

# Florida Manatee (*Trichechus manatus latirostris*) Unusual Mortality Event Recovery Plan

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Research Proposal

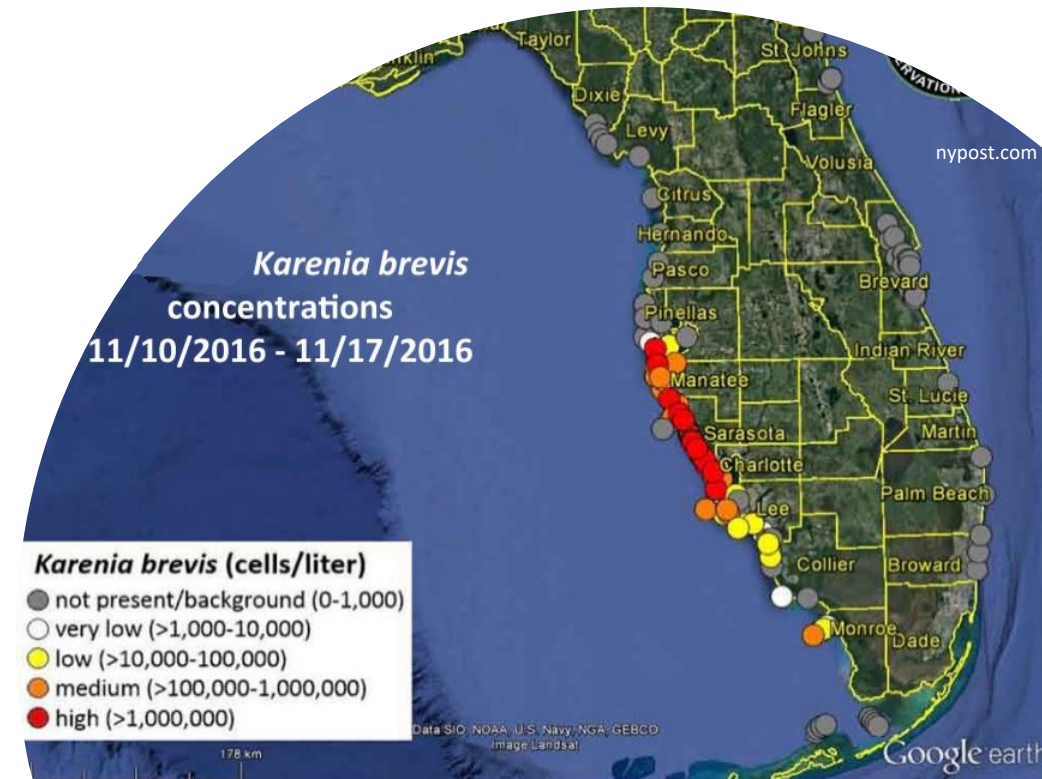
December 8, 2022



# Background

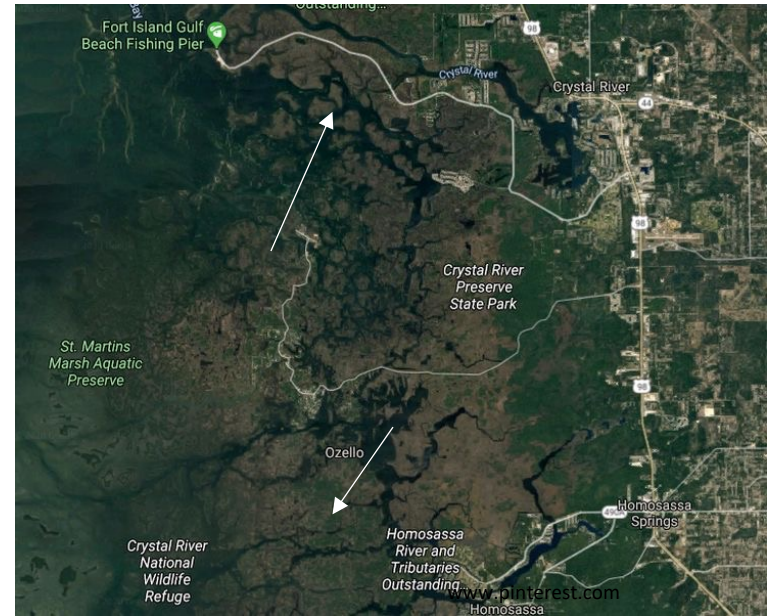


- 2016: Red tide harmful algal blooms (Ball et al., 2020)
- Killed approx. 60% of sea grass beds
- *Karenia brevis*- brevetoxicosis (Lazensky et al., 2020)
- March 2021: UME
- 1,101 mortalities- majority emaciated (Marine Mammal Commission, 2022)



