Hypersalinity Impacts on Seagrass and Molluscan Communities in Western Florida Bay

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Overview

1. Introduction
2. Project
3. Results
4. Current Status
5. Conclusion

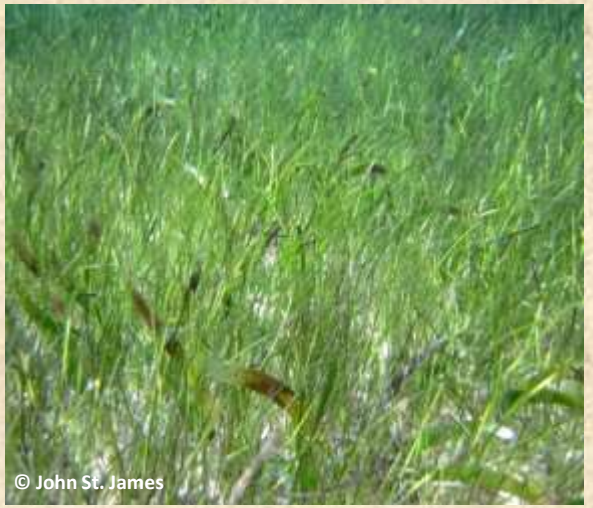
Florida Bay

- Shallow estuary
- Between Florida mainland and the Florida Keys
- Nesting, nursery, and feeding grounds

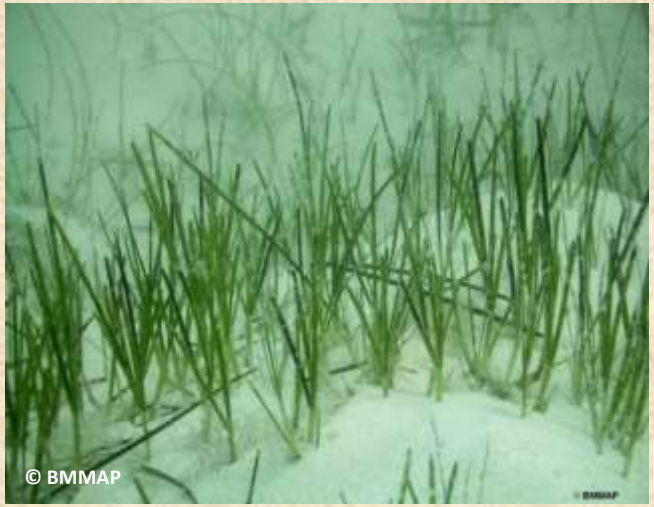
Seagrass

- One of the most productive marine ecosystems

Thalassia testudinum



Syringodium filiforme



Halodule wrightii

Die-off

- Localized drought 2014-2015
  - Caused lack of freshwater
  - Increased salinity up to 65 ppt
- Seagrass communities collapsed in summer and fall 2015

