





Indian River Lagoon: all organisms attached to live oysters



Laminated Guide

Postcard

Four Things You Can Do!

If you can no longer care for a pet, find someone who can. Remember, **DON'T LET IT LOOSE!**

Before leaving the water to head home, inspect your boat, trailer, equipment, clothing and buckets. Remove any plants and animals.

Learn to identify invasive plants, remove them from your yard and share your knowledge with neighbors.

DON'T PACK A PEST! When you travel out of Florida do not bring back fruit, vegetables, flowers, or nuts.

To learn more about invasive species visit:
Floridainvaders.org




The Problem

Why Invasive Species are a Threat



- Economic impacts of invasive species exceed 100 billion U.S. dollars each year. Costs include removal of plants and animals from ships, docks or pipes located in waterways.
- Invasive species compete with native species for space and food.
- We are currently assessing the impact these invaders have in the native ecosystem and on the native eastern oyster, *Crassostrea virginica*.

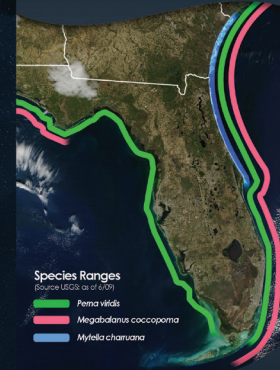
Funding sources:

UCF  Stands For Opportunity



What you can do to help

- Dr. Hoffman and Dr. Walters are studying the ecology, origin, and dispersal of these three invaders and are interested in receiving samples from as many locations as possible. If you find one of these species:
- Remove individuals from waterway and either set them out to dry or place them in ethyl alcohol.
 - Take accurate information on the location where they were collected.
 - Contact Dr. Hoffman or Dr. Walters.



Species Ranges
(Source: USGS as of 6/09)

- *Perna viridis*
- *Megabalanus coccopoma*
- *Mytilus charuana*

For more information please contact:

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Green Mussel

Guide to Recent Marine Coastal Invaders in the Southeastern United States



Charu Mussel



Pink Barnacle

Green Mussel: *Perna viridis*

Identification:

- May reach 1.5cm (3/4 in) in length
- Length of shell is 2 times the height of the shell
- Juveniles are a brilliant green
- Adults are dark green or brown



Fun Fact

In many parts of the world, people consider green mussels a delicacy!

Native Distribution:

Persian Gulf, Philippines, Sumatra, Borneo, Bali, Sulawesi

Invasion History in United States:

- First found in Tampa Bay, Florida, in 1999 with subsequent natural dispersal.
- Second introduction to northeast Florida in approximately 2002.
- Currently found throughout the southeastern U.S. including the Indian River Lagoon, FL.

Commonly Mistaken Species That may be confused with these invaders

Scorched mussel
Brachidontes spp. *



Hooked mussel
Ischadium recurvum *



Ribbed barnacle
Geukensia demissa *



Florida shiny spike
Elipha buckleyi *

Titan Acon (Pink) Barnacle: *Megabalanus coccopoma*

Identification:

- Up to 6 cm (3 in) in height and width
- Obvious pink exterior coloration

Fun Fact

Juvenile barnacles move in water currents for weeks before they permanently settle as adults.

Native Distribution:

Pacific coast of Americas from southern California to Ecuador



Invasion History in the United States:

- Currently found in the Gulf of Mexico and along southeastern U.S. coast from Florida to southern North Carolina.
- Indian River Lagoon distribution: first collected from Cape Canaveral area in 2006 (Brevard County). This species is currently found throughout the Indian River Lagoon system on hard substrates. It is established in Volusia County including New Smyrna Beach and Ponce de Leon Inlet.

