# Florida Department of Health Aquatic Toxins Program

Environmental Protection Agency (EPA) Region 5
Harmful Algal Bloom/Clean Water Act/Safe Drinking Water Act
Workshop and Public Meeting, Chicago, IL April 27 – 29, 2016

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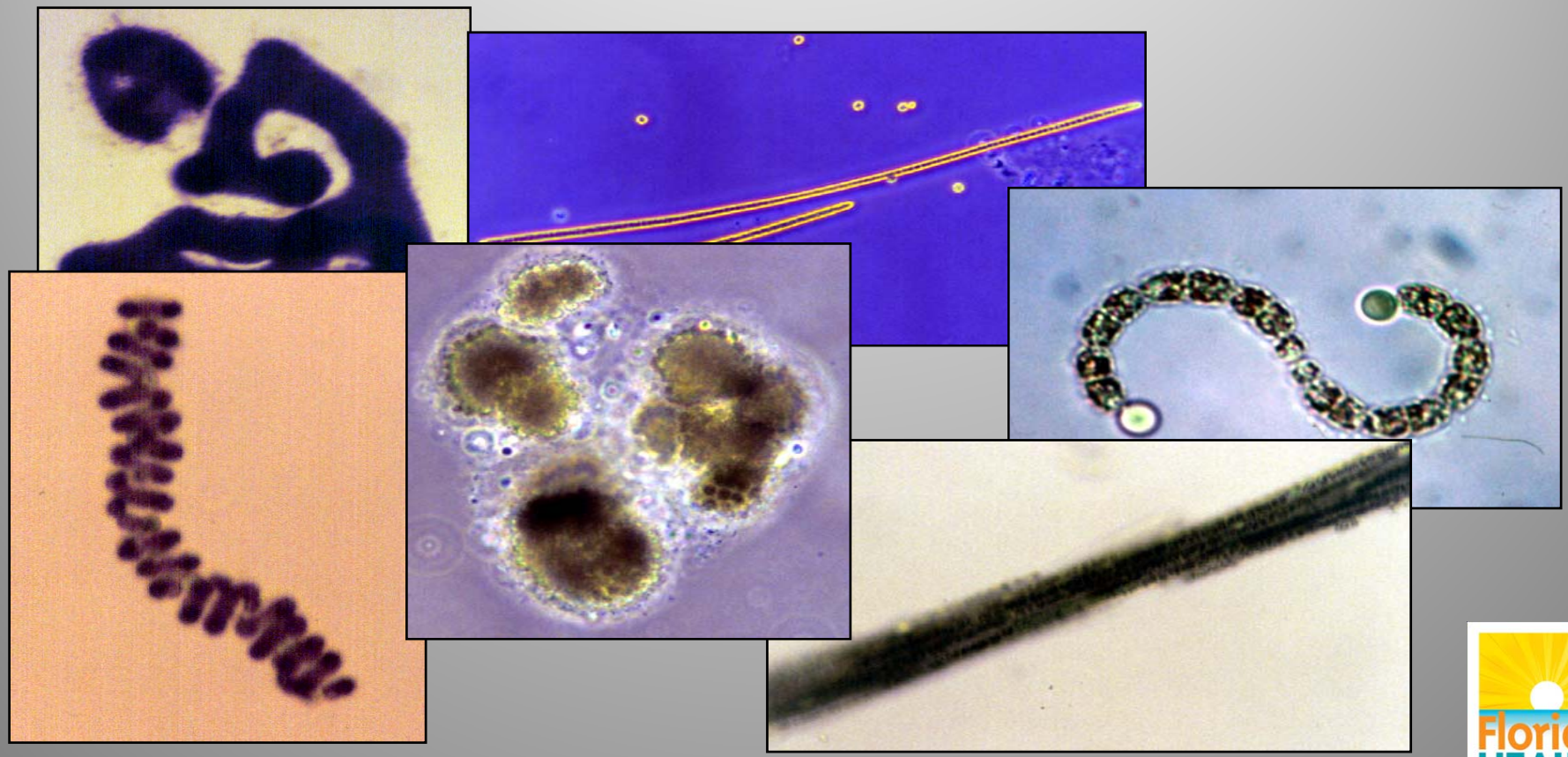
Administrator: Public Health Toxicology Section
Bureau of Environmental Health

# Freshwater: Cyanobacteria

*Microcystis, Cylindrospermopsis, Lyngbya, Anabaena, Oscillatoria, Aphanizomenon*



# Freshwater: Cyanobacteria


# Target Audience

- Health care providers
- Residents
- Visitors
- Workers



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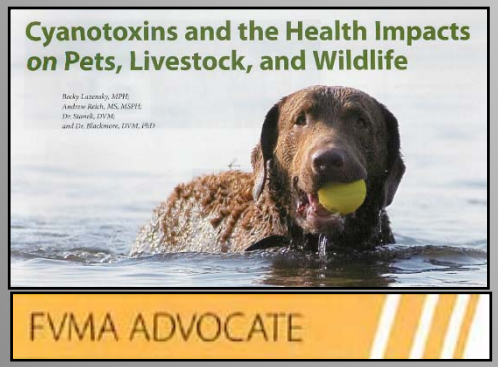
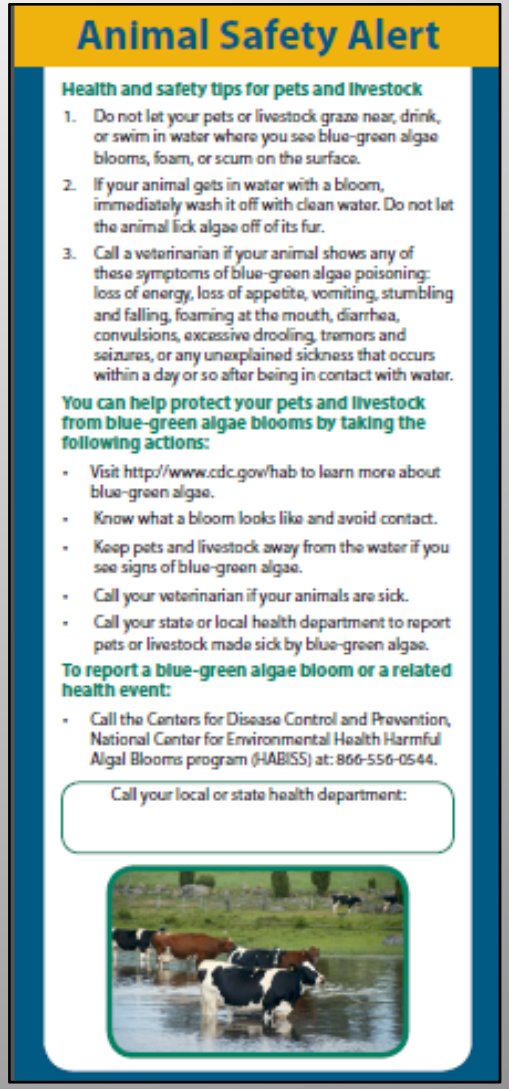
# Target Audience (continued)

