

Blue-green Algae Blooms

Lake Wisconsin Alliance August 28, 2021

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Blue-green Algae = Cyanobacteria

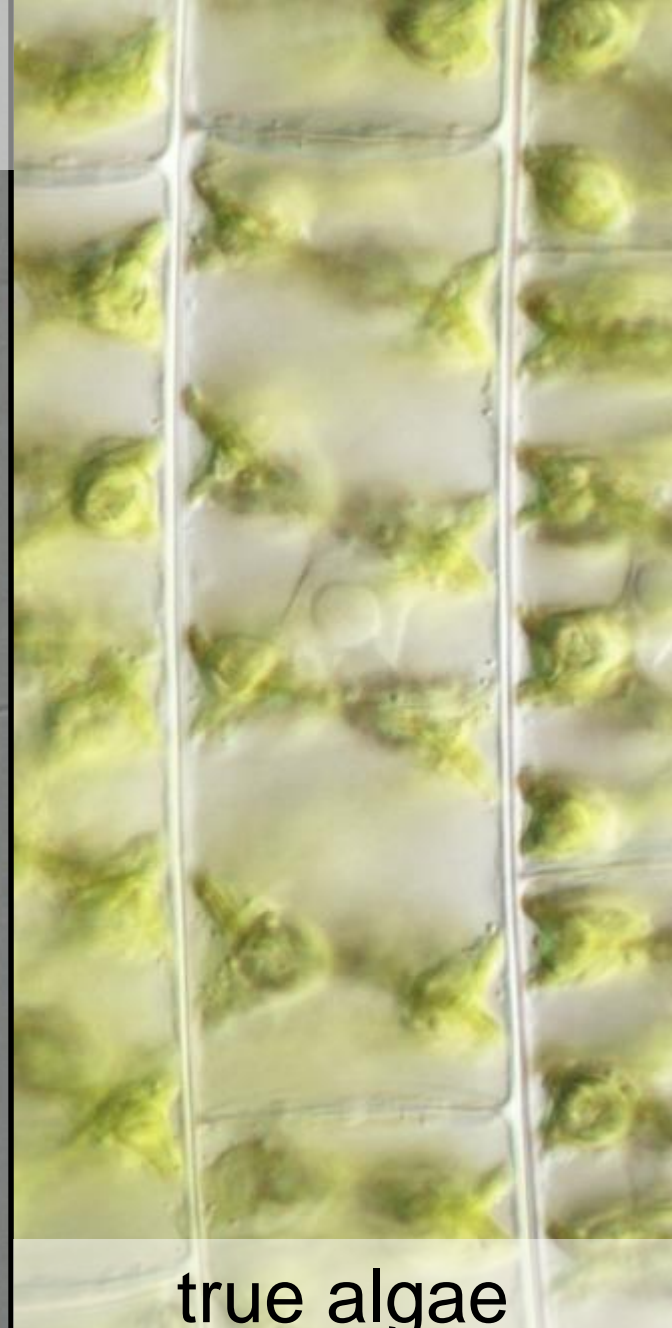


10 μm

cyanobacteria



cyanobacteria



true algae
(*Spirogyra*)

Blue-green Algae = Cyanobacteria
Planktonic = floating in the water

How can you tell if you are seeing
planktonic cyanobacteria?

Look for tiny green specks in
water or green “dust” on surface
- these are **cyanobacteria / blue-green algae.**

What is a bloom?

Bloom = excessive growth to nuisance levels.
Harmful Algal Blooms = HABs.
No official quantification exists.

Blooms: Planktonic

“pea soup”



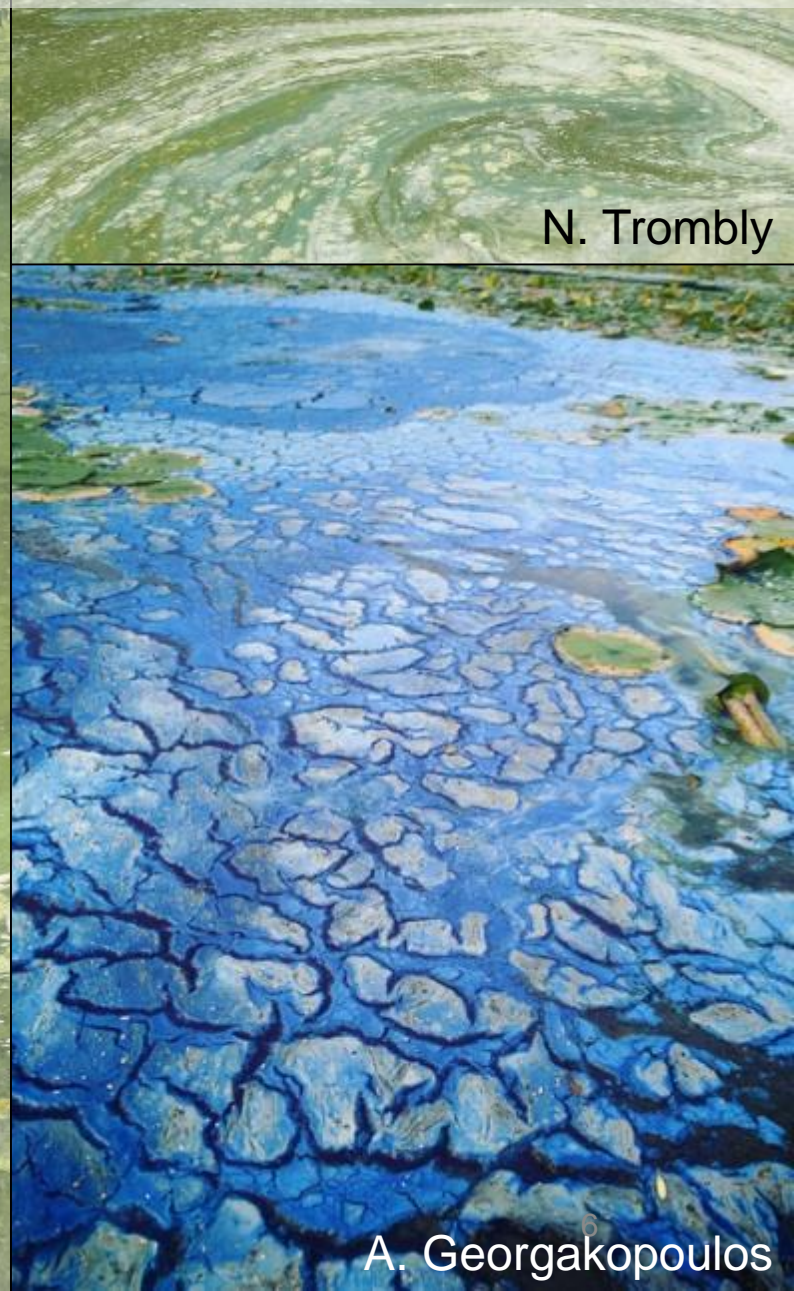
Blooms: Planktonic Scums (“spilled paint”)



J. Lepsch



T. Johnson



A. Georgakopoulos



N. Trombly

Blooms: Wind-driven Accumulations



UW SSEC and WisconsinView



S. Giblin

Wind can create highly localized bloom conditions, even in lakes with low nutrient levels.

Blooms: Floating Mats from the Lake Bottom



D. Blumer



S. Caven



E. Evensen



Blooms may be many different colors.

