

Reef Environmental Education Foundation (REEF) conserves marine ecosystems for their recreational, commercial, and intrinsic value by educating, enlisting, and enabling divers and other marine enthusiasts to become active stewards and citizen scientists. REEF links the diving community with scientists, resource managers, and conservationists through marine-life data collection and related activities. This report documents REEF's success and growth in 2011.



ANNUAL REPORT

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We are proud to present the 2011 Annual Report. In 2011, Reef Environmental Education Foundation (REEF) significantly improved its marine conservation programs by utilizing innovative technologies and partnerships. The launch of online fish identification webinars was one of REEF's most exciting and successful endeavors of the year. "Fishinars" have attracted a world-wide audience of marine enthusiasts and expanded REEF's ability to train Volunteer Fish Survey Project participants. Early in 2011, REEF also received its 150,000th fish survey! By year's end, the number approached 160,000, making this the world's largest fish sightings database created by volunteer divers and snorkelers. Scientists used REEF data to publish landmark findings that resulted in better conservation and management practices. One such impact was National Oceanic and Atmospheric Administration (NOAA) granting Goliath Groupers five more years on the endangered species list in Florida, a decision based in large part on REEF survey data. Grouper Moon Project research paid off with the Cayman Islands' official eight-year extension of a ban that prohibits fishing for Nassau Grouper at spawning aggregation sites between November and March. Finally, REEF took advantage of collaborative partnerships to further the Lionfish Project through regional collecting and handling workshops, removal derbies, and cutting-edge research. In 2012, REEF looks forward to incorporating even more technological advances into our work, including: expansion of Fishinars, live video feed of Grouper spawning online and in the classroom, acoustic tagging and tracking of lionfish, increased outreach efforts, and a new look to our website. We hope that you continue with us on our adventures in the coming year!



REEF volunteers are at the heart of our grassroots marine conservation programs. Our volunteers are as diverse as the ocean they work to conserve. They can be found making a difference through work on land or in the water, in their hometown or abroad, behind a computer or a microphone. Whatever your interests, there's a niche at REEF just waiting for you. Here's what a few of our members are saying about their volunteer experiences:





"I've learned a lot and have met other wonderful REEF members who have really inspired me. I only wish I had hooked up with REEF sooner!"

Kenny Tidwell

"I feel lucky that I get to be part of looking after our mostly unknown and least observed animals on earth."

Doug Harder

REEF gave me a reason to continue diving.

Patricia Broom

"I like sharing with others the fun of being a REEF member and volunteer."

Georgia Arrow

"Always hoping to locate a new or rare species has added a new and exciting dimension to diving."

Bob Hillis

"Thanks to REEF, I feel I am making a contribution to the preservation of this precious and fragile environment."

Patricia Richardson

"We are so proud of the work REEF has done, and we will continue to be fish counters as long as we can dive!"

Itziar Aretxaga



Members are the key to REEF's success! Signing up as a member is free and can be done easily online at www.REEF.org.

In 2011, REEF welcomed 3,064 new members, bringing the total number of REEF members to 45.814.



VOLUNTEER OF THE YEAR

REEF awarded 2011 Volunteer of the Year to Heather George. Since becoming a member nearly a decade ago, she has conducted 192 REEF surveys throughout the world and is a member of the Advanced Assessment Team in the Tropical Western Atlantic and Hawaii. In 2010. Heather joined the volunteer research team for the Grouper Moon Project. Through the years, she has conducted fish identification trainings for dive shops and aquaria and has led several REEF Field Survey Trips. Heather also served on the REEF Board of Trustees from 2007 to 2010 and brought a wealth of knowledge about fundraising and membership develement to the organization. In

2011, Heather assisted with the expansion of the Volunteer Fish Survey Project to the South Pacific as part of the field team to American can Samoa. We are so grateful to have such a wonderful volunteer who contributes to REEF in so many ways.

Thank you, Heather!



THE FACES OF REEF

REEF's Volunteer Fish Survey Project enables divers and snorkelers to report fish sightings and other data. Since the program's inception in 1993, REEF has trained and involved over 16,000 divers and snorkelers in marine life identification and the collection of fish population and distribution data. Through this citizen science program, REEF volunteers have generated one of the largest marine life databases in the world. Today, they continue to conduct surveys throughout the coastal waters of North and Central America, the Caribbean, Hawaii, and the South Pacific.



