



**Algal Blooms and
Bacteria Sampling
Results in City
Coastal Waterways
Commission Conference
December 19, 2017**

Photo credit: C.E. Rodstrom



CITY OF FORT LAUDERDALE

What is Blue-Green Algae?

- A naturally occurring aquatic micro-organism that depends on sunlight to grow, similar to plants.
- Found in freshwater environments throughout the world.
- Quickly multiply in water bodies with high nutrients.
- Certain types of algae may contain toxins.



CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT

What Causes Algal Blooms?

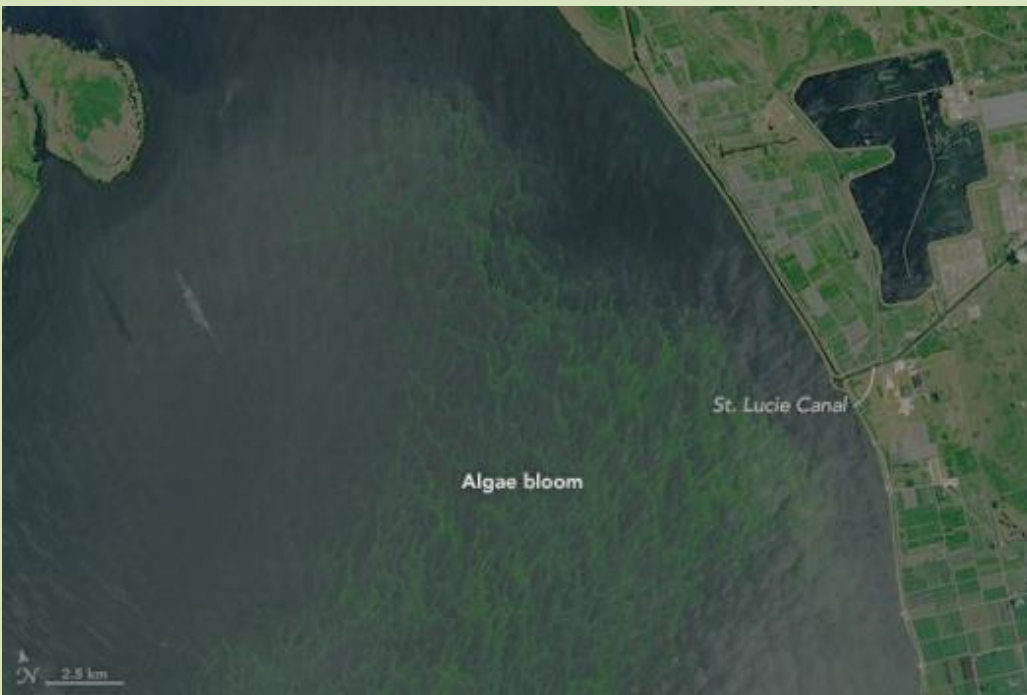


Photo credit: www.tcpalm.com

- Warm temperatures and calm water conditions
- Common in South Florida during summer and early fall
- Blooms are often associated with significant rainstorms or freshwater releases from inland canals which discharge nutrient laden water into coastal estuaries
- Major Blue-Green Algae Bloom on Treasure Coast in 2016



CITY OF FORT LAUDERDALE

PUBLIC WORKS DEPARTMENT

What Are the Environmental Impacts?

- Under normal conditions:
 - Sunlight penetrates the water and promotes growth of aquatic plants
 - Plants produce oxygen
 - Fish thrive
- During an algae bloom:
 - Sunlight is blocked by algae
 - Excessive nutrients in water are consumed
 - Decomposing algae uses up oxygen
 - Lack of oxygen causes fish kills
 - Addl impacts if algae contains toxins



CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT



2017 Algal Bloom

- Aug 22 -First complaint received, South Fork of New River
- Aug 27 – Las Olas Isles and Lauderdale Isles
- Aug 29 – Citrus Isles
- Aug 28 - City inspects waterways and sends water sample to a private lab



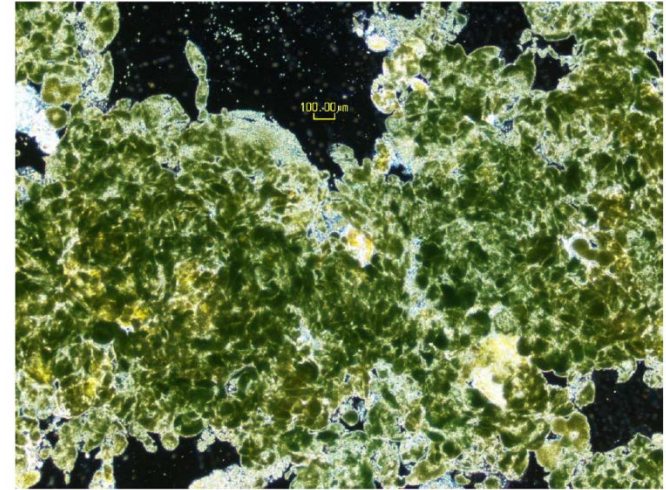
CITY OF FORT LAUDERDALE

PUBLIC WORKS DEPARTMENT

City Sample Results

- Private lab identifies various algae including a potentially toxic algae: *Microcystis* spp
- Private lab recommends toxin analysis of original sample
- Private lab reports toxins present in the single sample submitted
- FDEP contacted but no specific action is recommended

Micrographs



Microcystis spp. at 40X



CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT

What Is Being Done about Algal Blooms?