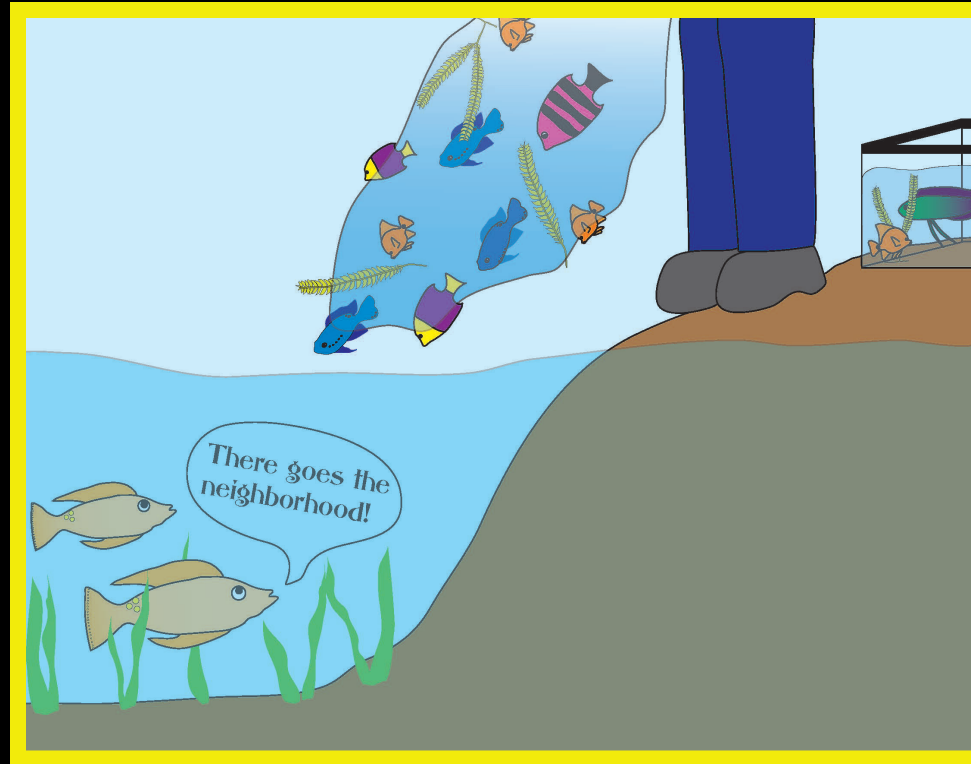


Ivory barnacle
Balanus crenatus



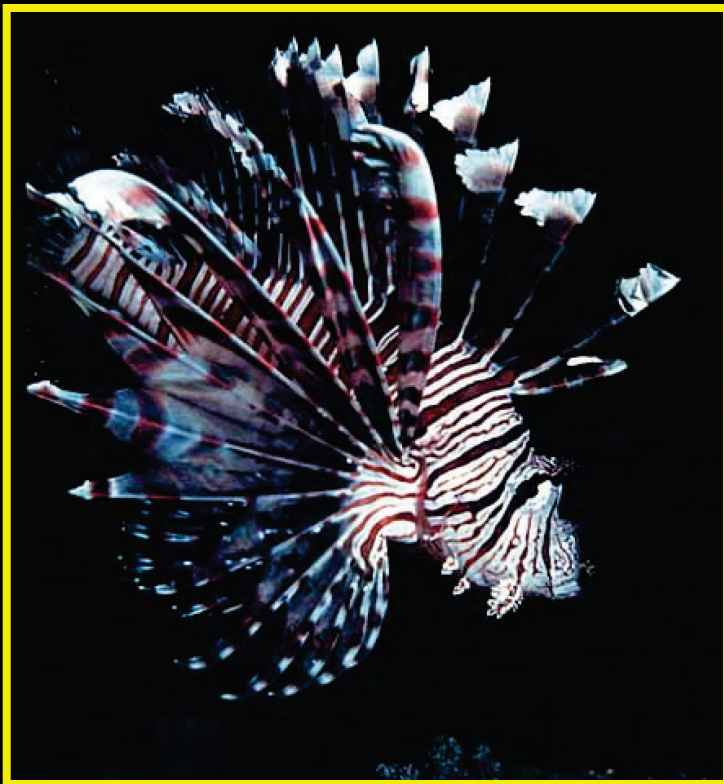
Purple striped barnacle
Balanus amphitrite