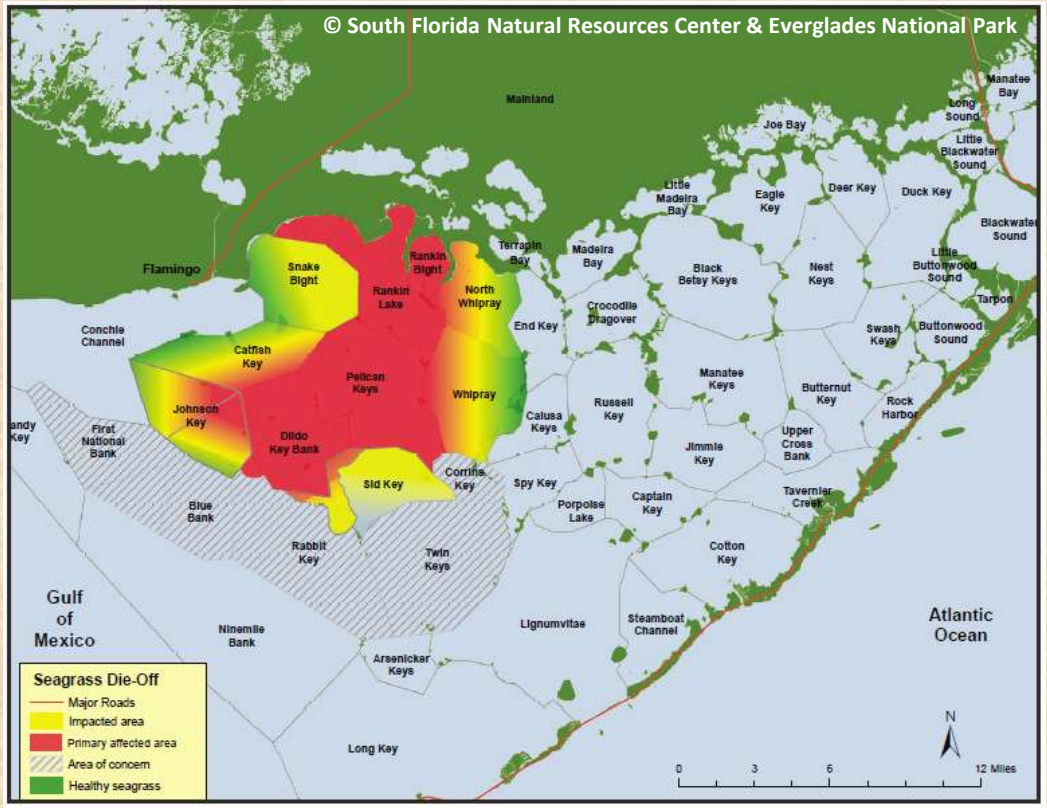
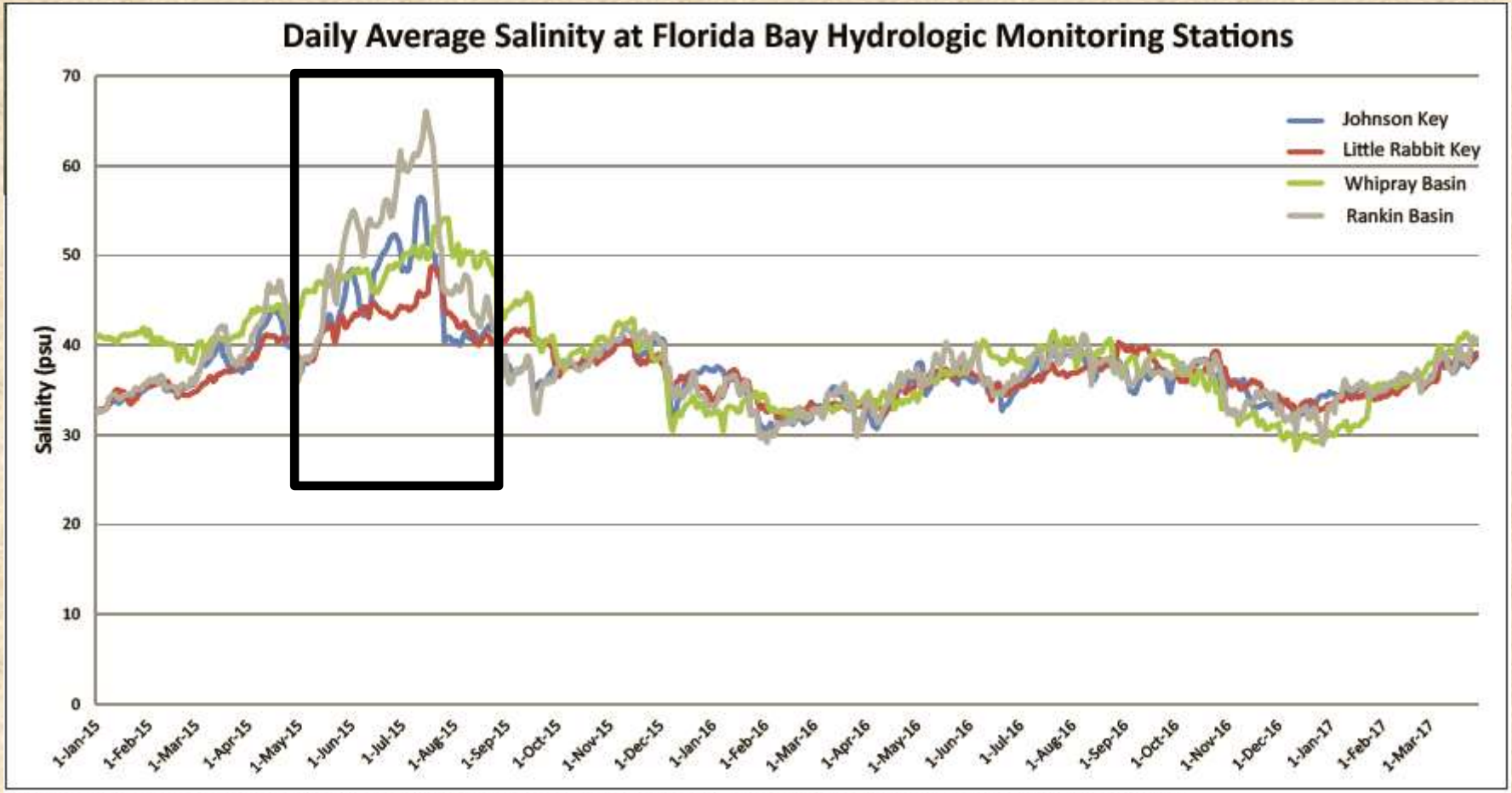


