

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

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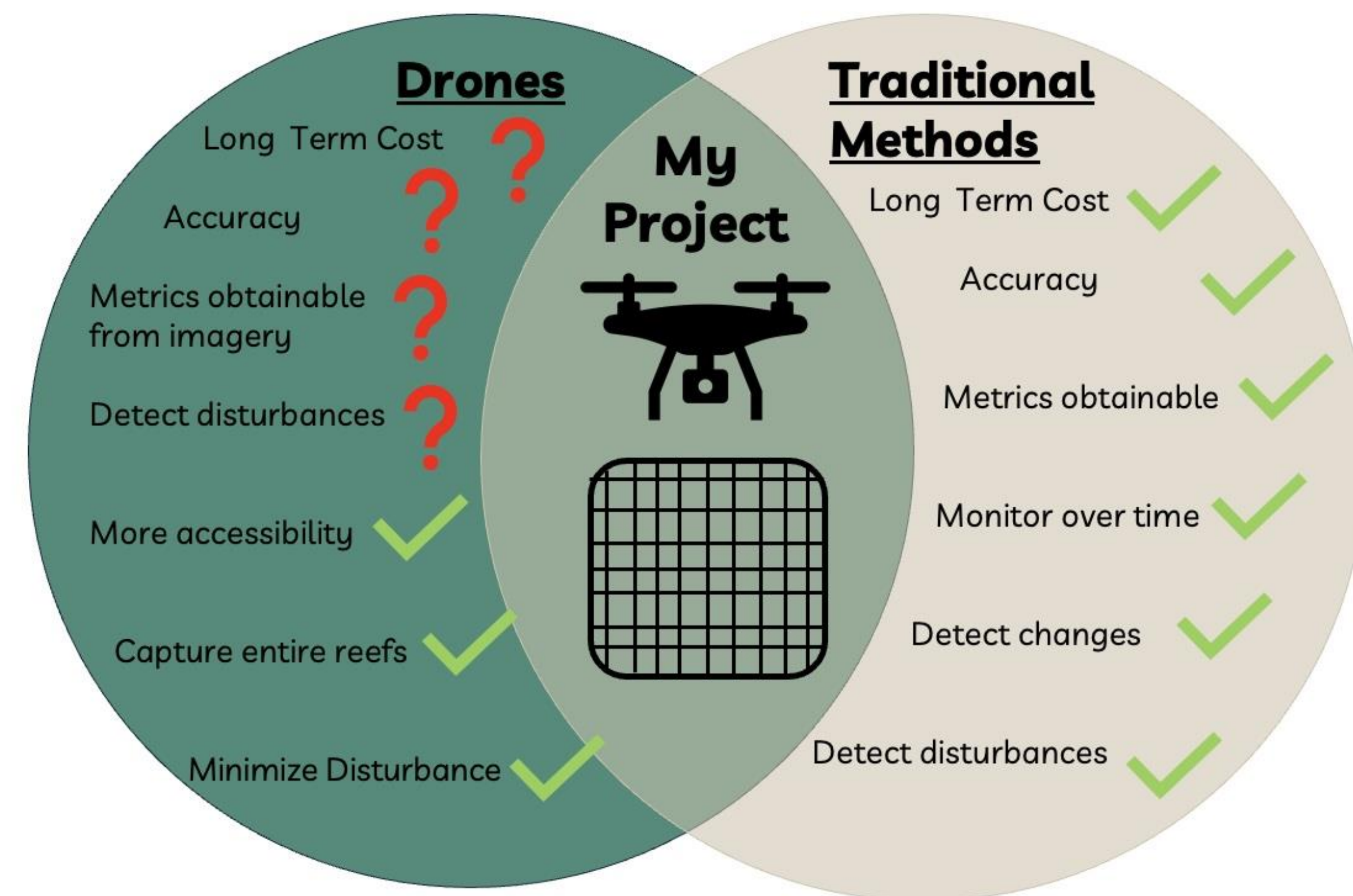
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Introduction

Traditional oyster reef sampling methods conducted by boat are limited by accessibility

AND, drones allow us access to these areas and give us the ability to monitor more reefs in less time and provide us with different metrics

BUT, We are not sure what metrics the drone is capable of detecting or if drones are worth it in terms of cost and effort compared to traditional methods



