

Sargassum Invasion: Composting as a Solution



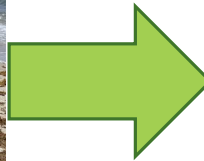
MIAMI



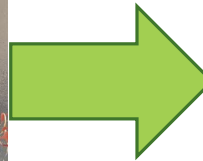
Afeefa Abdool-Ghany



Sargassum influx on beach



Sargassum collected from beach



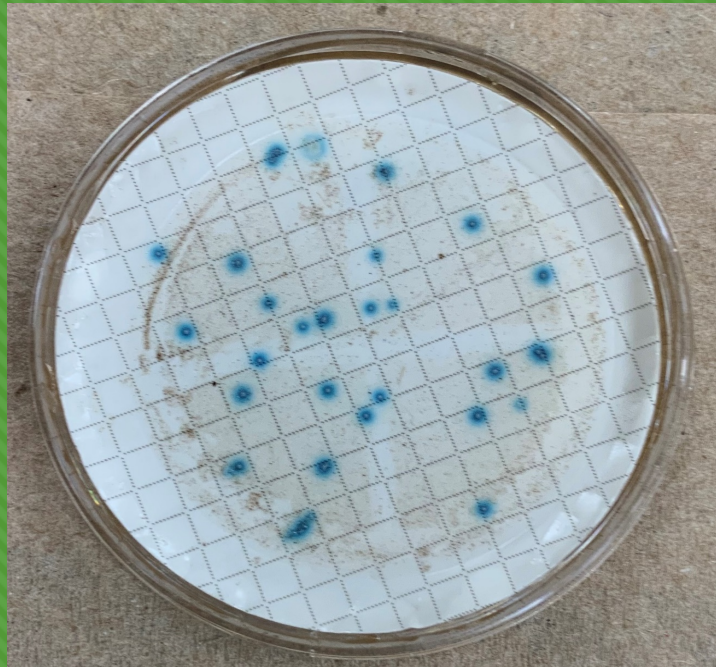
Sargassum compost pile



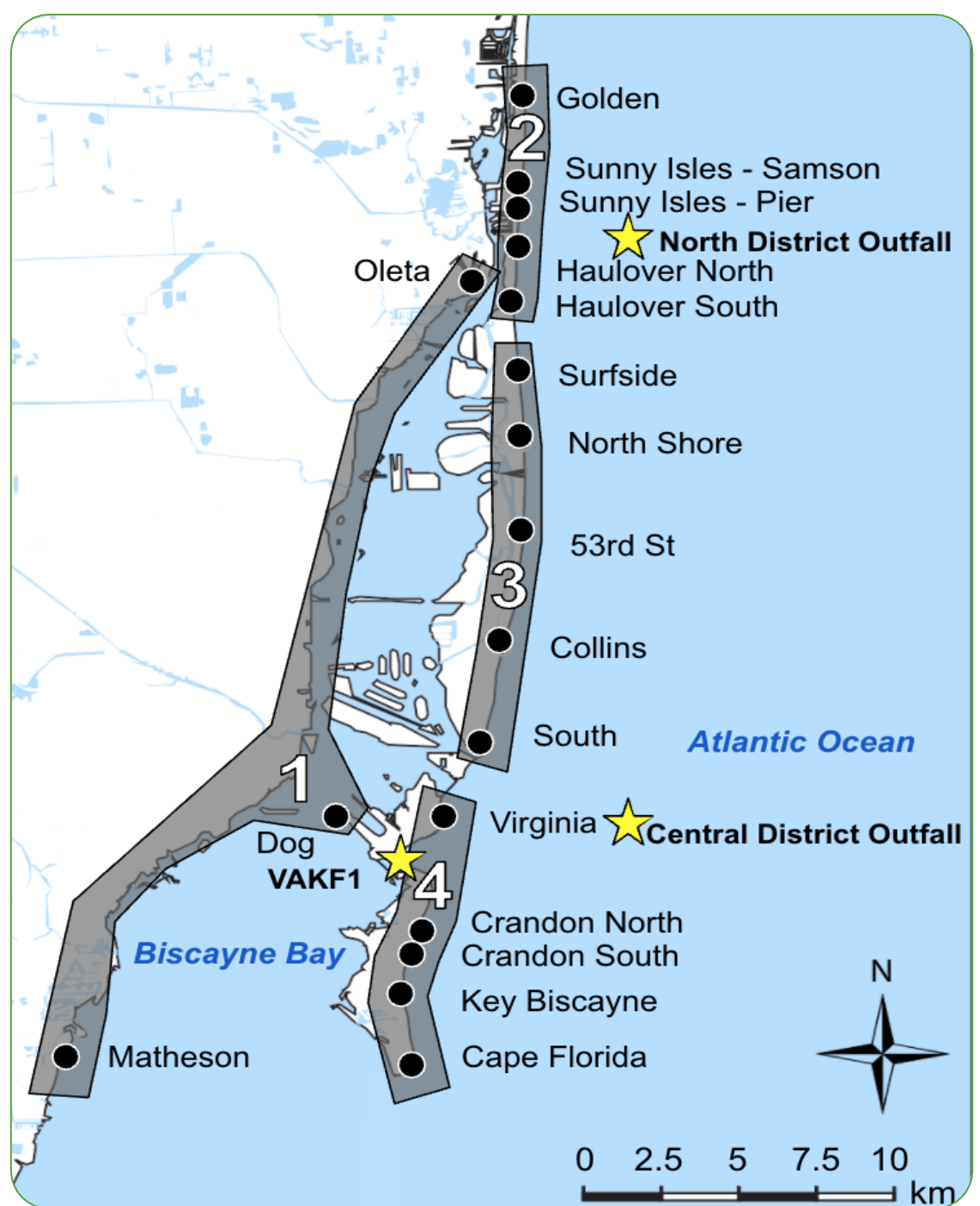
Associations Between Beach Bacteria and *Sargassum*