- Veterinarians
- Farmers
- Pet Owners





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# Medical Fact Sheets

Medical Fact Sheet
Harmful Algae Bloom Series

Blue-Green Algae Toxin
(Cyanotoxin) Illness

FLORIDA DEPARTMENT OF HEALTH

DIVISION OF Environmental Health

Version 2 - 10/03/2007

**CAUSATIVE AGENT:** Blue-green algae toxin (cyanotoxin) illness results from exposure to the toxins associated with organisms known as cyanobacteria. Their complexity, diversity and number of species involved makes the assessment of health impacts an emerging research and medical issue. Species of blue-green algae that form HABs in marine and fresh water include *Microcystis aeruginos, Anabena circinalis, Anabena flos-aquae, Aphanizomenon flos-aquae, Cylindrospermopsis raciborskii, Lyngbya wollei* and *Oscillatoria.* Exposure can occur through ingestion of contaminated drinking water, inadvertent ingestion via recreational water activities, use of contaminated dietary supplements and possibly from inhalation of aerosols containing cyanotoxins and dermal contact with algae and/or surface water. The cyanotoxins belong to diverse groups of chemical substances with specific toxic mechanisms including neurotoxins (anatoxin-a, anatoxin-a(s), saxitoxin, neosaxitoxin), hepatotoxins (microcystins, nodularins, cylindrospermopsin), tumor promoters (microcystins) and dermatotoxins (include aplysiatoxins and lyngbyatoxin, (also potent tumor promoters and protein kinase C activators) and lipopolysaccharides, aka LPS (also gastroenteritis and possibly causing dermatitis).

**SIGNS/SYMPTOMS:** Skin contact has been reported to produce rash, hives, or skin blisters (especially on the lips and under swimsuits). Inhaling water droplets from irrigation or water-related recreational activities have been reported to cause runny eyes and nose, a sore throat, asthma-like symptoms, or allergic reactions. Ingestion can cause acute, severe gastroenteritis (including diarrhea, vomiting); liver toxicity (nausea, vomiting and acute liver failure); kidney toxicity, and neurologic effects such as salivation, muscle cramps, twitching, paralysis and cardiac or respiratory failure (these are the symptoms most often seen in dogs who have been exposed to anatoxin). There is poor understanding of the health effects from chronic exposures.

**ONSET/DURATION:** With exposure to neurotoxic cyanotoxins, symptoms can appear within minutes to few hours of exposure, but may take up to 36 hours to manifest themselves. Hepatotoxin symptoms can appear rapidly within hours, but may occur as late as several days following exposure to high amounts of cyanotoxins.

**DIAGNOSIS:** Diagnosis is based on a clinical evaluation of symptoms and exposure history. Environmental samples should include assessment by microscopic identification of cyanobacteria and analytical testing by HPLC/MS and ELISA. Increased serum levels of liver enzymes have been associated with hepatic injury after cyanotoxin ingestion. Clinical laboratory tests are not presently available for the diagnosis of cyanotoxin poisoning in humans. Research efforts are underway to assess the potential to detect certain cyanotoxins in blood.

**TREATMENT:** In general, the only treatment available for exposure to the blue green algal toxins is supportive medical treatment after complete removal from exposure. If the exposure was oral, administration of activated carbon to decrease gut absorption may be efficacious if given within hours of exposure. Artificial respiration with exposure to the neurotoxins (such as saxitoxin) should also be considered. Based on past outbreaks, monitoring of volume, electrolytes, liver and kidney function should all be considered in the case of acute gastroenteritis associated with some of the blue green algal toxins.

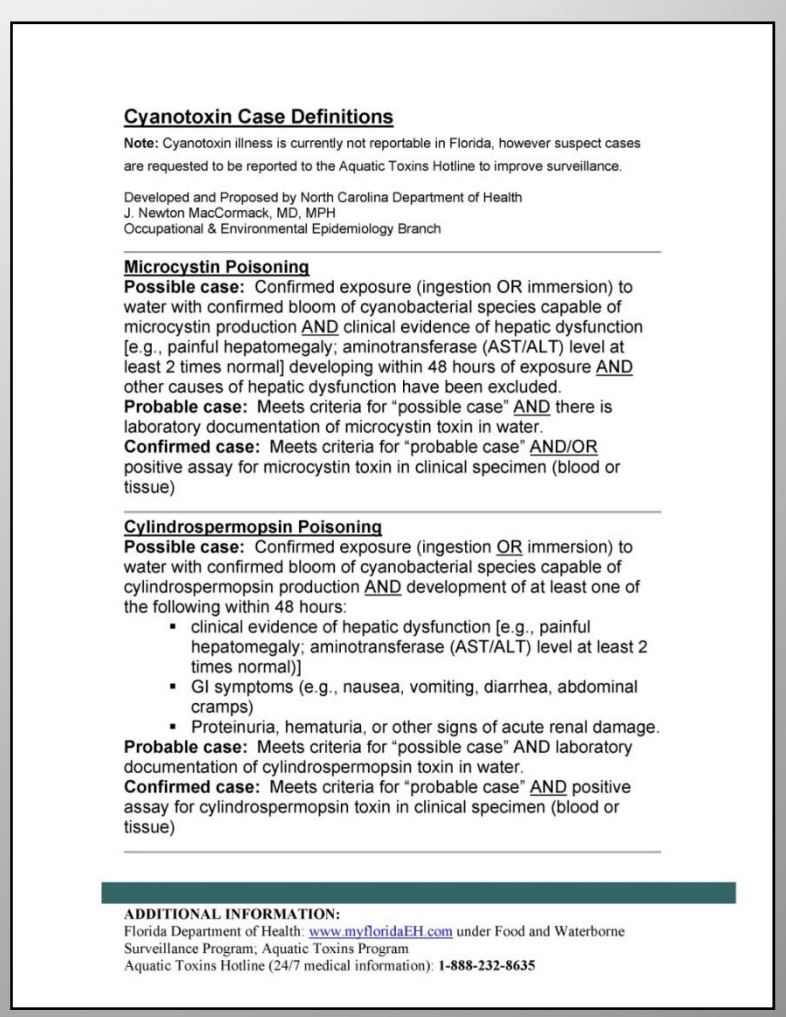
**RISK GROUPS:** All persons are susceptible to cyanobacteria. However, young children, the elderly and those individuals with underlying immunologic, neurologic, hepatic or kidney disease may be at increased risk. Effects on pregnancy and fetal health is unknown. Animals drinking raw water contaminated with toxin-producing cyanobacteria are especially prone to acute poisonings.

