Challenges in Coral Reef Management: Lessons Learned from Education and Outreach Projects in the Mexican Caribbean.

23.942

Sarah Frias-Torres[1,2,3] ,Maria Bello[4], Rafael Araujo[3,5], Hernando Cardenas[3,5]. 1. MRAG Americas, St. Petersburg, Florida, USA;

2. ORCA, Ocean Research and Conservation Association, Fort Pierce, Florida, USA; 3. ILCMA, Instituto Latinoamericano de Ciencias Marinas y del Ambiente, Miami, Florida, USA; 4.NOAA-NMFS-Southeast Fisheries Science Center, Miami, Florida, USA; 5. University of Miami, Rosenstiel School of Marine and Atmospheric Sciences, Miami, Florida, USA

Introduction

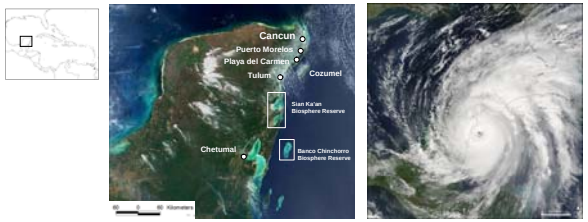
Coastal communities in the Mexican Caribbean (or Mayan Riviera) face unprecedented socioeconomic and environmental conflicts due to uncontrolled tourism development, in spite of Mexican environmental laws that prohibit mangrove and coral reef destruction (Ley General de Vida Silvestre, Chapter I, Article 60). Hotel developers are quickly expanding the Cancun style of massive hotel construction towards other coastal communities (Puerto Morelos, Tulum, Cozumel or Playa del Carmen) to fully exploit any relatively untouched coastal areas remaining. An awareness of the ecological damage is lacking in the decision-making process for sustainable use of resources.

Purpose

The purpose of our workshops was to achieve the translation of science that otherwise limits environmental awareness in coastal communities: from English to Spanish, from scientific language to a language for a lay audience.

Methods

- ❑ Workshop 1: Playa del Carmen, municipality building, 2004; 30 attended
- ❑ Workshop 2: Cancun, Universidad del Caribe campus, 2006; 32 attended
- ❑ Coordination: ILCMA, Instituto Latinoamericano de Ciencias Marinas y del Ambiente, Miami, Florida, USA
- ❑ Themes: conservation and sustainable use of coral reefs and associated habitats (mangroves, seagrass)
- ❑ Teachers: Bi-lingual (English-Spanish) Hispanic scientists teaching in Spanish
- ❑ Targeted audience: capacity building for environmental managers, government officials, lawyers, tourism developers, architects, engineers, teachers and students



Study Area. [Left] Tropical Western Atlantic. [Center] Yucatan Peninsula, Mexico. Locations in the Mexican Caribbean (Riviera Maya) mentioned in the text are indicated. [Right] Hurricane Wilma, Category 5, October 21, 2005; approaching landfall in the Mexican Caribbean. Major event between the two workshops (Unplanned experiment!). *Photo-Credit: NASA Visible Earth.*

Results and Discussion

A. Ground-truth

1. Hurricane Wilma provided a new start for more sustainable coastal development. Instead rebuilding and new construction were exponentially devastating for mangrove and coral reef ecosystems.

2. Unrealistic tourism expectations….

1. Sedimentation in nearshore patch reefs
2. Hotels built less than 50 m from high water line cause beach erosion.
3. Excessive demand of freshwater in a region fully dependent on subterranean aquifers.
4. Non-native plants, replace primary mangrove habitat

Photo Credit: Travel and Leisure magazine 2008, 5-start hotel built in Playa del Carmen after hurricane Wilma

3. … generate uncontrolled coastal development

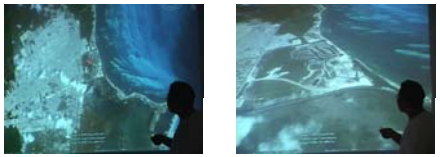
Puerto Aventuras, 20 km south of Cancun, 2006. The new coastal development destroyed intact coastal mangroves and construction accelerated after hurricane Wilma. Silt plumes moving towards the coral reef can be observed. *Photo Credit: Centro Mexicano de Derecho Ambiental*

4. In spite of best practices from dive operators, half-day SCUBA adventures for first time divers impact greatly any remaining live coral cover

[Left] Two colonies of partially alive *Acropora palmata* await….[Right] as an inexperienced diver "walks" towards them. *Photo Credit: S. Frias-Torres, Isla Mujeres, Cancun, Mexico, 2006*

B. Workshops

1.Workshop participants shared their own experiences on habitat destruction due to coastal development.



A workshop participant exposes coastal mangrove destruction due to a tourism development initiated after hurricane Wilma, in Puerto Juarez, north of Cancun, Mexico.
Photo Credit: S. Frias-Torres, frames from workshop video, 2006

2. During fieldwork (Puerto Morelos), 90 % of workshop participants saw a coral reef for the first time in their life

[Left] Workshop participants gathering for fieldwork. [Center] Ready to snorkel, a participant explores a shallow coral reef for the first time. [Right] Live *Acropora palmata*, dead coral and coral rubble. *Photo Credit: S. Frias-Torres, Puerto Morelos, Mexico, 2006*

3. Testimonials from workshop participants provide hope for the future. *[Photo Credits: S. Frias-Torres, frames from workshop video, 2006]*

Gisela Maldonado, Marine Biologist, Marine Natural Parks Manager
"In Playa del Carmen, we have a **500 % growth rate** in the last 10 years. **Immigration and tourism** generate extreme habitat destruction and social injustice. Service workers live in **slums** away from **luxury hotels**… We [scientists and managers] must also become conservation advocates."

Carlos E. Oshte, Environmental Manager
"We live in a tourist town [Cancun] that is very famous worldwide. After this workshop, we know the importance of the mangrove, the coral reef and how important they are to our future."

Monica Alba, Biologist & Environmental Educator
"This workshop was a forum where Mexicans and non-Mexicans could learn and share experiences in coral reef conservation. Thank you for this opportunity."

Jorge Estrada, Sustainable Tourism Graduate
"When we studied Tourism, we had many biologists that understood their own scientific terms but we did not. The workshop teachers made it possible for us to understand."

Heidi Mesa-Monroy, Environmental Lawyer
"Sustainable tourism exists and can be accomplished as long as we all agree on it. We have to conserve in order for all of us to win and not to loose our resources. People eventually go away or find a new place to vacation. **If we work at the economic, social and environmental level we can accomplish sustainable development! "**

Conclusions

1. **In water fieldwork was a powerful motivator to turn learning into action**
2. **Communities must participate in the tourism decision-making process**
3. **Public awareness of existing environmental laws is needed.**

Acknowledgements

Funding for the 2006 workshop was provided by the NOAA Coral Reef Conservation Program. K. Lindeman and P. Martin provided aerial photographs of Puerto Aventuras.

Disclaimer: Views expressed here are those of the author's and do not represent any supporting agency.

Contact: sfrias_torres@hotmail.com