Beach Advisories

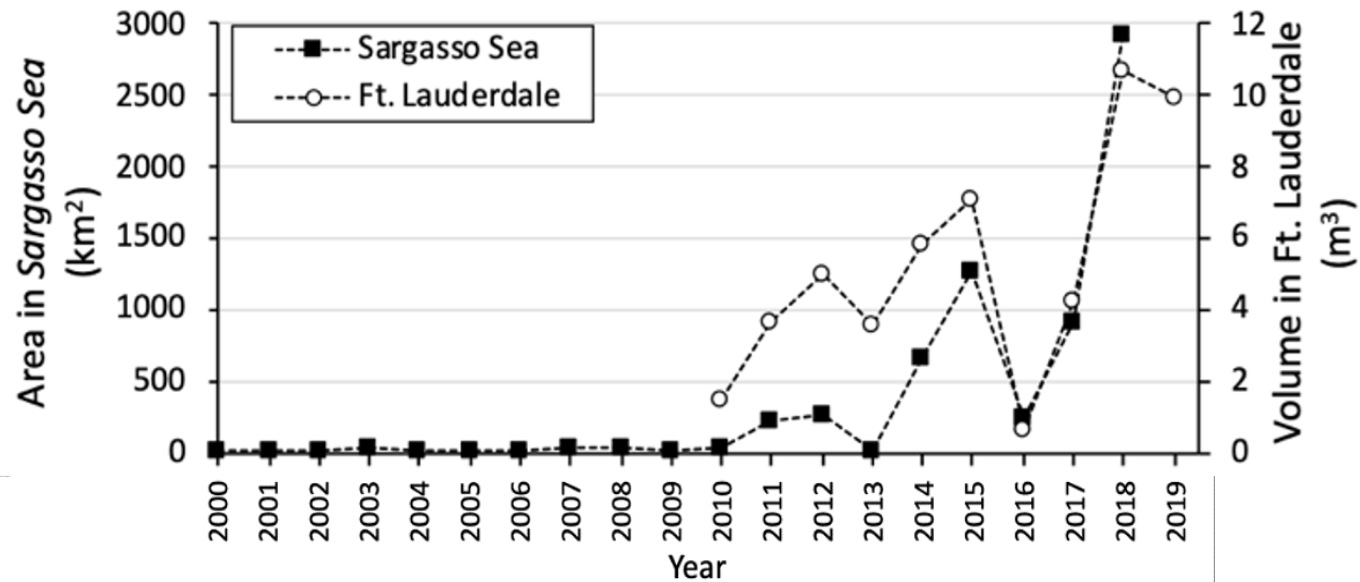
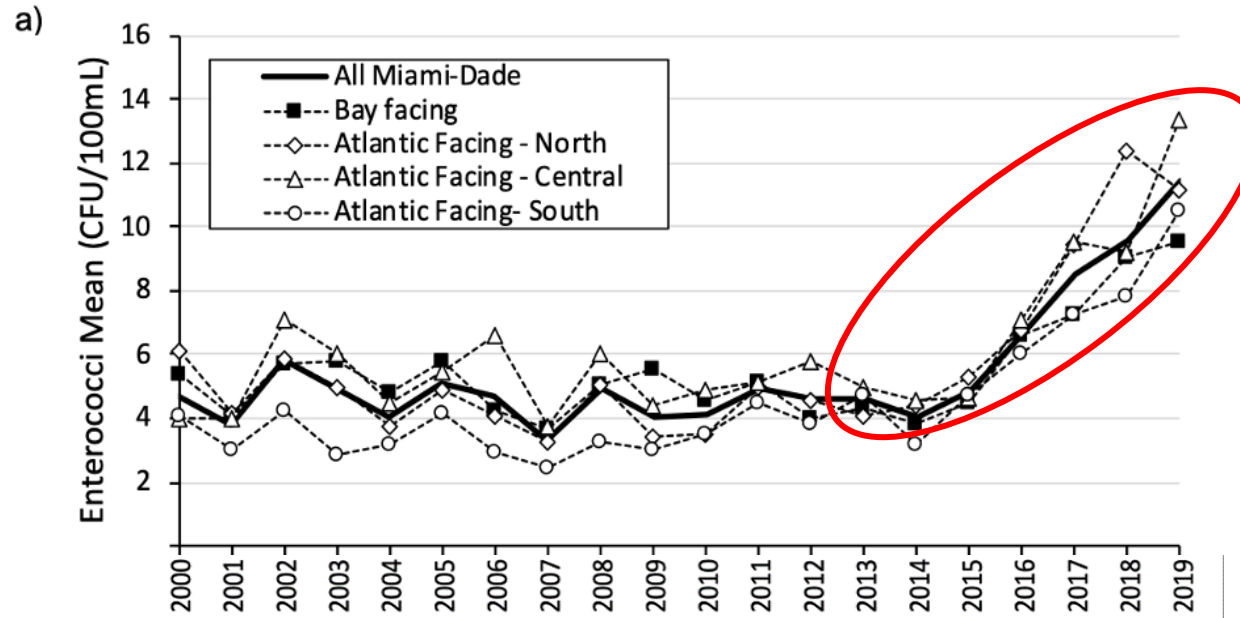
Enterococci