**PREVENTATIVE MEASURES:** Avoid contact with water or algae if visibly present (foam, scum, or mats of algae). Restrict swimming, boating and other activities in blooms. If exposed, rinse off with fresh water as soon as possible. Pets or livestock should not swim in or drink from areas where the water has. If pets (especially dogs) do swim in scummy water, rinse them off immediately—do not let them lick the algae (and toxins) off their fur. Algaecides may temporarily increase the amount of toxins in the water.

**REPORTING REQUIREMENTS:** None. At present, cyanotoxin illness is not a reportable disease in Florida. To improve their surveillance of this illness, the Florida Department of Health asks health care providers to report suspect cases to the Aquatic Toxin Hotline at 1-888-232-8635 or the Aquatic Toxins Program at the Florida Department of Health.

**ADDITIONAL INFORMATION**
Aquatic Toxins Hotline (24/7 medical information): **1-888-232-8635**
The Florida Department of Health's Aquatic Toxins Program at www.myfloridaeh.com

AQUATIC TOXINS PROGRAM
Protecting Florida's citizens and visitors from Harmful Algal Blooms and related illnesses through
RESEARCH ◆ SURVEILLANCE ◆ EDUCATION



## Cyanotoxin Case Definitions

**Note:** Cyanotoxin illness is currently not reportable in Florida, however suspect cases are requested to be reported to the Aquatic Toxins Hotline to improve surveillance.

Developed and Proposed by North Carolina Department of Health
J. Newton MacCormack, MD, MPH
Occupational & Environmental Epidemiology Branch

### Microcystin Poisoning

**Possible case:** Confirmed exposure (ingestion OR immersion) to water with confirmed bloom of cyanobacterial species capable of microcystin production AND clinical evidence of hepatic dysfunction [e.g., painful hepatomegaly; aminotransferase (AST/ALT) level at least 2 times normal] developing within 48 hours of exposure AND other causes of hepatic dysfunction have been excluded.
**Probable case:** Meets criteria for "possible case" AND there is laboratory documentation of microcystin toxin in water.
**Confirmed case:** Meets criteria for "probable case" AND/OR positive assay for microcystin toxin in clinical specimen (blood or tissue)

### Cylindrospermopsin Poisoning

**Possible case:** Confirmed exposure (ingestion OR immersion) to water with confirmed bloom of cyanobacterial species capable of cylindrospermopsin production AND development of at least one of the following within 48 hours:

- clinical evidence of hepatic dysfunction [e.g., painful hepatomegaly; aminotransferase (AST/ALT) level at least 2 times normal)]
- GI symptoms (e.g., nausea, vomiting, diarrhea, abdominal cramps)
- Proteinuria, hematuria, or other signs of acute renal damage.

**Probable case:** Meets criteria for "possible case" AND laboratory documentation of cylindrospermopsin toxin in water.
**Confirmed case:** Meets criteria for "probable case" AND positive assay for cylindrospermopsin toxin in clinical specimen (blood or tissue)

**ADDITIONAL INFORMATION:**
Florida Department of Health: www.myfloridaEH.com under Food and Waterborne Surveillance Program; Aquatic Toxins Program
Aquatic Toxins Hotline (24/7 medical information): **1-888-232-8635**

