Florida Department of Environmental Protection

Natural Oyster Reef Monitoring in Central Indian River Lagoon

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OIMMP – May 22-23, 2018

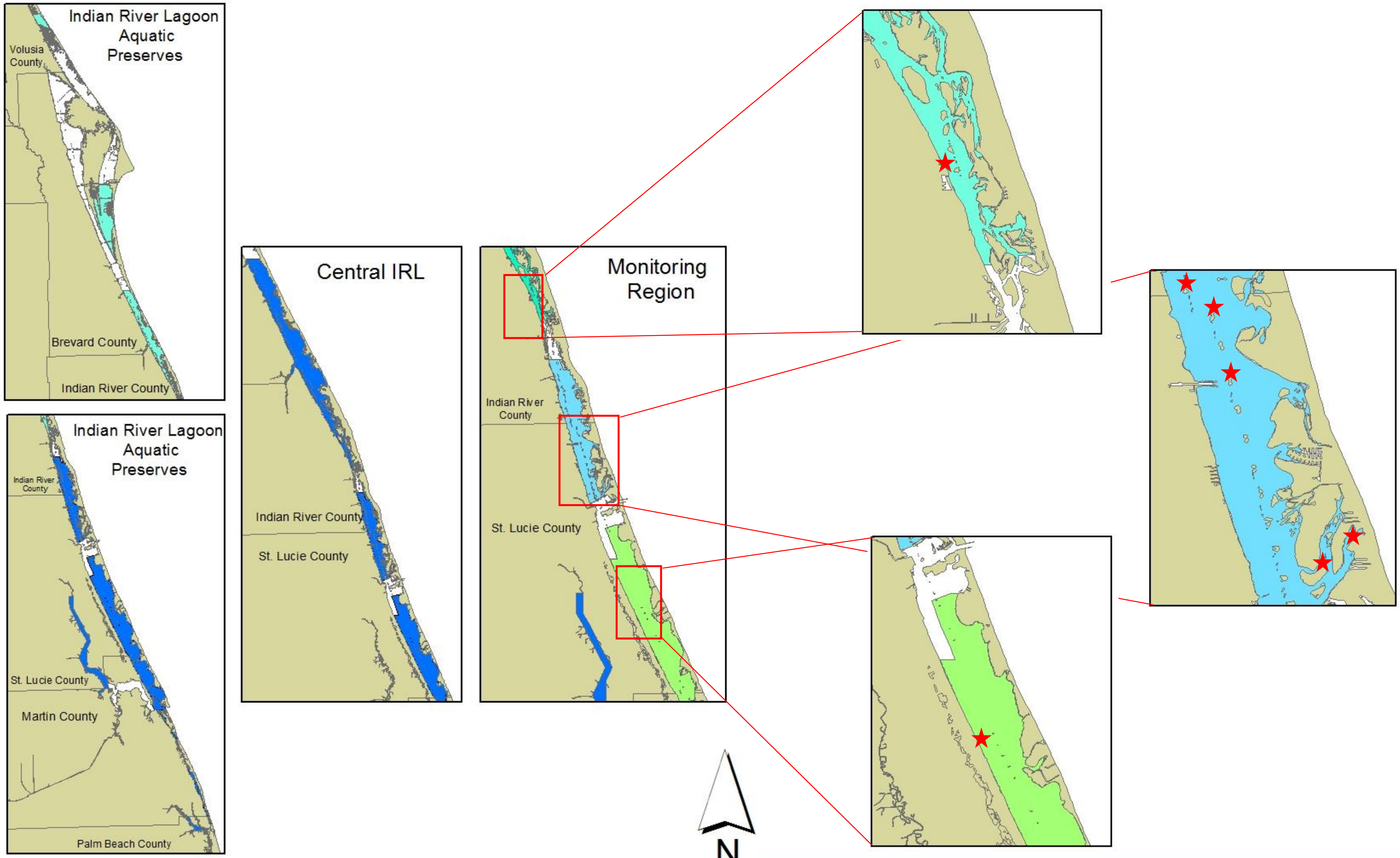
Partnership

Existing ocean observation efforts tend to focus on the open ocean or on physical and chemical characteristics.
The MarineGEO initiative fills a critical void with its unique focus on:

- The coastal zone, where people and marine life are concentrated
- Biodiversity and the factors that create resilience to stressors
- Systematic data collection over a long time span
- Integration of multiple scientific disciplines to understand biodiversity and ecosystem function
- Experiments to help us truly understand the drivers of change.

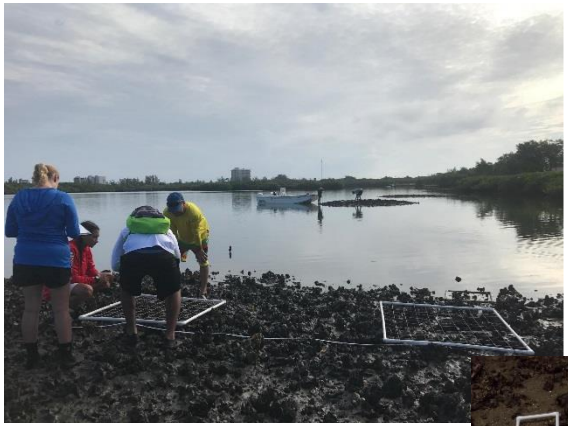
The initiative will employ long-term standardized observations and experiments to build the first comprehensive database on the coastal ocean's physical characteristics and biodiversity, making new scientific discoveries possible.

Central Indian River Lagoon



Natural Reef Monitoring Methods

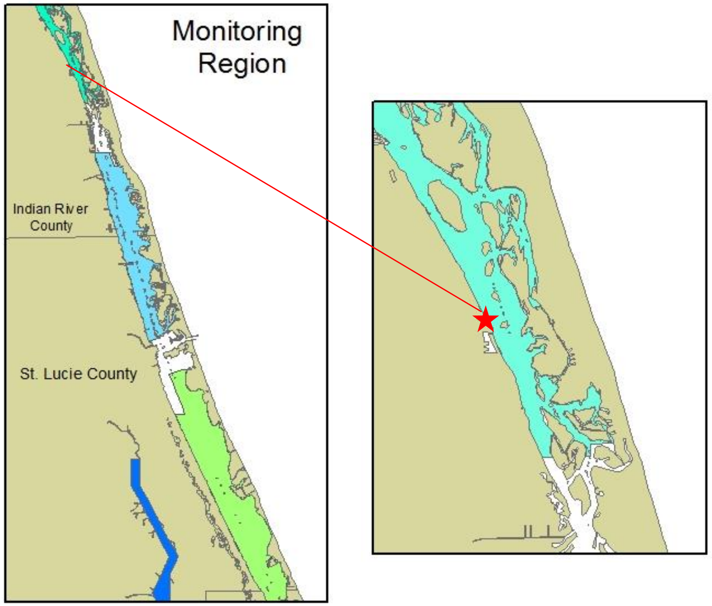
- Height of reef is measured using string, level and meter stick at four cardinal points
- (3) transects, (5)1x1m quadrats per transect (n=15), 81 point counts for each quadrat (sediment, cultch, live or box)
- On each of (3) transects .25x.25m quadrat placed at lower left of larger quadrat (location on transect randomly selected), all oysters excavated into bucket, rinsed, and all live and box oysters are counted. A cumulative of 50 oysters are measured (25 box, 25 live maximum per quadrat- or if all live or box- measure 50)
- 3 Bioboxes are placed at each reef 1-2 months before sampling. Contents are brought back to the lab for further identification. Larger organisms, such as fish and crabs are identified, measured and released in the field

