

SAVe Our River's Grasses *Expedition*



REPORT

PREPARED BY
ST. JOHNS RIVERKEEPER



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RIVERKEEPER®

2024

TABLE OF CONTENTS

SAV Significance and Decline.....	3
SAVe Our River's Grasses Expedition Overview.....	9
Detailed Site Findings.....	14
Strategies to SAvE Our River's Grasses.....	39
Continuing our Expedition.....	48
Special Thanks.....	49
References.....	50



LETTER FROM THE St. Johns Riverkeeper

Dear River Enthusiasts,

As we wrap up year two of our 5-year SAVE Our River's Grasses Expedition, we want to thank everyone who has shared their dedication, their docks and their knowledge of the river we all share and love.

Not only did we gain keen insight from our sampling and surveys, but we also deepened our riverine connections with so many who value the St. Johns. From riverfront homeowners to freshwater anglers, there is unifying concern about our river's disappearing submerged aquatic vegetation (SAV). Fortunately, there is also a growing coalition dedicated to SAVING our river's grasses.

For more than a decade, St. Johns Riverkeeper has fought to protect our river's SAV from harm. Initially, the focus was preventing saltwater intrusion from burning and ultimately killing SAV in the northern, Duval County portion of our river's estuary. Dredging, sea level rise, and overuse of our aquifer continue to drive saltwater further upstream, undermining the health of our river's grasses.

In 2017, Hurricane Irma underscored other threats. More than 90% of St. Johns River SAV was lost from Lake George north through Putnam County to Southern Clay and St. Johns Counties due to prolonged high, dark water and other combined stressors that continue to stunt the return of the river's grasses.

Freshwater fishermen in the Middle and Upper Basins are also sounding the alarm about the significant loss of SAV that is threatening the future of the river's commercial and recreational fisheries.

This report provides an overview of the importance of SAV and the compounding stressors affecting our river's grasses. It also reflects on the findings of SJRK's 2024 Expedition and compares this year's findings to those in 2023. Most importantly, it provides strategies to SAVE our river's SAV and next steps including new partnerships that broaden our ability to save the river we love.

Together, we will make a difference.

For the River!



Lisa Rinaman
Your St. Johns Riverkeeper



SAV SIGNIFICANCE AND DECLINE

Submerged aquatic vegetation (SAV) is the foundation of our river's health – providing biofiltration, habitat for both commercial & recreational fisheries, erosion control, oxygenation of the water column, carbon sequestration & storage, and more.

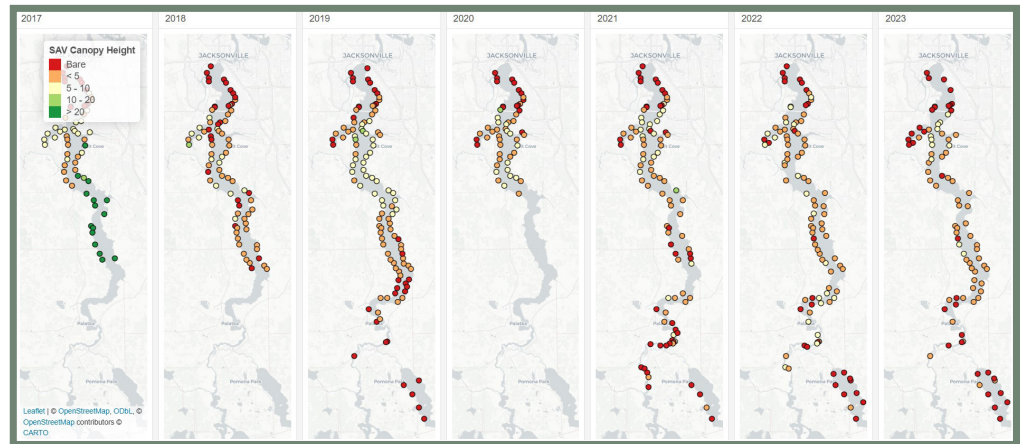
Dan Kolterman, project manager Florida Fish & Wildlife Commission (FWC), stated that SAV “are one of the most important biological components of the river. These grasses provide key ecosystem services including nursery and foraging habitat for many species of fish and wildlife, they help bind up nutrients, stabilize the sediments, and wave energy attenuation.” (Palatka Daily News, 2023).

Unfortunately, the St. Johns River SAV is suffering mounting threats and stress resulting in the near demise of our river's submerged grasses much to the alarm of scientists, fishermen, homeowners and river enthusiasts.

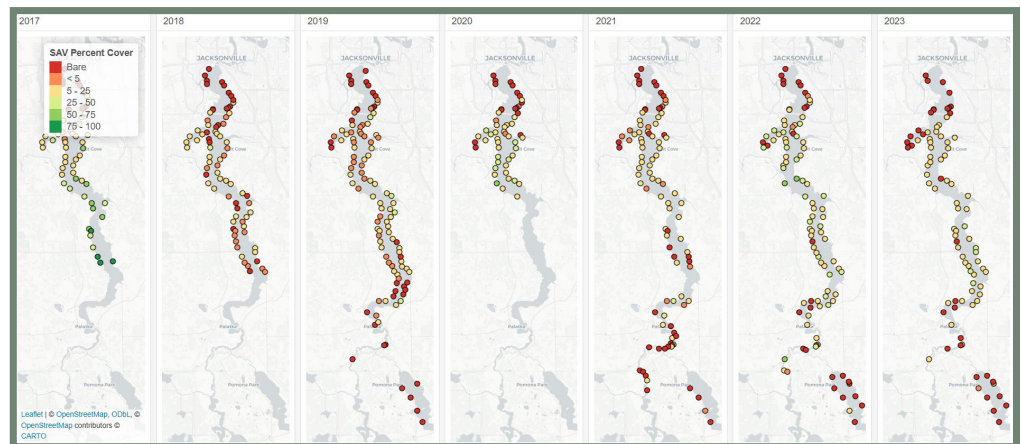
SAV stressors are often compounded by one another, making recovery all the more difficult for this fragile ecosystem.

These maps by St. Johns River Water Management District (SJRWMD) show the stark reality of SAV's significant decline from 2017-2023. Both the canopy height (how tall the grass stalks are from root to tip) and percent cover (a/k/a grass bed density) have suffered extreme loss as a result of multiple stressors. Stressors are conditions that cause damage, kill, or stunt SAV growth.

SAV Canopy Height 2017-2023 (SJRWMD)



SAV Percent Cover 2017-2023 (SJRWMD)



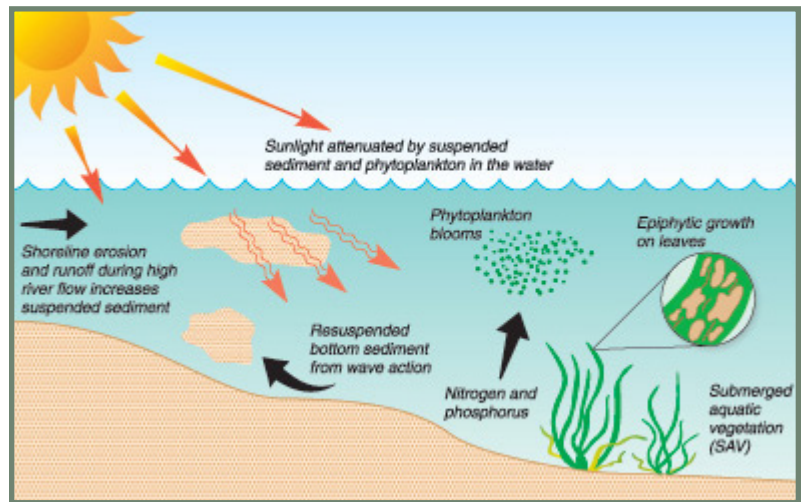
SAV STRESSORS WATERSHED-WIDE

State and federal agencies have identified a variety of stressors that negatively affect SAV. They are often linked together, and thus separating each into individualized causation factors is difficult. Additionally, stressors affect the St. Johns' grasses differently, depending on location, species, and whether these stressors are compounded upon one another. In general, documented stressors (Sagan, 2007; Goldberg, et al., 2018; & Pinto, et al., 2022) fall into the following categories:

- 1. Increased light attenuation** (aka lack of light penetration) due to conditions such as algal blooms, higher water levels, high color content, turbidity, & irresponsible development
- 2. Increased salinity** due to dredging, overpumping of our aquifer, structural flow interference, sea level rise, & drought
- 3. Water quality degradation** due to factors such as nutrient pollution & sedimentation
- 4. Extreme climatic events** including hurricanes, flooding & drought
- 5. Grazing pressure or disruptive behaviors** by species such as turtles, blue crabs, manatees and even invasive species like tilapia.

Following Hurricane Irma in 2017, scientists concluded that the vast majority of SAV disappeared in the Lower St. Johns River with estimates as high as 99% (Virnstein, 2022).

SAV does periodically decline as a result of droughts or hurricanes, but the grasses typically begin to grow back within a few years. However, SAV diversity and abundance in the St. Johns have not bounced back since Hurricane Irma due to persistent higher, darker water that have decreased light availability and the following compounding stressors.



LIGHT ATTENUATION

Light attenuation is the gradual decrease in light intensity as it passes through water due to light being absorbed or scattered by water, suspended particles or dissolved chemicals. A function of water clarity, light attenuation has been identified as a major factor limiting the depth at which SAV can thrive (Midwood, et al., 2021).

As light attenuation increases, light intensity decreases and SAV is unable to photosynthesize as efficiently. Light attenuation is increased by factors like high color, algal blooms, and suspended solids. High color can be caused by changes in flow (due to powerful storms & precipitation events), accumulation of sediment, and algae particulates. While the light-attenuating color of the Lower St. Johns River is mostly of natural origin, the two other factors that increase light attenuation, chlorophyll-a and total suspended solids, are often anthropogenic, caused by human activity. (Sagan, 2007).

Irresponsible development practices and urban sprawl can also lead to increased light attenuation in the water column. Coastlines developed with residential units are associated with nutrient enrichment in the adjacent waterways and phytoplankton blooms, which contribute to low-light conditions (Goldberg, et al., 2018). The figure above depicts a conceptual diagram of factors affecting water clarity as they relate to light attenuation. Impacts of nutrients, sediments, algal blooms, and epiphytic growth on SAV can affect the amount of sunlight reaching the plants (USGS, 2018).

According to SJRWMD, water color and water depth are the dominant light attenuation factors in the Lower St. Johns.

EXTREME CLIMATIC EVENTS

"Tropical storms and hurricanes not only increase light attenuation by increasing color and suspended solids in the system, they can also remove SAV through physical scouring of the littoral zone" (Sagan, 2007).

In 2017 Hurricane Irma wiped out SAV from Lake George north through Putnam County to Southern Clay and St. Johns Counties. The typical flow rate of the St. Johns River is between 2-11 billion gallons/day, depending on drought and flood conditions. During Irma, the flow rate hit 88 billion gallons/day; this rate may not even represent the maximum, however, as the gauge on the Acosta Bridge was rendered inoperable after this measurement. More than 90% of the SAV was lost after Hurricane Irma and the stressors continue to stunt the return of the grasses.

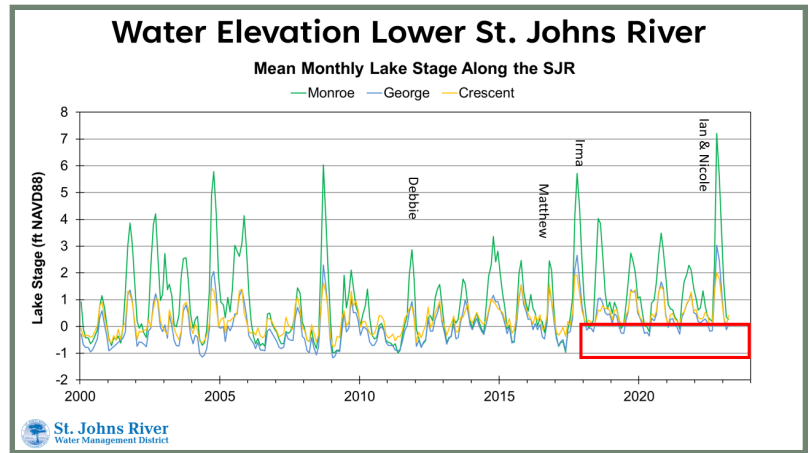


Figure 1. Water elevation of lakes along the Middle and Lower St. Johns River. Note since 2017 minimum elevations have been higher than previous years.

Since Hurricane Irma, water levels remain persistently higher in the Middle and Lower St. Johns River during the periods of the year with typically low water elevations (see Figure 1).

Higher water levels mean greater light attenuation due to both deeper water depth and darker water color resulting from dissolved organic matter from the submerged floodplain's vegetation. Less light means less growth of SAV making it more susceptible to grazing pressure.

