
REEF

Marine Ornamentals as Aquatic Invasives in SE FL

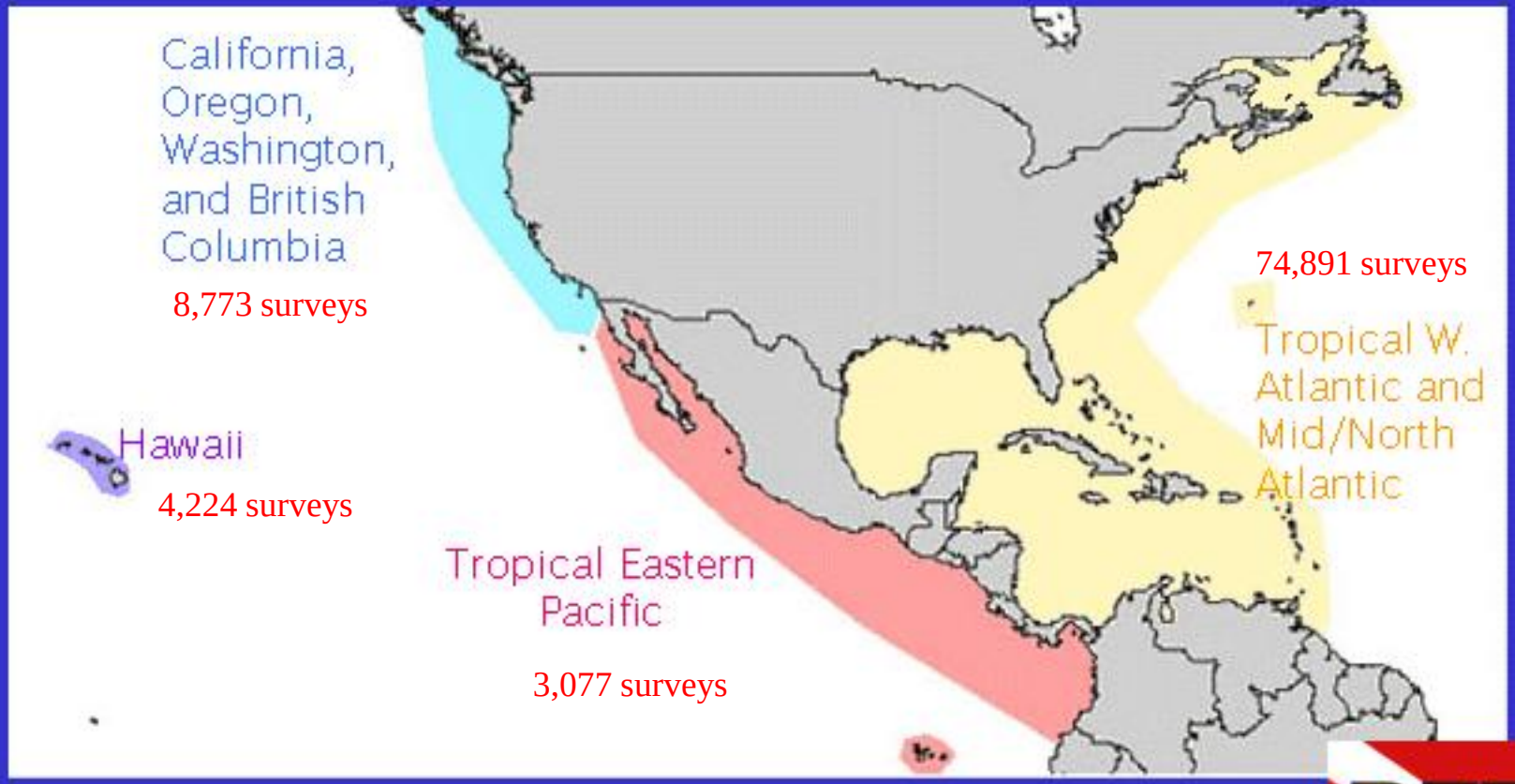
Lad Akins
Reef Environmental Education Foundation

Reef Environmental Education Foundation

- REEF HQ in Key Largo with a Pacific office in Seattle
- Coordinate the Fish Survey Project
- Conduct monitoring and assessments
- Exotic Species campaign
- Spawning aggregation projects
- Education/Outreach Programs