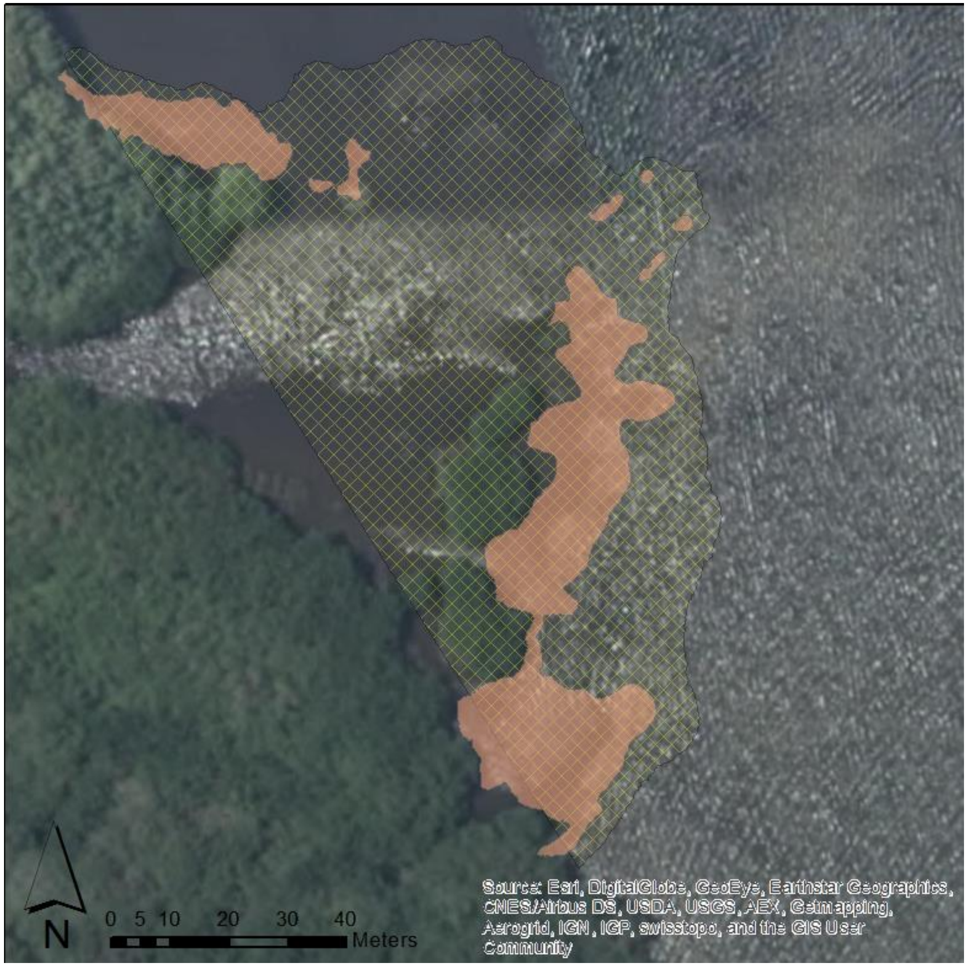


Mapping

- Trimble Unit
- Main reef: 10% cover, flag/walk perimeter
- Shell hash/blowout zone, flag/walk perimeter
- Drone footage- help find parts of reef
- Pathfinder software-differential correction, export as shape file.
- Challenges

Vero Beach Northern Relief Canal



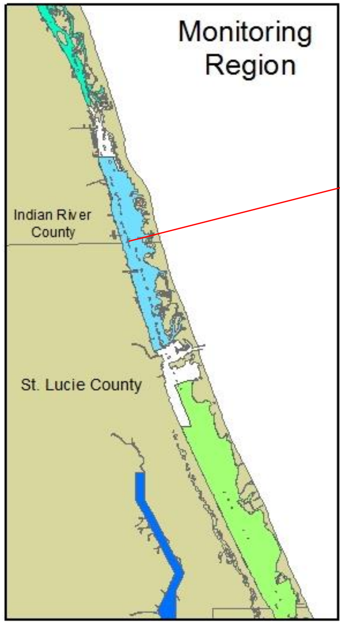


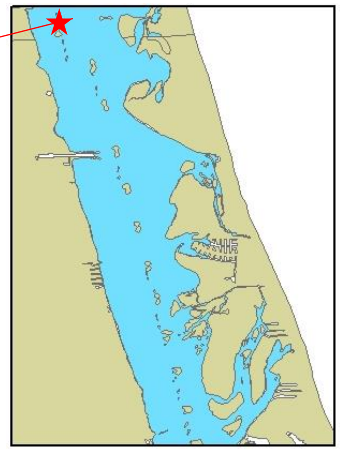
Mean % Box: **4.2**
Mean % Cultch: **60.1**
Mean % Live: **20.6**
Mean % Sediment: **15.1**

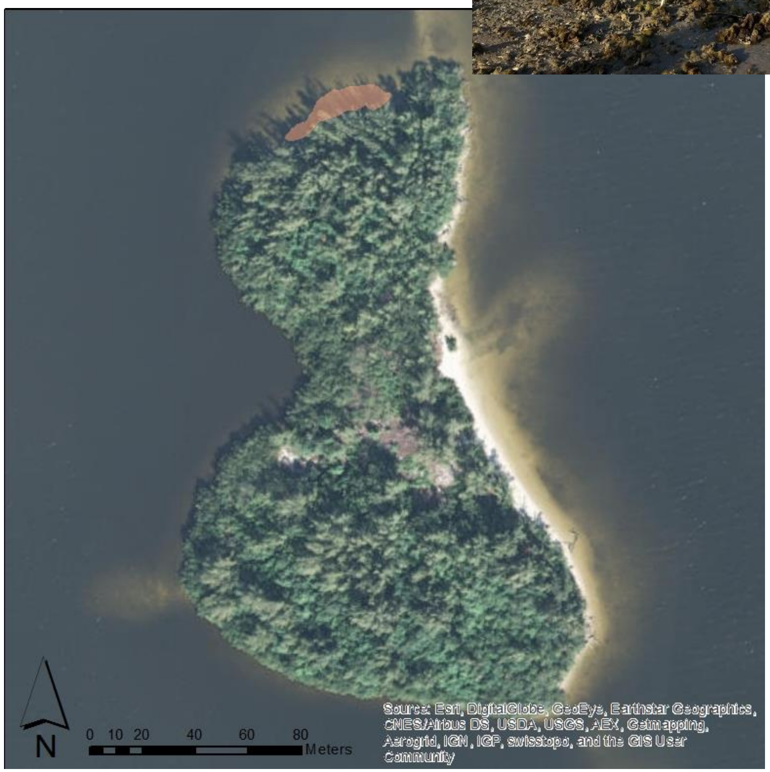
Total % Live: **76.3**
Total % Box: **23.3**

Mean size (mm) Live (n= 102): **35.4**
Mean size (mm) Box (n=37): **53.8**

Spoil Island IR43





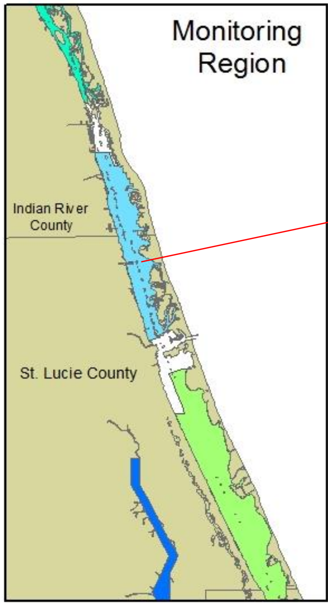


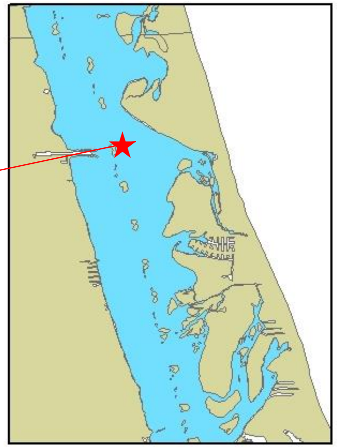
Mean % Box: **7.8**
Mean % Cultch: **46.4**
Mean % Live: **6.9**
Mean % Sediment: **38.9**

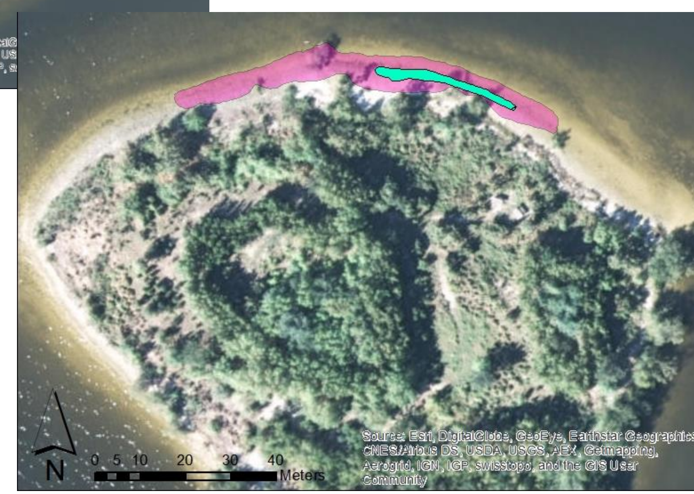
Total % Live: **43.9**
Total % Box: **56.1**

