LAKE OKEECHOBEE PHYTOPLANKTON BLOOM MONITORING PROJECT

Mandate: Comprehensive Everglades Restoration Plan (CERP)
Lake Okeechobee Watershed Protection Program (LOWPP)

Background:

What is an algal bloom? An algal bloom is a dense growth of microscopic algae that results in water that looks green, may have a floating scum, and may have a distinct musty odor.

Why are we concerned about algal blooms? Algal blooms can cause problems with taste and odor of drinking water, they can contribute to the formation of carcinogenic chemicals in that water upon chlorination, and they sometimes can produce toxins that kill or cause disease in fish, wildlife, and domestic animals if they drink the water.

What is being done to prevent algal blooms? A large number of ongoing and planned projects in the Lake Okeechobee Protection Program aim to dramatically reduce inputs of nutrients to the lake; a main goal of this nutrient reduction is to reduce occurrence of algal blooms in the lake water.

Project Overview:

Algal blooms represent a significant risk to the Lake Okeechobee ecosystem and the human population that depends on this water resource for drinking water, recreation, fishing, and other uses. Algal blooms occur in a lake when high concentrations of nutrients enter the water and stimulate the growth of microscopic algal cells that naturally occur there. Their growth becomes much more rapid than normal, and under the right conditions (for example, warm water and high sunlight) these algae can reach such high levels that the water turns bright green, and sometimes a floating scum occurs on the water surface. The blooms are caused by a particular type of algae called blue-green algae, or cyanobacteria. Algal blooms can cause problems with taste and odor in drinking water, they can contribute to the formation of carcinogenic substances (trihalomethanes) in drinking water when it undergoes chlorination, and at times, they can produce toxins that can cause liver and neurological disease in animals and humans that drink or come into contact with the water. Blooms also can cause skin irritations, they can kill fish and other animals in the lake, and their appearance and odor can impair the recreational value of the lake.

The Lake Okeechobee Protection Program is implementing a number of projects in the watershed to reduce the input of nutrients to the lake. One of the main goals of this program is to substantially reduce the occurrence of algal blooms in the lake; blooms now are relatively common, especially in the summer months. The Lake Okeechobee Division at the South Florida

Water Management District is carrying out a monthly program to monitor the location and intensity of these algal blooms. This is a long-term program, designed to gather baseline data and then to identify trends in the occurrence of blooms in the lake as nutrient inputs are reduced. In other words, it is a program to assess both the present health of the lake, from the perspective of algal blooms, and our success in improving lake health in the long run.

We monitor algal blooms by collecting samples of surface water at 9 locations around the lake shore where this problem historically has been most severe. The sampling locations include sites where there is a high level of recreational use of the lake, and sites near major drinking water intake structures (Fig. 1). If there is a visible scum of algae on the water surface, digital photographs are taken and posted on this web site, along with information regarding the date and location of the surface blooms. Water samples are analyzed for nutrient (nitrogen and phosphorus) concentrations, and the concentration of chlorophyll, a plant pigment that provides a good rapid indicator of whether or not blooms are present. Chlorophyll values measured in the lake typically range from below 10 to above 100 parts per billion (ppb). Concentrations higher than 40 ppb are considered to represent a moderate bloom; the water at this level has a distinct green color. Concentrations higher than 60 ppb are considered to represent a severe bloom; the water at this level is heavily loaded with algae, surface scum may be present, and there may be a detectable odor.

In May of 2004, the District also began sampling for toxins, specifically Microcystin (a common toxin in the lake since the 1980's), along with algal bloom sampling in an effort to provide a more comprehensive database to keep track of the ecological health of the lake. Currently there are no state or federal guidelines for the level of toxicity and risk for lake systems but the World Health Organization suggests 1.0 microgram per liter for drinking water.

