



# KINGS BAY RESTORATION PROJECT

KingsBayRestorationProject.com  
A project by Save Crystal River, Inc.



2019

Annual Report

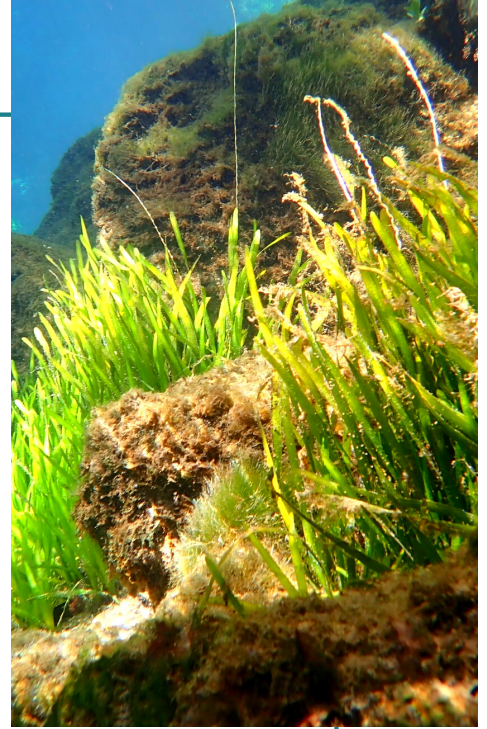
**Remove. Restore. Prevent.**





# WHO IS SAVE CRYSTAL RIVER

After decades of decline it was time to restore the ecosystem to the clear, picturesque setting, with fish, grasses and wildlife, that it had been before. Not an easy undertaking and it became clear that this restoration was going to take a significantly larger effort. Residents and businesses joined forces, and Save Crystal River Inc. was founded as a Florida 501(c)(3) not-for-profit. They set their sights on restoring the bay and its estuaries, and preserving this paradise for generations to come. Word soon spread of Save Crystal River's mission and Carter Henne, President of Sea and Shoreline, contacted Save Crystal River about helping in the restoration efforts. It quickly became clear that his expertise in growing and planting eelgrass was just what our project needed and the Kings Bay Restoration Project was born.



## THE KINGS BAY RESTORATION PROJECT

Save Crystal River began its pilot project of Kings Bay restoration in 2015. This phase of the project opened up 74 new and previously unidentified spring vents, removed 10,230 tons of Lyngbya and other detrital material. Upon monitoring the eelgrass showed a 97% survival rate, compared to a global survival rate of only 50%. These successful results fueled Save Crystal River's determination and inspired incredible support from state and local officials.

Now in our 5th year of restoration, the Kings Bay Restoration Project has removed nearly 50,000 cubic yards of Lyngbya, opened over 300 springs vents, and planted over 110,000 native "Rock star" eelgrass plants.





# THE KINGS BAY RESTORATION PROJECT

## Mission & Goals

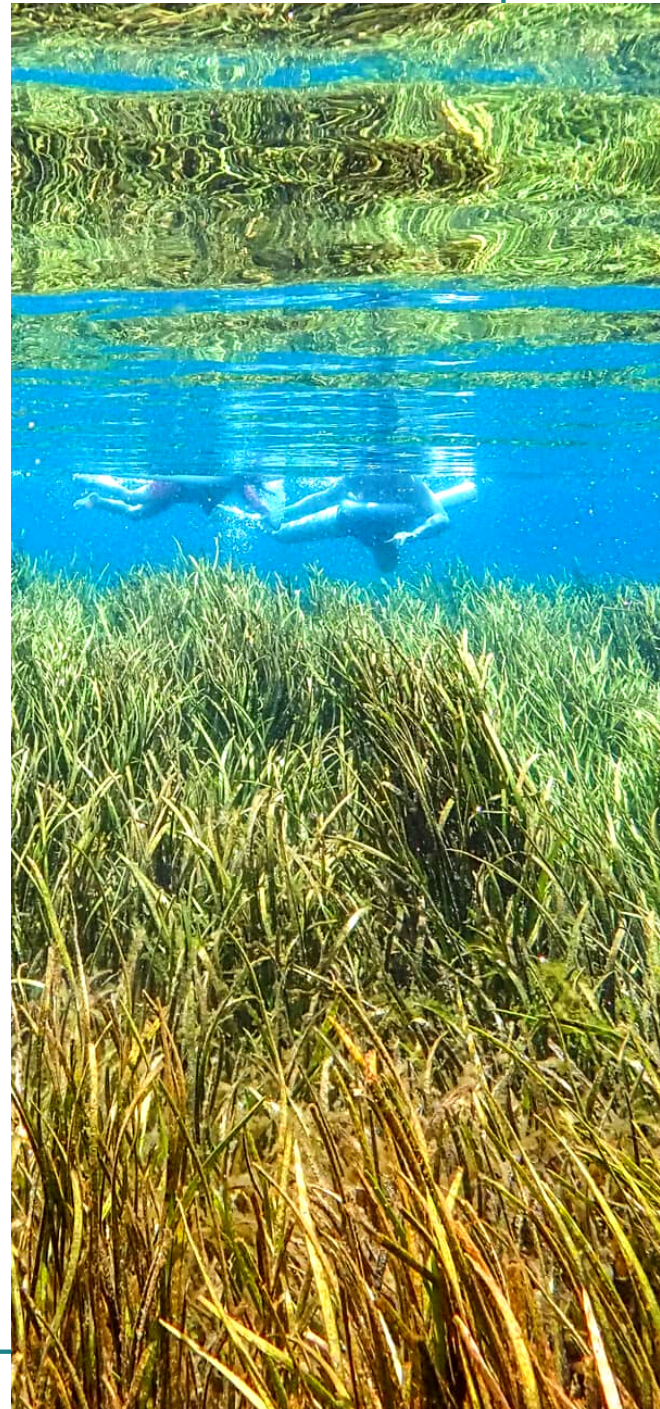
The Kings Bay Restoration Project was created by Save Crystal River with a goal to restore over 92 acres of King's Bay, a fresh water inland bay in Citrus County, FL. King's Bay, fed by the Floridian Aquafer, is a vital spring-shed.

