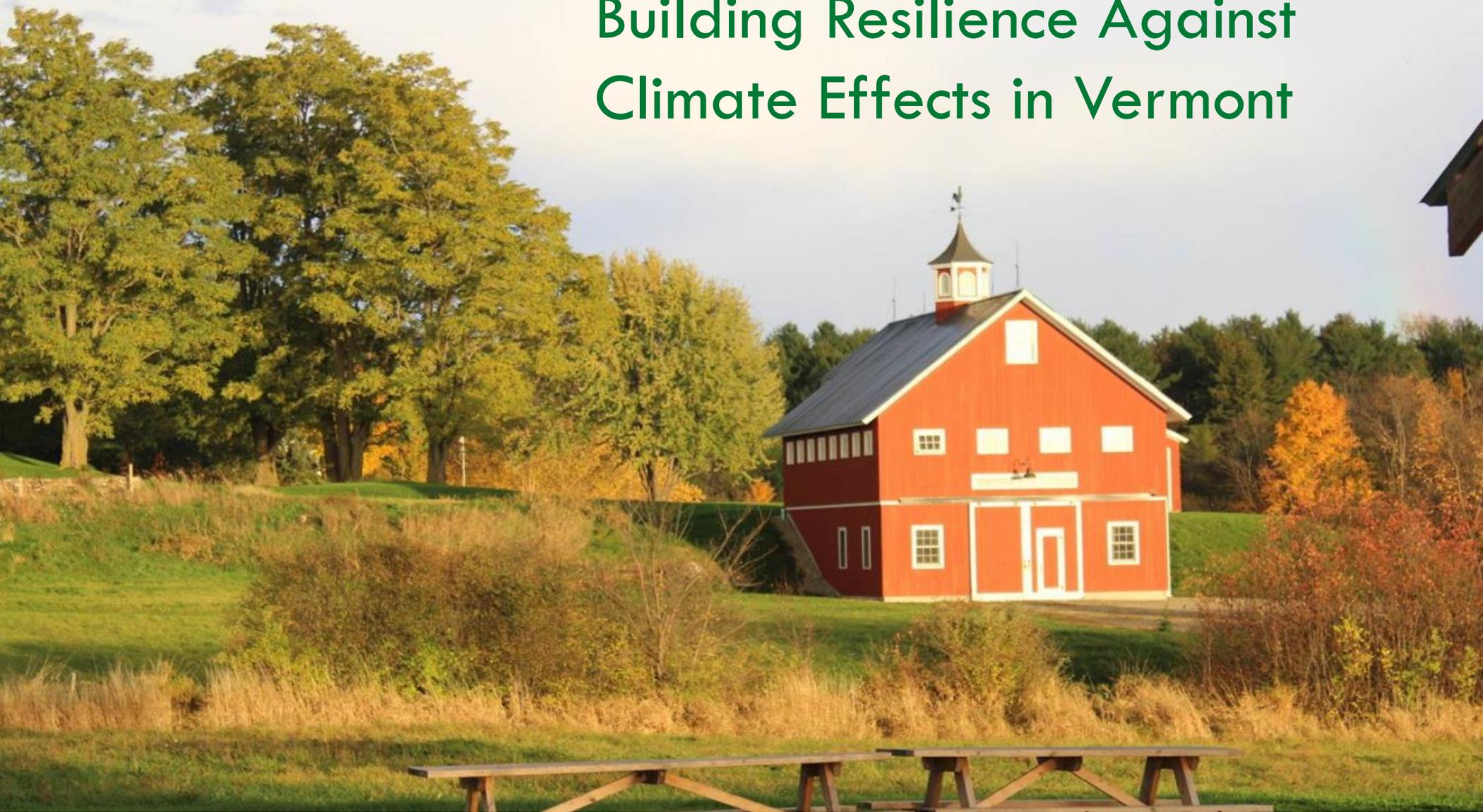


Presenter



Jared Ulmer, AICP, MPH
Coordinator
Climate Change Adaptation Program
Vermont Department of Health