A Diver conducting a REEF Fish Survey

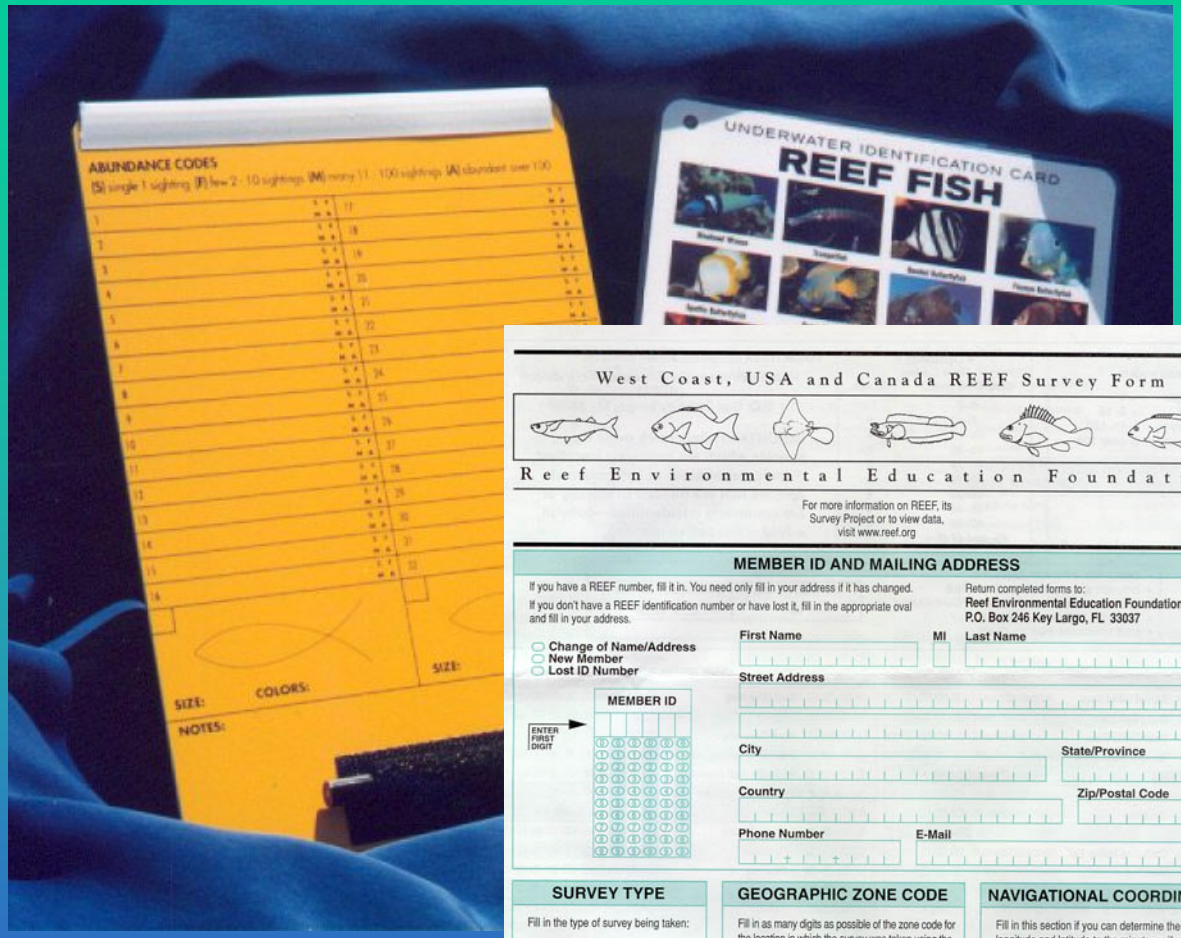
REEF Fish Survey Project

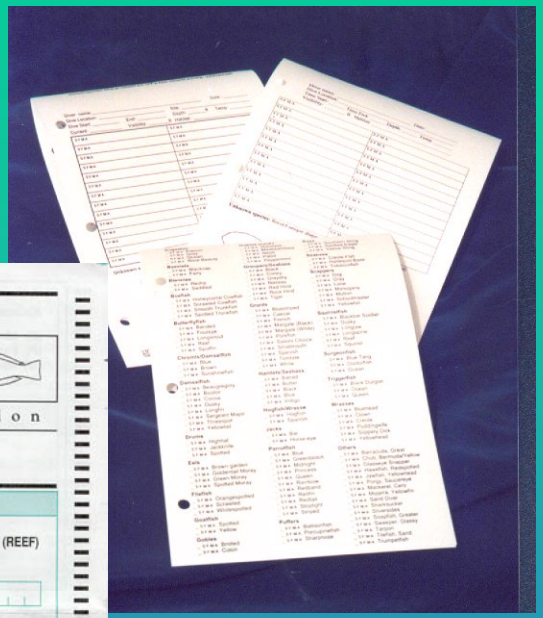


Roving Diver Technique

- Free swimming range around dive site (within 100m)
- Record all species positively identified
- Estimate relative abundance for each species
  - Single (S) -1
  - Few (F) - 2-10
  - Many (M) - 11-100
  - Abundant (A) - >100
- Transfer data to REEF survey sheet

Schmitt, E. F. and Sullivan, K. M. 1996. Analysis of a volunteer method for collecting fish presence and abundance data in the Florida Keys. *Bulletin of Marine Science*, **59**(2), 404-416.





West Coast, USA and Canada REEF Survey Form

Reef Environmental Education Foundation

For more information on REEF, its Survey Project or to view data, visit www.reef.org

MEMBER ID AND MAILING ADDRESS

If you have a REEF number, fill it in. You need only fill in your address if it has changed.

If you don't have a REEF identification number or have lost it, fill in the appropriate oval and fill in your address.

Return completed forms to:
Reef Environmental Education Foundation (REEF)
P.O. Box 246 Key Largo, FL 33037

- ○ Change of Name/Address
- ○ New Member
- ○ Lost ID Number

First Name | MI | Last Name

Street Address

MEMBER ID (ENTER FIRST DIGIT)

City | State/Province

Country | Zip/Postal Code

Phone Number | E-Mail

SURVEY TYPE

Fill in the type of survey being taken:

- ○ Species & Abundance
- ○ Species Only

There are two types of surveys that can be made with this form:

A **Species and Abundance (S&A)** survey is taken on a single dive and records the species positively identified as well as their abundance.

A **Species Only (S)** survey may be taken over multiple dives and indicates which species were positively identified (by marking the **Single (S)** bubble for these species).

GEOGRAPHIC ZONE CODE

Fill in as many digits as possible of the zone code for the location in which the survey was taken using the numbers found on the **REEF Geographic Code List** (see www.reef.org or contact REEF).

Enter the code in the grid below.

ENTER FIRST DIGIT

NAVIGATIONAL COORDINATES

Fill in this section if you can determine the exact longitude and latitude to the minute, or if possible to the hundredth of a minute. **(S&A only)**

Please do not use LORAN coordinates.