As of November 2019, over \$17 Million has been invested to restore our damaged ecosystem.

With over 24 acres complete, the Kings Bay Restoration Project has set it's sights on completely restoring the 92 acres that make up King's Bay. The deadline? Crystal River's Centennial birthday on July 2, 2023.



Seagrass meadows are believed to be the third-most valuable ecosystem in the world after estuaries and wetlands. About 2½ acres of seagrass (roughly the size of two football fields) provides habitat, erosion control, and other benefits with an estimated value of nearly \$29,000 a year.







## WHAT HAPPENED TO KINGS BAY?

Kings Bay, along with many of Florida's waterways, is no stranger to aggressive and/or invasive species. In the 90's, *Hydrilla* was a cause for much concern as it began choking out the native plants in the Bay. A mixture of man-made and natural activity killed off this unwanted plant. Unfortunately as the *Hydrilla* died it fell to the bottom and decayed killing our native grasses, creating a low oxygen environment, and leaving the perfect condition for the aggressive blue-green algae, known as *Lyngbya*, we now see smothering our bay

**LYNGBYA** may not be a name you recognize, but if you swim, boat, or watch manatees in Kings Bay then you have seen it. *Lyngbya* looks and feels like dark, slimy, strands of hair that seem to grow from canal bottoms and get tangled in long, floating mats. Unlike *Hydrilla*, *Lyngbya* is in-fact native to our area but the conditions created by the decaying *Hydrilla* left the perfect breeding ground for this aggressive algae to take control in our once beautiful waterways.





# THE REMOVAL PROCESS

The first step is removing the Lyngbya through specially designed vacuum equipment that doesn't disturb the existing sand and sediment. The suctioned material is pumped through vacuum tubes into a mechanical separator located on shore at our dewatering site.

The water is further filtered through a bag system then is returned to the canal. This approach removes 50%+ nitrogen and 95% phosphorus from the water. The clean water is returned to the ecosystem.

This systematic filtration approach is important because it removes a nutrient source for the Lyngbya. Thus increasing the competitive advantage for the newly planted eelgrass plants. The organic material is transported to an offsite farm where it will be used for fertilizer and soil enrichment.



95%

Phosphates Removed

50%

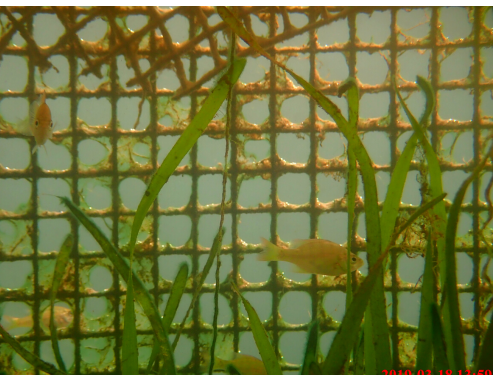
Nitrogen Removed





# EELGRASS EFFECT

Once the Lyngbya and dead detrital material is vacuumed from the bottom of a restoration area, a native variety of eelgrass called 'Rock Star' is planted in the newly cleaned sand.

