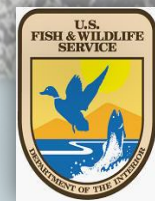




# Community-Based Oyster Reef Restoration Project Mosquito Lagoon, Florida

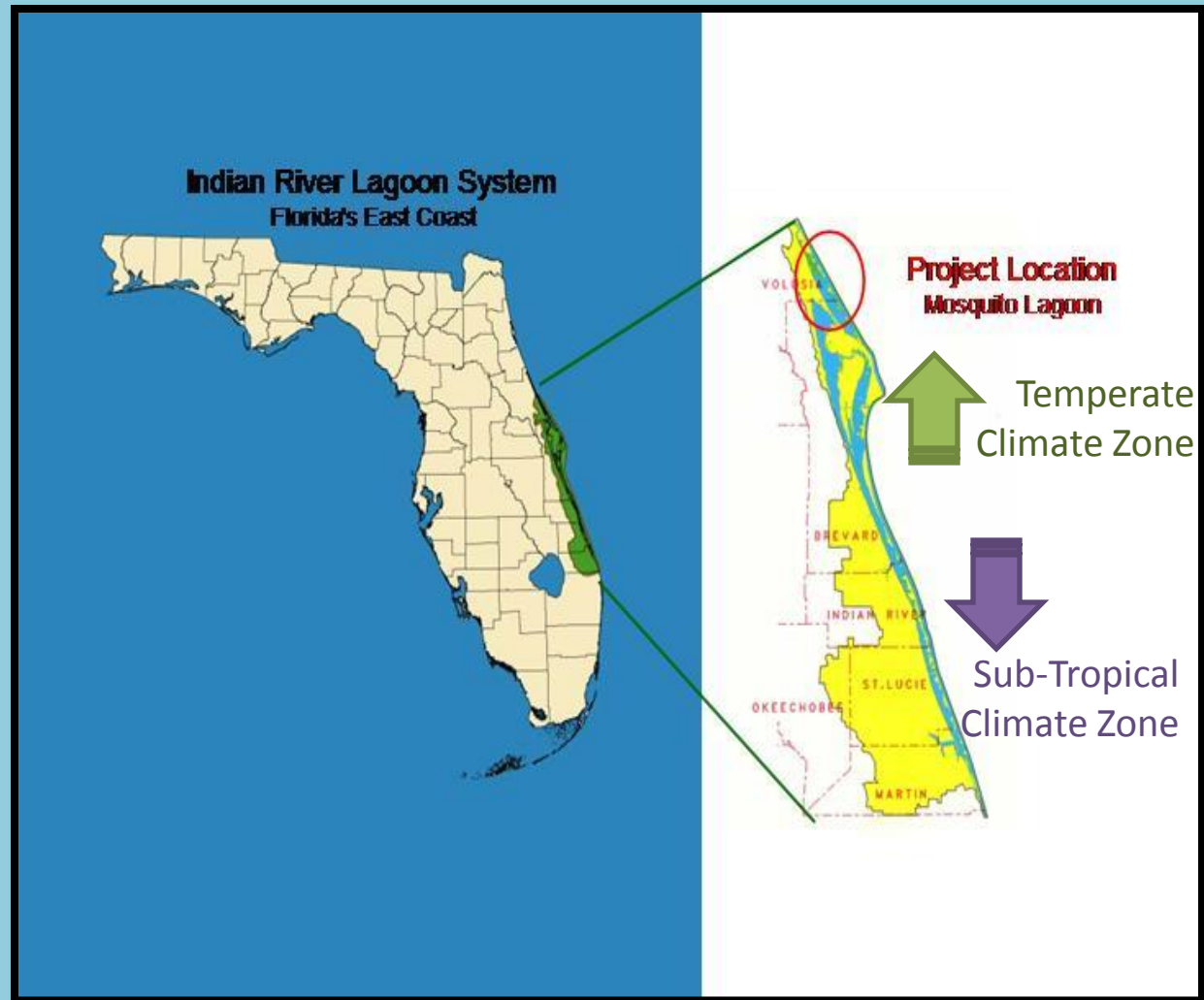




# Canaveral National Seashore Mosquito Lagoon, FL

## Indian River Lagoon:

- 3 bodies of water
  - Indian River
  - Banana River
  - Mosquito Lagoon
- 156 miles long
- Biologically diverse **estuary** home to over 4000 species.

