Cyanobacteria as a Public Health Issue

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Illnesses from Cyanotoxins

- Ingestion: gastroenteritis, nausea, diarrhea, stomach cramps, vomiting, hepato-toxicosis, liver failure and muscle weakness and/or paralysis

- **Severity depends on type of toxin, concentration, and amount consumed**

- No documented cases of illness in Florida directly related to drinking water containing cyanotoxins

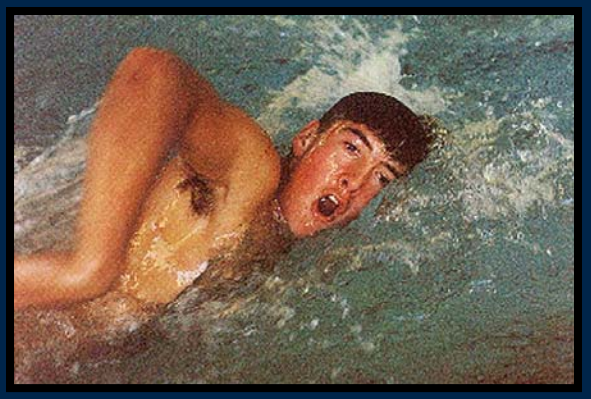
Susceptible Populations ?

- Elderly
- Immuno-suppressed
- Underlying disease: Asthma
- Pregnant women, fetus
- Children
- People with extended exposure periods