Aquarium Dumping



Invasive Species Associated with Aquarium Dumping

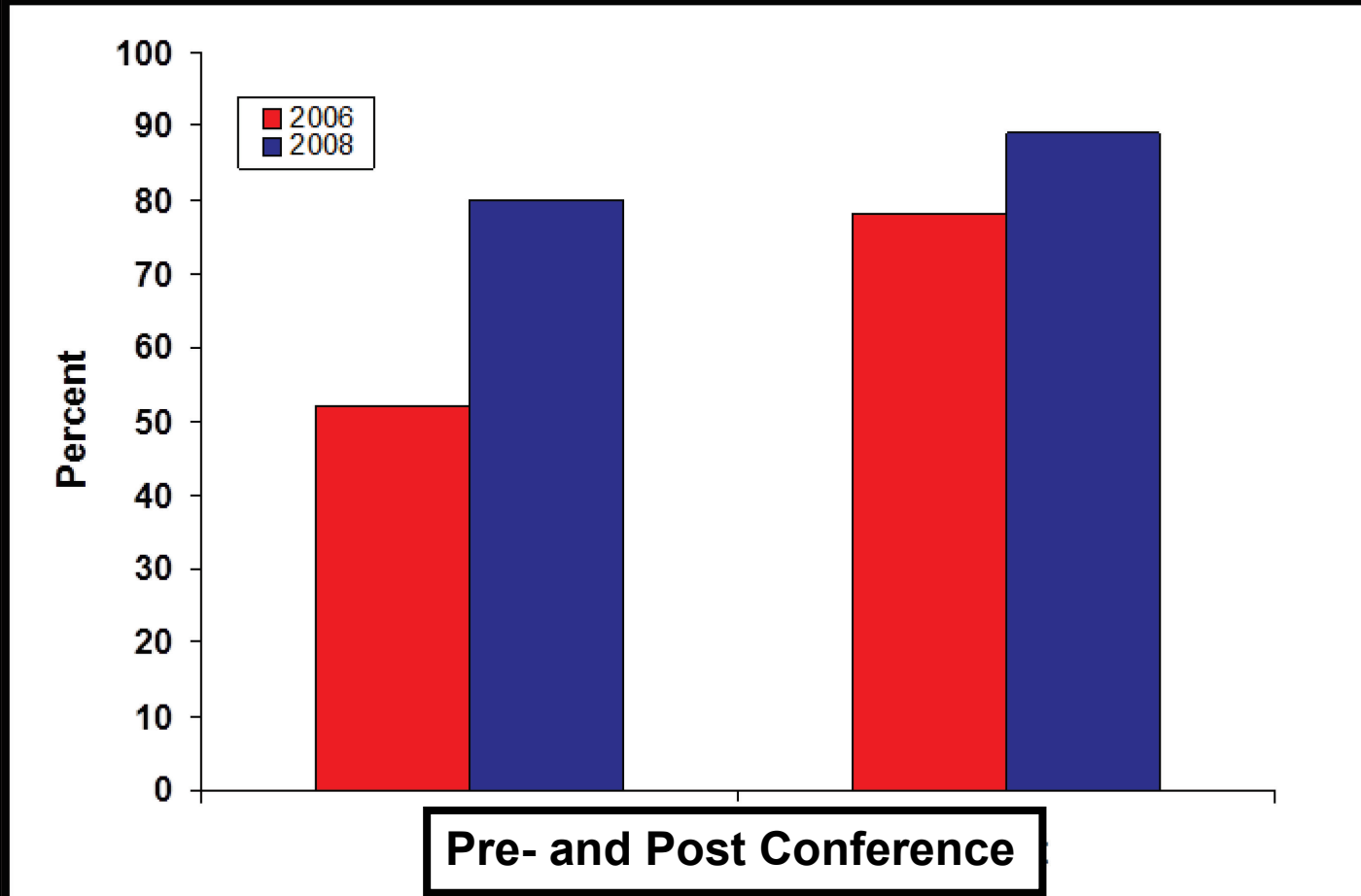
Pterois volitans



Caulerpa taxifolia

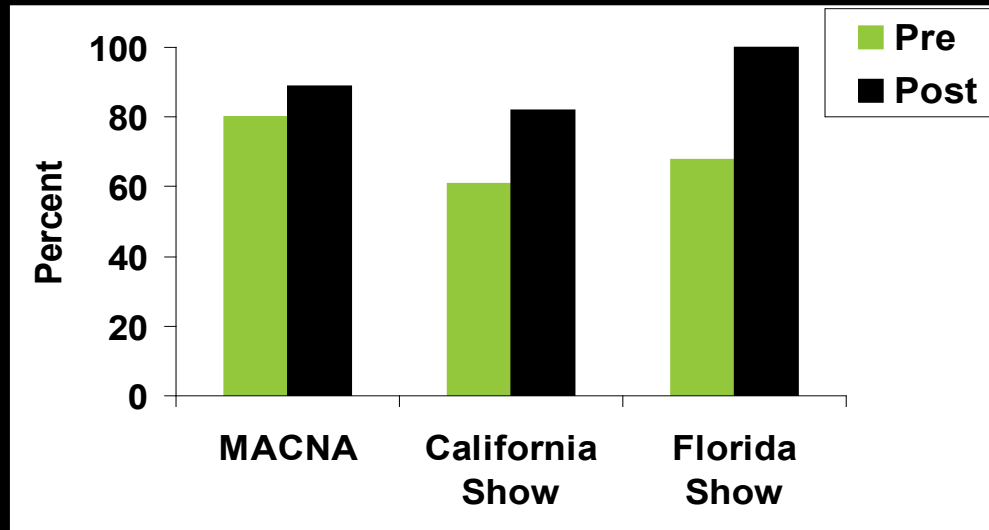


MACNA Participants: Percent with Good Understanding of the Problems with *Caulerpa taxifolia* and Aquarium Dumping



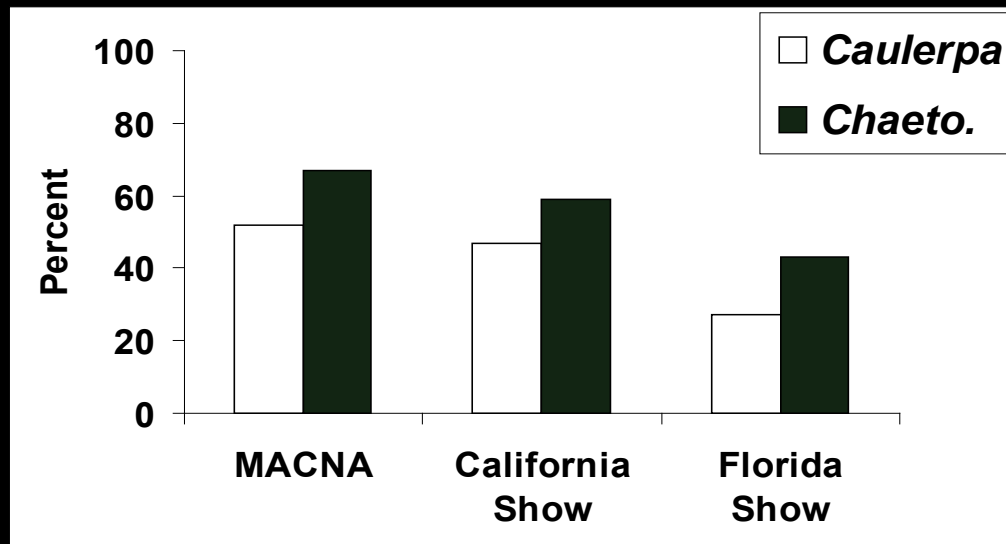
3 Hobbyist Conventions (2008-2010)

Good understanding of problems with aquarium dumping



Do you have *Caulerpa/Chaetomorpha* in your tanks at home?

Caulerpa taxifolia



Chaetomorpha sp.



Got Chaeto?

Please be careful!

The green alga *Chaetomorpha* is commonly called Chaeto, brillo pad algae, wire algae and spaghetti algae.

