

# Sargassum and Water Quality

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# What is Sargassum?

- Brown macroalgae
- 60+ benthic species
- 2 pelagic species
- Asexual fragmentation
- Christopher Columbus
- “Golden floating rain forest”
  - Refuge for migratory species
  - Breeding, nursery and forage
  - Loggerhead turtles, eels
- Ashore
  - Food source for birds
  - Shoreline stabilization
  - Nutrient source

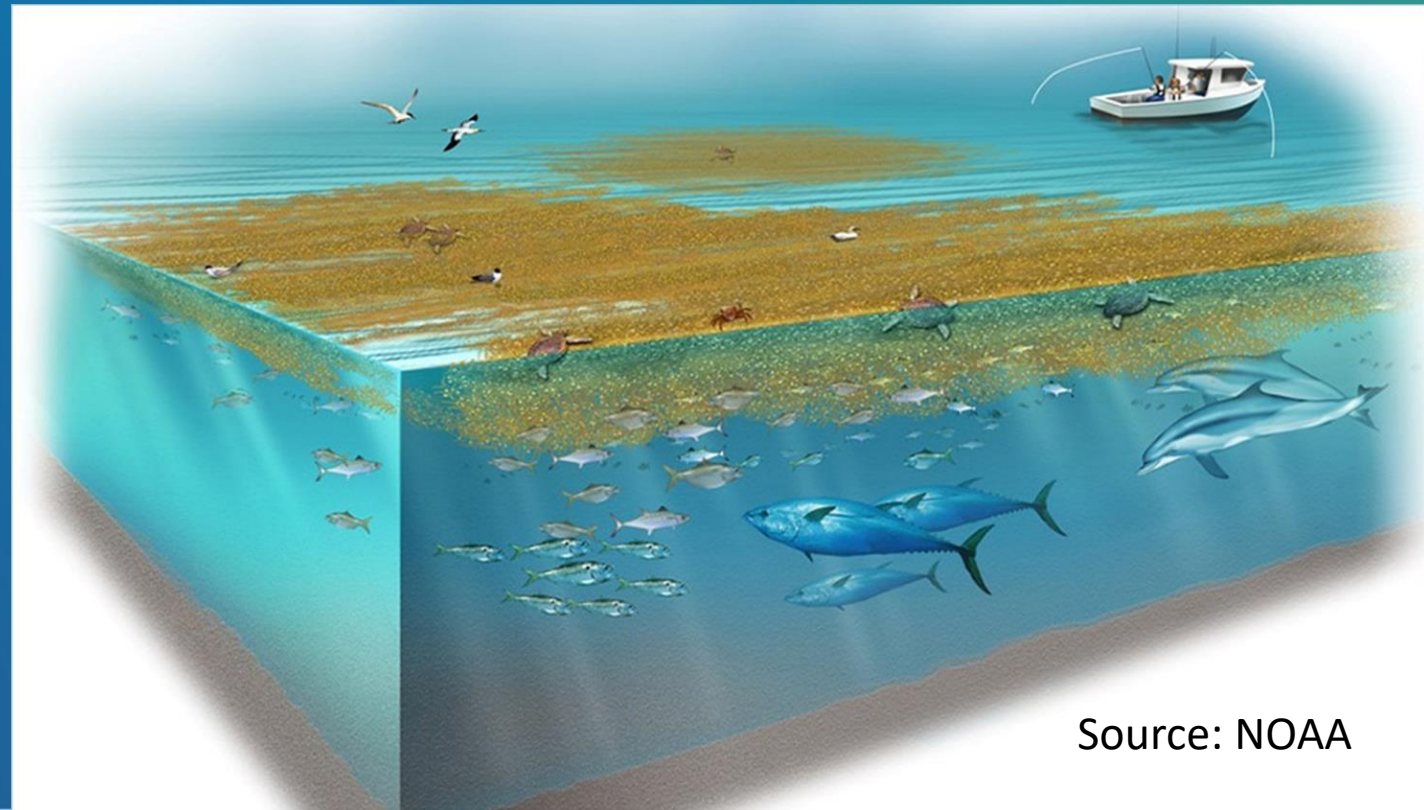


