

FY 2005 Coral Reef Conservation Project: Support for Coral Reef and Fisheries Enforcement in Puerto Rico: Stage I

April 7, 2006



**By Eileen Alicea
for
NOAA Coral Reef Conservation Program**

**Acknowledgements:
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Photos by Jaime Collazo and Cynthia Russe Ramos

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Summary:

This project is providing support for fisheries and coral reef enforcement in Puerto Rico in the form of two trainings: 1) Marine species identification workshop for rangers; and 2) Training exchange between enforcement officers, hearing officers, judges, and biologists. The project is also producing an out-of-the-water fish photo series for the Ranger Corps and an equipment maintenance program assessment with recommendations. A follow-up exchange with Florida Keys NM Sanctuary Enforcement personnel will be attempted.

Stage I Project Description:

Stage I of this project included the following two components:

- 1) Production of an out-of-the-water photo series of regulated fish and invertebrates. The purpose was to produce a photo series that would be closer representations of the fish inspected dockside, at fish markets, and on fishers boats.
- 2) Coral and fish identification intensive training for 32 rangers including the DNER Coral Reef Enforcement Team of 8 members. This training included classroom instruction as well as a performance measure in the form of an examination that will lead to a special training certificate.

Results:

By April 4, 2006, the 38 page color photo series was finalized and 100 copies were printed. The book contained 34 color photos of fish and crabs that were taken out of the water. Photos came from the Puerto Rico Department of Natural and Environmental Resources (DNER) files, from Fish Base, NOAA, and a few other personal sources from which permission was obtained. Ninety-eight copies were distributed to DNER (including the 32 rangers who attended the species identification training) and two remain at NOAA.



On April 6-7, 2006, a coral and fish identification intensive training was held in San Juan for 32 rangers that included the Coral Reef Enforcement Team of eight rangers and the Fisheries Task Force rangers who work with the NOAA Fisheries Enforcement officer. See **Appendix A** for the full Agenda of the course taught by Dr. Edwin Hernández, Marine Ecologist from the University of Puerto Rico-Río Piedras. The workshop curriculum was based on the specific goal of developing basic visual criteria for the field identification of managed reef fish and coral

species. This was accomplished by the following activities: 1) discussion of the principal morphologic and morphometric characteristics used in the identification of managed reef fish

and coral species; 2) discussion on how to use a dichotomous taxonomic key for the identification of corals; 3) visual identification of fish and coral taxonomic characteristics using a combination of power point presentations and printed material; and 4) providing pre-and post written examination on the identification of selected fish and coral species. This performance measure assessed existing knowledge and learning achieved in the workshop. DNER personnel also presented on the fisheries regulations and on the importance and handling of mooring buoys. Many informal comments reflected the rangers' satisfaction for a guide that reflected species realistically out of the water.



Zulena Cortés conducting fish measurement exercise

Post-test results demonstrated a significant difference in scores within the individual as well as within the group (See **Table 1** below and **APPENDIX B** for detailed pre-and post-test results). Only forty-seven percent of the rangers passed the pre-test at 70% or more with 67% as the average score that was a failing grade as a class. One hundred percent of the participants passed the post-test at 70% accuracy or above with 31 of 32 rangers passing at 81% or above. The post-test average score was 93%.

Table 1

	Percentage passing rangers	Average Score	Average Improvement Percentage
Pre-test	47%	67%	N/A
Post-test	100%	93%	26%

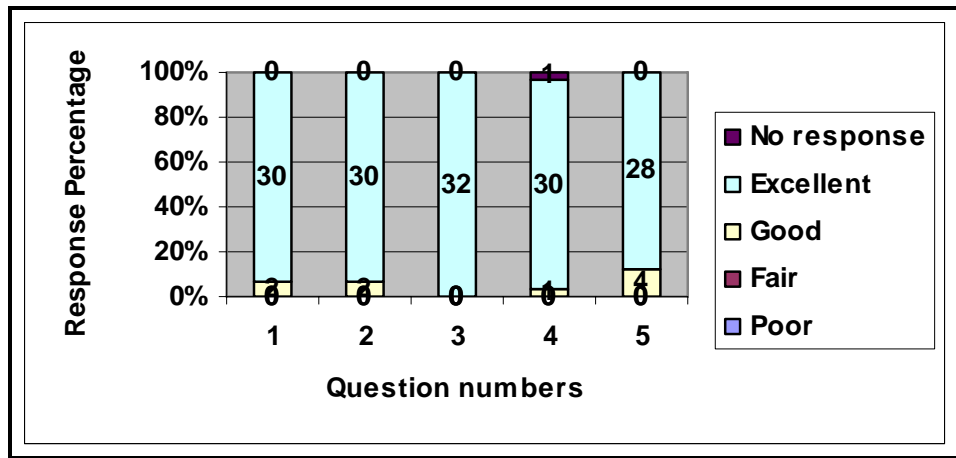
All 32 participants completed a course evaluation. See **Appendix C** for evaluation format. The rangers first rated general aspects about the course through the following five questions: (Q.1) general organization; (Q.2) accommodations; (Q.3) Coral portion of workshop; (Q.4) Fish/crabs portion of workshop; and (Q.5) general quality of explanations. As seen in **Graph 1** below, 87-100% of rangers rated all these general items in the “excellent” category. A second set of questions addressed self-perception about their own learning. Questions 7 through 11 inquired about the approximate quantity of knowledge that the rangers gained in each of the following areas: (Q.7) Coral Identification; (Q.8) Fish identification; (Q.9) Other invertebrate identification; (Q.10) Fish measurement; and (Q.11) How rangers can assist in buoy program.