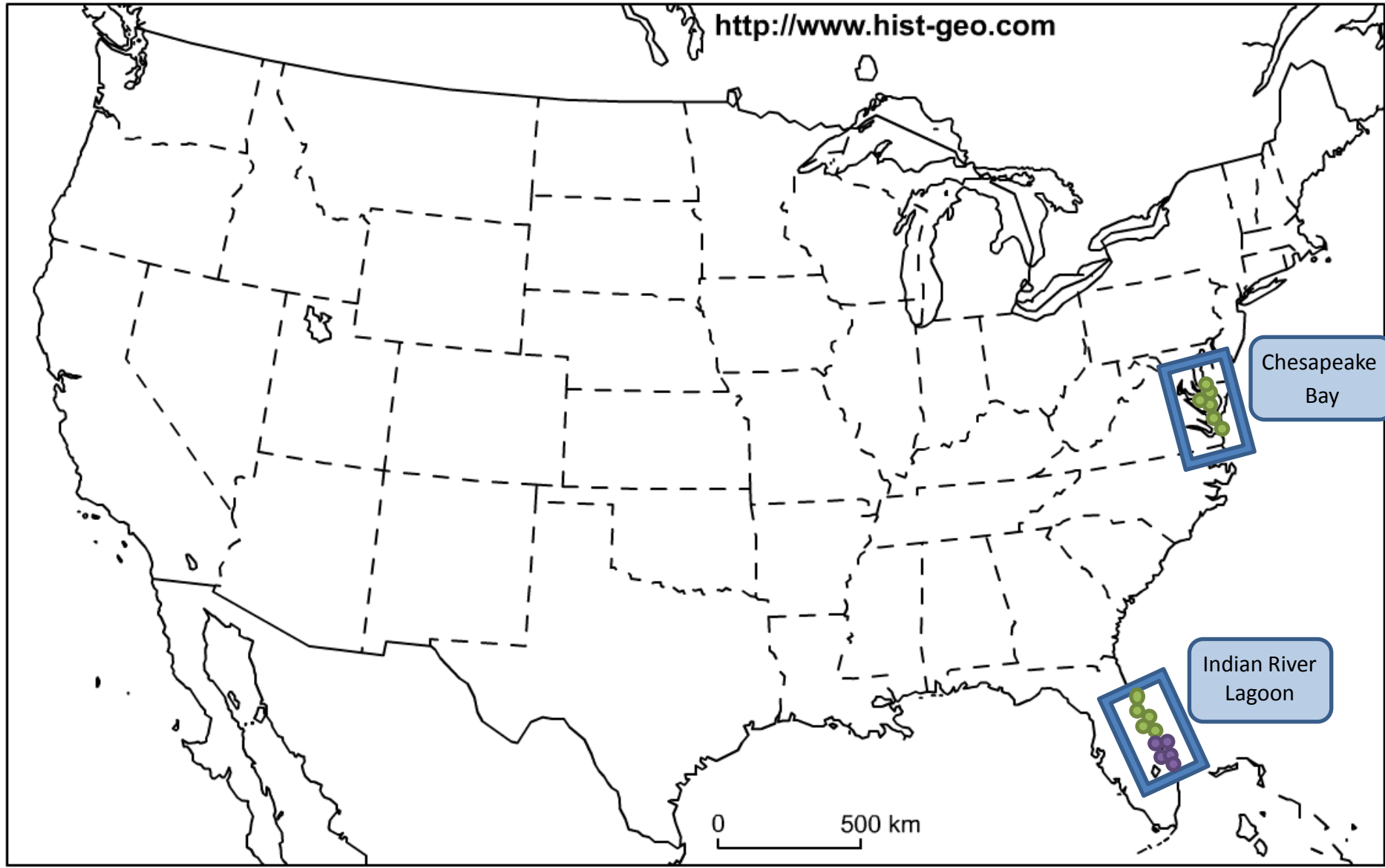




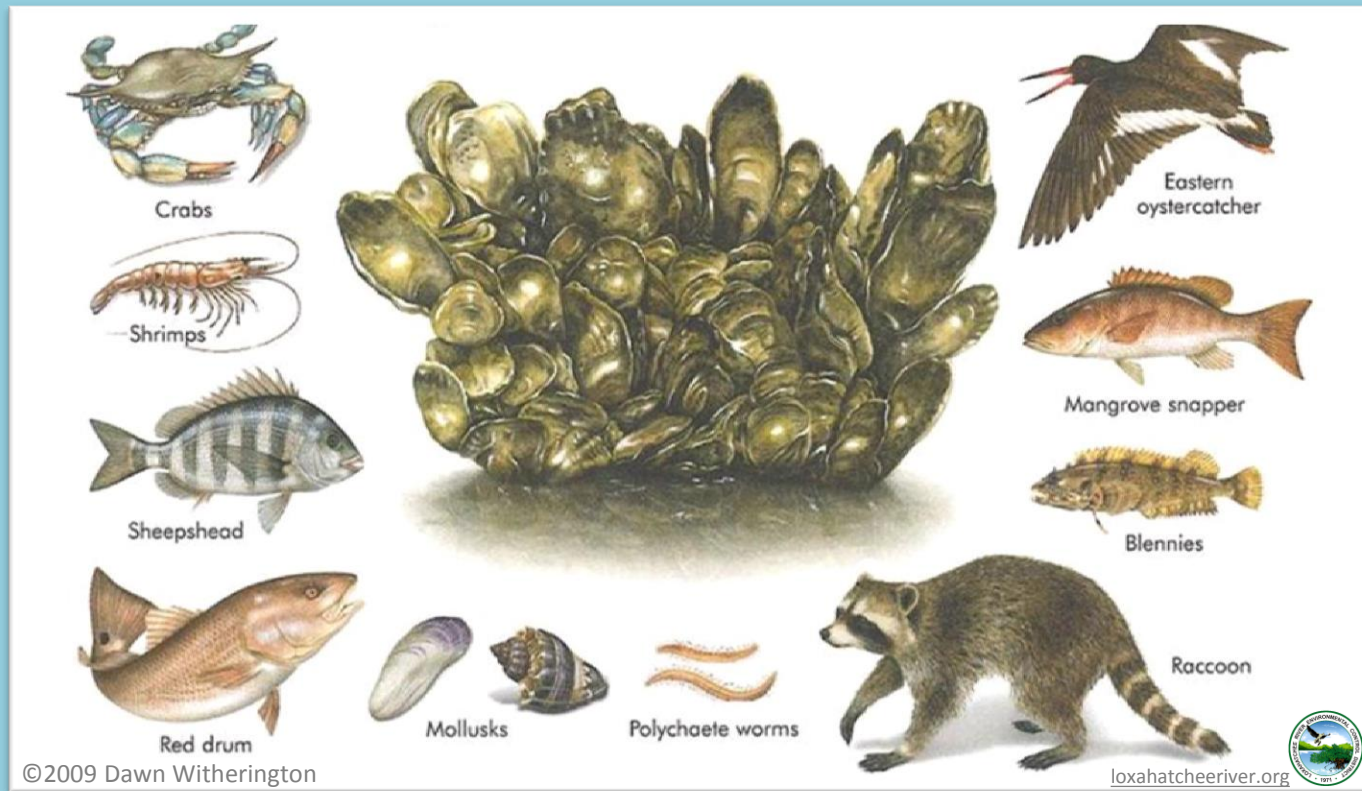
Temperate  
Climate Zone



Sub-Tropical  
Climate Zone



# Oysters are a KEYSTONE species.



## What is a Keystone Species?

A keystone species is one that plays a critical role in determining and maintaining the overall relationship of plants and animals within an ecosystem.

If a keystone species is removed or declines, the nature of the ecosystem will change dramatically.