Though Hurricane Ian in September 2022 did not have the sheer magnitude of water in comparison to Irma, the St. Johns still saw as much as 20 inches of rainfall in the Upper and Middle Basins. This caused prolonged flooding of homes and businesses near the river for weeks triggering sewage system discharges and damage to septic systems, spilling millions of gallons into Floridian waterways.

Tropical Storm Nicole in November 2022 was less extreme than Hurricane Irma, but the fact that it landed on the East Coast impacted the St. Johns River more quickly and directly than Irma or Ian which landed on the Southwest coast. Additionally, its path was significantly wider. Nicole also claimed the area's worst storm surge since the early 1900s with the exception of Irma, reaching 3.57 feet (News4JAX, 2022), which when combined with wind gusts of 70 mph, sent repeating bulges of water into the river mouth.

Storm impacts are even more disastrous in areas where wetlands have been reduced; under normal conditions, the river's network of vegetation and wetlands act like a sponge by slowing the flow, absorbing nutrients, and filtering out sediment. When the wetlands are reduced through human impacts (i.e. dredging the river, industry, residential housing & commercial real estate), the river's natural ability to slowly filter runoff is inhibited. This increases flooding in areas near the river and increases the risk of toxins, turbidity, and nutrient runoff, which can cause extreme harm to SAV health.

EXTREME CLIMATIC EVENTS CONT.

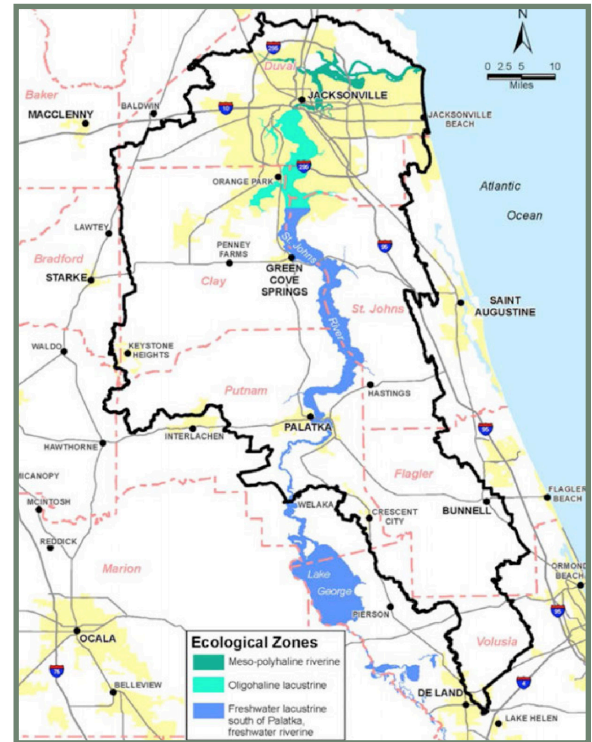
Historically, our river's grasses bounced back after extreme climatic conditions, but SAV abundance and diversity has not bounced back since the 2017 die off. This failure to recover underscores the importance of identifying and understanding all of the stressors as they relate to SAV.

Hurricane Milton in 2024 also resulted in darker, deeper water and flooded the river with excess tannins from nearby swamps, transforming our blackwater river from an iced tea clarity to a coffee-like opacity.

Hurricane Milton resulted in prolonged floods, as sustained northeasterly winds caused the river to reverse flow for several days. Downstream water levels remain elevated due to the St. Johns' naturally slow flow, and have been further exacerbated by seasonal king tides that have increased tidal levels by 1-2 feet. These conditions blocked essential sunlight from reaching the river's struggling eelgrass.

SALINITY

SAV found in the Lower St. Johns River Basin is primarily freshwater and brackish water species (Pinto, et al., 2022), meaning that they are highly sensitive to salinity stress. The Summary of Submerged Aquatic Vegetation (SAV) Status Within the Lower St. Johns River 1996-2007 prepared by Jennifer Sagan documents the effects salinity has on SAV during drought periods occurring from 1999-2001 and 2006-2008. During these periods, some areas in the lower (Duval, and northern parts of Clay & St. Johns Counties) reaches of the river were completely stripped of SAV presence due to higher than normal salinity concentrations.



Increased saltwater intrusion is accelerating due to sea level rise, deepening of the St. Johns River at the mouth, and overuse of our aquifer that is reducing freshwater spring flow.

According to the 2024 Lower St. Johns River Report (LSJRR), the St. Johns River can be split into three Ecological Zones based on salinity (Pinto, et al., 2022): Ecozone 1 - Mesohaline (closest to the Atlantic Ocean); Ecozone 2 - Oligohaline; and Ecozone 3 - Freshwater Lacustrine as one moves upstream (southward).

The above graphic depicts these zones and their ranges throughout the St. Johns River. Due to their salinity intolerance, SAV can only fully establish itself in Ecozones 2 and 3. This is more true now than in years past with more recent and frequent salinity intrusion.

The 2024 LSJRR reports that the river's ecology has been negatively impacted as a result of long-term rising salinity and is worsening due to increasing saltwater intrusion that is harming wildlife, SAV and river health.

GRAZING PRESSURE

Blue crab, turtles, and manatees are some of the known dominant grazers of SAV in the St. Johns River. Other species like invasive tilapia damage SAV by disruptive feeding behaviors and nest building. Grazing pressure has not historically been a major stressor of SAV due to the river's naturally abundant grasses. However, due to other stressors (primarily light attenuation, salinity, and water quality), SAV is unable to increase its growth rate (Morris & Tomasko, 1993) and build the biomass (Goldberg, et al., 2020) necessary to revive the once-ample beds throughout the river. This creates a ripple effect up the trophic chain and starves aquatic wildlife that rely on SAV.



Blue Tilapia with Mullet on the Silver River.
Florida Springs Institute

According to a FWC and SJRWMD 2023 Report, herbivory (grazing pressure) is a limiting factor for SAV in the Lower St. Johns, and atypically high grazing pressure may ultimately be limiting recovery amid typical water clarity conditions. However, there are a number of alternative scenarios for which grazing is only a proximate limiting factor. Elevated salinities and epiphyte loads increase light requirements for SAV (Sand-Jensen 1977, Kraemer et al. 1999, French and Moore 2003, Dobberfuhl 2007). Either stressor, or a combination of the two, may slow plant growth enough such that background grazing pressure is enough to limit recovery. (Timbs & Kolterman 2023)

While blue crab, turtles and manatees have been established as known grazers of eelgrass in the St. Johns, blue tilapia have recently exploded as another threat, further exacerbating grazing pressure with their disruptive behaviors. Blue tilapia (*Oreochromis aureus*) are an invasive species to the United States and their establishment in Florida dates back to the 1960s. They were introduced predominantly by commercial and state entities for a multitude of reasons, one being as a method of aquatic plant control. The historical introduction of blue tilapia is troublesome, especially in areas like Silver Springs where the species now comprises 88% of the total fish population (Moody, 2021). Their invasive nature and resilience to SAV stressors (high salinity and poor water quality, in particular) provide more understanding on the hazard tilapia can pose for natural aquatic vegetation, including eelgrass. It has been observed that tilapia tend to burrow and further disturb the grasses. While more research is needed to determine their entire effects on SAV, with numbers increasing due to fewer hard freezes, tilapia will be examined further to determine their threat to the river and its native species.

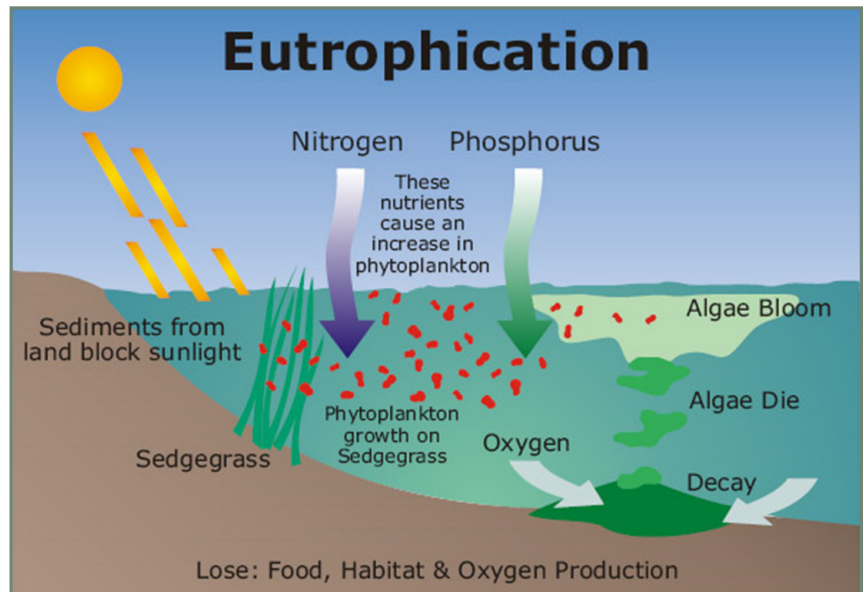
WATER QUALITY: HARMFUL ALGAL BLOOMS & NUTRIENT POLLUTION

A harmful algal bloom (HAB) occurs when algal density rapidly increases in an aquatic system; this is often caused by excess nutrients, commonly referred to as eutrophication. The graphic below (IRL, 2020) portrays the eutrophication process and its effects on the water column. With millions of cells per liter, HABs deplete available oxygen in the water column, block available sunlight penetration, and can be highly toxic. While they can occur naturally, nutrient pollution increases their frequency, duration and intensity.

WATER QUALITY: HARMFUL ALGAL BLOOMS & NUTRIENT POLLUTION CONT.

Increased dissolved nutrients can also increase both populations and density of light-blocking epiphytes (Stallings, et al., 2015). Epiphytes are any non-parasitic plant that grows upon another plant for physical support. Overall, SAV productivity can be greatly hindered by competition with phytoplankton for light and epiphytic growth on shoot and blade surfaces (Goldberg, et al., 2018; Boustany et al. 2010).

Nutrient pollution is caused by various factors; these include sewage sludge (biosolids) seepage from land disposal, fertilizer run-off, wastewater discharge, and septic tank, old infrastructure or lift station leaks.



SAVE OUR RIVER'S GRASSES EXPEDITION OVERVIEW

In response to the significant decline of SAV, St. Johns RIVERKEEPER (SJRK) launched its first SAVE our River's Grasses Expedition in 2023 to seek answers and solutions to the disappearing SAV of the St. Johns. During this expedition, our team surveyed an 80-mile stretch of the river between Doctors Lake and Lake George three times during the growing season in May, August and October. Our mission was to search for remaining grass beds, take detailed measurements, conduct water quality testing, and seek solutions to restore this vital habitat. SJRK met with riverfront residents, fishermen, scientists and community leaders to enhance our data collection by the observations of those who have lived on, explored, fished, or studied our river for decades.

In 2024, our team returned to the river during the SAV growing season to continue this important research of identifying solutions to reverse the devastating loss of SAV for year two of our research that will continue until 2027.

2024's Expedition expanded from the 12 sites in 2023 for a total of 14 sites this year. Research methods include quadrat and transect sampling to ascertain SAV canopy height and grass bed density, along with detailed water quality testing to include Depth, Temperature, Turbidity, Chlorophyll-a, Dissolved Oxygen, Salinity, and pH. The 2024 findings are outlined in this document.

OUR TEAM

The 2024 SAVE Our River's Grasses Expedition Team consisted of St. Johns Riverkeeper Lisa Rinaman, SJRK Board Chair and Boat Captain Steve Cobb, Advocacy Specialist Soraya Aidinejad, Community Engagement Coordinator Jessica Finch, SJRK interns Abigail O'Neil, Ellie McComas, Meagan Lamey, and Rebekah Cooper. Special thanks to SJRK's Research and Data Specialist, Zoe Tressel.



The following pages will summarize the findings of our three 2024 field visits.