- Tropical Western Atlantic
- Northeast US and Canada
- Hawaiian Islands
- Tropical Eastern Pacific
- Pacific US & Canada
- South Pacific

SURVEY SUMMARY

In 2011, the Volunteer Fish Survey Project achieved several exciting milestones that included:

- Reaching the 10,000th survey in Hawaii and celebrating the program's tenth anniversary in the region;
- Reaching the 20,000th survey in the Pacific Coast Region. Divers from California to the Pacific Northwest have conducted surveys on fish, invertebrates, and algae along the Coast since 1997; and
- Reaching the 150,000th survey in REEF's Survey Project database!
 Ross Whiteside conducted the lucky 150,000th survey on June 13,
 2011, at Mixing Bowl in Little Cayman in the Caribbean. Ross and
 his wife Terri have been active REEF members since 2002 and are
 members of the Advanced Assessment Team. Congratulations
 Ross and Terri, and thanks to all of our surveying members for
 helping us achieve this landmark!
- During the year, REEF volunteers conducted 8,485 surveys at 2,090 sites. They conducted 64% of surveys in the Tropical Western Atlantic, 20% of surveys in the Pacific Coast region, and 8% around the Hawaiian Islands. Members conducted the rest of the surveys in the Northeast, the Tropical Eastern Pacific, and the South Pacific. At the end of the 2011, REEF volunteers had completed 157,962 surveys.

ADVANCED ASSESSMENT TEAM (AAT) AND SPECIAL PROJECTS

In 2011, REEF welcomed 34 new members into the AAT. This elite group of 356 REEF Surveyors contributes expert-level survey data and has opportunities to participate in special survey projects. Collectively, the AAT has conducted 59,610 surveys throughout REEF's project regions.

REEF continued three monitoring projects in 2011 with assistance from our AAT:

VANDENBERG ARTIFICIAL REEF PROJECT

In its second year post-deployment, survey team members documented fish assemblages associated with the *Vandenberg* and adjacent reef areas. The *Vandenberg* is a 523' steel hulled missile tracking ship that was intentionally sunk seven miles off Key West, FL, in May 2009, to serve as a recreational diving and fishing artificial reef. Over 140 species have been documented on the wreck.

MARINE SANCTUARY PROJECTS

Members of Pacific AAT conducted fish and invertebrate surveys at two United States (US) West Coast National Marine Sanctuaries (NMS): the Monterey Bay NMS; and the Olympic Coast NMS. These datasets are being used to document changes in key rocky reef fish and invertebrate species. 2011 was the ninth year of consecutive data collection in both of these marine protected areas.

GREAT ANNUAL FISH COUNT

In 2011, we celebrated the Great Annual Fish Count (GAFC)'s twentieth year. REEF coordinates this annual event each July to mobilize and train volunteers to identify and document fish diversity and population trends. Dozens of GAFC events were held across all REEF regions, including free identification seminars and organized survey dives. The largest GAFC event continued to be a week-long survey blitz throughout the US Northeast, in which 90 divers conducted 124 surveys at 25 sites in 4 states.

www.REEF.org/programs/volunteersurvey

VOLUNTEER SURVEY PROJECT

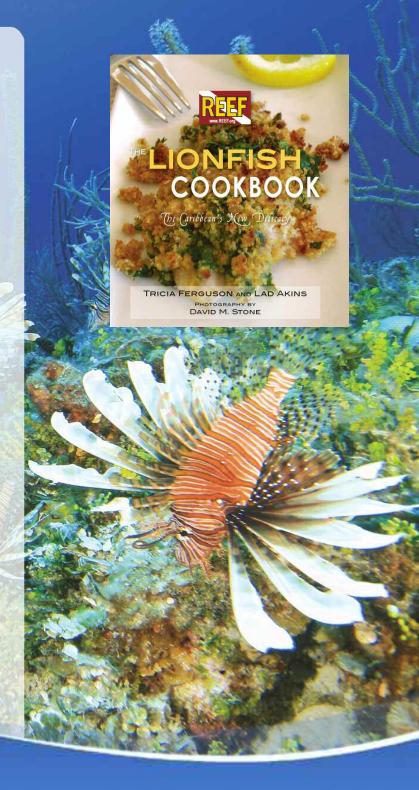
REEF's Lionfish Program is leading the way on research, response strategies, and control programs for this intruder. Invasive Lionfish, endemic to the Indo- Pacific and Red Sea, are posing serious threats to western Atlantic marine ecosystems. First sighted in the waters of southeastern Florida in 1985, lionfish have now become established throughout the western Atlantic, Caribbean, and Gulf of Mexico.

