Assessing Unoccupied Aircraft Systems for Long-Term Monitoring of Intertidal Oyster Reefs

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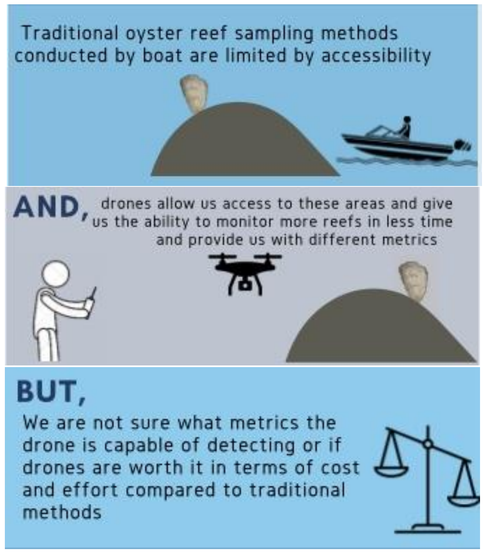
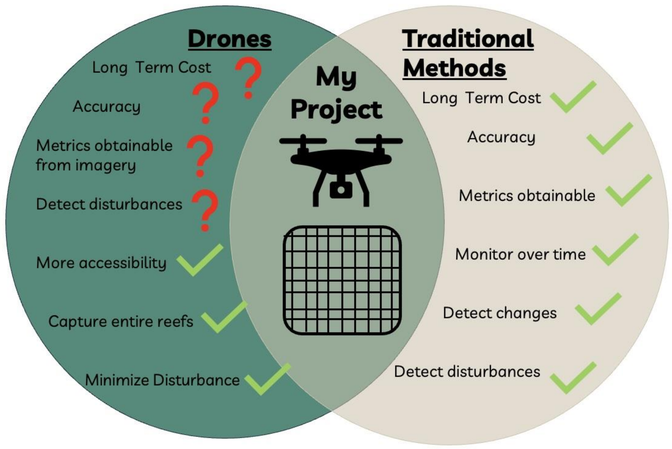
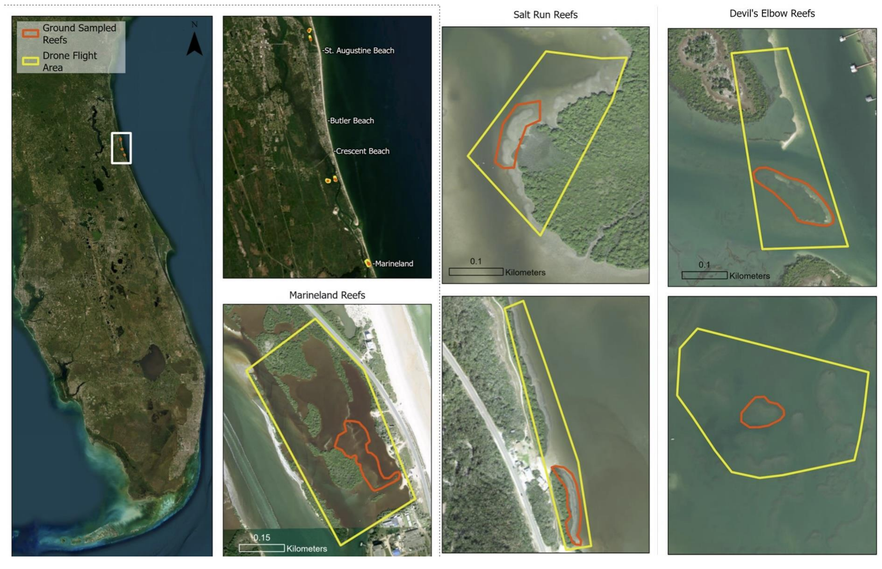
Introduction





Methods

- We obtained input from Florida stakeholders to perform a comparison of UAS (drone-based) methods to traditional, ground-based methods
- Our stakeholders determined it was important to
  1. To determine if drone-derived products can detect change in reef condition due to various impacts (boat wakes and harvesting)
  2. Determine the long-term feasibility of the drone-based methods compared to traditional monitoring in terms of cost and accuracy.
  3. Determine the number of ground-based samples required to represent a reef



1. Ground-based methods can detect impacts. Can drones?

Year 1 Initial Cost Analysis	In-situ Methods	Drone Methods
Cost per Reef (Labor Included)	$3,156	$4,256
Final Expenses (Labor Included)	$123,103	$165,971
Area Covered (in m^2)	234 m^2	191,326 m^2
Total cost / per reefs/ per unit area covered (m^2)	$530	$0.86

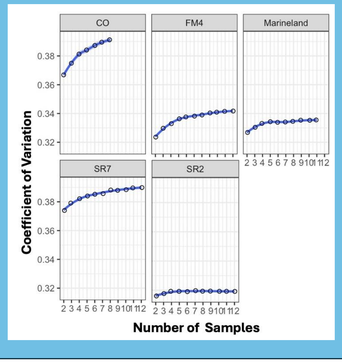
Year 5 Cost Analysis	In-situ Methods	Drone Methods
Cost per Reef (Labor Included)	$1159	$931
Final Expenses (Labor Included)	$191,232	$153,612
Area Covered (in m^2)	990 m^2	809,457 m^2
Total cost / per reefs/ per unit area covered (m^2)	$198	$0.18

Year 1 based on 39 reefs sampled

Year 5 based on 165 reefs sampled

2. Drones are cost ficient and cover more area

3. Twelve ground-based samples are sufficient on most reefs, but not on the most variable



Reefs:

CO – patch reef, exposed to boat wakes

FM4 – patch reef, sheltered from boat wakes

Marineland – flat, amorphous reef

SR7 – fringe reef, not harvested

SR2 – fringe reef, harvested