



Florida's CyanobHAB Monitoring and Response

Division of Environmental Assessment and Restoration

Florida Department of Environmental Protection

November 7, 2019



CyanoHAB Surveillance

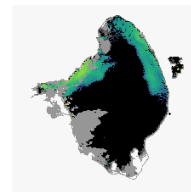
How do we know where and when a surface water is experiencing a harmful algal bloom (HAB)?



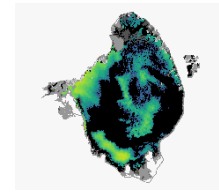


CyanoHAB Surveillance (continued)

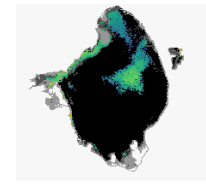
- State agency field staff (FDEP, WMDs, FWCC) during course of normal field work
- General public through FDEP Algal Bloom Hotline and Online Reporting Form submittals
- County and local governments
- NOAA satellite imagery for North and South Florida (300-Meter resolution)



7/23/2019



7/3/2019



6/25/2019

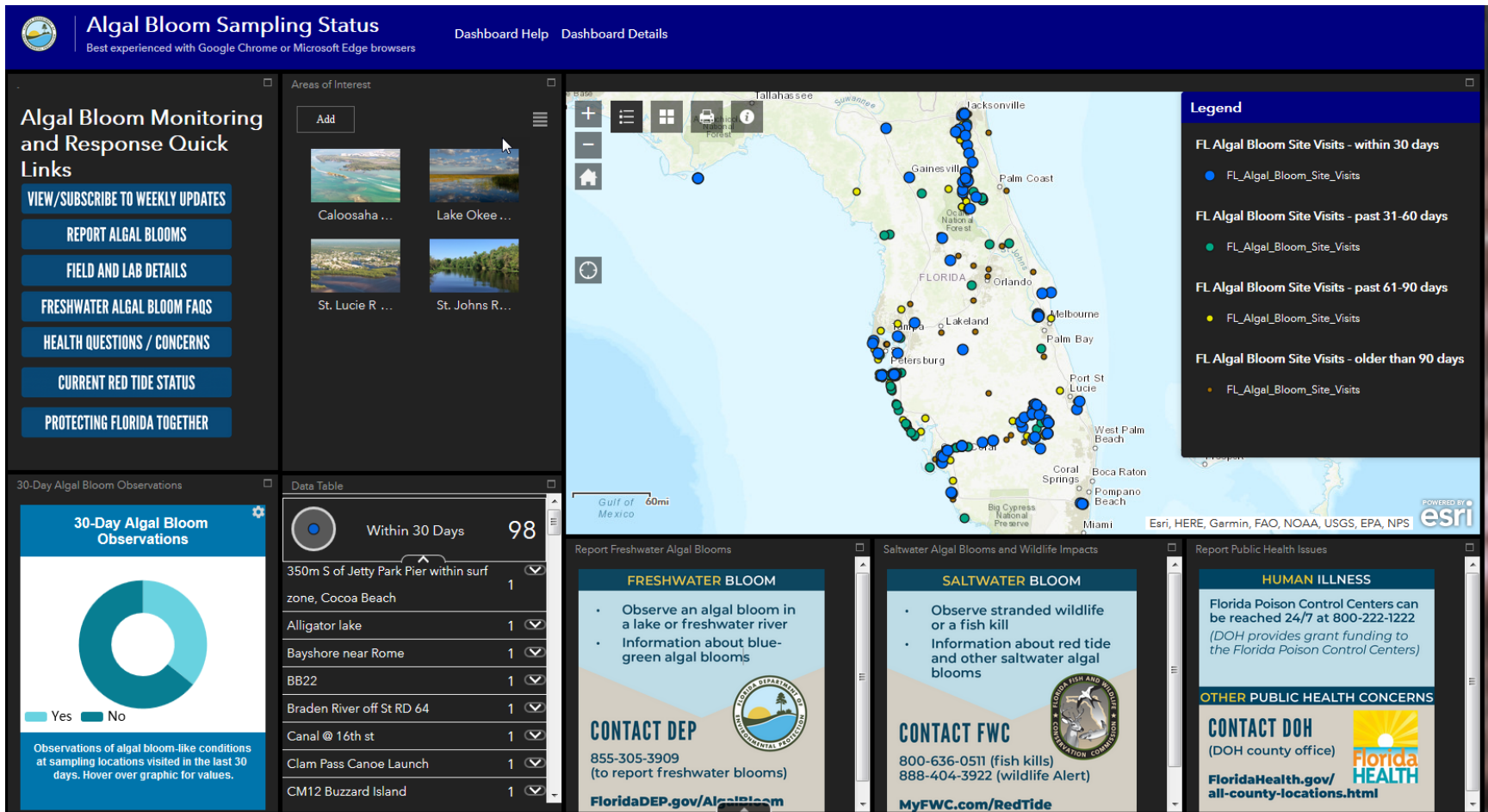
Images from NCCOS Hab Data Explorer, https://products.coastalscience.noaa.gov/habs_explorer/