As seen in **Graph 2**, there was more variability in ratings provided. However, 72-84% of rangers reported learning “Much” (the highest rating) in the areas of Coral Identification, Fish identification, and Fish measurement. From 81 to 97% of rangers believe they learned “Some-Much” in the areas of other invertebrate identification and how rangers can assist in DNER’s buoy program.

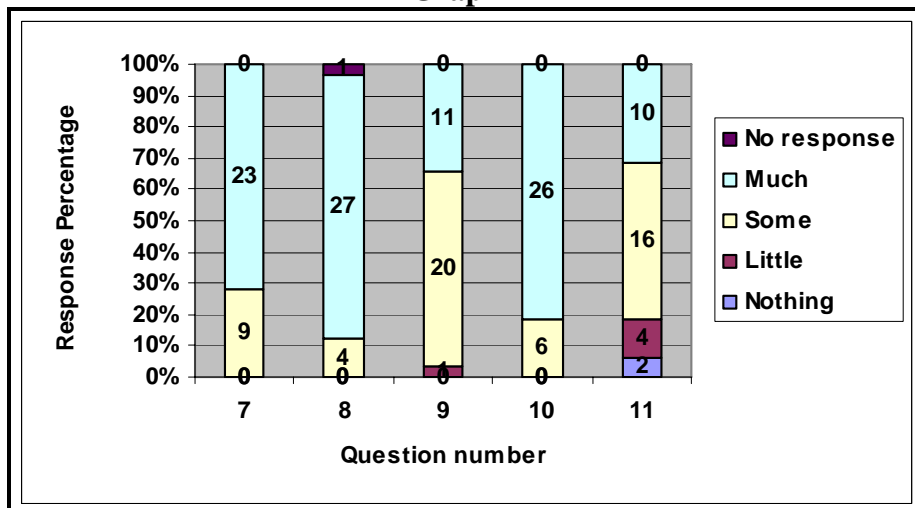
The quantitative results of the course evaluation correlated very well with the participant comments. These were all positive or gave recommendations on what to add to the course. For a full record of the comments see **Appendix D**. The following were common themes found in these comments:

- ✓ Wanted more time for the subjects covered
- ✓ Would have liked field experience also
- ✓ Excellent instructors
- ✓ Would have liked the DNER lawyer to have more time (even after her time was extended)

Graph 1



Graph 2





Test time

Conclusion

This workshop fulfilled an important need in the Puerto Rico DNER Ranger Corps: capacity building in basic biology to learn skills that Rangers can use on a daily basis as they carry out their responsibilities. Marine species recognition and identification is a main concern for the Ranger Corps as most of them are not fishers. The out-of-the water species guide was also a very useful and realistic tool, according to the rangers' comments

throughout the workshop. This course had an immediate effect in the daily work of one of the rangers who attended the workshop. She described how a shipment of Goliath Grouper was confiscated and how the fish identification guide provided to the rangers the day before was instrumental in identifying the species. The Ranger Corps is currently building a very strong court case.

Lastly, the work necessary to design and write the marine species guide identified some needs to amend the Fisheries Regulation 6768. More details on this matter can be obtained from the DNER staff working on other previously identified needed amendments.



APPENDIX A

Taller para Vigilantes de Identificación de Especies Marinas Reglamentadas y de Corales Comunes

6 y 7 de abril de 2006
Hotel Holiday Inn, Isla Verde
8020 Calle Tartak (Mapa en la Pag 4)
Carolina, Puerto Rico 00979
787 253-9000