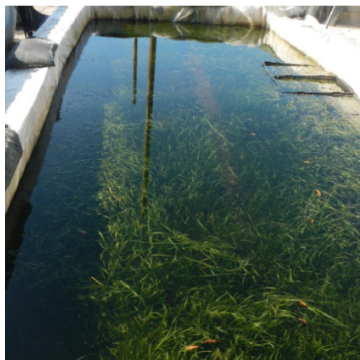


The Rock Star eelgrass is planted in small groups and covered by Grow SAV (*Submerged Aquatic Vegetation*) Exclusion Devices for up to one year. This protects the new plants from potential anchor damage, or aquatic herbivores that may uproot the eelgrass before the roots become established.

Once established, each Rock Star eelgrass plant can grow up to 7 feet in any direction with the roots intertwining to secure itself into the soil.

## WHERE THE EELGRASS GROWS

Before the eelgrass plants take the dive into their new home they are cultivated by our contractor, Sea & Shoreline, in their nursery. This is a crucial step in ensuring our eelgrass plants are acclimated and prepared to thrive in our beautiful and unique environment.



### Fun Fact!

The grass photographed to the right is located in the main Hunter Springs Canal. No grass was manually planted in this canal. It is flourishing due to natural growth and spreading





# EELGRASS EFFECT

Once the planted eelgrass begins to flourish, the habitat begins to change.

Eelgrass produces large quantities of oxygen into the water which creates the perfect conditions for aquatic animals. It also provides food and shelter for thousands of aquatic organisms, thus building a thriving food chain. Restored areas are seeing an observable increase in wildlife including Striped mullet, bluegill, Atlantic needlefish, spotted sunfish, snook, blue crab, crayfish, and Florida softshell turtles.

Oxygenated water also inhibits Lyngbya growth and outcompetes the aggressive algae for nutrients in the water. This not only scales back the lyngbya significantly but also removes nitrogen and phosphorus from our waterways, improving our water quality.

The Kings Bay Restoration Project reduces nutrient runoff pressure on St. Martins Marsh, the National Wildlife Refuge, and the Outstanding Florida Waterway by improving water quality upstream.

**While in the grow nurse, the maturing eelgrass plants require certain maintenance. This maintenance, much like terrestrial grass, includes mowing!**



**Seagrass filters water when it captures and traps suspended sediments out of the water column**



## Fun Fact!

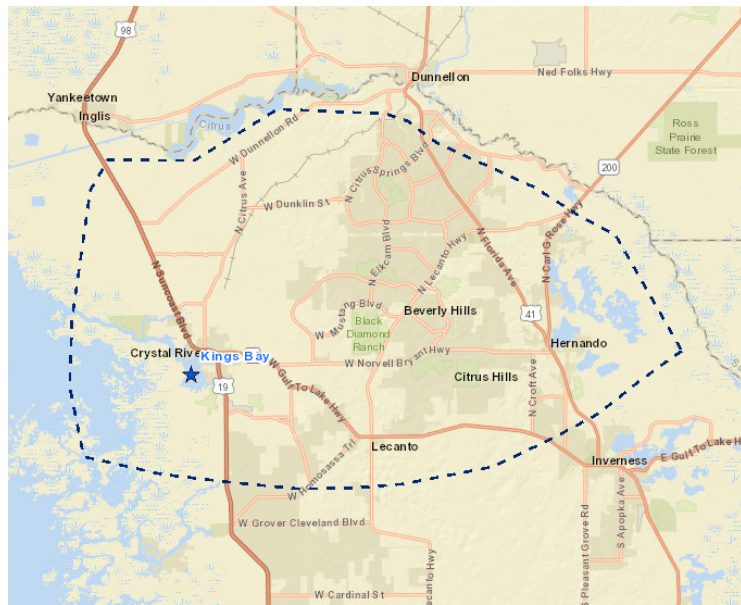
One acre of seagrass can absorb 3,500 miles worth of carbon emitted by a car each year.



# WHEN IT RAINS IT POURS

Rain is no stranger to Florida. What may be a surprise, however, is the effect storm runoff is having on our waterways. A springshed is the surrounding land areas and underground flows of water that contribute to our springs, sometimes extending hundreds of square miles across multiple counties. As water in the springshed makes its way toward the springs it picks up pollutants and degrades the quality of our aquifer.

Even if you don't live directly on the waterways storm water runoff from your area can still find its way to the Bay. Pollutants like fertilizer, vehicle fluids, improper waste disposal, etc. can all find their way into our waterway. What have you put into the Bay lately?



High pollutant levels, such as nitrogen and phosphorus, cause algae blooms including Lyngbya in the Bay. About 15% of nitrate loading into Kings Bay is attributed to urban fertilizer.