- City inspectors continued to visually monitor the waterways
- FDEP inspected and sampled
- Broward County conducted water quality testing
- Strategic Communication provided outreach to neighbors

This update is from a public agency. The only posts they can see are their own. [Learn more.](#)



Chaz Adams, City of Fort Lauderdale AGENCY



Avoid Algae in Waterways - Help Reduce Algae by Preventing Stormwater Runoff

Neighbors and visitors are reminded to avoid algae blooms when recreating in local waterways. People and pets should never swim in water with algae blooms.

To report a bloom, contact the Florida Department of Environmental Protection at 855-305-3903 or make a report online at www.reportalgalbloom.com.

For more health and safety tips as well as steps you can take to help prevent algae by reducing stormwater runoff, visit <https://goo.gl/GnK6jY>

2 Sep · Subscribers of City of Fort Lauderdale



Thank



Reply

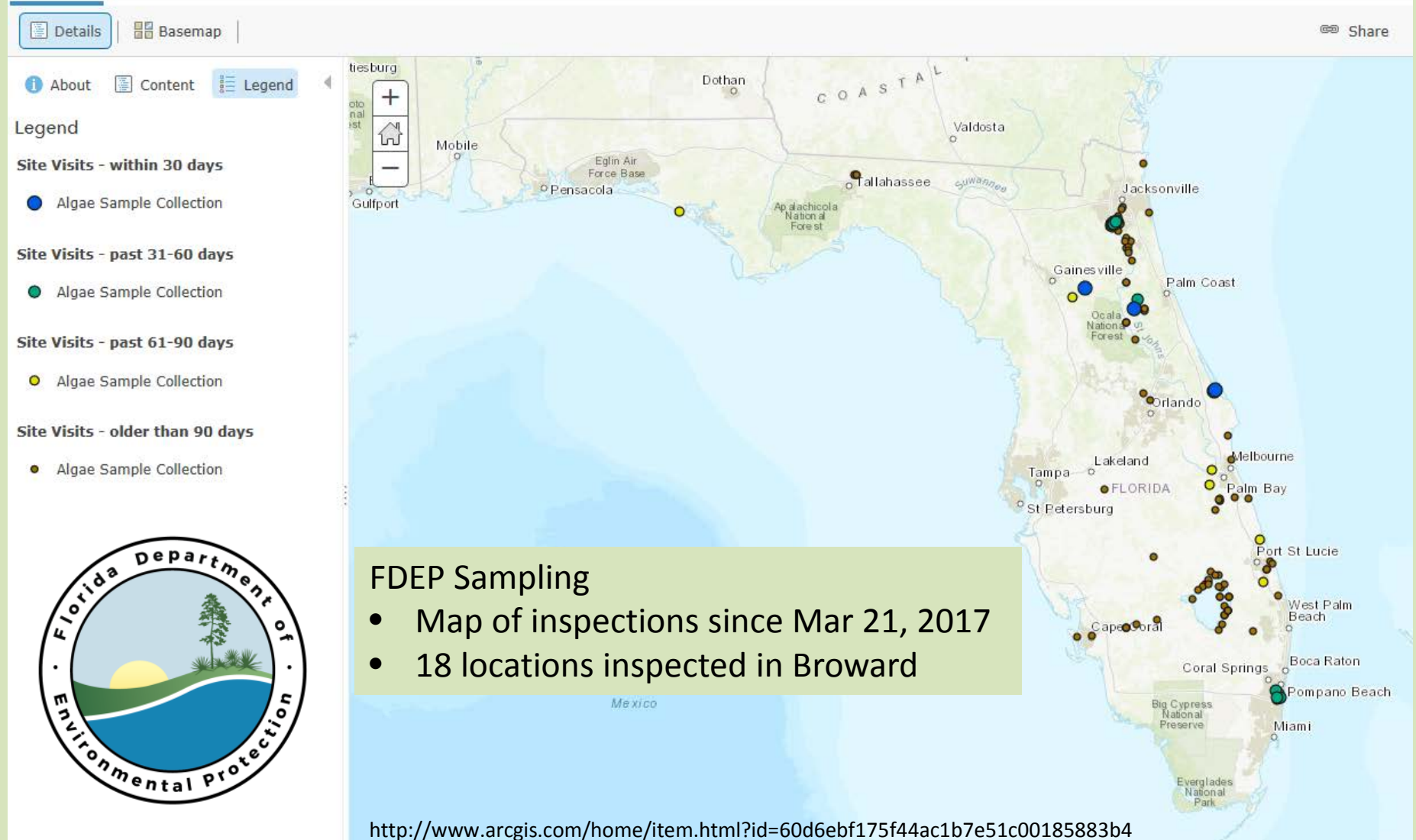


10 Thanks



CITY OF FORT LAUDERDALE

PUBLIC WORKS DEPARTMENT





Details

Basemap

<http://www.arcgis.com/home/item.html?id=60d6ebf175f44ac1b7e51c00185883b4>



Legend

Site Visits - within 30 days

● Algae Sample Collection

Site Visits - past 31-60 days

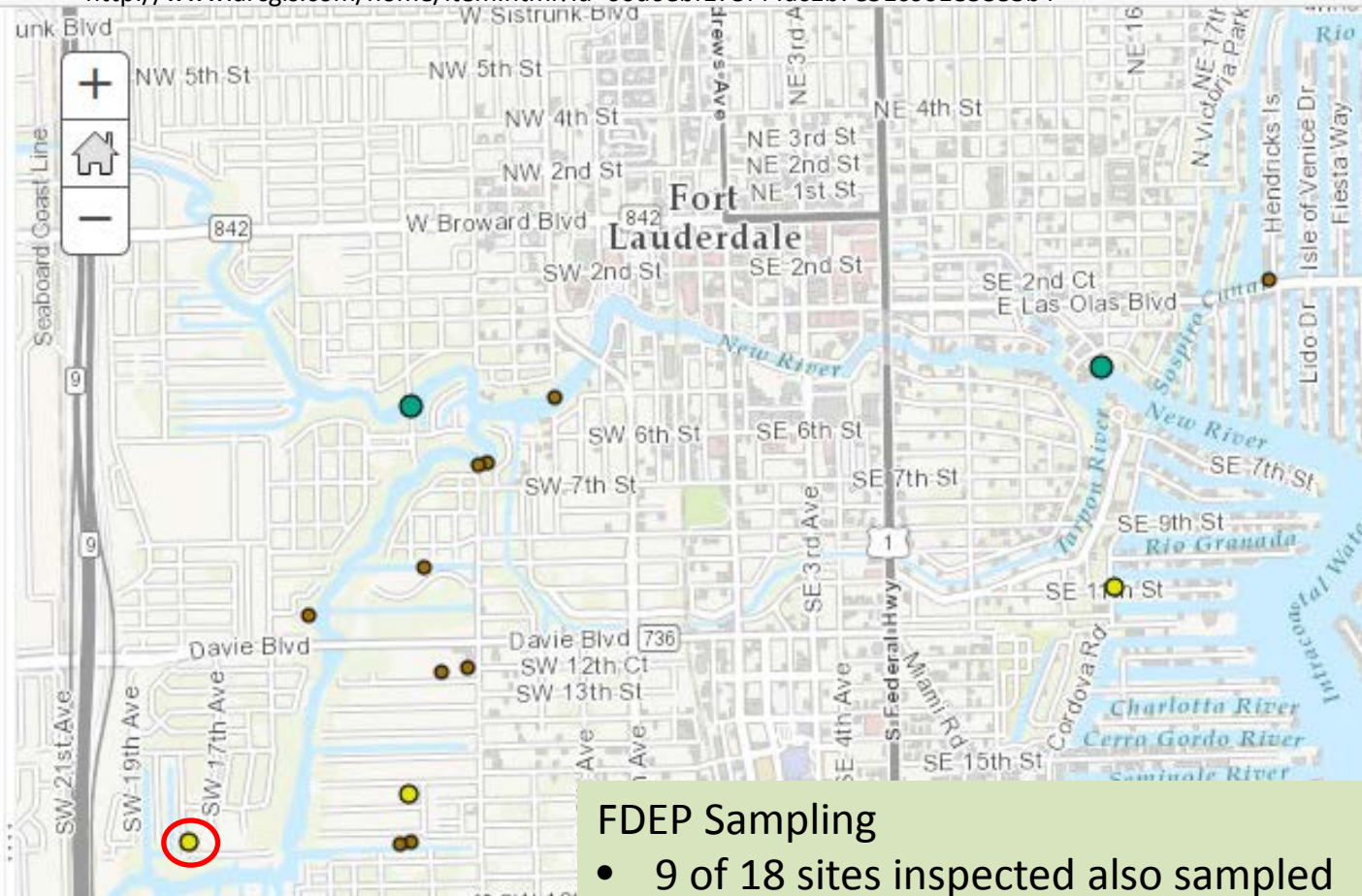
● Algae Sample Collection

Site Visits - past 61-90 days

● Algae Sample Collection

Site Visits - older than 90 days

● Algae Sample Collection



FDEP Sampling

- 9 of 18 sites inspected also sampled
- Only one tested positive for microcystin toxin on 9/25/2017
- Last recorded sample taken 10/30
- No algae blooms detected by City staff since early November



CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT

Algal Blooms have Dissipated



Algal blooms had substantially dissipated by Nov 1.



