



Webinar

National Association of Marine Laboratories (NAMML)

“Immersive Marine Science Education from the St. Johns River to the Atlantic Ocean”

- Sponsored by the NAMML Education Committee
- February 25, 2022
- Speaker: Melinda Simmons & Jeremy Stalker, Jacksonville University
Marine Science Research Institute
- [Link to recording](#)

Immersive Marine Science Education from the St. Johns River to the Atlantic Ocean

Dr. Melinda Simmons &
Dr. Jeremy Stalker



A vertical teal marbled background with swirling patterns of dark teal, light teal, and yellow-green, set against a black background. It occupies the left side of the slide.

Goals

- Share our education & outreach efforts
- How/why they were started
- How they were funded
- What has worked well
- Things to consider when designing these types of programs

Jacksonville University

- Private, liberal arts university
- On the St. Johns River
- 4,001 students
 - 2,652 under graduates
 - 1,349 graduate students



Marine Science Research Institute



Marine Science Research Institute



Marine Science Research Institute

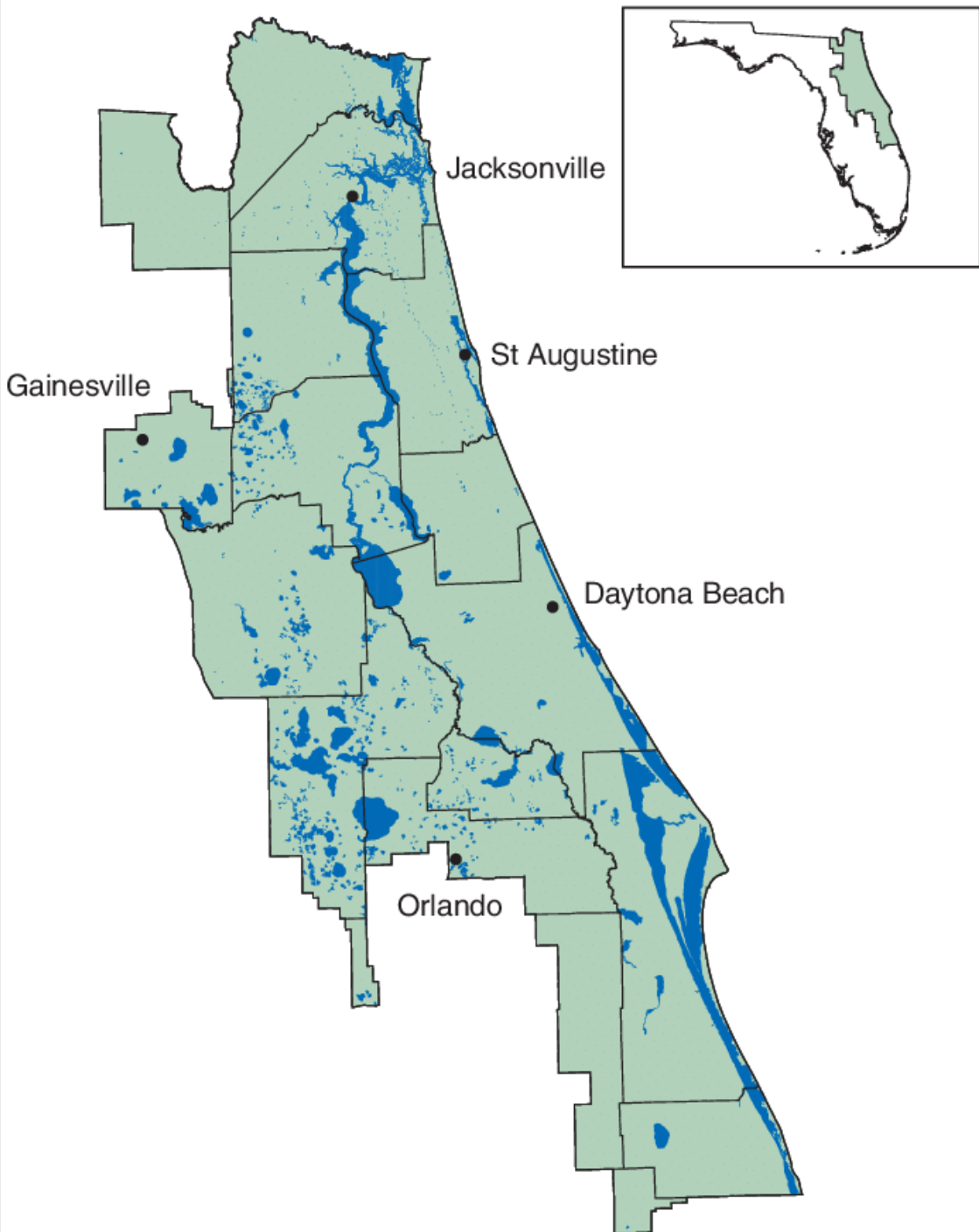


Northeastern Fisheries Laboratory

St. Johns River Time Series



THE **JOY** MCCANN
FOUNDATION



St. Johns River

- Longest river in Florida (500 km)
- Drains 16% of Florida's total surface area (~24,424km²)
- Northward flowing to the Atlantic Ocean at Jacksonville
- <9m elevation change from headwaters to the mouth
- 100 springs provide over 30% of the flow

Lower St. Johns River (LSJR)

- The LSJR is a tidal, estuary system
- LSJR basin extends through 9 counties
- There are a variety of industries and land uses along its banks
- It is also a major shipping channel and is currently undergoing dredging to 14.6m for this purpose