A variety of species of *Chaeto*, including *Chaetomorpha linum* and *Chaetomorpha crassa*, are commonly sold to aquarium hobbyists.

Chaeto is used for nutrient scrubbing in tanks and refugia.

Chaeto purchases frequently contain many "hitchhiker" species, including non-native invertebrates and invasive seaweeds.

Scientists are concerned that any release of chaeto in coastal waters could be as devastating as the global invasions of the feather alga *Caulerpa taxifolia*.

Fragments of *Chaeto* less than 1 mm in length can survive and continue growing!

Please Help Prevent Further Invasions! Dispose of all unwanted aquarium plants, including the smallest fragments of *Chaetomorpha*, by placing them in a sealed plastic bag in the freezer for 24 hours and then placing the bag in a trash can. Water that may contain *Chaetomorpha* fragments should be strained and any fragments bagged, frozen and placed in the trash. Thanks!

Questions? Please contact:

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For more information on invasive seaweeds, please go to:
<http://www.usc.edu/org/seagrant/caulerpa/index.html>

Outreach Products: “Alternatives to Release” Brochure



Give to a responsible aquarium or pet store.



Freeze *Caulerpa* for a minimum of 24 hours.

DON'T RELEASE A PEST

Freezing is Best!

BE A RESPONSIBLE AQUARIUM HOBBYIST!

LOOK INSIDE FOR: ALTERNATIVES TO DUMPING

AQUARIUM PLANTS AND PETS



DUMPING AQUARIUM PLANTS AND PETS IS

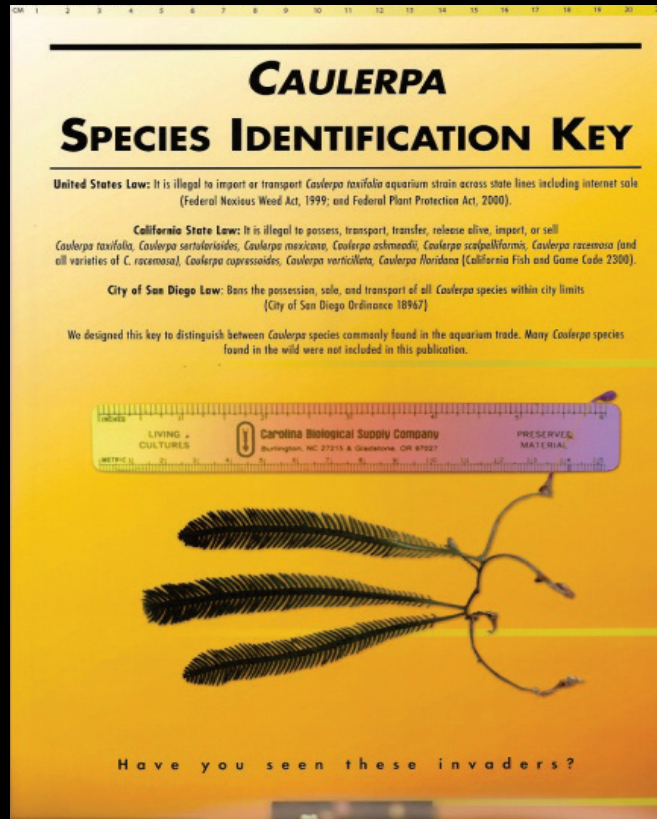
ENDANGERING MARINE ECOSYSTEMS

YOU CAN HELP PREVENT FUTURE PROBLEMS

FOR MORE INFORMATION AND TO DOWNLOAD A COPY OF THIS BROCHURE GO TO:

<http://www.usc.edu/org/seagrant/AquatNuisance.html>

Identification Keys for Aquarists, Inspectors & Enforcers



Based on morphological characteristics

Species commonly confused with *Caulerpa*



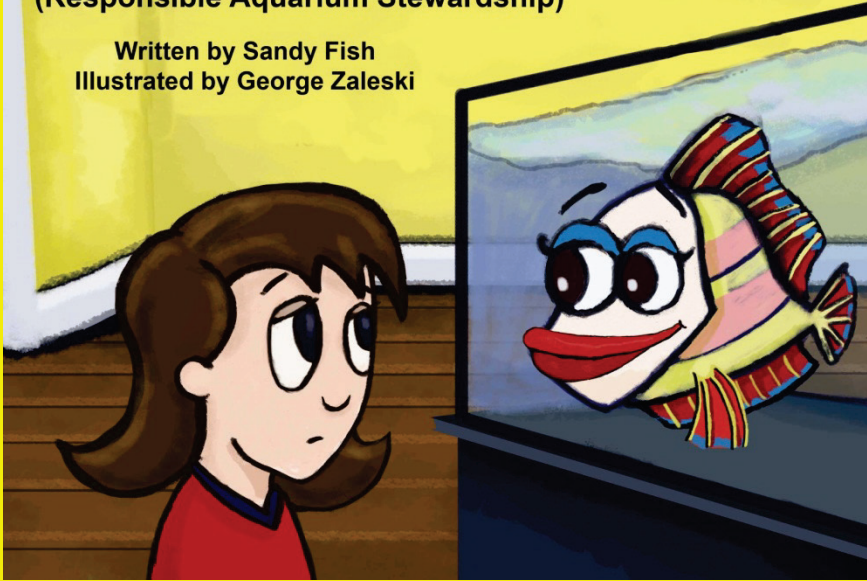
Animated Video and Public Service Announcement



Invited to 12 film festivals (3 awards!)

