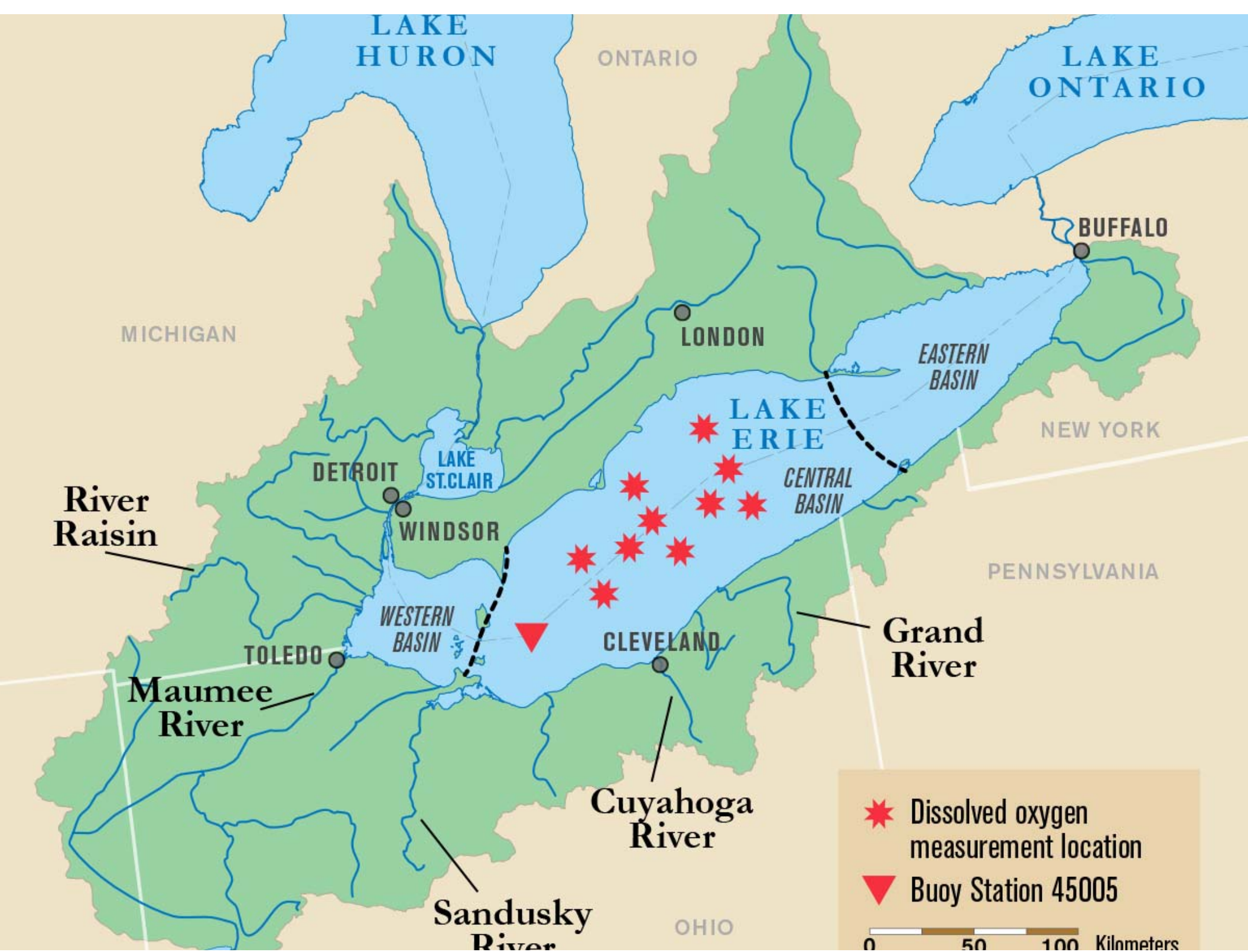
Harmful Algal Blooms (HAB's)