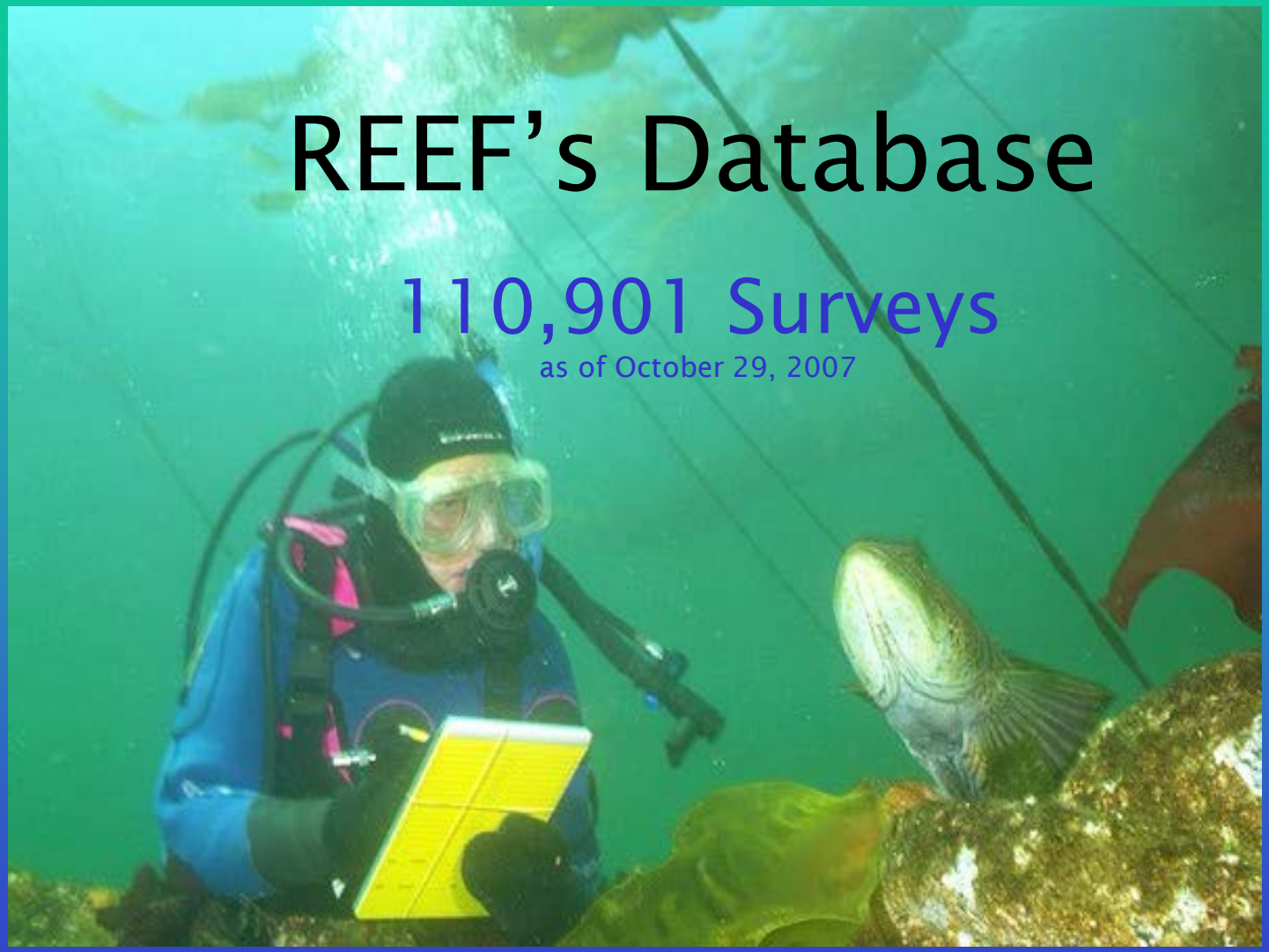
LATITUDE - N			LONGITUDE - W		
DEG	MIN	/100	DEG	MIN	/100
			1		

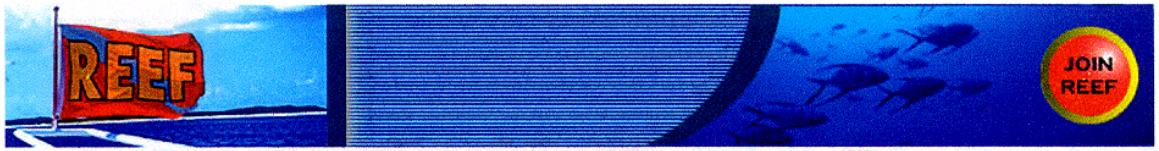
DIVE SITE

Print the local name of the dive site and area below.

PLEASE DO NOT WRITE IN THIS SHADED AREA

16149


REEF's Database
110,901 Surveys
as of October 29, 2007



THE REEF ENVIRONMENTAL EDUCATION FOUNDATION

"AN ACTIVE ORGANIZATION OF DIVERS COMMITTED TO THE PRESERVATION OF THE MARINE ENVIRONMENT"

Join our team of divers conducting marine life surveys!

Surveys to Date: 27006 -- More Stats Here!!

ONLINE STORE || FAQ

PARTNERS AND SPONSORS

HOW TO CONTRIBUTE

MEMBER SERVICES

- Field Stations
- Events, Seminars, Dives
- Experience Level Info.
- Member Forum

REEF DATA

- About the Survey Project
- The REEF Database
- View YOUR Data
- Monitoring and Research

WEB RESOURCES

- Fish Gallery and Quizzes
- Discussion Board
- REEF Notes (Newsletter)
- Related Links
- Press Room

REEF's MEMBER LISTSERV

www.reef.org

Geographic Report

Geographic Zone 3302

(Biscayne NP)

Rank	Common Name	Total		Expert		Novice	
		SF%	DEN	SF%	DEN	SF%	DEN
1	Blue Tang	88.8%	2.6	98.5%	2.6	81.9%	2.6
2	Stoplight Parrotfish	88.8%	2.6	94.1%	2.6	85.1%	2.6
3	Bluehead	85.8%	3.2	100%	3.4	75.5%	3
4	Bicolor Damselfish	82.7%	3.1	100%	3.2	70.2%	3
5	Ocean Surgeonfish	82%	2.5	97%	2.5	71.2%	2.5
6	Sergeant Major	78.3%	3.1	77.9%	3.2	78.7%	3
7	French Grunt	77.7%	2.7	80.8%	2.6	75.5%	2.9
8	Porkfish	74.6%	1.9	89.7%	1.9	63.8%	1.9

REEF Observer Experience Levels

Levels 1-5 based upon
- Number of surveys conducted
- High passing scores on visual ID exams
- Maintaining proficiency via surveying and testing

Levels 1-3
- Considered “Novice”
- Used to encourage participation
- Valuable for most common species

Levels 4 and 5
- Considered “Expert”
- Used in Advanced Assessments
- Valuable for quality observations and assistance in other projects

REEF Data

- Fisheries independent data (Fishery Councils, protected species…)
- National Park Service (Biscayne) non-invasive species inventories
- Cayman Islands nassau grouper spawning aggregation assessment
- National Marine Sanctuary habitat/species relationships
- NOAA reef restoration assessments
- State of Florida artificial reef assessments
- Scientific publications available on REEF.org…

Select publications using REEF data…

•Taylor, M.S. and L. Akins. 2007. Two new species of Elactinus (Telostei:Gobiidae) from the Mexican Coast of the Gulf of Mexico.. Zootaxa. 1425: 45-51.

•Christine A. Ward-Paige, Ransom A. Myers, Christy Pattengill-Semmens. In Prep.. Yellow Stingray in the Florida Keys.

•Neely, K.L. . In Prep.. Using a meta-analysis of monitoring data to determine the effects of bleaching on reef inhabitants. .

•Auster, P.J., B.X. Semmens and K. Barber. 2005. Pattern in the co-occurrence of fishes inhabiting the coral reefs of Bonaire, Netherlands Antilles. Environmental Biology of Fishes. 74 (2): 187-194.

•Kingsley, M.C.S., ed.. 2004. The Goliath Grouper in southern Florida: assessment review and advisory report. Southeast Data and Assessment Review. vii + 17 pp.

•Semmens, B.X., E.R. Buhle, A.K. Salomon, and C.V. Pattengill-Semmens. 2004. Tankers or fish tanks: what brought non-native marine fishes to Florida waters. Marine Ecology Progress Series. 266:239-244