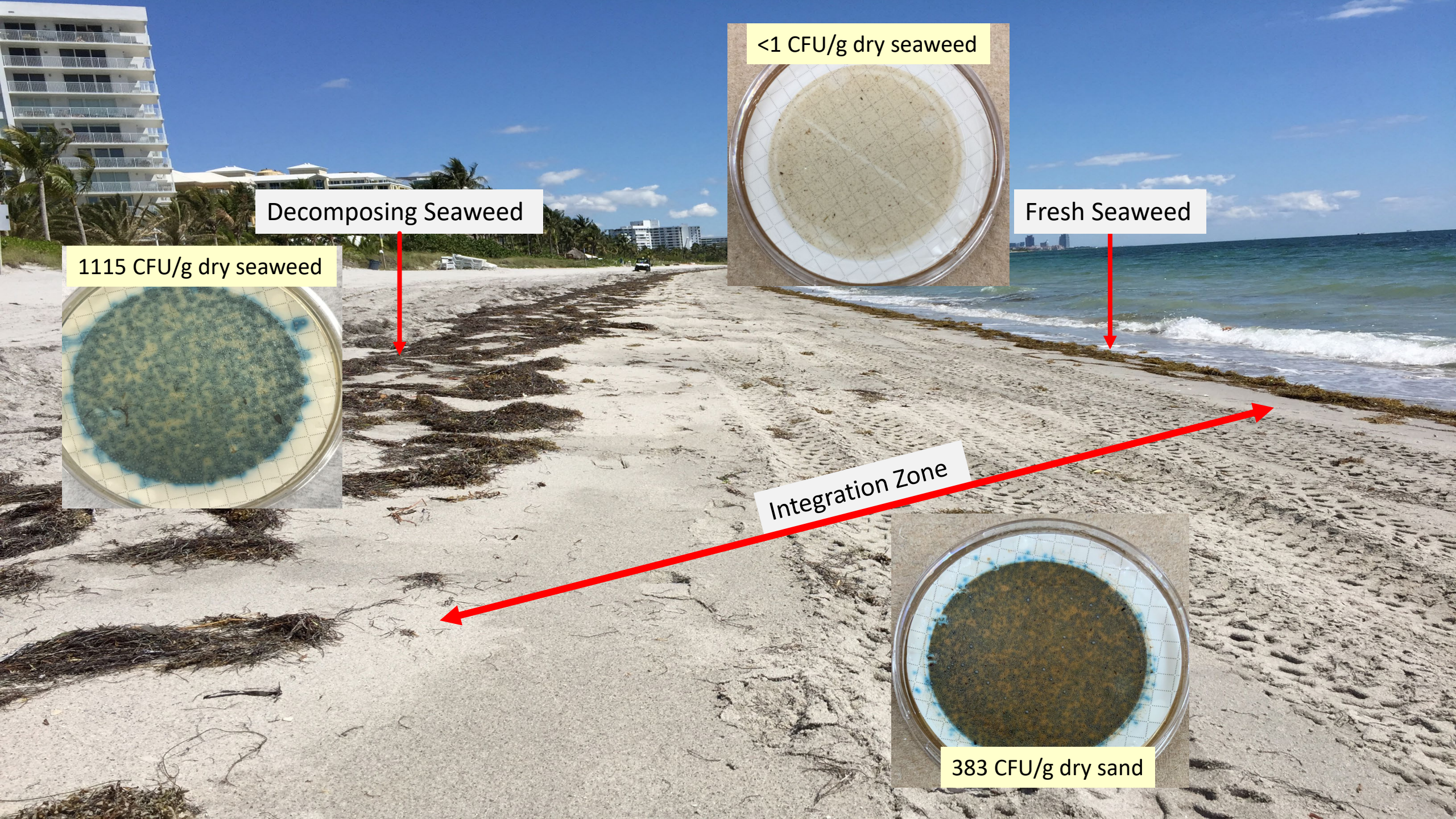


CFU = colony forming units



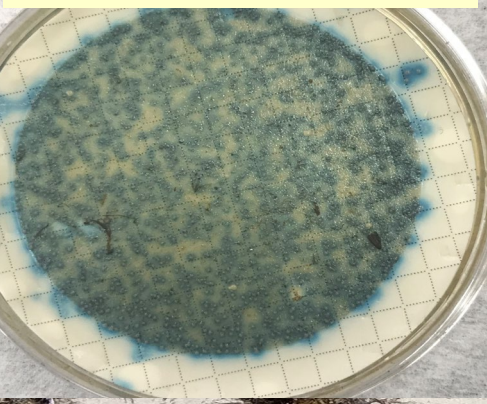
Enterococci Levels at Different Regions 2000-2019



