Seagrasses and water quality in the FKNMS after Hurricane Irma

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Chla in NE/Central Florida Bay Due to Hurricane Irma
(>5 µg/l = Algal Bloom)

Aug 1, 2017
1-mo. pre-Irma

Oct 10, 2017
1 mo. post-Irma

Feb 12, 2018
5 mo. post-Irma

Jun 11, 2018
9 mo. post-Irma

Due to Hurricane Irma (>5 µg/l = Algal Bloom)
Water Quality Patterns in Central FL Bay: Die-off and hurricane impact

Period of Record (POR) = Median: WY1992-2014

Chlorophyll $a$ (ug/l)

Phosphorus concentrations are highly elevated

Current trend shows improvement

Chlorophyll $a$ concentrations are elevated

Total Phosphorus ug/l
Benthic Habitat Permanent Monitoring Sites

Original 30 sites (1995)
10 sites for nearshore emphasis (2012)
17 sites in Dry Tortugas (2011)
Erosion or Burial at Site 243?

June 2017
Half of quadrats had lush Tt, half were bare

October 2017
Only quadrat left with seagrass
Burial at Site 269

June 2017

October 2017

January 2018
Florida Bay and FKNMS study sites (1995-present)

- WQPP transects (FKNMS)
- FHAP and FIU-LTER transects (Florida Bay)
- FHAP spatial basins (n=29 to 31 sites)
- Spatial zones used for statistical analysis
Spatial pattern in short-term response
(comparing post-Irma to pre-Irma seagrass and macroalgae abundance)

Seagrass

Macroalgae
Nonparametric repeated measures analysis of variance
(Compares Fall/Spring 2017 changes to Fall/Summer 2012-2016 changes)

Seagrass

Macroalgae

Significant
Non-Significant
Seasonal change analyses

(Compares Fall/Spring 2017 changes to Fall/Summer long-term changes using several statistical methods)
FKNMS seasonal change analysis
(Uses data from 1995-2017 to predict fall 2017 seagrass/macroalga cover)

(a) Predicted fall 2017 seagrass cover
Observed fall 2017 seagrass cover

(b) Predicted fall 2017 macroalga cover
Observed fall 2017 macroalga cover
a. Moderate (5-10 cm) burial after Hurricane Irma at FKNMS site 255
b. Moderate (5-10 cm) burial after Hurricane Irma at FKNMS site 239
c. Strong seagrass erosion after Hurricane Irma at FKNMS site 276
d. Erosion (background) and canopy thinning (foreground) at FKNMS site 294
Erosion and Thinning at Site 294

[Image: A section of submerged vegetation showing erosion and thinning. The red outline marks the area affected by erosion, and the white scale indicates approximately 15 cm.]
Recovery Trajectories after Hurricane Georges

- Site 216
- Site 243
- Site 309

- Thalassia
- Syringodium
- Halodule
- Macroalgae