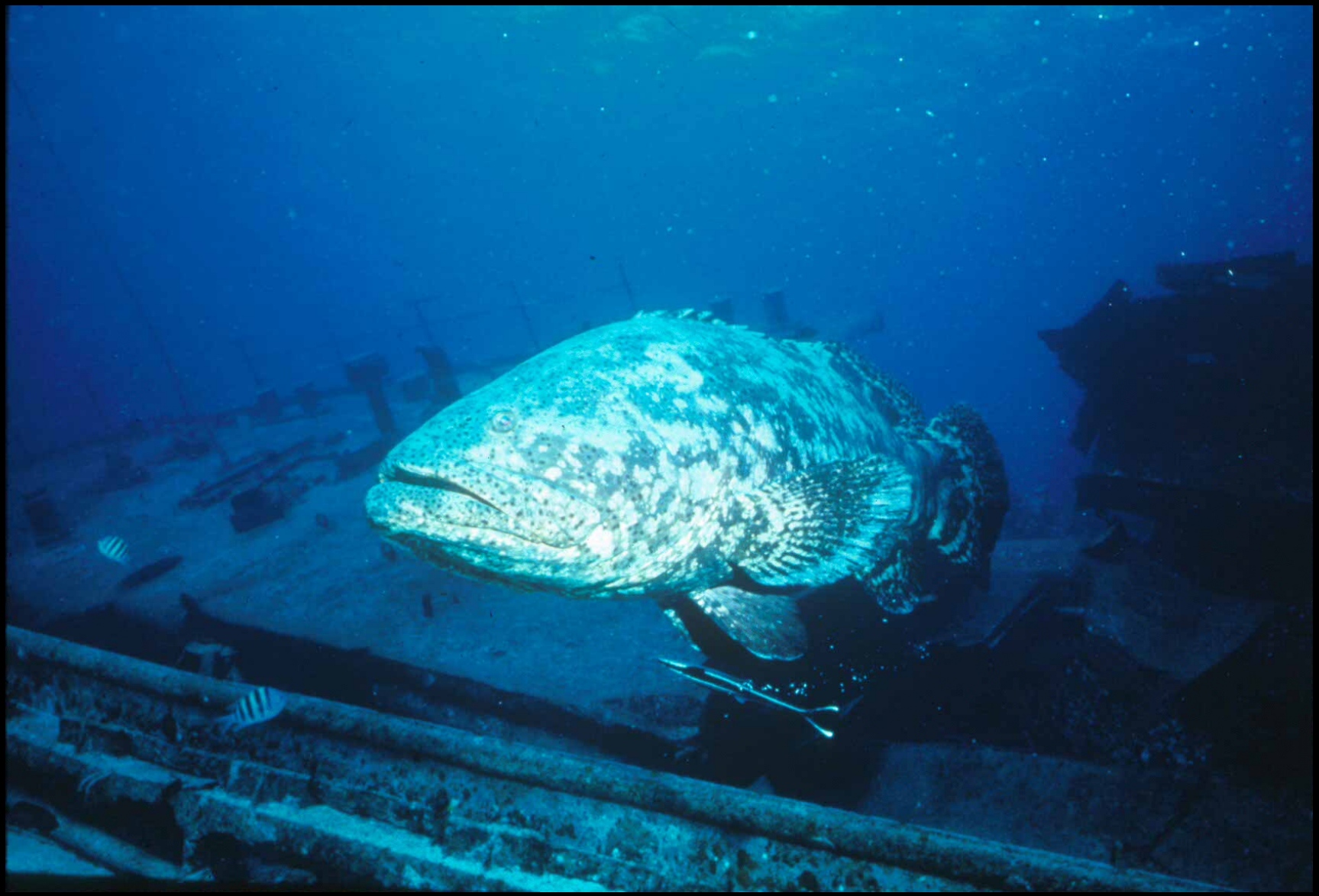
•Whaylen, L., Pattengill-Semmens, C.V., Semmens, B.X., Bush, P.G. and M.R. Boardman. 2004. Observations of a Nassau Grouper Spawning Aggregation Site In Little Cayman, Including Multi-Species Spawning. Environmental Biology of Fishes. 70: 305-313

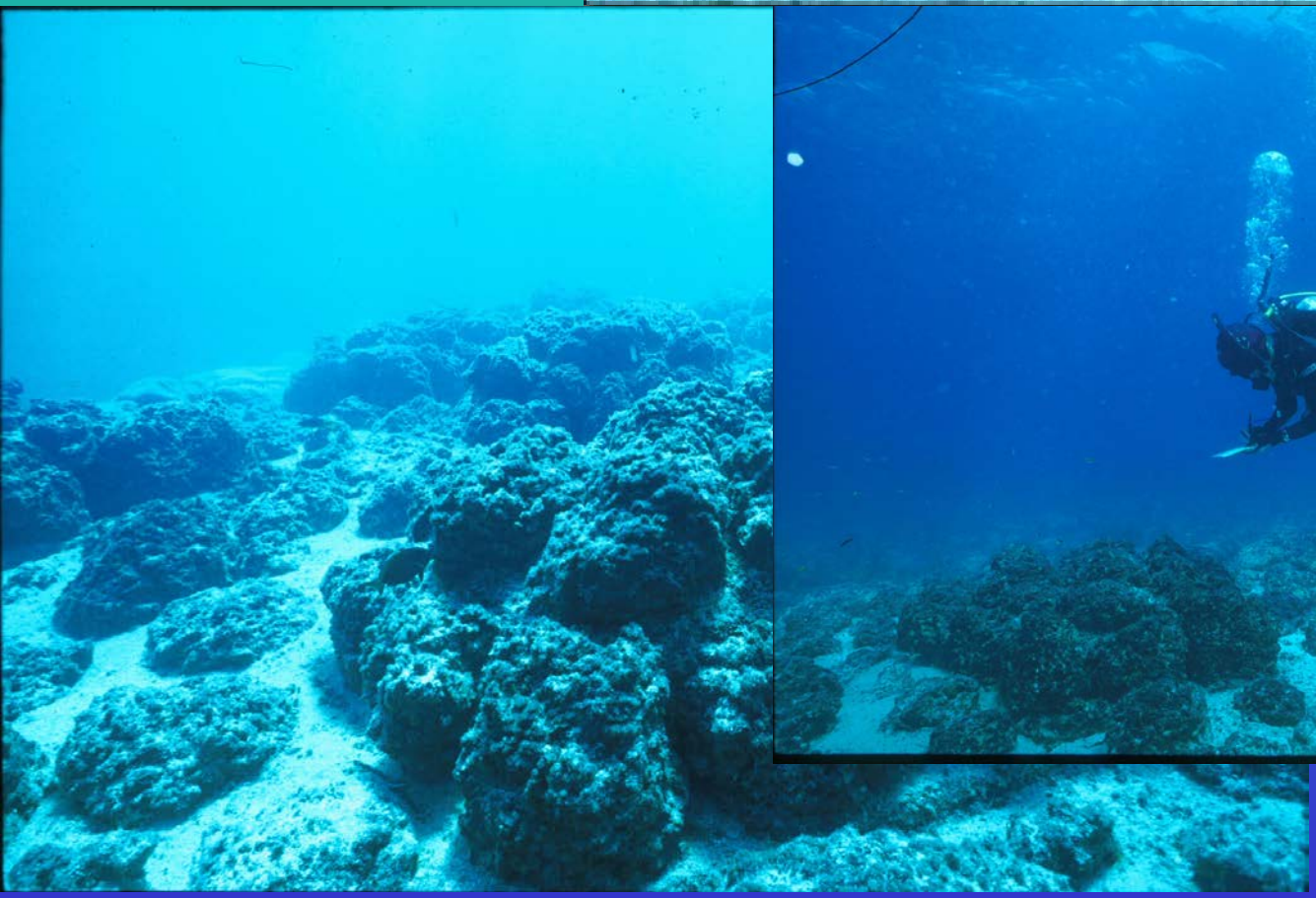
•Pattengill-Semmens, C.V. & B.X. Semmens. 2003. The status of reef fishes in the Cayman Islands (B.W.I.). Atoll Research Bulletin. Vol. 496., pp. 226 -- 247

•Schmitt, E. F., T. D. Sluka, and K. M. Sullivan-Sealy. 2002. Evaluating the use of roving diver and transect surveys to assess the coral reef assemblages off southeastern Hispaniola.
Coral Reefs. 21: 216-223