Building Resilience Against Climate Effects in Vermont



Outline

- ❑ Analysis:
 - ❑ Climate change in Vermont
 - ❑ Priority health concerns
 - ❑ Disease burden analysis
- ❑ Adaptation
 - ❑ Health department actions
 - ❑ Partnerships
- ❑ Next steps

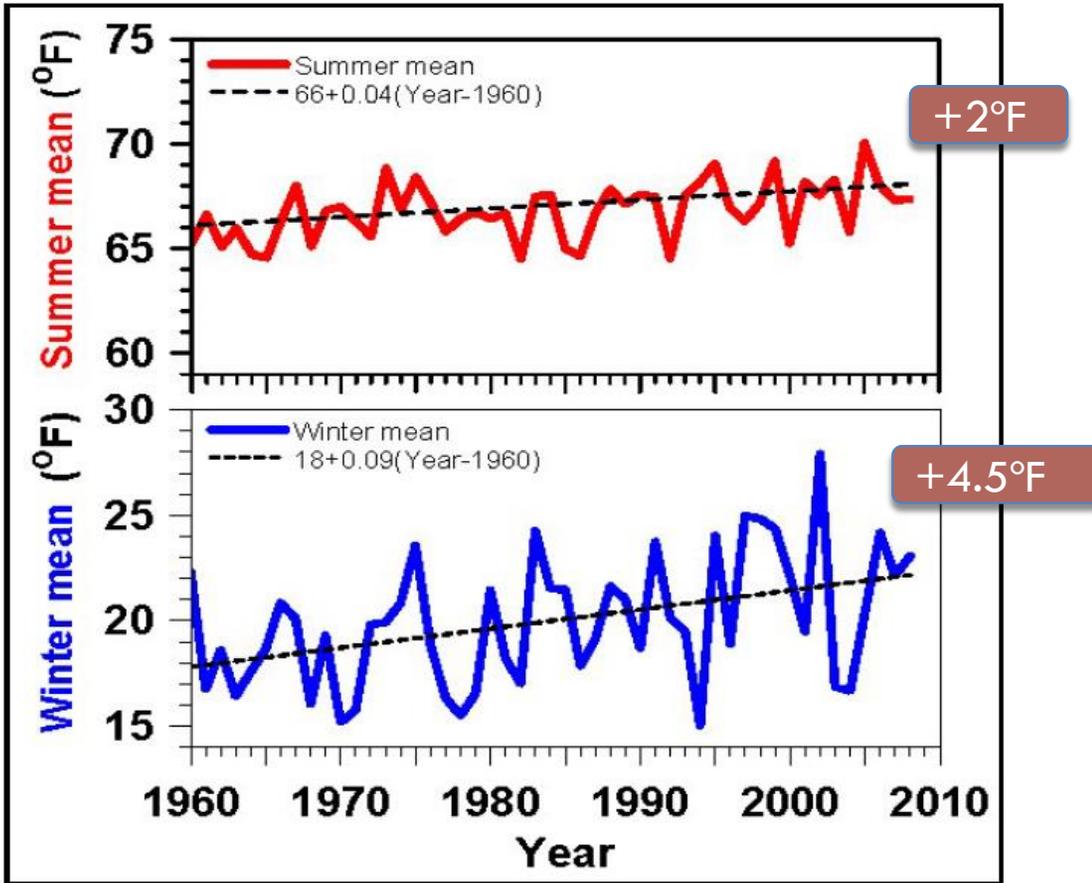