# Public Health Surveillance Tools

EpiCom

- Public health bulletin board

Florida Poison Information Centers

- Tampa, Jacksonville, Miami

Florida reportable disease system

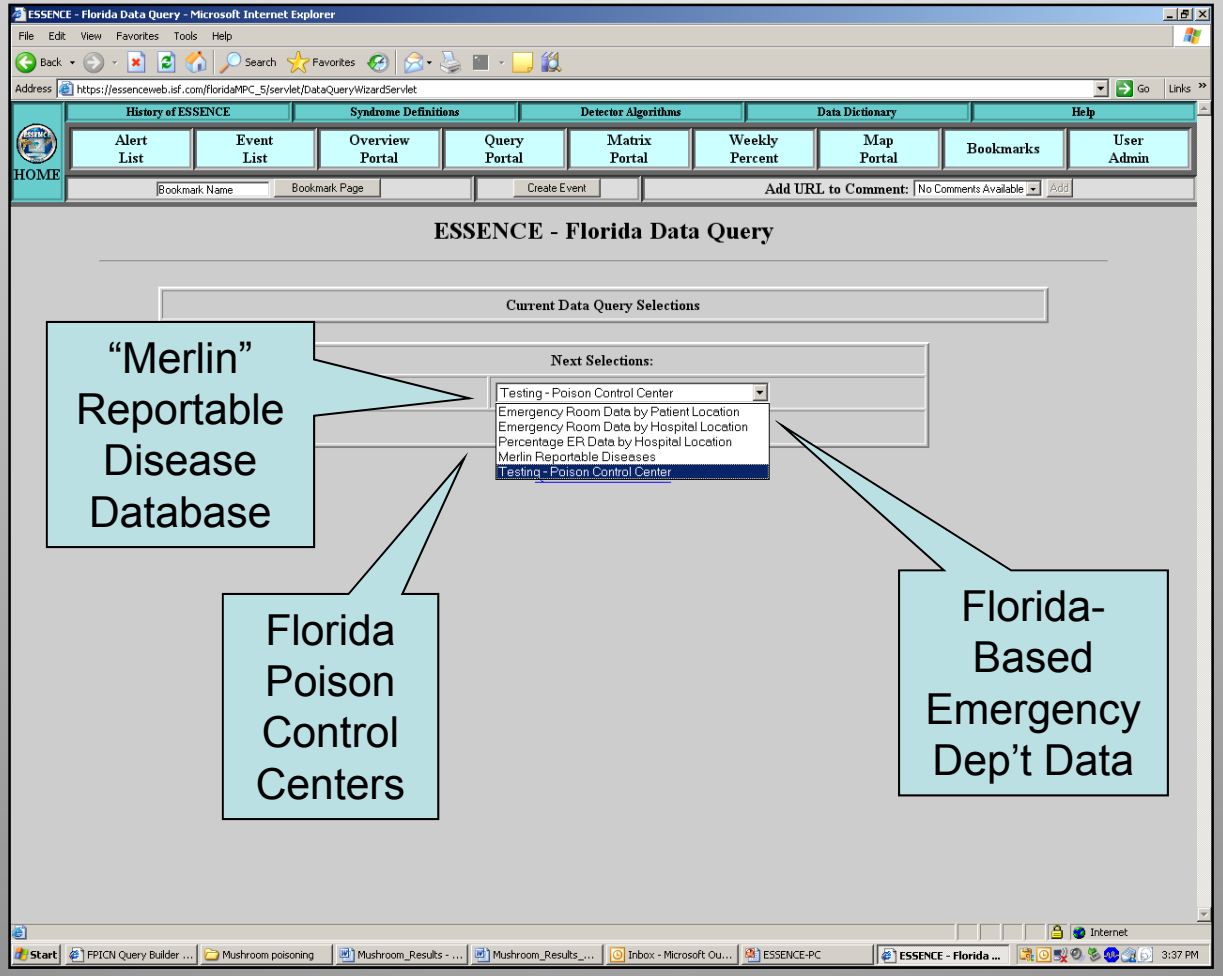
- Merlin

ESSENCE

- Syndromic surveillance
- Includes Florida hospital emergency department and acute care facility data

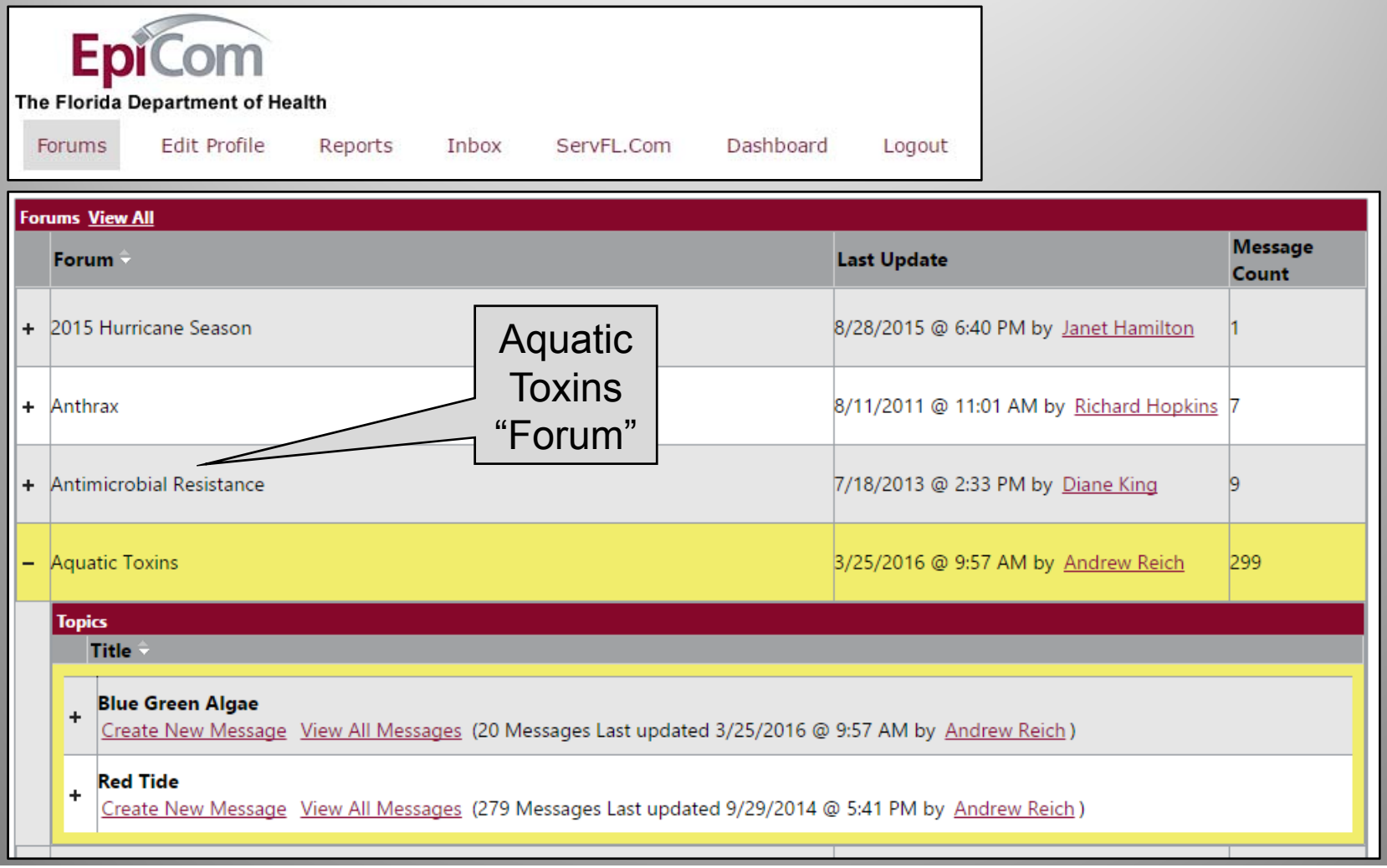
# ESSENCE - Florida

"Electronic Surveillance System for Early Notification of Community-based Epidemics"