2011 was a busy year for REEF's Lionfish Program. We focused on increasing education and outreach, applied research, and control programs. REEF also expanded these efforts to a broader Caribbean-wide audience. Highlights of the year included:

- Authoring and producing the first Lionfish Cookbook, which sold out of its first printing of 3,000 copies in just over a year;
- Highlighting the lionfish issue in major media, including two Emmy award-winning features and a special segment with Dan Rather;
- Conducting regional training workshops for more than 20 Caribbean countries;
- Creating a full-time lionfish research and education program manager position in partnership with the Cape Eleuthera Institute;
- Co-organizing and hosting the fourth annual lionfish session at the Gulf and Caribbean Fisheries Institute conference;
- Initiating groundbreaking research on lionfish by-catch in the lobster fishery;
- Removing 3,562 lionfish through derbies, which REEF expanded to the Florida Keys, Bahamas, and Southeast Florida;
- Authoring research papers on lionfish foraging behavior and nutritional analysis;
- Serving on the Gulf and South Atlantic Regional Panel on Aquatic Invasive Species;
- Conducting bimonthly lionfish collecting, handling, and permitting workshops in South Florida;
 Advising the Federal Aquatic Nuisance Species Task Force and the National Park Service in development of their lionfish response plans; and
- Continuing research on lionfish removal success, trapping, movement, and impacts as well as facilitating the research of others through training and consultation.

REEF has focused on lionfish control and researching new ways to address the invasion. Our partnerships with NOAA, US Geological Survey (USGS), the National Aquarium (Washington, DC), universities, dive industry organizations, and other local groups have provided significant resources towards furthering our understanding of the invasion and how best to minimize lionfish impacts.

www.REEF.org/programs/exotic/lionfish



LIONFISH PROJECT



The Grouper Moon Project, a collaboration between REEF and the Cayman Islands Department of the Environment (DOE), aims to study and conserve the endangered Nassau Grouper. Historically, Nassau Grouper represented one of the Caribbean's most economically important fisheries. Due to intense harvest on spawning aggregations, populations have dwindled. Through cutting-edge research, Grouper Moon scientists are documenting the importance that marine reserves and seasonal closures play in the long-term recovery and conservation of this endangered species.

In 2011, REEF and our collaborators helped to solidify progressive management of this endangered species in the Cayman Islands.

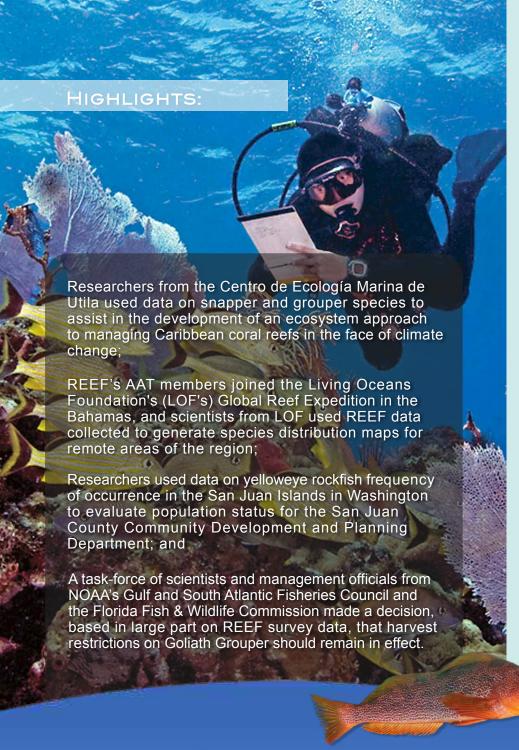
- Guided in large part by Grouper Moon research findings, the Cayman Islands Marine Conservation Board extended an eight-year ban on fishing aggregation sites. This ban was due to expire at the end of 2011.
- The Cayman Islands Ministry began considering permanent protections for the species during the spawning season.