Figure 6. Area of Florida Bay turtle grass die-off event in July 2015 through February 2016. Red = area containing dead turtle grass in patches of varying size; not 100% dead. Yellow = mixed live/dead impacted areas. Green = healthy turtle grass. Striped area = dense seagrass most at risk of die-off expansion.

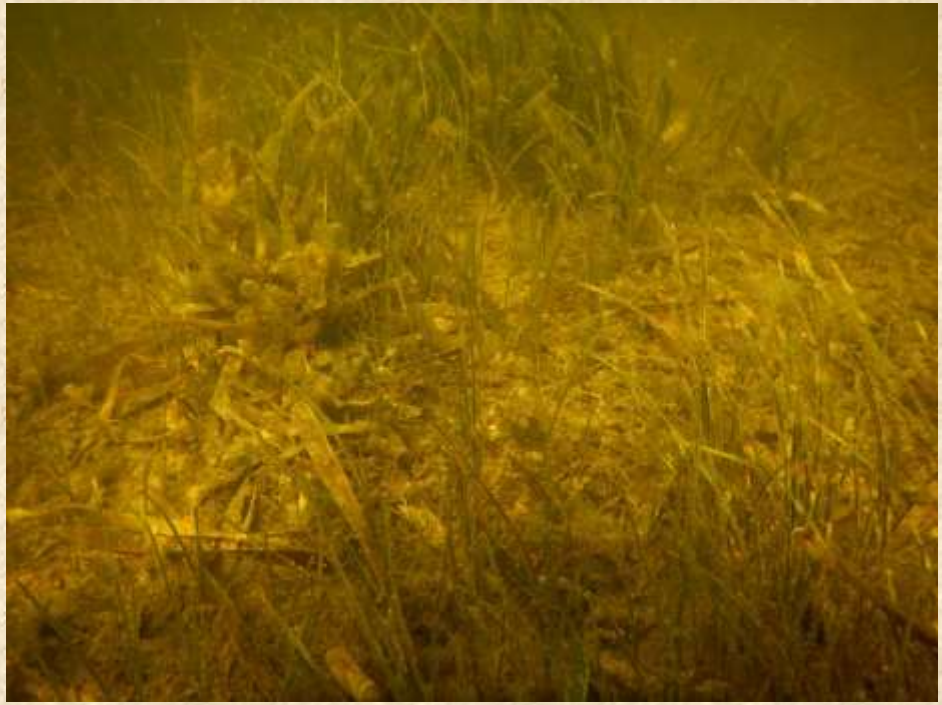
Die-off



Salinity data from the South Florida Water Management District's DBHYDRO Environmental Database.