MAY 2024 FIELD VISIT

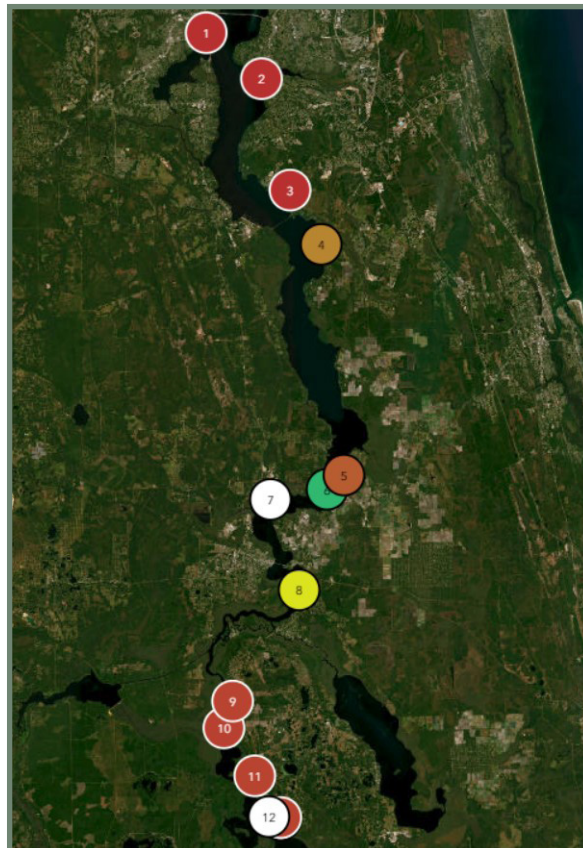
SUMMARY OF FINDINGS

- Each expedition site along the 80-mile venture had SAV, but the majority of SAV demonstrated significant grazing pressure as in 2023.
- At several sites, SAV beds were more extensive with a measurable improvement in canopy heights compared to last year.
- This year, the team discovered a greater diversity of SAV and encountered species that were not observed in 2023. Newly encountered species include: *Najas guadalupensis* (also known as southern naiad or guppy grass), *Potamogeton pusillus* (small pondweed), and *Eleocharis* sp (spikerush).
- *Chara* sp. (also known as musk grass), an SAV that is actually a macroalgae, was still dominant at the Welaka and Georgetown sites. It was also discovered further north in East Palatka. *Chara* is considered to be a precursor species to eelgrass and other SAV species.
- As in 2023, one of the most exciting highlights was the presence of long, healthy grasses within Dancy Point's large-scale enclosure & San Mateo's smaller enclosure that are part of a Florida Fish & Wildlife Commission's (FWC) 's pilot project. FWC installs fencing to protect grasses from grazers, giving our river's SAV a fighting chance. Outside the Dancy Point enclosure, SAV was cropped short like all the other unprotected areas, demonstrating the significant grazing pressure due to limited SAV food sources throughout the Lower St. Johns.

SAV GRASS BED DENSITY AND CANOPY HEIGHT FINDINGS

KEY:

- Red = Poor
- Orange = Struggling
- Yellow = Improving
- Green = Thriving
- White = No Sampling
- Black = Zero SAV Cover



AUGUST 2024 FIELD VISIT

SUMMARY OF FINDINGS

- Canopy heights had improved at two sites since May 2024 and at three sites since August 2023.
- At Dancy Point, SJRK was encouraged to discover that SAV density had improved both inside and *outside* the protective enclosure since May 2024, while canopy heights inside the enclosure have seen a remarkable increase compared to August 2023. The average height now measures 50 cm, a significant rise from last year's average of just 6.3 cm. Some blades of SAV grew to nearly a meter in length.
- Water temperatures were noticeably warmer, with elevated readings at **seven** sites compared to August 2023. Eelgrass does not tolerate excessively high temperatures well. The upper limit is between 95-105°F (35-40°C). Exceeding this range can damage the foliage and flowers, leading to wilting, drooping, and even leaf sunburn, in which eelgrass may struggle to recover. Studies have shown that eelgrass thrives best in temperatures around 82°F. Four sites read in the mid-80s (84-85°F), while 10 sites ranged from the high 80s to low 90s (86-93.5°F).
- Chlorophyll-a indicates the concentration of algae in a waterbody. **Eleven** out of the 14 sites exceeded the healthy parameter for Chlorophyll-a, which should be less than or equal to 5.4 micrograms per liter (µg/L).
- Similar to August 2023, seven of our 14 SAV sites had potentially toxic cyanobacteria present and prevented our team from entering the water following safety protocols. Cyanobacteria, a/k/a harmful algal blooms (HAB), can be highly toxic and dangerous to human health. Lab results revealed the presence of at least three types of potentially toxic cyanobacteria in the samples analyzed.
- SAV was found at all the surveyed sites that were not interrupted by HABs.
- Grazing pressure from aquatic species continues to be a major stressor affecting the recovery of SAV, as evidenced by the sparse and heavily cropped grasses that were observed compared to that of the SAV within the protective enclosures.

SAV GRASS BED DENSITY AND CANOPY HEIGHT FINDINGS

KEY:

Red = Poor

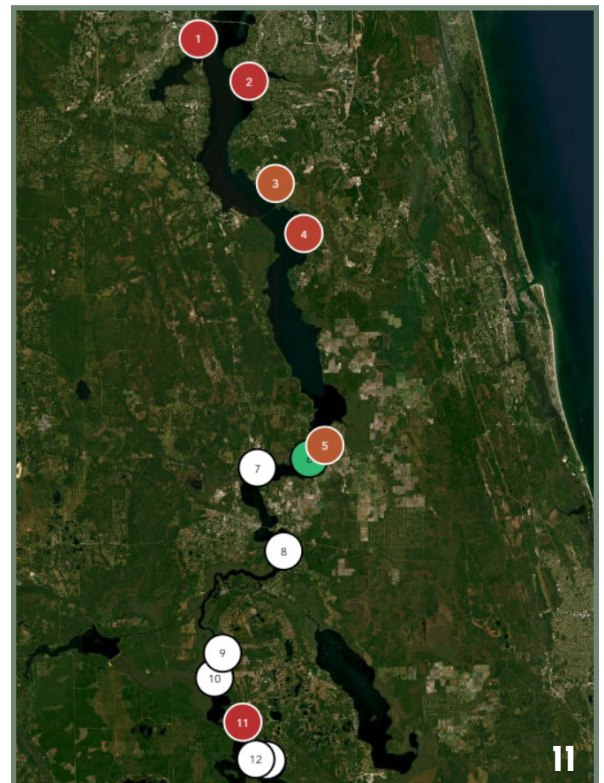
Orange = Struggling

Yellow = Improving

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Black = Zero SAV Cover



OCTOBER 2024 FIELD VISIT

SUMMARY OF FINDINGS

- October 2024's field visit was SJRK's 6th SAV survey of an 80-mile stretch of river between Doctors Lake and Lake George.
- Unfortunately, there was an alarming loss of SAV along the expedition route due to back-to-back hurricanes since our August field visit.
- Consecutive hurricanes flooded the river with excess tannins from nearby swamps, transforming our blackwater river from an iced tea clarity to a coffee-like opacity. These conditions blocked essential sunlight from reaching the river's struggling eelgrass.
- Hurricane Milton resulted in prolonged floods, as sustained northeasterly winds caused the river to reverse flow for several days. Downstream water levels remain elevated due to the St. Johns' naturally slow flow, and have been further exacerbated by seasonal king tides that have increased tidal levels by 1-2 feet.
- Hurricanes Helene and Milton resulted in darker, deeper water; consequently, many sites weren't accessible. The accessible sites required amended survey methods.
- Increased climatic activity can result in decreased percent cover and canopy height through the following methods:
 - Flooding: flushes the river with tannins from nearby swamps and the darker color makes it difficult for sunlight to reach/grow the SAV and creates higher water depth for longer periods, again decreasing available sunlight - an exponential factor in SAV's ability to grow
 - Scouring of the littoral zone, which directly rips up SAV
- To make matters worse, the protective enclosure located at Dancy Point in East Palatka was compromised in early September. The eel grass that once reached historic conditions succumbed to grazer pressure in approximately three week's time and was reduced to stubble by our October field survey.
- Post-storm conditions further complicated our survey efforts.
- Six of our 14 sites were inaccessible due to high, choppy water, and one site was inaccessible because of the presence of potentially toxic blue-green algae.
- At the accessible sites, we measured water depth and SAV using a modified survey method due to high, dark water. At Dancy Point, we conducted a full survey with consistent methods from past visits to capture conditions before and after the fence breach.



Here are our findings from the seven accessible sites:

All 7 Sites: Average depths from each site were 66.1 cm - 112.7 cm.
Average water temperatures were in the mid to low 70s, averaging 74°F

Open Sites: Average canopy heights ranged from 2-2.89 cm
Average grass bed density ranged from 0%-34%

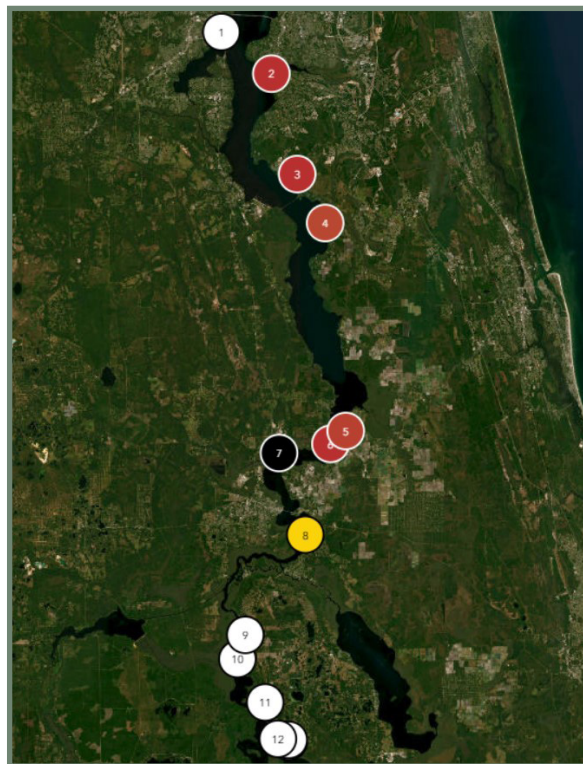
Protected Sites: Average canopy heights of 10.5 cm
Average grass bed density 67%

Our October visit was a stark reminder that much more needs to be done to give our river's grasses a fighting chance.

SAV GRASS BED DENSITY AND CANOPY HEIGHT FINDINGS

KEY:

- Red = Poor
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2024 DETAILED SITE FINDINGS

FOR REFERENCE

This Report provides an overview of water quality parameters measured at each site and compares them to data from the previous year. For reference, exceedances are defined as follows:

- **TURBIDITY:** Anything over **29 NTUs** above background exceeds Florida standards
- **CHLOROPHYLL-A:** Chlorophyll-a water quality criteria is **≤5.4 µg/L**. Chlorophyll-a is an indirect measure of biological responses to nutrient enrichment. Higher Chlorophyll-a levels could be caused by septic system failures, sewage leakage, or urban and fertilizer runoff.
- **DISSOLVED OXYGEN:** In predominantly freshwaters of the SJR in the Peninsula bioregion, the DO should not be less than **38%** saturation, which is equivalent to approximately **2.9 mg/L** at 30°C and 3.5 mg/L at 20°C.
- **SALINITY:** Full strength seawater is 35 parts per thousand. In downtown Jacksonville the water is brackish water, a mix of fresh and saltwater) with salinity averaging 10-18 ppt, and 0-5 ppt. Near the Buckman Bridge and south, the river is mostly freshwater) averaging 0-5 ppt. In a study conducted by IFAS eelgrass can survive in a maximum salinity of about 10-12 ppt but does best at salinity levels around 5 ppt or below.
- **TEMPERATURE:** Eelgrass does not tolerate excessively high temperatures well. The upper limit is between 95-105°F (35-40°C). Exceeding this range can damage the foliage and flowers, leading to wilting, drooping, and even leaf sunburn, from which American eelgrass may struggle to recover. In a study conducted by IFAS eelgrass can survive in temperatures between 55°F and 100°F (13°C – 38°C) however, it **grows the best around 82°F** (28°C).
- **pH:** The national guidelines for water quality recommend that lakes and rivers have a pH of **6.5-9.0** for the protection of aquatic organisms. Eelgrass is essential for increasing pH levels by intaking CO₂, which mitigates the effects of ocean acidification.



SITE I: DOCTORS LAKE

Doctors Lake is the first site of our 80-mile venture located at the property of Betsy and Tony Sievert, whose family has owned their Clay County home on the north bank of Doctors Lake since 1969. Situated just west of the HWY 17 Bridge, their property is bulkheaded and historically featured lush SAV and frequent manatee visits. Eelgrass (*Vallisneria americana*, also known as "tape grass") used to dominate this area.

May 2023 vs 2024: In May 2023, no eelgrass was present, although it did appear sparsely in August 2023 and October 2023. During the May 2024 Field Visit, SAV was not only discovered, but showed improvements in canopy height compared to August and October 2023. Though still short and stunted (averaging 6.9cm), it was well dispersed throughout the site area.

August 2023 vs. 2024: In August 2024, we were encouraged that the eelgrass discovered in May was still present. Although the canopy heights were modest compared to the flourishing SAV that once thrived, there were signs of improvement. The average canopy height increased significantly, reaching 6.2 cm this August compared to 2.64 cm in 2023. The grassbed density was slightly less, averaging 21% compared to 30% in 2023. During this visit, we were again warmly welcomed by Betsy and Tony, in addition to five of their neighbors. Jack Randall, a journalist for *Clay Today*, also documented highlights of the morning and our work with SAV. Read the story online at [ClayTodayOnline.com](https://www.claytodayonline.com).