Unknown CLA Volunteer



R. McLennan



N. Trombly



T. Moris



DLSD



J. Williamson



WDHS



J. Williamson

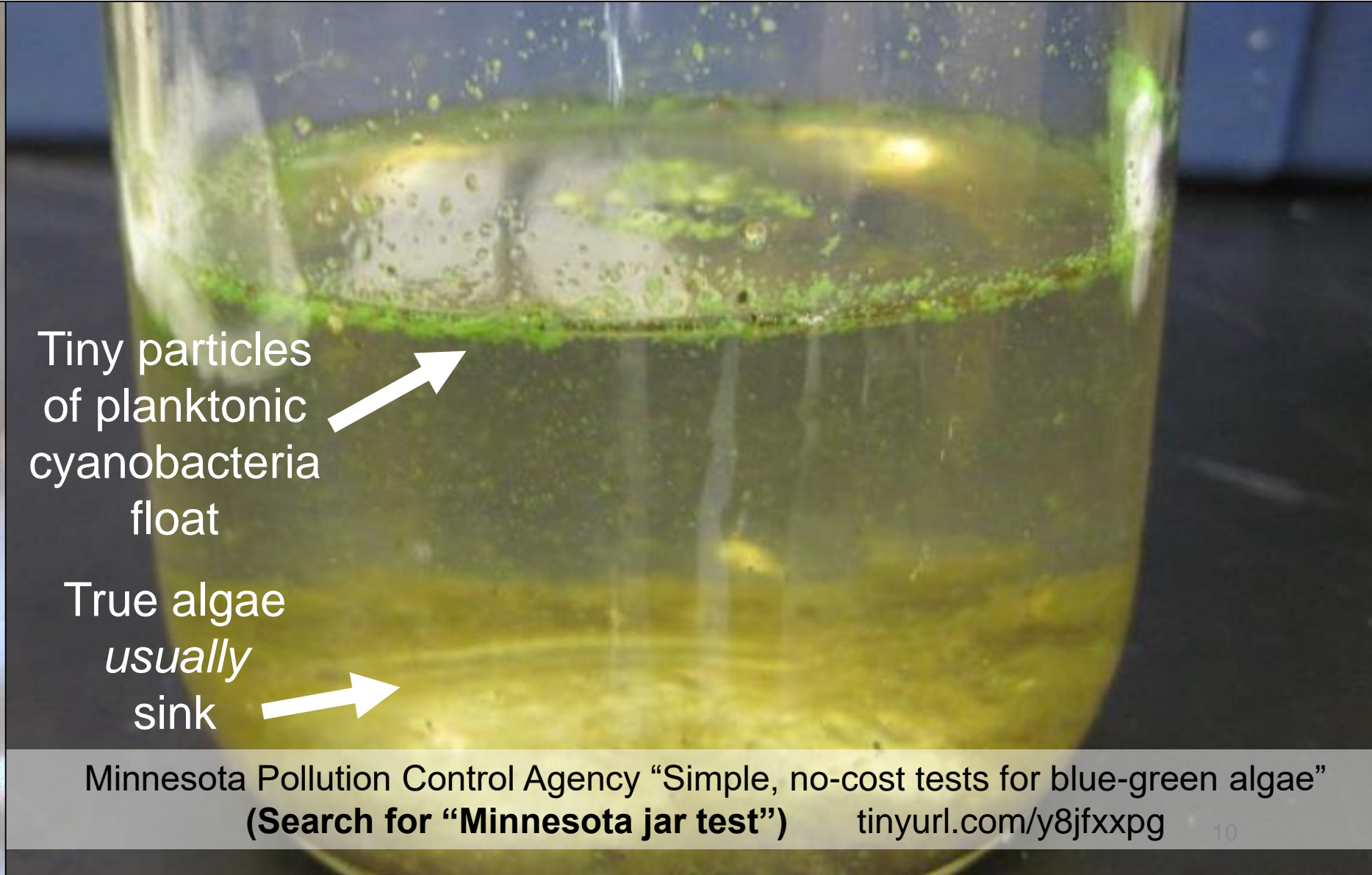
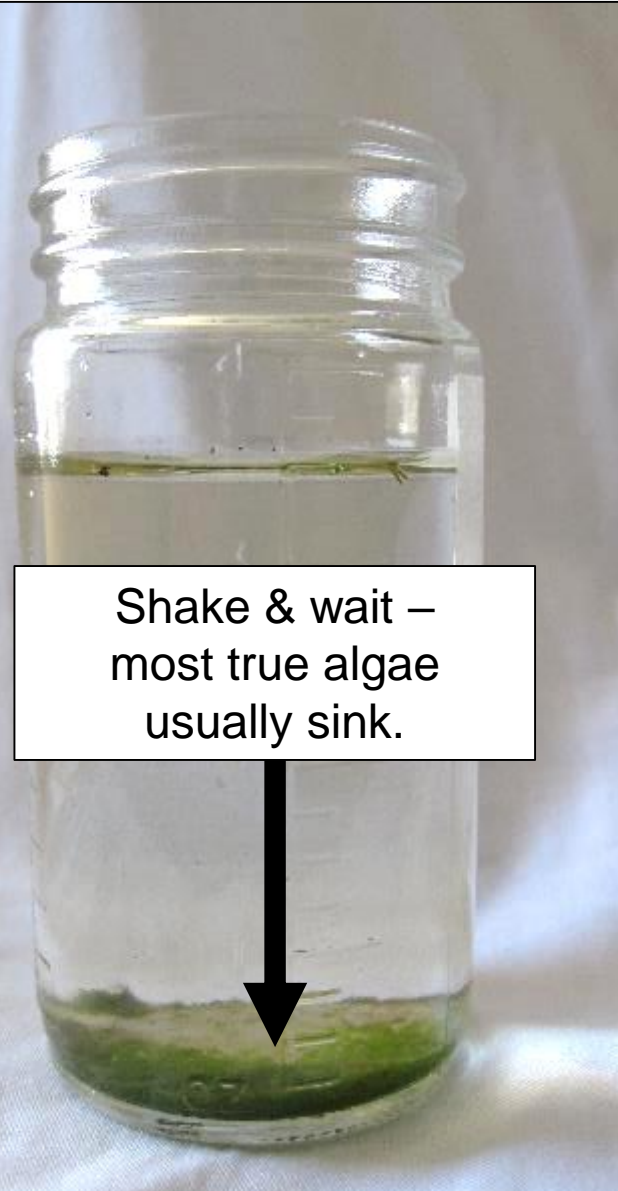


A. Dryja



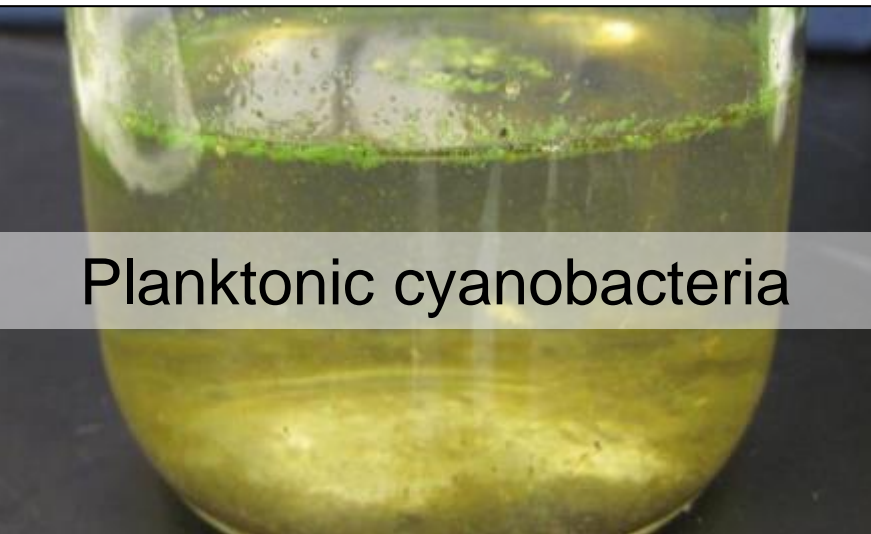
Finn Ryan, yaharaproject.org

How do I tell if it's planktonic cyanobacteria or something else? "Jar Test" – does it form a floating layer?