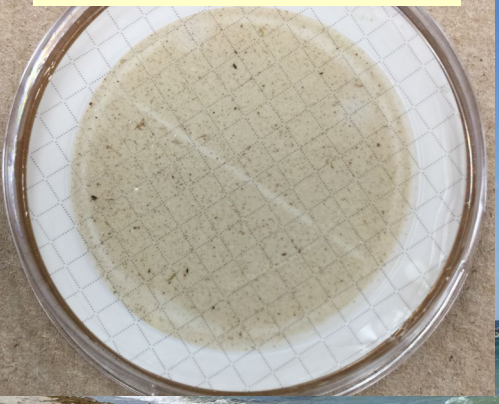


Decomposing Seaweed

1115 CFU/g dry seaweed



<1 CFU/g dry seaweed



Fresh Seaweed

Integration Zone

383 CFU/g dry sand



AP

Miami-Dade To Begin Sargassum
Seaweed Cleanup On County Beaches



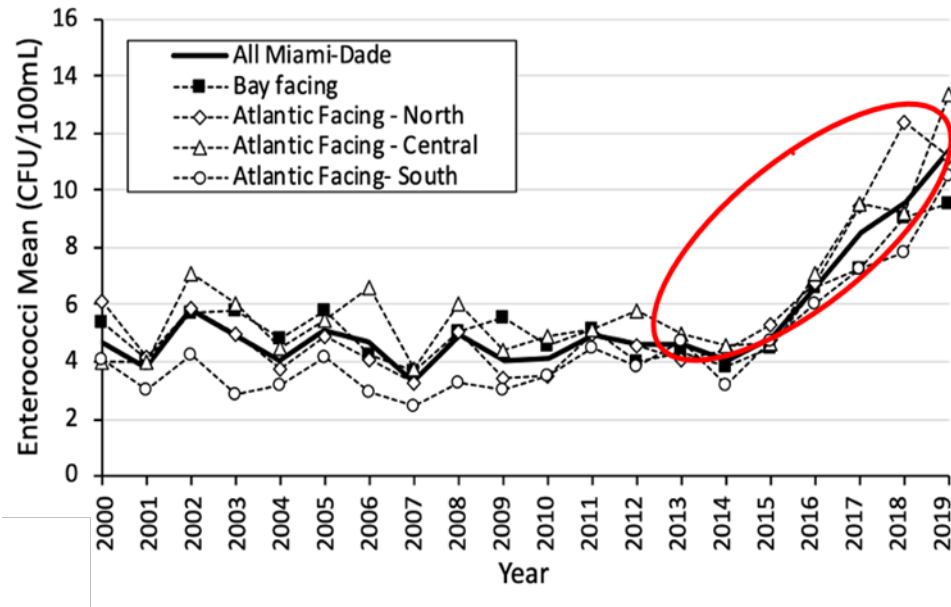
Possible Links To *Sargassum* Increases

- Warming Temperatures
- Climate change
- Nutrient Enrichment



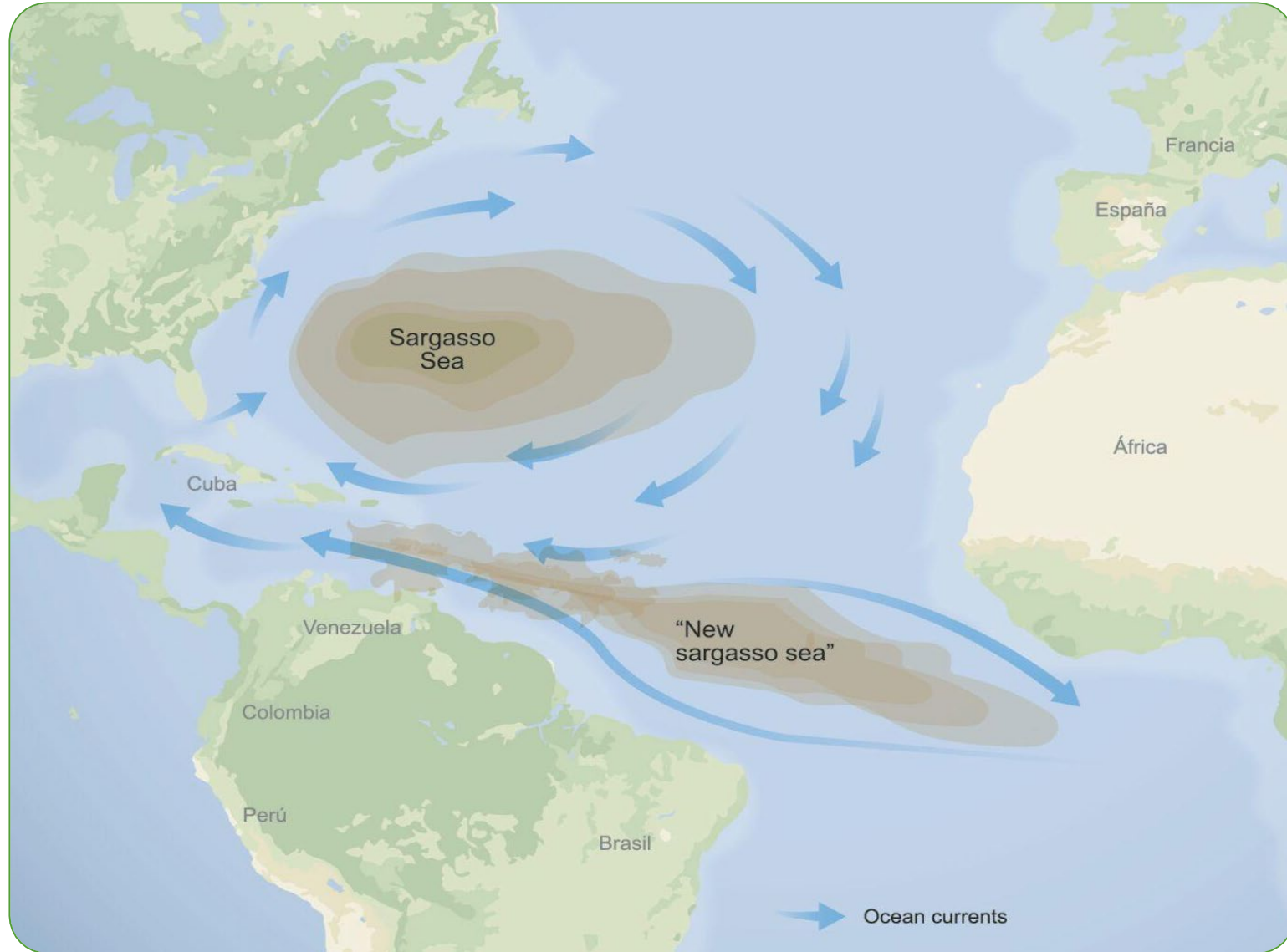
Conclusion

Bacteria Increase



Shoreline Accumulation of *Sargassum*

- Excess *Sargassum* is washing up on the shores of Florida beaches.
- Large quantities of *Sargassum* have been reported in the central Atlantic Ocean and the Caribbean Sea.
- Researchers attribute the release of nutrients from deforestation of the Amazon rain forest to the sudden increase in *Sargassum* within the Caribbean.



Seaweed Management In Florida

