

World Health Organization

- **Cyanobacterial Toxins**
- Cyanobacteria or blue-green algae occur worldwide especially in calm, nutrient-rich waters.
- Some species of cyanobacteria produce toxins that affect animals and humans. People may be exposed to cyanobacterial toxins by drinking or bathing in contaminated water.

Washington Post

The toxin that shut off Toledo's water? The feds don't make you test for it.

August 11, 2014

- There are no national standards for algal cyanotoxin in drinking water. U.S. utilities don't need to test for it. How widespread the toxin is in drinking water is a mystery. Monitoring is voluntary. ...The U.S. Environmental Protection Agency for years has discussed drafting rules to cover cyanotoxins but hasn't acted.
- And with these algal blooms predicted to worsen in Lake Erie and other lakes and reservoirs — thanks to a mix of **global warming, invasive species and pollution** — the issue is expected to pop up more often. Some believe Toledo could be a tipping point.

Toledo Ohio water intake surrounded by algae, Aug 3, 2014
2.5 miles from shore of Lake Erie





Blooms Like It Hot
Hans W. Paerl, *et al.*
Science **320**, 57 (2008);
DOI: 10.1126/science.1155398

CLIMATE

Blooms Like It Hot

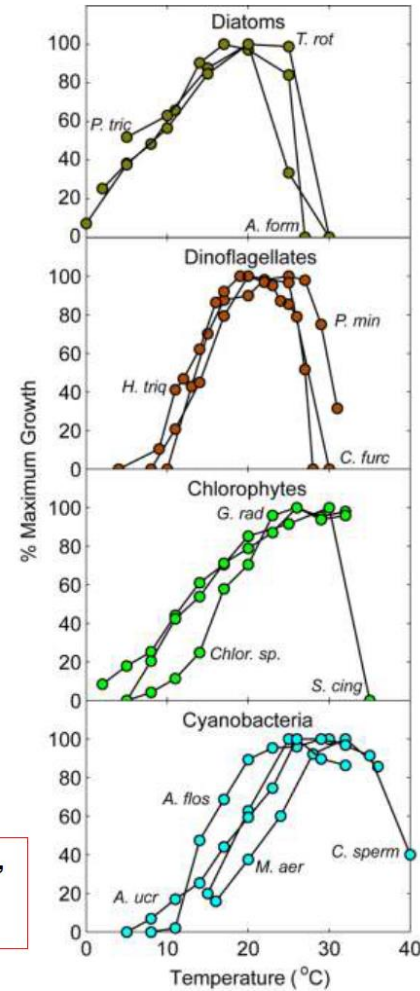
Hans W. Paerl¹ and Jef Huisman²

A link exists between global warming and the worldwide proliferation of harmful cyanobacterial blooms.

The link to CyanoHABs..... Temperature affects growth rates



References: Kraweik 1982, Grzebyk & Berland 1996; Kudo et al., 2000, Litaker et al., 2002, Briand et al., 2004, Butterwick et al., 2005, Yamamoto & Nakahara 2005, Reynolds 2006



Iowa Beach Closings - Cyanobacteria

Year	Number of Microcystin Advisories
2014	22
2013	24
2012	14
2011	7
2010	2

- The Iowa DNR only collects samples and run the advisory until Labor Day.
- Rain late in the season saved 2014 from having higher numbers.
- Locations are roughly the same each year, although L. Darling got a late start due to construction and Brushy Creek didn't have water due to restoration.

Effects of rainfall patterns on toxic cyanobacterial blooms in a changing climate: between simplistic scenarios and complex dynamics.

[Reichwaldt ES](#)¹, [Ghadouani A](#).

- This review ...identifies mechanisms that influence ... toxic cyanobacterial blooms. ...
- Such changes in the rainfall patterns will lead to favourable conditions for cyanobacterial growth due to a **greater nutrient input into waterbodies during heavy rainfall events**, combined with potentially longer periods of **high evaporation and stratification**.

Analysis of Monthly Waste Water ByPass information from Iowa DNR – April 2009 to October 2013

- Heavy rains and saturated conditions overwhelmed collection system and treatment plant
- Summary data being sought