# ECOSYSTEM FUNCTIONS

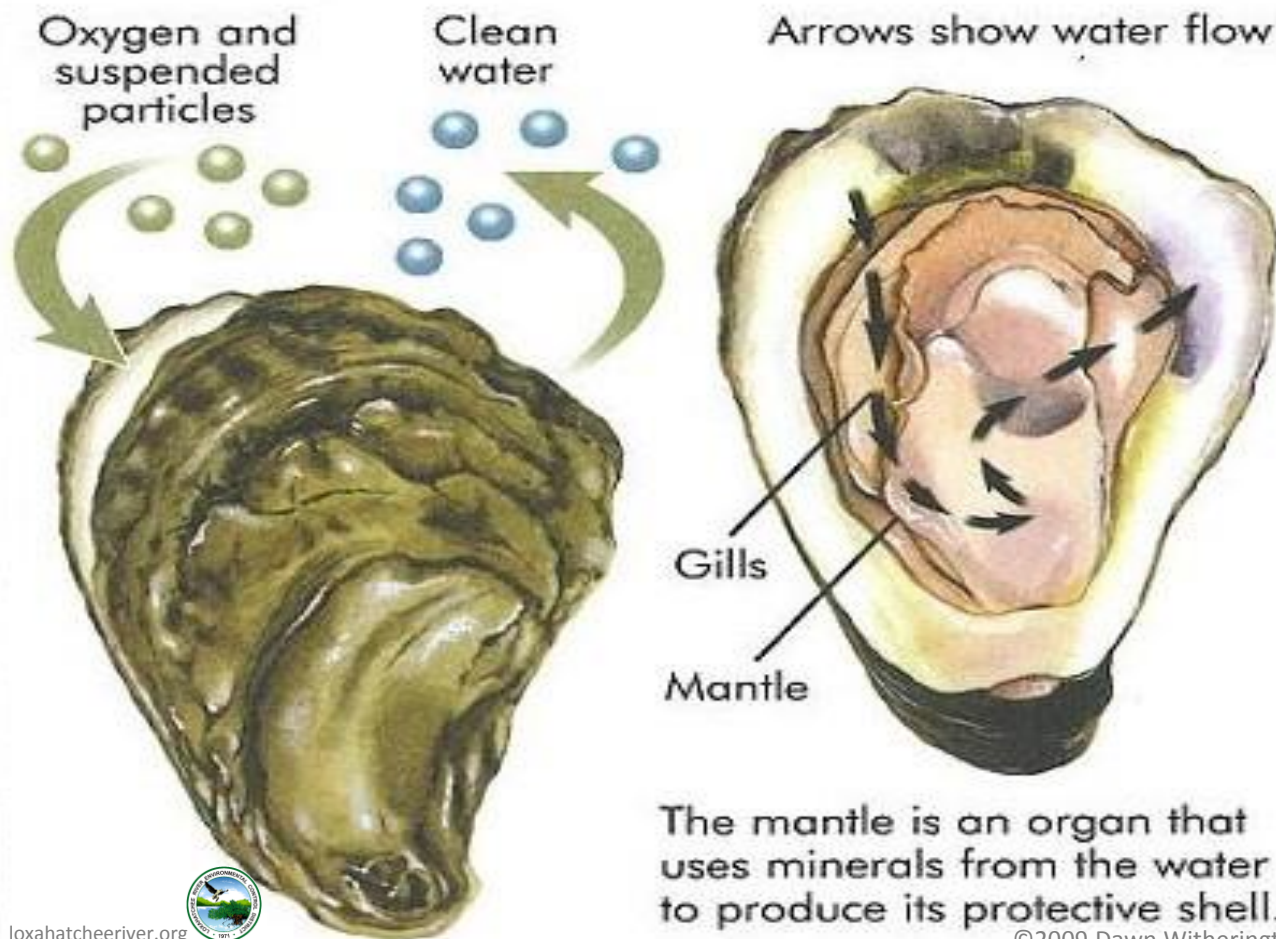
- Food
- Habitat
- Prevent Erosion
- Filter Feeding





# Filter Feeding

Oysters use their gills to absorb oxygen and strain food out of the water. One adult can strain plankton and organic matter out of the water at a rate of up to 50 gallons per day (or 1500 times its body volume). A healthy oyster reef contributes significantly to overall water clarity in the estuary.



One adult oyster can filter  
**2 gallons of water in 1 hour!**

That's 1500 x its body volume in one day!



For an average kid to drink  
1500 x your body volume  
you'd have to drink  
~ 15,789 gallons of water every day!

