

# ATTACK OF THE HABS

OR

## HAB RISK AND RESPONSE: ODEQ'S PERSPECTIVE

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# Why should Oklahoma care about Blue Green Algae?

## DRINKING WATER SUPPLIES

- Oklahoma has ~ 235 drinking water supplies
- Ingesting algal toxins can make you sick

## RECREATIONAL RISK

- Recreational exposure can result in mild to serious adverse health effects
- Most adverse health reports are unsubstantiated or initially attributed to other causes
- Pets and livestock have a high risk of suffering effects

# Blue Green Algal Toxins

- **Dermal Toxins/Endotoxins**
  - Lipopolysaccharides
  - Present in cell walls
  - Causes rashes, upper respiratory problems, gastrointestinal issues
- **Neurotoxins**
- **Hepatotoxins**

# Symptoms of BGA Exposure

- Rashes
- Flu-like symptoms
  - Nausea
  - Vomiting
  - Diarrhea
  - Upper Respiratory
- Neurological
  - Numbness
  - Weakness
  - Vertigo
- Abnormal Liver Profile

# Who is most at Risk?

- **Young**
  - Increased incidental ingestion
  - Lower body weight
- **Old**
- **Immunocompromised**
  - Diabetes
  - Hepatitis
  - Asthma
- **Pets and livestock**

# Public Water Supplies

- Microcystin is on EPA's Contaminant Candidate List for regulation
- WHO suggests a 1 ug/l (ppb) level for microcystin to protect long-term health
- Treatment techniques to reduce BGA Toxins
  - Use deepest intake level possible
  - No chlorine until after filtration
  - Optimize to maximize turbidity removal
  - Use GAC or PAC if possible
  - Ozonation as a disinfectant

# Recreational Advisory Levels

Level of Risk	Cyanobacteria Cell Count (cells/ml)	Level of Cyanotoxin (Microcystin)	Actions
LOW	20,000 cells/mL	4 ug/L	Provide info to public, post <b>ADVISORY</b>
MEDIUM	100,000 cells/mL	20 ug/L	Restrict primary body contact, post <b>WARNING</b>
HIGH	Cyanobacterial scum formation	N/A	Consider further restrictions

# Recreational Signage

## ADVISORY

### HARMFUL ALGAE PRESENT

Lake may be unsafe for people and pets

#### Until further notice:

- Contact with water is discouraged (e.g., swimming, water skiing). *Contacto con agua es desalentar.*  
No nade o practique el esquí acuático en áreas con espuma o verdín.
- Do not drink untreated lake water.  
No tome el agua tratado del lago.
- Keep pets and livestock away.  
Mantenga alejados las mascotas y el ganado.
- Clean fish well and discard entrails.  
Limpie bien el pescado y deseche las tripas.
- Avoid areas of visible algae accumulation when boating.  
Evite las áreas con espuma o verdín cuando ande en lancha.



In case of contact with harmful algae, call your doctor or veterinarian if you or your animals experience nausea, vomiting, diarrhea, skin rash, eye irritation, respiratory symptoms, or other unexplained illness.

Report new algae blooms to

Call your local health department:

For more information:

## WARNING

### HARMFUL ALGAE PRESENT

Lake unsafe for people and pets

#### Until further notice:

- Swimming, water skiing, and water contact is prohibited.  
No nade o practique el esquí acuático.
- Do not drink untreated lake water.  
No tome el agua tratado del lago.
- Keep pets and livestock away.  
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# What Happened in 2011?

**Grand Lake**

**USACE**

**Ft. Gibson**

**Keystone**

**Tenkiller**

**Eufaula**

**Skiatook**

**Waurika**

**Texoma**

**City of OKC**

**Overholser**

**Hefner**

# 2011 Blue-Green Algae Counts

Lake	Organism	# of cells/mL	
Grand Lake	Microcystis	>200,000	Moderate Risk when >100,000 cells/mL
Eufaula	Cylindrospermopsis	57,000	
	Planktolyngbya	36,000	
Fort Gibson	Cylindrospermopsis	58,000	
	Pseudanabaena	90,000	
Keystone	Anabaena	2,317,000	
	Anabaenopsis	1,109,000	
Overholser	Anabaena	1,426,000	

# 2011 Blue-Green Algae Counts

Lake	Organism	# of cells/mL	
Waurika	Merismopedia	670,000	Moderate Risk when >100,000 cells/mL
	Cylindrospermopsis	62,000	
Hefner	Pseudanabaena	264,000	
	Planktolyngbya	74,000	
	Cylindrospermopsis	52,000	
Texoma	Cylindrospermopsis	117,000	
	Planktolyngbya	67,000	
	Pseudanabaena	68,000	
Tenkiller	Cylindrospermopsis	118,000	