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

Non-Harvestable



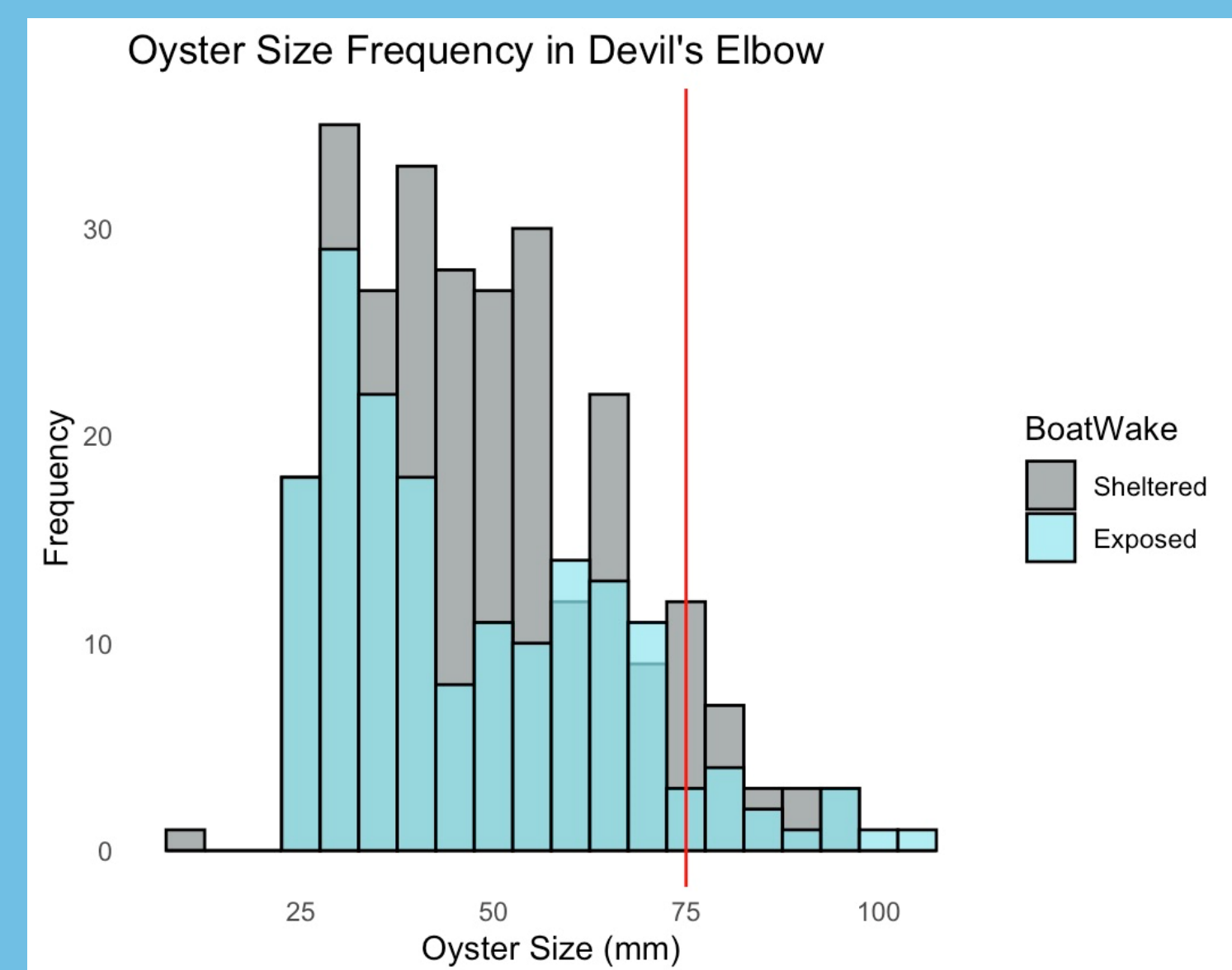
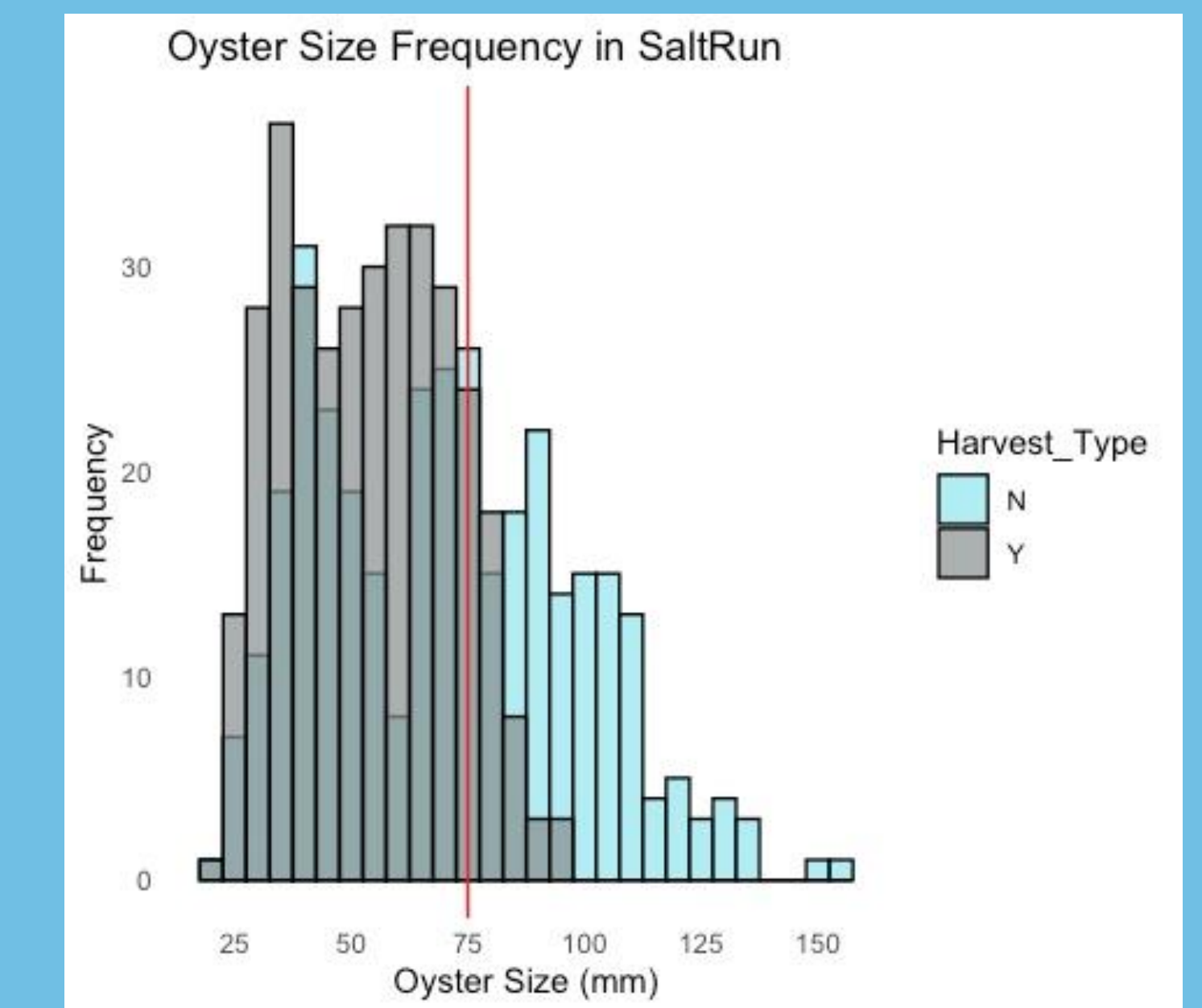
Harvestable