## You can make a difference



Storm Water runoff from both front and back yards will eventually end up in the waterways. Treat both lawns the same.



Don't fertilize your lawns. Look in to Florida Friendly landscaping. If fertilizer is used make sure they are slow release.



Pick up pet waste from both back and front yards. This waste contributes to algae blooms.



Eliminate pesticides, leaking fuel or motor oil, and any other chemical contaminate that can be picked up by storm water runoff.



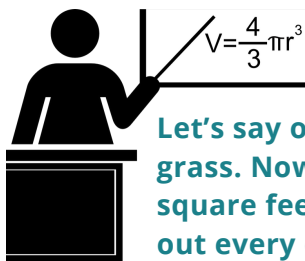
# MINDING YOUR BOTTOM

Let's say you've just reached your favorite fishing spot for the day. It's beautiful and sunny and you just know you're coming home with dinner. You park your boat over a nice meadow of eelgrass where you can see all the small fish just swimming around. You toss your anchor over and get to work.

That's how simple it is to damage the bottom. When you pull that anchor up it will be covered in plants. You've probably never given it much thought, just simply dunked it off a few times then went on your way. But think about how many boats you saw out on the water that morning. Now think about how many boats are on the water every day of the year. That's a lot of anchors.

We are loving our favorite spots to death. Anchor and prop scars can take up to 10 years to self-repair, if they ever repair at all.

Take a few extra minutes and find a sandy spot to place your anchor in or use a hydraulic shallow water anchor.



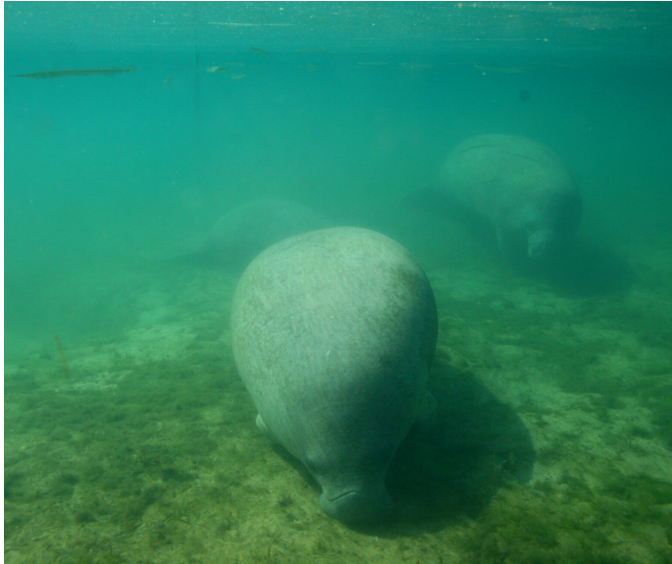
## Let's do some math!

Let's say one anchor pulls up about one square foot of grass. Now if that boat moved 5 times it would pull up 5 square feet of grass in total. Now let's say that boat goes out every day for 30 days and moves 5 times a day. That equals 150 square feet of eelgrass destroyed. If 290 boats did that (move 5 times a day multiplied by 30 days) it would destroy an acre of eelgrass every month!



# THE SEASONAL CIRCLE

One question seems to come up pretty frequently during certain times of the year. “I had so much grass last year! Now it’s all barren. Where did my grass go?”. Yes, that can be concerning but consider this, are the leaves on the trees green all year? Do all of your flowers bloom non-stop? The eelgrass is a plant, and like most plants it goes through seasonal changes.



## WINTER

This is when the concerns start to roll in, but what is winter in Citrus County? Manatee Season! And one of the positive effects of our project is feeding the manatees. So what happens when the extraordinary manatee population arrives hungry from their trip? They give our eelgrass fields a good mowing! Add that to colder

temperatures reducing the growing rate and BLAMMO! it appears the grass has all died and gone to Atlantis.

## SPRING

While the weather is starting to get warmer, its still a bit too cold for full blown growing season.

(That comes next!) During early Spring the eelgrass will stay mostly dormant, occasionally sending out runners (rhizomes) that will grow taller but without protection the manatees will continue to munch them down until the population starts to vacate.





# THE SEASONAL CIRCLE

The beauty of mother nature's plan is that it is relatively predictable. Now in our 5th year of the Kings Bay Restoration Project we have seen this cycle play out each season. The good news? The eelgrass always comes back! Sometimes in places we haven't even restored yet!

## SUMMER

IT'S GROWING SEASON!!! This is when the magic happens! Warmer weather promotes a growing BOOM and we begin to see those beautiful lush eelgrass beds. This is also when the eelgrass starts breaking up the Lyngbya so it can wash away with the current and leave us with gorgeously clear springs.