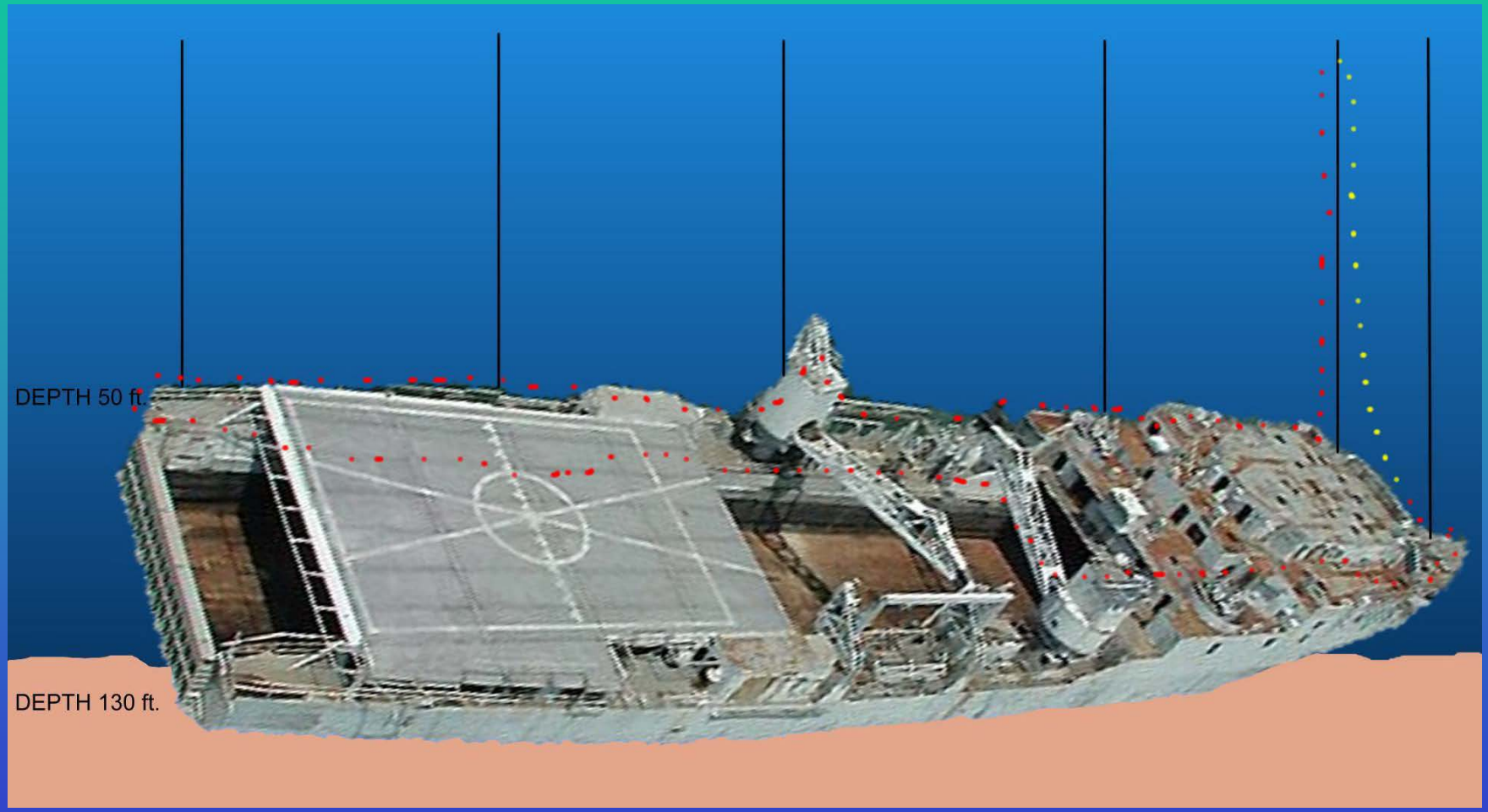
Pattengill- Semmens, C.V.. 2002. The reef fish assemblage of Bonaire Marine Park: an analysis of REEF Fish Survey Project data. Proceedings 53rd Gulf and Caribbean Fisheries Institute. 53: 591-605

Jeffrey, C.F.G., C. Pattengill-Semmens, S. Gittings, and M.E. Monaco. 2001. Distribution and sighting frequency of reef fishes in the Florida Keys National Marine Sanctuary.
Marine Sanctuaries Conservation Series MSD-01-1. US Dept. of Commerce, NOAA, Silver Spring, MD.. 51 pp.