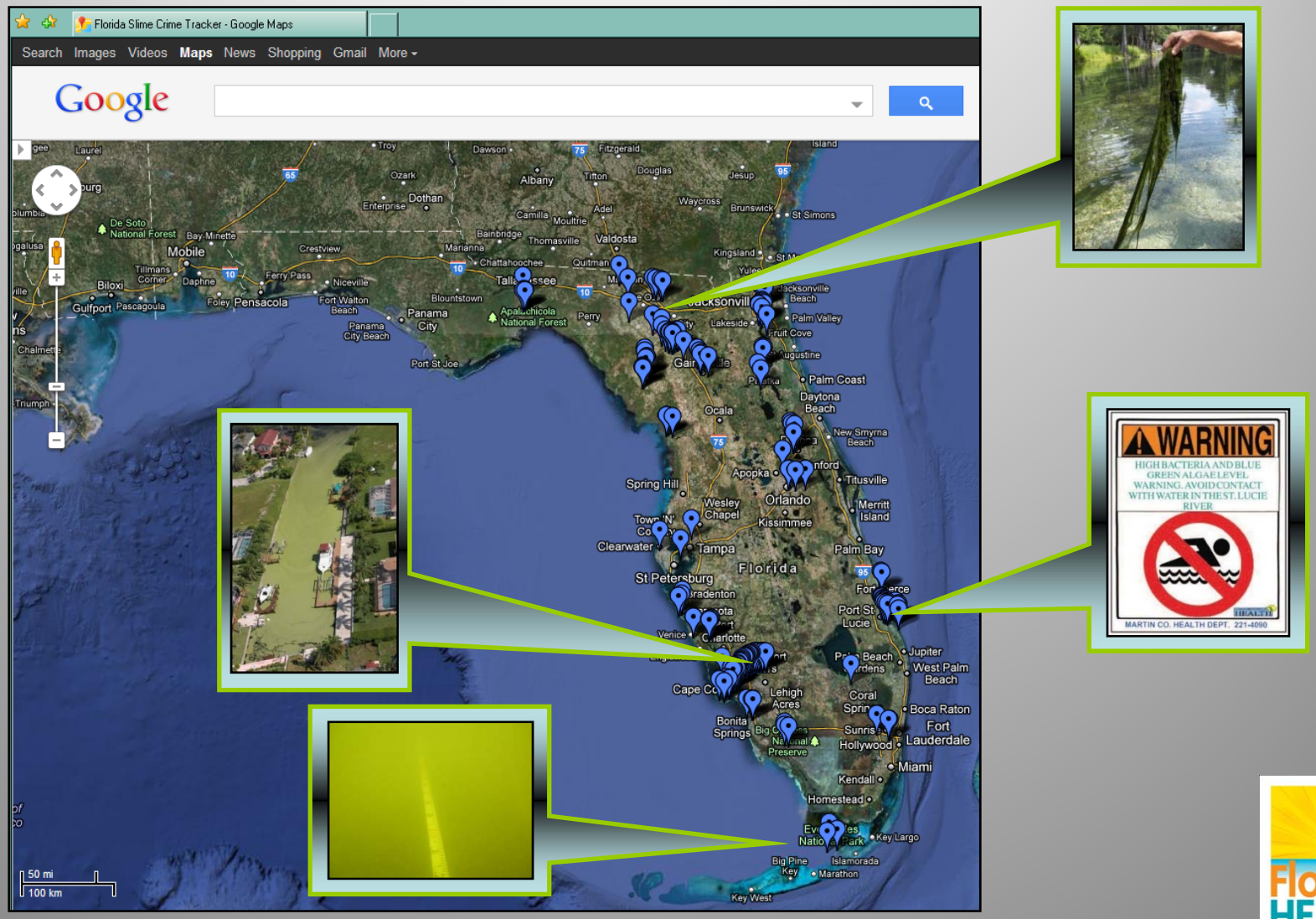


# EpiCom System

Full text subscribers = 309; "Title" only subscribers = 78



# Florida “Slime Crime” Tracker













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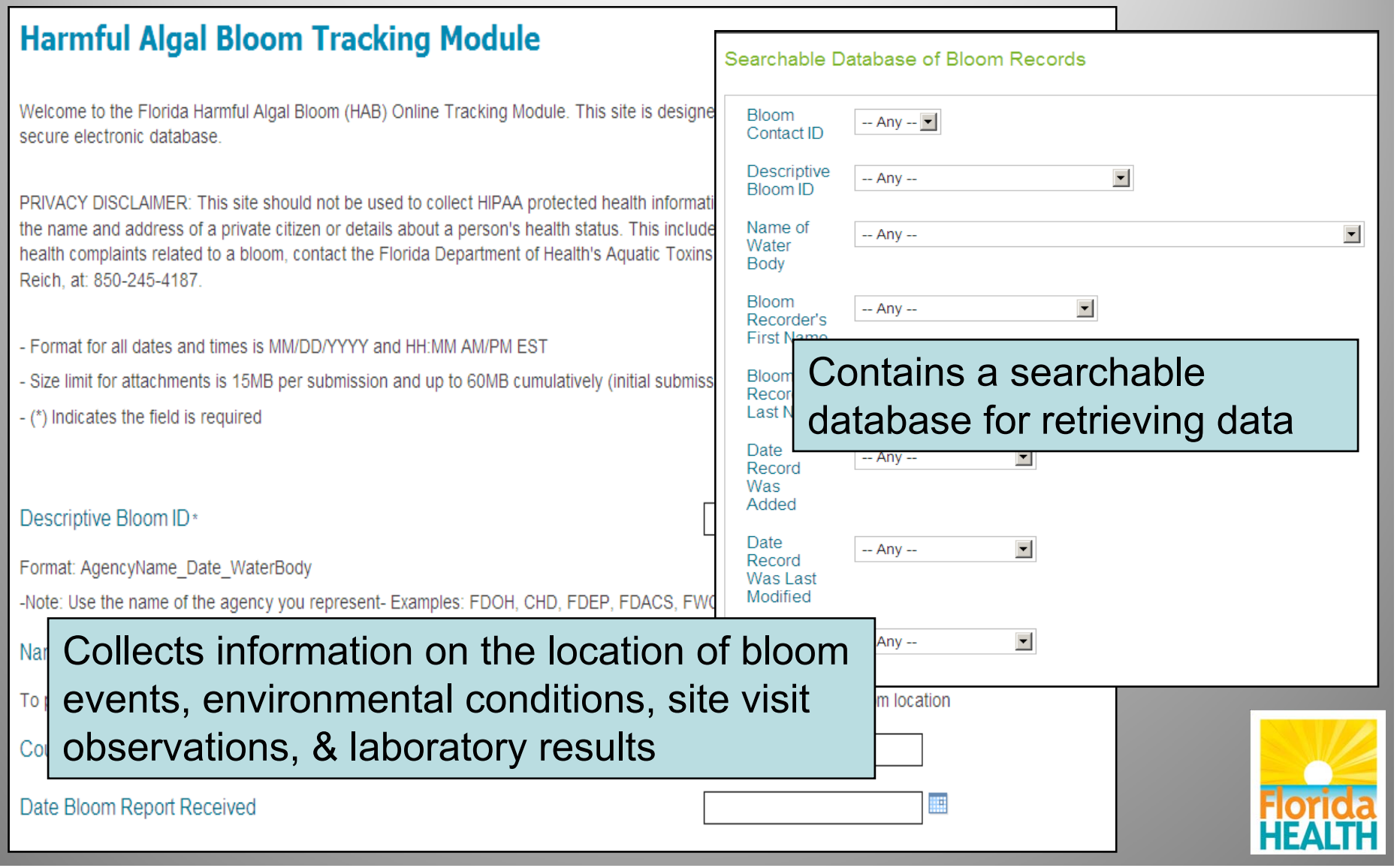
# Cyanobacteria Tracking Website