Other highlights included:

- Finding evidence through monitoring that spawning site reserves have resulted in more fish and that new "teenagers" continue to show up to spawn;
- Conducting ground-breaking research using satellite-linked current drifters released at the aggregation site. REEF tracked movements of the drifters to better understand why Nassau Grouper aggregate and spawn when and where they do;
- Developing a dynamic website to share results of the drifter project Baby Grouper Adrift!
 The Adrift website featured a map that continually updated the location of the drifters as they completed a 45-day path that grouper larvae may take. Watching the paths conveys regional connectivity, as well as the self-recruiting nature of the Cayman Island grouper populations;
- Spreading the word about the Grouper Moon Project and the impending expiration of existing management protections, REEF worked with the North America Our World Underwater scholar, Josh Stewart, to produce a video short, "Grouper's Last Stand." The powerful three-minute video was posted on YouTube (http://www.youtube.com/user/WeSpeakFish) and shared through many social media outlets;
- Drafting an integrated, marine science curriculum, designed to raise students' awareness and understanding of Nassau Grouper; and
- Partnering with noted marine artist and conservationist, Dr. Guy Harvey, to begin work on a documentary, "Mystery of the Grouper Moon."

www.REEF.org/groupermoonproject

GROUPER MOON PROJECT



REEF's Volunteer Survey Project generates valuable data on ocean populations, while expanding scientific awareness among its participants. The extensive REEF data set is an important source of information for documenting changes in populations and community structure as well as cataloging biological diversity. REEF provides data to many scientists and researchers from academic institutions and resource management agencies each year. In 2011, REEF fulfilled 18 requests for data files, from scientists at institutions such as NOAA, Oregon Department of Fish and Wildlife (DFW), Seattle Aquarium, the Gilbert Ichthyological Society at the Burke Museum at the University of Washington, Washington DFW, University of Connecticut, University of North Carolina Wilmington, Centro de Ecología Marina, Living Oceans Foundation, and Florida Fish and Wildlife Conservation Commission.

In 2011, researchers published the following articles based on REEF data and projects:

Auster, P, D Grenda, J Godfrey, E Heupel, S Auscavitch and J Mangiafico. 2011. Behavioral observations of Lilliputian piscivores: young-of-year Sphyraena barracuda at offshore sub-tropical reefs (NW Atlantic Ocean). Southeastern Naturalist.10(3):563-569

Green SJ, Akins JL, Côté IM. 2011. Foraging behaviour and prey consumption in the Indo-Pacific lionfish on Bahamian coral reefs. Marine Ecology Progress Series 433:159-167

Morris, JA, A Thomas, AL Rhyne, N Breen, L Akins, and B Nash. 2011. Nutritional properties of the invasive lionfish: A delicious and nutritious approach for controlling the invasion. AACL Bioflux. Volume 4(1): 21-26

Pattengill-Semmens, CV, BX Semmens, and J Nichols. 2011. Patterns of Fish Biodiversity in the Salish Sea. Salish Sea Ecosystem Conference Proceedings.

Semmens, BX, EJ Ward, EE Holmes, CV Pattengill-Semmens, and BI Ruttenberg. 2011. Integrating time-series of community monitoring data. American Fisheries Society Conference Proceedings



DATA USE & PUBLICATIONS

In 2011, education and outreach efforts continued to be a priority. REEF presented at conferences, attended dive shows, added Field Stations, continued Fish and Friends, introduced Fishinars, conducted lionfish workshops, brought the ocean to the classroom, and expanded our internship program.



CONFERENCES

REEF staff presented results at five scientific conferences, including: Public Participation in Scientific Research Workshop (New York, NY); Rockfish in the Salish Sea Workshop (Seattle, WA); International Marine Conservation Congress (Victoria, BC); Salish Sea Ecosystem Conference (Vancouver, BC); and Gulf and Caribbean Fisheries Conference (Puerto Morales, Mexico). Director of Special Projects, Lad Akins, also participated in numerous lionfish working groups.

