Harmful Algal Blooms - Mitigation

Kansas Annual HAB Meeting

January 24, 2019
Division of Environment

Background – KDHE Initiatives

- 2017 In-lake Treatment Research
- Improved knowledge base to make appropriate decisions addressing HABs
- Identify options to consider for feasibility and affordability
  - Research success stories, case studies
  - Learn what other states are doing
  - Emerging technologies
- Developed report and presented to senior leadership
HAB Prevention and Management

• Focus of the project was to research in-lake mitigation options

• Watershed practices to reduce nutrients must be implemented to address External Loading

• WRAP/BMPs
  • Lag time for lake response: HABs continue

• Regulatory Tools
  • TMDLs, permits
  • TP Use Rules/Bans
  • Setbacks/Ordinances
Milford Reservoir

Milford Lake - HAB Days per Year

- 2011: 80 days
- 2012: 40 days
- 2013: 20 days
- 2014: 140 days
- 2015: 120 days
- 2016: 140 days
- 2017: 80 days

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HAB Mitigation Strategies

From the KDHE Bureau of Water 2017 Report,

“Harmful Algal Bloom Mitigation Strategies: In-Lake Treatment Options for Water Quality Improvement”
HAB Mitigation Strategies: Nutrient Removal - External


www.Ostara.com/nutrients Crystal Green phosphorous struvite product. The display of a commercial product is not an endorsement from KDHE.
HAB Mitigation Strategies: Nutrient Removal - Internal

- Lake bottom habitats are disturbed
- Very Expensive and typically requires re-dredging
- Potential complimentary choice when nutrients and sediment are being addressed

Image from dockanddredge.com, The display of a commercial company is not an endorsement from KDHE.
HAB Mitigation Strategies: Nutrient Removal - Internal

Phosphorus Binding

Alum and Phoslock

Source: Phoslock

Source: Aquatic Solutions

The display of a commercial product is not an endorsement from KDHE.
HAB Mitigation Strategies: Nutrient Removal - Internal

- Specific Species work best, i.e. Switchgrass
- Lake Meade: delayed bloom till later in the year
- Nutrient Removal a function of coverage
- Scale
- Utility for stormwater

From the KDHE Bureau of Water Project,

“Floating Wetlands, Old and New”
-Diana Lehmann

Meade State Fishing Lake, photo from Scott Satterthwaite
HAB Mitigation Strategies: Inhibit Cyanobacteria Habitat

Algae Barriers

Assessment of an Intake Barrier for Water Quality Control at Iron Gate Reservoir- 2013 Study Results, Watercourse Engineering

Aeration and Mixing

Medora Corporation, IGridBee SolarBee, www.medoraco.com

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HAB Mitigation Strategies: Inhibit Cyanobacteria Habitat

Milford Lake: 3 ft Lake Level Drop

Exposed Lake Bed

Drawdown
HAB Mitigation Strategies: Destruction of Cyanobacteria

- Copper based algaecides improve clarity, but cause an increase in toxin amounts as cyanobacteria die off.
- Hydrogen peroxide can be selective for cyanobacteria; fast acting; approved for potable waters and organic use.

Image of Copper sulfate from MEL Science

The display of a commercial product is not an endorsement from KDHE.
HAB Mitigation Strategies: Destruction of Cyanobacteria

Ultrasound

Source: LG Sonic, The display of a commercial product is not an endorsement from the KDHE

Photo of Richard Sanders (KDWPT) and Tom Hammer (Shawnee Co) installing an ultrasound system in Central Park Lake as part of KDHE Bureau of Water’s project to determine the efficacy of ultrasound algae remediation.
KDHE Initiatives - Milford

• Southerly winds during the warm season plus major nutrient inputs from the Republican make ideal bloom conditions on the northern portion of the lake

• Existing Efforts
  • WRAPs
  • Fish Removal
  • KU: Wind and HAB transport modeling
  • USGS sampling
  • Recent drawdowns

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KDHE Initiatives – Pilot Project

- Funding for Pilot work approved
  - Milford and Marion
- Goal to delay and reduce the frequency and duration of bloom events
  - Take advantage of existing efforts with drawdown
- Challenges
  - Scale
  - Weather and resulting lake levels
HAB Mitigation Strategies: CY2019 HAB Pilot in Kansas

**Milford Lake**
- Drawdown
- Vegetation
- Peroxide based algaecide
- Ultrasound
- Fish removal

**Marion Lake**
- Supplemental vegetation
- Peroxide based spot treatment
- Ultrasound
- Phosphorus binding feasibility study
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Milford Lake

Normal Elevation of 1144.4

2558 surface acres in zone "C" with a depth of 8 foot or less

PROJECT AREA MAP
Questions?

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