Presented by
Rob Karner, M.S.
Watershed Biologist
Glen Lake Association
rkarner@leelanau.org

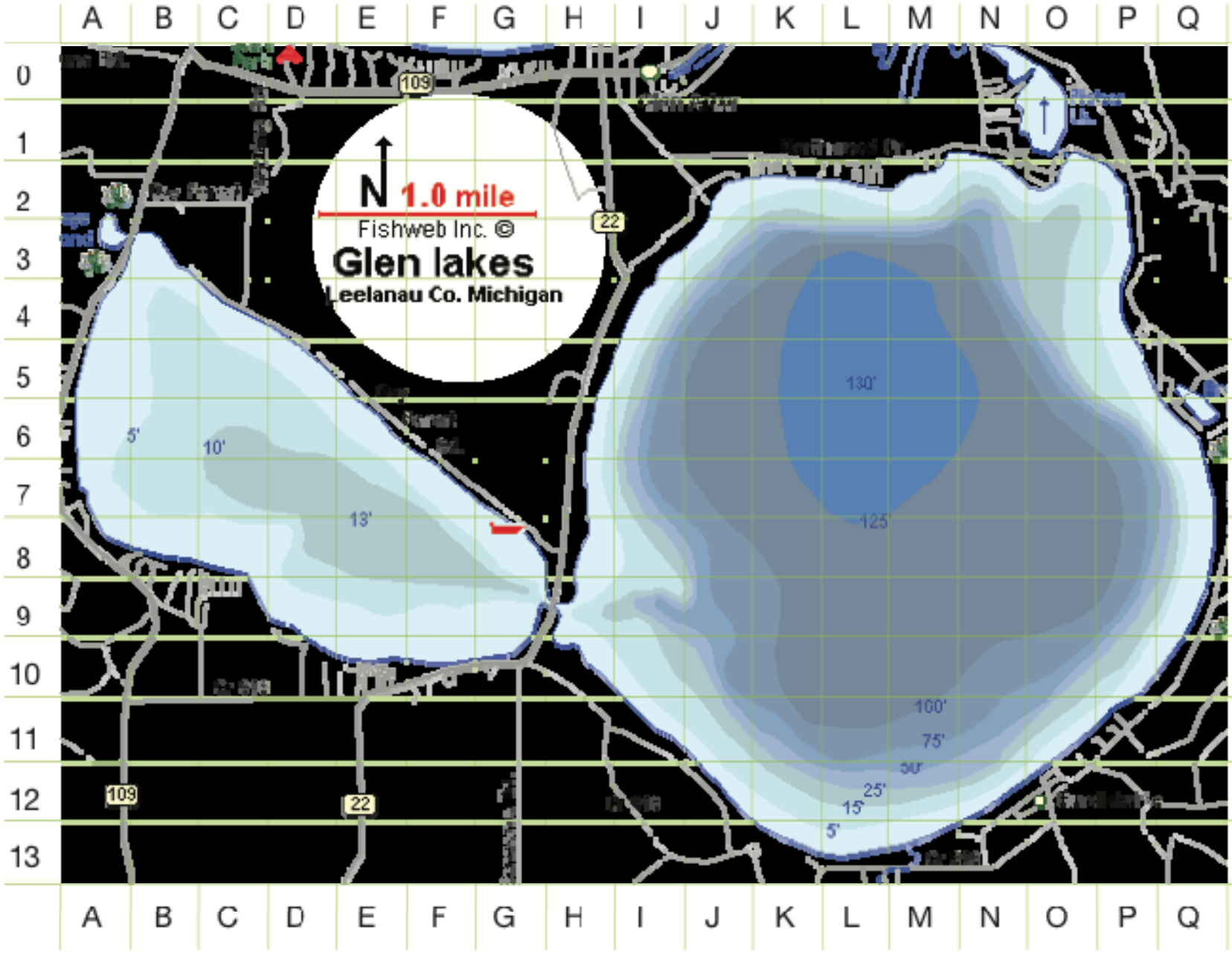
Lake Erie


LAKE HURON
ONTARIO
LAKE ONTARIO
BUFFALO
MICHIGAN
LONDON
EASTERN BASIN
LAKE ERIE
NEW YORK
DETROIT
LAKE ST.CLAIR
CENTRAL BASIN
River Raisin
WINDSOR
PENNSYLVANIA
WESTERN BASIN
CLEVELAND
Grand River
TOLEDO
Maumee River
Cuyahoga River
Sandusky River
OHIO
Dissolved oxygen measurement location
Buoy Station 45005
0
50
100
Kilometers