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Climate change in Vermont

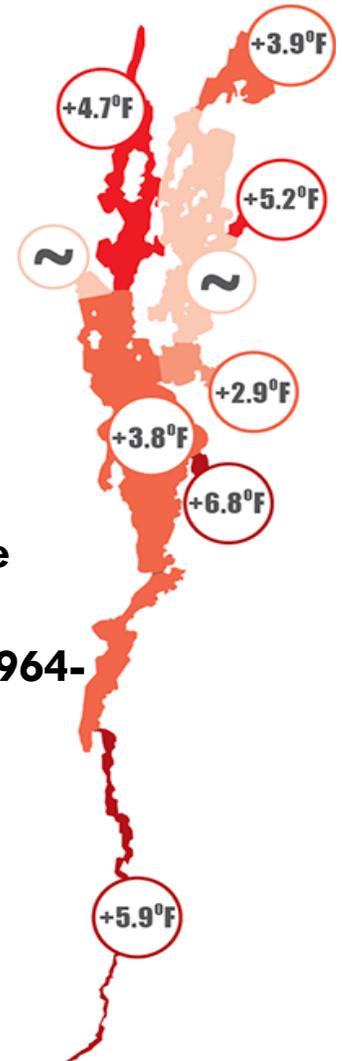
Temperatures have been increasing

Vermont ambient temperatures, 1960-2010



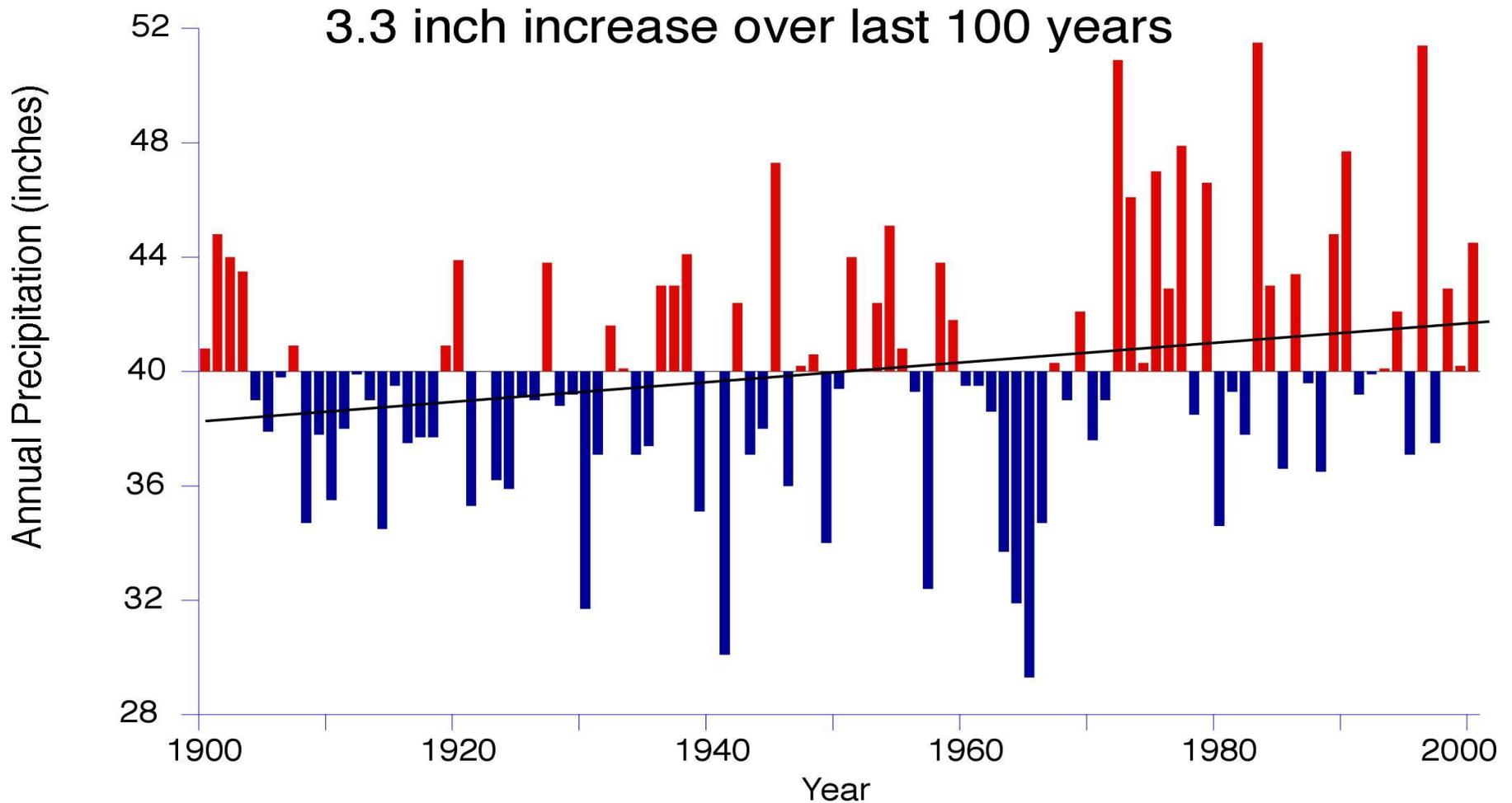
Based on data from 4 stations in Vermont, 1960-2010

