The Evolving Champlain Monitoring Program Ten years and still counting

Angela Shambaugh VT Department of Environmental Conservation June 26, 2013

First Known HAB Event - 1999

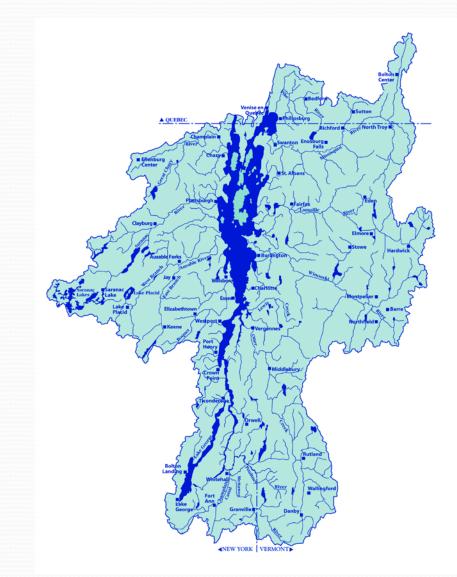


A dog doing what dogs do when it's hot



The Challenges

- Little data on phytoplankton or cyanotoxins
- Limited resources
- Overlapping jurisdictions
- Large physical area with highly variable water quality
- Varied population demographics





Leveraging our resources

- Lake Champlain Basin Program
- the University of Vermont
- the Long-term WQ monitoring program and VT DEC





Initial Results - 2000

- Known toxin producers throughout the lake
 - Anabaena, Aphanizomenon, Microcystis
- Microcystin was throughout the lake
 - Source waters
 - Low levels found in raw and finish water on some days
- Anatoxin was present
 - Not in raw or finish waters
- No PSP
- Phytoplankton were toxic to mice





We Rely on Strong Partnerships and Diverse Funding

- Partners
 - LCC
 - UVM
 - VTDEC
 - VDH
 - SUNY-CESF





- Funding
 - LCBP
 - NOAA
 - Small grants to UVM
 - State of VT



Long-term Goals for Champlain

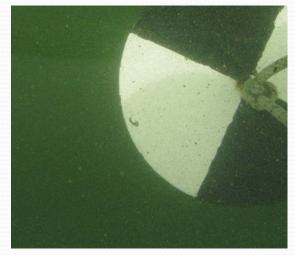
- An effective monitoring protocol
- A comprehensive data set
- A communication network for health and environmental professionals
 - A consistent response
- Educate the public





First Steps

- Modification of Chorus and Bartram's drinking water facility monitoring protocols
- Establishment of email list serve to share information and observations
- Development of outreach materials
 - Training water facility operators
 - Websites and brochures





What have we learned?

- TP concentrations indicative of bloom potential
- Chlorophyll not a good indicator of cell density or toxicity
 - UVM found phycocyanin probe to be unsatisfactory
- Cell density is a reasonable estimator of recreational risk
- Conditions vary with location
- Conditions change rapidly





What have we learned?

- Microcystin present lake-wide most years
- Anatoxin seldom found
- Very few human illnesses linked to cyano exposure
- We can't be everywhere







VT's approach to Cyanobacteria

- Towns have primary jurisdiction
- Recreation is primary focus
 - Beach guidance: close if any of these are present
 - Visible cyano or presumed cyano scums
 - Microcystin > 6µg/L
 - Anatoxin >10µg/L
- Drinking Water
 - Voluntary cyanotoxin practice
- Lots of Outreach



Quantitative Monitoring Protocol

- Monitoring conducted from June to September
 - VT DEC, UVM and LCC citizen volunteers
- 3m net plankton samples
- Toxin analyses run when trigger cell density is reached
- Actions at stations are based on its conditions



Assessment Levels

<u>Generally Safe</u>

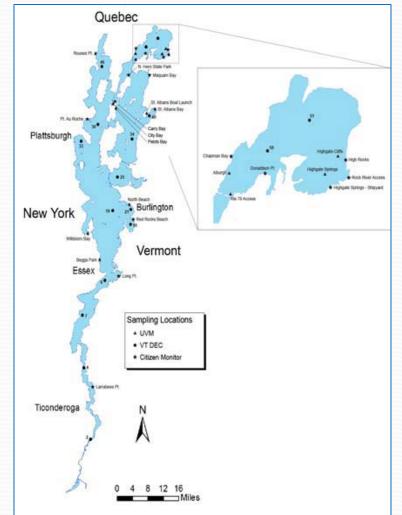


- Density of potentially toxic taxa are <4000 cells/mL
- <u>Low Alert</u>
 - Density of potentially toxic taxa >4000 cells/mL
 - Microcystin <6 ug/L
- <u>High Alert</u>
 - Density of potentially toxic taxa >4000 cells/mL
 - Microcystin >6ug/L



Overcoming Limitations

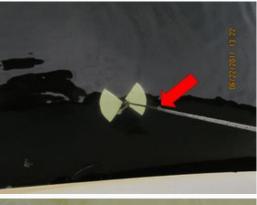
- Monitoring limited to high risk areas
- Most of Champlain doesn't experience HABs
- The public needs to be able to assess cyano risk on their own
 - Presence/absence of scum is visual cue that most would recognize





The New Visual Assessment

Generally safe = no or few cyanobacteria









The New Visual Assessment

Low Alert = cyanobacteria present at less than bloom levels

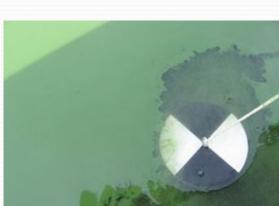




The New Visual Assessment

- High Alert = bloom in progress
- No routine toxin testing
 - VDH works with municipalities to test as needed







People are passionate about their lake!