Figure made by Kmusser

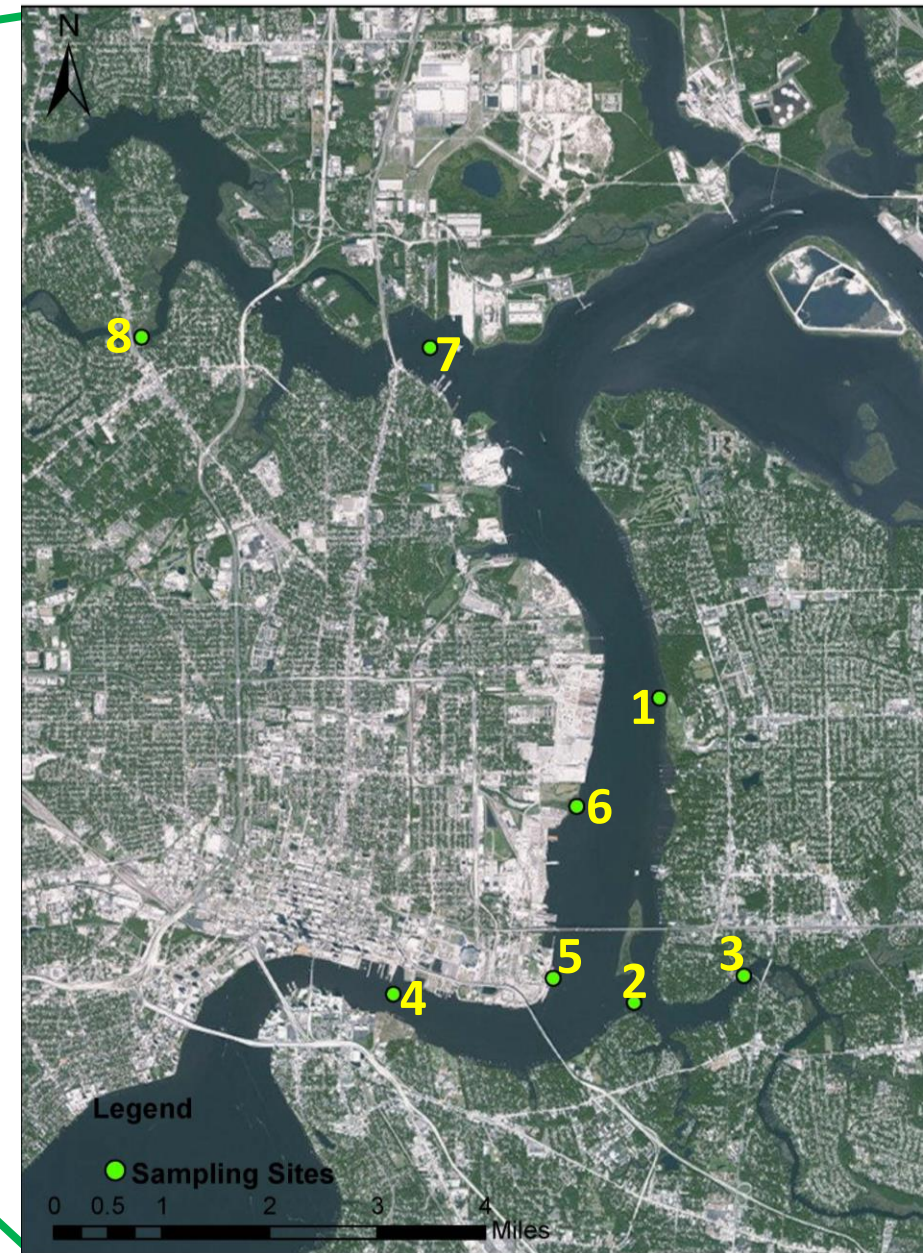
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Why a LSJR Time Series?

- Monitoring and evaluation of anthropogenic impacts on the St. Johns River
- Other reasons:
 - The MSRI has the means to build a long-term data set
 - Base line measurements pre-dredging
 - Increases in harmful algal blooms (HABs)
 - Reduced agency sampling due to funding cuts
 - Climate change – hurricanes
 - Valuable learning opportunity



Left figure made by Kmusser
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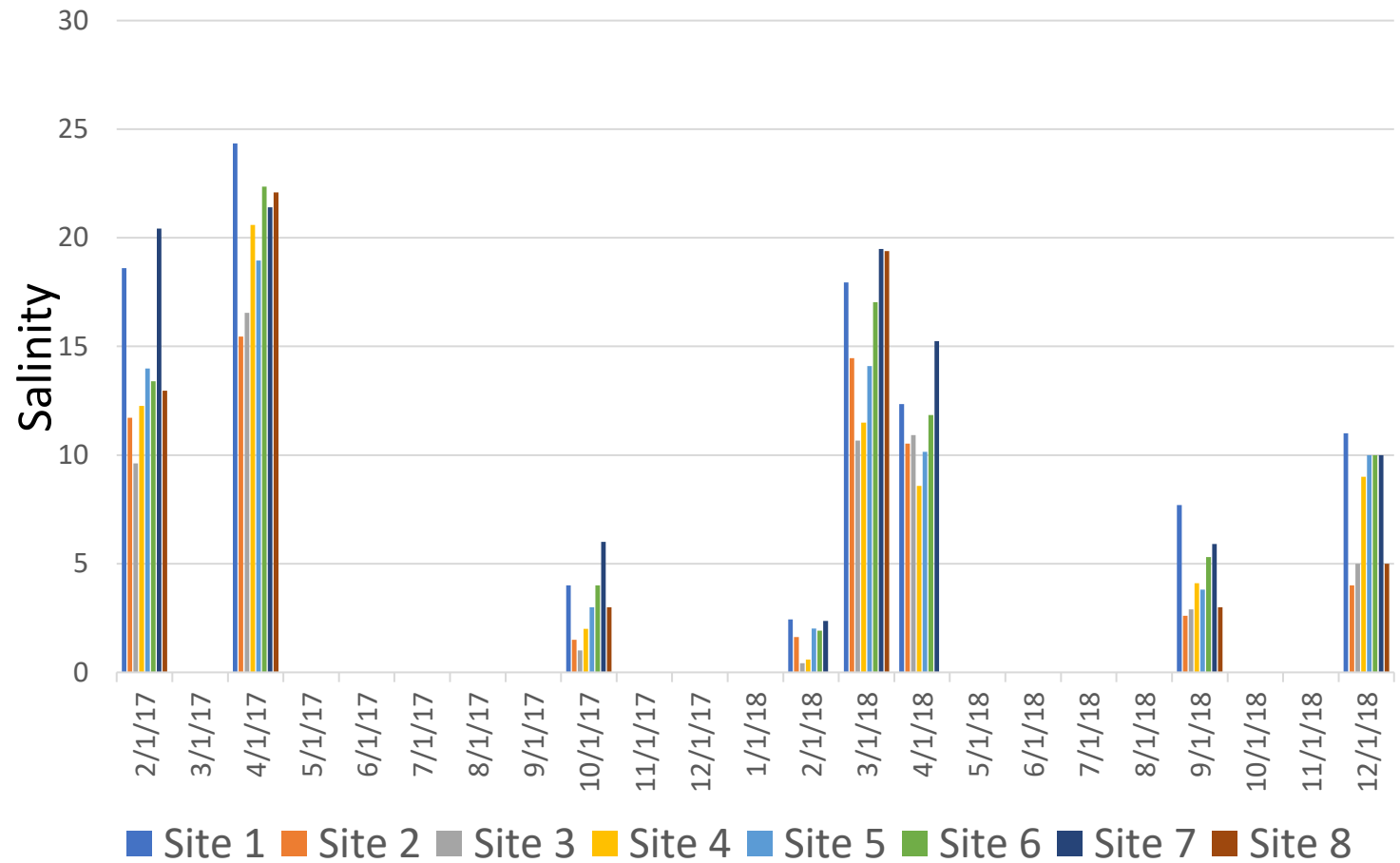
Time Series Sites