DIVE EVENTS

REEF reached out to the scuba and dive travel community by attending and often presenting seminars at the following events: Beneath the Sea (Secaucus, NJ); Diving Equipment and Marketing Association Show (Orlando, FL); Northwest Dive & Travel Expo (Tacoma, WA); Our World Underwater (Chicago, IL); SCUBA Show 2011 (Long Beach, CA); and Divers Day (Vancouver, BC, and Long Beach, CA).

EDUCATION & OUTREACH

FIELD STATIONS

25 new Field Stations signed up to act as local representatives and promote REEF in their area. Each Field Station serves as an active center of outreach and education for our organization. Most offer REEF Fish Identification Courses, organize survey dives, and may sell underwater paper, slates, and related fishwatching materials.

www.REEForg/resources/fieldstations

FISH AND FRIENDS

Now in its third year, REEF continues to attract a standing room only crowd at this monthly social event and marine science seminar that is presented at Headquarters in Key Largo, FL on the second Tuesday of every month.

FISHINARS

REEF introduced these interactive, fun webinars in 2011 to spread our marine conservation programs and fish identification training to a world-wide audience. Marine life ID classes help new surveyors learn fish identification and keep experienced surveyors' skills fresh. Other topics have included the lionfish invasion and fish behavior. These short and convenient sessions are available to members for free from the comfort of their own home.

• www.REEF.org/resources/webinars

MARINE CONSERVATION INTERNSHIP

In 2011, REEF selected six individuals for participation in this competitive program. This experience introduced them to working in the non-profit sector of marine conservation through hands-on experience. Interns worked on projects related to biological assessment fieldwork and data analysis, community education and outreach, writing, and artwork.

REEF IN THE CLASSROOM

Several US high schools used the Volunteer Fish Survey Project to provide students a firsthand experience on how to conduct fish surveys and analyze their results. In 2011, teachers from Vermont, Minnesota, California, and Nelson (BC) incorporated REEF into their classroom and field programs.





EDUCATION AND OUTREACH



Reflecting on our successes in 2011, we are inspired and excited to look forward. In 2012, we will continue to have a positive impact on the environment through the expansion of our marine conservation and education programs. REEF is working diligently to protect marine environments and fulfill our mission by:

PARTNERING WITH DIVERSE CONSTITUENTS

We plan to: help develop an International Best Practices for Lionfish Control and Management document that includes input from resource managers from 14 countries; and continue collaboration in the Grouper Moon Project with the Cayman Islands Government, as well as Caymanian businesses, educators, and fishermen.

DIVERSIFYING EDUCATION AND OUTREACH PROGRAMS

We plan to: expand Fishinars to include more advanced topics and specialized guest speakers; and grow the Marine Conservation Internship program at Headquarters in Key Largo, FL.

EMPOWERING VOLUNTEERS

We plan to: develop volunteer training programs and expand methods for volunteers to get involved in ways that are engaging, fun, and convenient.

REEF members are essential in achieving the accomplishments listed throughout this report and help drive our future endeavors. With their support, we look forward to reaching many more important milestones in 2012 as we continue to fulfill our mission through marine conservation programs.



LOOKING FORWARD

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Thank you to all the photographers who donated pictures in 2011!

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New World Publications

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NOAA Coral Reef Conservation Program **NOAA National Marine Sanctuaries** The Ocean Reef Conservation Association Elizabeth Ordway Dunn Foundation The Sailfish Marina on Singer Island Cayman Prep and High School Disney Wildlife Conservation Fund The Curtis & Edith Munson Foundation The National Fish and Wildlife Foundation Sensational Seas Project United States Geologic Survey (USGS) Monroe County The Green Turtle Club Resort and Marina National Park Service

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Page 1 - Cover: Reef Scene by Paul Humann

Page 2:

Diver by Janna Nichols

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Lionfish on Reef by Rich Carey

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Grouper Aggregation by Paul Humann

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Surveyor by Nathan Brown Yelloweyed Rockfish by Janna Nichols Goliath Grouper by Armando Jenik Yellowtail Snapper by Anna DeLoach Kelp Greenling by Pete Naylor

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Background Surveyor by Brian Slopey

Divers by Janna Nichols

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Rock Beauty by Jonathan Lavan

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Razorfish by Ken Marks

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Grunts by Ned DeLoach

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Surveyor by Beth and Al Bruton

REEF 2011 Annual Report Designer: Joanne Kidd

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