# Background

- 2017: U.S. Fish and Wildlife Service (FWS) reclassification from endangered to threatened (Rycyk et al., 2018)
- Climate change- 4 protected natural hot springs & 7 man-made thermal refuges (Edwards, 2013)
- Obstructions: fence that blocks the Homosassa Springs limiting manatee access points (Laist & Reynolds, 2005)
- Over 100,000 annual visitors in winter (Marine Mammal Commission, 2022)
- Inc. pollution and dec. in water visibility (Sorice et al., 2005)





# Background

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- 2017: Key Largo, FL study
- Manatees grazing purposely on *Chondrilla caribensis*
- Low spicule count
- Photosynthetic cyanobacteria
- No chemical defense
- Consumed by reef fish, hawksbill turtles (*Eretmochelys imbricata*), and green turtles (*Chelonia mydas*)

(Fitt, 2020)



# Objectives

Find alternate food resources for the Florida manatee

Dec. harassment in “swimming with manatees” ecotourism in Crystal River

Inc. the amount of people held responsible for harassing manatees and other wildlife using proof

Analyze manatee distribution & abundance in the Crystal River during the winter season



# Sponge Experiment

- Location: Homosassa State Park
- Duration: 7 months
- *C. caribensis* collected by Dr. Chris Freeman
- Placed on hard substrates in light accessible & non-accessible areas
- 2 underwater night vision cameras
- Monitor manatee health and water quality
- Manatee ID- scars



# Monitoring Study

- Location: Crystal River
- Duration: 7 months September-March x3 days/week
- 5 kayak monitors & 15 snorkeling monitors w/ GoPros
- 6-person research vessel w/ HexH2O UAS drone: used in a capture-mark-recapture study (Edwards et al., 2021)
- Use of tour company boats/kayaks if possible



## Harassment of manatees is defined by:

1. Approaching manatees before being approached
2. Chasing manatees
3. Poking/prodding/stabbing manatees with any object
4. Separating a cow from her calf
5. Separating an individual from its group
6. Feeding manatees
7. Disturbing a sleeping manatee



# Materials

- Portable freezer (for sponge transport) x2
- Gallon ziploc bags (for sponge collection) x10
- GoPro Hero 11 x 20
- GoPro handheld sticks x5
- Micro SD cards (1TB) x20
- Snorkel mask set ups x15
- Pool noodles x15
- SiOnyx Nightwave night vision marine camera x2
- Research vessel (6 person) x1 a week for 7 months
- HexH2O UAS device x1





# Budget

Item	Cost
Portable Freezer x2	\$1222.18
Gallon Ziploc Bags x20	\$4.69
GoPro Hero 11 x20	\$7,999.80
GoPro Handheld Sticks x5	\$99.75
Micro SD cards (1 TB) x20	\$379.80
Snorkel & Masks x15	\$1000.00
Pool Noodles x15	\$3.75
SiOnyx Nightwave Night Vision Marine Camera x2	\$3,190.00
Research Vessel x1 a week for 30 weeks/7 months	\$45,000.00
HexH2O UAS device x1	\$6,449.00
Wetsuits x20	\$1,600.00
Kayaks x5	\$2,145.00
Training per person x20	\$1000
Waterproof radios x5	\$399.75
<b>Total</b>	<b>\$66,202.75</b>

# Timeline

## Research

**December 2022:**  
Research proposal  
submission deadline

## Outreach

**January-April 2023:**  
Outreach to Homosassa  
State Park, Crystal River  
tour boat & kayak  
companies, and Dr. Chris  
Freeman at the College  
of Charleston