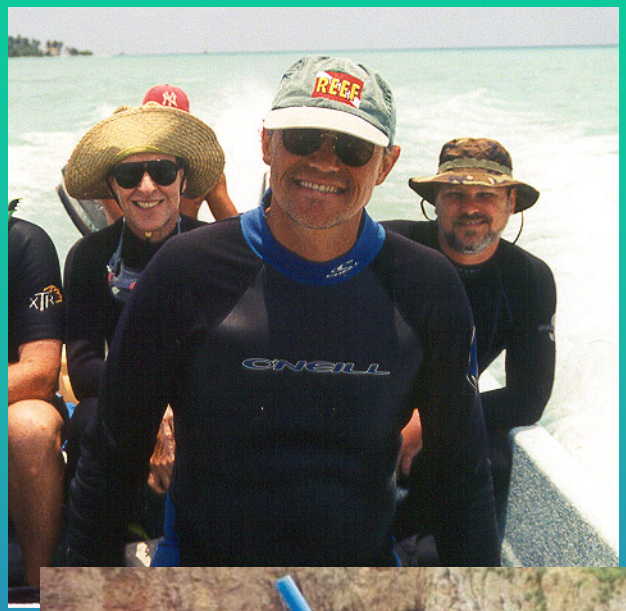


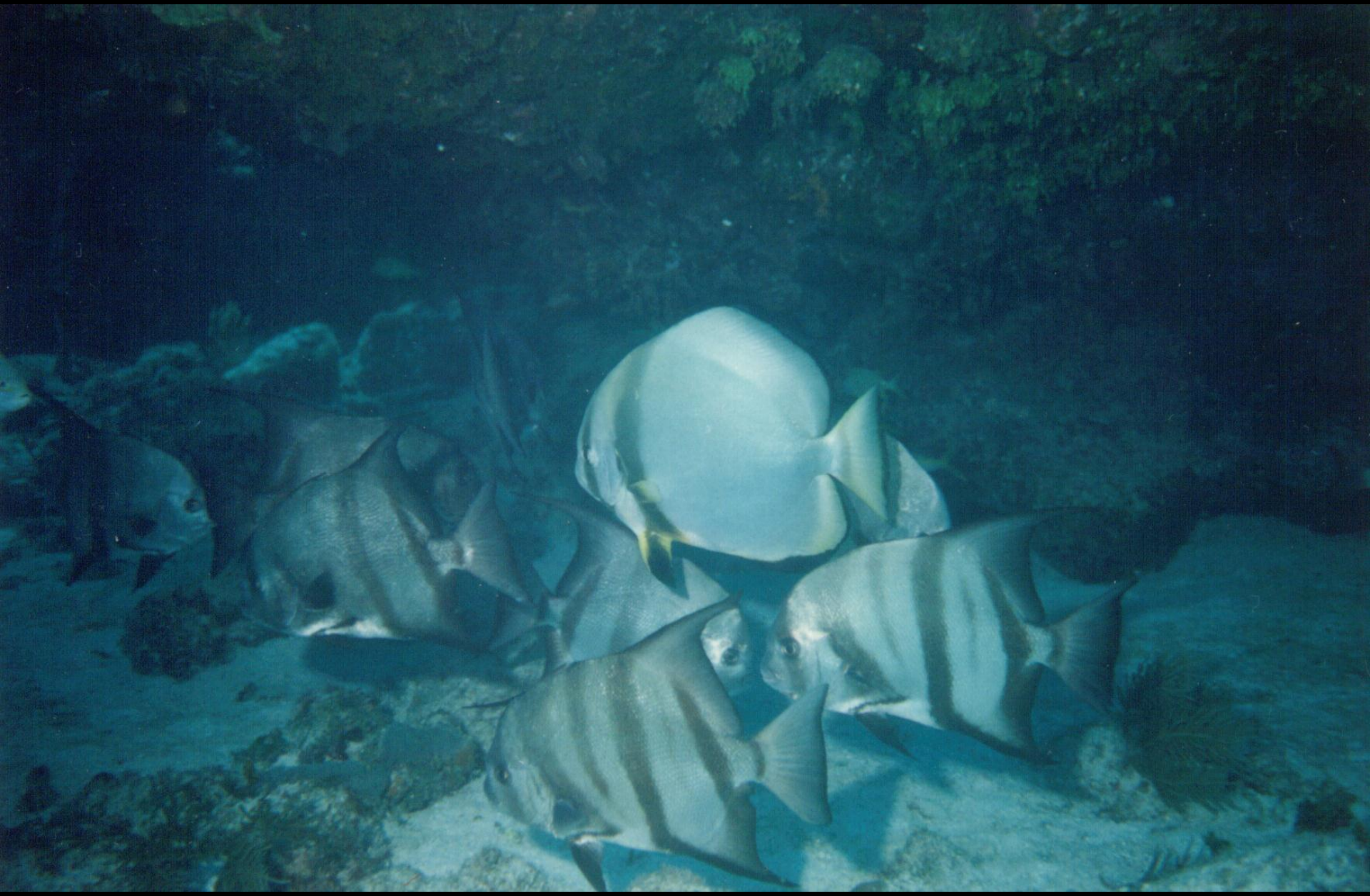
USS Spiegel Grove LSD-32 artificial reef monitoring




Taylor, M.S. and L. Akins, 2007

Benefits of REEF Programs





Documentation and tracking of Exotic Species populations

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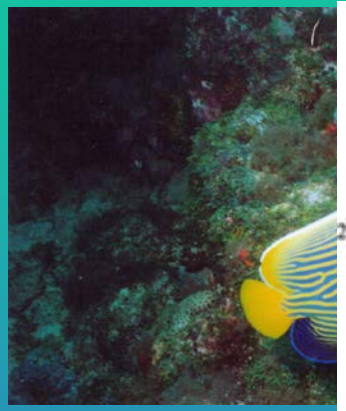
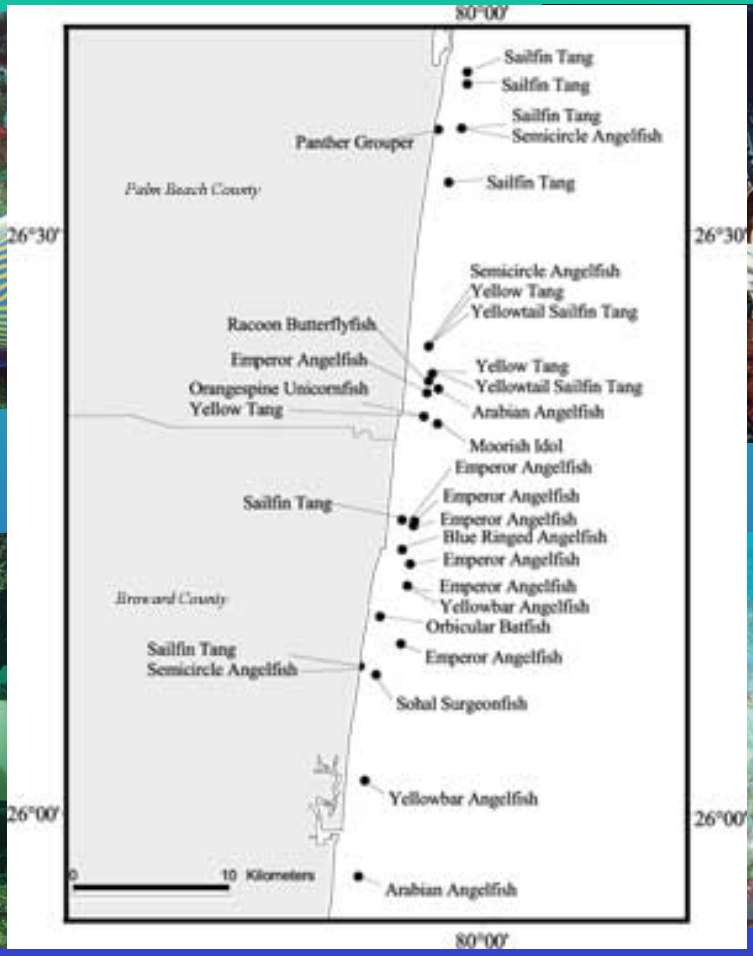
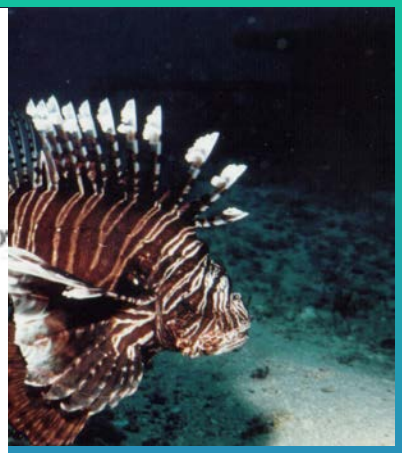