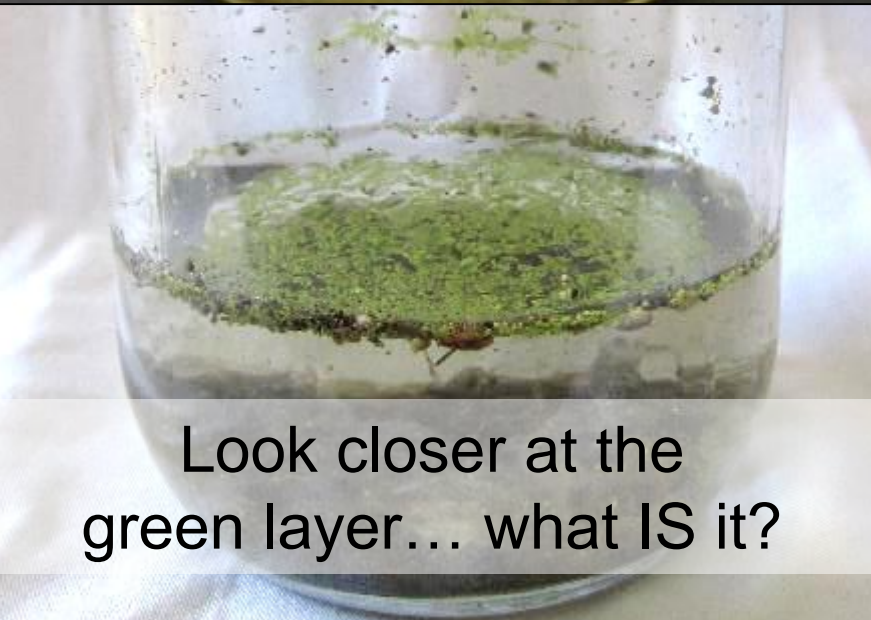


Minnesota Pollution Control Agency "Simple, no-cost tests for blue-green algae"
(Search for "Minnesota jar test") tinyurl.com/y8jfxp9g

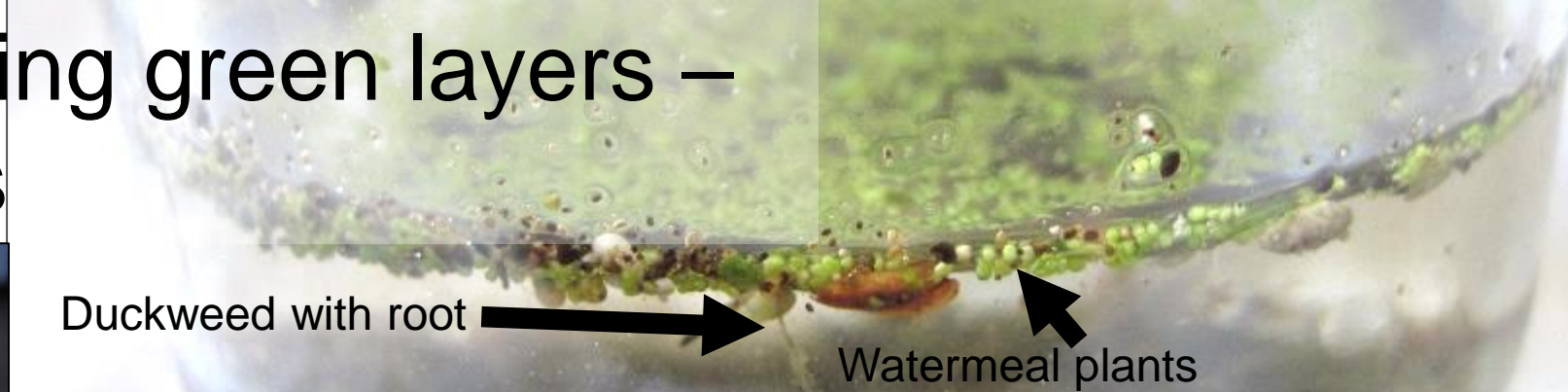
Look closely at floating green layers – some may be plants



Planktonic cyanobacteria



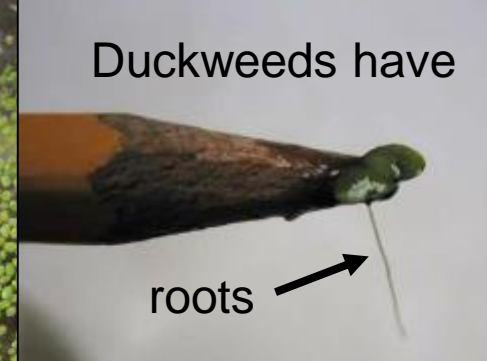
Look closer at the green layer... what IS it?



Duckweed with root

Watermeal plants

Floating green layer contains tiny leaf-green plants with regular outlines.



Duckweeds have

roots



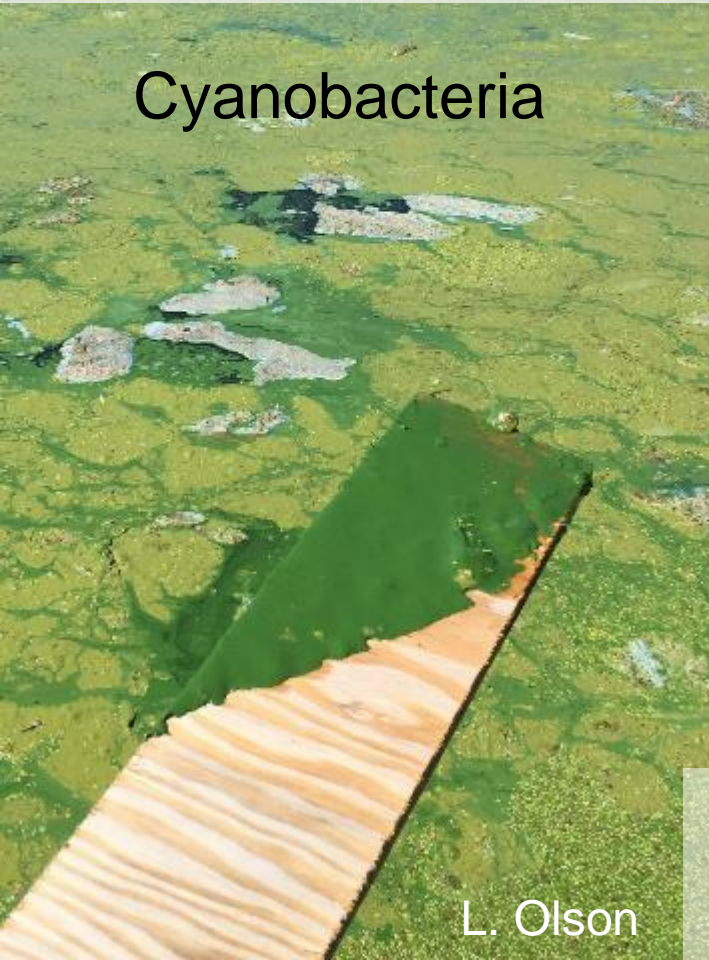
Watermeal plants

are oval

Wolffia (watermeal) is a tiny floating plant. A few duckweeds are present too.