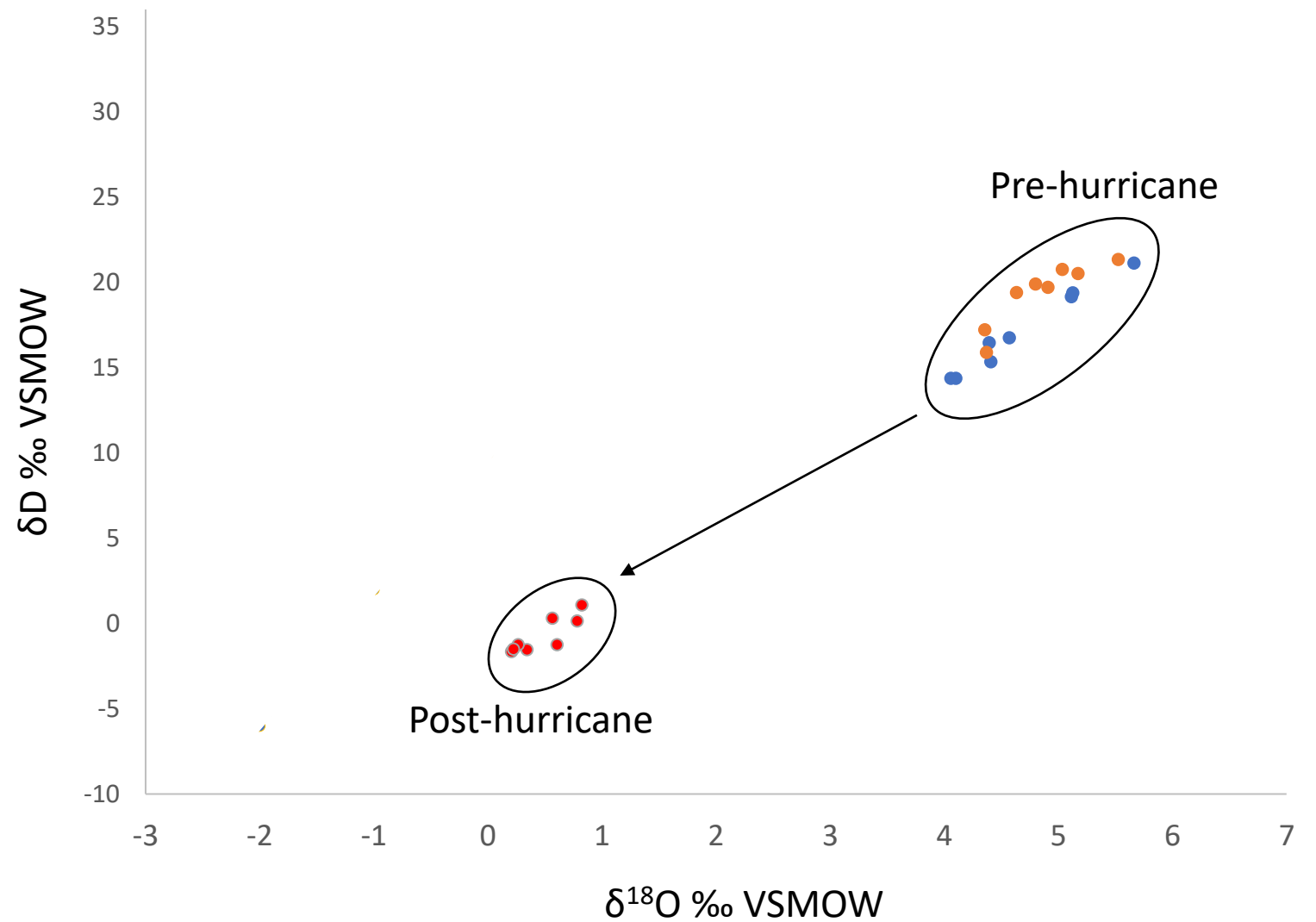
Hurricane Irma hit Florida on September 10th 2017



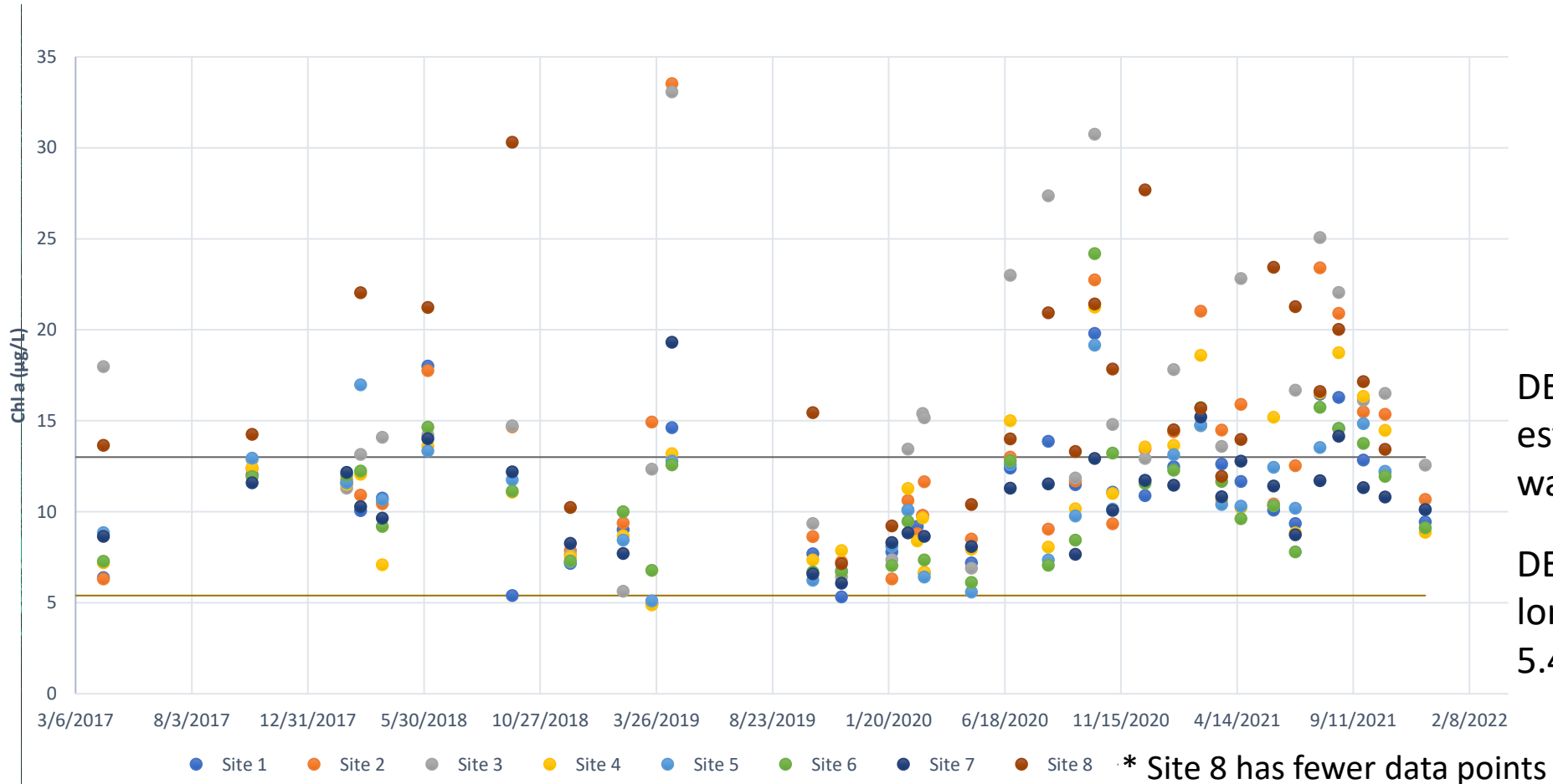
Chemical recordings of an acute weather event