October 2023 vs. 2024: In 2023, October's canopy height reached 3.18 cm and grass bed density stood at 34%. Due to consecutive hurricanes in September and October, this site was inaccessible for a full SAV transect during our October 2024 visit, as the water was rough and elevated. Despite these challenging conditions, team members ventured into the water to conduct a preliminary sweep for SAV. However, they did not locate any grass during this brief and initial inspection. The site displayed nearly equal water quality parameters between 2023-2024 and May-October 2024, except for the changes noted below:

WATER QUALITY PARAMETER	MAY 2023	MAY 2024	TREND
DISSOLVED OXYGEN	86.20%	112.3%	Within satisfactory range; Improved
TURBIDITY	1.77 FNU	3.71 FNU	Within satisfactory range; Worsened
CHLOROPHYLL A	17.35 µg/L	7.0 µg/L	Not within satisfactory range; Improved

WATER QUALITY PARAMETER	AUGUST 2023	AUGUST 2024	TREND
WATER TEMPERATURE	27.8°C / 82.04°F	29.1°C / 84.38°F	Within satisfactory range; Worsened
SALINITY	0.51 ppt	1.29 ppt	Within satisfactory range; Worsened
CHLOROPHYLL A	5.72 µg/L	4.62 µg/L	Within satisfactory range; Improved

DOCTORS LAKE (SITE 1) CONT.

WATER QUALITY PARAMETER	OCTOBER 2023	OCTOBER 2024	TREND
DISSOLVED OXYGEN	88.9% / 7.71 mg/L	76.0% / 6.39 mg/L	Within satisfactory range; Worsened
SALINITY	0.71 ppt	0.42 ppt	Within satisfactory range; Worsened
pH	8.26	7.02	Not within satisfactory range; Improved
TURBIDITY	2.63 FNU	4.54 FNU	Within satisfactory range; Worsened

WATER QUALITY PARAMETER	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	28.8°C / 83.84°F	29.1°C / 84.38°F	23.2°C / 73.76°F	Satisfactory status, Conditions improving
DISSOLVED OXYGEN	112.3% / 8.39 mg/L	74.6% / 5.61 mg/L	76% / 6.39 mg/L	Satisfactory status, Conditions worsening
SALINITY	5.99 ppt	1.29 ppt	0.42 ppt	Satisfactory status, Conditions worsening
TURBIDITY	3.71 FNU	2.31 FNU	4.54 FNU	Satisfactory status, Conditions worsening



SITE 2: FRUIT COVE

Ben and Louann Williams have lived on the east bank of the St. Johns River, just south of Julington Creek, for nearly 36 years. Their property in St. Johns County boasts a natural shoreline with mature cypress trees. As a former commercial fisherman and the founder and 35-year owner of Fisherman's Dock, Ben knows and cherishes the St. Johns like an old friend.

To protect fledgling grasses from grazers—a growing problem due to the lack of food for turtles, manatees, and fish—Ben has fenced off a small portion of the river bottom beside his dock.

May 2023 vs 2024: During our May 2023 visit, SJRK did not conduct a full SAV survey, but noted sparse presence of SAV starting at 28 meters from shore. In June, SJRK returned to conduct a full survey and recorded an average canopy height of 1.71 cm and an average grass bed density of 11%. In stark contrast, in May 2024 SJRK mapped a 50-meter transect of SAV with an average density of 46%. Despite a healthier density, the SAV remained short and stunted from grazing pressure with an average canopy height of 3.6 cm.

August 2023 vs. 2024: In August of 2024, much like the observations at Doctors Lake, the team noted an increase in eelgrass canopy heights compared to last year. The average canopy height reached 5.1 cm, more than doubling the 2.05 cm recorded in 2023. Despite increased canopy height, 2024's grass bed density was substantially lessened at 21% compared to 34% in 2023. In comparison to May of this year, the canopy heights have shown marked improvement, rising to an average from 3.6 cm to 5.1cm.

October 2023 vs. 2024: In October, water levels were significantly higher due to consecutive hurricanes (95 cm deep compared to 70.03 cm in October 2023). However, conditions were still shallow enough to conduct a modified SAV survey. Average grass bed density was nearly unchanged from last year (20% this month vs. 21% in 2023) but showed a concerning decline from May's density of 46%. Similarly, average canopy height decreased to 2.47 cm, falling below both October 2023 (3.38 cm) and the heights recorded in May (3.6 cm) and August (5.1 cm).

The site displayed nearly equal water quality parameters between 2023-2024 and May-October 2024, except for the changes noted below:



WATER QUALITY PARAMETER	MAY 2023	MAY 2024	TREND
WATER TEMPERATURE (°C/°F)	27.8°C/82.04°F	29.4°C/84.92°F	Within satisfactory range; Worsened
SALINITY	5.13 ppt	7.03 ppt	Within satisfactory range; Worsened
DISSOLVED OXYGEN	98.90%	95%	Within satisfactory range; Worsened
TURBIDITY	4.26 FNU	3.51 FNU	Within satisfactory range; Improved

FRUIT COVE (SITE 2) CONT.

WATER QUALITY PARAMETER	AUGUST 2023	AUGUST 2024	TREND
WATER TEMPERATURE	28.5°C / 83.3°F	29.6°C / 85.28°F	Within satisfactory range; Worsened
SALINITY	7.03 ppt	.54 ppt	Within satisfactory range; Improved
CHLOROPHYLL A	10.82 µg /L	7.62 µg/L	Not within satisfactory range; Improved

WATER QUALITY PARAMETER	OCTOBER 2023	OCTOBER 2024	TREND
DISSOLVED OXYGEN	97.1% / 8.33 mg/L	62.0% / 5.23 mg/L	Within satisfactory range; Worsened
SALINITY	0.44 ppt	0.31 ppt	Within satisfactory range; Worsened

WATER QUALITY PARAMETER	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	29.4°C / 84.92°F	29.6°C / 85.28°F	23.1°C / 73.58°F	Satisfactory status, Conditions improving
DISSOLVED OXYGEN	95% / 7.03 mg/L	83.9 % / 6.38 mg/L	62.0% / 5.23 mg/L	Satisfactory status, Conditions worsening
SALINITY	7.03 ppt	.54 ppt	0.31 ppt	Satisfactory status, Conditions worsening

SITE 3: ORANGEDALE (NEW 2024 SITE)

Site 3, a newly added location, is situated on the east bank of the St. Johns River in St. Johns County, at the property of Debby and Brian Wetmore, just north of the Shands Bridge. During our visits in May and August 2024, we were greeted by their neighbor, Bob Cole, who reminisced about how the area used to be dominated by lush eelgrass.



In May, SJRK discovered not only the presence of eelgrass (*Vallisneria americana*) but also a new species not observed during the 2023 Expedition: *Najas guadalupensis* (southern naiad). The team recorded an average SAV cover of 55%, comprising *Vallisneria americana*, *Najas guadalupensis*, and *Chara* sp. Canopy heights averaged 6.3 cm for eelgrass, 12.8 cm for southern naiad, and 8.9 cm for chara.

By August 2024, the site exhibited even greater SAV diversity, including *Vallisneria americana*, *Najas guadalupensis*, *Eleocharis* sp. (spikerush), and *Chara* sp. The average SAV cover and canopy height remained consistent with May's findings, with a density of 51% compared to 55% in May and an average eelgrass canopy height of 6.2 cm, only slightly below May's 6.3 cm.

In October 2024, despite water levels being significantly higher this month due to back-to-back hurricanes (98 cm compared to 70.27 cm in May and 66.6 cm in August), conditions remained shallow enough to conduct a modified SAV survey. However, average grass bed density saw a sharp decline, dropping to just 9% compared to 55% in May and 51% in August. Similarly, the average canopy height for *Vallisneria americana* fell to 2.69 cm, down from 6.3 cm in May and 6.2 cm in August.

We do not have water quality data for last year, as this is a newly added site as part of our 2024 SAV Expedition. The parameters that showed notable changes during each field visit month are as follows:

WATER QUALITY	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	30.3 °C / 86.54°F	31°C / 87.8°F	23.5°C / 74.3°F	Satisfactory status, Conditions improving
DISSOLVED OXYGEN	107.5% / 8.03 mg/L	110.9 % / 8.23 mg/L	66.2% / 5.47 mg/L	Satisfactory status, Conditions worsening
SALINITY	1.21 ppt	.47 ppt	0.30 ppt	Satisfactory status, Conditions worsening
CHLOROPHYLL A	2.68 µg/L	4.12 µg/L	5.62 µg/L	Unsatisfactory status, Conditions worsening

SITE 4: COLEE COVE

Site 4 is located at the property of Victor Jackson, who has lived in Colee Cove for nearly 30 years. His property on the east side of the St. Johns River features a low wooden bulkhead and several large cypress trees. Over the years, Victor has observed a noticeable decline in the eelgrass behind his home, compared to the healthier distribution that once existed.



May 2023 vs. 2024: This May, noteworthy findings included increased SAV diversity. Alongside eelgrass, *Najas guadalupensis* (southern naiad) was also identified. The average SAV percent cover at this site rose to 88%, a substantial increase from 50% in May of the previous year. Additionally, the canopy height of eelgrass saw remarkable growth, averaging 6.03 cm this year compared to just 1.5 cm last year.

August 2023 vs. 2024: In August 2023, the team was unable to conduct a transect survey for SAV due to the presence of potentially harmful algae. Fortunately, during the August 2024 visit, no such algae were observed, enabling a 30-meter transect survey. The survey revealed the presence of eelgrass (*Vallisneria americana*) exclusively, with an average canopy height of 4.5 cm and an average percent cover of 62%.

October 2023 vs. 2024: In October 2024, despite significantly higher water levels due to back-to-back hurricanes (101 cm compared to 58 cm in May and 76.7 cm in August), conditions were still shallow enough to conduct a modified SAV survey. Unfortunately, SAV growth was notably stunted, with the average canopy height reduced to just 2 cm and the average percent cover dropping to a mere 1%.

The site displayed nearly equal water quality parameters between 2023-2024 and May-October 2024, except for the changes noted below:

WATER QUALITY PARAMETER	MAY 2023	MAY 2024	TREND
DISSOLVED OXYGEN	139%	107.5%	Within satisfactory range; Worsened
TURBIDITY	3.26 FNU	0.22 FNU	Within satisfactory range; Improved
CHLOROPHYLL A	3.7 μ /L	2.68 μ /L	Within satisfactory range; Improved

COLEE COVE (SITE 4) CONT.

WATER QUALITY PARAMETER	AUGUST 2023	AUGUST 2024	TREND
WATER TEMPERATURE	30.9°C/87.62°F	31.3°C/88.24°F	Within satisfactory range; Worsened
DISSOLVED OXYGEN	96.6%/7.19 mg/L	87.1 %/6.40 mg/L	Within satisfactory range; Worsened
CHLOROPHYLL A	4.3 µg/L	2.68 µg/L	Within satisfactory range; Improved

WATER QUALITY PARAMETER	OCTOBER 2023	OCTOBER 2024	TREND
DISSOLVED OXYGEN	85.4%	44.8%	Almost unsatisfactory status, Worsened
SALINITY	0.44 ppt	0.31 ppt	Within satisfactory range; Improved
TURBIDITY	0.35 FNU	0.51 FNU	Within satisfactory range, Worsened

WATER QUALITY	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	30.3 °C/86.54°F	31.3°C/88.24°F	23.8°C/74.84°F	Satisfactory status, conditions improving
DISSOLVED OXYGEN	107.5%	87.1%	44.8%	Almost unsatisfactory status, Conditions worsening
SALINITY	1.21 ppt	.46 ppt	0.31 ppt	Satisfactory status, Conditions improving
CHLOROPHYLL A	2.68 µg/L	2.68 µg/L	5.13 µg/L	Almost unsatisfactory status, Conditions worsening

SITE 5: MAYS COVE (NEW 2024 SITE)

Site 5 is located at the property of Roy and Christine Fouts, who live on Mays Cove in East Palatka. Their home is a newly added site to the 2024 SAV Expedition. Roy and his wife looked for over two years for their retirement home on the St. Johns. Roy says "it was immediately obvious that this home on the river captured our hearts. That was a little over eight years ago and we are still deeply tied to this piece of land and the area in general."

The loss of eelgrass from Mays Cove was a severe blow to his beloved "Cove". It was once covered with a carpet of eelgrass with hard packed sand that the roots loved. In a few short years, not a blade of grass was left, only sand and water logged wood. With the departure of the grass, Roy and Christine also lost the food chain that attracted the largemouth bass by the thousands. When the grass was here, they could catch bass from their dock with little effort. Without grass, the food chain does not exist; only transient game fish, and rarely bass, are present.

In May 2024, SJRK found the presence of eelgrass, averaging a 72% cover and an average canopy height of 4.41 cm with signs of grazing pressure. Chara was also found at this site averaging 7.17 cm in height.