Change in Lake Champlain temperature, 1964-2009



Source: Lake Champlain Basin Program, 2015 State of the Lake Report

Precipitation has been increasing



Time series represent average of 79 meteorological stations in the Northeast, 1899-2000. [From Wake 2005]

Future expectations for Vermont

- Warmer ambient and water temperatures
- During warm months:
 - Longer growing season
 - More frequent heat waves
 - Fewer total days with rain
 - But more frequent heavy rain
- During winter:
 - Shorter freeze season
 - More precipitation
 - But less as snow, more as freezing rain

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Priority health concerns

Extreme weather events

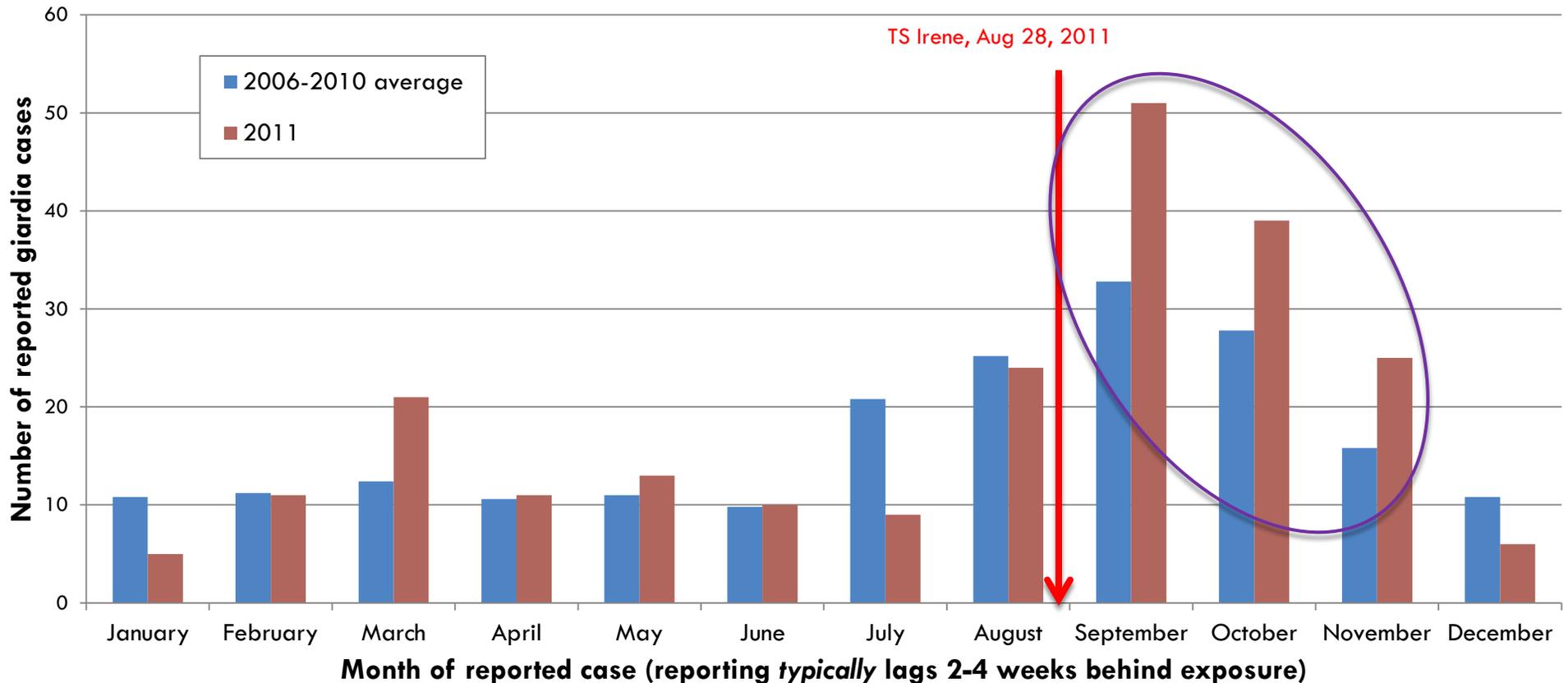
□ Health impacts from Tropical Storm Irene (2011)