A New Home for an Old Friend
(Responsible Aquarium Stewardship)

Written by Sandy Fish
Illustrated by George Zaleski



FISH INVADERS AT GYPSY POINT:
Katie and George Learn About Alternatives to Aquarium Dumping

By: Suzie Fish



Children's Books

Created at Educator's Workshop
in Florida Keys

Both independently evaluated by
scientists & children

Pre-K Book: Survey Results

(pre-K: n = 37; 2nd grade: n = 51)

1) Did you like the book?

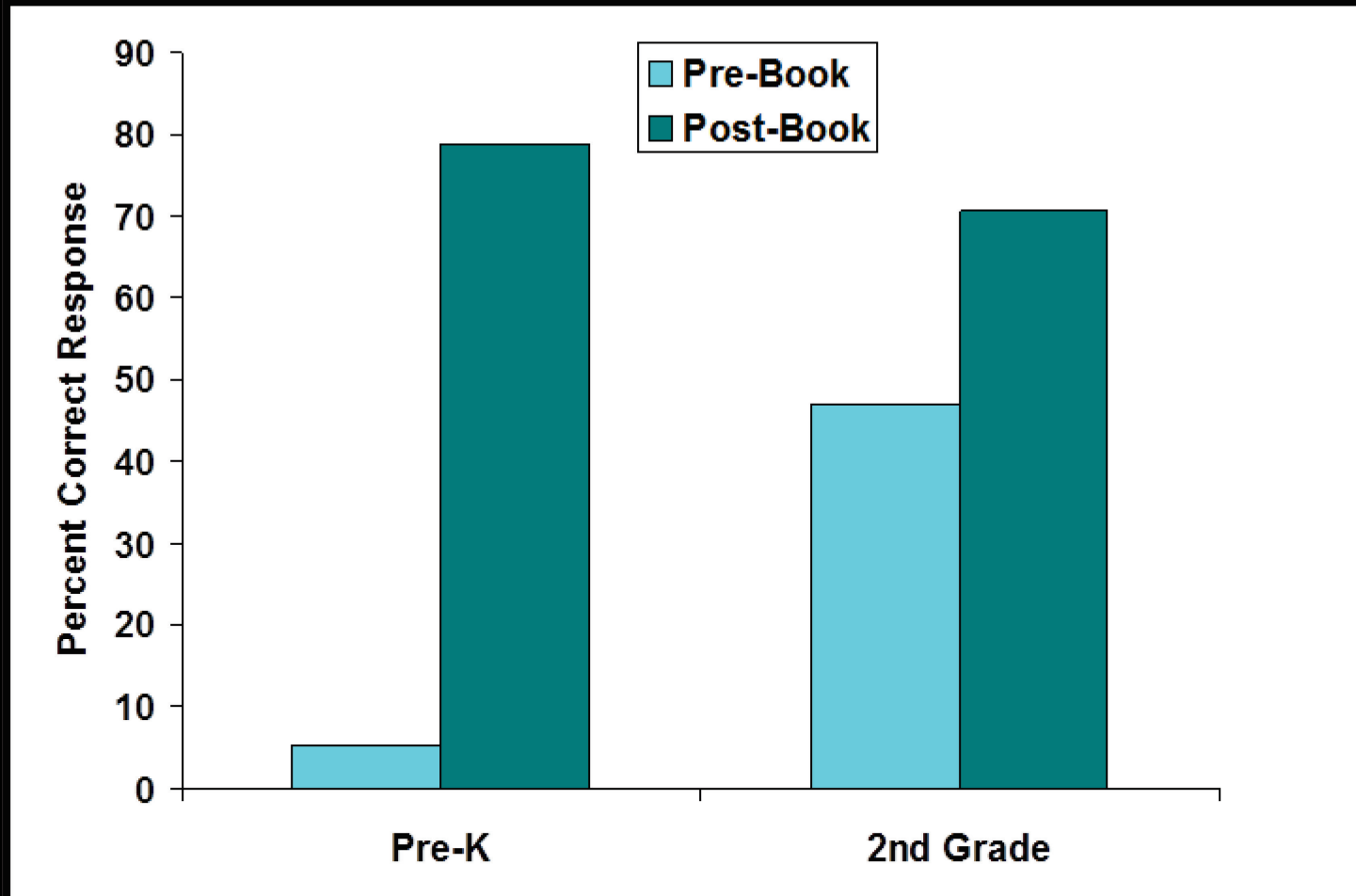
Pre-K: 100%, 2nd grade: 91%

2) Do you want to read the book again?

Pre-K: 97%, 2nd grade: 77%

3) When someone moves and can't take care of their aquarium tank any longer, what should they do?

When someone moves and can't take care of their aquarium tank any longer, what should they do?