In August 2024, the team discovered a diverse array of SAV, including eelgrass, *Eleocharis* sp. (spikerush), and *Chara* sp. (musk grass). Compared to May, the average percent cover was slightly lower in August at 60% vs. 72%. However, the eelgrass height remained nearly consistent, averaging 3.8 cm in August compared to 4.41 cm in May.

In October 2024, as with the other sites, a modified SAV survey was necessary due to elevated water levels, which averaged 72.6 cm at low tide (compared to 25.8 cm in May and 26.7 cm in August). The team observed SAV with a limited diversity of eelgrass (*Vallisneria americana*) present. The eelgrass had an average canopy height of 2.5 cm and a grass bed density of 34%. We do not have water quality data for last year, as this is a newly added site as part of our 2024 SAV Expedition. Parameters that showed notable changes from May-October 2024 are below:

WATER QUALITY	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	31.1°C/87.98°F	31°C/87.8°F	23.1°C/73.58°F	Satisfactory status, Conditions improving
DISSOLVED OXYGEN	162.50%	108.7%	77.4%	Satisfactory status, Conditions worsening
SALINITY	0.42 ppt	.43 ppt	0.28 ppt	Satisfactory status, Conditions improving
TURBIDITY	11.86 FNU	1.30 FNU	37.43 FNU	Unsatisfactory status, Conditions worsening
CHLOROPHYLL A	10.14 µg/L	8.14 µg/L	8.71 µg/L	Unsatisfactory status, Conditions improving

SITE 6: DANCY POINT

Site 6 is at the property of Ray and Lana Bunton who have lived on the east bank of the St. Johns in East Palatka for nearly 50 years. Additionally, Ray's family has lived at that location since 1970. Ray partnered with his friend David Girardin and FWC to fence off nearly three acres of river bottom through a public partnership to monitor SAV growth while protected from grazers. The shoreline consists of a wooden bulkhead. The SAV team monitored SAV and water quality inside the fenced area as well as outside of the protected zone.



May 2023 vs. 2024: Inside the enclosure in May 2024, the team surveyed the highest grass bed density at this site at 66% and the highest average canopy height at 54 cm. In May 2023, the site had only 29% density and an average canopy height of 2.38 cm. Outside of the enclosure, while the SAV was still short and chopped due to evident grazing pressure, there were signs of improvement. The average canopy height increased to 3.44 cm from 1.3 cm last May, and the average density rose to 21% from 19% May 2023.

August 2023 vs. 2024: In August 2024, the average canopy height inside the enclosure showed a dramatic increase, averaging 50 cm compared to just 6.39 cm in August 2023. The grass bed density also improved, reaching an average of 71% this year, up from 63% last August. Outside the enclosure, canopy height also saw progress, with an average of 4 cm this year compared to 1.45 cm in 2023.

October 2023 vs. 2024: Sadly, the protective enclosure at Dancy Point was compromised in early September 2024, leading to significant changes in SAV conditions. Within approximately three weeks, the eelgrass, which had previously thrived under historic conditions, succumbed to intense grazer pressure. By the October 2024 field survey, the eelgrass inside the enclosure had been reduced to stubble, with an average canopy height of just 2.89 cm and a grass bed density of 5%. This marks a stark decline compared to October 2023, when the average canopy height was 45.5 cm, and the grass bed density reached 60%.

The Dancy Point site displayed nearly equal water quality parameters between 2023-2024 and May-October 2024, except for the changes noted below:

WATER QUALITY PARAMETER (INSIDE ENCLOSURE)	MAY 2023	MAY 2024	TREND
DISSOLVED OXYGEN	124.9% / 9.73 mg/L	174.9% / 12.82 mg/L	Within satisfactory range; Improved
TURBIDITY	4.26 FNU	9.74 FNU	Within satisfactory range; Worsened
CHLOROPHYLL A	6.43 µg/L	10.05 µg/L	Not within satisfactory range; Worsened

DANCY POINT (SITE 6) CONT.

WATER QUALITY PARAMETER (OUTSIDE ENCLOSURE)	MAY 2023	MAY 2024	TREND
DISSOLVED OXYGEN	124.9% / 9.73 mg/L	174.9% / 12.82 mg/L	Within satisfactory range; Improved
TURBIDITY	4.26 FNU	9.74 FNU	Within satisfactory range; Worsened
CHLOROPHYLL A	6.43 µg/L	10.05 µg/L	Not within satisfactory range; Worsened

WATER QUALITY PARAMETER (INSIDE ENCLOSURE)	AUGUST 2023	AUGUST 2024	TREND
WATER TEMPERATURE	30.9°C/87.62°F	32.2°C/89.96°F	Almost unsatisfactory status; Worsened
DISSOLVED OXYGEN	112.4%/8.37 mg/L	106.4 %/7.63 mg/L	Within satisfactory range; Worsened
TURBIDITY	3.28 FNU	0.19 FNU	Within satisfactory range; Improved

WATER QUALITY PARAMETER (OUTSIDE ENCLOSURE)	AUGUST 2023	AUGUST 2024	TREND
WATER TEMPERATURE	30.7°C/87.26°F	32°C/89.6°F	Almost unsatisfactory status; Worsened
DISSOLVED OXYGEN	100.4%/7.48 mg/L	125.3 %/9.13 mg/L	Within satisfactory range; Improved
CHLOROPHYLL A	5.23 µg/L	8.77 µg/L	Not within satisfactory range; Worsened

WATER QUALITY PARAMETER (INSIDE ENCLOSURE)	OCTOBER 2023	OCTOBER 2024	TREND
DISSOLVED OXYGEN	106% / 8.76 mg/L	80.0% / 6.71 mg/L	Within satisfactory range; Worsened
SALINITY	0.41 ppt	0.28 ppt	Within satisfactory range; Improved
TURBIDITY	0.79 FNU	0.37 FNU	Within satisfactory range; Improved

DANCY POINT (SITE 6) CONT.

WATER QUALITY PARAMETER (OUTSIDE ENCLOSURE)	OCTOBER 2023	OCTOBER 2024	TREND
DISSOLVED OXYGEN	101.3% / 8.76 mg/L	78.1% / 6.56 mg/L	Within satisfactory range; Worsened
SALINITY	0.41 ppt	0.28 ppt	Within satisfactory range; Improved
TURBIDITY	1.81 FNU	1.64 FNU	Within satisfactory range, Improved

WATER QUALITY (INSIDE ENCLOSURE)	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	31.8°C/89.24°F	32.2°C/89.96°F	23.5°C/74.3°F	Satisfactory status, Improving
DISSOLVED OXYGEN	174.9% / 12.82 mg/L	106.4% / 7.63 mg/L	80.0% / 6.71 mg/L	Satisfactory status, Worsening
SALINITY	0.42 ppt	.42 ppt	0.28 ppt	Satisfactory status, Improving
TURBIDITY	9.74 FNU	0.19 FNU	0.37 FNU	Satisfactory status, Improving
CHLOROPHYLL A	10.05 µg/L	6.92 µg/L	7.89µg/L	Unsatisfactory status, Improving

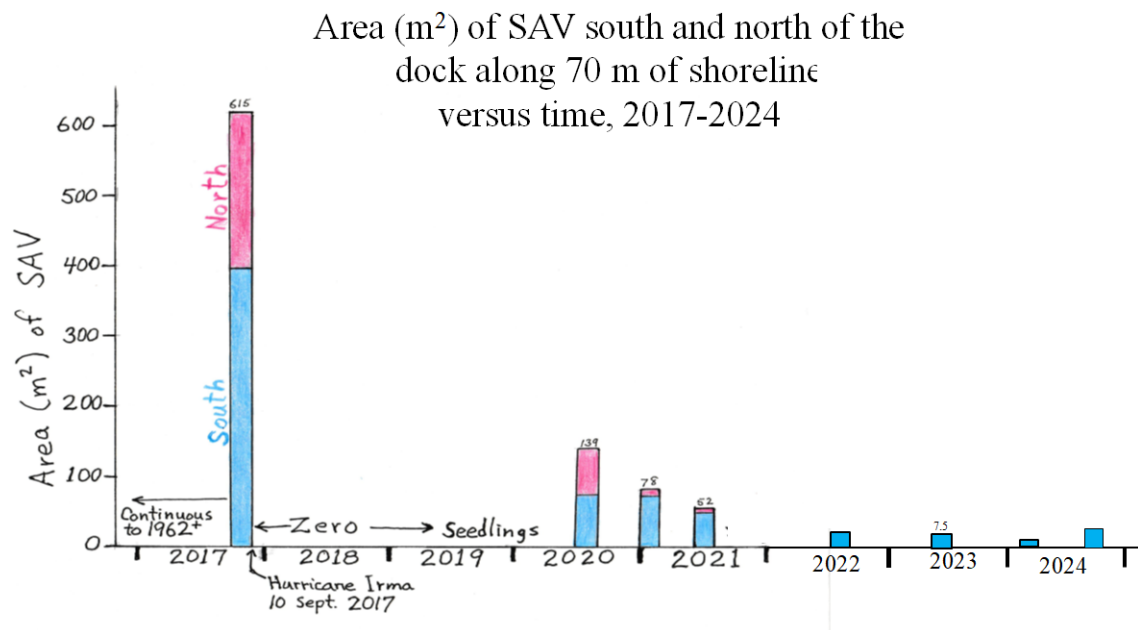
WATER QUALITY (OUTSIDE ENCLOSURE)	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	31.8°C/89.24°F	32°C/89.6°F	23.7°C/74.66°F	Satisfactory status, Improving
DISSOLVED OXYGEN	170.7% / 12.51 mg/L	125.3% / 9.13 mg/L	78.1% / 6.56 mg/L	Satisfactory status, Worsening
SALINITY	0.42 ppt	.41 ppt	0.28 ppt	Satisfactory status, Worsening
TURBIDITY	14.7 FNU	0 FNU	1.64 FNU	Satisfactory status, Improving
CHLOROPHYLL A	10.02 µg/L	8.77 µg/L	7.94 µg/L	Unsatisfactory status, Improving

SITE 7: FORRESTER POINT (NEW 2024 SITE)

Site 7 is at the property of Erich and Cathy Marzolf in East Palatka. Located in what is known as Forrester Point, their property sits on a beautiful bluff surrounded by live oaks. This site is also [Site #2 on the Bartram Trail](#) in Putnam County.

This site is the former home of one of SJRK's science advisors, Dr. Bob Virnstein, a former SJRWMD scientist and a seagrass expert. He is a trusted advisor for the St. Johns Riverkeeper SAV Team, as well as for various projects aimed at protecting seagrass in the Indian River Lagoon and eelgrass in the St. Johns River.

Here is a summary of his research beginning in 2017 right before Hurricane Irma:



In February 2024, Dr. Virnstein set 6 exclusion cages, each just under one square meter. Three are 2-inch by 3-inch mesh and three are 6-inch by 6-inch mesh. After monitoring them monthly, he observed the following patterns:

1. The SAV spreads horizontally first.
2. The SAV then becomes more dense.
3. The SAV then starts to send up longer blades.

Unfortunately, due to high winds and high water levels, SJRK was unable to survey for SAV at this location during the May 2024 Field Visit.

The team returned to the site on June 11 to get a baseline assessment of SAV. Short, stunted eelgrass was present with evident signs of grazing pressure. The bed lengths were also very short - 10 meters from the shoreline, SAV dropped off. The average canopy height for eelgrass was 4.3cm and the average grassbed density was 9%.

In August 2024, the team was unable to get in the water due to the presence of potentially toxic algae. Results from the lab revealed the potentially toxic (PTOX) cyanobacterium *Microcystis* sp. (> 210 colonies per mL).

FORRESTER POINT (SITE 7) CONT.

In October, as with the other sites, a modified SAV survey was necessary due to elevated water levels. The SJRK team did not find any presence of SAV at this site at the time of the survey. We do not have water quality data for 2023, as this is a newly-added site of the 2024 Expedition. The parameters that showed notable changes from May-October 2024 are below:

WATER QUALITY	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	31.9°C/89.42°F	31.7°C/89.06°F	23.2°C/73.76°F	Satisfactory status, Conditions improving
DISSOLVED OXYGEN	161.4%/11.80 mg/L	117.7%/8.56 mg/L	68.5%/5.79 mg/L	Satisfactory status, Conditions worsening
TURBIDITY	5.76 FNU	0.03 FNU	1.41 FNU	Satisfactory status, Conditions improving
CHLOROPHYLL A	10.51 µg/L	13.21 µg/L	7.64 µg/L	Unsatisfactory status, Conditions improving



SITE 8: SAN MATEO

Site 8 is at the property of Tim Houghtaling and Leslie Mullins, who have lived on the east bank of the St. Johns River in Putnam County since 2013. Their property has a metal bulkhead. Tim is actively advocating for more protections of our river's grasses. In March 2022, he installed his first fenced enclosure similar to Site 6 - Dancy Point, but on a smaller scale. Inside the fence the SJRK team found primarily eelgrass. The team also identified aquatic sponges that were encapsulating some of the eelgrass.