Potential Exposure Pathways

Direct Skin Contact

Ingestion of Food



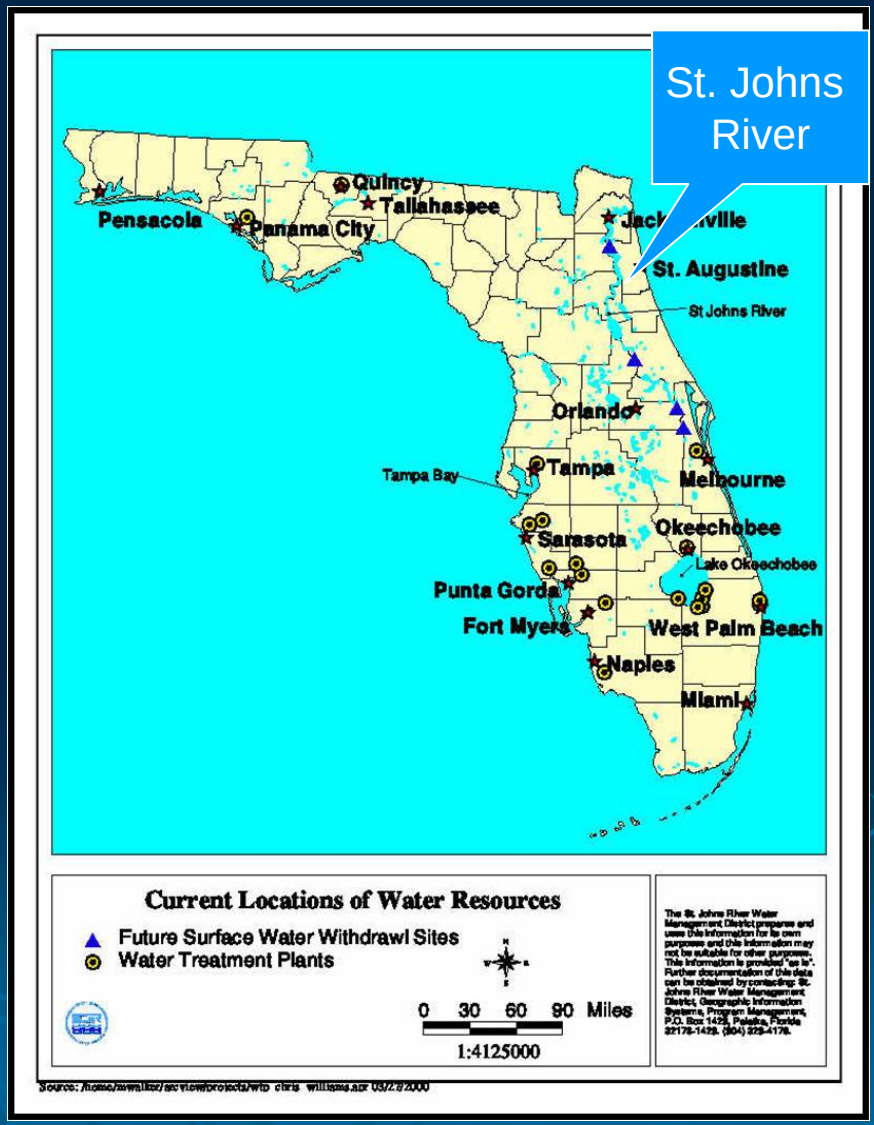
Incidental Ingestion

Drinking Water

Inhalation of Aerosols

Public health - drinking water resources

- 10-15% of Florida's population utilizes surface water supplies for drinking water
- Floridian Aquifer unable to meet projected demands for 2020
- Some surface supplies experience cyanobacteria blooms that produce toxins

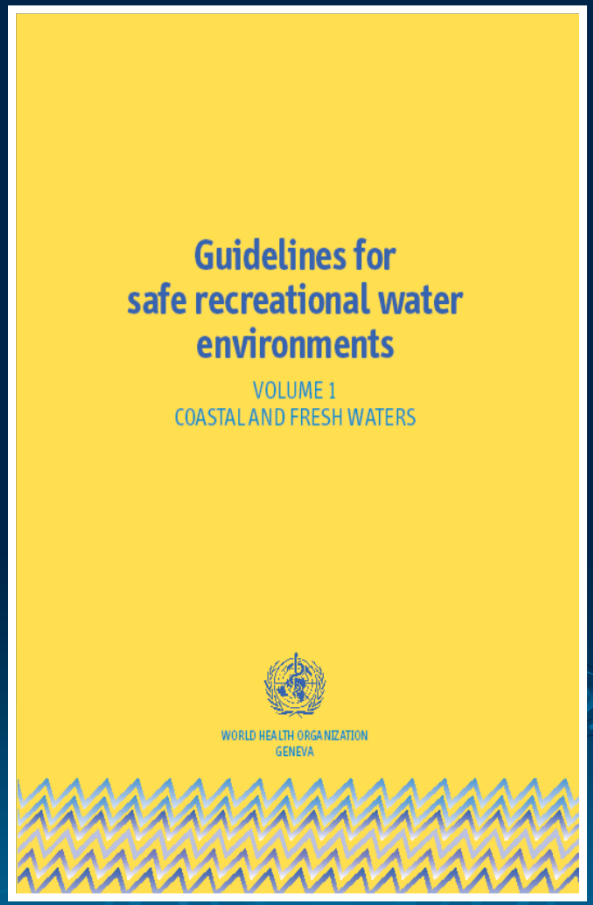


Guidelines for Exposure

- The WHO provisional guideline for lifetime exposure to microcystin-LR is 1.0 µg/L per day

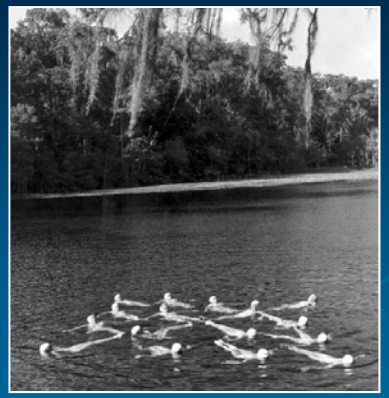
- There are no guidelines for acute exposure

- There are no regulatory standards for cyanotoxins in drinking water or recreational waters established by EPA in the U.S.