FISH INVADERS AT GYPSY POINT:

Katie and George Learn About Alternatives to Aquarium Dumping



Authors: G. Nimnualrat, A.M. Wotkyns & G. Zaleski
Illustrator: G. Zaleski

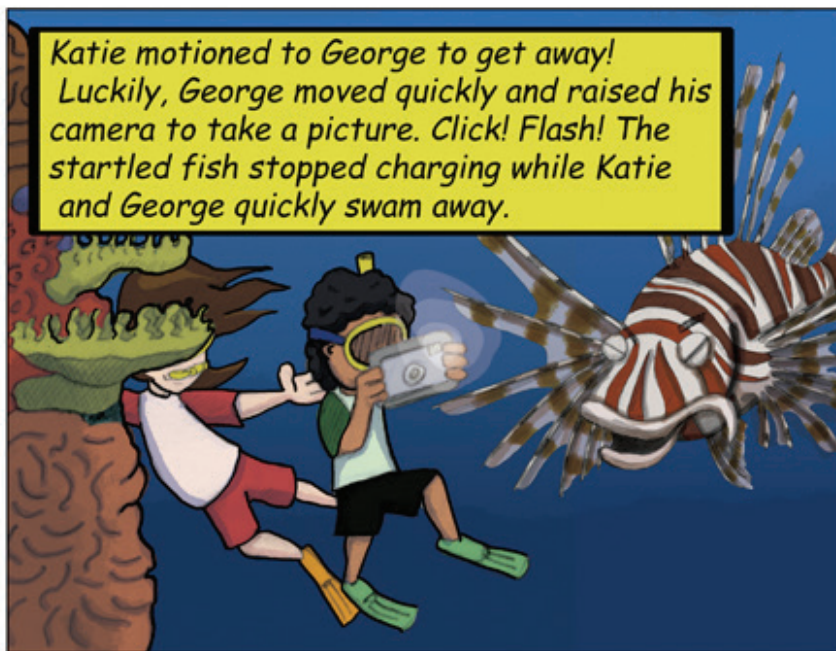
Soon they saw three large, ornate fish hanging around a massive coral head. The fish stood out with their vivid red and white vertical stripes, and long spines on their dorsal and pectoral fins.



As Katie and George got closer, one fish turned toward them, flared its fins, pointed its spines and began to charge.



Katie motioned to George to get away! Luckily, George moved quickly and raised his camera to take a picture. Click! Flash! The startled fish stopped charging while Katie and George quickly swam away.



The red lionfish's scientific name is *Pterois volitans*. Scientists think this species was introduced by aquarium dumping, which means that people have intentionally or accidentally released their pets into coastal waters.



PTEROIS VOLITANS
08241992 FEMALE



Do you mean people are doing this on purpose?



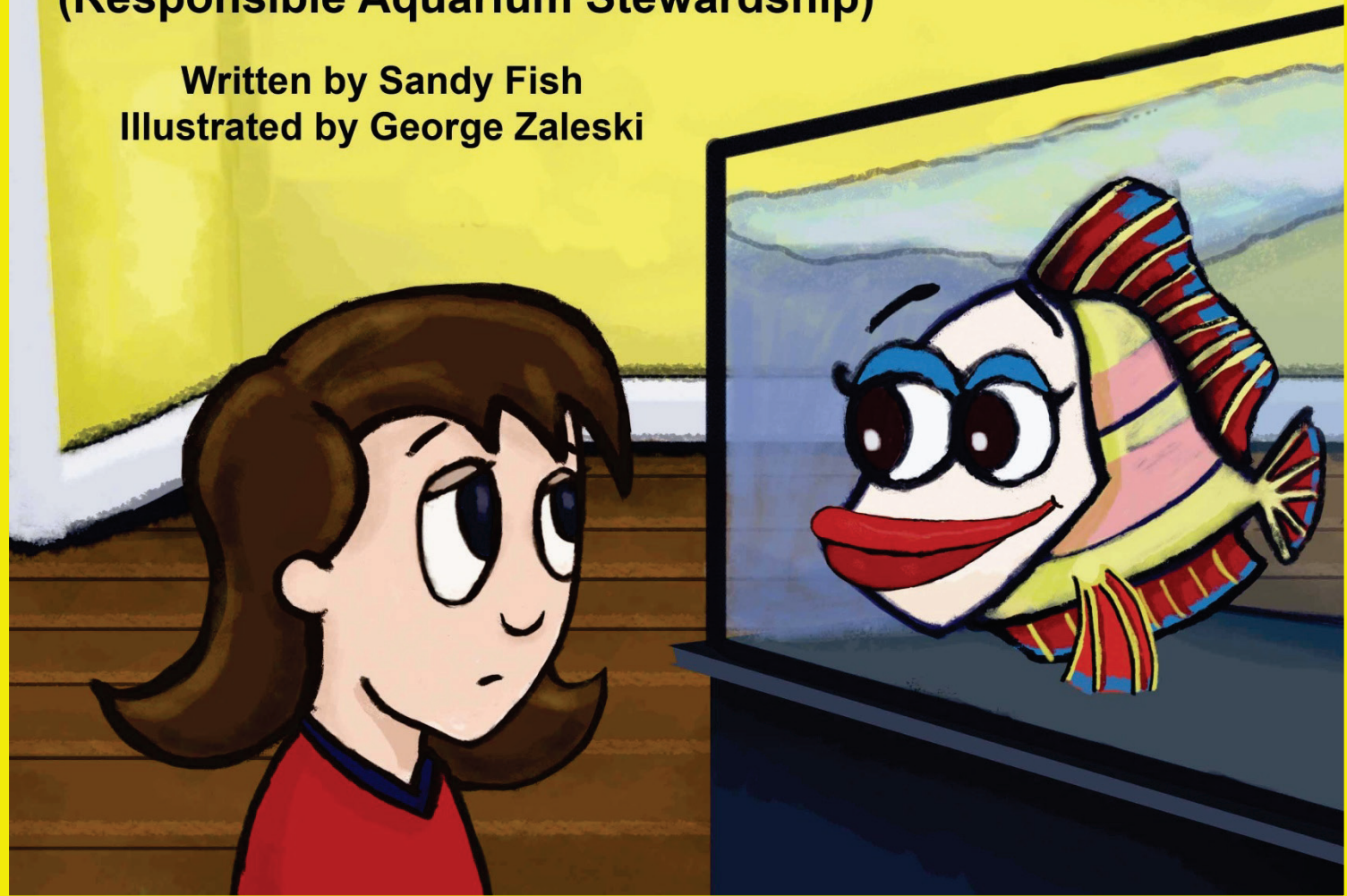
That's correct. People think they are doing their pet a favor, but this practice is harmful because it threatens the natural environment and all the other species that live there. An invasive species, like the lionfish, eat the food and take up the space that native species need. All organisms have their place in the environment and when an invasive species enters the system it can change everything.