May 2023 vs. 2024: We were pleased to see long, healthy eelgrass beds during our May 2024 visit. Average canopy height reached 12.9 cm compared to 2.27 cm in May 2023. Grassbed density was robust at 78% compared to 51% in 2023.

August 2023 vs. 2024: Unfortunately, during our August Field Visit, the team noticed an algae bloom and was unable to safely conduct an SAV survey and transect. Results from the lab revealed potentially toxic (PTOX) *Microcystis* sp. (> 600 colonies/mL), *Raphidiopsis raciborskii* (> 400 filaments/mL) and *Dolichospermum* sp. (> 60 filaments/mL). In August of 2023, canopy height reached 5 cm and grassbed density was 51%.

October 2023 vs. 2024: SJRK was pleased to see the continued presence of eelgrass during this visit. Compared to October 2023, this year's canopy height was reduced, with canopy heights averaging 10.5 cm (compared to 15.9 cm in 2023). Interestingly, grassbed density showed an increase from 2023, with current density reaching 67% compared to 55%.

May-October 2024: In October 2024, the team observed SAV conditions comparable to those recorded earlier this year in May, albeit slightly reduced. The average canopy height measured 10.5 cm (down from 12.9 cm in May), and the grass bed density averaged 67% (compared to 78% in May).

The San Mateo site displayed nearly equal water quality parameters between 2023-2024 and May-October 2024, except for the changes noted below:

WATER QUALITY PARAMETER	MAY 2023	MAY 2024	TREND
WATER TEMPERATURE	28.9°C / 84.02°F	32°C / 89.6°F	Almost unsatisfactory range; Worsened
TURBIDITY	3.78 FNU	5.97 FNU	Within satisfactory range; Worsened
CHLOROPHYLL A	4.4 µg/L	10.03 µg/L	Not within satisfactory range; Worsened

SAN MATEO (SITE 8) CONT.

WATER QUALITY PARAMETER	AUGUST 2023	AUGUST 2024	TREND
WATER TEMPERATURE	31°C / 87.8°F	34.2°C / 93.56°F	Not within satisfactory range; Worsened
DISSOLVED OXYGEN	105.6% / 7.83 mg/L	65.0 % / 4.57 mg/L	Within satisfactory range; Worsened
SALINITY	0.46 ppt	.36 ppt	Within satisfactory range; Improved
TURBIDITY	3.39 FNU	0.36 FNU	Within satisfactory range, Improved
CHLOROPHYLL A	3.87 g/L	6.9 µg/L	Not within satisfactory range; Worsened

WATER QUALITY PARAMETER	OCTOBER 2023	OCTOBER 2024	TREND
DISSOLVED OXYGEN	73% / 6.32 mg/L	61.4% / 5.18 mg/L	Within satisfactory range; Worsened
TURBIDITY	0.70 FNU	1.95 FNU	Within satisfactory range, Worsened

WATER QUALITY PARAMETER	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	32°C / 89.6°F	34.2°C / 93.56°F	23.3°C / 73.94°F	Satisfactory status, Improving
DISSOLVED OXYGEN	154.2% / 11.31 mg/L	65.0 % / 4.57 mg/L	61.4% / 5.18 mg/L	Satisfactory status, Worsening
SALINITY	0.40 ppt	.36 ppt	0.30 ppt	Satisfactory status, Improving
TURBIDITY	5.97 FNU	0.36 FNU	1.95 FNU	Satisfactory status, Improving
CHLOROPHYLL A	10.03 µg/L	6.9 µg/L	7.66 µg/L	Unsatisfactory status, Improving

SITE 9: THE FLORIDIAN CLUB (NEW 2024 SITE)

The Floridian Club is a newly added site to the 2024 SAV Expedition.

More than 40 years ago, Johnny Morris, the owner of Bass Pro Shops, acquired the Floridian Sports Club Fish Camp in Welaka, a small town located about an hour south of Jacksonville, Florida. Morris fell in love with the Welaka area in the 1970s while participating in the first B.A.S.S. tournament on the St. Johns River.



The Floridian Club's charm lies in its beautiful natural scenery, rich history, and excellent fishing opportunities. Today, the Floridian Sports Club remains a notable destination for bass fishermen and plays a significant role in the bass camp community. Bass Pro Shops utilizes the site to host boat dealers, store managers, vendors, and conservation groups, underscoring its ongoing importance to the fishing and conservation community. The club's enduring appeal and strategic use by Bass Pro Shops highlights its unique place in the bass fishing world.

We were met on site by Bass Pro Shops property management team, Whitney and Derek Underwood.

In May 2024, SJRK found and identified two types of SAV, both eelgrass and najas. The average canopy height was 3 cm for eelgrass and 5.1 cm for Najas. The average grass bed density was 16%.

In August and October, due to the presence of potentially toxic algae, the team was unable to get in the water and survey for SAV.

We do not have water quality data for last year, as this is a newly added site as part of our 2024 SAV Expedition. The parameters that showed notable changes during each field visit month are as follows:

WATER QUALITY PARAMATER	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	27.5°C/81.5°F	29.3°C/84.74°F	23.4°C/74.12°F	Satisfactory status, Improving
DISSOLVED OXYGEN	58.30%/4.58 mg/L	45.1 %/3.34 mg/L	72.0%/6.08 mg/L	Satisfactory status, Improving
SALINITY	0.69 ppt	.49 ppt	0.44	Satisfactory status, Improving
CHLOROPHYLL A	5.36 µg/L	5.15 µg/L	7.85 µg/L	Unsatisfactory status, Worsening

SITE 10: BEECHERS POINT

The Beechers Point site is located at the River Bend Condominiums just south of Welaka in Beechers Point. This site is bulkheaded with cypress trees on the bank.

Beechers Point is a notable location along the St. Johns River in Florida, known for its scenic views and ecological significance. Situated within the Welaka area, it features a blend of natural habitats, including marshlands and riverbanks, which support diverse wildlife. Historically, Welaka and its surrounding areas, including Beechers Point, have played roles in Florida's riverine history, blending natural heritage with human influence. The area's diverse aquatic and terrestrial ecosystems make it vital for conservation efforts, including those related to submerged aquatic vegetation, which is essential for maintaining water quality and providing habitat for aquatic species.



May 2023 vs. 2024: In May 2024, the team was pleased to find eelgrass present at this site, compared with a complete lack of SAV in May 2023. An abundance of chara remained. The average canopy height for eelgrass was 4.1 cm and 4.5 cm for chara. The average overall grass bed density was 2%.

August 2023 vs. 2024: In August, due to the presence of algae, the team was unable to get in the water and perform an SAV survey. In August of 2023, the chara was abundant at 14.28 cm and 58% grass bed density, with no presence of eelgrass.

October 2023 vs. 2024: In October, extreme high water levels and flooding in the area resulting from back to back hurricanes prevented the team from conducting an SAV survey. By October 2023, the formerly tall and lush chara had been reduced to nothing.

The Beecher's Point site displayed nearly equal water quality parameters between 2023-2024 and May-October 2024, except for the changes noted below:

WATER QUALITY PARAMETER	MAY 2023	MAY 2024	TREND
WATER TEMPERATURE	29.9 °C/85.82°F	30.6°C/87.08°F	Within satisfactory range; Worsened
DISSOLVED OXYGEN	139.3%	151.3%	Within satisfactory range; Improved
CHLOROPHYLL A	3.94 µg/L	8.33 µg/L	Not within satisfactory range; Worsened

BEECHERS POINT (SITE 10) CONT.

WATER QUALITY PARAMETER	AUGUST 2023	AUGUST 2024	TREND
WATER TEMPERATURE	30°C/86°F	30.8°C/ 87.44°F	Within satisfactory range; Worsened
DISSOLVED OXYGEN	109.3%/8.18 mg/L	86.8 %/6.42 mg/L	Within satisfactory range; Worsened
CHLOROPHYLL A	3.99 µg/L	7.73 µg/L	Not within satisfactory range; Worsened

WATER QUALITY PARAMETER	OCTOBER 2023	OCTOBER 2024	TREND
DISSOLVED OXYGEN	103.1%/8.92 mg/L	67.0%/5.61 mg/L	Within satisfactory range; Worsened
SALINITY	0.52 ppt	0.37 ppt	Within satisfactory range, Improved

WATER QUALITY PARAMATER	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	30.6°C/87.08°F	30.8°C/ 87.44°F	23.9°C/75.02°F	Satisfactory status, Improving
DISSOLVED OXYGEN	151.3%/11.31 mg/L	86.8 %/ 6.42 mg/L	67.0%/5.61 mg/L	Satisfactory status, Worsening
SALINITY	0.51 ppt	.42 ppt	0.37 ppt	Satisfactory status, Improving
CHLOROPHYLL A	8.33 µg/L	7.73 µg/L	8.42 µg/L	Unsatisfactory status, Worsening

SITE 11: JENERSON POINT (NEW 2024 SITE)

Site 11 is newly added to the 2024 SAV Expedition. Two sets of homeowners partnered with SJRK to have a SAV protective enclosure installed at this site. Amanda Dickinson and David Lutkins live at 210 S. Hayes Avenue and Mike and Brenda Marconi live at 208 S. Hayes Avenue in Crescent City, FL.



We were welcomed onsite by Amanda. Born and raised in Jacksonville, she spent a lot of her life fishing and recreational shrimping with her father. Over the last 10 years she has lived on the St Johns River from Ortega to Fruitland in Putnam

County. She states: "As a child in the late 1970's I remember swimming in Lake George, which was so clear and full of eelgrass. Now it's hard to find any eelgrass anywhere and the water is no longer clear." As a commercial crabber and shrimper, Amanda's husband David is very supportive of our partnership to protect and help restore the river's ecosystem. "It's really amazing how something so simple can have such a big impact on our river's future."

In May 2024, SJRK found eelgrass as well as chara present. The average canopy height for the eelgrass was 2.7 cm and 2.9 cm for the chara. The average grass bed density was 16%.

During the August field visit, eelgrass was once again found at the site, as well as *Najas guadalupensis*, which had not been identified in May. The SAV density was lower in August, with an average of 7%. Eelgrass canopy height averages remained nearly unchanged at 2.45 cm.

Consecutive hurricanes in September and October rendered this site inaccessible for a full SAV transect during our October 2024 visit due to elevated and rough water conditions. Despite the challenges, SJRK conducted a preliminary sweep for SAV but were unable to locate any grass during this initial assessment.

As this is a new site on our 2024 SAV Expedition, we do not have water quality data from last year. The parameters that exhibited notable changes during each field visit month are below:

WATER QUALITY PARAMATER	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	31.5°C / 88.7°F	31.1°C / 87.98°F	23.6°C / 74.48°F	Satisfactory status, Improving
DISSOLVED OXYGEN	178.40% / 13.17 mg/L	105 % / 7.73 mg/L	77.4% / 6.55 mg/L	Satisfactory status, Worsening
SALINITY	0.52 ppt	.59 ppt	0.36 ppt	Satisfactory status, Improving
CHLOROPHYLL A	7.18 µg/L	7.32 µg/L	8.98 µg/L	Unsatisfactory status, Worsening

SITE 12: DRAYTON ISLAND

Site 12 is behind the home of Ken and Jamie Baxley who have lived at this property on Drayton Island since 2004. Drayton Island, a privately owned and heavily forested island, is situated at the northern tip of Lake George on the west side of the main channel of the St. Johns River in Putnam County. The site exhibited a natural shoreline with a gentle slope and cypress trees.



May 2023 vs. 2024: When the SJRK team entered this site in May, it was found that only chara was present so no SAV measurements were taken.

August 2023 vs. 2024: As with other sites during the August Field Visit, visible algae films on the water's surface prevented safe SAV sampling. This was likewise the case in 2023.

October 2023 vs. 2024: In October, high water levels and flooding in the area prevented the team from entering the water to conduct an SAV survey.

The Drayton Island site displayed nearly equal water quality parameters between 2023-2024 and May-October 2024, except for the changes noted below:

WATER QUALITY PARAMETER	MAY 2023	MAY 2024	TREND
WATER TEMPERATURE	29.2°C/84.56°F	30.6°C/87.08°F	Within satisfactory range; Worsened
DISSOLVED OXYGEN	110.9%/8.50 mg/L	145.8%/10.98 mg/L	Within satisfactory range; Improved
CHLOROPHYLL A	3.76 µg/L	8.46 µg/L	Not within satisfactory range; Worsened

WATER QUALITY PARAMETER	AUGUST 2023	AUGUST 2024	TREND
WATER TEMPERATURE	31.6°C/88.88°F	31.3°C/88.34°F	Within satisfactory range; No significant change
DISSOLVED OXYGEN	124.8%/9.25 mg/L	109.6 %/8.08 mg/L	Within satisfactory range; Worsened
SALINITY	0.56 ppt	.61 ppt	Within satisfactory range; Worsened
CHLOROPHYLL A	3.58 µg/L	7.84 µg/L	Not within satisfactory range; Worsened

DRAYTON ISLAND (SITE 12) CONT.