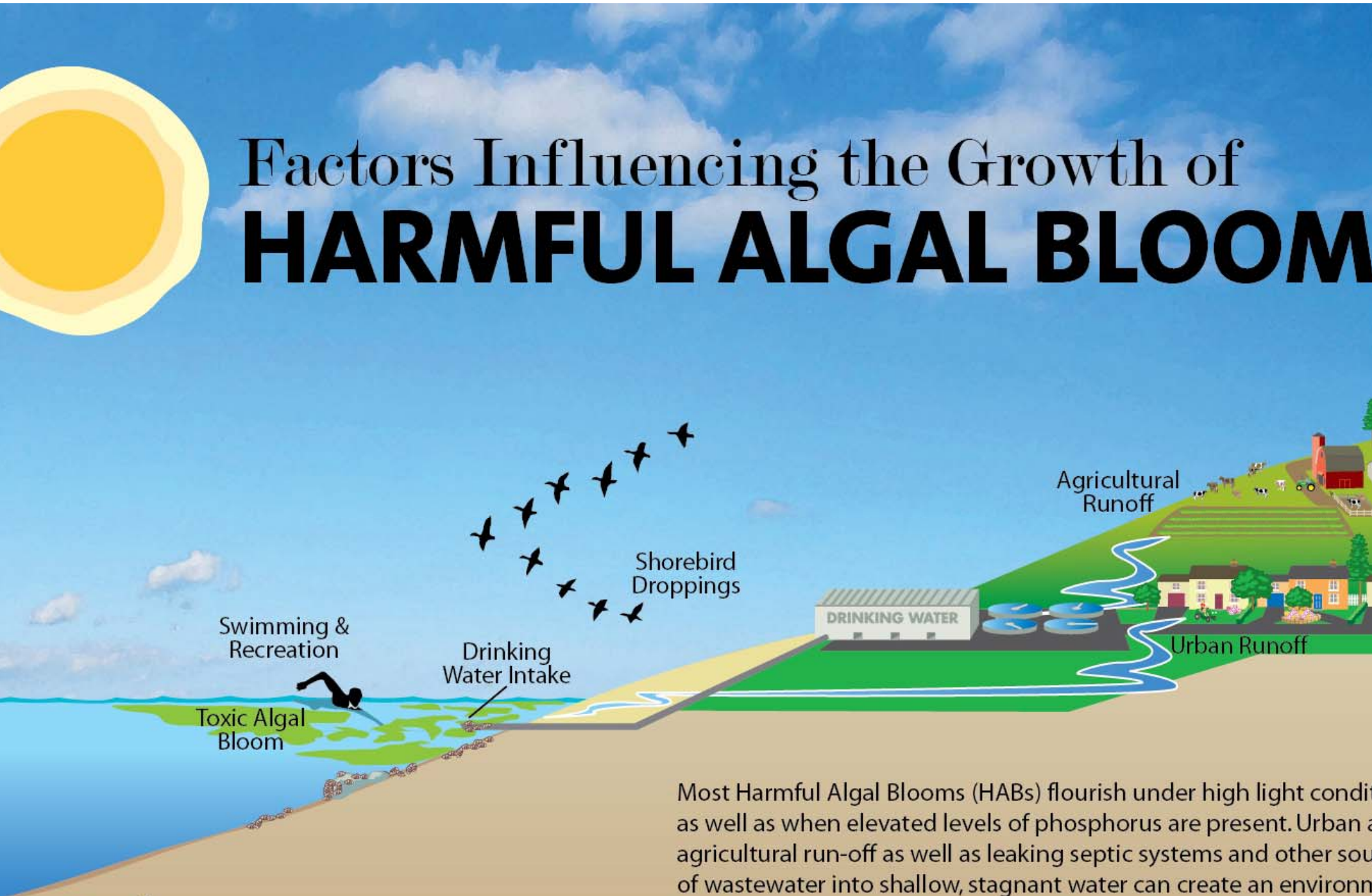
freshwater solutions LLC

innovative swimmer's itch strategies

Thanks to Fishweb.com for permission to modify this map to aid in combating swimmer's itch. Check out Fishweb.com for more map information.