Pictures are from Nov 15 City inspections.



CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT

Algal Bloom Water Quality Sampling



Five Sites

- 1) East of Royal Plaza
- 2) East Las Olas (Background)
- 3) East of Bontona
- 4) East of Lido
- 5) East of Coral Way

Four Dates

9/5*

9/20*

9/27

10/2

* DNA Bacteria Source Sampling

Algal Bloom Water Quality Sampling

Nutrients (NH_4 , NO_2 , NO_3 , oPO_4 , TKN)



- Nutrient concentrations relatively low
 - May be due to active uptake by algae

Algal Bloom Water Quality Sampling

CHLOROPHYLL a (FDEP Std -12 µg/l)



<u>SAMPLING SITES</u>	Times Standard Exceeded
1 - East of Royal Plaza	2 of 4 (10.6-186 µg/l)
2 - East Las Olas (Background)	0 of 4 (1.98-4.45 µg/l)
3 - East of Bontona	2 of 3 (8.43-18 µg/l)
4 - East of Lido	2 of 3 (6.41-48.3 µg/l)
5 - East of Coral Way	2 of 2 (19.9-35.6 µg/l)

What Causes Bacteria in Coastal Waterways?



- Birds, manatees and other wildlife
- Stormwater runoff of pet waste and on landscaping debris
- Septic tanks and sewage releases
- Live-aboard boat discharges
- Warm temperatures and calm water conditions increase survivability of bacteria



CITY OF FORT LAUDERDALE

PUBLIC WORKS DEPARTMENT



Algal Bloom Water Quality Sampling

E.coli, Enterococci and Fecal Coliform



Bacterial Test	Date of Exceedance	Sites Where Std Exceeded
E. coli		0 (16 samples)
Enterococci	Sep 27	1, 3, and 5
	Oct 2	3, 4, and 5
Fecal Coliform	Sep 20	1, 3, 4, and 5
	Oct 2	3

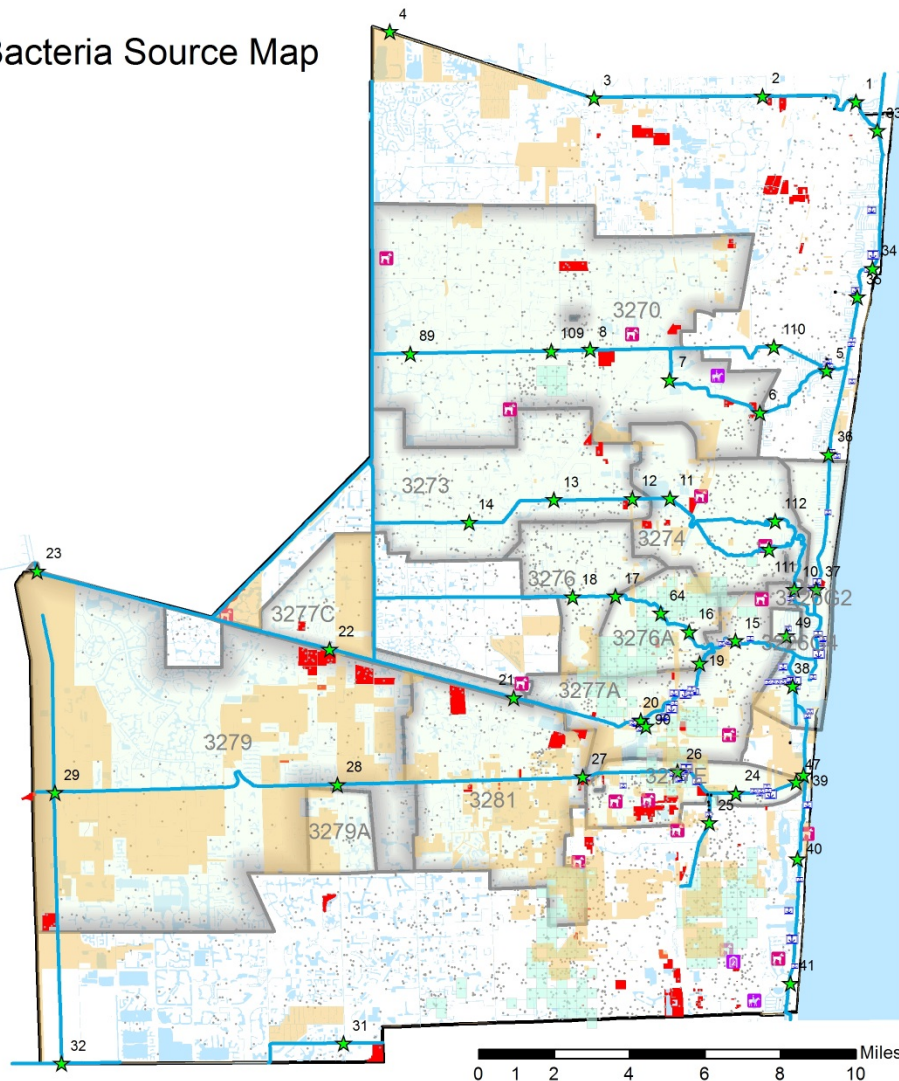
Algal Bloom Water Quality Sampling DNA Source Tracking HF183