Mean size (mm) Live (n= 54): **34.2**
Mean size (mm) Box (n=69): **41.2**

Spoil Island SL3





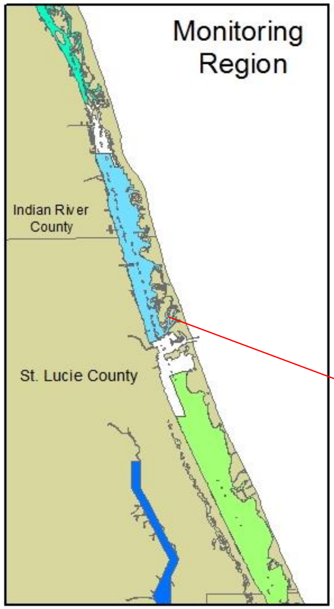


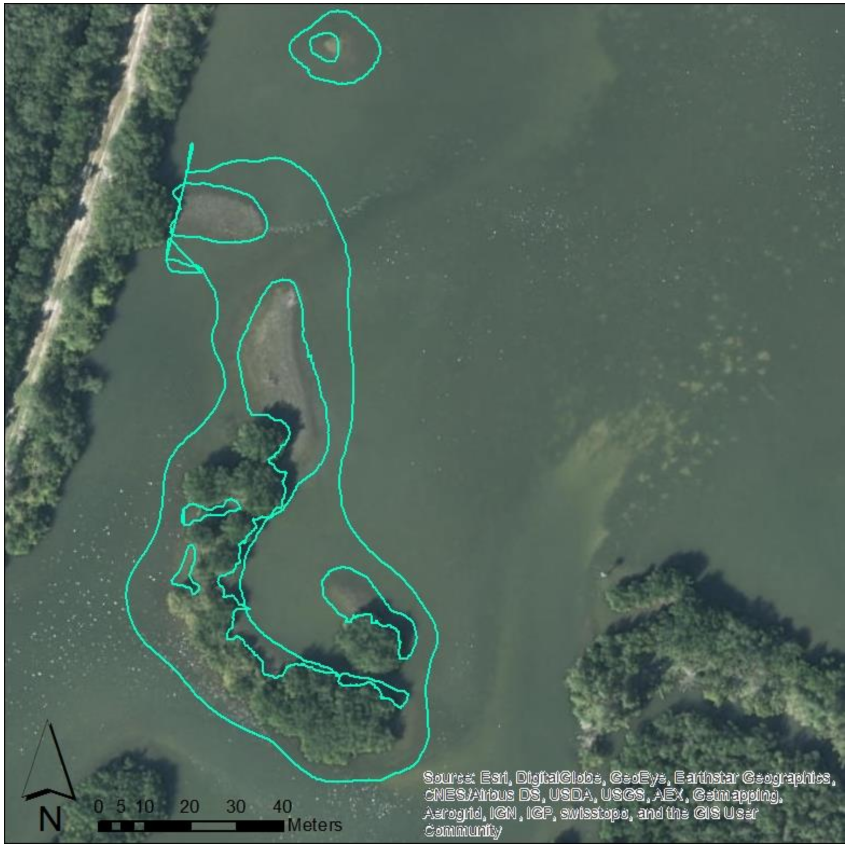
Mean % Box: **1.3**
Mean % Cultch: **9.7**
Mean % Live: **0.2**
Mean % Sediment: **88.7**

Total % Live: NO EXCAVATION DUE TO POOR CONDITION OF REEF

Mean size (mm) Live (n=): NO EXCAVATION DUE TO POOR CONDITION OF REEF

Jack Island



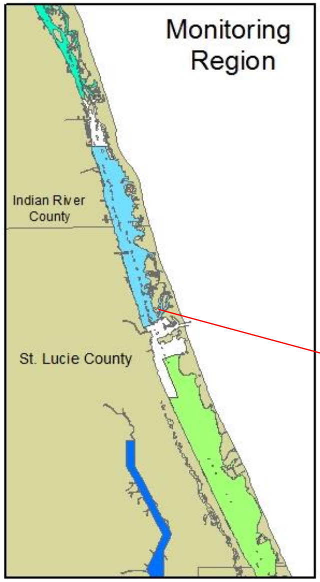


Mean % Box: **12.4**
Mean % Cultch: **71.6**
Mean % Live: **12.1**
Mean % Sediment: **3.9**

Total % Live: **66.4**
Total % Box: **33.5**

Mean size (mm) Live (n= 87): **29.8**
Mean size (mm) Box (n=51): **31.5**

Wildcat Cove

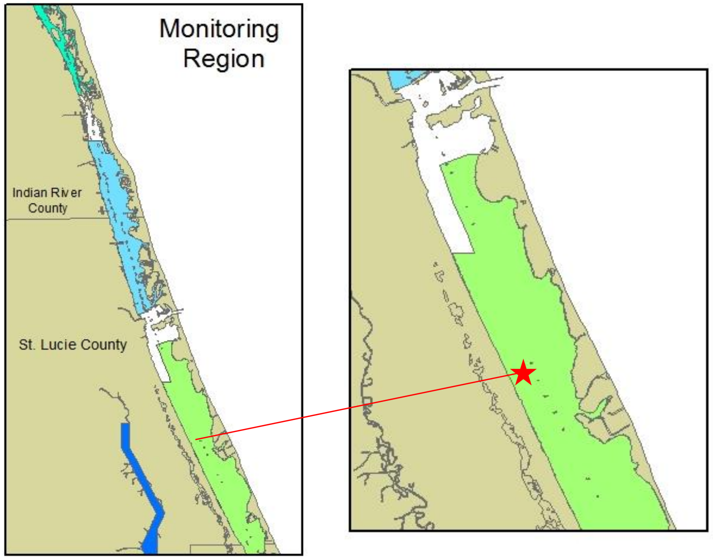


Mean % Box: **7.6**
Mean % Cultch: **48.9**
Mean % Live: **31.9**
Mean % Sediment: **11.5**