- 6 deaths
- Extensive property/infrastructure damage, power outages, and other service disruptions
- Wellheads submerged by floodwaters
- 30 public water systems issued Boil Water Notices
- 17 wastewater treatment facilities reported compromised operations
- Septic system failures, fuel spills, other hazardous contamination
- Over \$10 million estimated damage to crops and farmlands

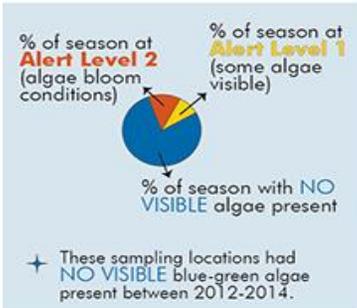


Waterborne & foodborne diseases

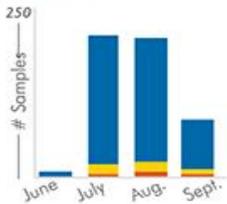
Count of Giardia cases reported to Health Department by month



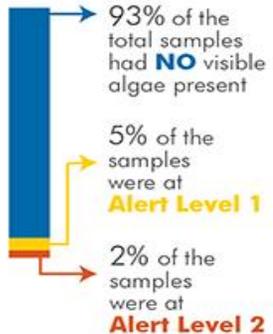
Blue-green algae



THE SAMPLING SEASON



2012-2014 TOTAL SAMPLES

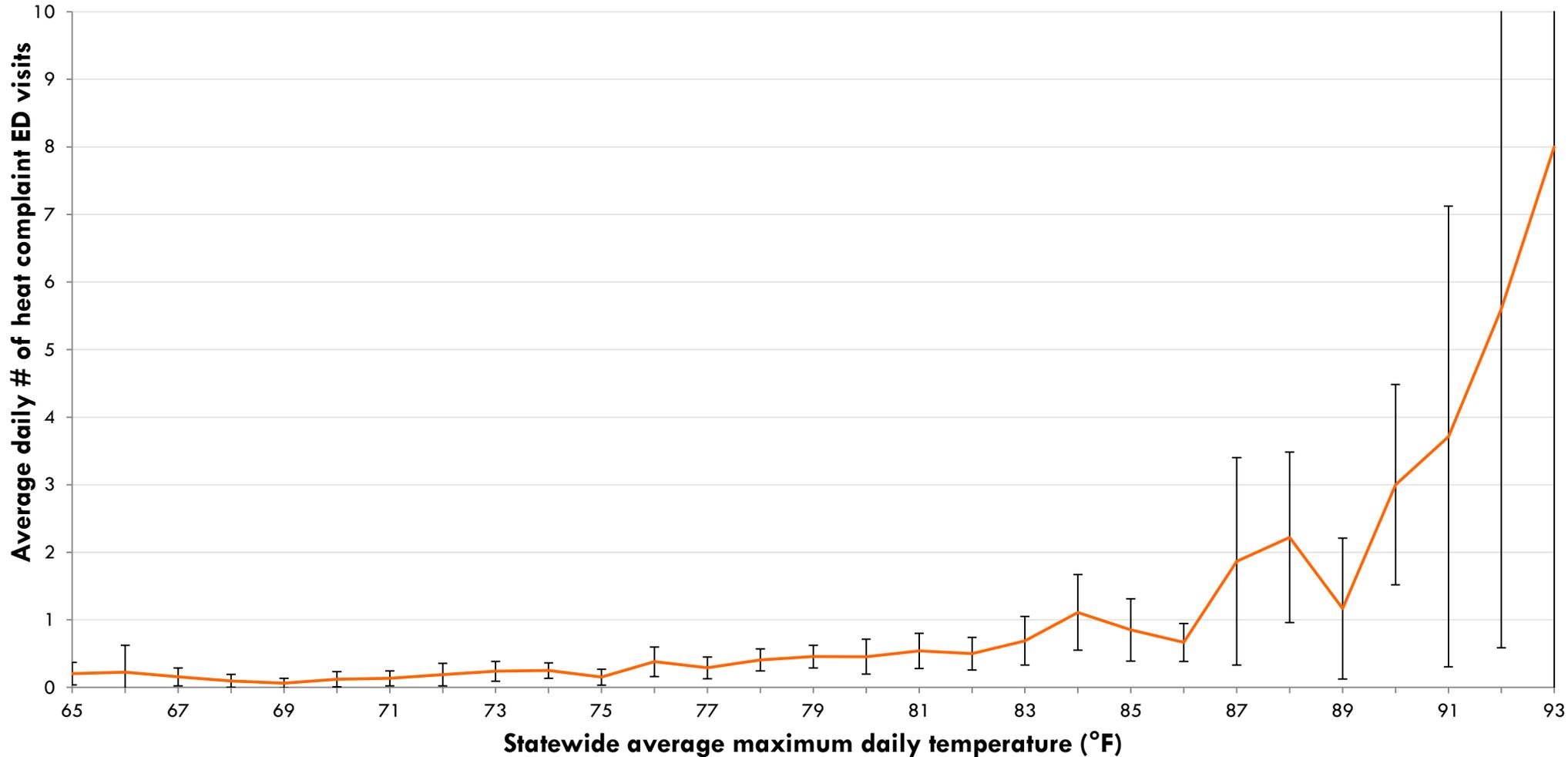


Missisquoi Bay:



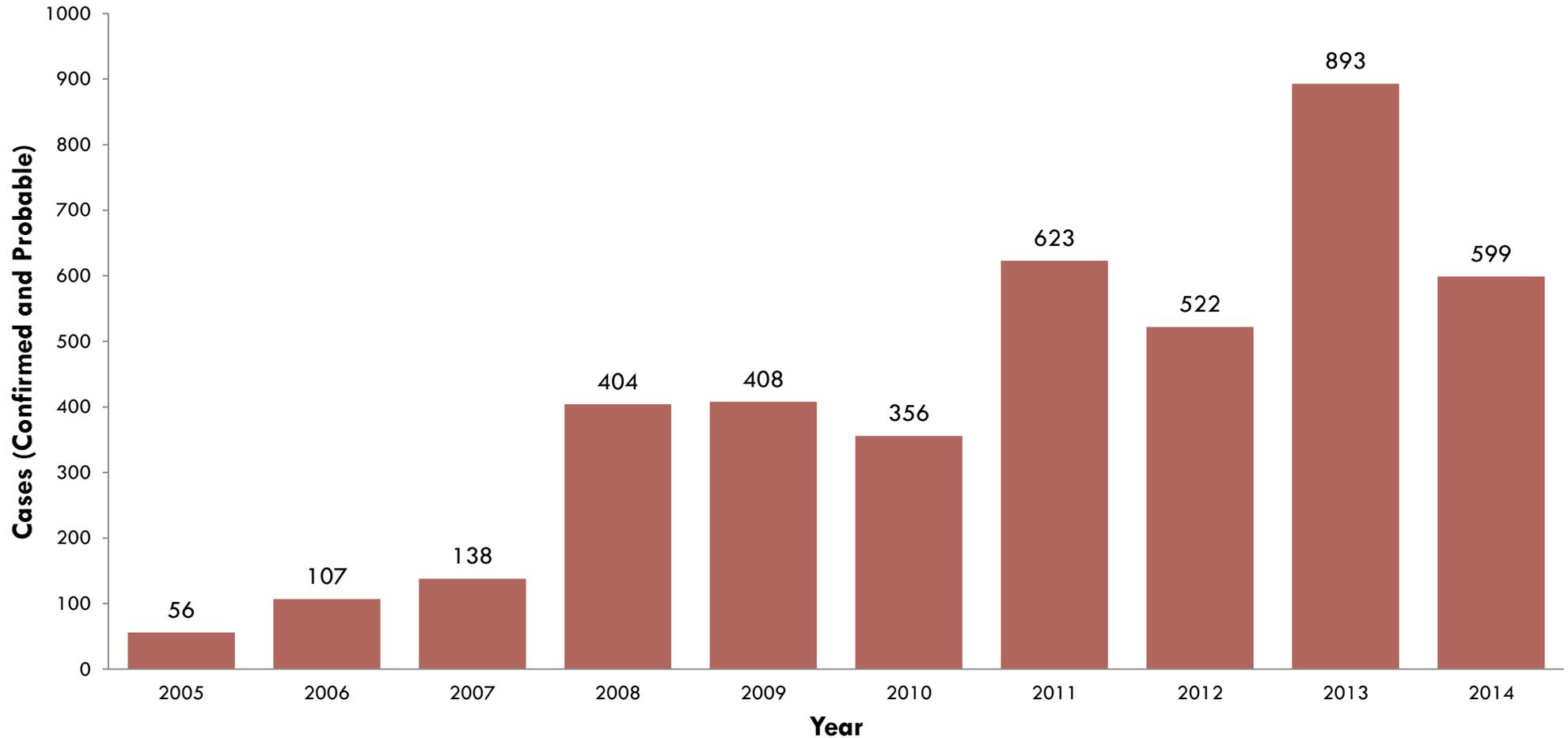
Heat-related illness and mortality

Average daily emergency department visits for heat complaints in Vermont, by maximum daily temperature, 2004 - 2013