## AUTUMN

Love is in the air and pollination is in the water. Fall is Flowering Season which is when we start to see long tendrils floating up to the water surface. These flowers then release pollen into the tides where it will float down the river to fertilize and create even more wonderful eelgrass!



# LAYING THE GROUNDWORK

## K-5th grade lesson plans

During Eco Week, for the past 4 years, Duke Energy's Mariculture Center has donated eelgrass for every student at Crystal River Primary to plant in their classroom tank. This grass is incorporated into lessons about science, ecosystems, biology, and even the art classes! At the end of the year the 5th grade students collect the whole school's eelgrass and bring it down to our local waterfront park where they get to plant it to benefit the environment and all those that live or visit Crystal River. Free downloadable lesson plans are available at [KingsBayRestorationProject.com](http://KingsBayRestorationProject.com)

### Example: 2nd Grade Lesson Plan

#### Instructional Time:

Lesson Title: Rock Star Eelgrass Farm	
Grade Level: 2	Life Science
SC.2.N.1.1	Raise questions about the natural world, investigate them in teams through free exploration and systematic observations, and generate appropriate explanations based on those explorations.
SC.2.N.1.2	Compare the observations made by different groups using the same tools.
SC.2.N.1.5	Distinguish between empirical observation (what you see, hear, feel, smell, or taste) and ideas or inferences (what you think).
SC.2.E.7.3	Investigate, observe, and describe how water left in an open container disappears (evaporates), but water in a closed container does not disappear (evaporate).
SC.2.L.16.1	Observe and describe major stages in the life cycles of plants and animals, including beans and butterflies.
SC.2.L.17.1	Compare and contrast the basic needs that all living things, including humans, have for survival.
SC.2.L.17.2	Recognize and explain that living things are found all over Earth, but each is only able to live in habitats that meet its basic needs.
SC.2.P.8.1	Observe and measure objects in terms of their properties, including size, shape, color, temperature, weight, texture, sinking or floating in water, and attraction and repulsion of magnets.





# 3rd Annual Planting Day

During planting day, our good stewards in training not only plant the grass but they also learn important lessons about the restoration process. They plant their grass, scrub the cages the grass is planted in, submerge in a virtual tour through the restored areas to see the grass under water, and see first hand how damamging anchors can be to the eelgrass.

*“This is for these future generations. We’re going to have 30 million people living here in 15 years . We need clean drinking water, we need places for recreation, we need places for people to get outside and get off those video games. Hopefully, these generations won’t make some of the same mistakes that past generations have made.”*

*–Fl Senator Wilton Simpson at the 3rd annual Save Crystal River Planting Day*





# Word on the Water

"Before the restoration project, the water clarity has been declining in my canal over the past few years. I was seeing less wildlife and it was beginning to look stagnant. After Save Crystal River's project began, I started seeing a difference almost immediately. Now that my canal is finished, the water is clearer, I have seen more birds and fish and it seems to be making a very positive impact. I cannot wait to see more in the future. It makes me want to get out and enjoy it more." - **Kristie Powell; Local Resident**

"Born and raised a Crystal River native, I've heard stories about how the water was clear and grass was everywhere! When I grew up the water was dirty and the grass was dead. Since this project has started the bay has tons of grass lots of manatees and clear water keep it up it's beautiful!!!!" - **Alex Reese; Local Resident**

"It's just been amazing watching the eel grass flourish, and in turn, watching our beautiful pristine water return! Thank you, thank you!♥." - **Katy Henry; Local Resident**

"See what can be fixed if we just come together and do it right!!! Congratulations to everyone who helped in this wonderful conservation project!!! May it continue for generations to come!!!!" - **Laura Kemp; Local Resident**

"It's Beautiful, clear, and healthier looking for sure. Wonderful project making a difference over time. Imagine how healthy our ecosystems will become if we continue supporting and spreading programs like this."

- **Leah Hill; Local Resident**

"The water quality and river wildlife have improved dramatically. It is such a joy to see to the bottom again in areas that have been cleaned and replanted."

- **Jacqueline Gregg; Local Resident**

"To be honest, I was skeptical of the viability of the Save Crystal River restoration efforts at the beginning. However, I am truly amazed and thankful for their tenacity now! Not only are the restoration areas flourishing with unbelievable amounts of eelgrass but the diversity and numbers of fish and turtles really add a sparkle to our manatee tours. Our summer tours were better than most of our winter. The water clarity was amazing and the guests enjoyed their passive observation of the manatees munching away. I personally like finding that secluded spot with the flowering eel grass and the transcendental aspect of watching the little oxygen bubbles rise to the surface. The spread of the grasses beyond the restoration areas is Overwhelming. Around Pete's Pier, the King Spring and even better is that there is eelgrass along the Indian canal from the CR Archeological Park to my shop."

