a lot easier to remember if it has photos with the names of each coral and algae.
- ~~/~~ Separate REEF and RECON training.
- ~~/~~ Tapered intro of different subject materials (RECON) separate from each other over time period to allow for learning one phase at a time.
- ~~/~~ Marine animal "e.g., maniteros".
- ~~/~~ Spread over more days.
- ~~/~~ More like these to conserving marine life.
- ~~/~~ More dives.
- ~~/~~ More material in Spanish.

~~/~~ More than one dive after recognizing the corals in the water to distinguish them from others well.

~~/~~ Pictures of the algae that we'll see in the training site.

3. How would you rate the training materials?

[# Respondents = 24]

Rating: 67% _____ Excellent 33% _____ Good _____ Fair _____ Poor _____ N/A

Comments:

~~/~~ May include more clear photos of the corals, algae, etc.

~~/~~ Booklet is very informative – don't know if you can cost-effectively add photos to book for later reference (after you leave and no slides are available).

~~/~~ Make a little book to carry on dives with clearer pictures.

~~/~~ We had what we needed to have! And what we need to continue.

4. Training Sessions

Session 1: Coral Identification, RECON Survey Sites, Conducting a RECON Survey

[# Respondents = 24]

Rating: 71% _____ Excellent 29% _____ Good _____ Fair _____ Poor _____ N/A

Comments:

~~/~~ Good plan (?), and good corals.

~~/~~ Good explanations.

~~/~~ Would like more information on the coral.

~~/~~ More slides indicating steps along the survey form.

~~/~~ Can improve in making sure that new staff to RECON know what they are doing.

Session 2: Reef Algae, Setting the Survey Line, Conducting a RECON Survey (cont.)

[# Respondents = 24]

Rating: 63% _____ Excellent 38% _____ Good _____ Fair _____ Poor _____ N/A

Comments:

~~/~~ Thanks to Judy.

~~/~~ Good explanations.

~~/~~ Good to show samples of what we will see – very helpful! Again, slides following steps along survey form.

5. Training Dives:

[# Respondents = 21]

Rating: 63% _____ Excellent 25% _____ Good _____ Fair _____ Poor 13% _____ N/A

~~/~~ Comments:

~~/~~ More training for recognizing the corals.

~~/~~ Good opportunity for ID of corals and practicing measuring and finding proper corals.

Opportunity to do 2nd part of survey – should spend more dive doing “mock survey” – ID all on 1st dive.

6. Survey Dive:

[# Respondents = 20]

Rating: 63% _____ Excellent 21% _____ Good _____ Fair _____ Poor 17% _____ N/A

~~/~~ Comments:

~~/~~ I need more practice.

~~/~~ Did not do survey dive.

7. Data Transcription

[# Respondents = 18]

~~/~~ Rating: 33% Excellent 38% Good _____ Fair _____ Poor 29% N/A

~~/~~ Comments:

~~/~~ Didn't really do this.

~~/~~ Really easy.

8. Quizzes and Examination

[# Respondents = 21]

~~/~~ Rating: 50% Excellent 38% Good _____ Fair _____ Poor 13% N/A

~~/~~ Comments:

~~/~~ Good overview of material.

~~/~~ Cover almost all that is important.

9. Additional Comments

~~/~~ Everything was satisfactory.

~~/~~ I think we need more time for training.

~~/~~ I think this was a very educational workshop. I encourage you to continue on.

~~/~~ Thanks for your time, the opportunity, your patients, and to share your knowledge to us. Next time, may help and official language translator. But thanks for be patient with my English. Enjoy our country!

~~/~~ Thanks to you!

~~/~~ Thank to Judy is the best, and thanks for the opportunity, all is very, very good.

~~/~~ Materials very good – more slides of coral and algae possibly. Realize there were restrictions for dives with both RECON/REEF programs together. Feel it is important to be able to complete all training and at least 1 survey dive before allowing us to do surveys – more helpful to you. For first time on joint project – overall went well. Good luck on future programs and thank you for making these programs available. They are really very important for getting local divers involved in conservation on the island.

~~/~~ Great workshop!

~~/~~ I liked the training a lot because now my divers are more interesting and I can appreciate more the corals reef.

~~/~~ The staff is doing a great job.

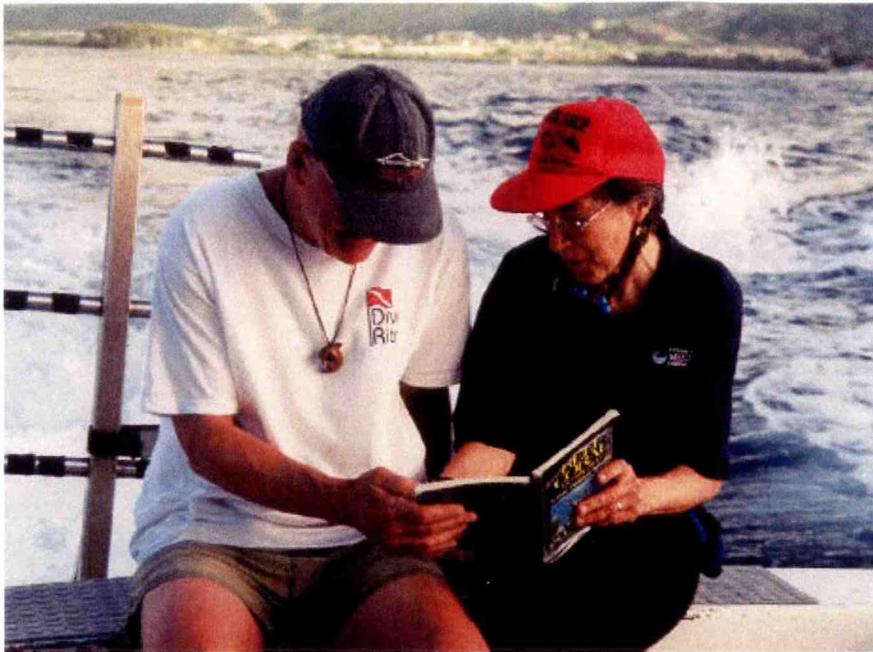
~~/~~ Overall a very good course. I learned a lot.

~~/~~ I am glad to have had the opportunity to participate.

~~/~~ For me this is an excellent experience.

~~/~~ Don't mix objectives in the dives in that way you can dedicate more time to make the practical part of the training. For the rest it was very good. Thank you.

~~/~~ Keep up with your program, you are not only earning divers for the surveys but you are teaching people to know things that never knew. Thank you!



Puerto Rico – Learning on the Boat



Puerto Rico Training Workshop – Training Staff and REEF AAT



REEF Advanced Assessment Team – Puerto Rico Training Workshop



Training Workshop – Classroom Session