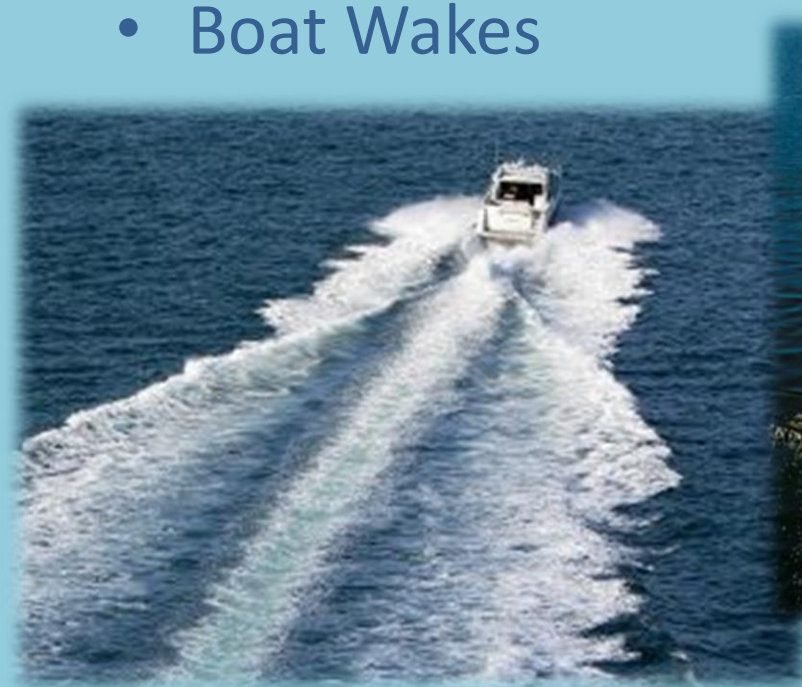
For an average adult it would be  
~ 35,526 gallons!!





# Oysters face a number of threats:

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





# Dead Margins in Mosquito Lagoon



**Boat wakes loosen sediments and dislodge oysters from the reef, pushing them towards the shore and forming large piles of dead oyster shell that extend out of the water.**



**Lots of Volunteer  
Manpower**



**OR**



**The Marginator**





Oyster mats help restore dead margins to productive oyster reefs.