Bloom Monitoring Stations

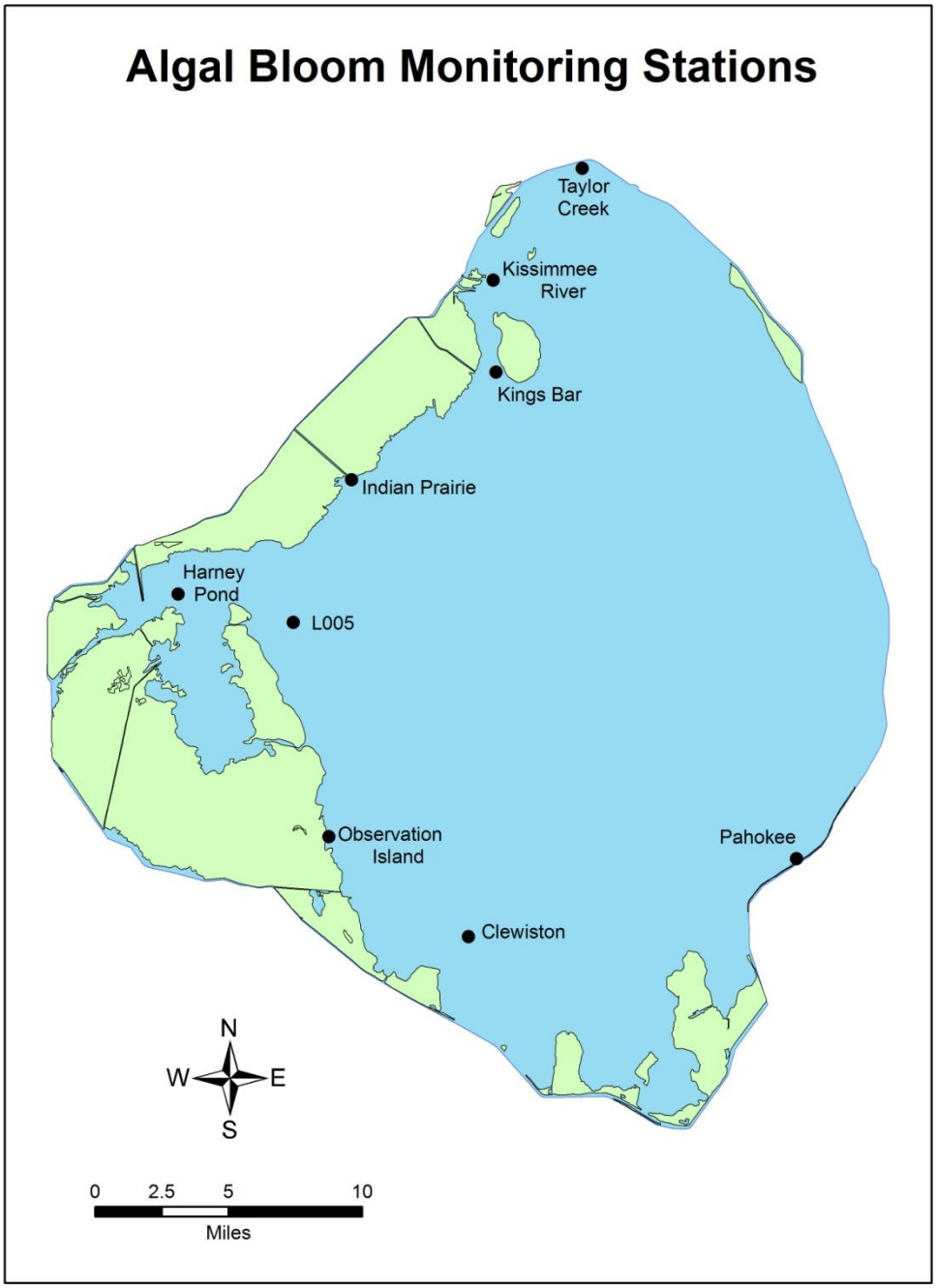

Figure 1. Monthly sampling locations for chlorophyll *a* and microcystin toxins.

How You Can Help

The South Florida Water Management District is aware that sport fishers and other users of the lake spend many days each month enjoying the benefits of this wonderful resource of the State. These persons are ideal observers of lake conditions, and often contact our staff about algal blooms or other problems that they notice in particular areas of the lake. This input helps us to better understand and ultimately protect the water resource.

If you observe an algal bloom in the lake (very green water and/or a floating scum of algae on the water surface), please contact Therese East in the Lake Okeechobee Division at 561-681-2500, ext. 4565 (e-mail: teast@sfwmd.gov).

If possible, make a note of the location (GPS coordinates if possible), the date, time of day, and general weather conditions at the time of observation. If you take digital photos, please consider providing them by email, for possible posting on this web site. Photos posted in this context will credit the person who took the picture.

Thank you!