- Management includes:
 - Leaving it on sand
 - Integration into sand
 - Using front end loaders to remove and haul away
 - Composting
- Can cause economic hardships for counties and cities
- Impacts tourist economy



Exploratory Work (March 2020)



4 Days



October 14, 2020



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Objectives

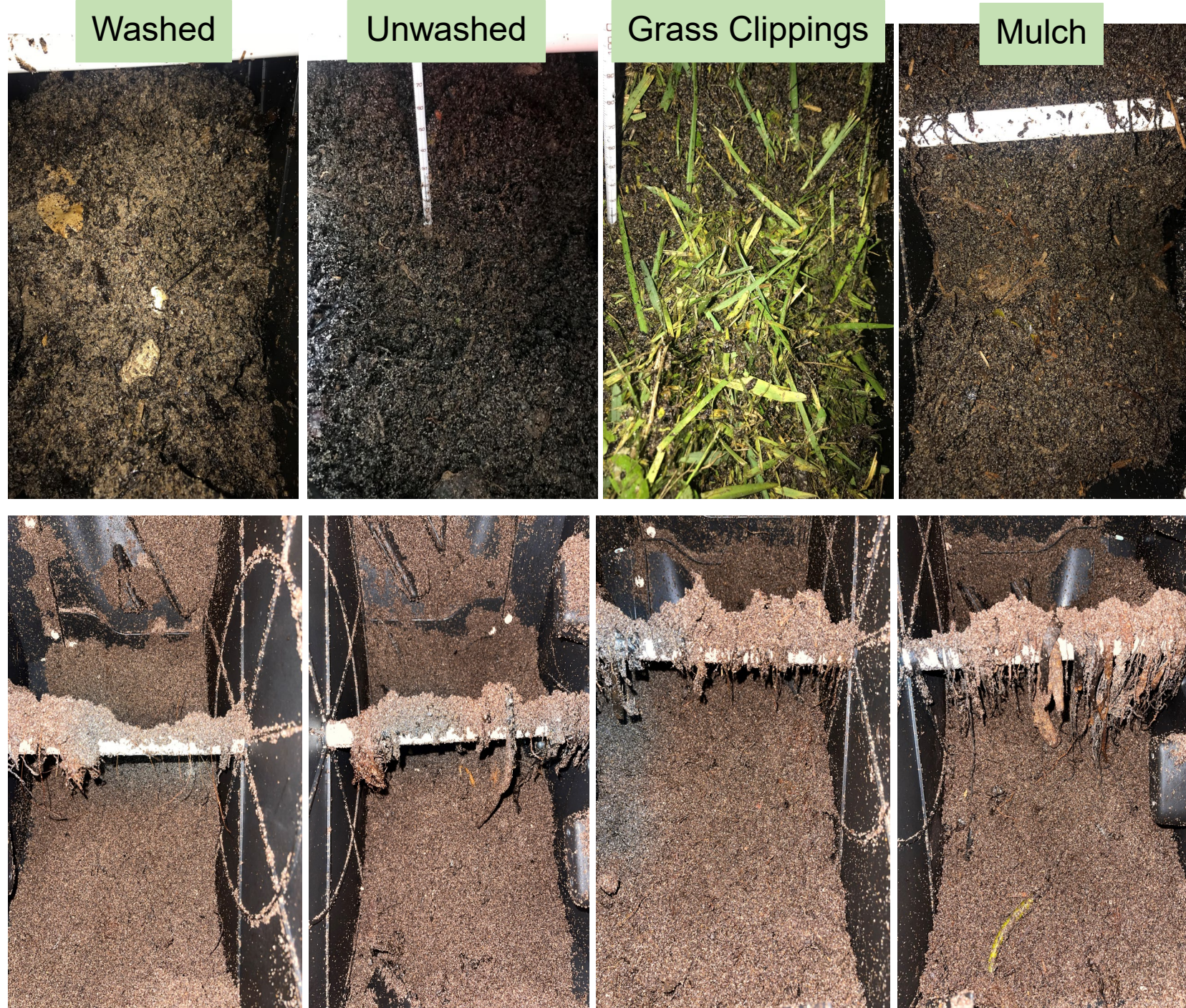
- The objectives of this project are to evaluate compost as a means of reusing Sargassum
- Two phases have been outlined in order to evaluate the suitability of the compost:
 - Phase I (Tumbler Composters) will focus on evaluating additives on the physical-chemical parameters of the resulting compost
 - Phase II (Compost Piles) will be at a larger scale and will focus on different processing for Sargassum (vegetative waste vs no additives).