HF183 test indicates human-source fecal contamination

- Detected at all sites for both sampling dates
- 7 of 8 samples averaged 344 HF 183 target copies for 100 ml
- One sample, Site 4 = 10,596 on Sep 20

Bacteria Source Map



Bacteria Source Sampling Sites in Broward County and Fort Lauderdale

- Map identifies sources of concern
- 2 rounds of sampling – Pre-Irma
- 7 dates collected
- 10 Broward sites sampled
- HF 183 detected in 17 of 18 samples





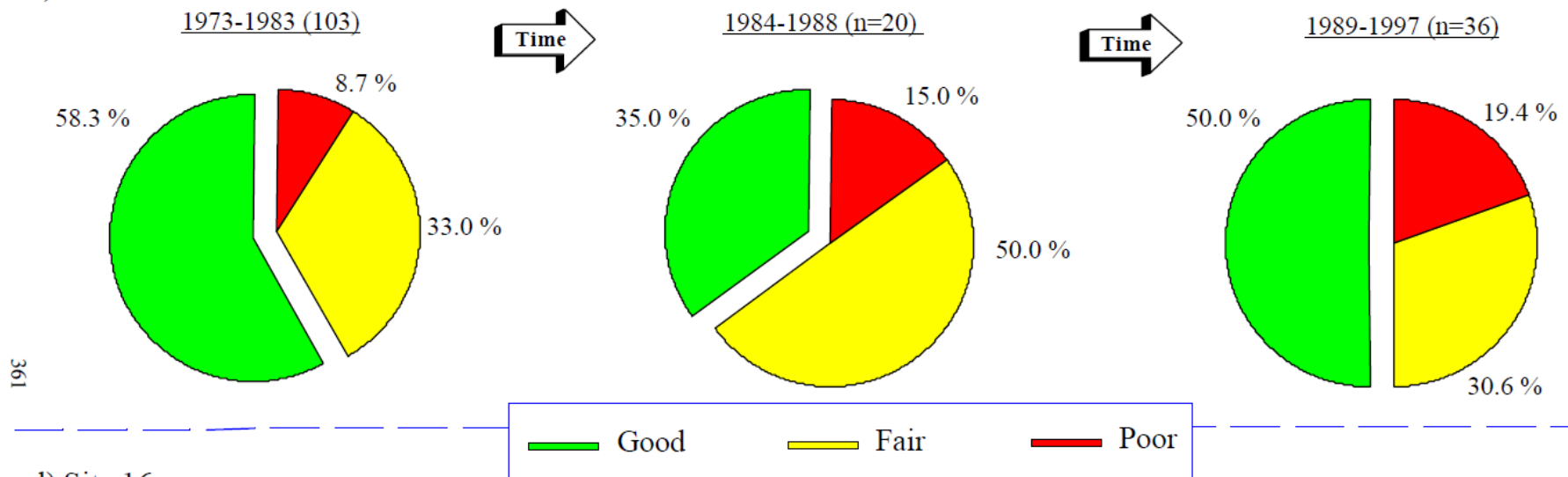
Historic Concentrations of Fecal Coliform 1973-1997

Water Quality Site 15 = Andrews Avenue and New River. The majority of water bodies in Broward County are impaired for fecal coliform bacteria.



Figure IV.52 (Cont.). Fecal Coliform (FC) Concentrations Observed in the New River Basin over Three Time Periods. Concentrations are categorized in terms of compliance with the Broward County marine FC standards which state the monthly average shall be equal to or less than 200 colonies/100 ml (good rating) and no single reading shall be above 800 colonies/100 ml (poor rating). Values between 201 and 800 colonies per 100 ml are defined as fair.