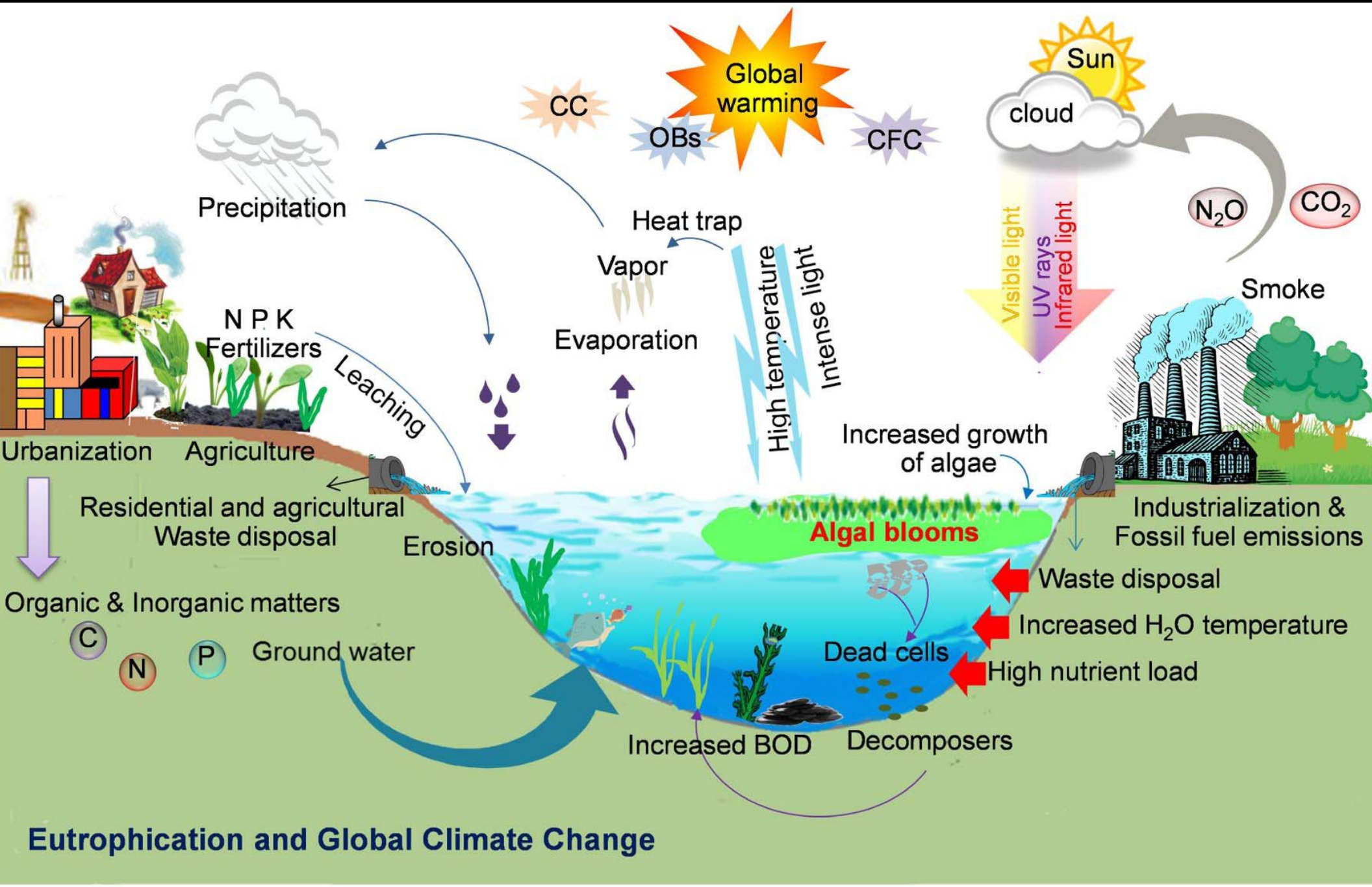


Factors Influencing the Growth of
HARMFUL ALGAL BLOOM



Most Harmful Algal Blooms (HABs) flourish under high light condi
as well as when elevated levels of phosphorus are present. Urban a
agricultural run-off as well as leaking septic systems and other sou
of wastewater into shallow, stagnant water can create an environm
for algae to flourish. Zebra mussels selectively feed and filter out o
algae, which enables HABs to flourish.

Sea Grant Michigan
Produced by Michigan Sea Grant College Program
www.miseagrant.umich.edu MICHU-10-742



Eutrophication and Global Climate Change

Health Impacts of Cyanotoxins

CLEAN WATER ACTION