Total % Live: **77.8**
Total % Box: **22.2**

Mean size (mm) Live (n=70): **48.6**
Mean size (mm) Box (n= 20): **51.7**

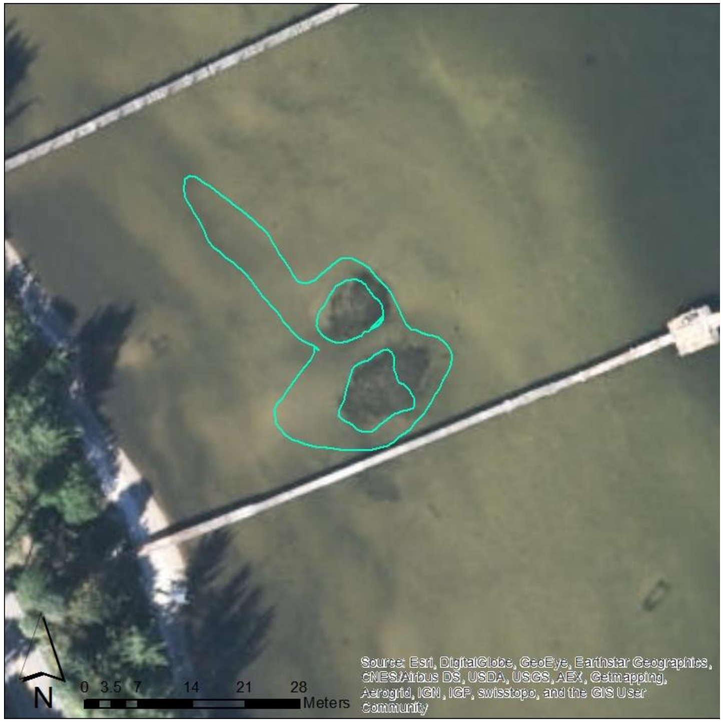
Midway



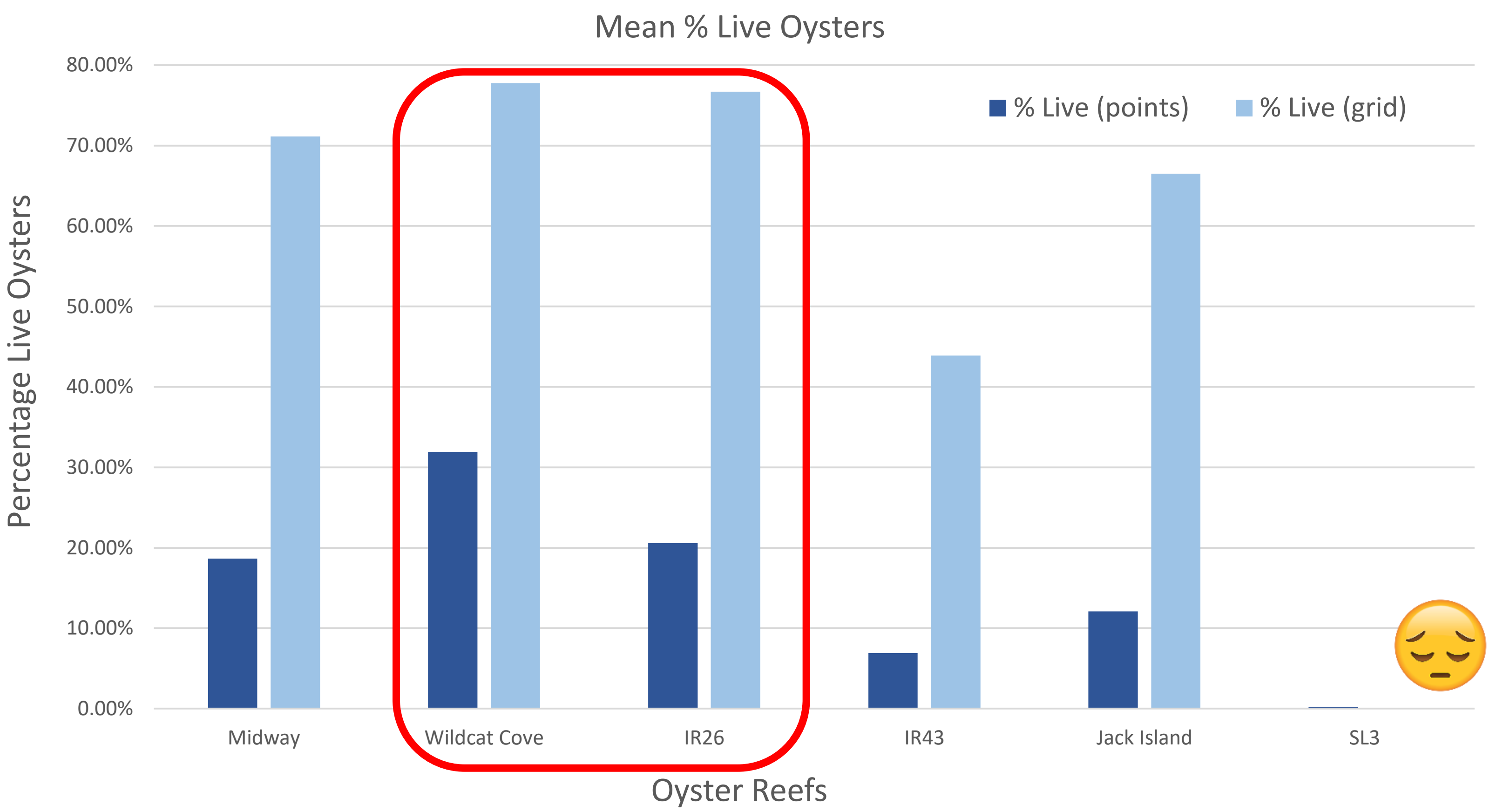
Mean % Box: **8.1**
Mean % Cultch: **60**
Mean % Live: **18.6**
Mean % Sediment: **13.2**

Total % Live: **71.1**
Total % Box: **28.8**

Mean size (mm) Live (n=101): **26.2**
Mean size (mm) Box (n= 50): **32.2**

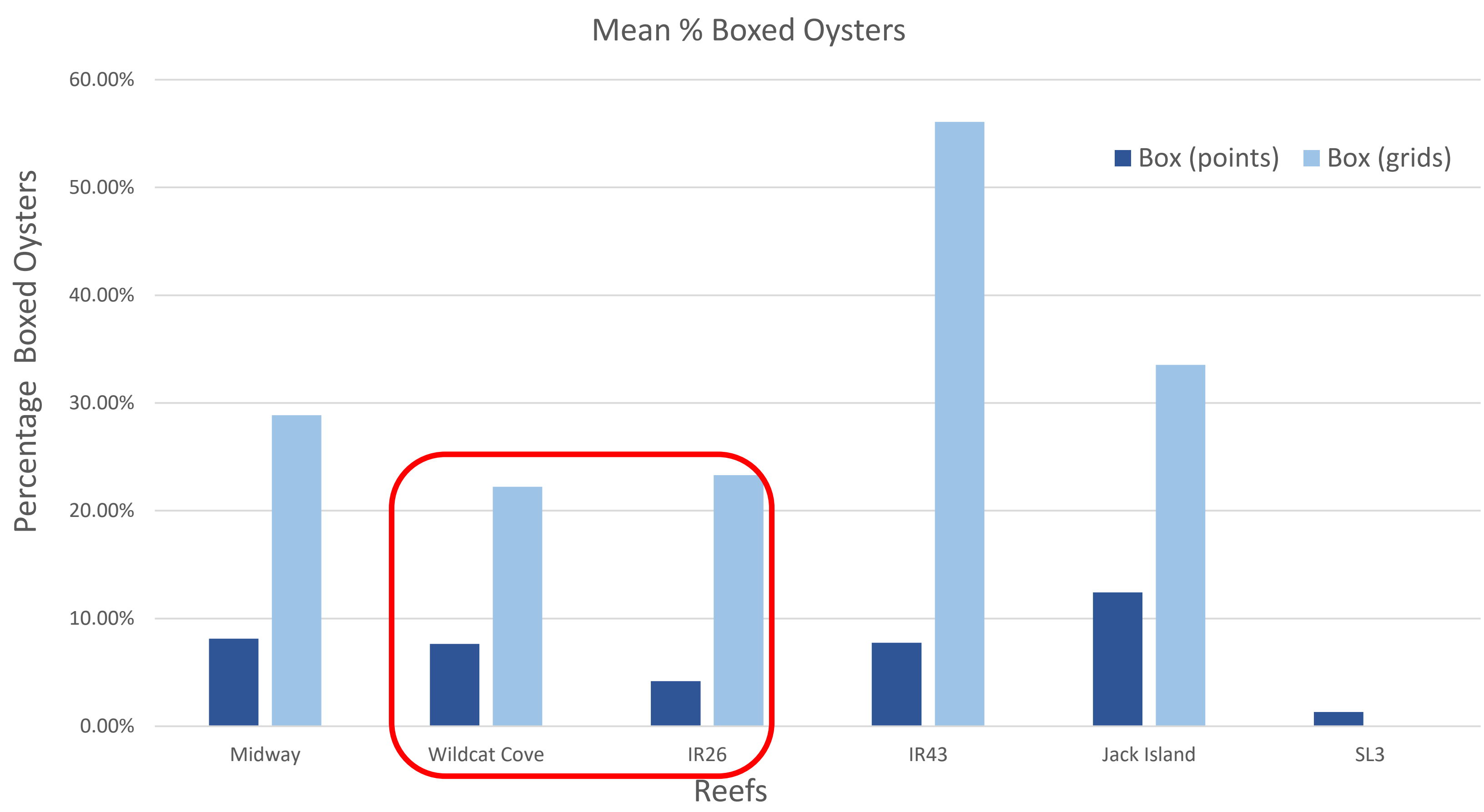


Closer Look



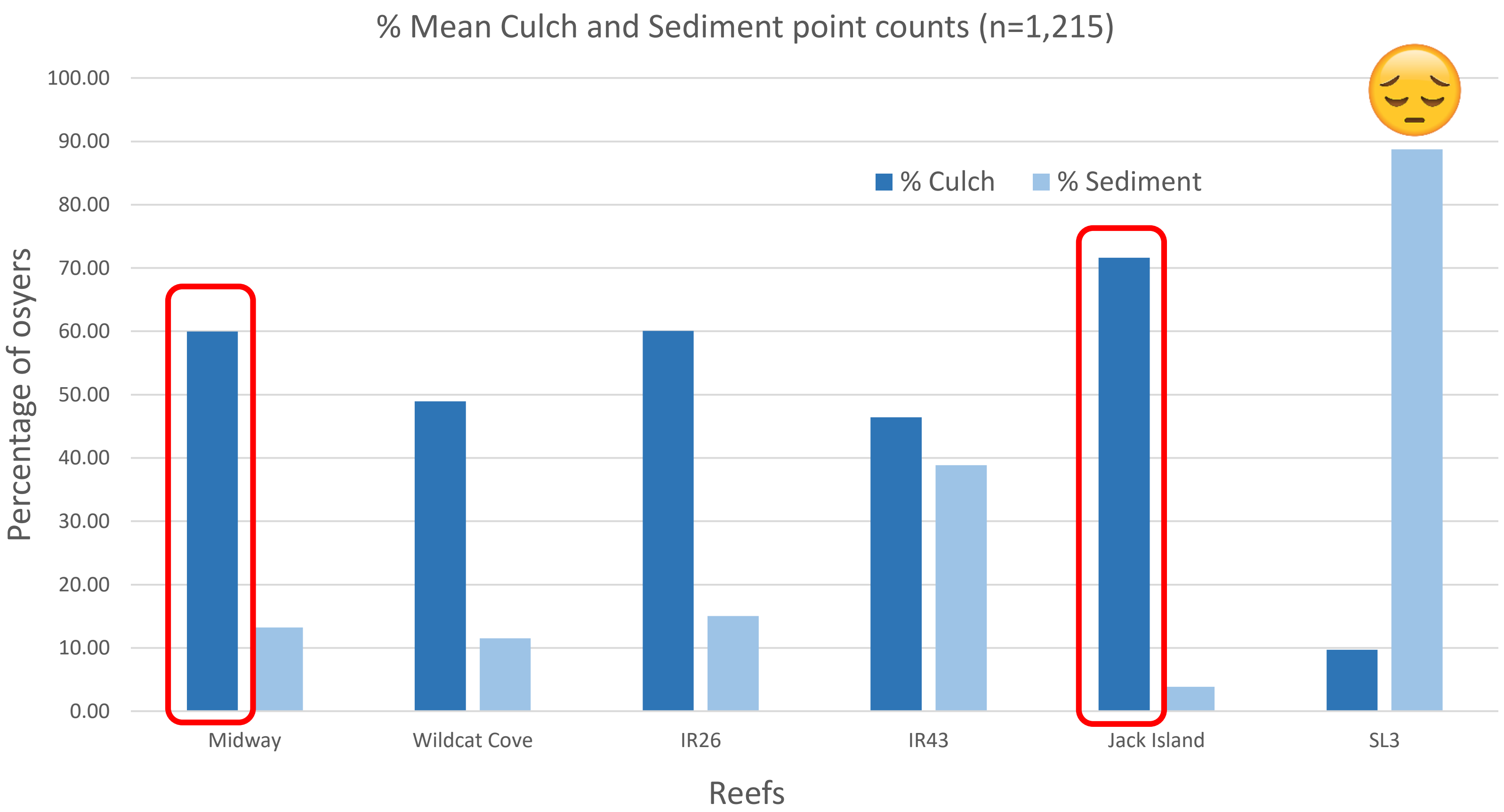
Mean % Live Oysters
% Live (points)
% Live (grid)
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Percentage Live Oysters
Midway
Wildcat Cove
IR26
IR43
Jack Island
SL3
Oyster Reefs