c) Site 15



d) Site 16

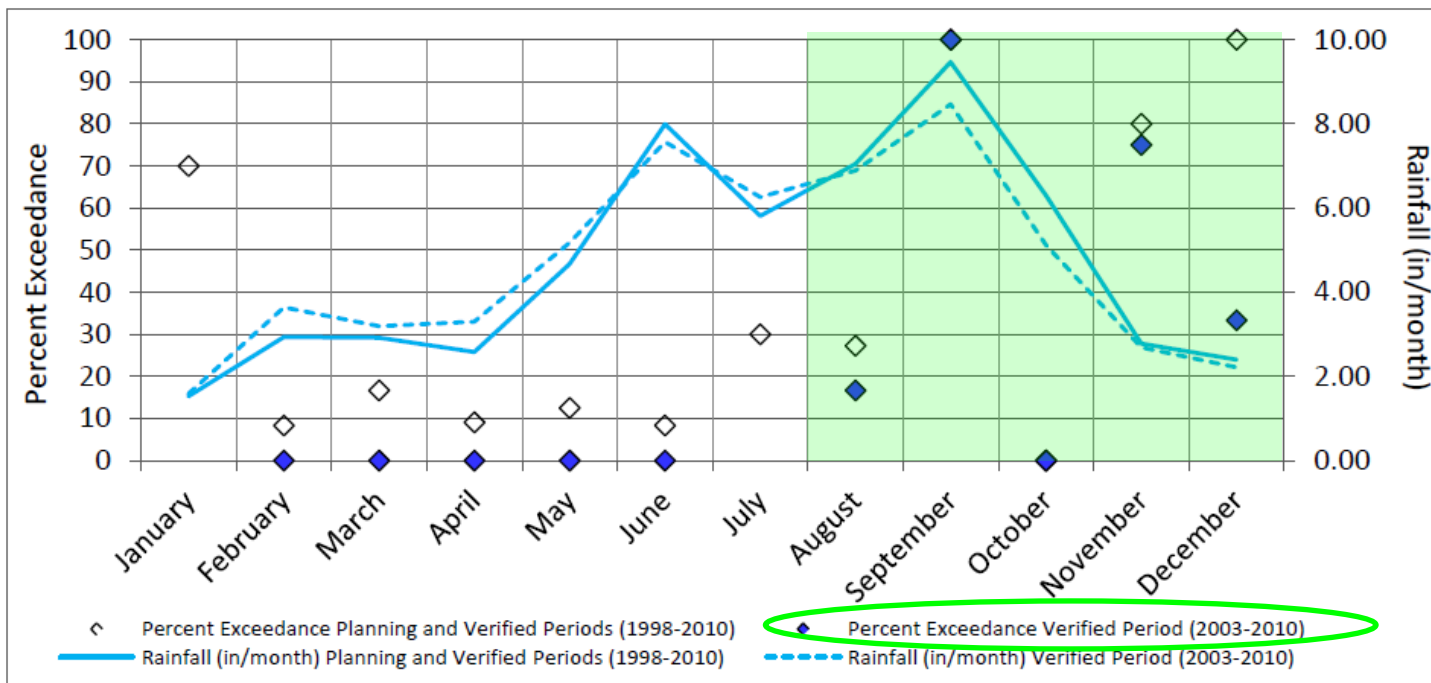
Historic Concentrations of Fecal Coliform

Las Olas Finger Isles – FDEP TMDL Report

1998-2010



FINAL TMDL Report: Southeast Coast-Biscayne Bay Basins, Las Olas Isles Finger Canal System (WBID 3226G4), Fecal Coliform, April 9, 2012