How do I tell if I am seeing floating cyanobacteria mats or something else?

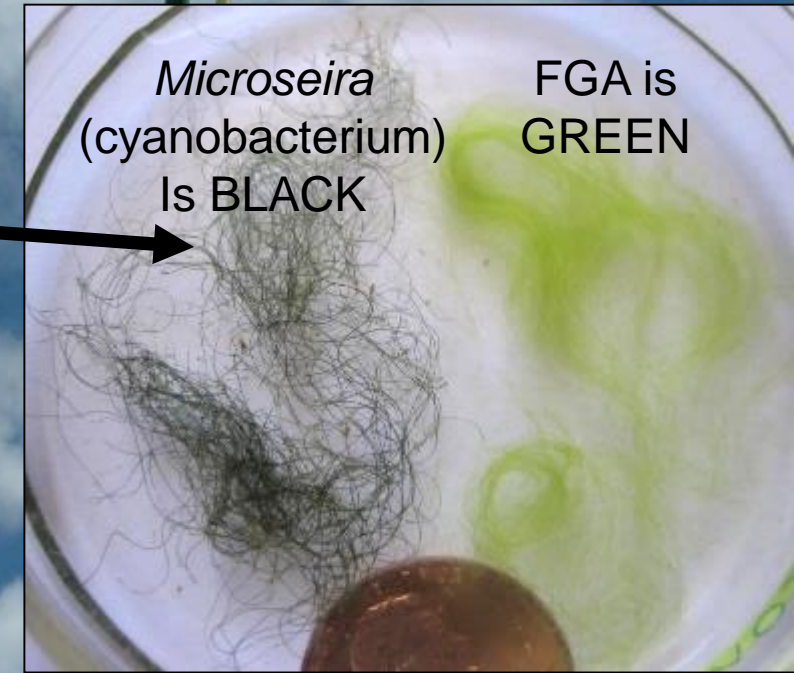
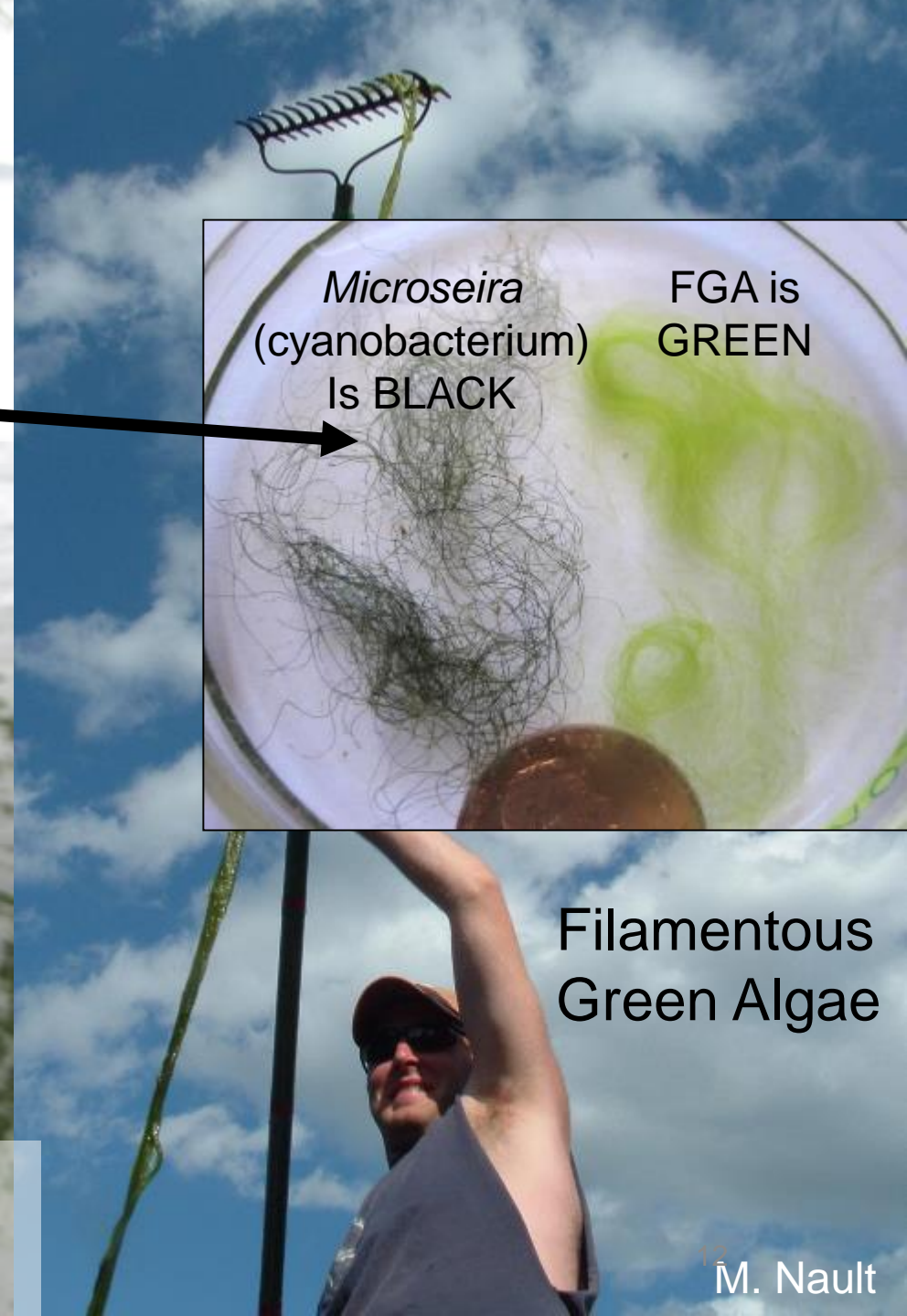
“Stick Test” – does it coat a stick like paint?
Does it drape over a stick like green hair?
(There is 1 exception, so look at color.)



L. Olson



Minnesota Pollution Control Agency
“Simple, no-cost tests for blue-green algae” tinyurl.com/y8jfxpg



M. Nault

What causes harmful blooms?

Generally,

- Excess nutrients (P & N) fertilize bloom growth.
 - Warm water and calm weather promote scums.
 - Shallow reservoirs and impoundments may be particularly vulnerable to blooms.
1. **Exact causes may be complex and specific to a water body.**
 2. **Blooms can grow in ANY waterbody because there are always *some* cyanobacteria in ALL waterbodies.**

What's Wisconsin doing to prevent HABs?

Nutrient reduction efforts.