Closer Look



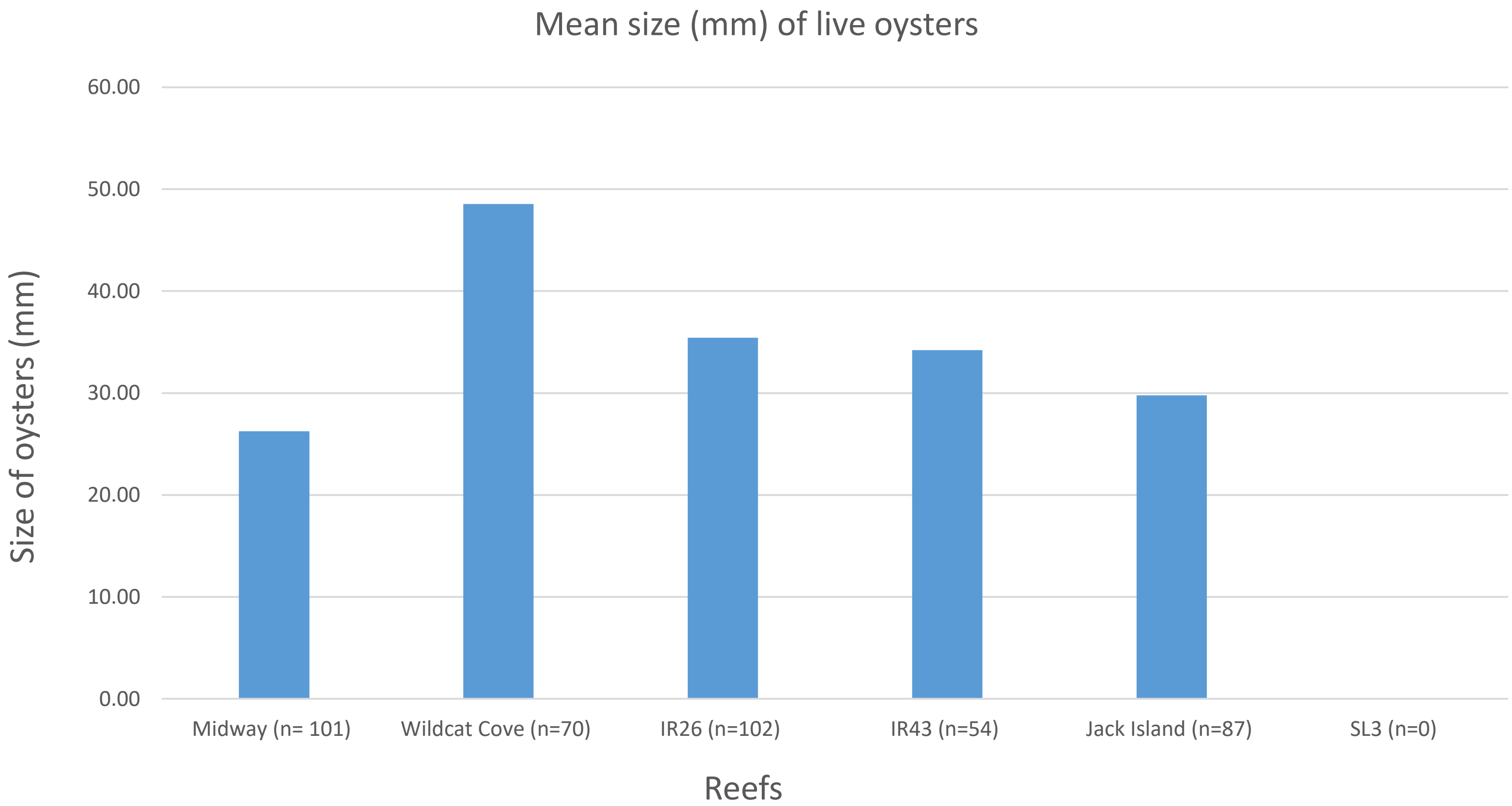
Mean % Boxed Oysters
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Percentage Boxed Oysters
Box (points)
Box (grids)
Midway
Wildcat Cove
IR26
IR43
Jack Island
SL3
Reefs

Closer Look



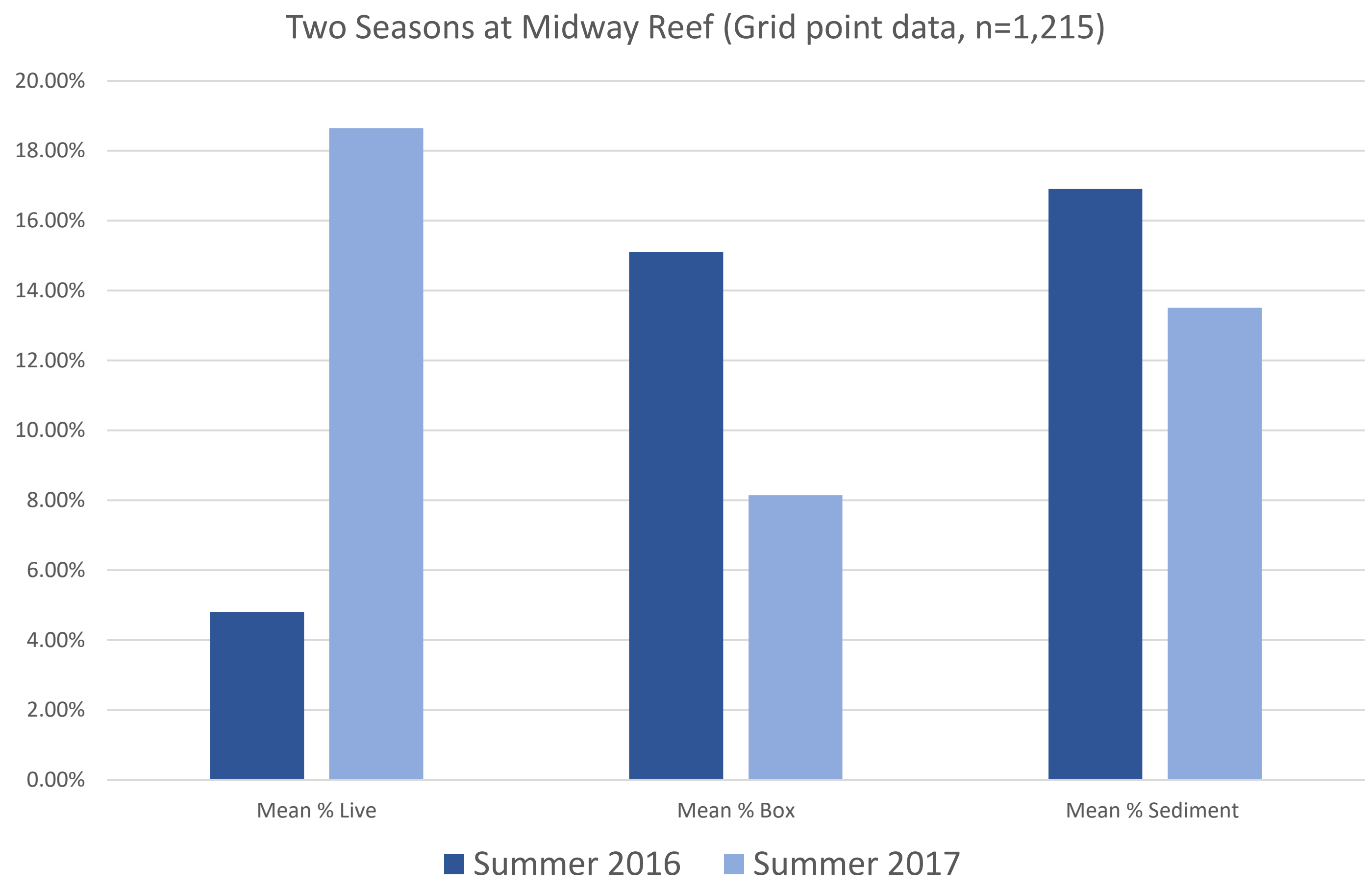
% Mean Culch and Sediment point counts (n=1,215)
% Culch
% Sediment
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Percentage of osyers
Midway
Wildcat Cove
IR26
IR43
Jack Island
SL3
Reefs