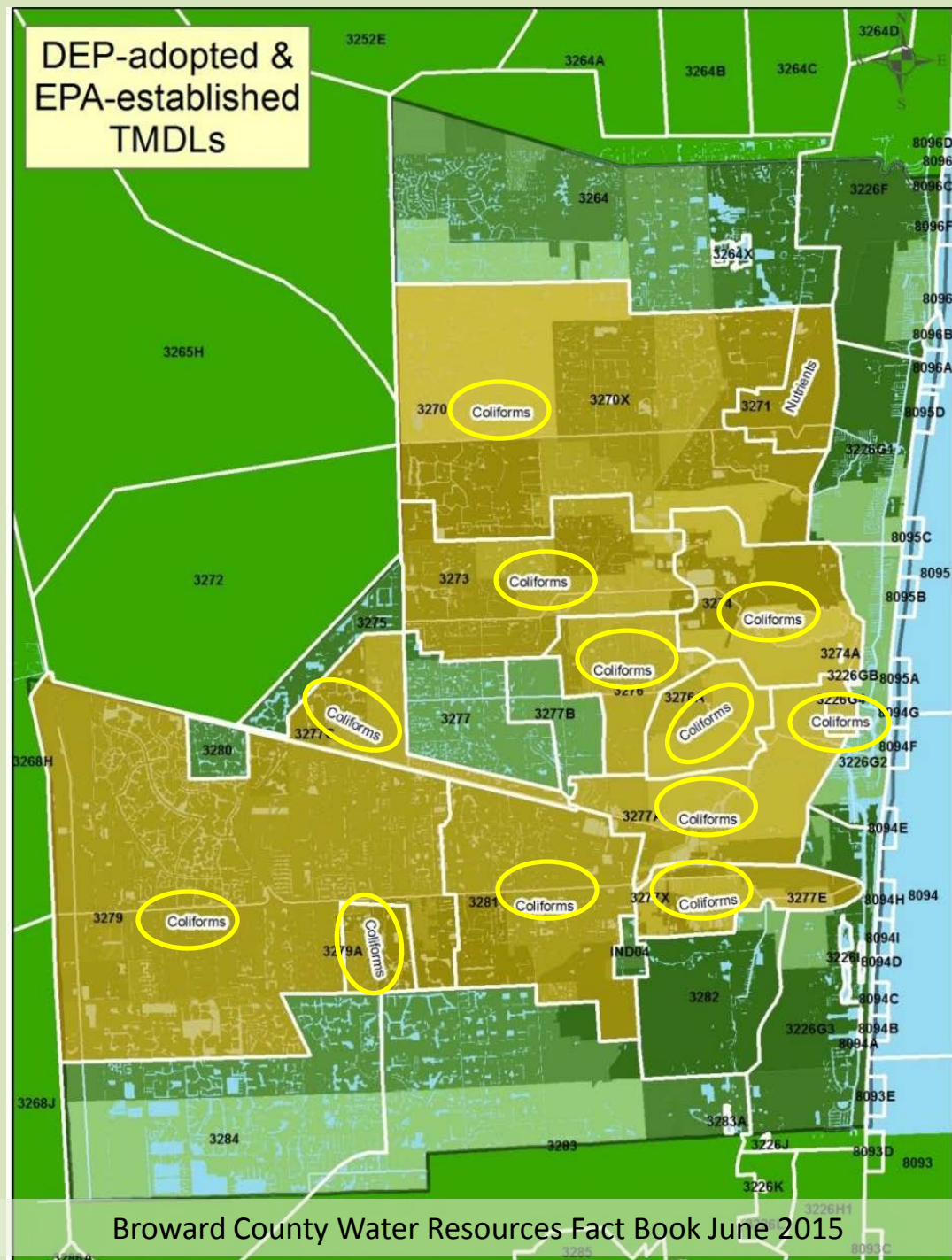


Exceedances of Fecal Coliform Standard are common in the fall (Range: 7-2700 MPN/100mL)

Total Maximum Daily Loads (TMDLs)

“A calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.”

The majority of water bodies in Broward County are impaired for fecal coliform bacteria.





QUESTIONS?

Nov 1 - No evidence of algae bloom in waterway near SW 10th St.



CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT

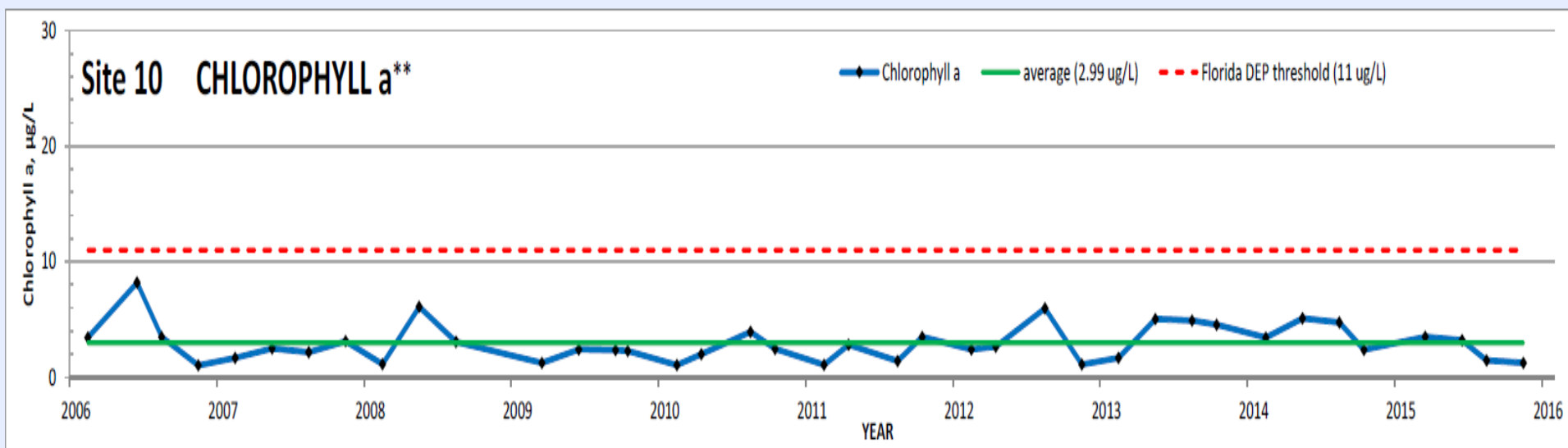
SITE 10 - estuarine

Middle River at East Sunrise Blvd
Water Body ID (WBID) # 3274



Chlorophyll is an indicator of algae and other plant materials in the water column.

Spikes common in summer and fall sampling.



CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT

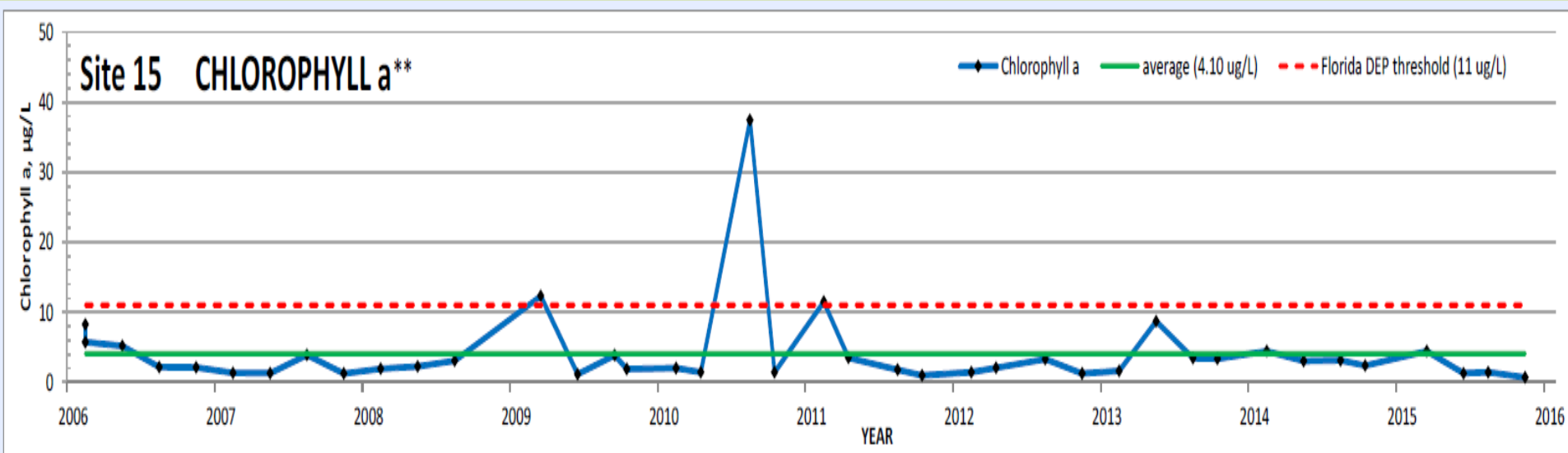
SITE 15 - estuarine

New River Canal at Andrews Ave Bridge
Water Body ID (WBID) # 3277A



Chlorophyll is an indicator of algae and other plant materials in the water column.

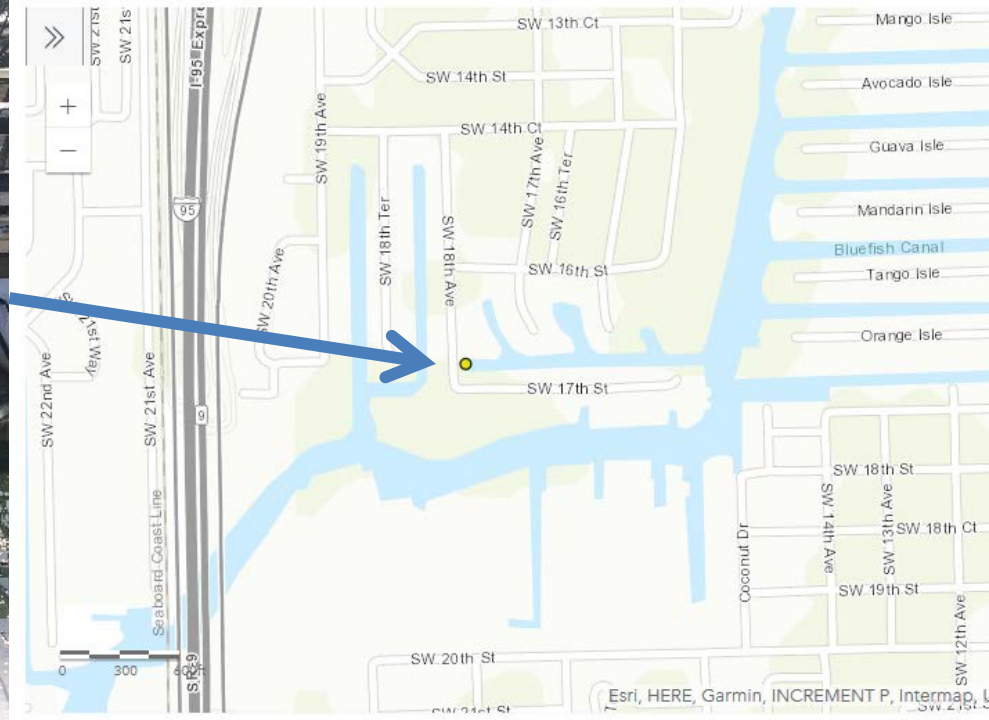
Spikes common in summer and fall sampling.



CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT



FDEP Photo 9/25/2017



September 25, 2017 Sample from Waterway north of SW 17th Street

- Microcystin toxin detected
- Anatoxin-a: not detected
- Cylindrospermopsin: not detected



CITY OF FORT LAUDERDALE
PUBLIC WORKS DEPARTMENT