*Sargassum natans*



*Sargassum fluitans*

Image: A.N.S. Siuda



Source: NOAA

# Sargasso Sea & Great Atlantic Sargassum Belt

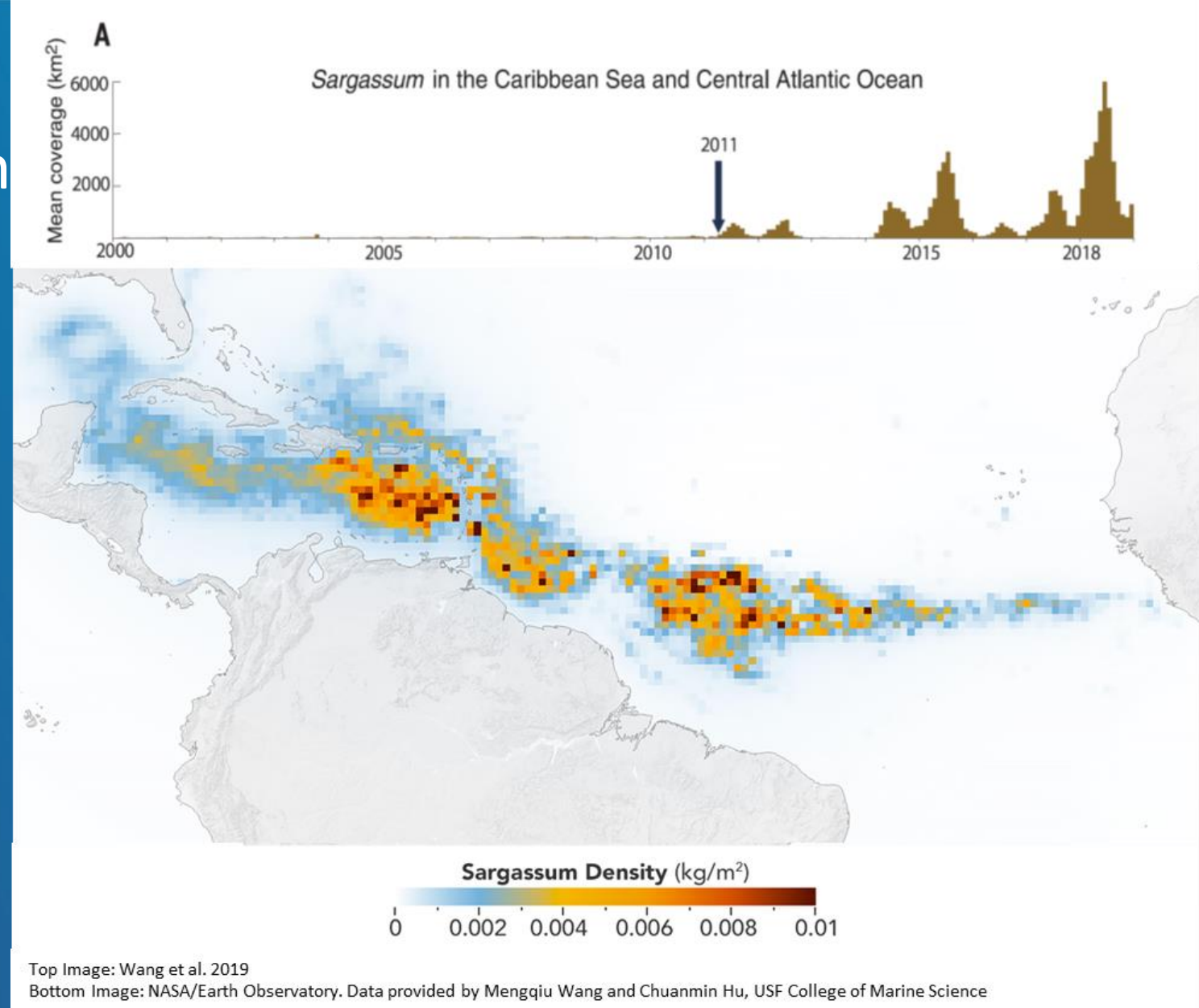
- 2009-2010 - extreme North Atlantic Oscillation
- Winds & surface currents advect sargassum from Sargasso Sea to the east & south and created “Great Atlantic Sargassum Belt”
- Since 2011 = Exponential growth with longer growing season, warm temps, river nutrients from Congo, Amazon, & Mississippi