JUEVES, 6 de abril

9:50 AM	Registro
10:10 a.m.	Bienvenida Ernesto Díaz, Administrador, DRNA Col. Félix Salas, Director Auxiliar, Cuerpo de Vigilantes, DRNA
10:20 a.m.	Importancia del Reglamento de Pesca Myrna Abreu, Directora de Caza y Pesca, DRNA
10:40 a.m.	Introducción, metas y objetivos del taller- Dr. Edwin Hernández - Discusión de la organización, agenda y contenido de los materiales.
11:00 a.m.	Importancia de la identificación taxonómica para la aplicación de leyes- Dr. Edwin Hernández
11:20 a.m.	Inspección de boyas de amarre Maribel Rodríguez, Proyecto F-27 de Recursos Marinos
11:30 a.m.	Pre-prueba de conocimiento de especies marinas reglamentadas.
12:00-1:00 p.m.	ALMUERZO
1:00 p.m	Introducción al uso de claves taxonómicas; con ejercicios prácticos de identificación taxonómica.
1:15 p.m.	Corales escleractínios – Especies principales; características diagnósticas; uso de laminas de identificación a prueba de agua; uso de claves dicótomas taxonómicas para la identificación de corales.
2:30 p.m.	Descanso
2:45 p.m.	Corales escleractínios (continuación) e Hidrocorales.

- 3:15 p.m. Octocorales – Especies principales; características diagnósticas; uso de laminas de identificación a prueba de agua; uso de claves dicótomas taxonómicas para la identificación de octocorales.
- 3:45 p.m. Repaso de las especies reglamentadas por el Reglamento 6768. Incluye pruebas informales para preparación para el examen final. Características diagnósticas para la identificación de las especies (imágenes digitales); uso de laminas de identificación a prueba de agua
- 4:30 p.m. Conclusión.

VIERNES, 7 de abril

- 10:00 a.m. Con't: Repaso de las especies reglamentadas por el Reglamento 6768. Incluye pruebas informales para preparación para el examen final. Características diagnósticas para la identificación de las especies (imágenes digitales); uso de láminas de identificación a prueba de agua
- 10:45 a.m. Ejercicio de medición de peces- Zulena Cortés y Maria del Mar López
- 11:30 a.m. Peces Ornamentales. Características diagnósticas para la identificación de las especies (imágenes digitales).
- 12:00 p.m. Almuerzo.**
- 1:00 p.m. Repaso de todas las especies de invertebrados y peces con pruebas informales.
- 2:00 p.m. Descanso
- 2:15 p.m. Examen Final para certificación.
- 3:00 p.m. Evaluación del curso, conclusión y entrega de certificados.

Las siguientes Guías de identificación de peces y corales se les entregara a cada uno de los vigilantes presentes.

- 1) Guia a prueba de agua de fotos en colores de peces y otros invertebrados fuera del agua**
- 2) Guia a prueba de agua de fotos en colores de corales comunes**

Vigilantes Participantes:

San Juan: Col. Felix Salas, y Capt. Victor Ramos Rodriguez

- | | |
|--|---------------------------------|
| 1. Vgte. Jaime Calderón Silva | 2. Vgte. Juan De Jesús Martínez |
| 3. Vgte. Richard A. Maldonado Martínez | 4. Vgte. Axel Rivera Pacheco |

Arecibo

1. Vgte. Wilfredo Luciano Arocho
2. Vgte. Juan Cruz Rodríguez
3. Vgte. Iris G. García

Aguadilla

1. Vgte. Luis A. Medina Muñiz
2. Vgte. Ángel Tejeras Morales
3. Vgte. Ángel M. Juarbe Ramos
4. Vgte. Aida Pérez
5. Vgte. Arnaldo Cabán López
6. Vgte. Carlos Medina Rodríguez

Mayaguez

1. Vgte. Luis Vargas Torres
2. Vgte. Juan C. Banch Cedeño
3. Vgte. Carlos Rodríguez Irizarry
4. Sgto. Dally Pérez Lugo

Ponce

1. Vgte. Mervin Rodríguez Rodríguez
2. Vgte. Jan M. Rivera Caraballo
3. Vgte. Ricardo Rivera Rodríguez
4. Vgte. Jaime Collazo Rodríguez-camera
5. Vgte. César Morales Cintrón

Guayama

1. Vgte. Luis I. Cintrón Velázquez
2. Vgte. Emilio Navarro Matías
3. Tnte. II Santiago J. Pabón Almodovar

Humacao

1. Vgte. Cynthia M. Russe Ramos
2. Vgte. Javier Burgos Meléndez
3. Vgte. José O. Carrasquillo Ríos

Fajardo

Vgte. José Pérez Rivera

Vieques

1. Vgte. Roberto Belardo Carambot

Culebra

1. Vgte. Edilberto Romero Llovet
2. Sgto. Misael Feliciano Monell

APPENDIX B: Pre- and Post-test results

Ranger number	Pre-test	Post-test	Notes	% Difference in performance
1	77%	94%		17
2	70%	94%		24
3	58%	90%		32
4	67%	87%		20
5	77%	90%		13
6	58%	90%		32
7	64%	100%		36
8	64%	90%		26
9	67%	90%		23
10			ABSENT	
11	67%	90%		23
12	74%	87%		13
13	61%	97%		36
14	74%	94%		20
15	55%	97%		42
16	67%	94%	-	27
17	67%	93%		26
18	67%	97%		30
19	93%	100%		7
20	32%	68%		36
21	45%	90%		45
22	70%	100%		30
23	74%	97%		23
24	48%	100%		52
25	80%	100%		20
26	39%	81%		42
27	74%	97%		23
28	80%	100%		20
29			ABSENT	
30	74%	100%		26
31	80%	97%		17
32	77%	97%		20
33	80%	97%		17
34	61%	87%		26