Closer Look

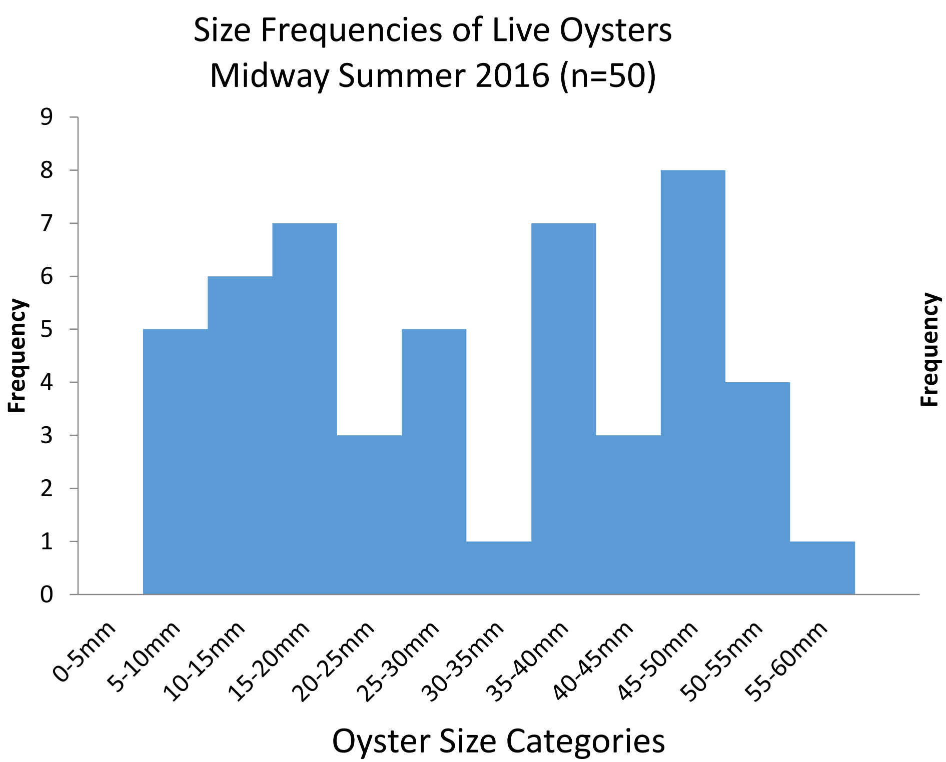


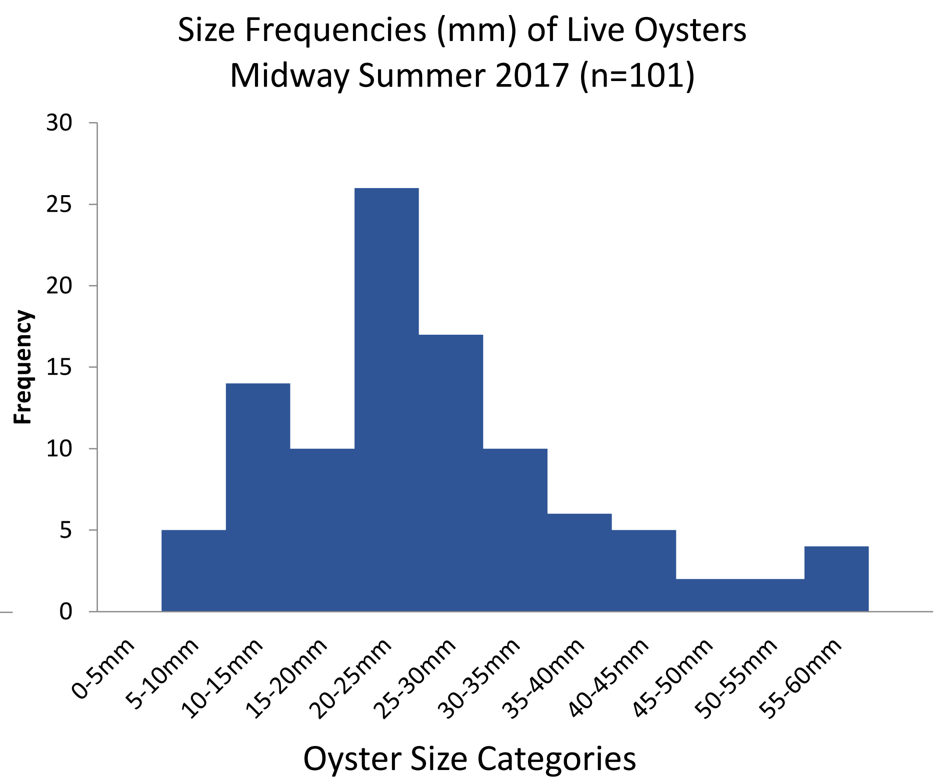
Mean size (mm) of live oysters
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Size of oysters (mm)
Midway (n= 101)
Wildcat Cove (n=70)
IR26 (n=102)
IR43 (n=54)
Jack Island (n=87)
SL3 (n=0)
Reefs