Chemical recordings of an acute weather event



Chlorophyll at 8 LSJR Sites Since 2017

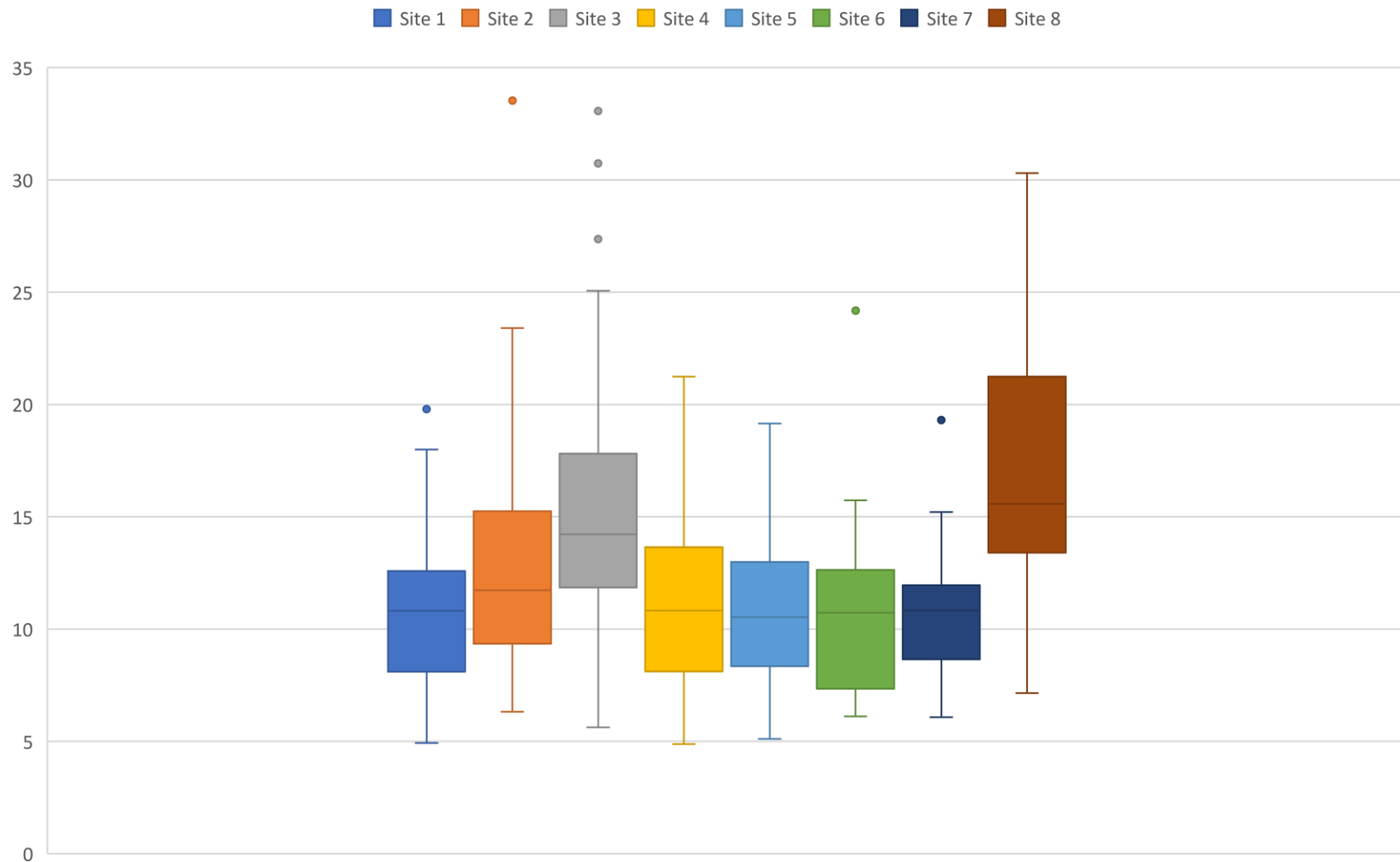


DEP impairment threshold for estuaries and open coastal waters: 11µg/L annual mean

DEP site-specific criterion for long-term annual averages: 5.4µg/L

Chlorophyll at 8 LSJR Sites Since 2017

Chl a Data from 8 Sites Over 58 Months



DEP impairment threshold for estuaries and open coastal waters: 11ug/L annual mean

DEP site-specific criterion for long-term annual averages: 5.4ug/L

* Site 8 has fewer data points

Pros & Cons



- This isn't "citizen science", but it also is not an NSF funded program run with paid technicians.
- There were times students were not allowed on campus that I had to step up and do all the sampling.
- There is a lot of data to analyze different ways and outside data sources (weather, tides, gauge heights) can be combined with our data producing interesting results and learning opportunities.
- Researchers from larger more research-intensive institutions but without easy St. Johns River access want to collaborate. We can make connections for our students.

The Science Of...

the
science of | ...

- You Tube Channel:

https://www.youtube.com/channel/UC_a3v6uutnyill35oQplZFg

- A VERY Early Bloom:

https://www.youtube.com/watch?v=sWMmsxJRAe4&ab_channel=TheScienceOf...



ST JOHNS RIVER

St. Johns River Algal Bloom April & May 2019: A Very Early Bloom

1,067 views • May 30, 2019

19 DISLIKE SHARE SAVE ...

The Science Of...

the
science of | ...