Once nutrients like phosphorus get into a lake, they are very difficult to remove.

It's not just the DNR! Point source regulation and non-point BMPs are implemented through cooperation of:

Municipalities

Counties

Producers

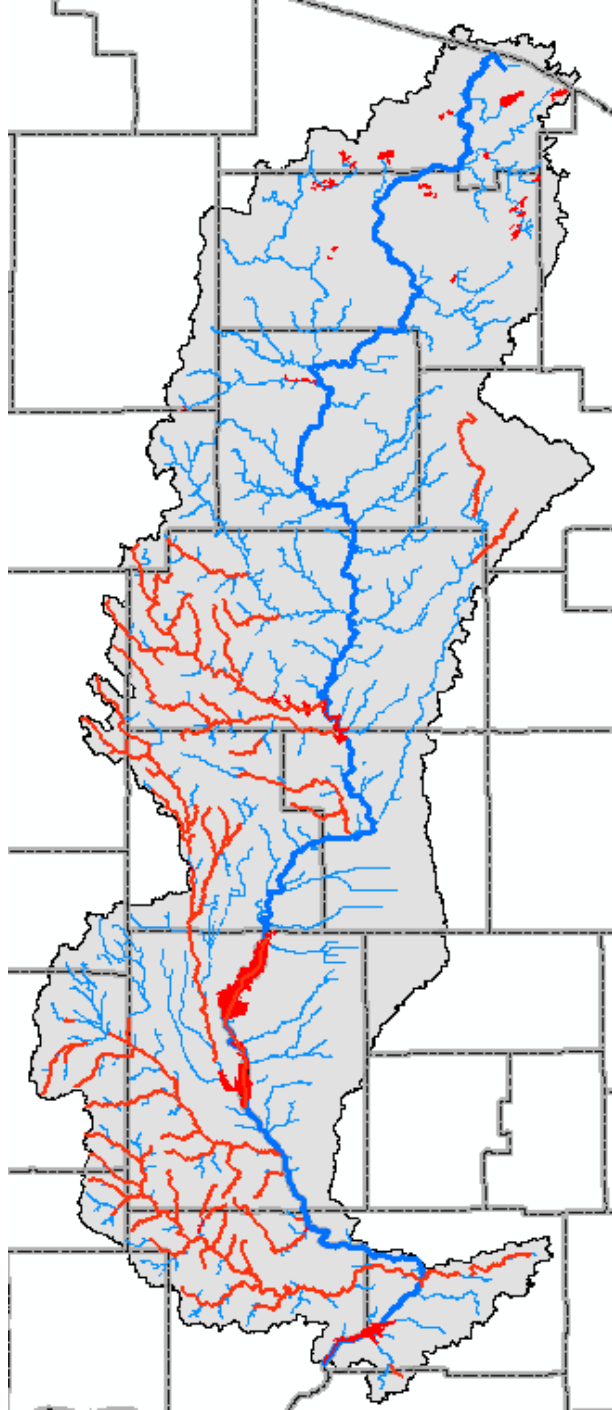
Land & Watershed Groups

UW-Extension

State & Federal Agencies

**Nutrient reduction efforts are not a “quick fix”
and it takes time to produce results.**

dnr.wi.gov/topic/SurfaceWater/nutrientstrategy.html



Phosphorus Impaired Waters (2016)

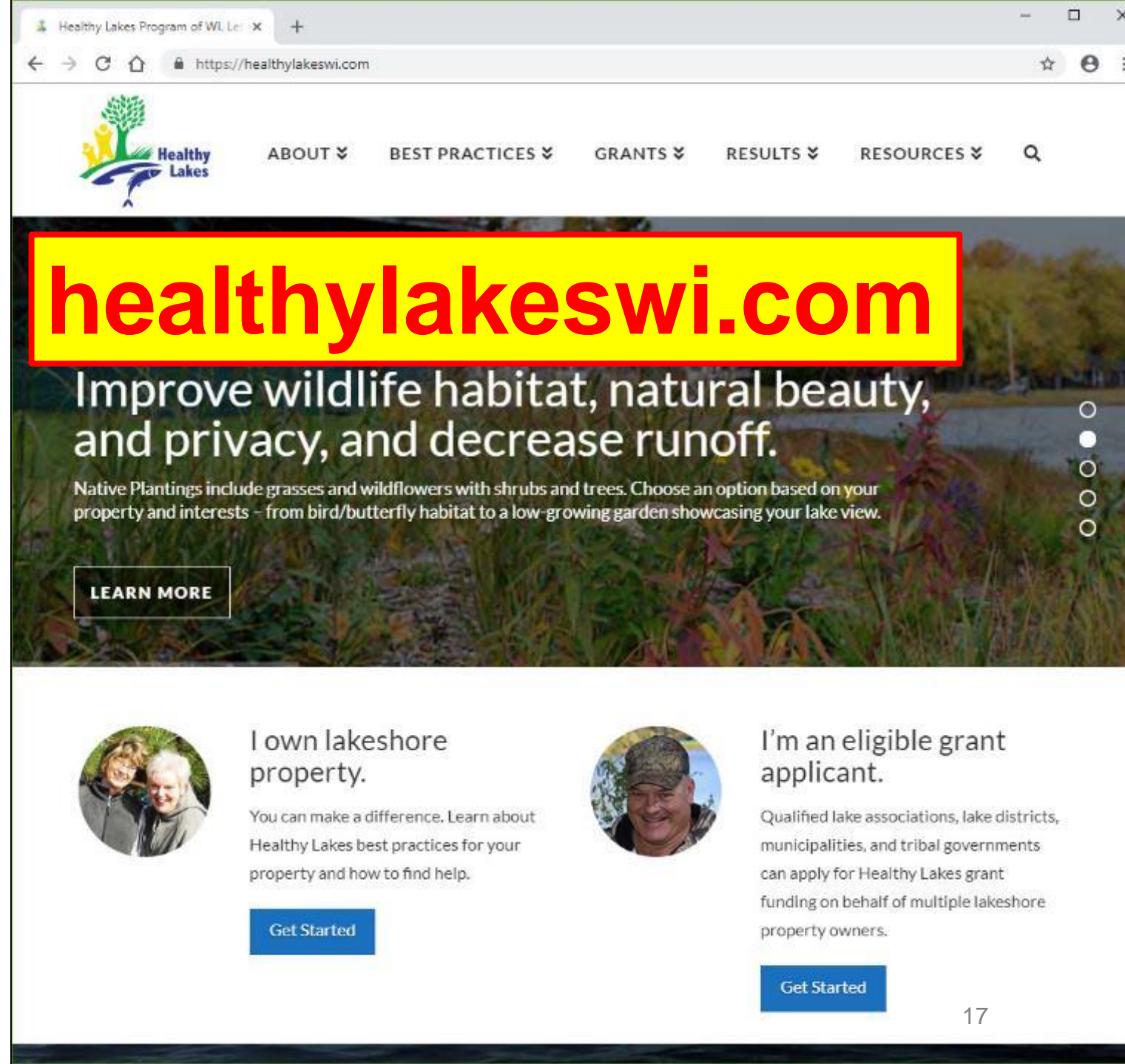
 110 streams/rivers segments

 38 lakes/reservoirs

Total Maximum Daily Load Projects (TMDLs) determine the amount of a pollutant a waterbody can receive and still meet water quality standards.