Summer 2016 & 2017

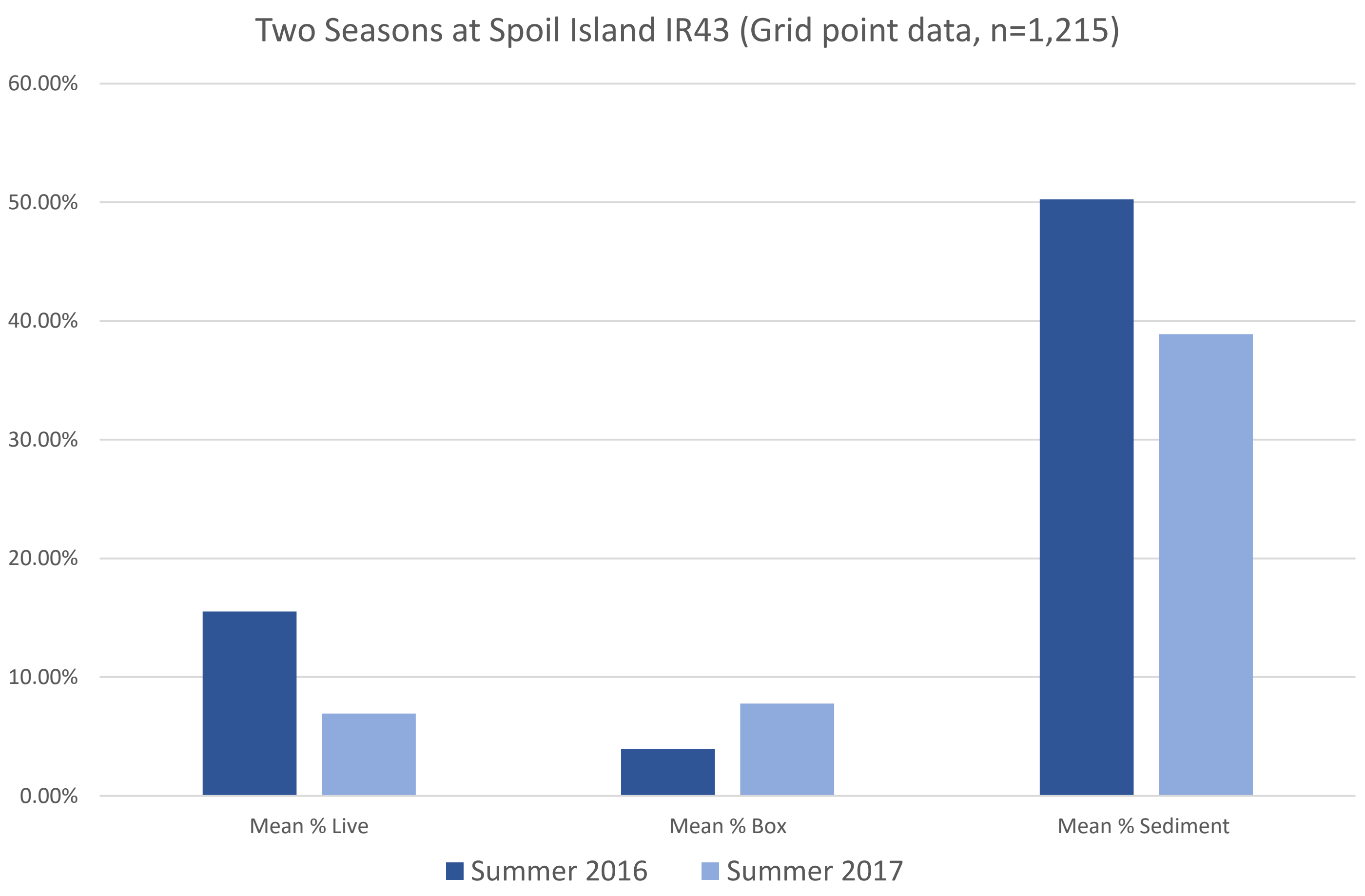


Summer 2016 & 2017

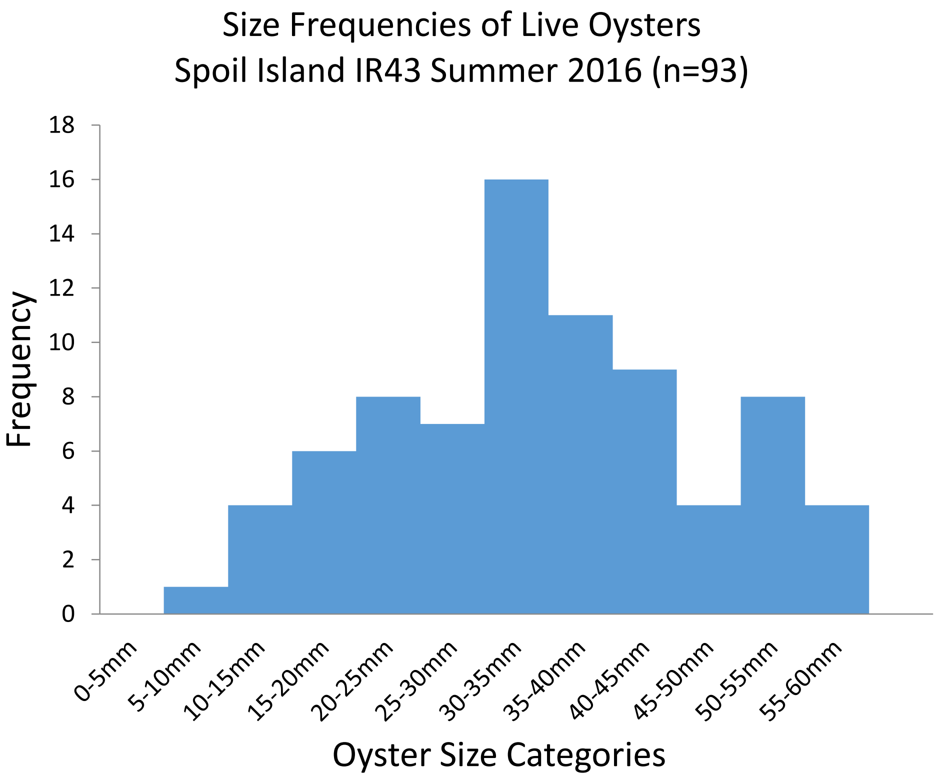


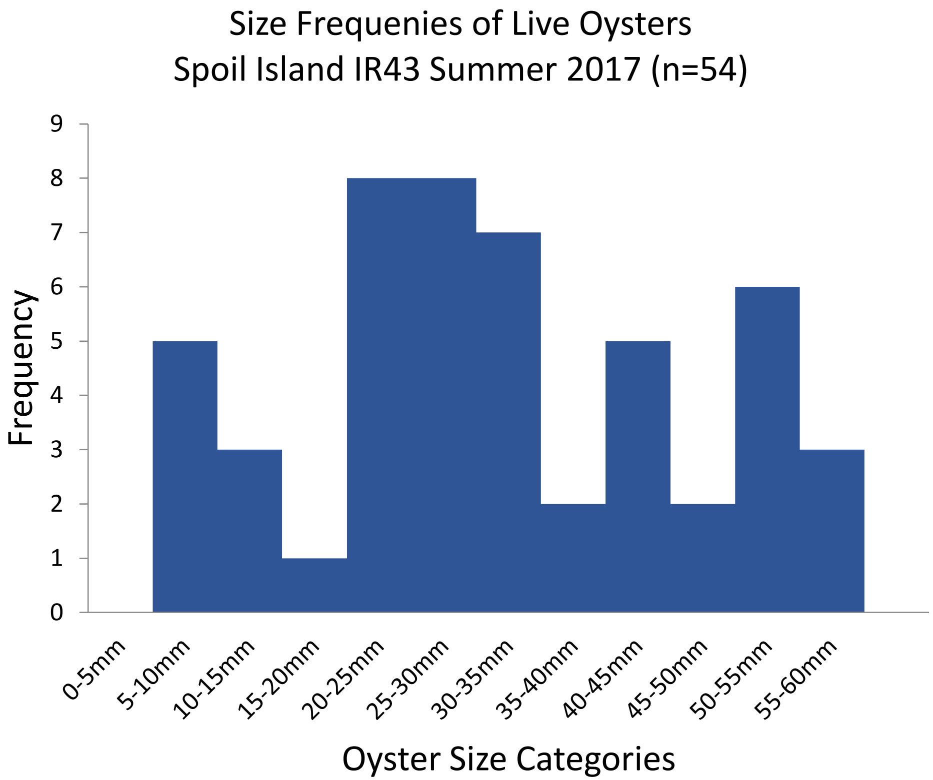


Summer 2016 & 2017

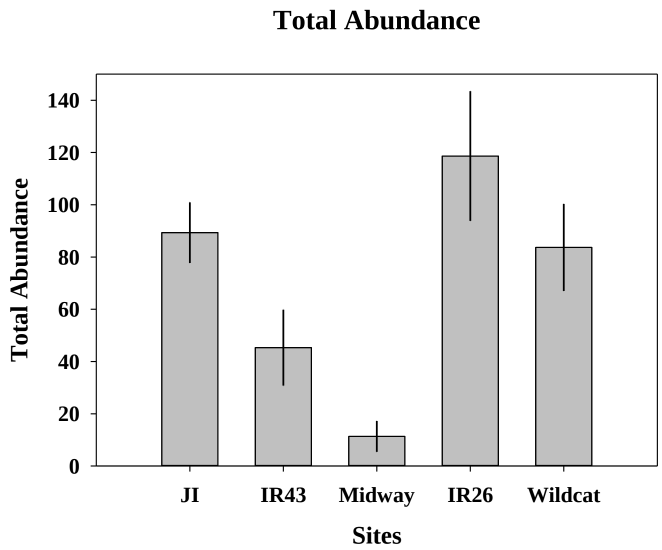


Summer 2016 & 2017

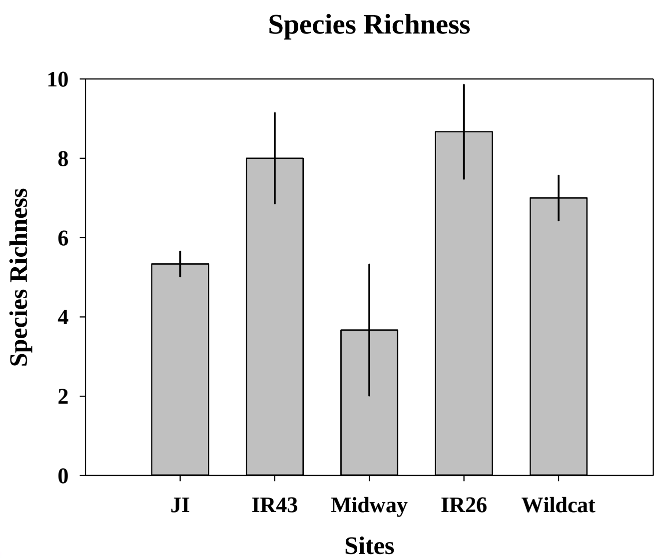




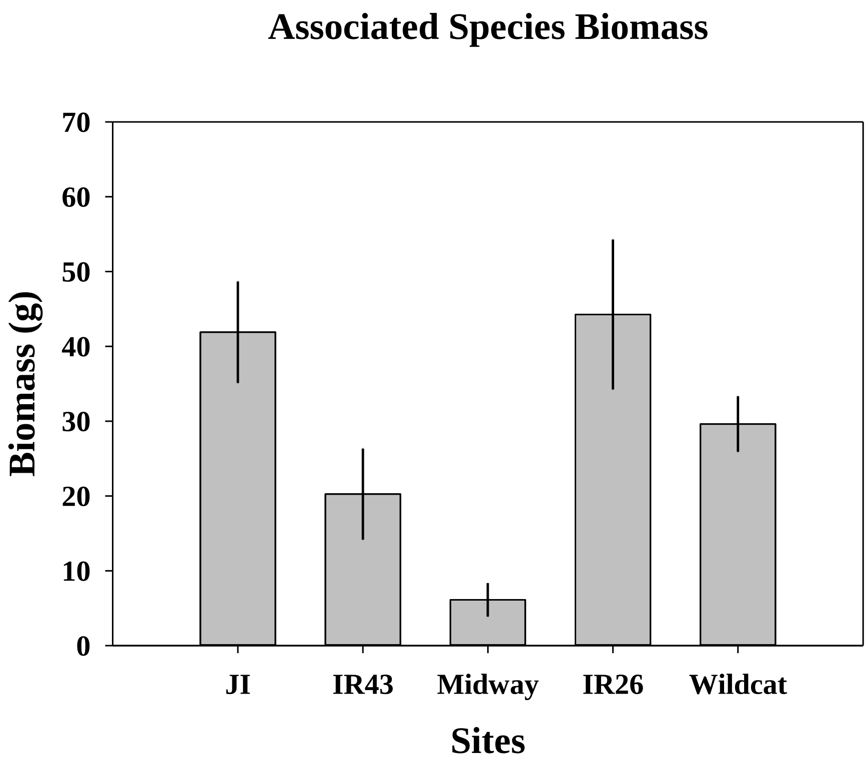
Bioboxes



Total Abundance
Total Abundance
140
120
100
80
60
40
20
0
JI
IR43
Midway
IR26
Wildcat
Sites

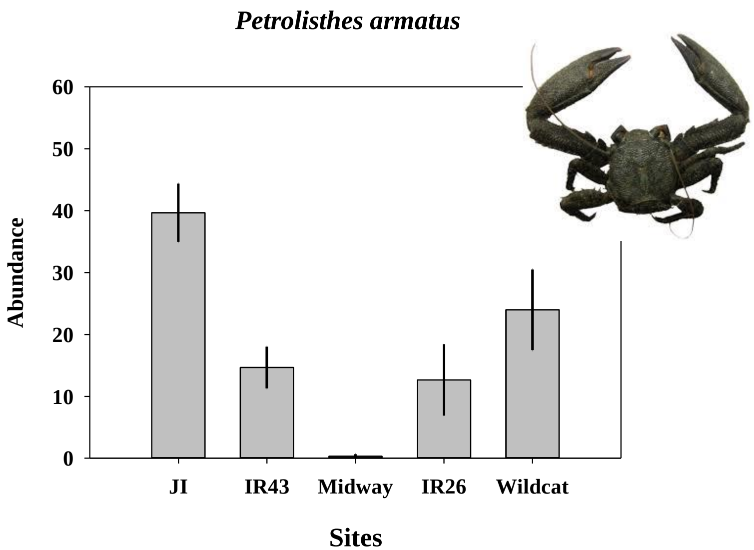


Species Richness
Species Richness
10
8
6
4
2
0
JI
IR43
Midway
IR26
Wildcat
Sites

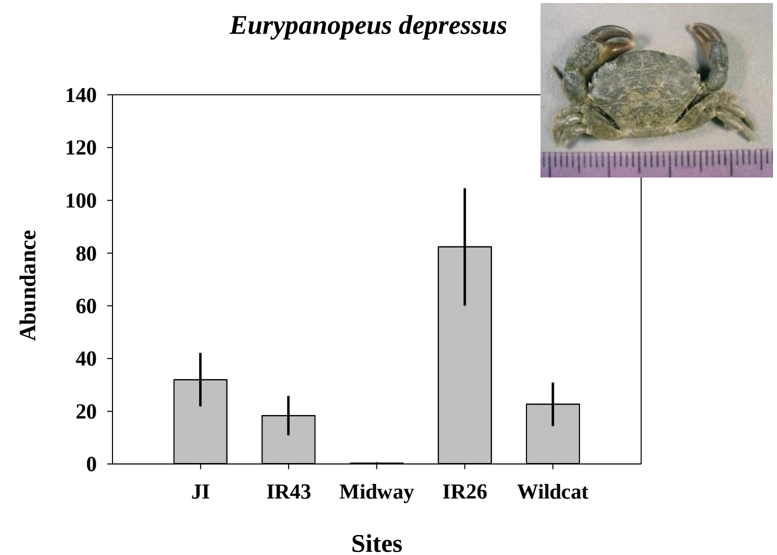


Associated Species Biomass
Biomass (g)
70
60
50
40
30
20
10
0
JI
IR43
Midway
IR26
Wildcat
Sites

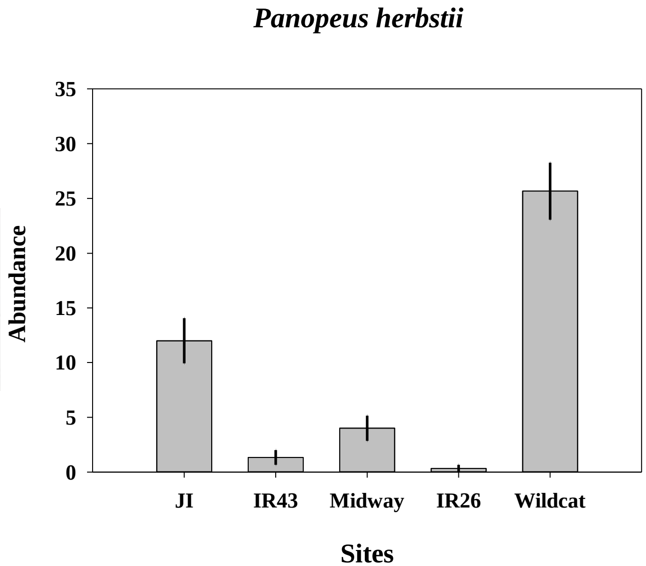
Bioboxes



Petrolisthes armatus
60
50
40
30
20
10
0
Abundance
JI
IR43
Midway
IR26