Guideline development

- Skin irritation and skin sensitization known to occur with exposure to cyanobacteria
  - NOT correlated with microcystins
  - NOT correlated with neurotoxic compounds
- Maybe due to lipopolysaccharide (LPS) in cell wall
  - surface acting toxins that can cause allergies

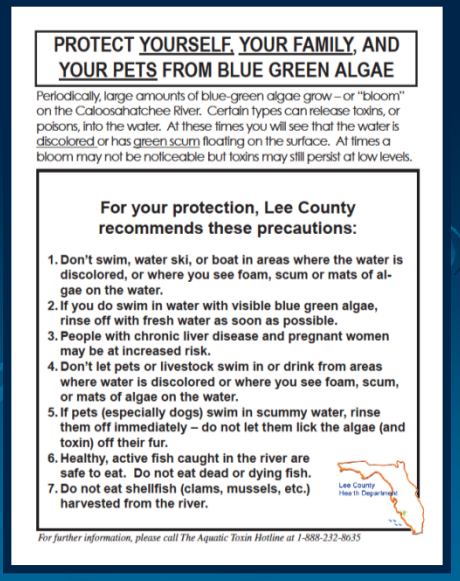


FDOH Recommendations

- Do not swim in the algae bloom or allow your pets to swim in the bloom

- If you come into contact with the bloom, wash with soap and water
  - Some people who are sensitive to the algae may develop a rash or respiratory problems

- Do not eat fish that are killed by the bloom
  - Healthy fish are ok to eat – only fillets



PROTECT YOURSELF, YOUR FAMILY, AND YOUR PETS FROM BLUE GREEN ALGAE

Periodically, large amounts of blue-green algae grow – or "bloom" on the Caloosahatchee River. Certain types can release toxins, or poisons, into the water. At these times you will see that the water is discolored or has green scum floating on the surface. At times a bloom may not be noticeable but toxins may still persist at low levels.

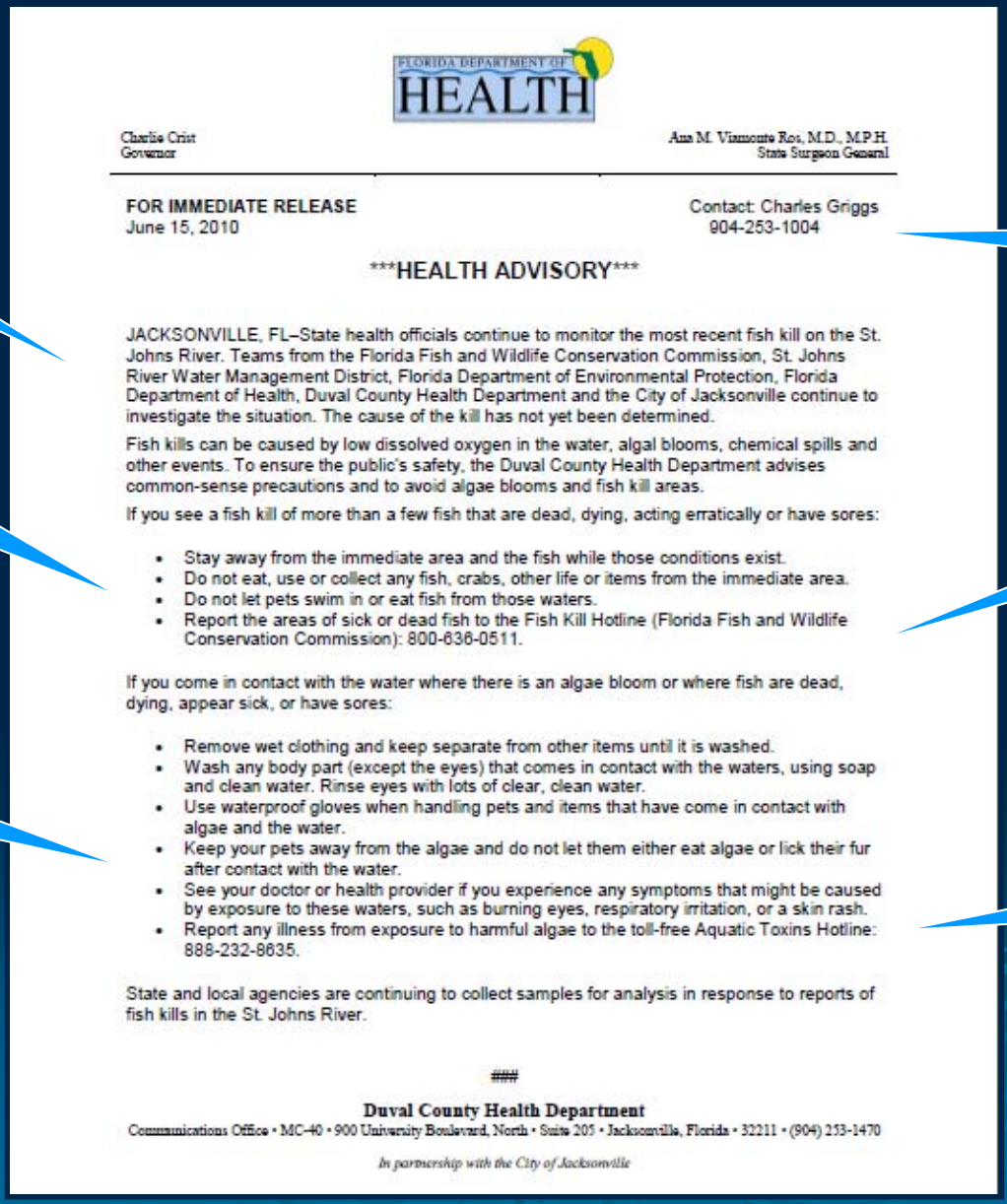
For your protection, Lee County recommends these precautions:

1. Don't swim, water ski, or boat in areas where the water is discolored, or where you see foam, scum or mats of algae on the water.
2. If you do swim in water with visible blue green algae, rinse off with fresh water as soon as possible.
3. People with chronic liver disease and pregnant women may be at increased risk.
4. Don't let pets or livestock swim in or drink from areas where water is discolored or where you see foam, scum, or mats of algae on the water.
5. If pets (especially dogs) swim in scummy water, rinse them off immediately – do not let them lick the algae (and toxin) off their fur.
6. Healthy, active fish caught in the river are safe to eat. Do not eat dead or dying fish.
7. Do not eat shellfish (clams, mussels, etc.) harvested from the river.

Lee County Health Department

For further information, please call The Aquatic Toxin Hotline at 1-888-232-8635

Press Release



FLORIDA DEPARTMENT OF HEALTH

Charlie Crist
Governor

Ana M. Viamonte Ros, M.D., M.P.H.
State Surgeon General

FOR IMMEDIATE RELEASE
June 15, 2010

Contact: Charles Griggs
904-253-1004

*****HEALTH ADVISORY*****

JACKSONVILLE, FL–State health officials continue to monitor the most recent fish kill on the St. Johns River. Teams from the Florida Fish and Wildlife Conservation Commission, St. Johns River Water Management District, Florida Department of Environmental Protection, Florida Department of Health, Duval County Health Department and the City of Jacksonville continue to investigate the situation. The cause of the kill has not yet been determined.

Fish kills can be caused by low dissolved oxygen in the water, algal blooms, chemical spills and other events. To ensure the public's safety, the Duval County Health Department advises common-sense precautions and to avoid algae blooms and fish kill areas.

If you see a fish kill of more than a few fish that are dead, dying, acting erratically or have sores:

- Stay away from the immediate area and the fish while those conditions exist.
- Do not eat, use or collect any fish, crabs, other life or items from the immediate area.
- Do not let pets swim in or eat fish from those waters.
- Report the areas of sick or dead fish to the Fish Kill Hotline (Florida Fish and Wildlife Conservation Commission): 800-636-0511.