CLEAN WATER FUND

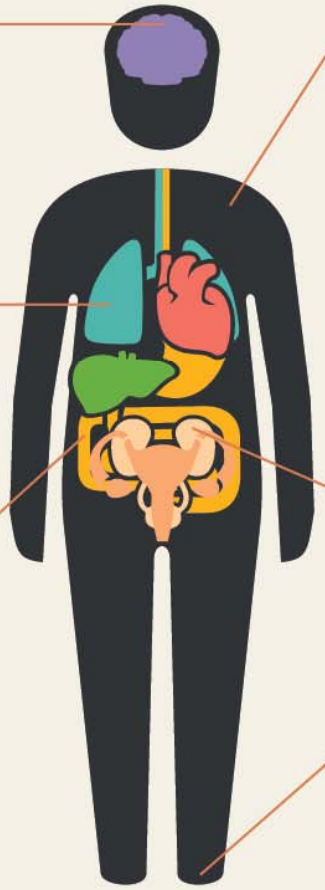
Note: *Not all cyanotoxins lead to all of these health impacts. These listed impacts are caused by microcystins or cylindrospermopsin, the two cyanotoxins that EPA has issued Health Advisories for.*

IN HUMANS

Brain
Source: Ingestion
Symptoms:
- Headache
- Incoherent speech
- Drowsiness
- Loss of coordination

Respiratory System
Source: Inhalation
Symptoms:
- Dry cough
- Pneumonia
- Sore throat
- Shortness of breath
- Loss of coordination

Digestive System
Source: Ingestion, drinking contaminated water, or eating contaminated fish
Symptoms:
- Abdominal pain
- Nausea
- Vomiting
- Diarrhea
- Stomach cramps



