Rhode Island’s
Cyanobacteria Bloom Response and Routine Monitoring Program

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Overview

- Historic Observed Blooms
- Bloom Response Program
- HAB Advisory Criteria
- Routine Monitoring/Screening Program
- Plans for 2013 Season
- Lessons Learned
- Phosphorus Reduction Efforts
Historic Cyanobacteria Blooms
• 2008 and 2009
  – No reported HAB’s

• 2010
  – Set Advisory Criteria
  
  – 3 HABs reported
  
  – Secured funds to begin cyanobacteria screening program and continue response monitoring
Bloom Response Program

- RIDEM staff respond to all reports of blooms that are received.

- Ask individuals reporting the bloom to email photos of the bloom before DEM staff are deployed.

- DEM staff conduct visual inspection of waterbody and collect samples from representative locations.

- Scum or mat present = Advisory

- Microscopic analysis conducted at RIDEM.

- Sample(s) sent to Laboratory for microcystin analysis.
HAB Advisory Criteria

- Advisory warning against water contact issued based on three criteria:
  - Visible Scum Present
  - Total Cyanobacteria Cell Count > 70,000 cells/ml
  - Microcystin toxin concentration > 14 ppb
If Advisory Criteria Are Exceeded:

1. DEM/HEALTH issue joint press release.
2. Letters are sent to municipalities
3. Advisory is posted at public access sites
4. Make contact with individuals/lake association/watershed group
Rescinding Advisories

• Municipality, lake association or watershed group, interested individuals are responsible for continued sampling

• 2 Consecutive Samples (2 weeks apart)
  – Total cyanobacteria cell count < 70,000 cells/ml
  – Microcystin levels < 14 ppb

• If no additional sampling then advisory is rescinded on Nov 1
Routine Monitoring/Screening Program
2011-2012

Developed to screen for and characterize cyanobacteria blooms in the State’s freshwaters.

- 11 Sites (per year) chosen based on anecdotal historical presence of algal blooms and chl-a and TP data collected by URIWW
- Samples collected mid-late September at recreational/public access points
- Samples analyzed for cyanobacteria ID/enumeration and toxicity (Microcystins)
- Temperature, Dissolved Oxygen, Spec. cond, Secchi (where applicable)
- Turnaround Time < 2 weeks for both cyano cell count and toxicity results
- Samples from HAB Response were submitted to ESS for shipment to Greenwater Lab
Monitoring Key:

Yellow
2011

Red
2012

Green
Both Years
Routine Monitoring/Screening Program
2011 Results

- Total Cyanobacteria cell densities ranged from 2,500 – 15 million cells/ml

- Total Cyanobacteria cell count of >70,000 cells/ml in 6 of 11 waterbodies.

- Microcystin levels ranged from 0.5 to 15 ug/l

- Resulted in 6 advisories issued.
Routine Monitoring/Screening Program
2012 Results

- Total Cyanobacteria cell densities ranged from 94 – 5 million cells/ml

- Total Cyanobacteria cell count of >70,000 cells/ml in 7 of 11 waterbodies.

- Microcystin levels ranged from 0.2 to 4.8 ug/l

- Resulted in 7 advisories issued.

Fig. 1 Woronichinia aegelliana 400X (scale bar = 20µm)
DEM HAB Response Results
2011

2 Response-based Advisories Issued

Spring Lake Reservoir
> 13 million total cyano cells/ml
Microcystin levels 35 ug/l

Slack Reservoir
>3 million total cyano cells/ml
Microcystin levels 82 ug/l
DEM HAB Response Results
2012

2 Response-based Advisories Issued

Mashapaug Pond
> 311,000 total cyano cells/ml
Microcystin levels 7 ug/l

Slack Reservoir
>902,000 total cyano cells/ml
Microcystin levels 48 ug/l
Dominant Cyanobacteria Species

- Woronichinia naegeliana
- Anabaena sp.
- Anabaena planctonica
- Plantothrix suspensa
- Microcystis botrys
- Aphanocapsa planctonica
- Aphanizomenon gracile
- Cuspidothrix issatschenkoi
Cyanobacteria cell density and Microcystin Levels (2011-2012)

Figure 1. Cyanobacteria Cell Density and Microcystin Levels (Pooled 2011 and 2012 Data)
Confirmed HAB's 2007-2013
Communications/Outreach

- Pre-Season meetings
- RIDEM and HEALTH websites
- Fact Sheet
- Outreach to Veterinarians
- URI Watershed Watch
- Increased Public Awareness
Plans for 2013

• Continue routine monitoring of 11-12 waterbodies.

• Continue to respond to HAB reports

• Work on developing a HAB webpage

• Continue outreach/communications

• Workshops/Presentations to Lake Associations, Watershed Groups, etc.
Lessons Learned/Issues Encountered

- HAB’s not ‘new’ in the state
- Some ponds experience consistent blooms (year after year) others do not.
- Algal conditions can change rapidly.
- Communication and coordination of responsibilities among agencies was successful.
- Dissemination of advisory to pond (no public access) residents is challenging.
- Towns have limited capacity to sample
- Learning from other State’s experiences very valuable.
- Budget/staff constraints are a huge issue.
- Most Blooms reported on Friday afternoons between 3-4pm.
Phosphorus Reduction Efforts

- Emphasizing Watershed Planning
- Developing new Nutrients criteria for lakes
  - Wadeable rivers/streams
- 15 Total Phosphorus TMDL’s completed to date
  - 2 projects being funded under non-point program in watersheds with documented HAB’s
  - MS4’s are required to incorporate TMDL requirements into their permits
- New Stormwater Manual with more stringent nutrient reduction requirements
- WWTF TP reductions
Questions?

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