COMMUNITY-BASED OYSTER RESTORATION & MONITORING IN THE INDIAN RIVER LAGOON

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Brevard Zoo
Our Mission:
Wildlife Conservation Through Education and Participation

- The ‘Community Built Zoo’
- Private, Not for Profit Organization
  - Completely funded by ticket sales, donations and grants
- Direct Connection to the Local and Visiting Community with ~423,000 visitors annually
- Provide Hands-On Activity through Conservation Kiosk
Indian River Lagoon

3 bodies of water
- Indian River
- Banana River
- Mosquito Lagoon

- 156 miles long

- Biologically Diverse Estuary: Home to over 4,000 species
Problems Facing the IRL

2011
Algal Superbloom & Secondary bloom
60% loss of seagrass beds

2012
Brown Tide

2013
Brown Tide
Unusual Mortalities

2015
Brown Tide

2016
Brown Tide
Extensive Fish Kill
Goals of Oyster Restoration in the IRL

- **Restore Eastern Oyster Population** in Volusia & Brevard County (*Crassostrea virginica*)

- **Improve Water Clarity**
  - Control algal blooms (brown tide, green algae)

- **Shoreline Protection**, Control Erosion

- **Habitat and Food** Source

- **Nutrient Removal**
Threats to Eastern Oyster

- Overharvesting
- Habitat Loss
- Reduced Water Quality
- Disease (MSX & Dermo)
- Boat Wakes

Brevard harvest of oysters is 0.7% of what it was 27 years ago.
Community-Based Oyster Restoration

- **Two Project Locations**
  - Volusia County: Canaveral National Park; Mosquito Lagoon
  - Brevard County: Indian River & Banana River

- **Funding Sources:** Grants, County, State, Cost-Share Programs, Sales Tax, Donations

- **Two Different Methodologies**
  - Oyster mats and Shell Bags
Oyster Mat Project

  2009-2010: UCF & The Nature Conservancy/Brevard Zoo
  2010-2016: UCF & Brevard Zoo

- Restore Footprint of Reefs Lost to Boat Wakes
  - Level “dead margins” & provide stabilized recruitment substrate

- Monitoring: Post-Restoration & Control Reefs
  Collected 9 continuous years of oyster data!
Step 1: Supply Prep

- Shell quarantine
- Shell collection
- Shell drilling
- Mat cutting & bundling
- Zip tie counting & bundling
Step 2: Mat Making

Coordinate workshops to make mats & drill shells with:
- Community groups
- Schools
- Companies
- Public Workshops
Step 3a: Rake Down Dead Margin

LOTS of Volunteer Manpower

OR

The Amphibious Excavator
a.k.a
“The Marginator”
Step 3b: Deploy Oyster Mats

Oyster mats are laid in the water like a giant quilt.

Cement weights are used to attach the mats to each other and keep them in place.
Project Accomplishments

77 reefs restored

45,000+ oyster mats deployed

Over 11.9 million oysters added to lagoon

49,000+ community volunteers

Restored footprint: 2.8 acres

Recruited seagrass found at 29.9% of restored reefs

263 mean live oysters/mat @ 9 years post-restoration
Oyster Gardening Project

- 2014: **$150K** from Brevard County Commissioners
  - Continued funding from County, State and SJRWMD
  - Tax referendum on 2016 ballot

- Study **Survivability** & **Recruitment** of Oysters

- Army of Lagoon-front Residents turned **Citizen Scientists**

**1030+ Oyster Gardeners** in Brevard County!
Project Accomplishments

• **6 Sites** Built to Date, **1 Pending Permits**
  • 4 additional to be built in 2017

• Methodologies
  • **Shell Bags**
    • Live Gardened Oysters
    • Blank Shell Bags
  • **Oyster Mats**
  • **Shoreline Vegetation** (Mangroves, Spartina)

• **200,000+ Gardened Oysters** added to IRL

• Continuous **Monitoring** for **Survival & Recruitment**
  • 2014-2015 Sites: Brevard Zoo & University of Central Florida
  • 2016-Present Sites: Brevard Zoo & Brevard County
Expanding Our Efforts

Living Shoreline Restoration

• Continuing Mat Making & Oyster Gardening
• Adopt-a-Mangrove with DEP IRL Aquatic Preserves

• NEW! Mangrove Fostering
  o Schools
  o Community Groups
  o Professional Organizations
  o Private Individuals
Living Shoreline Demonstration Site

- $500K from Florida’s Department of Economic Opportunity

- Shell Recycling Initiative
- Experiment on Appropriate Restoration Methodology: Florida Institute of Technology
- Construction of Living Shoreline Demonstration Site: Educational Example for Residents
Wave Tank Experiment: FIT
Shell Recycling: Brevard County

- **Recycled Shell**: Shucking House, Restaurants, Local Seafood Festivals
  - Dumpster provided by and transported by Anderson Rentals
- **Quarantine Site**: Donated by County, Oyster Shell Storage Site
- Supports **Numerous Restoration Projects** throughout the Lagoon

2.2 Million Pounds of Shell Recycled since 2015!
What’s Still to Come…

- **Shell Bagging Machine!**
  - Partnership with Harris Corporation
  - Increase Productivity & Efficiency

- **Save the Lagoon Plan**
  - 10 Year ½ Cent Sales Tax Increase
  - Construct **20 Miles of Living Shoreline**
Challenges

• Permitting, permitting, permitting!

• Seasonal “Tides”: Low vs. High Water Season

• Construction of Labor Intensive Materials (shell bags)

• Community Engagement

• Continuous Funding Sources
Working TOGETHER for the Lagoon

- Anderson Rentals
- Boater's Exchange
- Boeing Company Employee Community Fund
- Brevard County Parks and Recreation
- Brevard County Natural Resources
- Bright House Networks
- City of Satellite Beach
- Coastal Conservation Association (CCA)
- Delstar Technologies
- Disney Worldwide Conservation
- Eastern Florida State College
- Electrical Basics
- Florida Department of Environmental Protection
- Florida Fish & Wildlife Conservation Commission (FWC)
- Florida Oceanographic Society
- Florida Sea Grant
- Florida Today
- Florida DEP IRL Aquatics Preserve
- Girl Scouts & Boy Scouts of America
- Grant Seafood Festival
- HUBBS-SeaWorld Research Institute
- Indian River Lagoon National Estuary Program
- Limitless Vistas, Inc.
- Marine Discovery Center, New Smyrna Beach
- Modus Operandi
- National Oceanic & Atmospheric Administration
- National Park Service: Canaveral National Seashore
- Private donors
- Prudential Sterling Properties: Barbara Wall
- Red Lobster, Melbourne
- Rockwell Collins
- SeaWorld & Busch Gardens Conservation Fund
- Sorensen Moving & Storage
- Southeastern SeaProducts
- St. Johns River Water Management District
- The Nature Conservancy
- U.S. Fish & Wildlife Service
- University of Central Florida Biology Department
- University of Florida IFAS Extension
- Waste Management
- Wells Fargo/ National Fish & Wildlife Foundation

Volunteers Make it Possible!
Questions?

“In the end, we will only conserve what we love; we will love only what we understand; and we will understand only what we have been taught.” –Baba Dioum

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