How can I help?

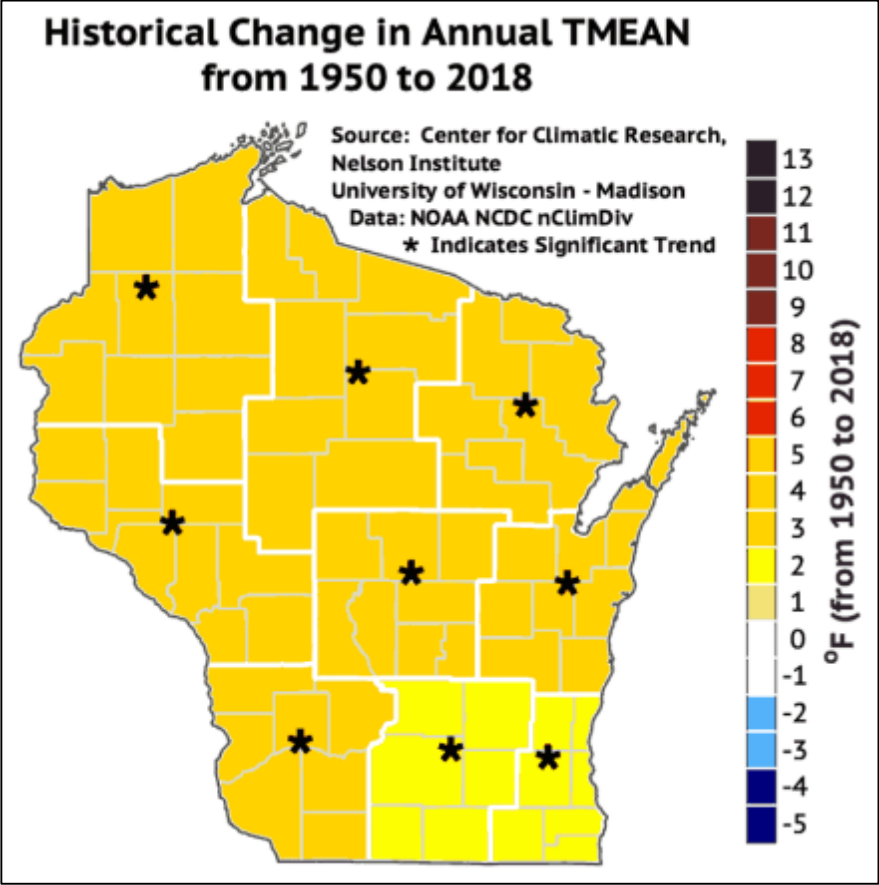
- Decrease runoff (& nutrients) into lakes.
- Inspect & maintain septic systems.
- Manage aquatic plants responsibly.
- Prevent the spread of aquatic invasive species.
- Keep leaves & yard waste out of streets.



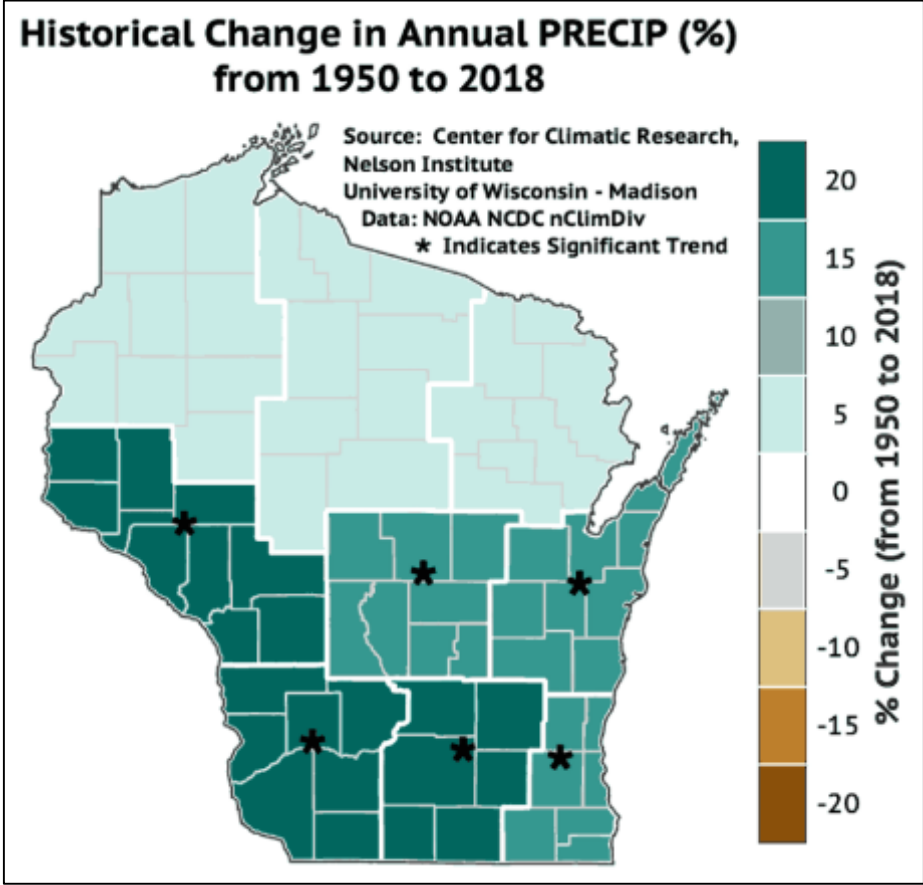
The screenshot shows the homepage of the Healthy Lakes Program website. At the top, there is a navigation menu with links for ABOUT, BEST PRACTICES, GRANTS, RESULTS, and RESOURCES, each with a dropdown arrow. A search icon is also present. The main banner features a large yellow box with the text "healthylakeswi.com" in red. Below this, the banner text reads: "Improve wildlife habitat, natural beauty, and privacy, and decrease runoff." and "Native Plantings include grasses and wildflowers with shrubs and trees. Choose an option based on your property and interests – from bird/butterfly habitat to a low-growing garden showcasing your lake view." A "LEARN MORE" button is located at the bottom of the banner. Below the banner, there are two columns of content. The left column features a circular photo of two elderly women and the text: "I own lakeshore property. You can make a difference. Learn about Healthy Lakes best practices for your property and how to find help." with a "Get Started" button. The right column features a circular photo of a man in a camouflage hat and the text: "I'm an eligible grant applicant. Qualified lake associations, lake districts, municipalities, and tribal governments can apply for Healthy Lakes grant funding on behalf of multiple lakeshore property owners." with a "Get Started" button.

Climate change in Wisconsin complicates HAB prevention.