- **Mike Engiles, Crystal River Watersports; Business Owner/Tour Operator**

"We can really tell the difference in the water clarity. Great job!" - **Troy Ensor; Local Resident**



# Word on the Water

"As tour operators in Kings Bay, we have witnessed, first hand, the drastic improvements to our bay from Save Crystal River's Restoration project. We have been operating eco tours since before this project began, and the difference from then to now is night and day! The flourishing grass beds in Kings Bay have drastically increased the water clarity, and we are now seeing more species of marine life than ever! We are seeing bass in the bay, which we haven't seen for YEARS! Not to mention healthy populations of bait fish, crabs, and bigger fish of all different species. We are even seeing other various aquatic vegetation thriving symbiotically with the eelgrass. Our residential population of manatee LOVES this project too! Our (summer) resident manatee population is growing in numbers and is healthier than ever. In the summer months, the water clarity is AMAZING and our tours have been phenomenal. Some even better than those during "manatee season." This will help our industry SO MUCH as we can redirect some traffic from the busy manatee season to the less crowded summer which will benefit the manatees, the tourism industry that is ever-so important to Citrus County, and also the visitors! With the depletion of grasses and marine life in many springs around Florida, this project really gives us, and the 200 thousand people a year who visit Citrus County, a strong hope for a better tomorrow!"  
-Kim Altman, Explorida; Business Owner/Tour Operator

"Crazy idea planting grass in the Bay, they said!?!?! No way is it going to work, they said!?!?! Well, congratulations to Save Crystal River, the locals who have worked so hard and the manatees that reap the rewards!! This incredible project proves that humans can make positive changes!!" - River Ventures; Tour Company

Kings Bay is such an important part of our ecosystem. We want this to continue so we have healthy rivers for all the animals, mammals, and people. It's one of the best reasons to live here. We appreciate all you're doing! -Tracy Cabrera; Local Resident

The Citrus County Chamber of Commerce is proud to stand shoulder to shoulder with you in restoring our beautiful bay. We are beyond grateful for the work that you are doing. - Josh Wooten, Citrus County Chamber of Commerce CEO

I have been guiding for 3 years out there. I Lived here for 26 years and what a difference it has made!! 2 years ago the only grass you could find was in cages and everything was darker. Now there is grass everywhere in hunters and its doing awesome!! Job well done!! Its working!!!! - Misty Kelly, Plantation Adventure Center; Tour Operator



# Stay "In The Know" with our weekly Neighborhood Update!

[www.KingsBayRestorationProject.com](http://www.KingsBayRestorationProject.com)



[HOME](#)

[THE PROBLEM](#)

[THE SOLUTION](#)

[SCIENCE](#)

[OUTREACH](#)

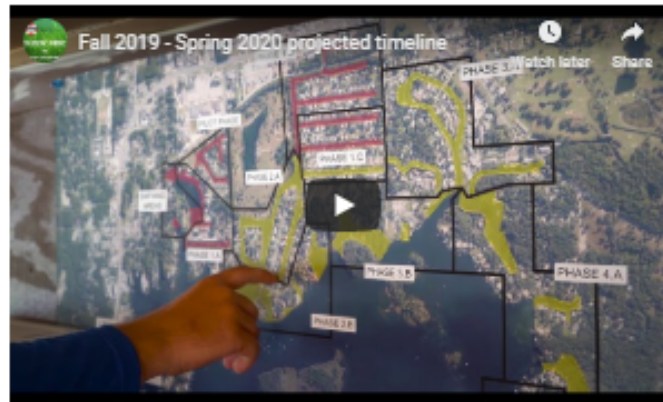
[NEIGHBORHOOD UPDATE](#)

[GET INVOLVED](#)

[NEWS](#)



## Happening Now



Click here for updates

**11/25/19 – This Week: (Cleaning & Planting)** Vacuuming is complete in canal 6! Planting will continue in Canal 6 and move to 2B2 when we finish canal planting. Please help us keep the project protected and watch your anchors to be sure you do not damage the newly planted grasses and cages.

**Phase 2B3/2B4:** Mobilization of pipe and lay flat hoses to prepare for hand vacuuming in areas 2B3 and 2B4 (see map to right).

**Bonus County Maintenance:** No County maintenance during Manatee season. Site clean up will continue this week to remove old Lyngbya bags.