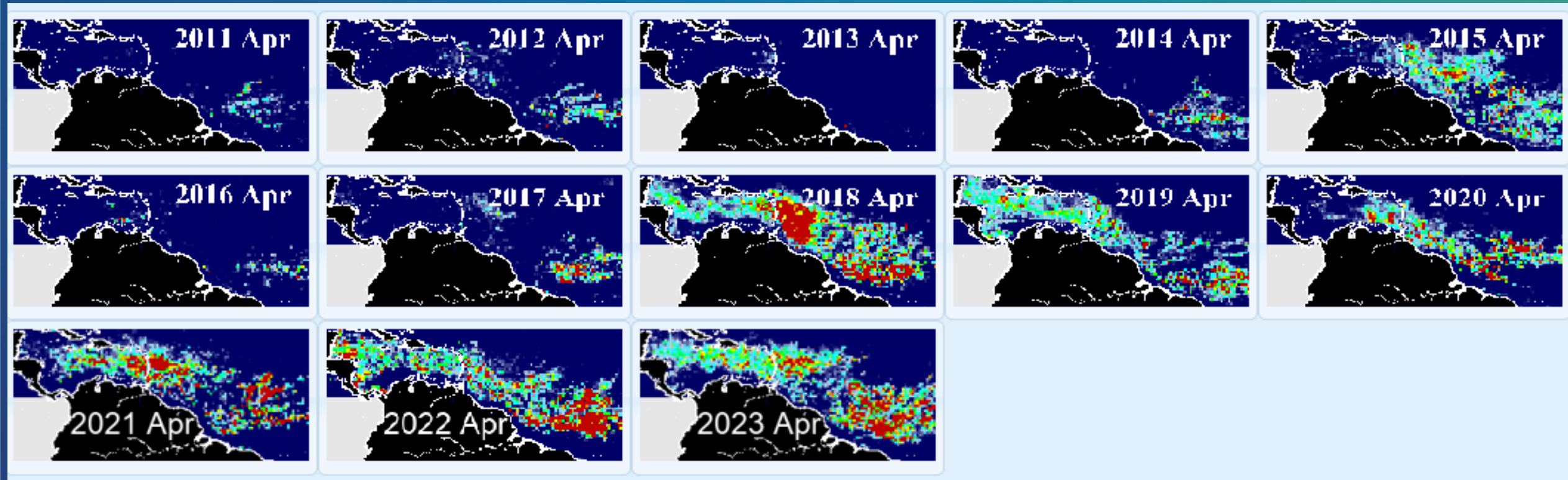
- Largest macroalgae bloom in the world!
- Since 2011 - seasonal influxes Caribbean, TX, FL