Vectorborne disease

**Vermont Lyme Disease Cases
2005 - 2014**



Other potential impacts

☐ Allergens

- Pollen
- Mold

☐ Skin irritants

- Poison ivy
- Poison parsnip

☐ Air pollution

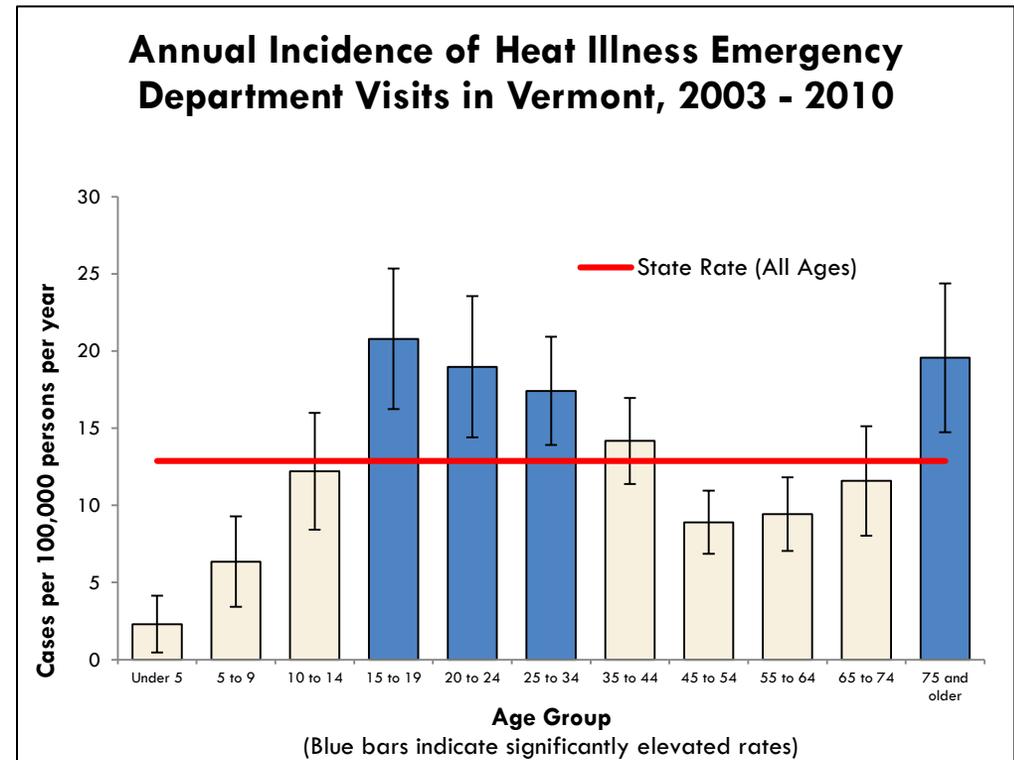