**11/18/19 – Last Week: (Cleaning & Planting)** Vacuuming is complete in canal 6! We will complete demobilization of divers and turbidity curtains etc during the week. We are preparing to mobilize into the area of 2B3 (See map to right) and should begin cleaning this area by next week. Planting will start in Canal 6 of around 14,000 units. Please help us keep the project protected and watch your anchors to be sure you do not damage the newly planted grasses and cages.

**Bonus County Maintenance:** No County maintenance during Manatee season. We will start to de-mobilize from dewatering site for Maintenance and remove the Lyngbya bags from area. Trailer and pumps already gone.

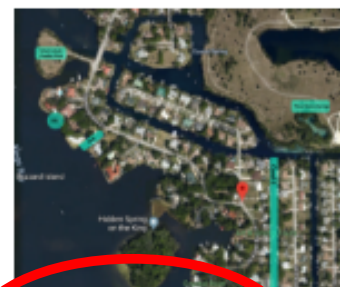
**11/11/19 – (Cleaning & Planting)** We will continue to work all week to get to the end of Canal 6. Dewatering will take place in the empty lot to the north of southernmost condos on Paradise Point Avenue for the diver vacuum. Planting will continue to be done in the area of Hunter Springs that were maintained in the month of September. Please help us keep the project protected and watch your anchors to be sure you do not damage the newly planted grasses and cages.

**(Cage maintenance)** Final cage cleaning will be done in canals 5 and 7.



**(Schatz Island/Paradise Point)** Site crews will work on hauling out the material from one Geotube to use as fertilizer on a local farm. A new liner and Geotube install will begin after material is hauled offsite.

**Bonus County Maintenance:** Crews will continue in the Hunter Springs area doing a grid pattern from north to south moving laterally west to east.



Subscribe to our mailing list

Subscription required

Email Address

Greeting \*

- ☐ Mrs.
- ☐ Ms.
- ☐ Mr.

First Name \*

Last Name \*





# KINGS BAY RESTORATION PROJECT

[www.KingsBayRestorationProject.com](http://www.KingsBayRestorationProject.com)



Crystal River

[www.SaveCrystalRiver.com](http://www.SaveCrystalRiver.com)

## Restore

Healthy Ecosystems through  
vacuuming and replanting eelgrass

**400+** previously unidentified spring vents  
opened and flowing

**130,000+** native "Rockstar" grasses  
planted

## Remove

Invasive algae that has overtaken  
native grasses and habitats.

**30** acres of canals cleaned.. Roughly  
22 football fields

**90,000+** cubic yards of Lyngbya  
removed

**95%** of phosphorous removed through  
specialized filtration

**50%** of nitrogen pollution removed  
through specialized filtration

## Maintain

Newly planted grasses to  
reccurance of algae overgrowth

**Improve** water quality

**Provide** food & shelter for native species

**1500+** manatee friendly patented  
exclusion cages protecting new grass

**Natural** growth and spreading of  
eelgrass plants in unrestored  
areas of King's Bay

## Whats Next?

Target Completion Date :  
Crystal River's Centennial Anniversary

**July 2, 2023**

Left to be cleaned :