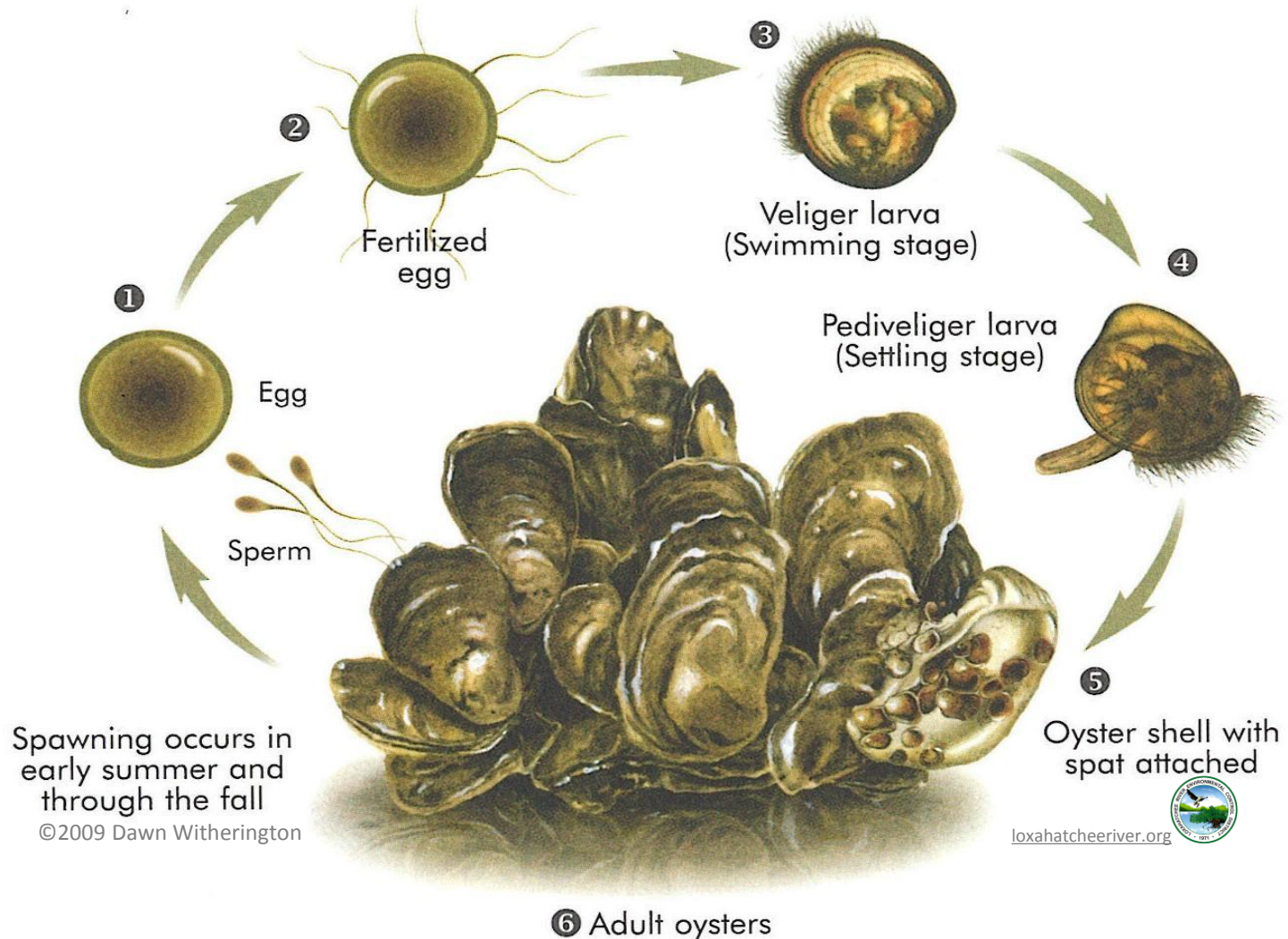
# OYSTER MAT DEPLOYMENT

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.





# Oyster Life Cycle





With the help of our partners and volunteers, 70 reefs have been restored in the Mosquito Lagoon!





# Oyster Reef Monitoring

Annual monitoring and data collection on each restored oyster reef tracks the progress of the restoration effort.



After 1 year in the water, 1 oyster mat can support the settlement of approximately 97 oyster spat.







## Volunteers Make it Possible!



So far our project  
has deployed over  
**38,000** mats into  
Mosquito Lagoon  
and hosted **over**  
**43,000** volunteers!