# OSDH Health Statistics

- 74 reports of illness possibly related to BGA exposure
- 56 were interviewed
  - Grand Lake – 21
  - Eufaula – 11
  - Ft. Gibson – 7
  - Keystone – 6
  - Texoma – 5
  - Hefner – 1
  - Tenkiller – 1
- Dates of Exposure: June 5 – August 28
- Incubation Period – median of 1 day
- Syndromes
  - Upper Respiratory – 59%
  - Gastrointestinal – 50%
  - Rash – 30%
  - Neurological – 23%
- 27 received medical care, 1 hospitalized with pneumonia

# Cumulative Efforts by DEQ

- Samples run
  - 67 ID and enumeration
  - 104 Toxin
- 250 calls from the public
- > 100 media calls
- ~150 original news stories
- 5 additional reports of BGA investigated

# What About 2012?

- **Multi-agency technical debriefing**
- **Analytical capabilities and capacities needed to be addressed**
- **Create a DEQ Response Plan**

# What About 2012?

## DEQ's Authority

- 27A Okla. Stat. § 2-6-103. Powers and duties of Department, Board, and Executive Director

A. The Department of Environmental Quality shall have and is hereby authorized to exercise the power and duty to: ...

9. Issue swimming and fishing advisories related to human and animal health hazards for waters of the state, based on available data.

# What About 2012?

## DEQ Response Plan

- Event based response.
- DEQ Complaints Hotline would be central path for reporting BGA blooms.
- Lakes with an existing program would continue with DEQ's concurrence.
- DEQ would coordinate investigations for non-program lakes.
- Recreational advisories based on cell counts.
- Signage consistent with USACE.
- Lake managers responsible for posting and closures.
- DEQ webpage would be central point for information.

# What About 2012?

**DEQ rule change regarding septic systems**

- **Requires nitrogen reducing systems within 660 feet of an impaired water body**
- **Requires soil profiling instead of perc test within 1320 feet of an impaired water body**

**Planned Outreach to Lake Managers and PWS Operators**

**Increased PWS monitoring**

**Coordination with OWRB on sampling**

**Increased laboratory capabilities and capacity**

# And Then...

## March 8 Lake Water Quality Working Group Meeting

- Called by Sen. Josh Brecheen and Dept. of Tourism
- Agencies: OSE, DEQ, OWRB, GRDA, OCC, ODAFF, OSDH, OUBS, OUCPH, USGS, USACE
- Others: Governors Office, State Senators and Reps, Congressional Staffers, Lake Texoma Assn, Marshall Co. Chamber of Commerce, Grayson County HD
- Goal: Write a Statewide Response Plan that balances risk with tourism considerations.
- 4 Committees: Health Effects(OSDH), Monitoring(OSE), Outreach(Tourism), Cost and Scope(GRDA)
- Report back April 5th

# Issues

- **Advisories based on cell counts(biomass) or toxin values**
- **Signage language too alarming**
- **The Ohio Plan**
  - **Toxins only**
  - **No Contact Advisory requires pet death or human illness**
- **Cost and who pays**
- **Coordination between agencies**

# Monitoring Committee

- Current resources for HAB monitoring are inadequate
- Monitoring that is responsive/reactive in nature is needed as conditions warrant (i.e. public complaints, visual observations, etc.)
- Initial routine monitoring should be for algal ID and enumeration (i.e. cell counts) Toxin testing would be conducted if cell count thresholds are exceeded
- costs for conducting a rudimentary sampling program on 80 to 100 reservoirs would be approximately \$215,000 annually
- an ideal monitoring program to assess and respond to HAB events would cost \$3.5M-4.5M annually
- Monitoring should occur every 2 weeks after a HAB is confirmed

# Health Effects Committee

- There is strong evidence that large populations of BGA present either a direct health effect themselves or have a high potential to rapidly produce toxins
- Because we only measure a few of the known toxins, advisories should be based on cell counts
- Advisory Thresholds should be protective of the young , the old, and the immunocompromised
- Continued use of the current BGA advisory thresholds is appropriate
- Waiting for someone to get sick before we take serious action (especially in the presence of overwhelming knowledge that these organisms make people sick) is poor public health policy

# Outreach Committee

- “One Message, One Voice” – need a coordinated, united message and a single reliable source of information
- BGA Communication Plan should have educational and advisory components
- Need one place (website) where media/consumers can go for reliable BGA information
- Information needs to be in laymen’s terms
- Everybody needs to use the same terminology
- Roll out the education portion first

# April 5 Lake Water Quality Working Group Meeting

- Additional attendees: Rep. Doug Cox, TX state representative, Texoma marina groups/owners, Texoma resort owners
- Committee Reports
- Tourism provided survey results of BGA public awareness and attitudes
- Issues
  - Lake “closings”
  - Cost of toxin testing
  - Funding for basic response
  - Analytical capacity
  - Website vs. signage

# April 5 Lake Water Quality Working Group Meeting

## Consensus?

- Education and outreach – yes
- Website – yes
- One voice - ???
- Advisory thresholds – no
- Lake signage – no

# **What Now?**

**Legislation – amendment or resolution**

**Current Response will continue for PWSs**

**Response for recreational risk is unclear**

**Outreach to lake managers is on hold**