- You Tube Channel:

https://www.youtube.com/channel/UC_a3v6uutnyilI35oQplZFg

- Making Drifter Buoys:

https://www.youtube.com/watch?v=VRuPeDhpMMY&ab_channel=TheScienceOf...



JACKSONVILLE

Making drifter buoys and tracking ocean currents with NOAA satellites (even during a Hurricane)

3,222 views · Apr 7, 2018

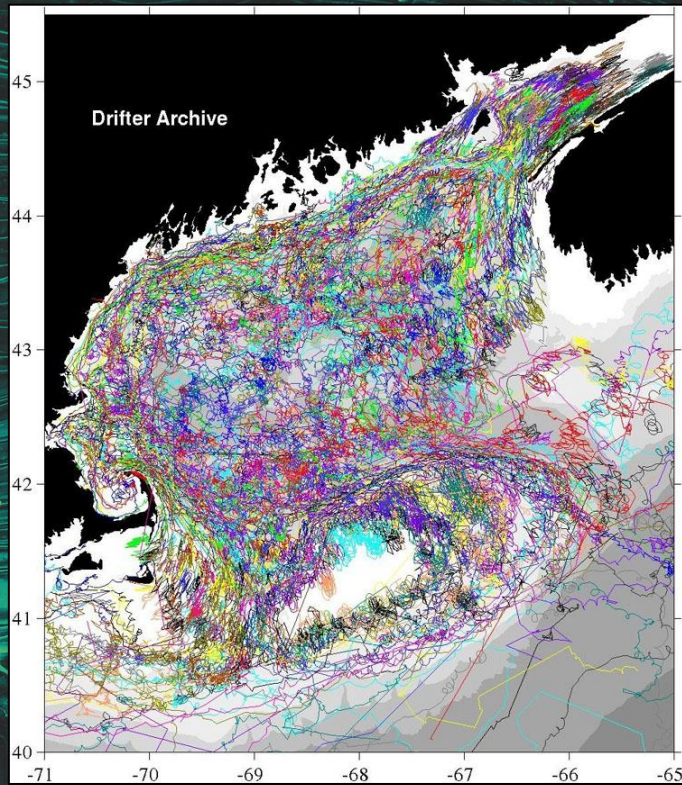
LIKE DISLIKE SHARE SAVE ...

Drifters GPS Enabled



- Provides engineering and hands-on building experience to middle school through graduate students
- Most students have not had experience designing gear or using tools
- They learn to test their designs.
 - Do they float?
 - Do they stay upright?
- Provides an opportunity to analyze real data they made possible.

To track a Buoy: Lobster Trap GPS Units



- Developed as inexpensive locators for Lobster traps
- Then used to study shelf currents for lobster larvae/settlement.
- Gulf of Maine Lobster Foundation is the provider of the GPS units.
- ([Student Drifters – GOMLF](#))



JU Buoy Production: Tape and Glue



- “Kara” type drifter (no drogue attached)
- Designed to float just below the surface with the GPS unit exposed several feet above the water level
- GPS units are sealed with a battery life of 3-8 months
- Drifters are weighted on the bottom with floats on the top.

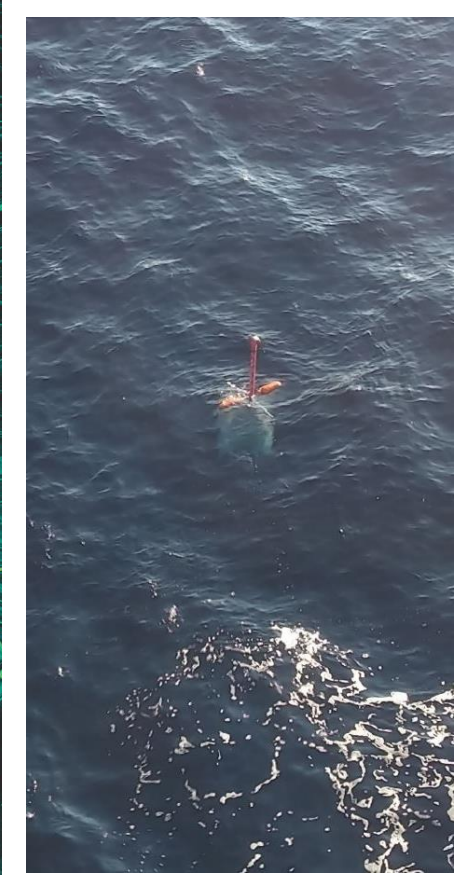


JU Buoy Production: Tape and Glue



- Process for Students
 - Design the drifter
 - Build the drifter (power tools!!!)
 - Test their design for buoyancy and stability
 - Label the drifter with Identification
 - The drifters are then launched by department boats, the OCEARCH vessel, or more recently in partnership with Crowley Marine
 - Students can use the data to predict movement, calculate current velocities, and total distance traveled by THEIR buoy!

JU Buoy Production: Sustainability



- The drifters need to be durable to last in heavy seas.
 - PVC easiest
 - Wood and Aluminum work well as a substitute
 - Canvas “sails” and durable twine threading
 - GPS unit is plastic. Sorry. Just the way that works.
 - Floatation with Cork floats, old bottles, etc.
 - We use reuse materials whenever possible
 - 2 were built out of trash found on beaches 😊

The Blog

BUOYS IN THE OCEAN

JACKSONVILLE UNIVERSITY

BLOG BUOYS TRACKING ABOUT CONTACT

Wilson Keeps on Swimming!

September 15, 2015
Dr. Jeremy Stalker

Jacksonville Marine Lab drifters deployed in 2015

Well Wilson was still transmitting as of 9/5/15. The buoy has been silent for about 10 days now. This is not a record, as the battery power starts...

Read More

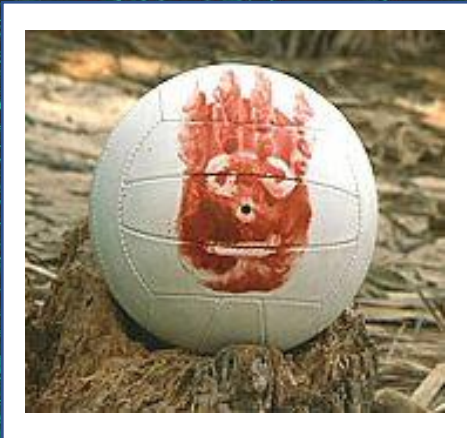
ABOUT US

We are here to increase knowledge and interest in the ocean and its currents. Weekly blogs will be posted to update everyone on where each buoy is, how it got there, and details about the location.