APPENDIX C

**EVALUACION DEL ADIESTRAMIENTO DE IDENTIFICACION DE ESPECIES
MARINAS**

**6 y 7 de abril 2006
San Juan, Puerto Rico**

**Usando la escala del 1 al 4, por favor evalúe los siguientes componentes del adiestramiento
(Circule el número escogido)**

1) Organización general del curso

1-Pobre 2-Regular 3-Bueno 4-Excelente

Comentarios _____

2) Facilidades del Holiday Inn

1-Pobre 2-Regular 3-Bueno 4-Excelente

Comentarios _____

3) Taller de Corales por el Dr. Edwin Hernandez

1-Pobre 2-Regular 3-Bueno 4-Excelente

Comentarios _____

4) Taller de peces y otras especies marinas por el Dr. Edwin Hernandez

1-Pobre 2-Regular 3-Bueno 4-Excelente

Comentarios _____

5) Las explicaciones durante el taller fueron:

1-Pobre 2-Regular 3-Buenas 4-Excelente

Comentarios _____

6) Experiencia de campo sobre asesoramiento de daños y restauración

1-Pobre 2-Regular 3-Bueno 4-Excelente

Comentarios _____

Usando la siguiente escala, por favor conteste las preguntas 7-11

Nada = No aprendió nada nuevo

Poco = Aprendió algo pero no que le va a ayudar en el trabajo como vigilante

Algo = Aprendió algunas cosas que le van a ayudar a desempeñarse mejor como vigilante

Mucho = Aprendió muchas cosas que le van a ayudar a desempeñarse mejor como vigilante

7) ¿De acuerdo a sus expectativas, cuánto piensa que aprendió sobre como identificar los corales comunes:

Nada Poco Algo Mucho

8) ¿De acuerdo a sus expectativas, cuánto piensa que aprendió sobre identificación de peces?

Nada Poco Algo Mucho

9) ¿De acuerdo a sus expectativas, cuánto piensa que aprendió sobre los invertebrados (Langosta y cangrejos)?

Nada Poco Algo Mucho

10) ¿De acuerdo a sus expectativas, cuánto piensa que aprendió sobre como medir peces?

Nada Poco Algo Mucho

11) ¿De acuerdo a sus expectativas, cuánto piensa que aprendió sobre como pueden los vigilantes participar en el programa de boyas de amarre?

Nada Poco Algo Mucho

General:

12) Comparado a otras experiencias de adiestramiento que ha tenido, esta fue:

Peor Igual Mejor Mucho mejor

13) Comentarios. Por favor, escriba lo que haría diferentemente.

APPENDIX D

Comments from Evaluations

- ✓ Wanted more time for the class and go to the field;
- ✓ Everything was excellent;
- ✓ We needed more than 2 days to go into more detail;
- ✓ Need to go to the field to practice what was taught;
- ✓ Be tested in the field;
- ✓ It would be more productive and advantageous in the field;
- ✓ Wouldn't do anything different;
- ✓ Vieques and Culebra rangers received excellent lodging and treatment;
- ✓ When a lot is covered about one theme, it's difficult to learn;
- ✓ All presenters were excellent except the mooring buoy person;
- ✓ We need to be handed out the fish regulations, this would help a lot in our performance;
- ✓ Regulate areas affected by boats where there are mooring buoys;
- ✓ Needed more time for explanations and going to field;
- ✓ Need more time and work in the field;
- ✓ Need more time;
- ✓ Everything was excellent in general terms;
- ✓ Recommend training on aquarium trade species including permit regs,
- ✓ Also need field experience;
- ✓ There should be more regular workshops;
- ✓ Need field work and work with real specimens;
- ✓ This workshop fulfilled my expectations for information, materials and forum to clear doubts, excellent;
- ✓ Excellent training,
- ✓ There was lots of knowledge about the subjects; training should be given at all units with the same presenters;
- ✓ I feel I have the capacity to take on the types of cases discussed here;
- ✓ Should do coral ID training through diving in Culebra since there are many corals there; Dr. Hernandez and NOAA personnel should be present;
- ✓ We need more time to dwell on subjects;
- ✓ Needed more time for the training;
- ✓ It would be good to have the lawyer present all day to answer legal Q's that come up;
- ✓ Needed more time for the subjects discussed.