## Receive

**May-August 2023:**  
Receive funds, purchase  
materials, and Dr.  
Freeman goes to Key  
Largo to collect sponges

## Conduct

**September 2023-March  
2024:** Conduct  
experiment and  
monitoring study



# Justification

- Educational interventions can improve environmental behavior (Aipanjiguly et al., 2003)
- Sociology experiments have proven that humans are more likely to follow rules when being watched (Yuan, 2022)
- *C. caribensis* could prove to be a partial solution to the detrimental loss of seagrass
- Dec. harassment of manatees & hold offenders accountable for their actions
- FL manatee could be at risk of getting reclassified as endangered if the annual deaths cont. to plummet or if there's another algal bloom
- **It's not too late!!** Dugong (*Dugong dugon*) classified as functionally extinct in areas of China (Lin et al., 2022)

**HELP PROTECT**  
*the* **Manatee**

**MANATEE ZONE**  
**SLOW SPEED**  
NOVEMBER - MARCH  
**MINIMUM WAKE**

*Remember*

- Snorkeling gear may increase your chances of a memorable experience since scuba bubbles may scare manatees
- Observe from a distance while in or on the water
- Do not pet or chase manatees
- Avoid excessive noise and splashing
- Do not attempt to feed manatees

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FOR MORE TIPS ON HOW TO SAFELY ENJOY MANATEES, PLEASE VISIT:  
<http://myfwc.com/wildlifehabitats/managed/manatee/>

**FLORIDA MANATEES**  
Florida's Manatee





Questions?



# References

- Aipanjiguly, S., Jacobson, S. K., & Flamm, R. (2003). Conserving manatees: Knowledge, attitudes, and intentions of boaters in Tampa Bay, Florida. *Conservation Biology*, 17(4), 1098–1105. <https://doi.org/10.1046/j.1523-1739.2003.01452.x>
- Ball, R. L., Malmi, M., & Zgibor, J. (2020). Trends of the Florida manatee (*Trichechus manatus latirostris*) rehabilitation admissions 1991-2017. *PLOS ONE*, 15(7), 1-11. <https://doi.org/10.1371/journal.pone.0223207>
- Edwards, H. H. (2013). Potential impacts of climate change on warmwater megafauna: The Florida manatee example (*Trichechus manatus latirostris*). *Climatic Change*, 121(4), 727–738. <https://doi.org/10.1007/s10584-013-0921-2>
- Edwards, H. H., Hostetler, J. A., Stith, B. M., & Martin, J. (2021). Monitoring abundance of aggregated animals (Florida manatees) using an unmanned aerial system (UAS). *Scientific Reports*, 11(1), 1-12. <https://doi.org/10.1038/s41598-021-92437-z>
- Fitt, W. (2020). Florida manatees *Trichechus manatus latirostris* actively consume the sponge *Chondrilla caribensis*. *PeerJ*, 8, 1-12. <https://doi.org/10.7717/peerj.8443>
- Marine Mammal Commission. (2022, September 8). Florida Manatee. Retrieved November 2, 2022, from <https://www.mmc.gov/priority-topics/species-of-concern/florida-manatee/>
- Laist, D. W., & Reynolds, J. E. III. (2005). Influence of power plants and other warm-water refuges on Florida manatees. *Marine Mammal Science*, 21(4), 739–764. <https://doi.org/10.1111/j.1748-7692.2005.tb01263.x>
- Lin, M., Turvey, S. T., Han, C., Huang, X., Mazaris, A. D., Liu, M., Ma, H., Yang, Z., Tang, X., & Li, S. (2022). Functional extinction of dugongs in China. *Royal Society Open Science*, 9(8), 1-7. <https://doi.org/10.1098/rsos.211994>
- Rycyk, A. M., Deutsch, C. J., Barlas, M. E., Hardy, S. K., Frisch, K., Leone, E. H., & Nowacek, D. P. (2018). Manatee behavioral response to boats. *Marine Mammal Science*, 34(4), 924–962. <https://doi.org/10.1111/mms.12491>
- Sorice, M. G., Shafer, C. S., & Ditton, R. B. (2005). Managing endangered species within the use–preservation paradox: The Florida manatee (*Trichechus manatus latirostris*) as a tourism attraction. *Environmental Management*, 37(1), 69–83. <https://doi.org/10.1007/s00267-004-0125-7>
- Yuan Ju Chair professor in the Department of Economics, & Jiawen Li Lecturer in Economics. (2022, September 13). *Moral science confirms people behave better when they think they're being watched*. The Conversation. Retrieved December 6, 2022, from <https://theconversation.com/moral-science-confirms-people-behave-better-when-they-think-theyre-being-watched-114384>