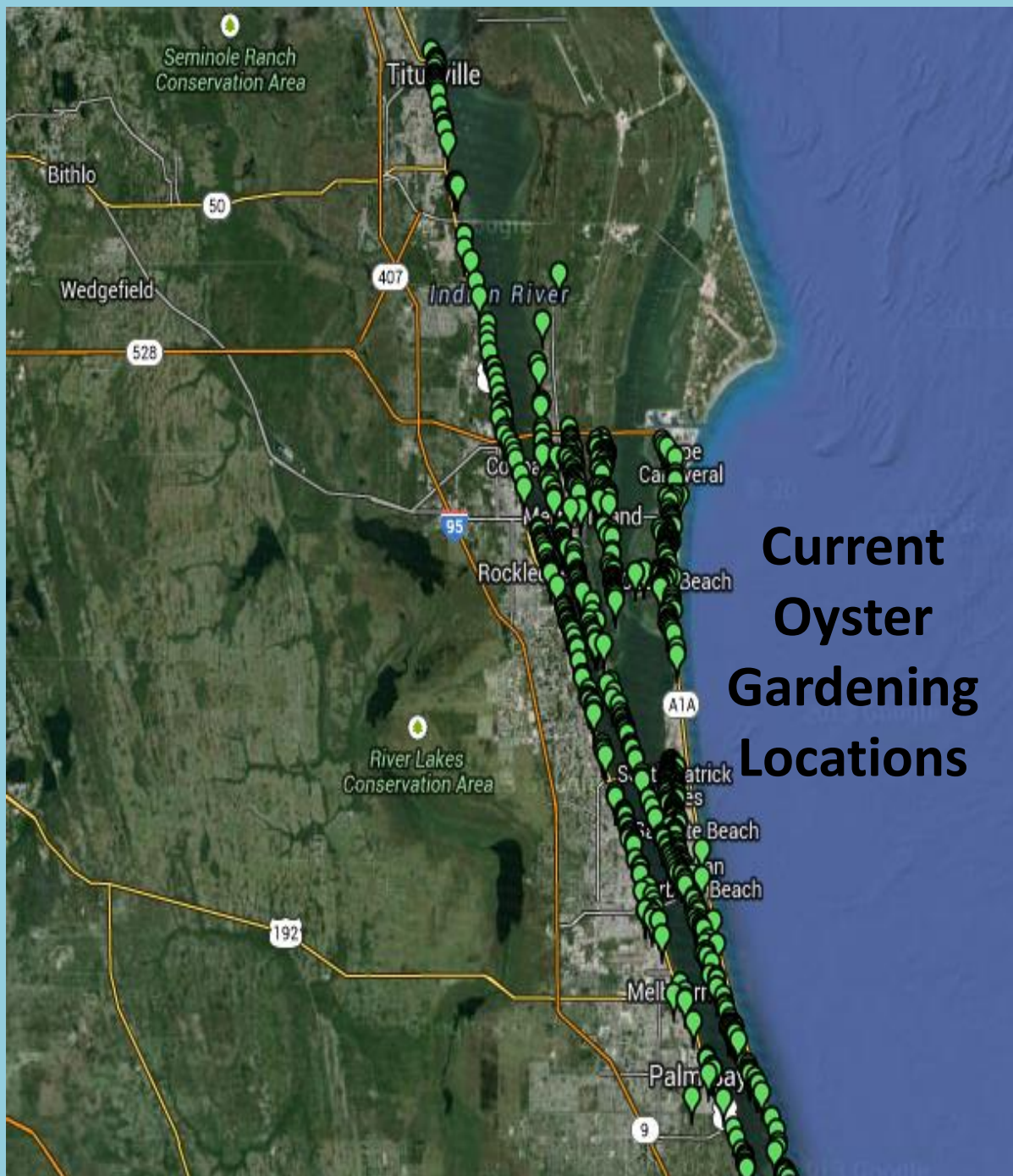


# Oyster Gardening Project

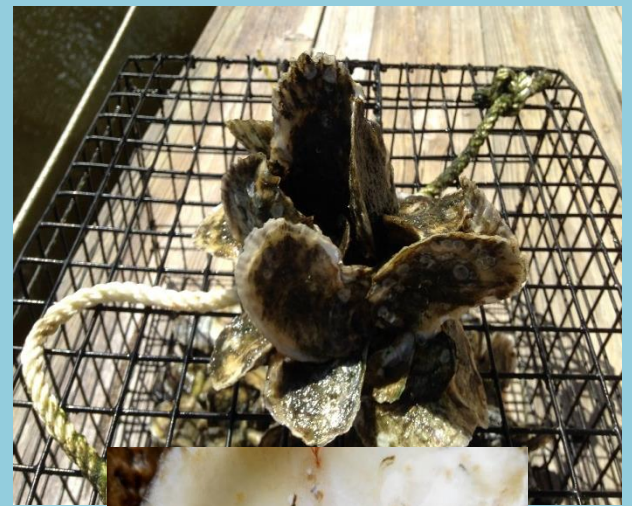
- **\$150,000** from Brevard County Commissioners
  - Partnered with Brevard County, UCF & numerous others
- **Community-based** restoration project
  - Over 800 Oyster Gardeners & 60+ Oyster Buddies
- Study **survivability and recruitment** of oysters
  - Oysters utilized for large-scale reef restoration
- **Three pilot reefs** constructed in Brevard County in 2014
  - Continue in 2015, study methodology for reef construction