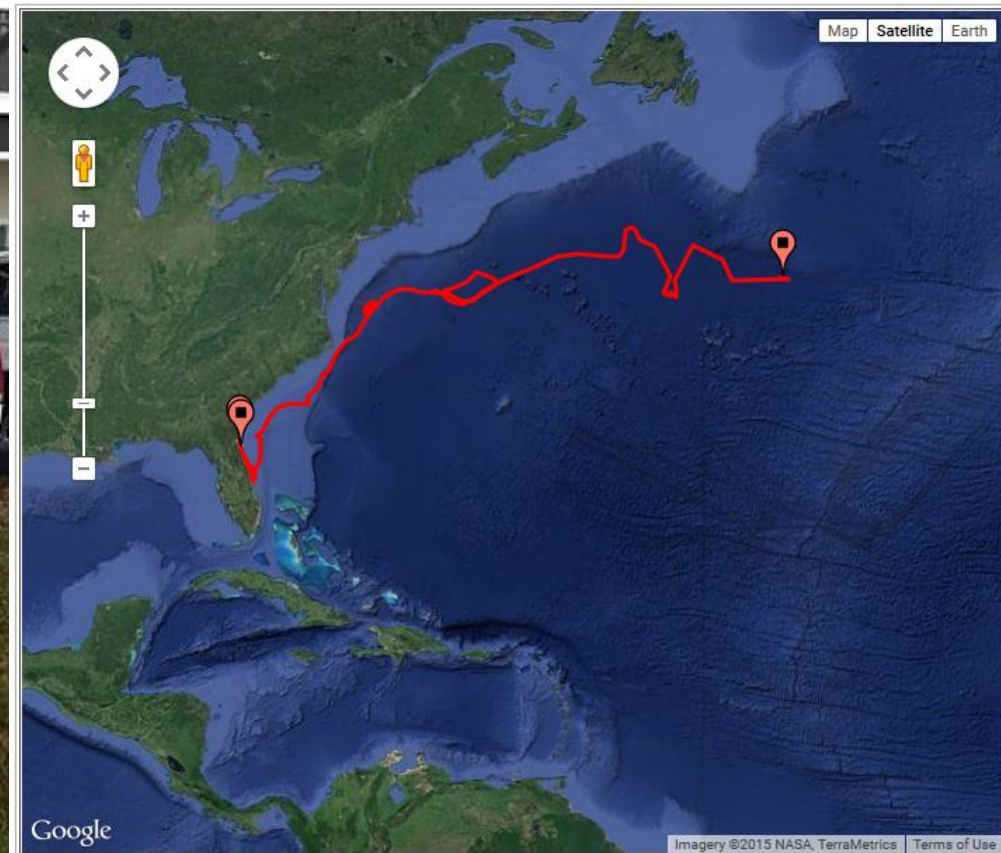
TRACK THE BUOYS

- Started by undergraduates for an independent study ([Drifter Buoys in the Atlantic Ocean](http://jenniferjessicabuo.wixsite.com) (jenniferjessicabuo.wixsite.com))
- Companion blog with information about the progress of the buoys and cool science and facts about the parts of the coast and ocean they are traveling through
- Could be anything Marine related!

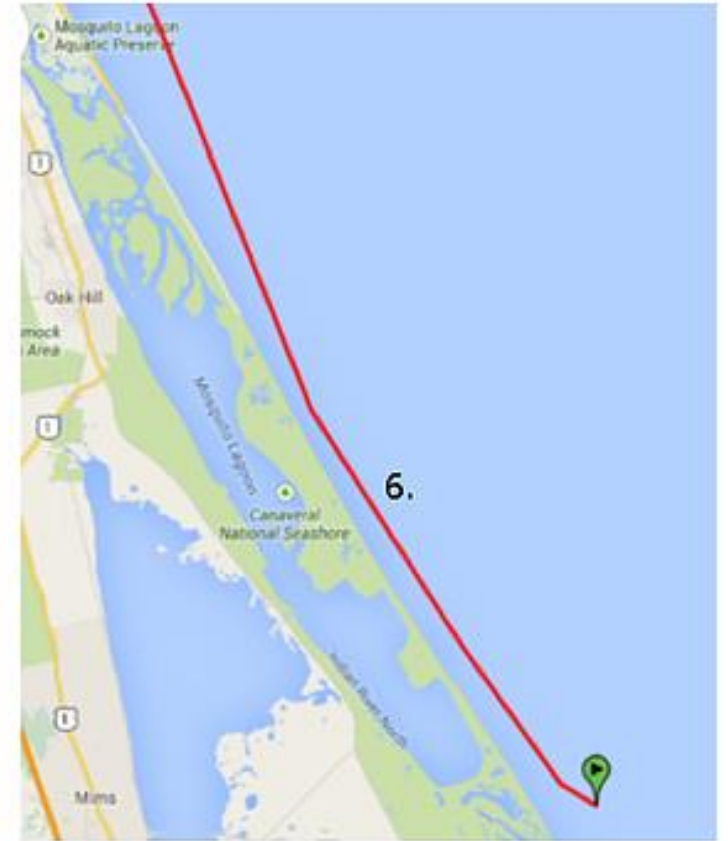
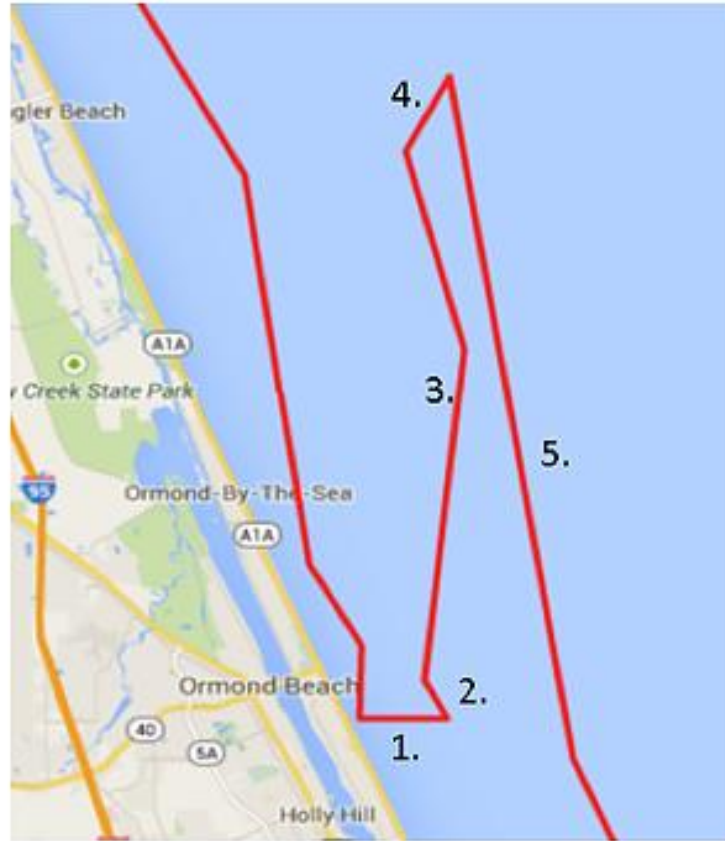
Wilson



