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BGA BACKGROUND:

For many years throughout the summer, Tulsa District Operations Division staff have received reports of lake visitors coming down with rashes, gastrointestinal discomfort, and upper respiratory infections after swimming in various Tulsa District lakes. Until the late 1990's we in Operations Division took that a general conclusion that swimming in untreated water exposes you to all kinds of nasty critters.

In 1998, Tulsa District experienced three fatal cases of Primary Amoebic Meningitis (PAM) in small children who had been splashing in warm, shallow water in Corps lakes in Oklahoma. PAM is a real nasty disease caused by a ubiquitous (it's everywhere) fresh water amoeba that can get into the human brain by forceful inhalation of water through the nose. Once infected it is almost always fatal.

As we studied the disease we found that Texas had experienced cases of PAM for several years prior to the Oklahoma infections. Last summer the State of Kansas experienced its first known case of PAM. Until the cases of PAM occurred, we really hadn't taken a close look at water quality issues other than looking at the impacts of seeping oil wells in some lakes, conducting watershed studies, and doing routine base-line water quality studies on Tulsa District Lakes on a multi-year cycle as well as annual swimming beach sampling.

We have always known that BGA is responsible for taste and odor problems in lake water but we had not tied it to the reports of rashes and illness until 2003 when Marion Lake in Kansas experienced a huge BGA bloom that at times almost completely covered the 6,000 acre lake with a pea green soup. See photo below.

There are two local communities that withdraw water out of Marion Lake. Due to the repetitive nature of the blooms they have had to upgrade their treatment

plants to remove the algae and, as we have found out, toxins produced by some BGA. Some toxin producing BGA are surface floaters while others are submerged. All BGA can cause skin rashes and some produce specific toxins that can affect human and animal internal organs and nervous systems. Due to an aggressive public information and signage program, reports of skin rashes and illness from BGA exposure to Marion Lake visitors have been held to a minimum but over the years several family dogs have died after swimming in the Lake during BGA blooms.

Summer 2011 Experience

The summer of 2011, huge blooms (explosive growth) of Blue-Green Algae (BGA) were confirmed in seven Tulsa District lakes in Oklahoma as well as in Grand Lake, operated by the State of Oklahoma. Grand Lake of the Cherokees, in northeast Oklahoma, is Oklahoma's largest lake with approximately 1,300 miles of shoreline.

In early spring 2011, Oklahoma Senator Jim Inhofe was hospitalized with an upper respiratory infection soon after swimming in pea green colored water in Grand Lake. The Grand River Dam Authority immediately began testing lake water and with Tulsa District assistance identified BGA as the culprit. Tulsa District was already experiencing the Marion Lake annual BGA bloom as well as a bloom in Big Hill Lake in Kansas. Within a month, five COE lakes in Oklahoma were experiencing major blooms with many reports from the public of skin rashes, hospitalizations, etc. The Oklahoma State Health Department received so many reports of possible BGA related skin rashes and illness that the Oklahoma State Epidemiologist began tracking reports of possible BGA associated public health problems.

Response to BGA issues

It took The State of Kansas a few years to fully accept that BGA blooms are a fact of life and that large blooms create a number of public safety issues. Within the last year Kansas has developed a BGA policy that adopted the World Health Organization (WHO) "Guidelines for Safe Recreational Water Environments" that uses cell counts of toxin producing BGA to recommend specific actions, from issuing Health Advisories and Warnings, to lake closures. During the summer of 2011, the Kansas Department of Health and Environment closed several lakes to any form of water based recreation including Milford Lake, a Kansas City District lake. Due to the lack of such a policy in Oklahoma and Texas, and the fact that there are eight Tulsa District lakes in Kansas, Tulsa District adopted the general framework of the Kansas "KDHE Agency Response Plan" for BGA.

Tulsa District is fortunate in that we have two full time Limnologists (Scientists who study Inland waters) on staff. Last summer they reviewed water quality data collected over a number of years by the University of Oklahoma Biological Research Station on Lake Texoma in support of the Oklahoma Department of Wildlife Conservations studies of Golden Algae blooms on the lake. Golden Algae release toxins that can kill fish. Many of the parameters analyzed for the Golden Algae are general indicators of different types of algae, including Blue-Green Algae. It became apparent that Texoma has more than likely been experiencing high levels of BGA for several years.

Subsequent sampling confirmed high levels of toxin producing BGA in Lake Texoma and due to high cell counts of specific toxin producing BGA, in accordance with the Kansas Plan, using WHO Criteria; a Lake-wide WARNING was issued. The warning prohibits all forms of water contact. The most recent sampling (January 2012) showed BGA levels remain at the ADVISORY Level which discourages water contact. Local interest groups are asking why Tulsa District is being so hard-nosed about BGA and Fort Worth District (and by extension) Little Rock District are silent on the issue.

Implications for others

My point for bringing this up is to provide Corps Districts that have not experienced BGA problems a general awareness of an issue that is impacting COE Districts throughout the nation. Have reports been received from lake visitors over the years of similar symptoms described above? It is very possible that Lake visitors are experiencing many of the symptoms of BGA blooms described above but not to the extent that other Districts are experiencing it or that symptoms simply haven't been connected to BGA.