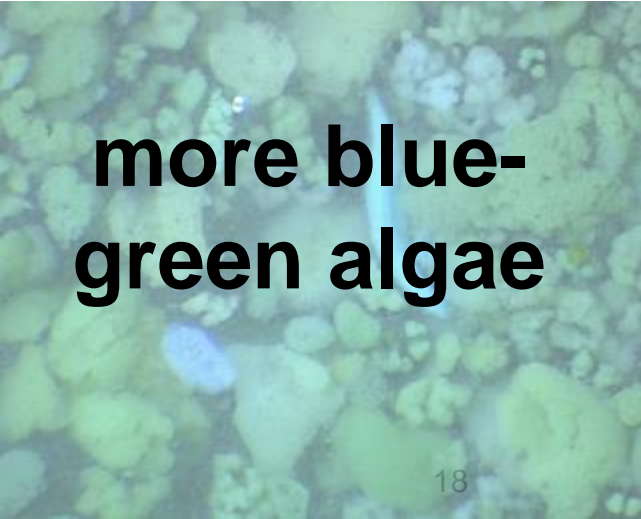
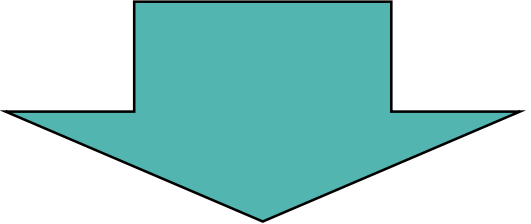
Average Annual Temperature



Average Annual Precipitation



warmer water,
more precipitation,
shorter ice duration /
longer growing season



Wisconsin Initiative on Climate Change Impacts wicci.wisc.edu

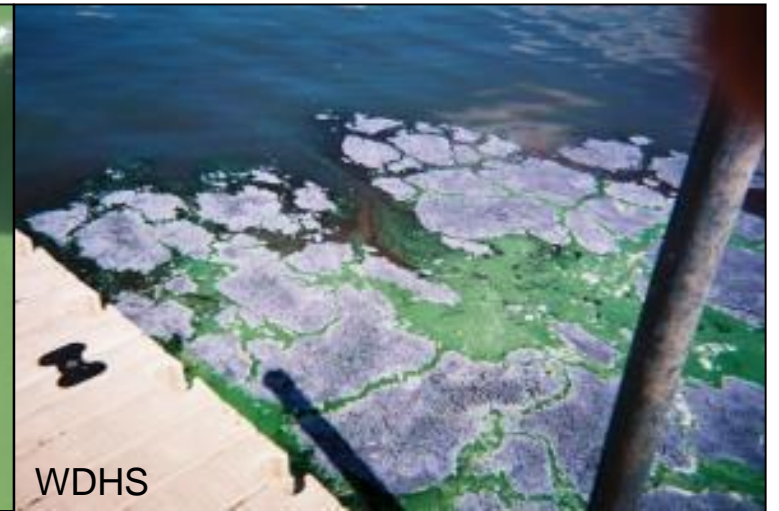
Wisconsin is becoming warmer and wetter.

* = significant trend from 1950 to 2018

The “harmful” part of harmful algal blooms

What We Know: Exposure Routes & Toxins

- **Ingestion, inhalation, skin exposure**
- Liver & kidney toxins, neurotoxins, dermatotoxins
- **Not all cyanobacteria make toxins, and toxins are not made all the time.**
- **You can't tell if toxins are present by looking at a bloom.**



Toxin Research: Fish Consumption

- Not all of the health risks from cyanotoxins in fish are currently known.
- Toxins may accumulate in organs, so only eat fillets.
- Rinse fillets well with clean water before cooking or freezing.
- Fish from waters with recurring blooms may have off-flavors from taste & odor compounds.
- Oregon Health Authority fact sheet:
<https://tinyurl.com/yywwbvdv>
(search for “Oregon Health fishing algae”)



How do public health agencies quantify risk?



US EPA Recreational Guidelines

Recreational Advisory Levels for Cyanotoxins	
Microcystins (MC)	Cylindrospermopsin (CYN)
8 µg/L	15 µg/L

Swimming Advisory: not to be exceeded on any day
(also dually proposed as Ambient Water Quality Criteria)

- Based on toxins' effects on liver & kidneys
- Take **children's** smaller size into account.
- Most public health agencies in Wisconsin do not monitor beaches for blue-green algae. Even in lakes that are monitored, blooms can change between the time of sampling and when testing results are available, so **it's important to assess conditions for yourself before swimming.**

How can you evaluate risk?



You can see the blooms that are of highest concern

Surface scums or opaque “pea soup” water indicate **possible high toxin concentrations** *if toxins are being produced.*