Jacksonville Marine Lab drifters deployed in 2015

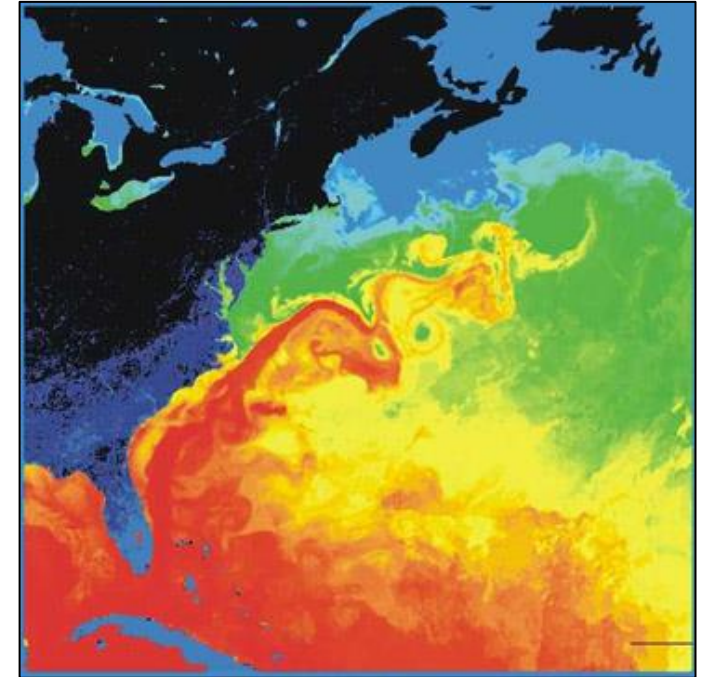
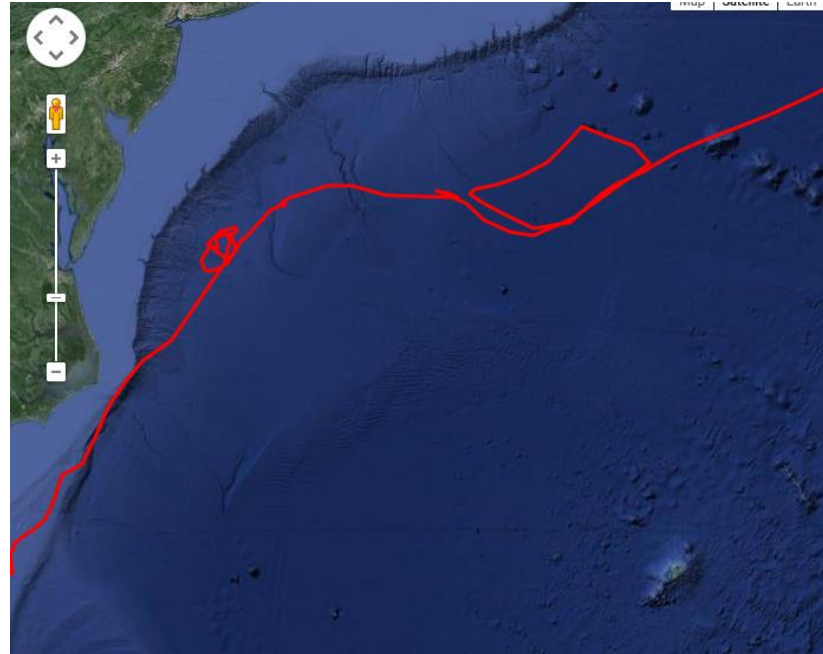


Wilson's Near misses



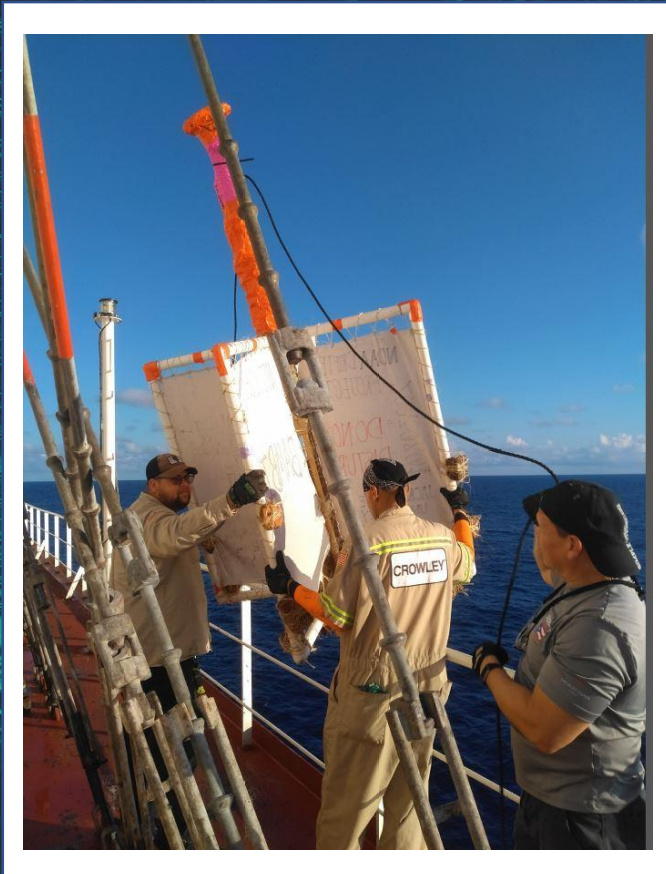
Twice we were sure it would wash up onshore.....

Wilson in the Gulf Stream



Student data can get added to models run by organizations like SECOORA ([Home page – SECOORA](#))
Real data, Real science.