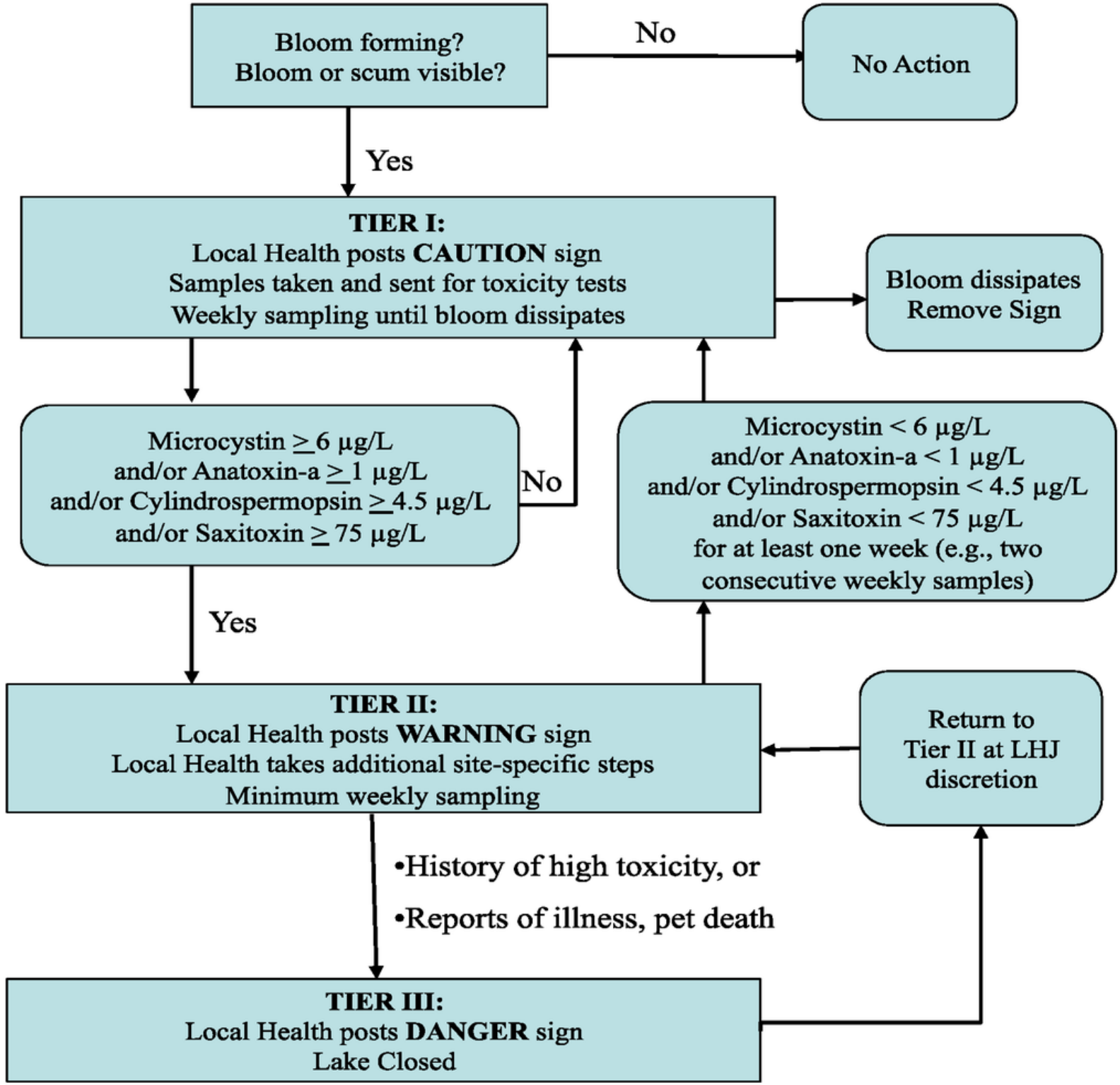
Body
Source: Contact, e.g. swimming
Symptoms:
- Irritation in eyes, nose, and throat
- Blistering around the mouth
- Skin rash, including tingling, burning and numbness
- Fever
- Muscle aches (from ingestion)
- Weakness (from ingestion)

Organs
Source: Ingestion
Symptoms:
- Kidney damage
- Abnormal kidney function
- Liver inflammation

Nervous System
Source: Ingestion
Symptoms:
- Tingling
- Burning
- Numbness

IN PETS

Symptoms:
Vomiting
Fatigue
Shortness of breath
Difficulty breathing
Coughing
Convulsions
Liver failure
Respiratory paralysis leading to death