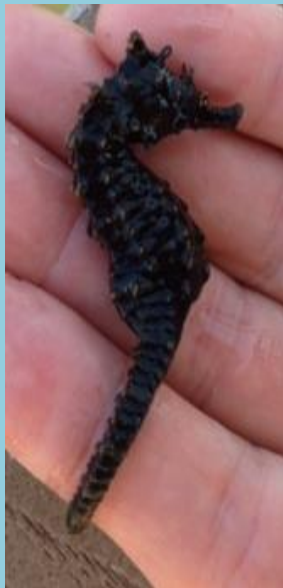
## Current Oyster Gardening Locations





# Becoming a Citizen Scientist

- **Two-hour training workshops for residents**
  - Importance of oysters in our lagoon
  - Procedures for monitoring & data collection
    - Build oyster habitats, given supplies & oysters
    - Suspend habitats from personal dock
- **Weekly Data Collection & Habitat Maintenance**
  - Monitor oyster growth & survival
  - Document biodiversity found in habitats
  - Online data input

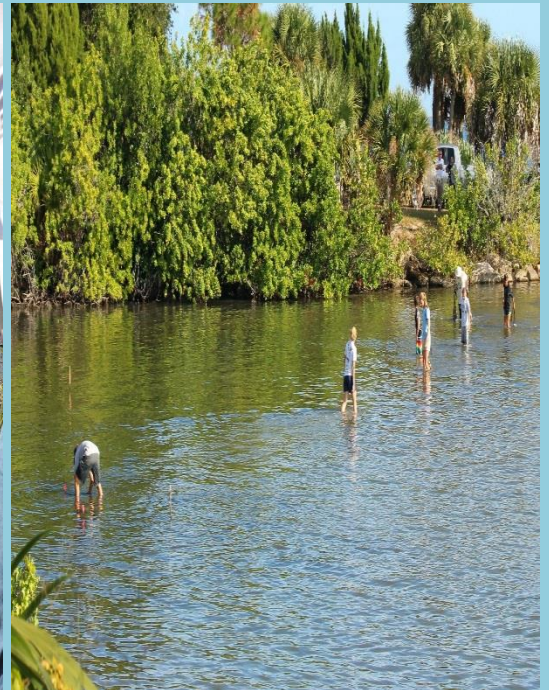




Oyster  
Collection

&

Reef  
Building





The mission of Brevard Zoo is  
Wildlife Conservation  
through Education and Participation.



For more information on how you can help contact  
Kate Brown at [KBrown@BrevardZoo.org](mailto:KBrown@BrevardZoo.org).

Thank you for your help in saving the  
oysters and saving the lagoon!

# How to Make an Oyster Restoration Mat

## Start

1 Thread a zip-tie through the hole in the oyster shell.

2 Loop the zip-tie around 1 square of mesh and tighten. You should hear a zipping noise. The shell will be on bottom of the mat and the closed zip-tie will be on the top.

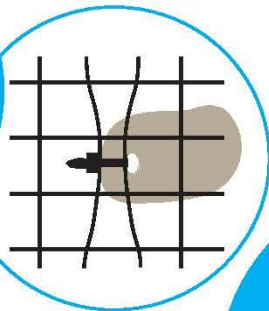
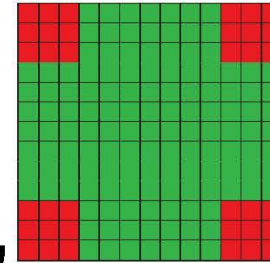
3 While tightening, make sure the oyster is as upright as possible. You can alternate tightening and adjusting the position of the shell to achieve this.

## Materials

36 drilled shells  
1 square of mesh  
1 bundle of 36 zip-ties  
Newspaper

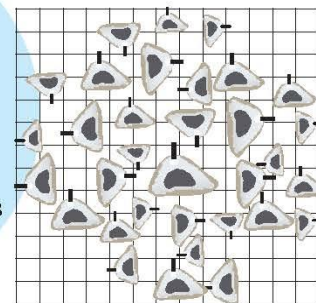
## The Setup

Oysters should be randomly spaced in the green area. The red area is off limits to enable us to attach mats to weights in the field.



Repeat the process with the remaining zip-ties in your bundle. Keep your bundle together so as not to lose any zip-ties. Make sure you cover all the green area on the mat.

5 Inspect your mat. Make sure there are 36 shells attached to the mat. Make sure all zip-ties are as tight as possible and attached correctly. You can do this by shaking the mat.



## Finished!

Recycle newspaper and the zip-tie ends that were cut off. Stack your completed mats in the designated area.

## Optional Step

If you are given permission, clip the end of each zip-tie as close to closure as possible. Scissors or clippers will be provided for this.