Sheltered from wakes



Exposed to wakes



Methods

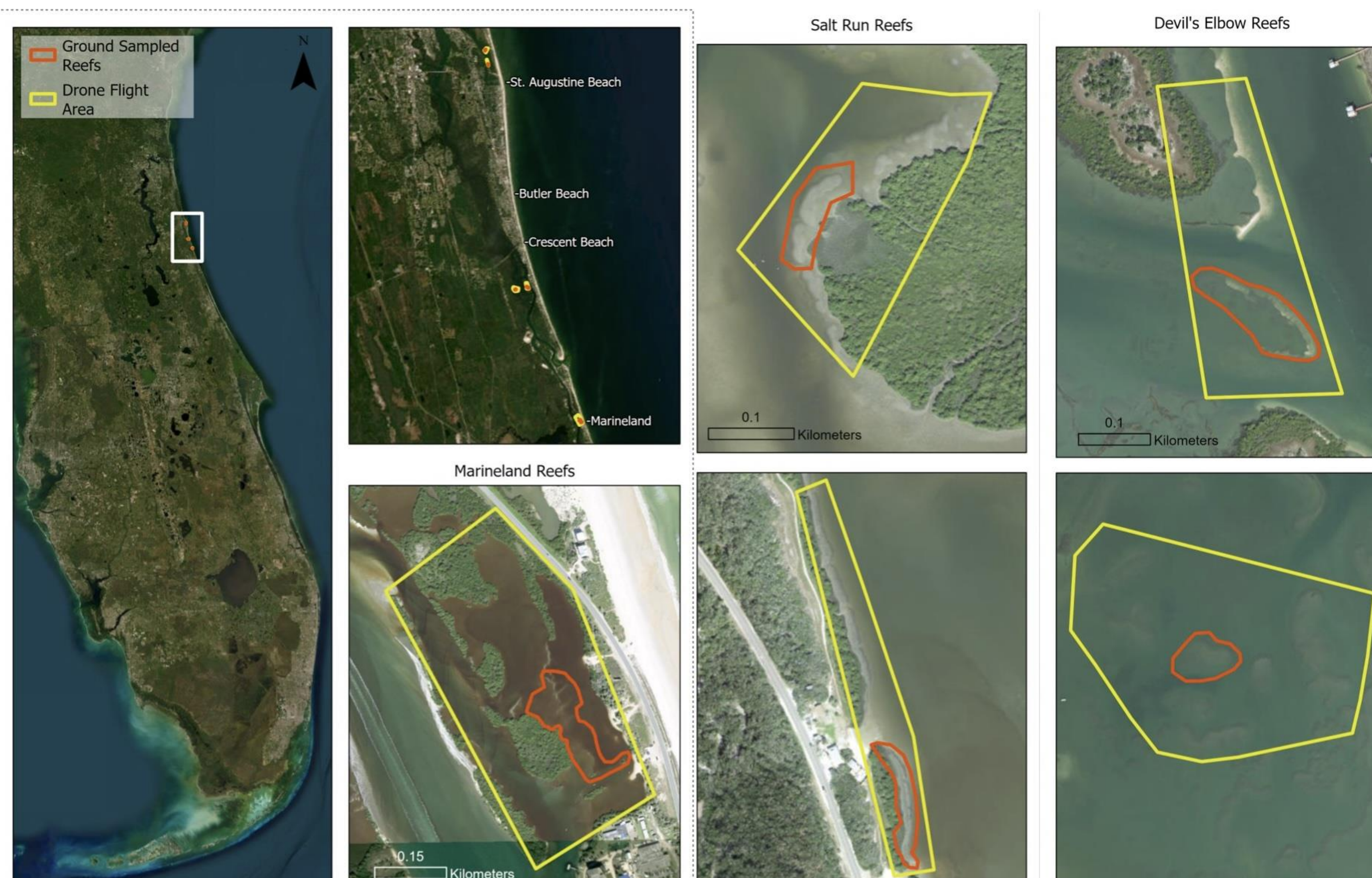
- We obtained input from Florida stakeholders to perform a comparison of UAS (drone-based) methods to traditional, ground-based methods
- Our stakeholders determined it was important to
 - To determine if drone-derived products can detect change in reef condition due to various impacts (boat wakes and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

Year 1 Initial Cost Analysis	In-situ Methods	Drone Methods	Year 5 Cost Analysis	In-situ Methods	Drone Methods
Cost per Reef (Labor Included)	\$3,156	\$4,256	Cost per Reef (Labor Included)	\$1159	\$931
Final Expenses (Labor Included)	\$123,103	\$165,971	Final Expenses (Labor Included)	\$191,232	\$153,612
Area Covered (in m ²)	234 m ²	191,326 m ²	Area Covered (in m ²)	990 m ²	809,457 m ²
Total cost / per reefs/ per unit area covered (m ²)	\$530	\$0.86	Total cost / per reefs/ per unit area covered (m ²)	\$198	\$0.18