If you come in contact with the water where there is an algae bloom or where fish are dead, dying, appear sick, or have sores:

- Remove wet clothing and keep separate from other items until it is washed.
- Wash any body part (except the eyes) that comes in contact with the waters, using soap and clean water. Rinse eyes with lots of clear, clean water.
- Use waterproof gloves when handling pets and items that have come in contact with algae and the water.
- Keep your pets away from the algae and do not let them either eat algae or lick their fur after contact with the water.
- See your doctor or health provider if you experience any symptoms that might be caused by exposure to these waters, such as burning eyes, respiratory irritation, or a skin rash.
- Report any illness from exposure to harmful algae to the toll-free Aquatic Toxins Hotline: 888-232-8635.

State and local agencies are continuing to collect samples for analysis in response to reports of fish kills in the St. Johns River.

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In partnership with the City of Jacksonville

Partnerships

Common Sense Approach

Actions that can be taken

Contact Information

Contact Information

Contact Information

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

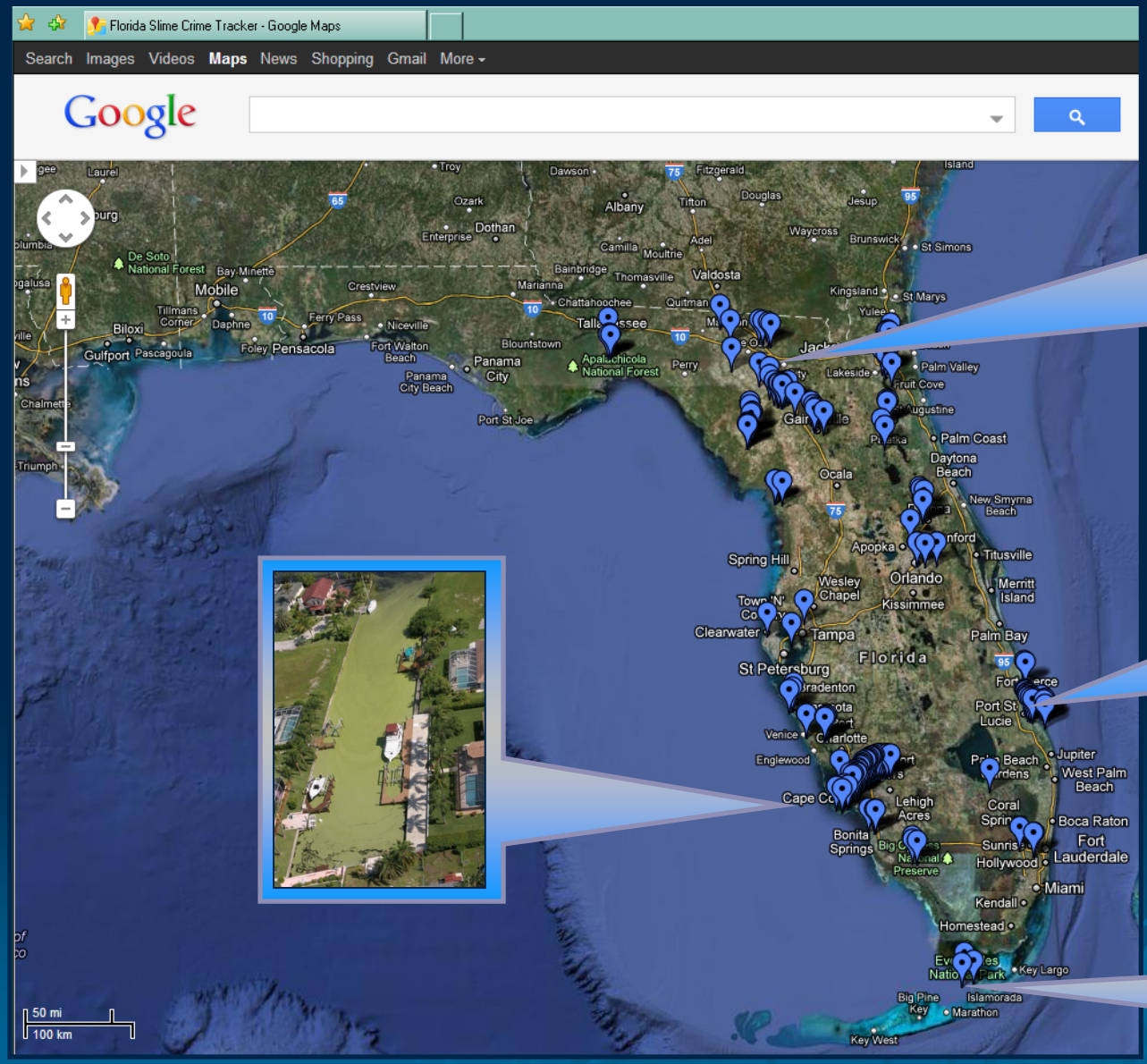
- EpiCom: Public Health Bulletin Board

- Florida Poison Information Centers
  - Tampa, Jacksonville, Miami
    Aquatic Toxins Hotline

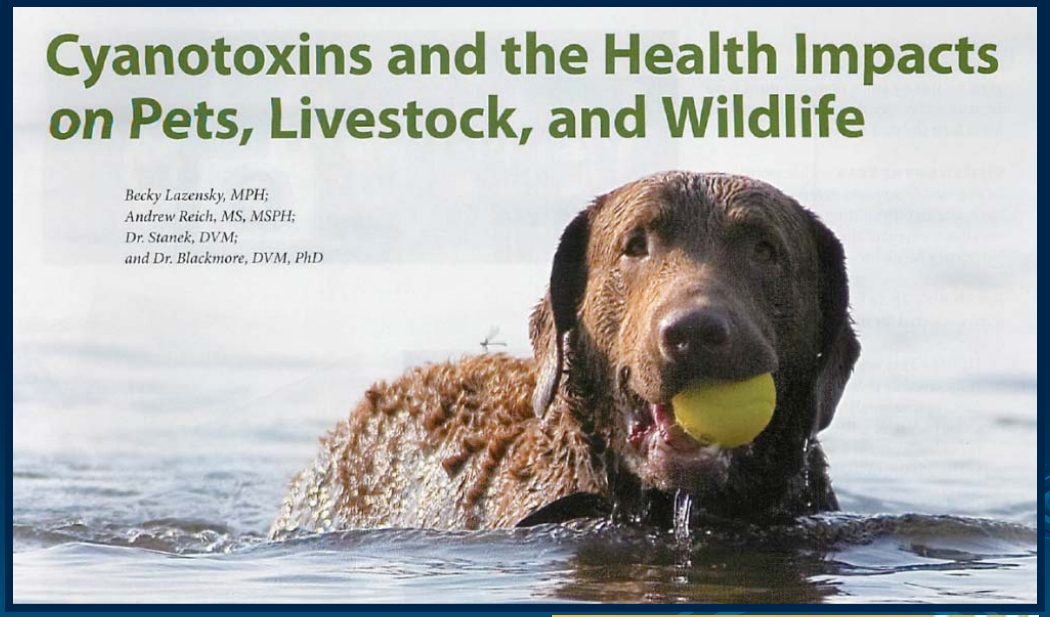
- Florida Reportable Disease System
  - Merlin

- ESSENCE
  - Syndromic Surveillance
    Includes Florida Hospital ED and Acute Care Facility data

Florida Slime Crime Tracker



Animal Impacts - Target Audience: DVMs, Farmers, Pet Owners



FVMA ADVOCATE

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