Die-Off

Little Rabbit Key, October 2016



Johnson Key, August 2016

Die-Off

Whipray Basin, August 2016

Rankin Basin, October 2016

Hypotheses

1. High salinity values due to the 2014-2015 drought conditions were the cause of the seagrass die-off

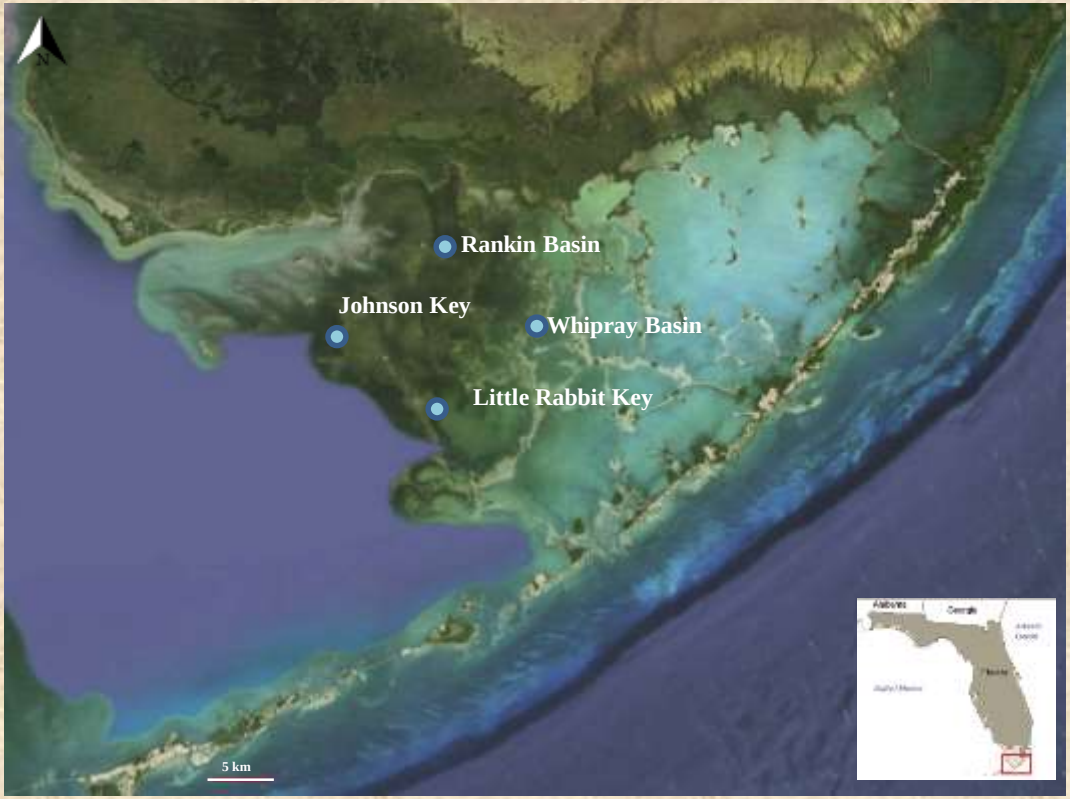
2. The seagrass die-off has an effect on the abundance and diversity of the molluscan communities