CyanoHAB Communication

Algal Bloom Dashboard

<https://floridadep.gov/algalbloom>



1/2/2020



CyanoHAB Communication

Agency Staff Coordination

- FDEP hosts a weekly Cyanobacteria HAB teleconference with other state agency staff to assist with coordination of sampling and outreach
- Most of these same staff participate on the ACOE's Lake Okeechobee Periodic Scientist calls



CyanoHAB Surveillance

Agency Staff Coordination

- Bloom reports are reviewed daily during bloom season
- Sampling locations are prioritized based on potential for human exposure/harm, representativeness of multiple reports, previous sampling history and analysis results, personnel
- Emails and phone calls are made to coordinate sampling among DEP, WMDs, FWCC, and participating county field staff



CyanoHAB Sampling

*The where,
when, and whys
of the State's
cyanoHAB
sampling
strategy*





CyanoHAB Sampling

Water, water everywhere

- Large number/area of Florida's aquatic resources makes intensive statewide HAB monitoring efforts cost prohibitive
- Without intensive sampling, we can never say with high confidence, what is happening in everyone's backyard due to the diversity of our cyanobacteria HABs
- Public bloom reported tool assisted us in targeting possible HABs



CyanoHAB Sampling

Why do we sample HABs?

- Public health protection
- Aquatic resource protection/management
- To try to understand the factors that contribute to occurrence, persistence, severity, and decline of HABs
- To determine if there are ways to effectively mitigate HABs when they occur
- To be able to predict when HABs will occur



CyanoHAB Sampling

What gets collected?

- Representative water samples
- Occasionally, scum samples are collected when cyanobacterial scum is dominant in the waterbody being sampled



Photo by FDEP, June 29, 2016, St. Lucie River



Photo by FDEP, June 23, 2016, Leighton Park



Photo by FDEP, June 24, 2019, Manatee River



Photo by FDEP, June 12, 2019 Flint Creek



CyanoHAB Sampling

What gets analyzed?

- Cyanotoxins
 - Microcystins (LR, RR, YR, LA, LF, LY)
 - Anatoxin-a
 - Cylindrospermopsin
 - Recently added: Microcystins LW, WR, and desmethyl LR
 - Working to add: Saxitoxin
- Algal Identification
- Chlorophyll *a*
- Nutrients



CyanoHAB Sampling

Precautionary Principle

- Florida Department of Health does not use a numeric toxin threshold value for advisories
 - Presence/Absence of Cyanobacteria bloom or toxins
- Advise the public to avoid recreating and allowing pets or livestock in waters with visible algae present
- Cyanobacteria bloom conditions change rapidly
- Unable to sample, ship, analyze, and disseminate results rapidly enough to accurately inform the public about the risk of recreating in a water at the time of use



What's New in 2019

Sampling Coordination

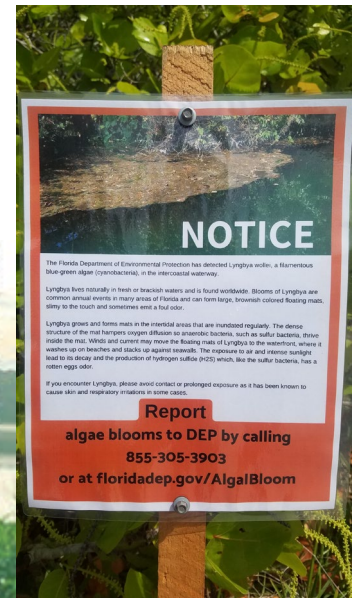
- Water Management Districts
 - Southern ROCs alternate sampling of Lake Okeechobee and the receiving waters weekly with SFWMD
 - NE ROC and SJRWMD split sampling responsibilities based on where a report is generated, with Shands Bridge being the dividing line
- Florida FWC
 - FWC assisted in the identification of reported blooms in estuary and bay waterbodies
- Counties and cities
 - Reported blooms are being collected by local entities with samples being sent to DEP, an outside lab, or in-house and results are relayed back to DEP



What's New in 2019

Safety Precautions

- Respirators given to ROC staff to wear during bloom responses
- Signage placed by DOH at waterbodies where toxins were detected





What's New in 2019

Documentation

- Survey123 App
 - Allows real-time updates to public facing map when samples are collected
 - Lab can update public facing map to show toxin results and levels (if applicable)
- Updated Bloom Response field sheet
 - Field sheet functions as an observation sheet and lab submittal form, with hopes of going digital in the future
- Bloom response data being uploaded into WIN

A screenshot of the Survey123 app interface. The title bar is green with a white 'X' icon and the text 'FL_Alga_Bloom_Site_Visits'. Below the title bar is a map showing a location with a red pin. The map coordinates are 28°4'N 82°22'W ± 42.9 m. Below the map are three dropdown menus: 'Algal ID' with 'Pending' selected, 'Total Microcystin Toxin (micrograms/L)' with 'Pending' selected, and 'Other Toxin (micrograms/L)' with 'Pending' selected. Below these are three radio buttons for 'Toxin Present': 'Yes', 'No', and 'Pending' (which is selected). At the bottom is a green bar with a white checkmark icon.