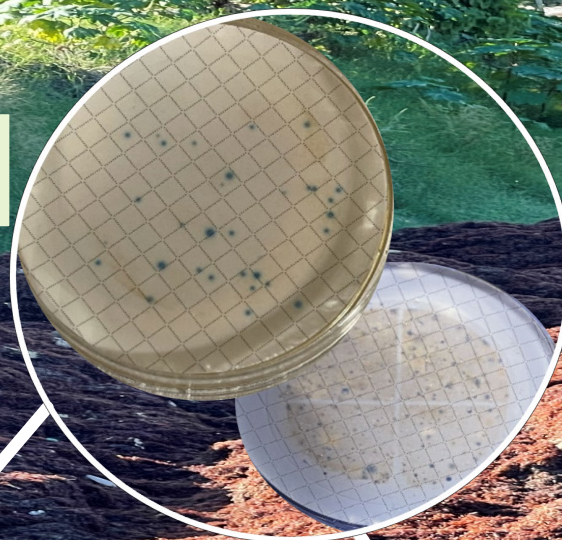
Phase I: Tumbler Composters

1. Washing *Sargassum* with freshwater.
2. No washing of *Sargassum*.
3. Green clippings (grass clippings) added to *Sargassum*.
4. Brown clippings (vegetative wood much) added to *Sargassum*.

Piles sampled bi-weekly for bulk physical-chemical parameters, bacteria, metals, and nutrients.



Bacteria Analysis



Metals



Nutrients



**Bulk Physical-
Chemical parameters**



Radish Bioassay

○ 5 experiments:

- 100% compost
- 100% potting soil
- 70% compost/ 30% potting soil
- 30% compost/ 70% potting soil
- 50% compost/ 50% potting soil



Results From Year 1- Phase 1

- Almost 90% reduction in weight
- Salinity is not an issue
- Arsenic meets most standards.
- Standards are in the process of being proposed based on the data collected so far.
- Carbon to Nitrogen ratios look good
- Bacteria high in tumbler
- **Promising solution**

Phase II of Year 1



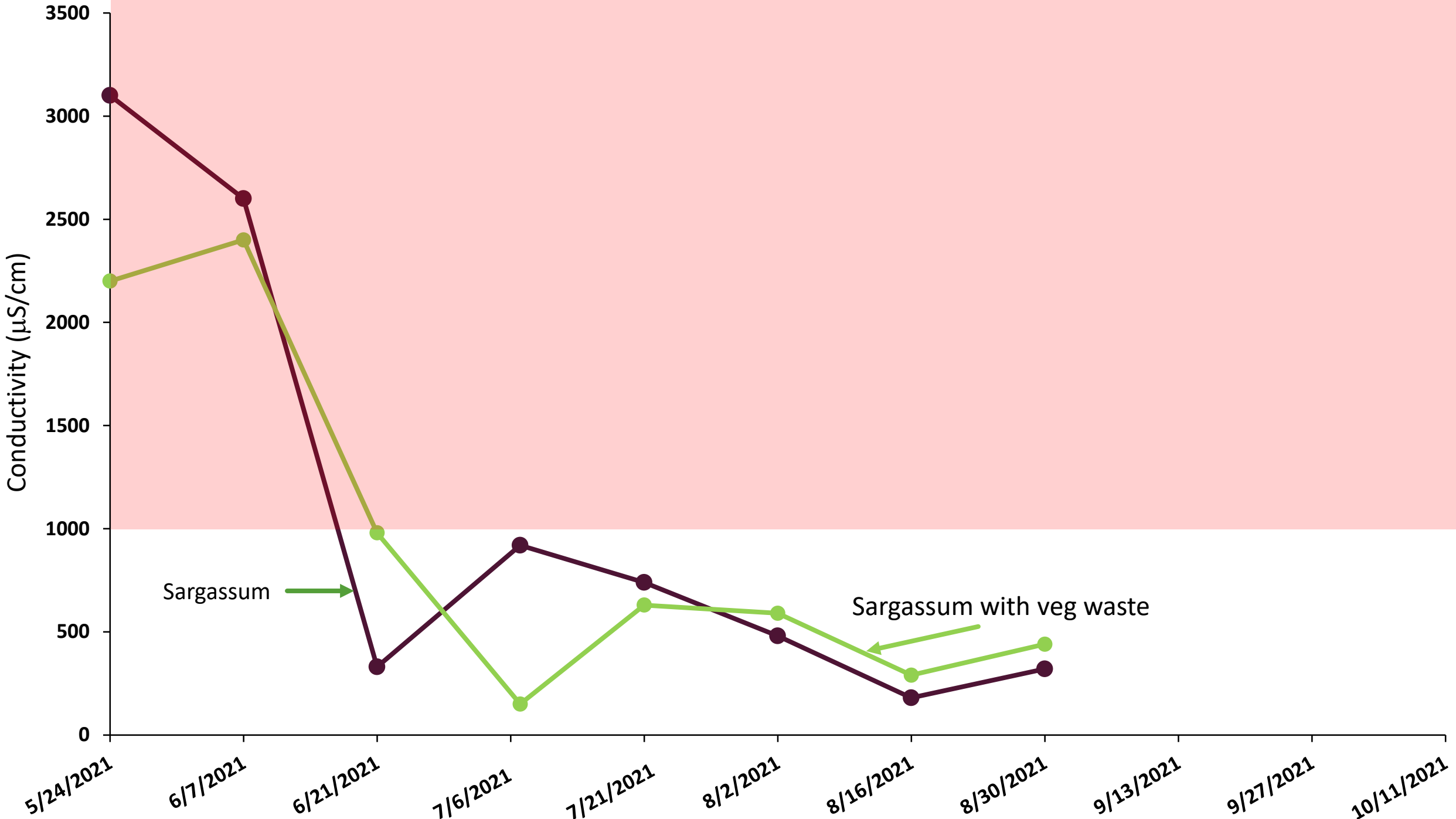
- Sargassum collected from Hallandale beach.
- Sargassum brought back to the Department of Public Works.
- Sargassum divided into two piles:
 - Sargassum
 - Sargassum and vegetative waste