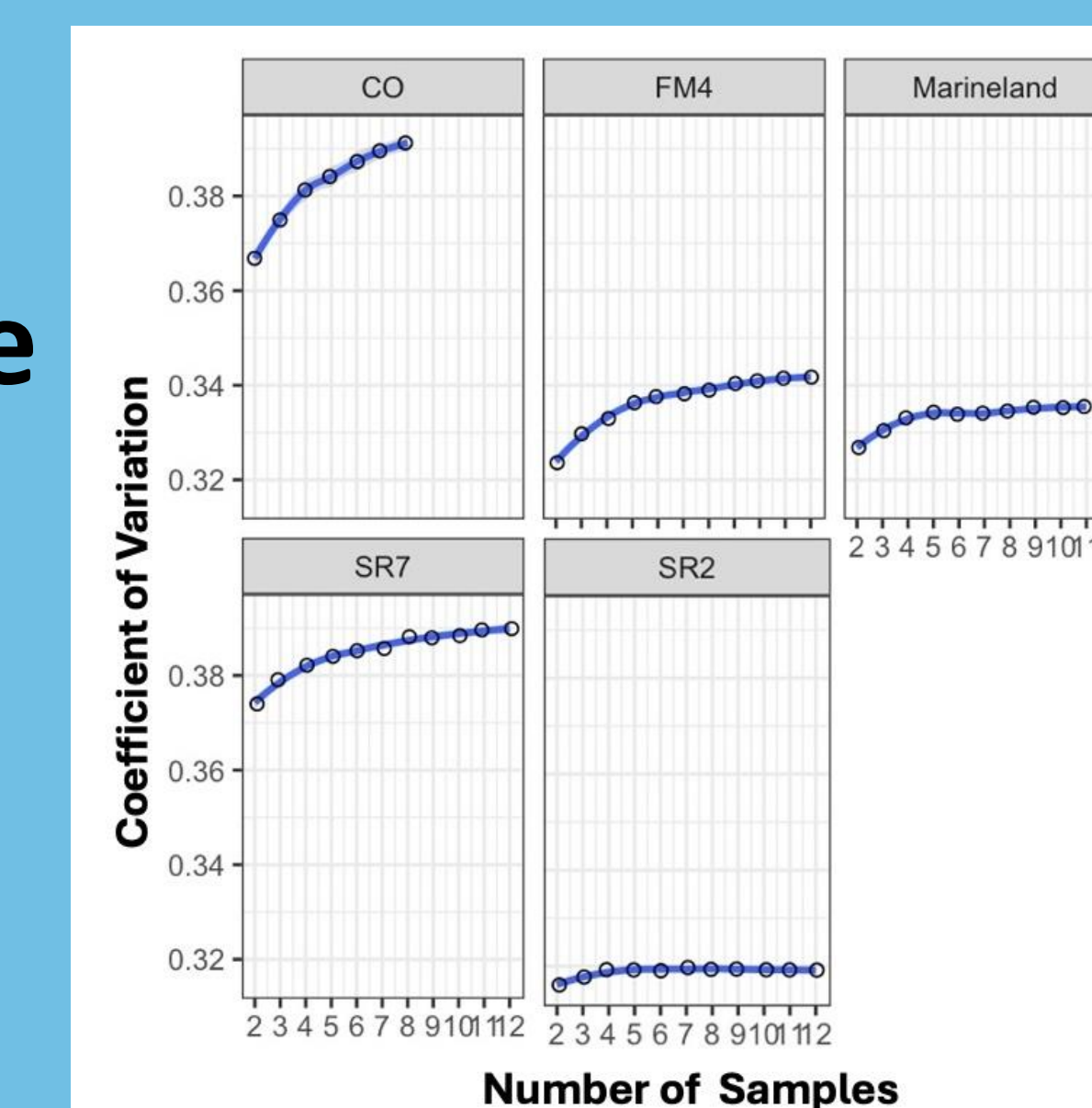
2. Drones are cost efficient and cover more area

Year 1 based on 39 reefs sampled

Year 5 based on 165 reefs sampled



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