Field Sampling

- September 2015- Present

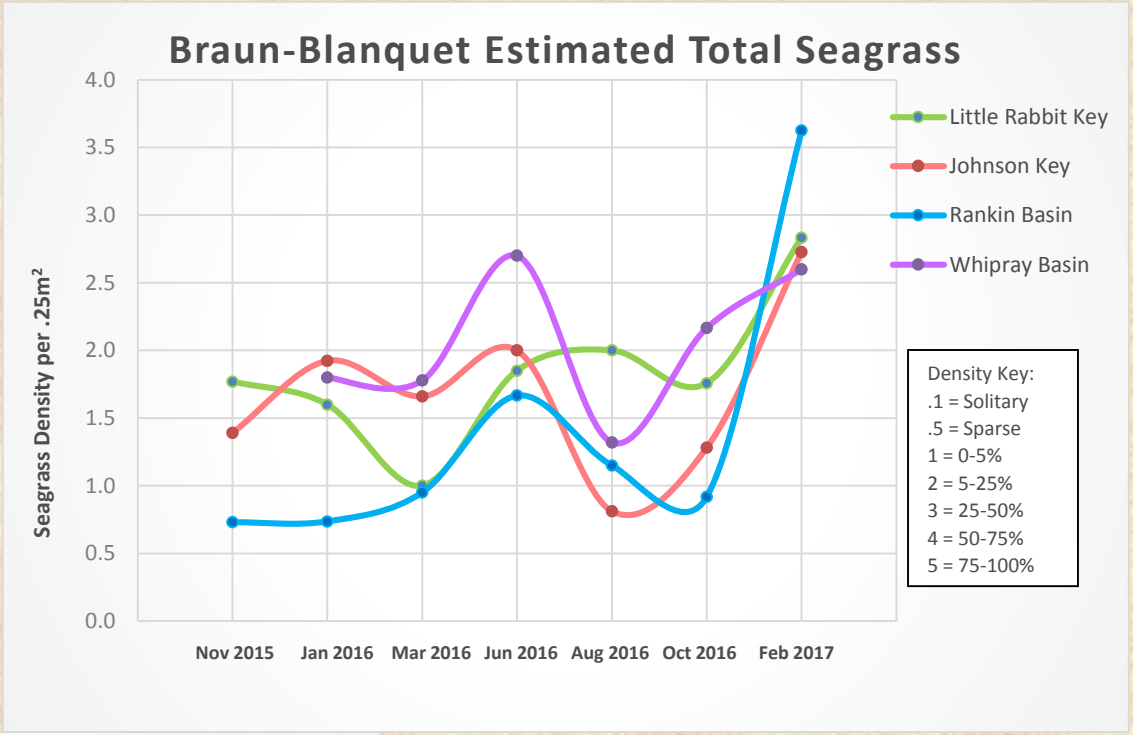
- Four sites
  - Little Rabbit Key
  - Johnson Key
  - Rankin Basin
  - Whipray Basin

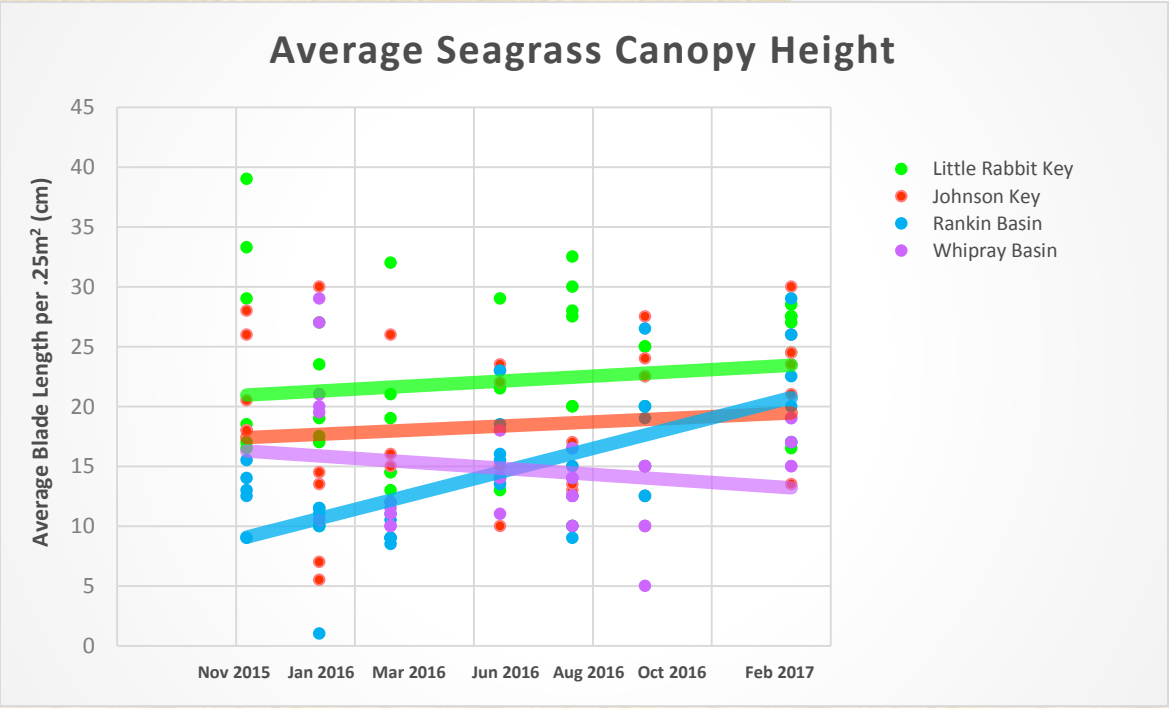
- Monitor
  - Water quality
  - Seagrass assessment
  - Mollusk diversity and abundance