Wildcat
Sites



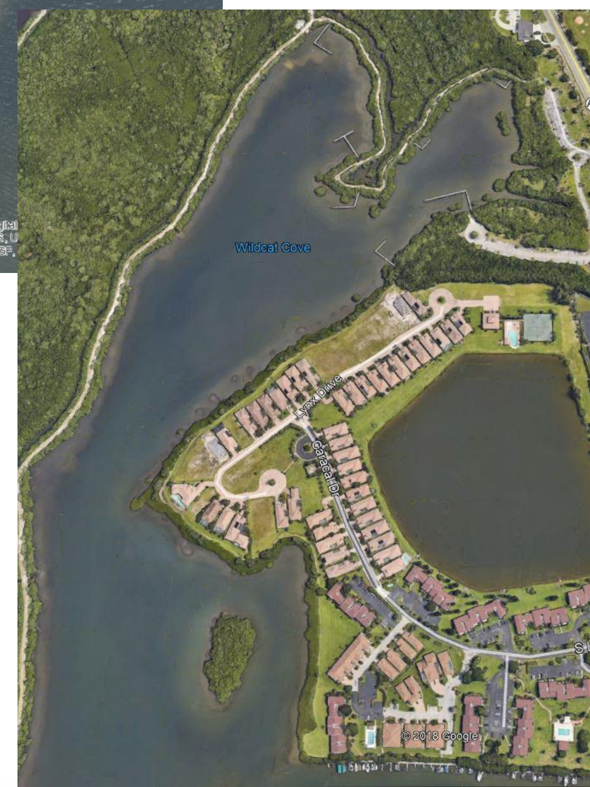
Eurypanopeus depressus
140
120
100
80
60
40
20
0
Abundance
JI
IR43
Midway
IR26
Wildcat
Sites



Panopeus herbstii
35
30
25
20
15
10
5
0
Abundance
JI
IR43
Midway
IR26
Wildcat
Sites

Moving Forward…

- Stop monitoring SL3 and switch to SL1
- Continue mapping Wildcat Cove
- Continue mapping additional oyster reefs in the region
- Map artificial reefs?
- Microplastics study with UCF, Dr. Linda Walters & partners- a new dynamic in oyster health assessment



Thank you

- OIMMP crew
- Smithsonian Marine Station Partners
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- Florida Oceanographic Society

- Environmental Learning Center/Indian River Land Trust Interns

- Nicole Schumann- University of SUNY Cortland

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