Cyanobacteria Bloom Response Field Data Sheet

RQ-2019-				Collected By:						
Customer				Field Report Prepared By:						
Project ID:		BLOOM_RESP		Sampling Agency:		FDEP				
Field ID:				Comments:						
				Collection Equipment:						
Matrix:				Grab		Coordinates:				
Tide:		☐ Rising ☐ Falling ☐ Slack ☐ N/A		High Tide Time:				Low Tide Time:		
Water Quality										
Date	Time ☐ EST ☐ CEN	D.O. (mg/L)	D.O. (%)	Temp °C	pH (SU)	Sample Depth (m)	Cond. (umho/cm)	Salinity (PPTH)	Secchi Disk (m)	Total Depth (m)
Bloom Observations										
Algal Bloom Observed? ☐ Yes ☐ No										
Water Surface		☐ Clear ☐ Scum		☐ Globs		☐ Slick				
Water Clarity		☐ Clear ☐ Slightly Turbid		☐ Turbid		☐ Opaque				
Bloom Color		☐ Green ☐ Red		☐ Brown		☐ Other: _____				
Algae Distribution		☐ Suspended in water column		☐ On surface		☐ Other: _____				
Water Odors		☐ Normal ☐ Sewage		☐ Petroleum		☐ Chemical		Other: _____		
Parameter Suite		Parameter Methods				Preservation		pH Check	#Bottles Sent to Lab	Bottle Group
Bloom ID (PT-50ML)		☐ BLOOM-ID				☐ Ice				
Chlorophyll (BP-1L)		☐ CHLSUITE-W				☐ Ice				
Toxins (BG-WD250)		☐ W-MCYST-AA				☐ Ice				
Preserved Nutrients (500mL HDPE)		☐ W-NH3 / W-NO2NO3 / W-TKN / W-S-A-TP				☐ Ice	☐ H2SO4	☐ <2		
		Lot			Exp:			☐ <2		
Filtered Nutrients (P125mL)		☐ W-PO4-F		☐ Field Filtered 0.45um Filter		☐ Ice				
Quantitative Algae		☐ DTY-QN-C / PKD-QN-C				☐ Ice	☐ Lugols			
Relinquished By:		Date/Time		Number of Coolers Shipped			Received By:		Date/Time	

1/2/2020



Stories from 2019

- Manatee and Braden River Bloom: mid June 2019 – mid July 2019
 - Dominant taxon *Aphanizomenon flos-aquae*
- Lyngbya Bloom reported from Pinellas County down to Lee County
 - Samples sent to DEP Lab and FWRI for analysis
- Lake Washington Bloom: July 2019 – August 2019
 - Provides two-thirds of the water supply to Melbourne
 - Sampling by FDEP and SJRWMD





Stories from 2019 – Southeast ROC

Major Sampling Locations:

Lake Okeechobee (April – present)
- coordination with DEP South, SE
ROC, & SFWMD

South New River Canal
(Broward Co.)
(July – September)





Stories from 2019 – Southeast ROC

Other Notable Sampling Locations:

Blue Cypress Lake
(Indian River Co.)
October

Indian River Lagoon
near C-25 Canal
(Saint Lucie Co.)
August





Summary

- Multiple ways to receive notification of occurrence and location of algal blooms
- Collaborative efforts to respond to bloom reports
- Collection and analysis of representative water samples to provide information on the risk to public health
- DEP Algal Bloom Dashboard to disseminate results to decision makers and the public



Thank you

ROC Teams

Lab Staff

SJRWMD

SFWMD

Division Office

FWRI

DOH

Communications

County and local

GIS Staff

Public Services



Regional Contacts

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Bloom or not a Bloom

What is an algae bloom anyway?



Bloom or not a Bloom

What is an algae bloom anyway?

Most commonly thought of as cyanobacteria or blue-green algae blooms.



7/30/19 FDEP



Caloosahatchee River 8/7/19 FDEP



8/28/19 FDEP



Micro algae bloom.





Lemon Bay, FDEP 5/16/19



Lemon Bay FDEP 5/7/19



Filamentous



Lemon Bay, FDEP 5/16/19



Lemon Bay FDEP 5/7/19



1/2/2020



What about Macrophytes?

This is the worst we have seen in the past 3 years nothing you have done has stopped this, each year it's become larger and is spreading throughout the whole canal





Can you visually tell if it is producing toxins?



Cylindrospermopsin (micrograms/L) : 0.49 I qualifier



Total Microcystin Toxin (micrograms/L) 190



Most of the reports we get are supplied from the public.

Outreach opportunity?

Ecology of algae.

What role do plants play.

How do retention ponds work?