Bloom forming?
Bloom or scum visible?
No
No Action
Yes
TIER I:
Local Health posts CAUTION sign
Samples taken and sent for toxicity tests
Weekly sampling until bloom dissipates
Bloom dissipates
Remove Sign
Microcystin ≥ 6 µg/L
and/or Anatoxin-a ≥ 1 µg/L
and/or Cylindrospermopsin ≥ 4.5 µg/L
and/or Saxitoxin ≥ 75 µg/L
No
Microcystin < 6 µg/L
and/or Anatoxin-a < 1 µg/L
and/or Cylindrospermopsin < 4.5 µg/L
and/or Saxitoxin < 75 µg/L
for at least one week (e.g., two
consecutive weekly samples)
Yes
TIER II:
Local Health posts WARNING sign
Local Health takes additional site-specific steps
Minimum weekly sampling
Return to
Tier II at LHJ
discretion
•History of high toxicity, or
•Reports of illness, pet death
TIER III:
Local Health posts DANGER sign
Lake Closed


100 µm

ANATOXIN

- **Toxin type:** *Neurotoxin*
- **Exposure Symptoms:** *Staggering, gasping, convulsions, diarrhea, death*
- **Algal Producers:** *Anabaena, Aphanizomenon, Planktothrix*

CYLINDROSPERMOPSIN

- **Toxin Type:** *Hepatoxin*
- **Exposure Symptoms:** *Vomiting, diarrhea, liver tumors, death*
- **Algal Producers:** *Aphanizomenon, Cylindrospermopsis, Planktothrix*

SAXITOXIN

- **Toxin Type:** *Neurotoxin*
- **Exposure Symptoms:** *Numbness, gasping, paralysis, incoherence, death*
- **Algal Producers:** *Anabaena, Cylindrospermopsis*

MICROCYSTIN

- **Toxin Type:** *Hepatoxin*
- **Exposure Symptoms:** *Rashes, vomiting, diarrhea, headaches, chest pain, fever, liver tumors, death*
- **Algal Producers:** *Anabaena, Microcystis, Nostoc, Planktothrix*

ETHYLENE GLYCOL [2 mg/kg-d]
ALUMINUM [1 mg/kg-d]
CHLORINE [0.1 mg/kg-d]
FLUORIDE [0.06 mg/kg-d]
ATRAZINE [0.04 mg/kg-d]
CYANIDE [0.02 mg/kg-d]
ALACHLOR [0.01 mg/kg-d]
BOTULINUM TOXIN A [0.001 mg/kg-d]
SELENIUM [0.005 mg/kg-d]
DDT [0.0005 mg/kg-d]
ANATOXIN-A [0.0005 mg/kg-d]
METHYLMERCURY [0.0001 mg/kg-d]
CYLINDROSPERMOPSIN [0.00003 mg/kg-d]
PCBs [0.00002 mg/kg-d]
SAXITOXIN [0.000005 mg/kg-d]
MICROCYSTIN LR [0.000003 mg/kg-d]
DIOXIN [0.000001 mg/kg-d]

TOXICITY SCALE

[Consumption thresholds for toxic effects based on daily ingestion in milligrams of toxin per kilogram of body weight.]

Information sourced from the Ohio EPA Algae Information for Recreational Waters program.
Website: http://epa.ohio.gov/habalgae.aspx

HABs

Harmful Algal Bloom Surveillance

Protect Your Pets!

What are Blue-green algae and how do they effect animals?

- Blue-green algae, (scientifically known as Cyanobacteria) are small, mostly microscopic photosynthetic aquatic organisms. Some can produce toxins which is why they can be a concern.

-If animals ingest these toxins they can be quickly sickened and even die.

- Signs of poisoning are staggering, salivation, vomiting, and difficulty breathing.

How to protect your pet

- Don't let pets swim or drink from areas where the water is scummy or where toxins are known to exist.

- If pets swim in scummy water, rinse them off immediately with clean water. Do not let them lick the scum off their fur.

- If you think your pet might have been poisoned by blue-green algae or their toxins seek medical treatment right away.

DEVILS LAKE
WATER IMPROVEMENT DISTRICT
www.DLWID.org