In 2012, the Florida Department of Health developed an online tracking module for coordinating statewide cyanobacteria bloom response.

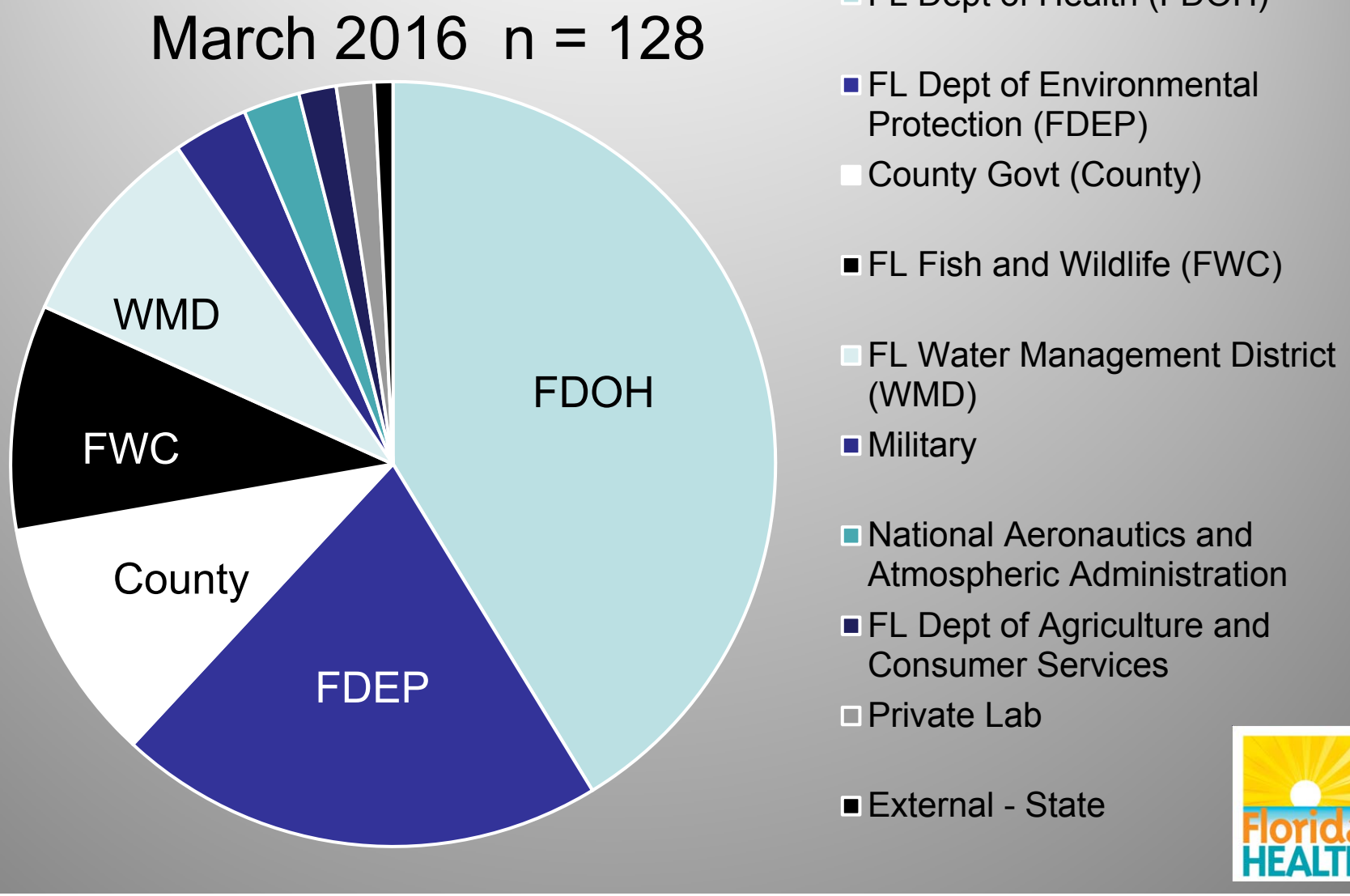
Caspio Web Hosting Site:

- http://www.caspio.com/
- Multi-user capability
- User name/password protected
- Somewhat “development” friendly
- Redacted public portal also available

