

8-22-14 Micro, Mega and Everything in the Middle

My primary care physician is an infectious disease specialist. I've stayed with him ever since my first case of Lyme disease. It takes a special person to love researching and responding to problematic things you usually can't see. We can barely see and often miss the tiny nymph deer tick but it is possible. He gets really excited as he politely asks for your permission to swab your nose when you have a sinus infection. He wants to know what you have; not just guess. I respect that. It is good science.

Well, you should have seen him the day I told showed him my little poster on Beach Closed Due to Harmful Algae Blooms about six years ago. I wanted his feedback but I did not know he would run out of the room, saying, "I'll be right back. I have to show you something!" He returned with information on a species of marine algae causing amnesia when it enters the eyes through aerosolized water, such as during water skiing. He was proud of me for closing the beaches for the blue green algae, or cyanobacteria, in the Monponsett Ponds, for he knew it was the right thing to do. Little did I know that six years later we would still be closing beaches.

My doctor's example of amnesia from algae seemed quite exotic at the time and I had enough to worry about locally. Little did I know how related these examples were and that six years later I would still be learning about algae and Harmful Algal Blooms, or, HABs, as the scientists call them.

These HABs are habitual now and the same reasons are listed over and over again, stagnation, warmer water, climate change, nutrient loading from run off, agriculture (and aquaculture), sewerage from both cities and small onsite septic systems, and impediments to flow, such as dams; many from the industrial revolution.

While we might have benefited from our corn being ground by a stone wheel hundreds of years ago, at least water kept running through. And we might have needed those shovels and shoes and everything else that was manufactured in a faster way for a fast growing country, powered by our streams and rivers turning wheels. But in 1964 a dam was built for an emergency. It reads, "...it is hereby declared to be an emergency law, necessary for the immediate preservation of the public convenience." Brockton needed water, so legislation was passed and a dam was built. Fifty years later we are paying a huge cost.

Those costs incurred are not only financial. The city of Brockton maintains a treatment plant for the water it diverts from the Monponsett Ponds to Silver Lake. The algal blooms must be resulting in extra filtering and treatment costs. The City of Brockton leases a desalination plant but rarely uses it. It was recently used when East Bridgewater needed water. Most of the time, though, all that water just runs through the plant to keep the plumbing in working order and then it is dumped into a river. What a waste! Water was held back and taken from one watershed, treated and then dumped into another watershed, without even being used. The polite, political and cover-up scientific sounding euphemism is "modified hydrology".

When water is allowed to stagnate, natural flushing is prevented and natural flow to streams and wetlands dependent on seasonal flow also stagnate instead of flourishing.

While we work on repairing septic systems, work with agricultural enterprises and seek funds for improving catch basin filtering and low impact methods of improving run off from impervious surfaces, we are still left with that dam and that damn stagnation.

To gain a better understanding of the complexity of the costs incurred and how widespread it is and why it is imperative to do all we can, read what scientists have gathered at "National Office for Harmful Algal Blooms" (Doesn't that title tell you something?) written by

our Cape Cod neighbors at the Woods Hole Oceanographic Institution. There, you can read about all kinds of algae and how dangerous they can be. The list of costs/problems associated with HABs (both marine and fresh waters) includes human health, wildlife, ecosystems, socioeconomic, and more. Here are just a few examples and quotes:

Paralytic shellfish poisoning, example: In 1990 six fishermen almost died from eating mussels during a fishing trip on Georges Bank. As the toxins can remain in the shellfish for years and it is not feasible to monitor the area, clam harvesting has been banned from the area ever since.

Amnesic Shellfish Poisoning (ASP) can be a life-threatening syndrome. There was a case on Prince Edward Island in 1987 when four people died after consuming toxic mussels. The water is tested ever since for this algae and its toxin.

Fresh water: According to the Woods Hole site, "Problems related to freshwater/ inland HABs are widespread and have become more prevalent in recent decades. For example, toxic cyanobacterial outbreaks seem to be expanding and occurring more frequently globally and in U.S. waters, with increasing reports of harmful species emerging in areas not having problems in the recent past, such as the cyanobacteria *Cylindrospermopsis* in eutrophic lakes in Florida and in Chesapeake Bay tributaries in Maryland. In addition, cyanobacteria-produced toxins and taste-and-odor compounds are becoming more of a problem in drinking water reservoirs, and off-flavor compounds have become particularly problematic in aquaculture operations."

"Harmful cyanobacteria blooms are potential public health threats in nearly every state in the U.S. due to their presence in drinking and recreational waters. The extent of this threat is not well known. Exposure to these toxins can cause an array of adverse health effects ranging from rashes and allergies to devastating liver damage in susceptible populations. The public health threat is potentially intensified when standard water treatment technologies do not effectively remove these toxins. In some cases, water treatment can exacerbate the problem rather than alleviate it. For example, the use of copper sulfate as an agent to control a bloom may, in fact, disrupt cells and release toxins into the water. However, it is not known how often toxin-producing blooms occur in drinking water sources and publicly accessible ponds, or if most standard drinking water treatments reduce toxin concentrations sufficiently to protect public health. It is also unclear whether the public is being routinely exposed to very low levels of these toxins in drinking or recreational waters or what the long-term impact of these exposures might be. For these reasons and because cyanobacterial toxins are extremely potent, the U.S. Environmental Protection Agency (EPA) has included cyanobacteria and cyanobacterial toxins on their Contaminant Candidates List."

I urge you to gain a better understanding of the seriousness and the immediacy of the rapid spread of algae and its complex impacts by visiting the Woods Hole site. I thank the National Oceanic and Atmospheric Administration Center for Sponsored Coastal Ocean Research Coastal Ocean Program (NOAA/CSCOR/COP) for their grant to the National Office for Harmful Algal Blooms at Woods Hole Oceanographic Institution, Directed by Dr. Don Anderson.

Learn more; live better.

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