Alternatives to Aquarium Dumping



A New Home for an Old Friend **(Responsible Aquarium Stewardship)**

Written by Sandy Fish
Illustrated by George Zaleski



Authors: *Suzie Caffery & Diahn Escue*

Moving day is here,
we hurry and we scurry,
to get all things done,
our vision is now blurry.

We're busy and we're dizzy,
but there's something we forgot!
It's our aquarium!
It really weighs a lot!



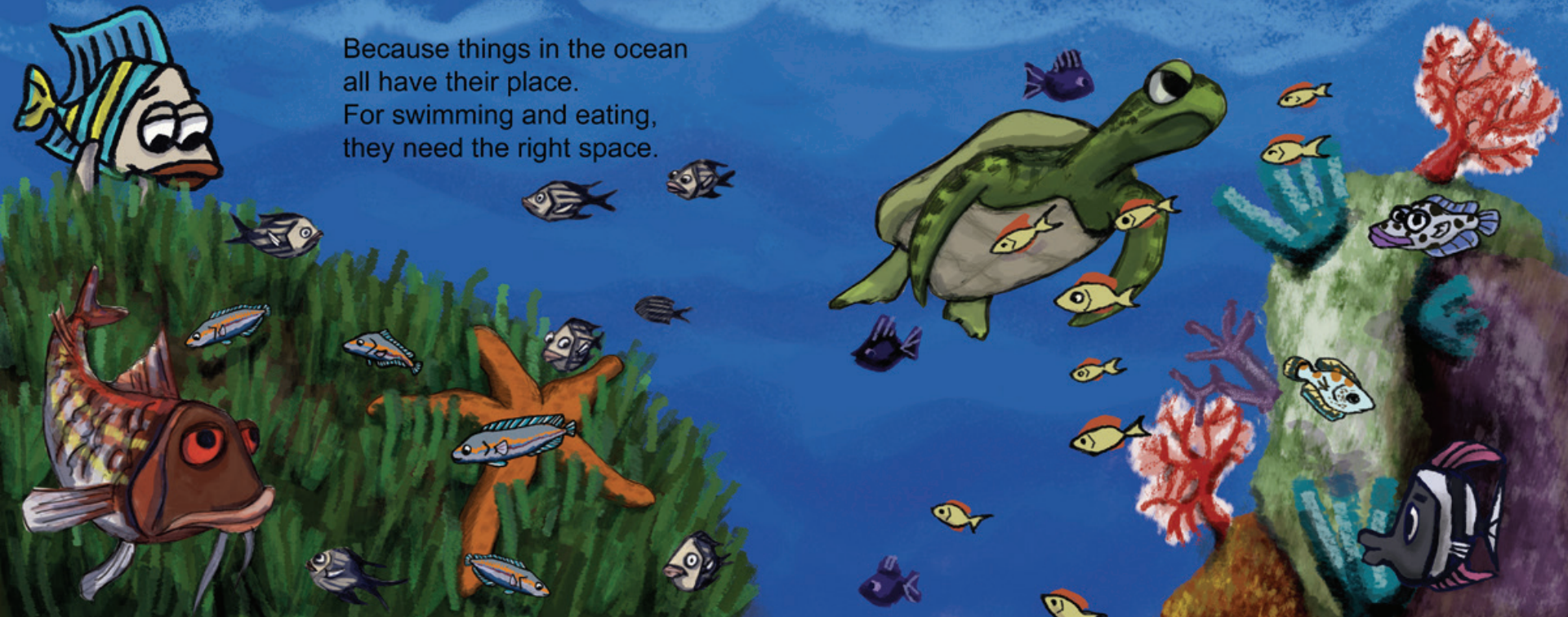
We can't move this!
Who knows what to do?
Let's stop just a minute.
We must think this through.



How do we move it?
Where does it go?
Do we dump it in the ocean?
That's a big No! No!



Because things in the ocean
all have their place.
For swimming and eating,
they need the right space.