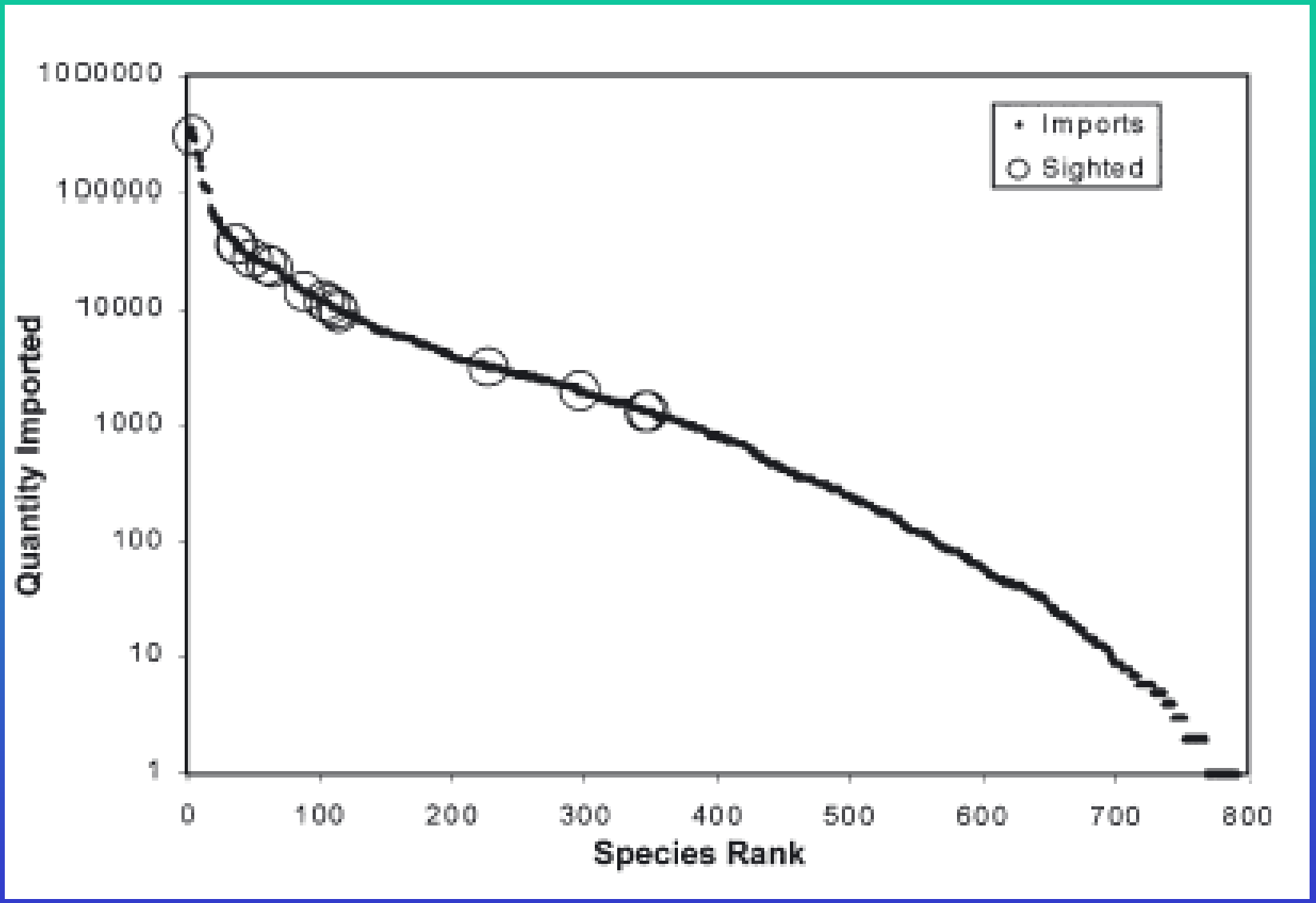




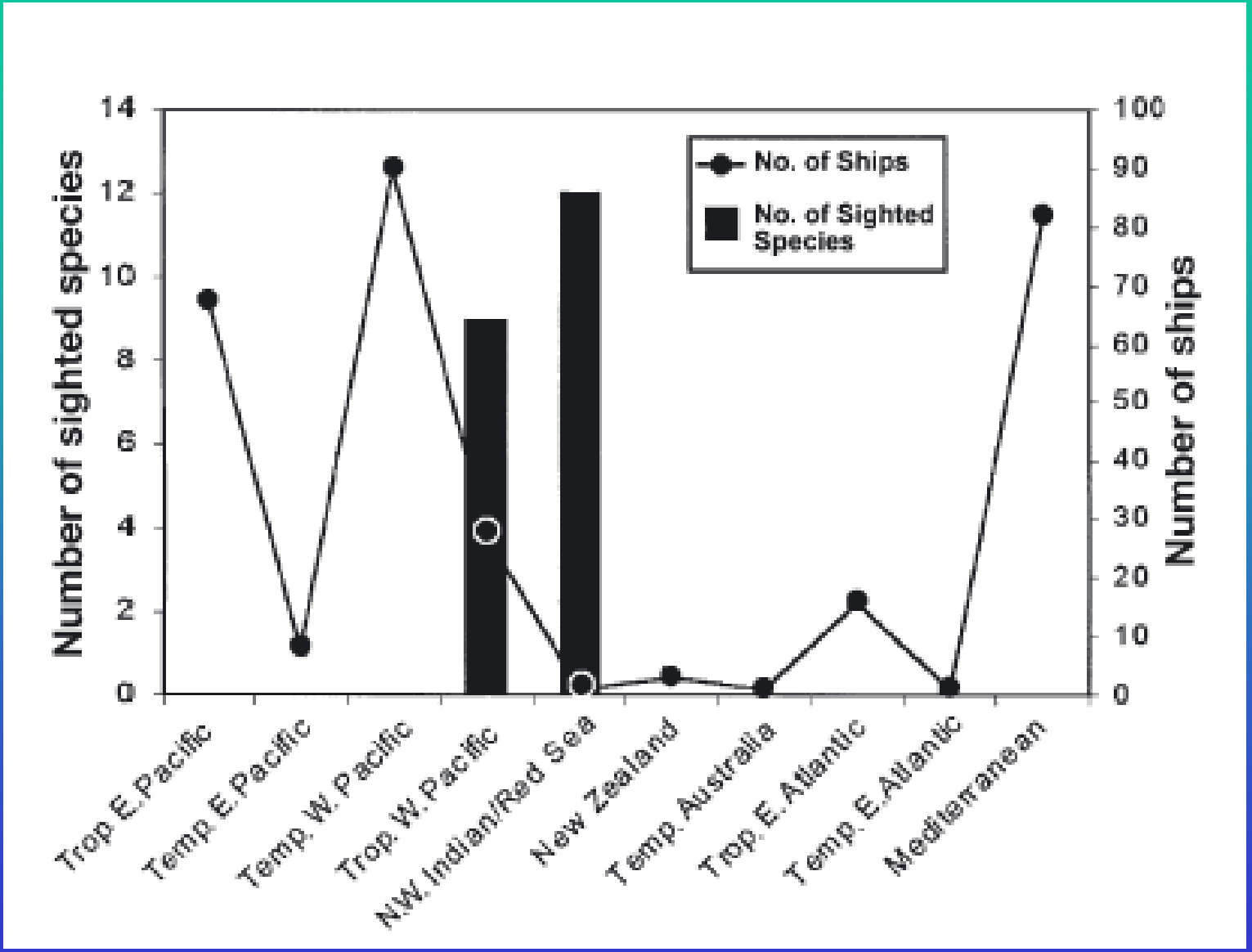
REEF reports of non-native species off SE FL