Sargassum Pile



Sargassum and vegetative waste



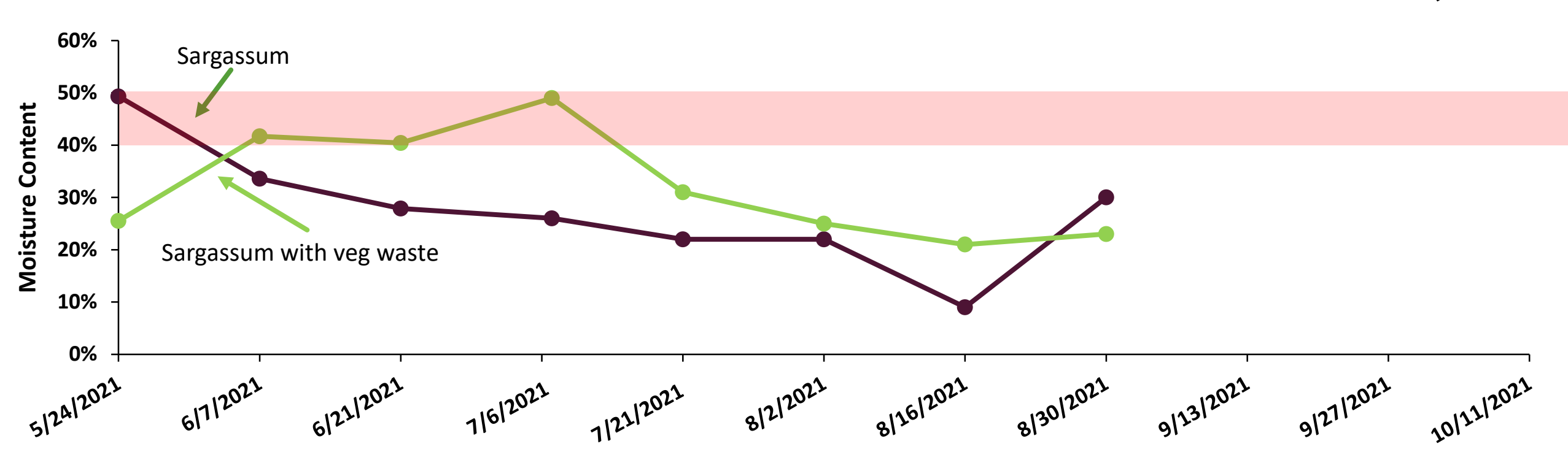
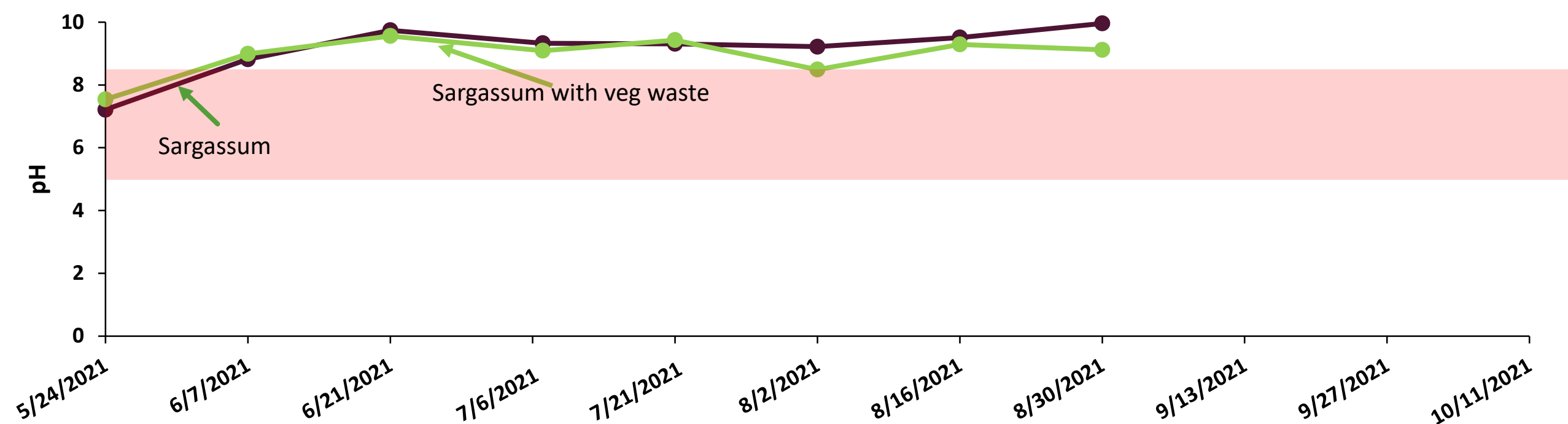