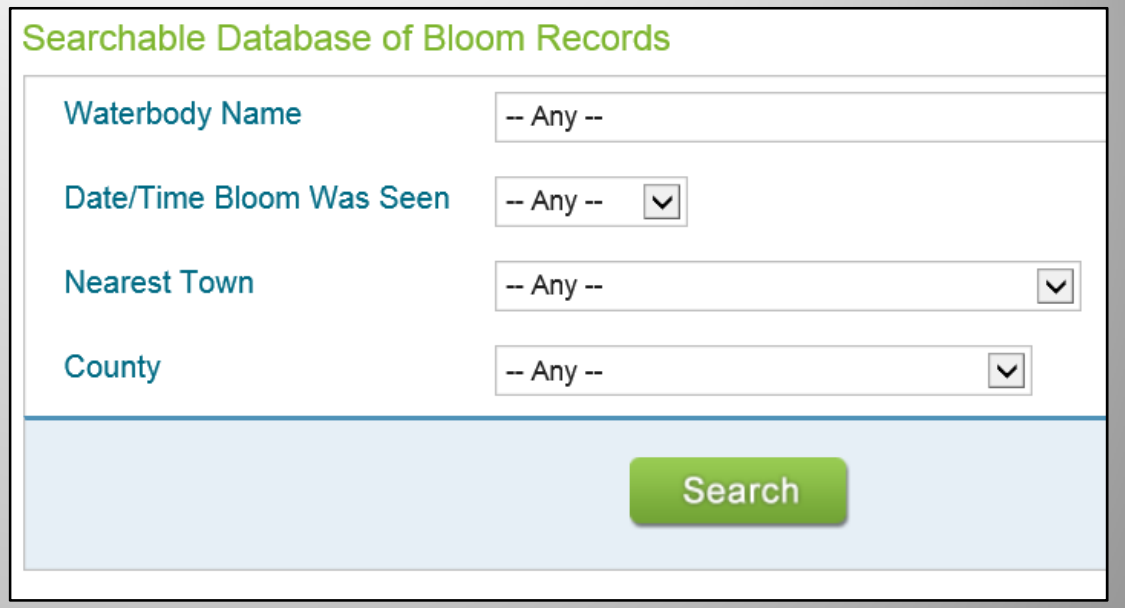
# HABs Tracking Website: Caspio



# Caspio Subscribers by Entity



# Public Access Bloom Records



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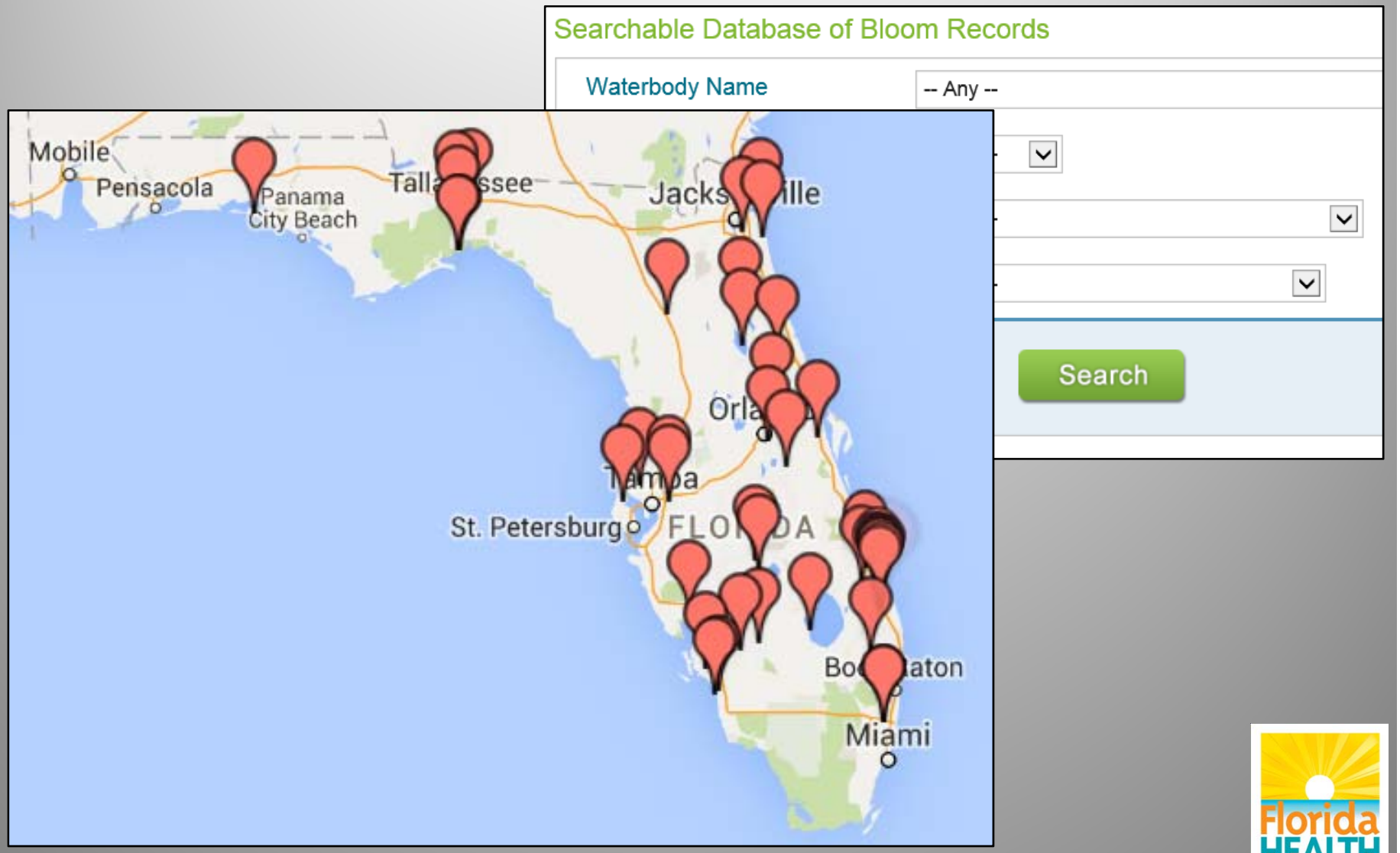