WATER QUALITY PARAMETER	OCTOBER 2023	OCTOBER 2024	TREND
DISSOLVED OXYGEN	111%/9.49 mg/L	85.0%/7.10 mg/L	Within satisfactory range; Worsened
SALINITY	0.50 ppt	0.35	Within satisfactory range, Improved

WATER QUALITY PARAMATER	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	30.6°C/87.08°F	31.3°C/88.34°F	24.2°C/75.56°F	Satisfactory status, Improving
DISSOLVED OXYGEN	145.8%/10.98 mg/L	109.6 %/8.08 mg/L	85.0%/7.10 mg/L	Satisfactory status, Worsening
SALINITY	0.50 ppt	.61 ppt	0.35 ppt	Satisfactory status, Improving
CHLOROPHYLL A	8.46 µg/L	7.84 µg/L	10.06 µg/L	Unsatisfactory status, Worsening

SITE 13: GEORGETOWN NORTH (NEW 2024 SITE)

The Georgetown North Site is an addition to the 2024 SAV Expedition and consists of 3 separate property owners that we met during a 2023 community meeting in Georgetown to discuss concerns about missing eelgrass in the St. Johns River. These neighbors consist of Dennis Soggs, Thadd & Marilyn Herkowski, and Butch & Teresa Miller, who are partnering with SJRK for our SAV protective enclosure initiative to complement FWC's project.



We were welcomed onsite in May, August and October by Dennis Soggs who moved to the area 4 years ago.

He states, "the majestic beauty of water has always been woven into my life and the ability to now live on the St. Johns River was a dream come true. Working with this team with a proven track record of success and spirited determination has rekindled my faith in hope a path can be found to help the river after all."

During our visit in May, SJRK identified the presence of both eelgrass and chara at this site. The average canopy height for the eelgrass was 3.3 cm and 5.6 cm for the chara. The average grass bed density was 43%. Grazing pressure was confirmed.

During the August field visit, visible algae films on the water's surface prevented SAV sampling.

This site was inaccessible for a full SAV transect during October due to elevated water conditions after back to back hurricanes. Despite these challenges, team members entered the water to perform a preliminary sweep for SAV but found no grass during this brief inspection. Since this is a newly added site for our 2024 SAV Expedition, we do not have water quality data from the previous year. The following parameters showed notable changes during each field visit month:

WATER QUALITY PARAMATER	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	29.5°C / 85.1°F	30.2°C / 86.36°F	23.5°C / 74.3°F	Satisfactory status, Improving
DISSOLVED OXYGEN	134.9% / 10.27 mg/L	87.4 % / 6.55 mg/L	82.0% / 6.92 mg/L	Satisfactory status, Worsening
SALINITY	0.50 ppt	.61 ppt	0.33 ppt	Satisfactory status, Improving
CHLOROPHYLL A	9.44 µg/L	7.35 µg/L	9.90 µg/L	Unsatisfactory status, Worsening

SITE 14: GEORGETOWN SOUTH (NEW 2024 SITE)

Similar to the Georgetown North Site, the Georgetown South Site is also an addition to the 2024 SAV Expedition and consists of 3 separate property owners: Bill & Holly Pickens, Mike & Lisa Gibbons and John & Diann Gregory that partnered with SJRK for a protective SAV enclosure.

We met these homeowners at the same 2023 community meeting in Georgetown in which we met the Georgetown North property owners.

We were met onsite by Mike Gibbons during each field visit this year, who also has been instrumental in helping construct the FWC enclosures.



In May, similar to the Drayton Island site, only chara was found, so no measurements were taken.

In August, algae was present in the water column, which again prevented sampling.

In October, high water levels after back to back hurricanes prevented the team from conducting a full SAV transect.

As this is a newly added site for our 2024 SAV Expedition, we do not have water quality data from the previous year. The following parameters showed notable changes during each field visit month:

WATER QUALITY PARAMATER	MAY 2024	AUGUST 2024	OCTOBER 2024	TREND
WATER TEMPERATURE	30.4°C/86.72°F	29.7°C/85.46°F	23.4°C/74.12°F	Satisfactory status, Improving
DISSOLVED OXYGEN	154.7%/11.61 mg/L	90.6%/6.81 mg/L	79.40%/6.71 mg/L	Satisfactory status, Worsening
SALINITY	0.50 ppt	.61 ppt	0.33 ppt	Satisfactory status, Improving
CHLOROPHYLL A	8.48 µg/L	7.11 µg/L	10.0 µg/L	Unsatisfactory status, Worsening

STORY MAP

For an interactive exploration of all our 2024 findings, please refer to our [2024 SAve Our River's Grasses Story Map](#). This resource provides detailed maps, data visualizations, and comprehensive summaries of the year's efforts and results, offering an engaging way to learn about our progress and impact.

HOVER OVER THE QR CODE WITH YOUR PHONE'S CAMERA:



SEEKING SOLUTIONS

STRATEGIES TO SAVE OUR RIVER'S GRASSES

Unfortunately, there is not a silver bullet solution that will SAVE our river's grass.

According to the St. Johns River Water Management District (SJRWMD), the current die off is due to persistent higher, darker water that would take a "drier climactic period" to offset. However, a drought would also deplete the river of fresh water and further exacerbate saltwater intrusion harming struggling SAV in the northern section of the Lower St. Johns.

It is critical that we deploy strategies that will reduce identified SAV stress by:

- Increasing Light Availability
- Stabilizing the St. Johns River Estuary's Critical Salt/Freshwater Balance
- Improving Water Quality
- Increasing the Resilience of the St. Johns River
- Expanding SAV Biomass to Reduce Grazing Pressure

We must also ask important questions and work collaboratively to find answers:

- Are higher, darker water levels the new normal? If so, what can we do about it?
- Are pesticides, herbicides and aggressive invasive plant management undermining SAV presence?
- How do we make our river more resilient to extreme climate events?
- Are there other factors undermining SAV health that are not on our radar?

A holistic, watershed wide approach is warranted to tackle all stressors to restore the St. Johns River.

Not one of the following strategies will SAVE our river's grasses in isolation, but if we work diligently to achieve the following protective measures, we will give our river a fighting chance.



PROTECT THE ST. JOHNS RIVER HEADWATERS (UPPER BASIN)

In May 2016, the St. Johns River Water Management District (SJRWMD) and the U.S. Army Corps of Engineers (USACE) completed the Upper Basin Restoration Project, one of the largest flood control and wetland restoration projects in the world.

For more than a decade, South Florida has been dumping their sewage sludge (AKA biosolids) on land in the upper basin after this harmful practice was outlawed in the Everglades watershed. Water quality in the St. Johns River Headwaters was drastically diminished as a result.

The health of the St. Johns River depends on a healthy Upper Basin.

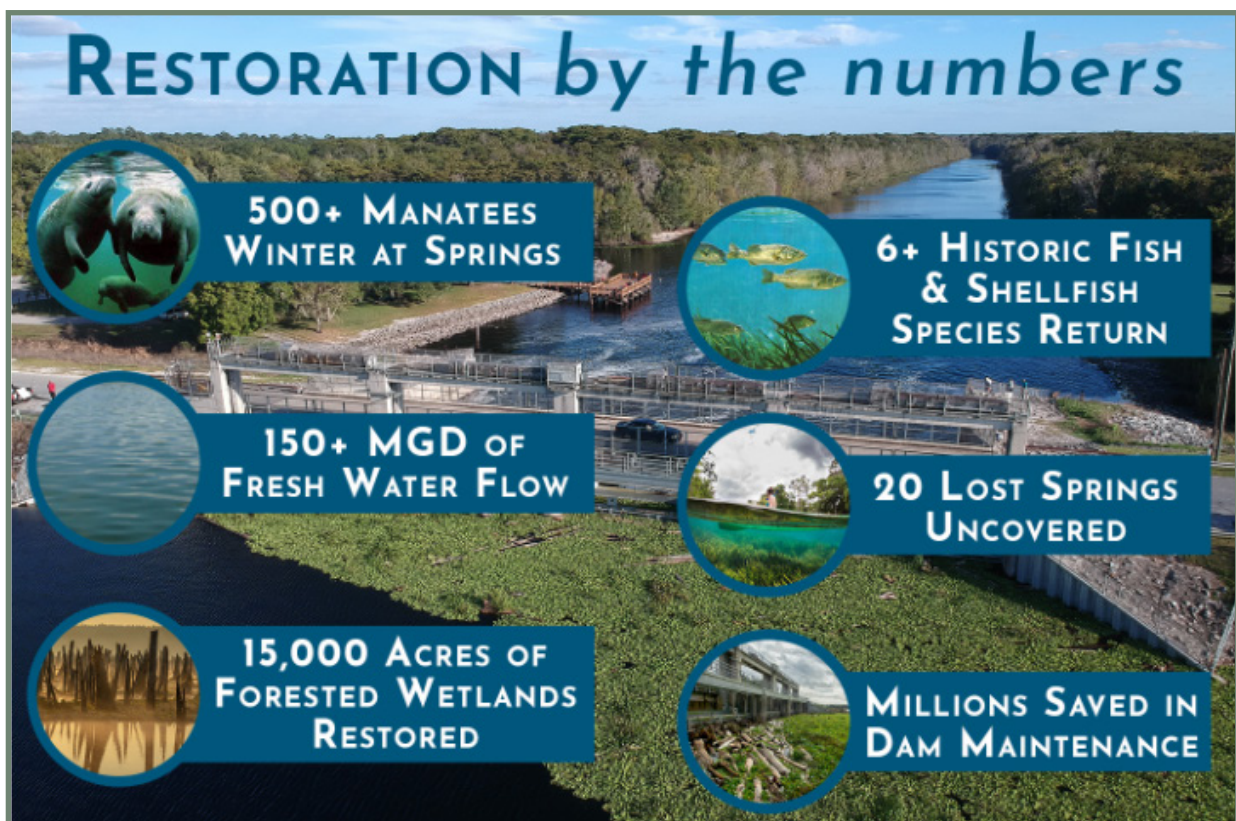
- Ban the land disposal of sewage sludge (AKA biosolids)
 - Florida must invest in sustainable sewage management strategies to process our state's growing volume of sewage.
- Protect from future harm - Demand regulatory oversight, protective permits, reasonable assurances and enforcement are met as required by law.
 - A high-density chicken facility, Morning Star Fields, is under construction just upstream from Blue Cypress Lake without the protective measures and reasonable assurances that are required by Florida Law.
 - We urgently ask the Florida Department of Environmental Protection to ensure that the permits and reasonable assurances are in place to protect the river as intended.
 - In June 2024, Grove Land Reservoir received a \$400 million taxpayer subsidy and if built as is will increase pollution in the already impaired Headwaters of the St. Johns. According to state agencies, reasonable assurances do not exist to support Grove Land's intent or to ensure that no harm will be caused to the Upper St. Johns and the northern Indian River Lagoon (IRL) near Sebastian.
 - We urgently request the SJRWMD to ensure all necessary safeguards are in place to provide an environmental lift to both the IRL and the St. Johns River. One water body must not be sacrificed for another.



REUNITE THE RIVERS - RESTORING THE NATURAL CONNECTION OF SILVER SPRINGS, THE OCKLAWAHA AND THE ST. JOHNS RIVERS

Restoring this natural connection will provide one of the most significant boosts to the river's natural ability to support healthy SAV. By breaching the Rodman dam, 7500 acres of forested floodplain will be restored, twenty springs will flow freely again, migratory fish will repopulate the river from the Atlantic Ocean to Silver Springs, and an average of 150 million gallons of natural flow will return to the Ocklawaha and Lower St. Johns. This restored natural connection will:

- Add clearer, cooler water that will help SAV growth
- Offset saltwater intrusion
- Maintain salt/freshwater balance
- Provide an eelgrass/SAV seed source
- Improve the delivery of critical nutrients for beneficial algae vs. harmful algal blooms
- Reduce herbicide use
- Increase biofiltration
- Migration enhancement of eel & fish like shad, striped bass, channel catfish, & mullet



PRIORITIZE WATER CONSERVATION & SPRINGS PROTECTION

Clean, fresh water is the lifeblood of the St. Johns River, its springs and tributaries. Our wetlands, forests, riparian zones, and SAV provide the habitat and food sources that sustain healthy plant, fish, and wildlife populations. The St. Johns also sustains nearly 5 million people who live within its watershed. It is our collective duty to protect this natural treasure. Unfortunately, Floridians still use 50% of our drinking water to irrigate our lawns. This unsustainable use of water is undermining our springs, rivers and future. We must live within our water means and not rely on harmful water withdrawals from the St. Johns.