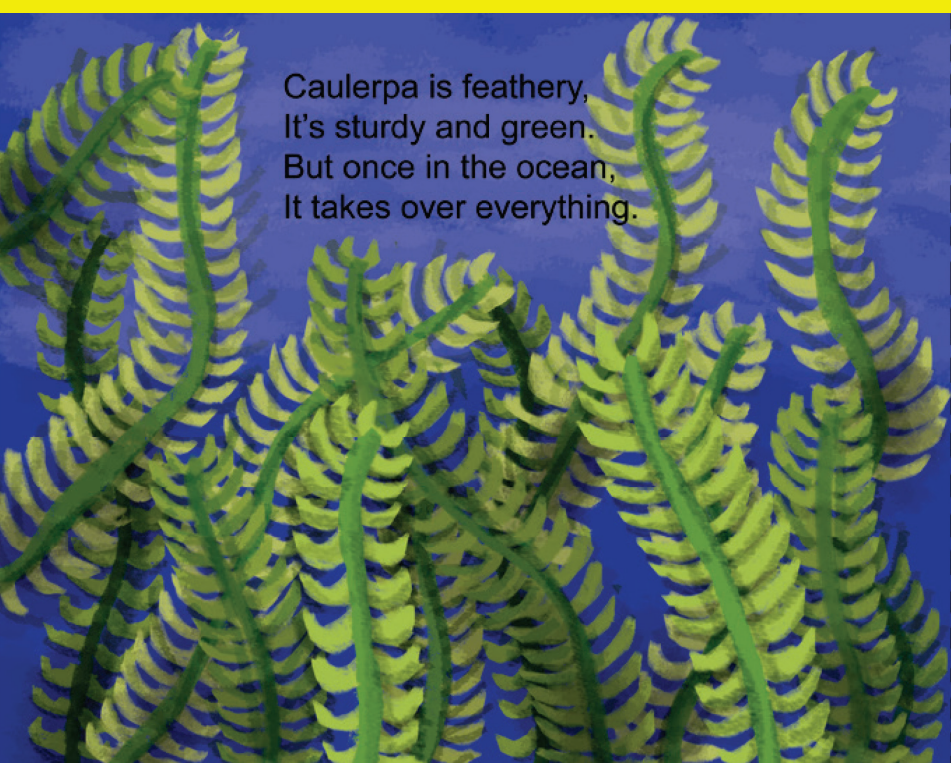


Oh the mistakes,
The mistakes that were made.
When Caulerpa and Spiky Lionfish,
Began to invade.




There once were some people,
Who really didn't think,
That dumping their aquarium,
Would cause such a stink!





Caulerpa is feathery,
It's sturdy and green.
But once in the ocean,
It takes over everything.

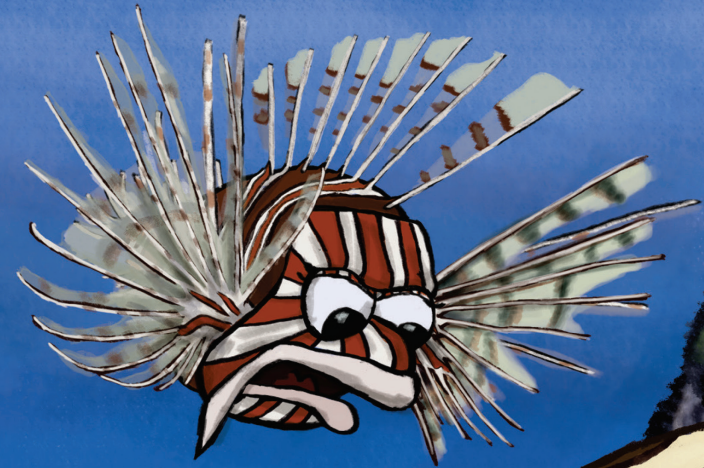


At first it looked so pretty,
How could it be so bad?
But the fish couldn't eat it!
It made them all so sad.

In our home aquarium,
Lionfish was small.
But once in the ocean,
He grew most of all.



The Spiky Lionfish,
Who was so far from his home.
Went swimming and searching,
For a place of his own.



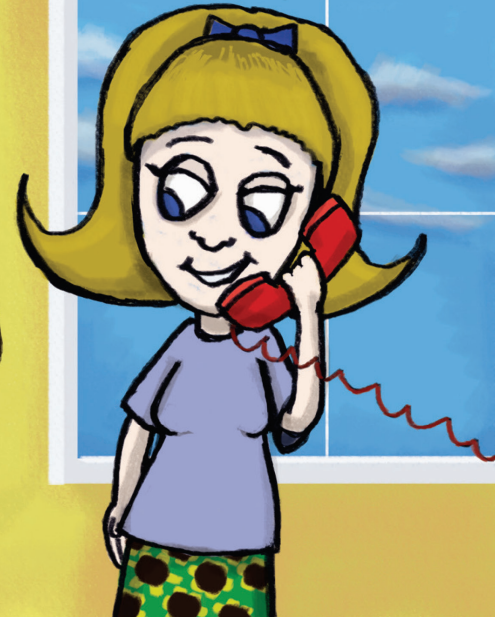
He went looking for dinner,
But, that Lionfish was rude!
That bully told the grouper,
"Get out of here Dude"!



Now the problem still remains,
To find a home for our friends.
I feel so confused,
Will this never end?



Thank goodness our Mother,
Who knew just what to do.
In no time at all,
Made a phone call or two.



We called our local pet shop,
And talked to Mr. Hank.
To see if he would take,
All the things in our tank.

We would take your fish,
But now we have too many.
Give your fish to a friend,
Who doesn't have any.



So, we gave our fish to a friend,
Which made him very happy.
There's a lot more to do,
So let's make it snappy!



For 24 hours,
Put plants in the freezer.
Then throw them away,
It can't be any easier.



Now strain the water,
Never pour down a storm drain!
Dump the water in the toilet,
Protect our food chain.



Friends we leave behind,
New friends we will make.
But we'll never the forget,
The friends we can't take!



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