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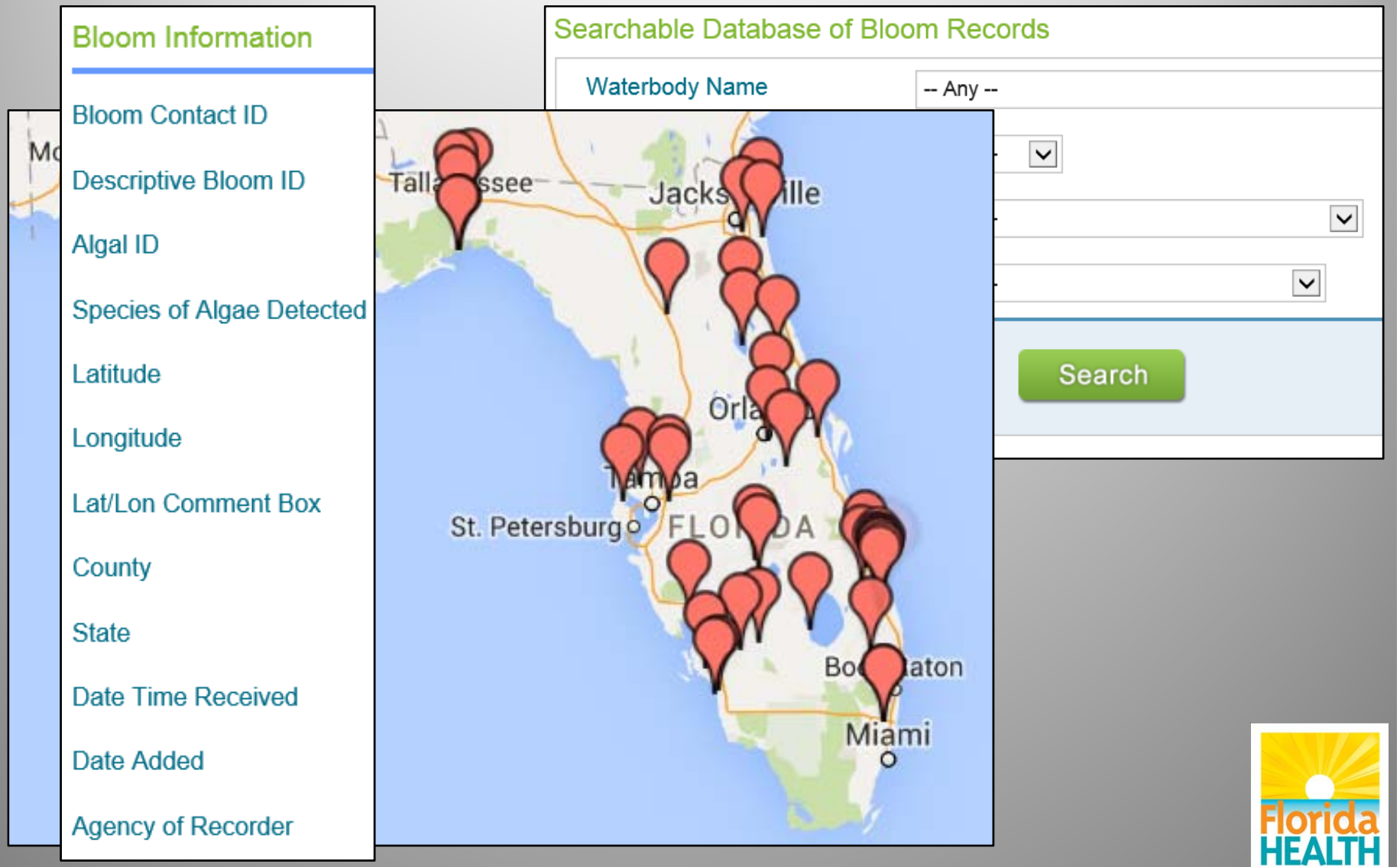
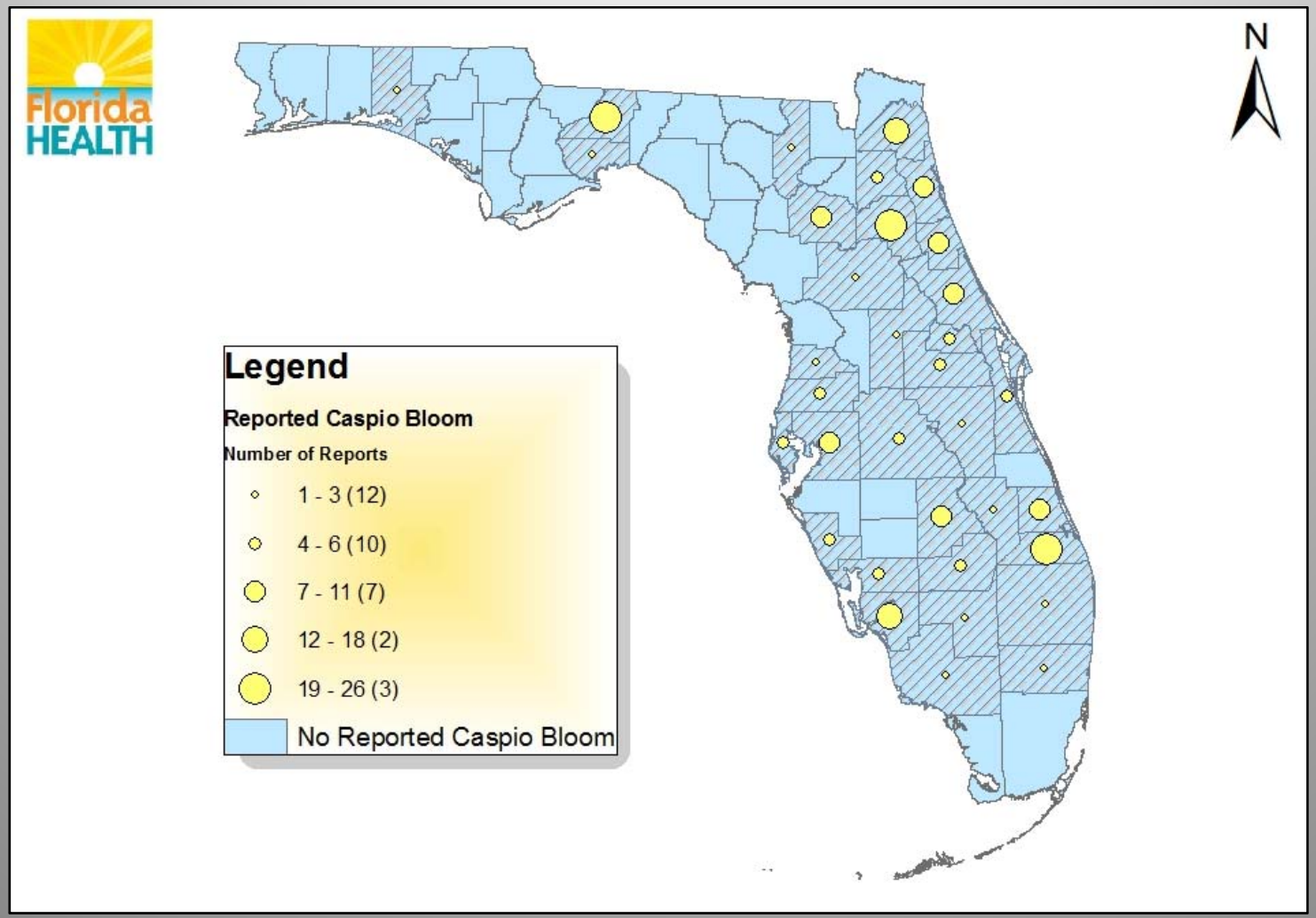


# Caspio – 270 records

## Many counties represented (33)

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www.floridahealth.gov/environmental-health/