- Stimulate Sustainable Growth, Not Unbridled Growth at our river and our springs' expense. Plan for Florida's population growth to better protect natural lands, promote livable communities, and save taxpayer dollars. Protective growth standards should be based on available water supply and protection of clean water for human consumption and natural systems.
- Prioritize Water Conservation, efficiency, and reuse strategies instead of expensive, harmful water withdrawals. Florida's water conservation strategies are wholly insufficient and exclude even the most obvious and cost-effective water conservation measures in favor of unsustainable, expensive, unnecessary, and damaging surface water projects.
- Protect the St. Johns River and Florida Springs from the inevitable harmful impacts of overuse of our Aquifer and surface water withdrawals. A holistic approach with safeguards must be in place to protect our aquifer, our springs and our river and to provide safe drinking water for Florida's future.

ADOPT PROTECTIVE FRESHWATER RESERVATIONS FOR THE LOWER ST. JOHNS TO PROTECT & RESTORE ITS CRITICAL SALT/FRESHWATER BALANCE

The St. Johns River Estuary is a 100-mile stretch of water from the river's confluence with the Ocklawaha River to where the St. Johns joins the Atlantic Ocean at Mayport. It's a transition zone between freshwater and saltwater ecosystems and is home to many recreational and commercial fisheries. It's a critical ecosystem that provides food, water, and shelter for plants and animals.

Unfortunately, the St. Johns River Estuary is out-of-balance and nearly devoid of fish habitat due to a number of stressors including saltwater intrusion. SAV requires more light in a higher salinity environment due to increased metabolic demands (Dobberfuhl 2007).

However, there is no regulatory target for salinity in the St. Johns even though this protection is available under Florida Law.

A water reservation is a legal mechanism, authorized by Section 373.223(4), Florida Statutes, to set aside water from consumptive uses for the protection of fish and wildlife or public health and safety.

When a water reservation rule is in place, the volume and timing of water at specific locations is protected for the natural system. Unfortunately, water reservations are currently only used in South Florida.

The St. Johns River Estuary must be equally protected.

PRIORITIZE RESILIENCY EFFORTS

Our river deserves a holistic approach and full exploration of all potential remedies. Solutions available comprise a mix of restorative, protective, and preventative measures and policies. These include freshwater flow restoration, nutrient pollution reduction, land and water conservation, resilience efforts, protective development strategies, and protective barriers.

Protective, conscientious regulation of development is another solution. Environmentally irresponsible development leads to loss of riparian buffers while increasing turbidity and nutrient pollution. Sustainable development like pervious pavement and more native green buffers will protect SAV and reduce risk of flooding and maintain the land's natural methods of pollutant filtration and shoreline stabilization.

Resiliency efforts like living shorelines for residents who live along the river can also protect SAV. This reduces wave action that rips SAV from the littoral zone, allows more shore stabilization, and reduces turbidity by limiting total suspended solids.

REDUCE NUTRIENT POLLUTION WATERSHED-WIDE

Our river requires a comprehensive, watershed-wide approach to effectively reduce nutrient pollution.

Nutrient pollution is caused by various factors; these include sewage sludge (biosolids) seepage from agriculture applications, fertilizer run-off, wastewater discharge, and septic tank or lift station leaks.

Protective measures are needed to prevent sewage sludge land disposal and other nutrient sources from causing algae blooms and polluting our waterways. More septic to sewer, sewer infrastructure upgrades and more sustainable agriculture practices to reduce nutrient runoff is also warranted.

Individual community members can also be positive influences in this endeavor to SAVE our River's Grasses. Nutrient pollution can be reduced by river-friendly fertilizing practices. If you use fertilizer, select a slow-release nitrogen fertilizer with zero phosphorous that does not contain herbicides or pesticides. Other options include limiting Spring fertilizer application until your lawn is fully established, refraining from fertilizer use in the rainy season and planting native plants to reduce groundwater and fertilizer use.

SAV FENCING ENCLOSURE INITIATIVE

Recent restoration efforts targeting eelgrass in the upstream sections of the Lower St. Johns River (LSJR), particularly in Lake George and Silver Glen Spring, have demonstrated remarkable success through the use of wire-enclosed fences.

These protective enclosures, designed to shield the plants from herbivore grazing, **resulted in canopy heights that were approximately ten times greater than those of eelgrass growing outside the enclosures.**

This stark contrast underscores the critical role of enclosures in **fostering SAV growth by mitigating grazing pressure** and allowing the plants to reach their full potential in height and density.

Research done by FWC Biological Scientist, Dan Kolterman, and SJRWMD Environmental Scientist Riley Timbs, demonstrates a significant, positive effect on the growth and recovery of eelgrass in the Lower St. Johns River. Research and field observations demonstrate that herbivory—primarily from manatees and other aquatic grazers—can severely limit the recovery and expansion of grass beds. When grazing pressure is removed, tape grass biomass not only recovers but also thrives without requiring supplemental interventions like transplants or seeding.

This suggests that grazing pressure is a substantial barrier to SAV restoration efforts. By allowing natural processes such as rhizome extension and self-seeding to take place within protected areas, restoration projects can leverage the plant's inherent regenerative capabilities to **achieve sustainable growth and improve habitat resilience.**

Protective fence enclosures are being implemented to safeguard both SAV and shoreline vegetation from grazing by plant-eating animals until the plants can establish themselves fully. These enclosures serve as a practical method to mitigate the immediate impacts of herbivory, especially as increasing populations of species like tilapia present growing challenges for river ecosystems. Tilapia, which have become more prevalent due to fewer hard freezes in the region, pose a potential threat to the health of the river and its native species.

While fence enclosures show promise in promoting vegetation recovery, further research is necessary to fully understand their long-term effects on SAV and their role in broader conservation strategies. Investigating the behavior and impact of herbivores like tilapia will also be critical to developing effective, sustainable solutions for preserving native habitats (Timbs & Kolterman, 2023).



SJRK ENCLOSURE INITIATIVE

St. Johns Riverkeeper (SJRK) is currently undergoing the permitting process to install small-scale exclusion fences in the St. Johns River at 10 sites along our expedition route. St. Johns Riverkeeper is partnering with Coastal Conservation Association (CCA), Mighty River Recovery and riverfront homeowners to install these protective enclosures using FWC's installation guidelines. As mentioned before, this effort does not involve SAV planting; its goal is to simply protect the native, viable seed bank/rhizome network and the existing grasses' ability to grow, germinate and disperse without grazing pressure. This strategy does not harm wildlife and has proven to quickly facilitate the regrowth of native grasses. We are committed to water quality data collection and surveying of SAV within the enclosures and outside the protective fencing.



In 2025, we will expand this effort and add additional sites to include areas in Duval and in the middle basin.

SJRK ENCLOSURE DATA COLLECTION

To evaluate the effectiveness of the FWC enclosures, the SJRK team conducted measurements of SAV growth and water quality in the existing fenced areas. Notable successes were observed in two key locations: the Bayard Point Conservation Area, situated south of Green Cove Springs on the river's west bank, and Dancy Point in East Palatka on the river's east bank. These areas demonstrated the enclosures' ability to support the recovery and establishment of SAV by reducing grazing pressures and providing a controlled environment for vegetation growth.

1. Bayard Point Conservation Area

On June 13 2024, SJRK joined FWC to survey SAV just south of Shands Bridge adjacent to Bayard Conservation Area and in Little Florence Cove.

Within the FWC SAV protective enclosures installed this past Spring healthy, robust native eelgrass with nearly 100% coverage was found in each enclosure.

SJRK surveyed within and outside the following enclosures:

- Bayard North 1
- Bayard North 2 (upstream and downstream)
- Little Florence Cove.

The team discovered a diversity of species, including *Vallisneria americana* (commonly known as eelgrass), along with other types of SAV including *Najas guadalupensis* (Southern Naiad), *Ruppia maritima* (widgeon grass), and *Chara* sp. (musk grass).

Within these enclosures, SAV coverage averaged an impressive 92%. *Vallisneria americana* (eelgrass) reached an average canopy height of 21.48 cm, *Najas guadalupensis* (southern naiad) grew to an average height of 22.98 cm, and *Ruppia maritima* (widgeon grass) stood out with an average canopy height of 66.4 cm. These measurements highlight the effectiveness of the enclosures in fostering robust SAV growth and diversity.

The success of the enclosures at Bayard demonstrates that, with some assistance, eelgrass can thrive in protected environments. A similar outcome was observed at the 2.6-acre Dancy Point enclosure in East Palatka, which is included in our Expedition route.



2. Dancy Point

Installed in February 2023, the Dancy Point enclosure showed promising results within just 3 months. By May 2023, SAV began to sprout, reaching an average canopy height of 2.38 cm and a grassbed density of 29%. Growth accelerated over the summer, with the eelgrass averaging 6.39 cm in height and a 63% grassbed density by August. By October 2023, the eelgrass reached an impressive average height of 45.5 cm, with the grassbed density holding steady.



By May 2024, the eelgrass inside the enclosure achieved even greater heights, averaging 54 cm, with a percent cover of 66%. Growth remained consistent through August, with the canopy height staying similar and grassbed density increasing to 71%.

Unfortunately, the enclosure at Dancy Point was compromised in early September 2024. This breach left the once-thriving eelgrass vulnerable to grazer pressure, leading to its rapid decline. Within three weeks, the previously lush beds were reduced to stubble, as observed during our October field survey.

Ray Bunton, the property owner who hosted the enclosure, collaborated with his friend David Girardin, who not only assisted in installing the enclosure but also monitored the SAV's progress within it. Reflecting on their observations, David remarked: "We noted rhizome extension into areas that had no grass previously. By the end of the project, we had approximately 85% coverage of mature eel grass that was producing flowers and seeding."

The overall structure of the enclosures is currently undergoing modifications to prevent future breaches and enhance their resilience. David's observations identified several design flaws in the enclosure structure, including the size and material of the mesh wire, the height of the fence, and the methods used to secure it. These factors influence the enclosure's effectiveness and vulnerability to breaches. Additionally, uncontrollable environmental factors, such as extreme weather events, also contribute to challenges, highlighting the critical need for routine maintenance to ensure the structure's durability and functionality.

While SAV protective enclosures are not a cure-all solution, they play a valuable role in supporting the recovery of submerged aquatic vegetation. These structures provide critical data on growth conditions and the impacts of environmental stressors while fostering SAV regrowth in localized areas.

MORE RESEARCH IS NEEDED

As we continue our SAVe Our River's Grasses Expedition, we will also expand our research to fully understand all threats to our river's grasses and work collaboratively to best understand how we can address those threats and ultimately restore the St. Johns' SAV.

- Are higher, darker water levels the new normal?
- Are pesticides, herbicides and aggressive invasive plant management undermining SAV presence?
- How do we make our river more resilient to extreme climate events?
- Are there other factors undermining SAV health that are not on our radar?
- Are there environmental disruptions that are made worse by excess nutrients?



CONTINUING OUR EXPEDITION

SJRK will continue the SAVE the River's Grasses Expedition through 2027 during SAV's peak growing season (March-October). We will collect more data and continue our conversation with homeowners, anglers, river enthusiasts, business owners and scientists to better understand our river and its significance to our communities, our economy and our lives.

To make this a reality, we appreciate the generous support of the Coastal Conservation Association (CCA) and Mighty River Recovery. Their dedication in conserving and restoring fish habitat aligns with our shared goals of the SAVE Our River's Grasses Expedition.

The SJRK team will continue to meet with agencies and review data currently being tracked by SJRWMD, USACE, and FWC to contribute to our understanding of the St. Johns River's SAV loss and the solution to its return.

We ask for your help to advocate for swift action to foster the return of SAV and its unparalleled ecosystem services, to SAVE the St. Johns for today and for future generations.

If you would like to get more involved, please visit Stjohnsriverkeeper.org and explore our various opportunities to advocate for solutions, "Get Your Feet Wet," participate in volunteer cleanup projects, join our young professionals group Rising Tides, or report violations related to pollution, marine debris, animal sightings, and more. SJRK has also created a survey for waterfront homeowners and would greatly appreciate your input on the condition of grasses behind your home. To report an algal bloom, hazardous material/marine spill, wetland violation, illegal discharge, construction site runoff, solid waste concerns, etc., please contact report@sjrk.org.

This effort would not be possible without the support of hosting riverfront residents and their neighbors, advising scientists, community leaders, anglers, and all those who care for the river. They have been instrumental in the success of this effort and in our ongoing partnership to SAVE our River's Grasses.

Together, we are making a difference.

For The River. For Us All.



Pictured: Steve Cobb, Lisa Rinaman, Roy Fouts, Joe Balog, Tim Mann, Abigail O'Neil, Jessica Finch and Soraya Aidinejad

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