- Lionfish *Pterois volitans/miles*
- Panther grouper *Chromileptes altivelis*
- Raccoon butterflyfish *Chaetodon lunula*
- Orbicular batfish *Platax orbicularis*
- Blue ringed angelfish *Pomacanthus annularis*
- Arabian angelfish *Pomacanthus asfur*
- Emperor angelfish *Pomacanthus imperator*
- Yellowbar angelfish *Pomacanthus maculosus*
- Semicircle angelfish *Pomacanthus semicirculatus*
- Moorish idol *Zanclus cornutus*
- Orangespine unicornfish *Naso lituratus*
- Sohal surgeonfish *Acanthurus sohal*
- Sailfin tang *Zebrasoma desjardinii*
- Yellow tang *Zebrasoma flavescens*
- Sailfin tang *Zebrasoma veliferum*
- Yellowtail sailfin tang *Zebrasoma xanthurum*
- Red Sea Bannerfish *Heniochus intermedius*

Relationship between importation and observations



Relationship between shipping origins and native range



Lionfish in the Atlantic

NOAA
Science for Coastal Communities

Center for Coastal Fisheries and Habitat Research
CCFHR

Biological and ecological assessments of the invasive lionfish in the Atlantic

James A. Morris, Jr.
NOAA National Ocean Service, Beaufort, North Carolina

Dean Ahrenholz
Ann Barse
Carolyn Currin
Wilson Freshwater
Roldan Munoz
Jennifer Potts
Paula Whitfield
Kathleen Sealey
Others…

Salisbury University

University of North Carolina Wilmington

REEF

NOAA National Oceanic and Atmospheric Administration U.S. Department of Commerce

Lionfish…

The big questions…

- What effect will they have on our native marine environments?
- What can we do about it?


CAMOLINE
Burlington, NC 27215 • 1-800-334-5551

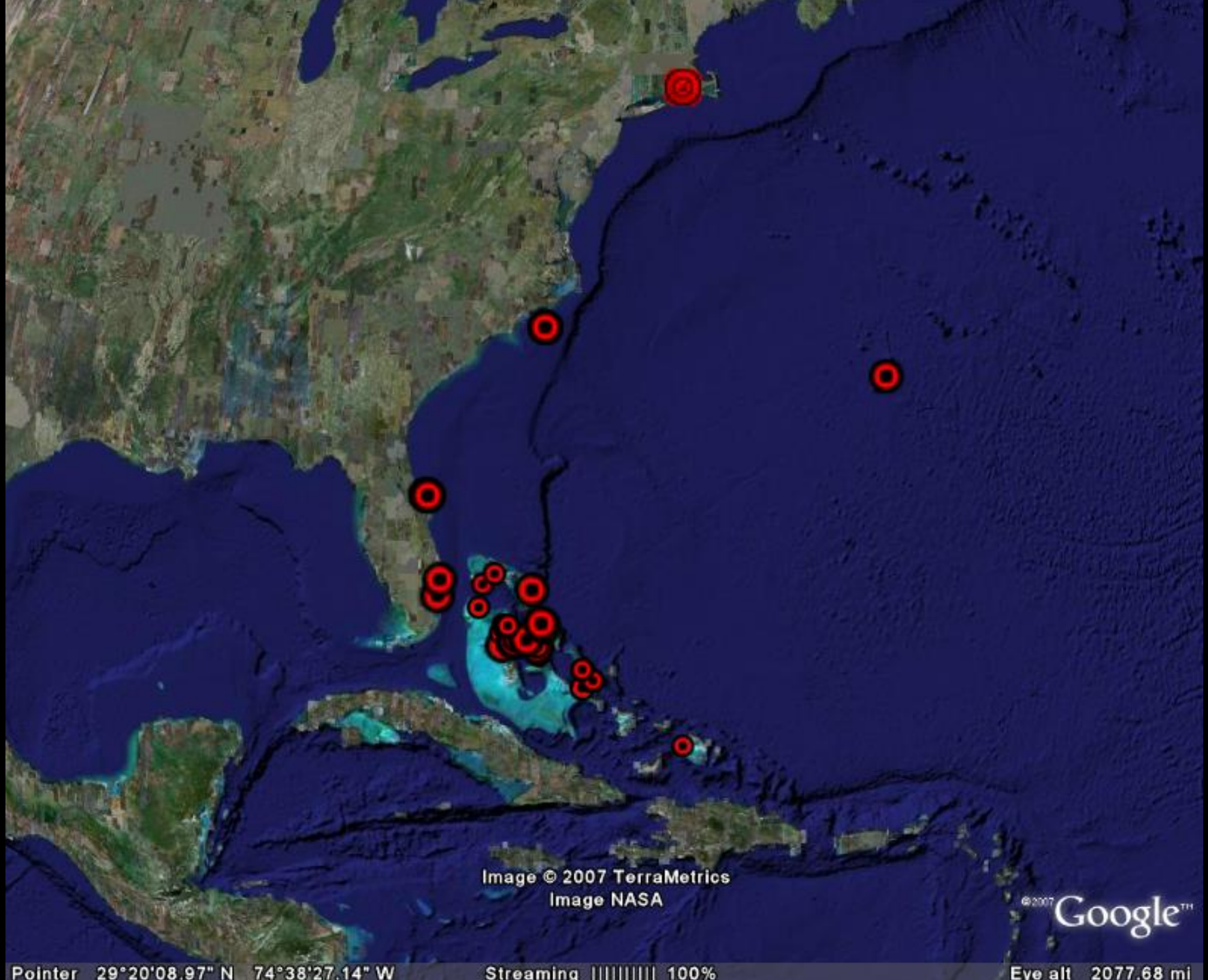


Image © 2007 TerraMetrics
Image NASA
©2007 Google™
Pointer 29°20'08.97" N 74°38'27.14" W
Streaming 100%
Eye alt 2077.68 mi

A (near) perfect invader?…

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- Genetic Bottleneck

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- Venomous protection

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- Reproductively active

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- Rapid growth

A (near) perfect invader?…

- Genetic bottleneck
- Venomous protection
- Reproductively active
- Behaviorally unique
- Rapid growth
- Young age at maturity

A (near) perfect invader?…

- Genetic bottleneck
- Venomous protection
- Reproductively active
- Behaviorally unique
- Rapid growth
- Young age at maturity
- Few parasites

A (near) perfect invader?…

- Genetic bottleneck
- Venomous protection (no predators)
- Reproductively active
- Behaviorally unique
- Rapid growth
- Young age at maturity
- Few parasites
- Wide range of potential prey

0
1
2
3
4
5
150 cm
6
7
8
9
10

The Best Plan…

- Prevention - through education, management, and regulation

- Early detection
- Warning
- Rapid response
- Control

A proposal?…

- Workshop to develop coordinated plan - (USGS, FWC, NOAA, NPS, REEF, others)
- Early detection surveys - (REEF, NOAA, FWC)
- Central database/alert system - (USGS?)
- Rapid response and follow-up teams – (REEF, local agency staff, public aquaria)
- Follow-up surveys – (REEF, FWC, others)

Catch of the Day?…