K. Welke



Chunks of material floating or growing on lake bottom



S. Caven



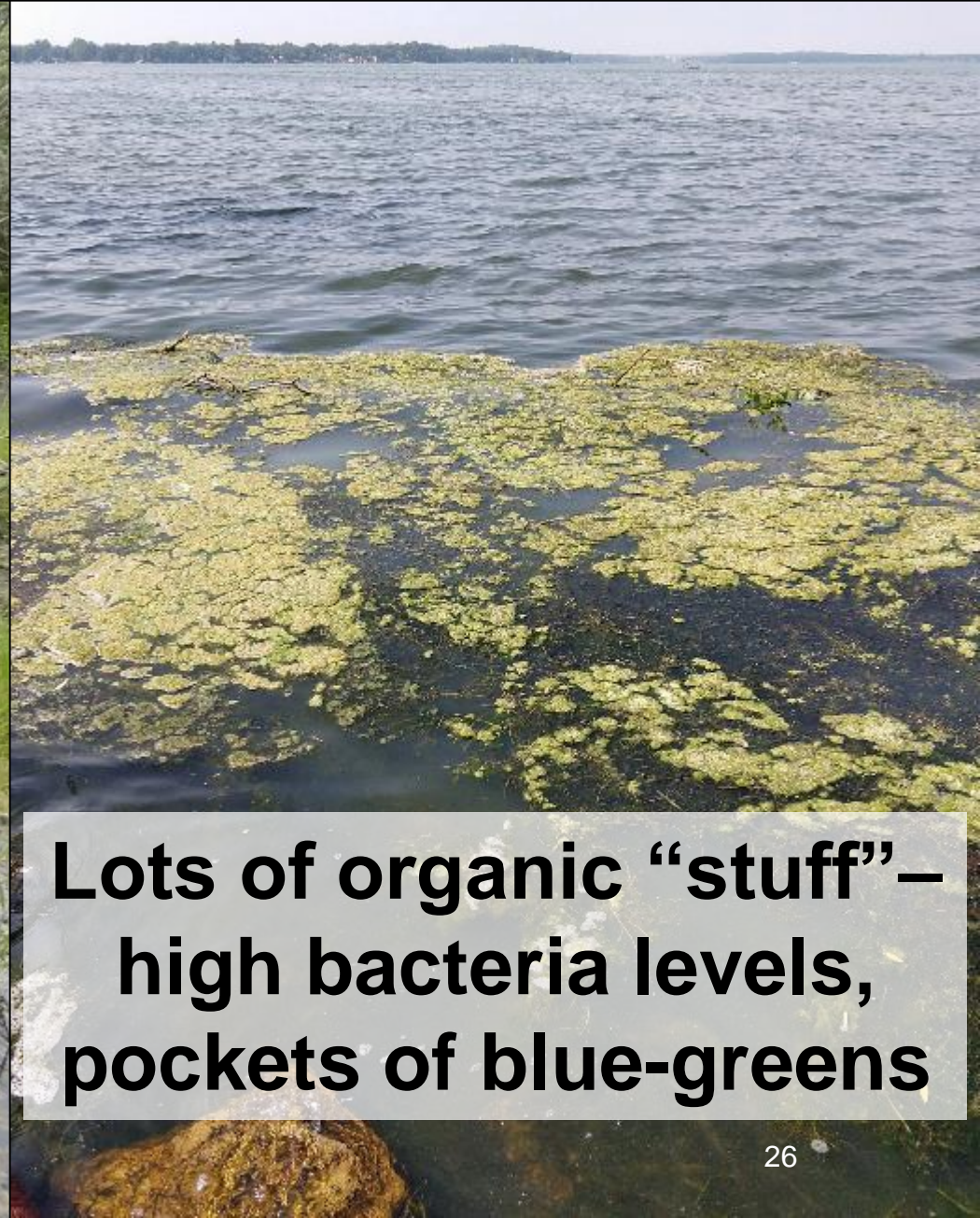
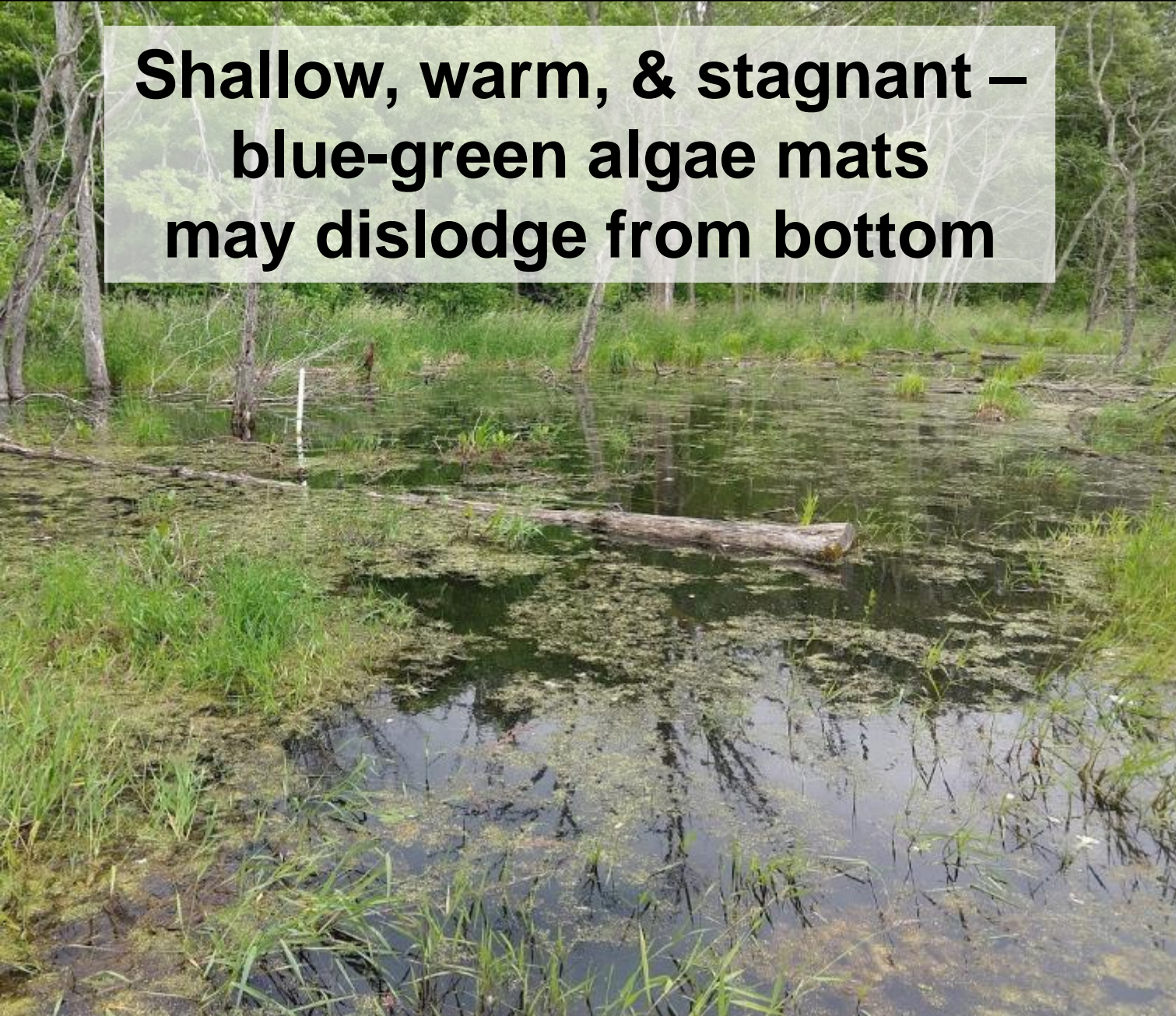
Fine dust on surface

Water is never 100% safe – other bacteria, viruses, and parasites may be present.

Judgement calls?

Not recommended for swimming

**Shallow, warm, & stagnant –
blue-green algae mats
may dislodge from bottom**



**Lots of organic “stuff” –
high bacteria levels,
pockets of blue-greens**

How can I stay safe?

- Avoid swimming in and boating through blue-green algal scums and “pea soup” water.
- **Can you see your feet in knee-deep water?** If not, choose a better place to swim.
- Choose the **clearest** water possible for small children and pets. **Avoid swimming in shallow, warm, stagnant water bodies.**
- Always **shower** after swimming in a lake, river, or pond.
- **Try to avoid swallowing water**, no matter how clean it looks (especially after a rainstorm!)



K. Schreiber, WDNR



**When in doubt,
keep out!**

What conditions are safer for dogs?



Choose the clearest water possible, in non-stagnant areas. How much “stuff” is in water? Would YOU want that water in your mouth? If not, find a better place for your dog to swim.

Keep your pets safe!

Water intoxication and **heat stroke** share symptoms with cyanotoxin poisoning.

Give your dog **frequent breaks** from playing in water.

Use **flat objects for retrieval** to minimize water ingestion.

Provide access to **shade and clean drinking water**.

Do your dogs or cats eat grass? **Don't use lake water to irrigate your lawn during a bloom.**



PetMD.com

The screenshot shows the Wisconsin Department of Natural Resources website. The main heading is "BLUE-GREEN ALGAE". Underneath, there is a "REPORT A BLOOM" section with instructions: "Report significant blue-green algae blooms to DNRHABS@wisconsin.gov. Please include the location of the bloom, the name of the water body, nearest town, county, the size and duration of the bloom, and several well-lit close-up photographs for verification. DNR is unable to test all reported blooms." Below this is a section on "Swimming advisory levels" developed by the United States Environmental Protection Agency. To the right is a "Related Links" sidebar with links to "Home", "Lakes Topics A-Z", "Lake Maps", and "Lake Water Quality Data". At the bottom, there is a "BLUE-GREEN ALGAE CONTACTS" section with a video player and a list of instructions: "If you think you are experiencing symptoms related to exposure to blue-green algae (e.g., stomach cramps, diarrhea, vomiting, headache, fever, muscle weakness, difficulty breathing), contact your doctor or the Wisconsin Poison Center (800) 222-1222 right away.", "If your pet displays symptoms such as seizures, vomiting, or diarrhea after contact with surface water, contact your veterinarian right away.", and "To report a case with potential health effects caused by blue-green algae, visit the [Department of Health Services](http://Department of Health Services.wisconsin.gov) or contact the Bureau of Environmental and Occupational Health at (608) 266-1122." There are also navigation tabs for "Home and Afloat", "Drinking Water", "Recreation", "Protect Yourself", and "Resources".

dnr.wi.gov
Search for “algae”

You can report significant blooms to DNRHABS@wisconsin.gov

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