Lake Champlain committee staff trained over 100 volunteers to monitor shorelines

More than 50 reported all summer long

All lake segments had quantitative and qualitative data

Total Number of Stations = 88



2012 Weekly Process

- VT DEC and UVM collect quantitative samples
- Volunteers make observations at designated site
 - LCC reviews and approves each report
 - Photos provided by volunteers when conditions reach alert levels
- UVM and VDH conduct toxin analyses as needed
- VT DEC collates
 - Email to state and public health officials each Thursday
- VT DOH posts to their website each Friday



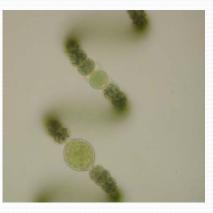
New in 2012 - The Interactive Map

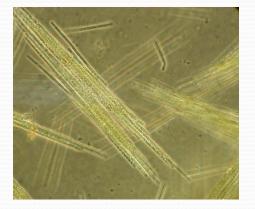
Lake Champlain Blue Green Algae Tracking (5/23/2013)								
Select Lake Region: Select Lake Region	n name:			Find		VERM DEPARTMENT Environn Public Health T	ONT DF HEALTH mental racking	
HERD GRAND GEORGIA	Site#	Test Site Name		Date	Test Type	Status		
ISLE ALBANS COUNTY VT	105	Hawkins Bay		06/19/13	Visual	Generally Safe		
COUNTY VI	27	Red Rocks Beach		06/18/13	Visual	Generally Safe	H	
Clinton SOUTH MILTON COUNTY V	44	Oakledge Park rocky shoreline		06/18/13	Visual	Generally Safe		
County, NY HERO	18	Long Point		06/18/13	Visual	Generally Safe	V	
COLCHESTER	Blue	e Green Algae	The status	of Blue-ar	een Algae st	hown on the map reflects		
SOUTH BURLINGTON		ing Results	conditions	and data a	s of the date	of report.		
BURLINGTON		High Alert			nples are co lay have char	illected once each week. nged.		
	•	Low Alert	To use this	s man				
		Generally Safe	- Zoom in	using zoor	-	double clicking on the map		
SHELBURNE	0	Previous Weeks				for that site's results or by town in the boxes above		
	Status	- Click on t			on the alert status in the results box for description viewed on monitors 1024x768 or of higher resolution			
CHARLOTTE	About	Blue-green Algae and	l blooms					
County, NY HINESBURG	Wind and waves can move algae around. Blooms can appear or disappear very rapidly							
FERRISBURG	so conditions around the lake are likely to change over the course of the week To check on the current status of your favorite beach or swimming area, contact whoever							
	is responsible for maintaining the beach. This may be the town, Vermont State Parks,							
ADDISON WASHINGTON		or a private association It is not possible to tell whether algae blooms are toxic by looking at them.						
PANTON QUINTY VT		yone should become f d them.	amiliar with	the appear	ance of blue	-green algae blooms and		
10 km ADDISON		examples of what Blue	e-green Alga	e does and	l does not lo	ok like <u>here</u> .		
	ns because the	ecause they are more likely to drink water while swimming.						
5mi								

VERMONT

2012 by the numbers

- >600 site-specific reports posted
 - 73% were utilized the visual assessment
- >250 plankton samples analyzed
- >300 filters collected for toxin analysis
 - Approx. 100 analyzed
- 81 people received email updates
- >3300 visits to the new interactive map







2012 Cyanobacteria Status

- 90% of reports indicated generally safe conditions
- 2% reported high alert conditions
- No human or animal illnesses reported





We continue to evolve

- State of VT will have primary responsibility for Champlain program in 2013
- Interactive map will have crowd-sourcing programming
 - volunteers input data directly in database
 - Reduced data management time
 - Rapidly updated map
 - Mobile-device friendly





Looking Ahead

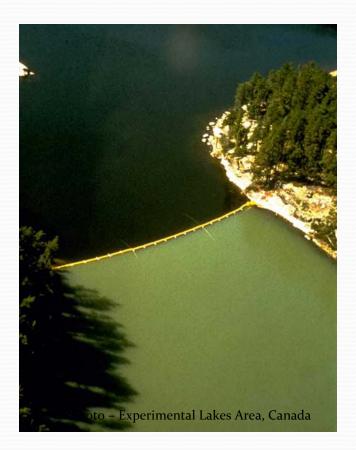
- Interactive map is not realtime
 - Education about proper use of the map
- Adapt to Changing conditions
 - Recognizing new species and/or new toxins
 - Adapting to a warming climate





Looking Ahead

- Drinking Water Facilities
 - Responding to affected facility in major urban area
- Reduce P in our lakes
 - Increasing P means increasing HAB events



Champlain Websites

- <u>http://www.lakechamplaincommittee.org/get-</u> <u>involved/volunteers/bga-monitors/bga-report/</u>
- <u>http://healthvermont.gov/enviro/bg_algae.as</u>
 <u>px</u>
 - <u>https://webmail.vdh.state.vt.us/vttracking/bluegreenalg</u> <u>aefp/</u>
 - <u>http://healthvermont.gov/enviro/bg_algae/documents/</u> <u>BGA_guide.pdf</u>