Pros & Cons



- Sometimes the drifters are short lived. They sink or are washed up onshore.
- Not cheap.....~\$600 per drifter for the GPS unit, satellite time, and building supplies
- Valuable skills and lessons are learned. Makes abstract concepts tangible.
- Students share the links to track their drifters with family and friends.
- Builds relationships with local schools and boat operators
- Good for media: in news, The Science Of..., local papers
- Future: may have a competition where classes track their own drifters, similar to the great turtle race (<https://news.mongabay.com/2007/04/great-turtle-race-set-to-launch-from-costa-rica/>) with potential for sponsorships of classes

MSRI: Marine Science Summer Camp

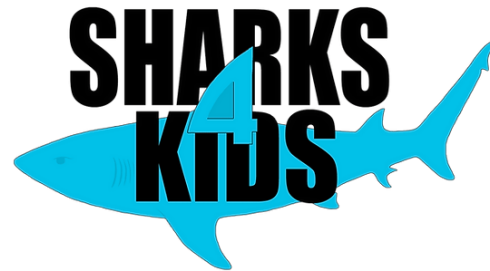


- \$395 per week for day camp
- ~60% of camp participants receive financial aid
- Extended care \$75 per week 7:30 a.m. to 6 p.m.
- Overnight option \$695
- First week: June 20th-24th river themed and affiliated with the Connected program
- Second week: June 27th-July 1st shark themed and affiliated with OCEARCH
- <https://www.ju.edu/msri/education/summer-camps.php>

MSRI: Virtual Marine Science Camp 2019



the
science of ...
of



MSRI: Virtual Marine Science Camp



- More accessible than in-person camp
- Free
- Able to involve more organizations and experts
- Kids could ask questions and get answer in real time
- However, must monitor the chat carefully
- Lasting impact – the videos are still available online
- Strengthened relationship with donor which lead to...

Connected - JU-JAXPORT Partnership

An educational initiative that aims to raise awareness about the importance of the St. Johns River as a vital natural resource.



How important is it for people in Jacksonville to learn about the St. Johns River?

- Very important.....76%
- Somewhat important.....23%
- Not important..... 1%

Which of the following statements do you think best describes the St. Johns River?

- A river in good condition in need of improvements in some areas.....52%
- A degraded river that has value, but needs a major cleanup.....39%
- Don't know..... 9%

Please rate the following as very important, somewhat important, or not important.

**Very
Important**

- Health of the River.....87%
- River as a visual amenity.....74%
- River as a source of recreation.....70%
- River as a source of jobs.....40%
- River as a source of food.....35%

Which three should receive the most attention from the city in terms of funding?

- Ensuring the cleanliness of the river.....78%
- Improving the resiliency of the river.....54%
- Building new shoreline walkways29%
- Increasing access to the river.....29%
- Expanding downtown Riverwalks.....26%
- Encouraging the building of more waterfront restaurants26%
- (Fishing piers, Dredging for recreational boating, Docking facilities, Kayak launches, Boat ramps)



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UNIVERSITY



OUR COMMON THREAD

The vital St. Johns River

It's the heartbeat of our city — the lifeblood of our region. And our future is intertwined with its health and vitality. That's why Jacksonville University and JAXPORT are uniting in a shared purpose. We're bringing together research, education, and global commerce in a mission to educate and engage the community.

INVITE US TO TEACH



Connected – Education & Outreach

- Public speaking events



Connected – Education & Outreach

- Experiential learning on the river



Connected – Education & Outreach

- Mobile hands-on lessons



Connected – Education & Outreach



FREE DOWNLOADS

Lesson Plans & Activity Sheets

We are excited to have coloring pages, word scrambles, fact sheets, and fully developed lesson plans ready for you to use in your classroom or at home. Please help yourself!

FREE DOWNLOADS



RESEARCH & EDUCATION

Expertise that serves the greater good

For decades, scientists and students at Jacksonville University's Marine Science Research Institute have studied the river and its diverse ecosystems. *Connected* is an open invitation to explore, discover, and engage with the beautiful St. Johns River, and it's a call to respect, value, and protect this vital natural resource.

RESOURCES

- [River Life](#) column by Dr. Quint White
- [The Science Of...](#) educational videos
- [State of the River](#) report
- [JU Virtual Marine Science Summer Camp 2020](#) recordings
- [Florida Ports Council Seaports Resiliency Report](#)
- [2021 Right Whale Festival](#)
- [JAXPORT Overview](#)

We love teaching about our river.

Connected Thus Far...



- Preliminary survey of 469 Jacksonville Metro Residents
- Media Kickoff event
- Enviroscape lessons
- Hydrology lesson & tour at the Jacksonville Arboretum & Gardens
- Science Fairs & Festivals
 - Comparative anatomy of marine mammal skulls & shark jaws
 - Display live St. Johns River organisms
- Videos - scouting sights & story boarding

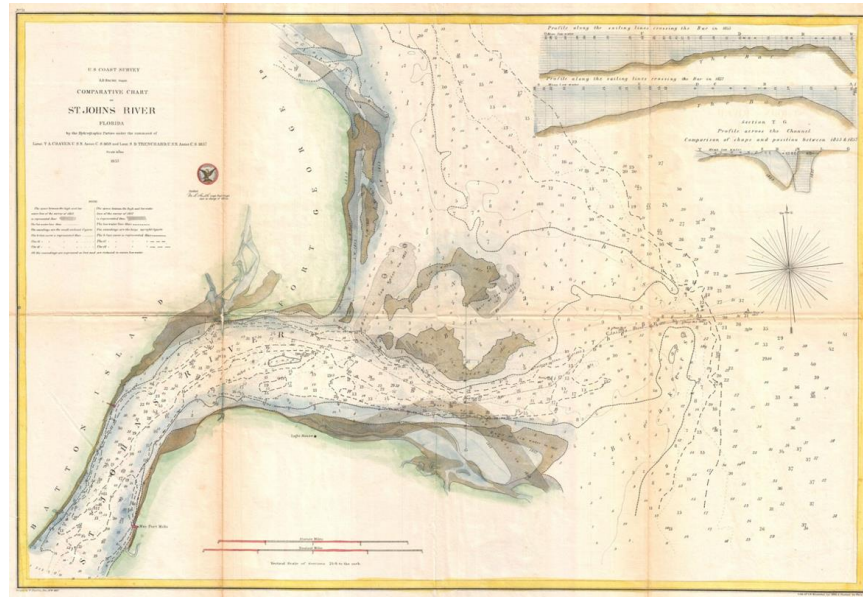
Videos: Regenerative Energy Cranes



Alex Willemin is an internationally award-winning screenwriter, director, and cinematographer. He runs Alix Filmworx with his wife and creates narrative, commercial and documentary work seen on PBS, ESPN, & HBO.



Videos: Reshaping of the St. Johns River



A vertical strip on the left side of the slide features a teal and dark green marbled pattern with wavy, organic lines and small speckles. A solid lime green horizontal bar is positioned at the top, containing the title text.

Connected Future

- More school visits, public events, & online resources
- Change One Thing – student videos
- Video production
- PSAs
- Summer camp
- Survey

Questions?

Request a connected event: <https://www.ju.edu/connected/>

