

**Funding Harmful Algal Bloom (HAB) research, monitoring, and management strategies**

KDHE and KBS are asking for \$875,000 for HAB cause and effect research, response, and testing applied in-lake management strategies.

**Harmful Algal Bloom Cause and Effect Research (KBS)** - HABs, also known as blue-green algae blooms, seem to be increasing in frequency and toxicity in Kansas. HABs have occurred in more than 20 Kansas reservoirs annually since 2011 and have caused multiple animal fatalities and human illnesses. HABs occurred again in summer 2017 in our largest reservoirs, as well as smaller reservoirs monitored by KDHE. KBS continues to study reasons for their occurrence and toxicity for wildlife and human safety. Collections of HABs were pumped from Milford and Marion reservoirs and transported to experimental outdoor tanks at KBS's Aquatic Research Facility of 100 ponds, 80 tanks, and an experimental reservoir at the University of Kansas Field Station. Here studies are ongoing to better understand what water quality conditions cause blooms, and specifically what causes blooms to become toxic. **The goal of the HAB research at KBS is to identify the trigger for HAB toxin production, which will ultimately allow management strategies to be targeted at mitigating or preventing dangerous HAB toxin release.** Additionally, KBS has tentatively planned to work in collaboration with KDHE on testing applied HAB treatments at the University of Kansas Field Station and possibly in Milford reservoir. KBS is requesting an enhancement of \$200,000 annually to fund equipment, travel, supplies, laboratory analyses, and graduate student(s) associated with toxin experiments and applied treatment testing. The combination of research and testing applied management solutions will likely serve as the mechanism for State-funded economic efficiency for future HAB research and KDHE's planned response and pilot programs.

**Harmful Algal Bloom Response Program (KDHE)** – The objective of the HAB Response Program is to quickly and reliably provide current information to the general public regarding the status of a possible Algal Bloom to reduce the risk of exposure to humans, pets and livestock. The process typically is kicked off when a citizen or lake manager notifies KDHE of a suspicious bloom. KDHE samples the water and analyzes the sample for blue-green algae identification, cell count or toxin levels. Based on the results, KDHE will issue a public health recommendation level mimicking that of the national weather service; “Watch, Warning or Lake Closure”. KDHE is requesting an enhancement of \$175,000. The funding would be used to support staff (2FTE), contract out services, fund equipment/travel/supplies.

**Harmful Algal Bloom Pilot (KDHE/KBS/ other state and federal agencies)** -KDHE's highest priority for additional resources is a Harmful Algal Bloom Pilot. A harmful algae bloom is the uncontrolled growth of toxic algae that can have adverse health impacts on people, pets and livestock. Algae is present in all waters. However, when nutrients are added, the risk of algal blooms and their associated toxins dramatically increase. Microcystin is the primary toxin currently plaguing Kansas reservoirs. Harmful Algae Blooms have been increasing in frequency, duration, and intensity; which means toxic blooms are growing larger and lasting longer each year. In 2017, Kansas had a record 24 reservoirs impacted by one or more blooms. The toxins released by blue-green algae cause derma toxic effects, gastrointestinal distress and are a hepatotoxic – impacting the liver. The blooms also impact recreational use, as opportunities to

enjoy a day at the lake are impacted by blooms. In turn, this impacts local economies such as convenience stores, bate shops, cabin rentals.

The Pilot program proposed today is specifically designed to investigate and demonstrate in-lake treatment options. The numerous treatment combinations can be grouped into 3 categories:

1. Most intuitive - Prevention, preventing nutrients from heavily entering the water through Best Management Practices on agricultural land.
2. Phosphorous in lake – binding techniques such as aluminum sulfate.
3. In-Lake Management techniques such as water level management, technologies that increase water circulation, lyse or kill cells, or create algal competition favoring non-toxic species in the aquatic environment.

The pilot program objective is to assess the effectiveness of such treatment options at minimizing the impact of Harmful Algae Blooms. KDHE would like to pilot this evaluation on Milford Reservoir around the City of Wakefield. The goal is to reduce the duration and frequency of blooms. KDHE is requesting a budget enhancement of \$500,000 per year. Approximately \$400,000 would be used for the collaborative applied HAB treatment demonstrations described above. The remaining \$100,000 would be used to evaluate the treatments and develop a long-term mitigation plan for HABs at Milford.

This pilot would be a highly coordinated effort, meeting routinely with KWO, KBS, KDWPT, Corps of Engineers and local representatives surrounding Milford. There is a lot of opportunity to partner and collaborate with State and Federal agencies. For example, we have tentatively planned to beta test various treatment techniques with KBS before initiating a pilot. Coordination would include a review of the individual and combinations of treatment strategies, monitor implementation progress, and evaluate results. Goals to evaluate success would be related to water quality monitoring data and trends, frequency and duration of blooms, toxicity of blooms, and testimony from local constituents.