**62 more acres**



# MEET OUR SCIENTISTS.



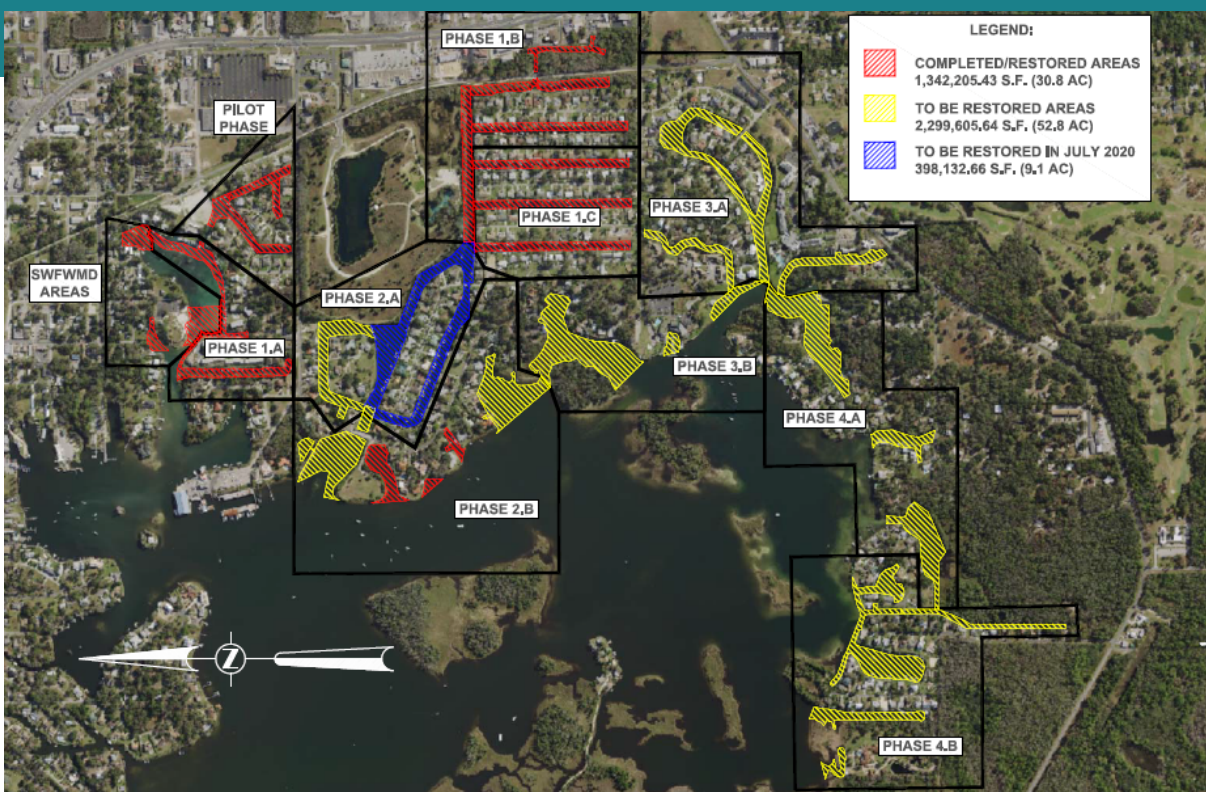
Sea & Shoreline founder Jim Anderson started his career cultivating lawn grasses of various species to accompany his nursery operations. Jim ventured into seagrasses when a local favorite fishing area was threatened with closure to boats as a result of extensive propeller scarring. He argued that repairing the seagrasses was more logical, and began developing technologies to address seagrass-restoration needs. As a turf farmer/grower, he felt using farming skills and retooling them to fit the aquatic arena would be a logical transition.



Sea & Shoreline president Carter Henne was born and raised in central Florida. His passion for the environmental stewardship and outdoor recreational sports have always been a life priority. Trained as a marine biologist, Carter has an extensive history in restoration efforts including seagrass restoration and enhancement, living shoreline studies, and habitat enhancement in many areas throughout Florida.



David Ceilley with Johnson Engineering is a Certified Senior Ecologist by ESA. David is also a Research Associate and Graduate Faculty member at the Florida Gulf Coast University. David has over 29 years of professional experience in limnology, marine biology, wetland ecology, fish, wildlife, and macroinvertebrate studies. He has worked in a professional scientific supervisory role since 1987 and produced numerous technical and scientific reports related to aquatic and terrestrial ecosystems.





# IT TAKES A VILLAGE

Success on a scale this large is impossible without a solid support system and community partners. Thank you to all of our supporters, donors, advocates, and local residents dedicated to making a lasting change to improve our ecosystem and clean our waterways.

## COMMUNITY PARTNERS



THE WILLIAM M. AND MARY M. LYONS CHARITABLE FUND  
HUNTER SPRINGS, INC.  
DOUG & JO SONERHOLM  
RIEGEL USA  
CITRUS COUNTY SCHOOL SYSTEM  
GROUND FOG PRODUCTIONS  
WEDU  
CITRUS COUNTY CHAMBER OF COMMERCE  
CITRUS COUNTY TOURIST DEVELOPMENT COUNCIL  
CITRUS COUNTY CHRONICLE  
KINGS BAY ROTARY CLUB  
MANATEE ECOTOURISM ASSOCIATION (META)  
HOMOSASSA RIVER RESTORATION PROJECT  
DIGITAL HOUND MEDIA  
TCG RECYCLING  
THE IRISH AMERICAN CLUB  
THE BEVERLY HILLS FISHING CLUB

## PHOTOS IN THIS REPORT PROVIDED BY:

EXPLORIDA ADVENTURE CENTER  
RIVER VENTURES  
CRYSTAL RIVER WATERSPORTS  
DOUG SONERHOLM  
BREE LAJOIE



[KingsBayRestorationProject.com](http://KingsBayRestorationProject.com)

[SaveCrystalRiver.com](http://SaveCrystalRiver.com)

# KINGS BAY RESTORATION PROJECT



Lisa Moore, President  
Steve Lamb, Vice President  
Michelle Sivilich, Executive Director

[Info@SaveCrystalRiver.com](mailto:Info@SaveCrystalRiver.com)

P.O. Box 2258  
Crystal River, FL  
34423