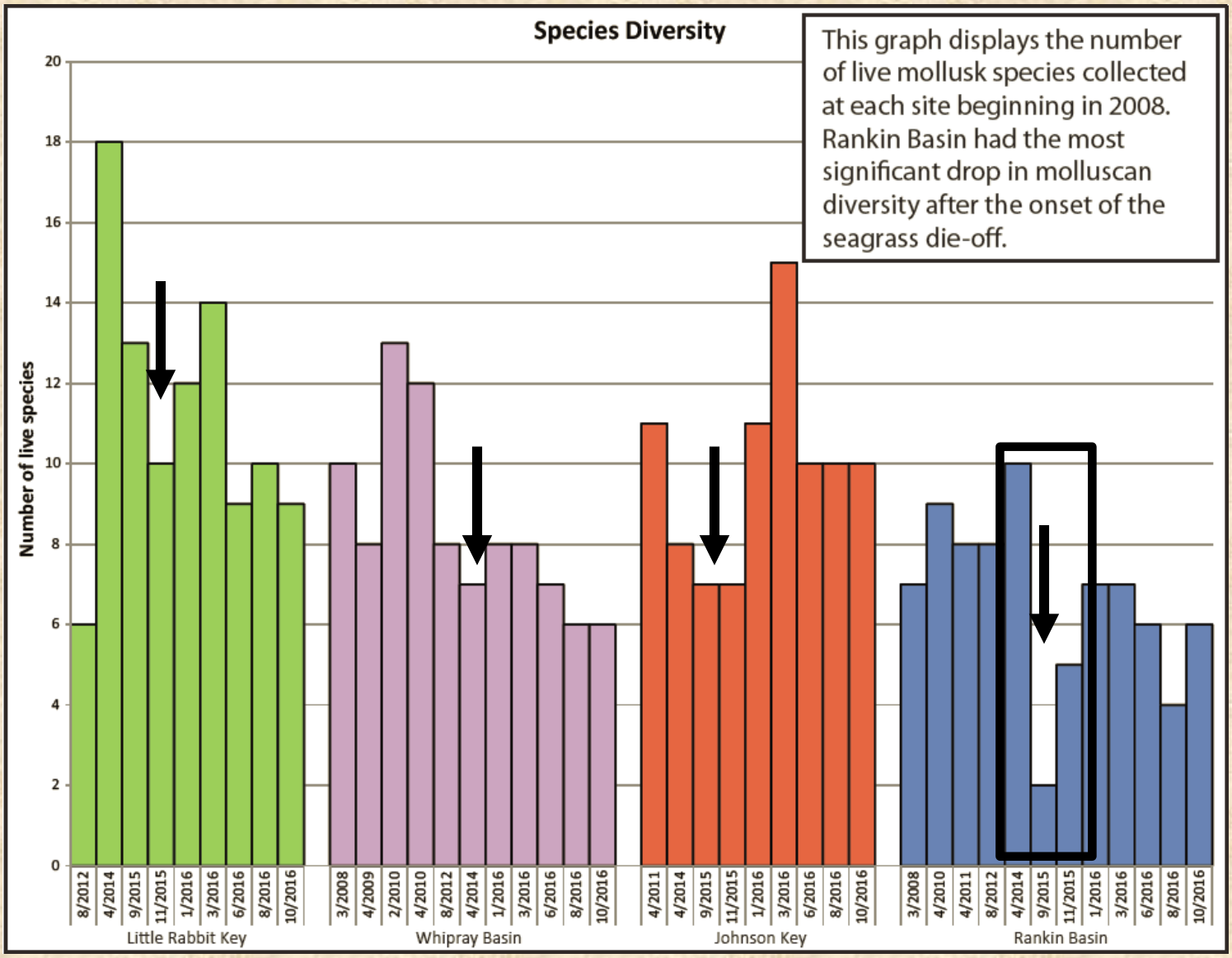
Field Sampling

Results


Braun-Blanquet Estimated Total Seagrass
Seagrass Density per .25m²
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Nov 2015
Jan 2016
Mar 2016
Jun 2016
Aug 2016
Oct 2016
Feb 2017
Little Rabbit Key
Johnson Key
Rankin Basin
Whipray Basin
Density Key:
.1 = Solitary
.5 = Sparse
1 = 0-5%
2 = 5-25%
3 = 25-50%
4 = 50-75%
5 = 75-100%

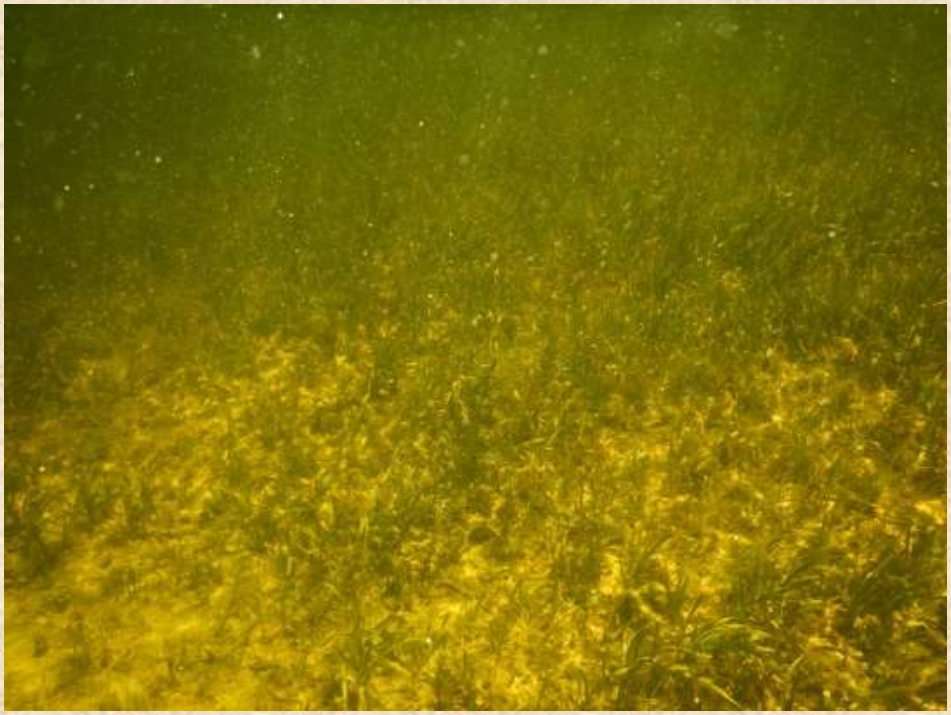

Average Seagrass Canopy Height
Average Blade Length per .25m² (cm)
45
40
35
30
25
20
15
10
5
0
Nov 2015
Jan 2016
Mar 2016
Jun 2016
Aug 2016
Oct 2016
Feb 2017
Little Rabbit Key
Johnson Key
Rankin Basin
Whipray Basin

Species Diversity



Current Status Updates

Little Rabbit Key, February 2017



Johnson Key, February 2017

Current Status Updates

Whipray Basin, February 2017

Rankin Basin, February 2017

Conclusion

- Little Rabbit Key has remained stable and healthy
- Johnson Key and Rankin Basin have shown signs of recovery
- Whipray Basin is showing signs of a potential die-off
- Continue to monitor every 16 weeks
  - Water quality
  - Seagrass condition
  - Mollusk abundance and diversity

Acknowledgements

- USGS Everglades Priority Ecosystems Science (GEPES)
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- Project database: Http://sofia.usgs.gov/exchange/flaecohist/.