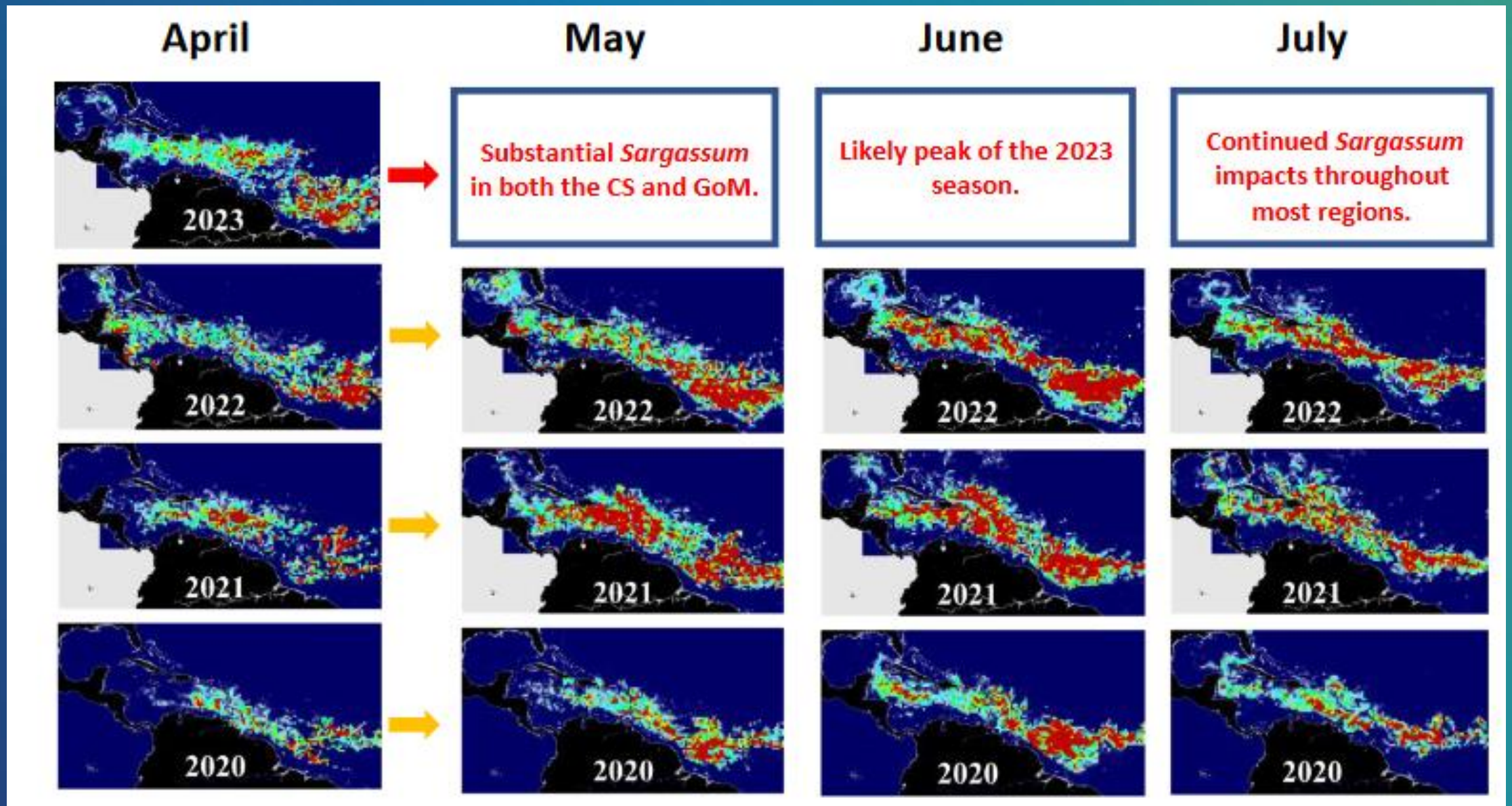


Fort Pierce Beach. Source: Treasure Coast Palm News, 2019



# University of South Florida Satellite-based Sargassum Watch System (SaWS) APRIL 2011 to 2023





Source: Outlook of 2023 *Sargassum* blooms in the Caribbean Sea and Gulf of Mexico  
 April 30, 2023, by University of South Florida Optical Oceanography Lab  
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# Economic Impacts

- Too much of a good thing!
- Impacts beach tourism
- Can cover and smother
  - Sea turtle nests
  - Seagrasses
  - Patch coral reefs
- Fish kills
- Decomposing *Sargassum*= hydrogen sulfide and ammonia
- Costs of Beach Cleanup



Image: Barbados Government Information Service

# Mechanical Removal from Beaches

- Miami:
  - 2019: 4 targeted beaches \$3.8M
  - 2023: anticipating \$6M
  - Est: ALL beaches >\$45M
- Florida Keys
  - ~\$150K annually
  - Trucked to C&D landfill
- Mexico 2018: \$17.2M



Miami Beach, Florida. Source: Vincent Encomio, Florida Sea Grant

# Pilot Study to Evaluate Sargassum Composting for Soil Amendment in Municipal Landscaping at Key West Botanical Garden, June to September 2021