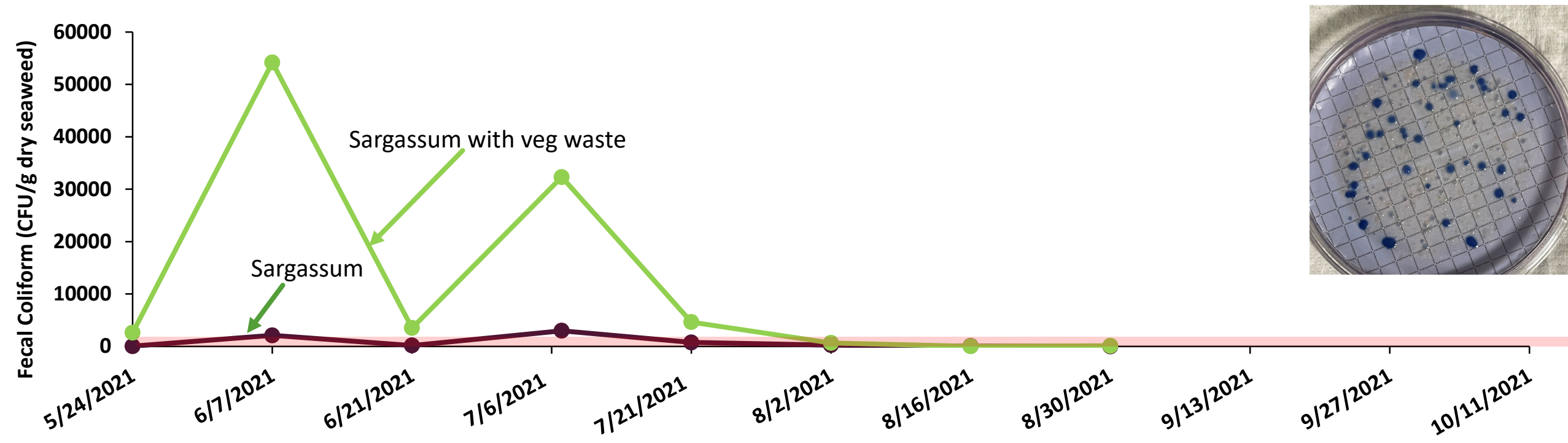
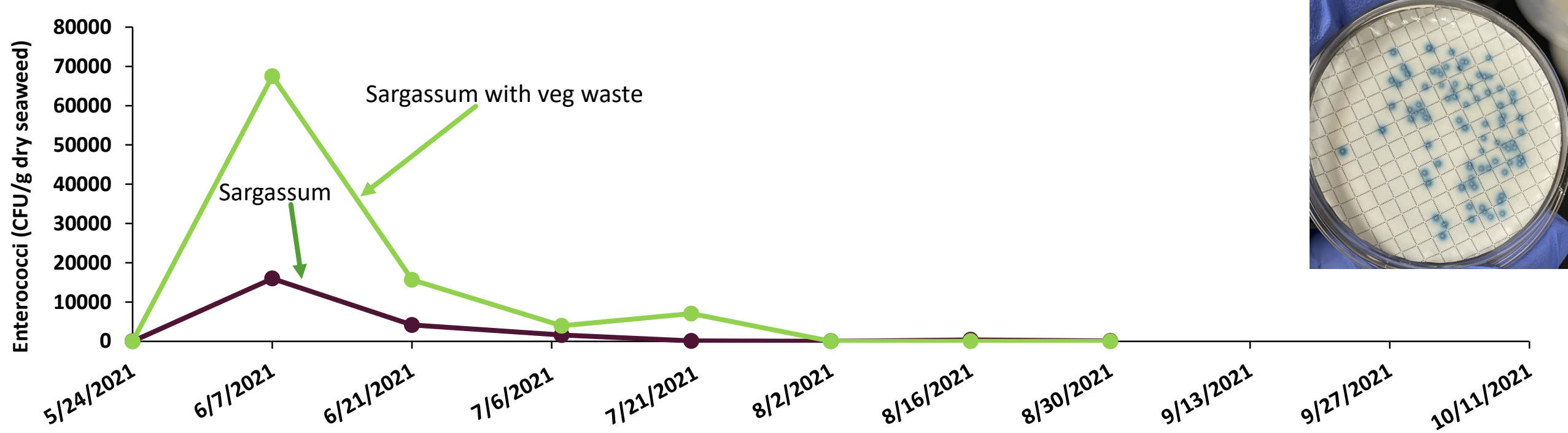
Sargassum



Sargassum with veg waste









Questions?

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