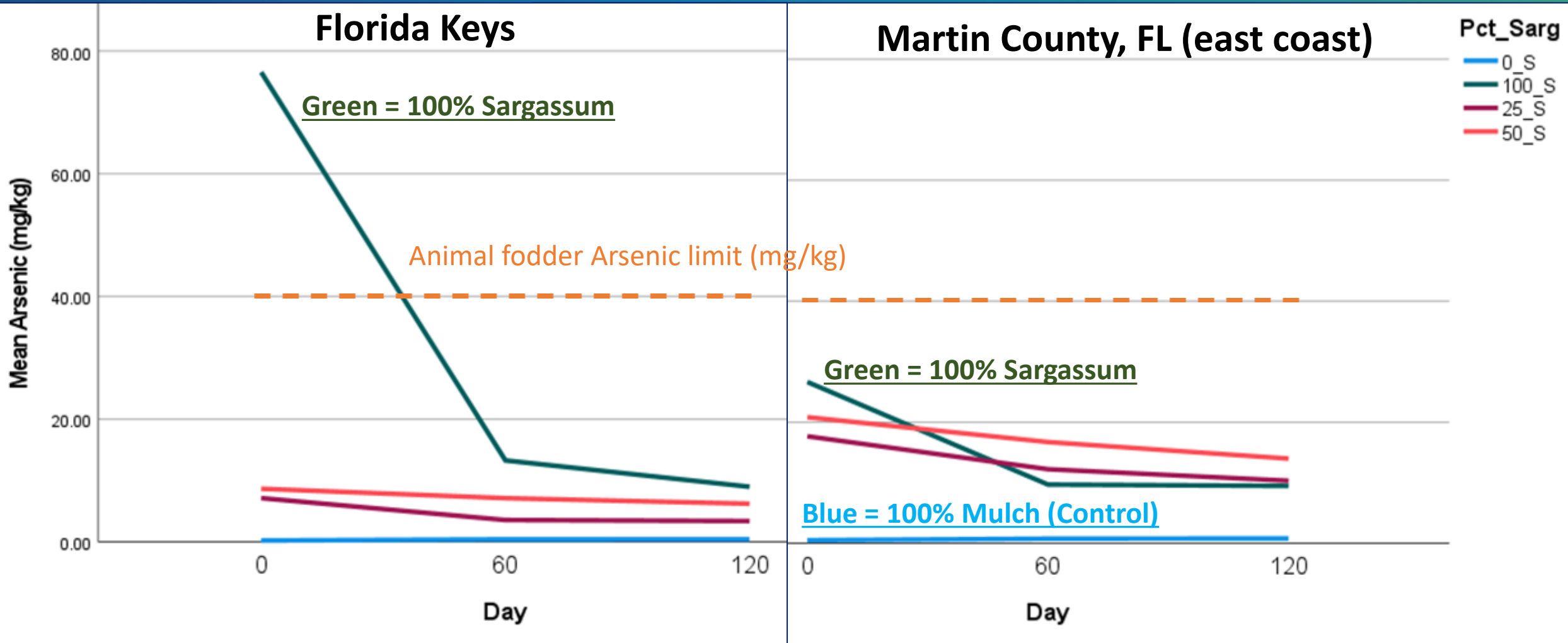
# Sargassum Composting for Soil Amendment Applications in Municipal Landscaping

Treatment I (A,B,C)	Treatment II (A,B,C)	Treatment III (A,B,C)	Control (A,B,C)
100% sargassum	50% sargassum/ 50% wood chips	25% sargassum/ 75% wood chips	100% wood chips

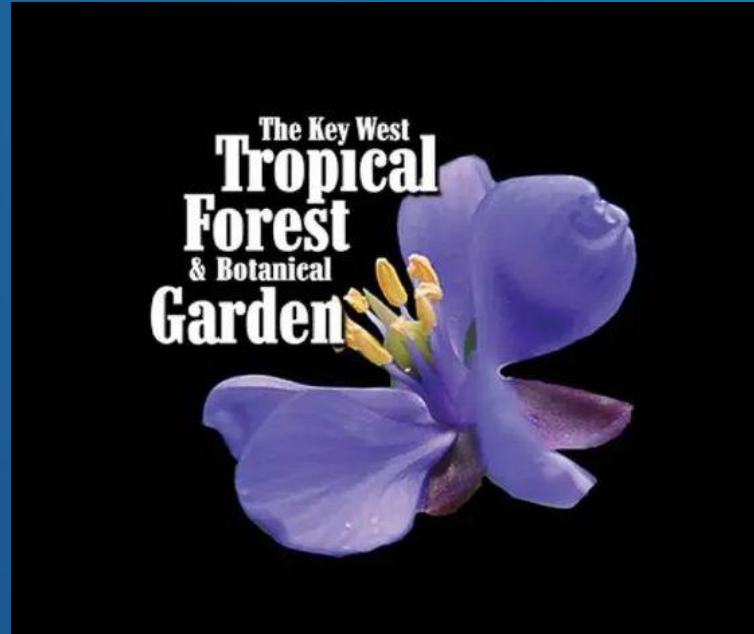
- Pilot study = 120 days in Monroe and Martin counties
- Tested every 60 days for TN, TP, K, C,  $\text{NH}_3\text{-N}$ , and Arsenic



# Total Arsenic by treatment (mg/kg)



# Partnerships



# Questions?



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