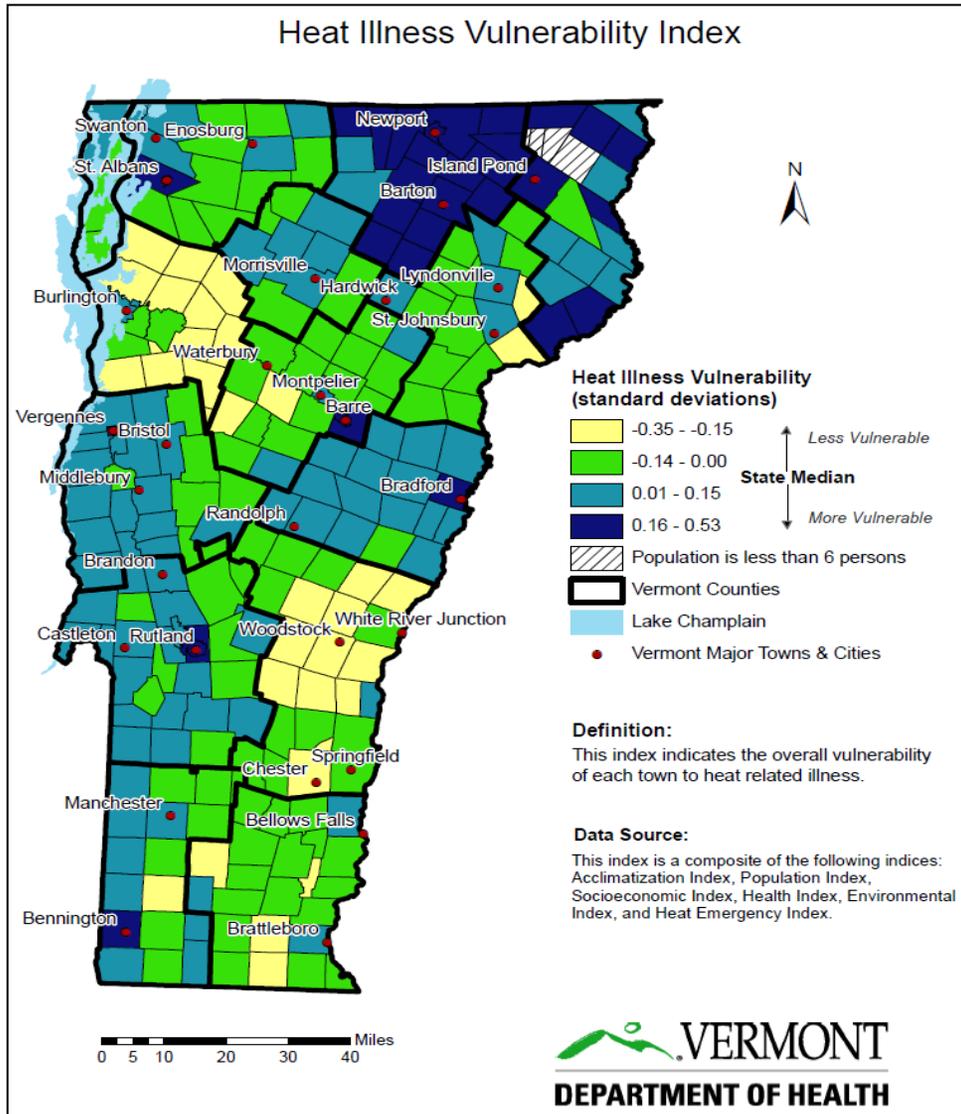
- Ozone & fine particulate matter

☐ Mental health

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Disease burden analysis

Vulnerability assessment



Projecting disease burden

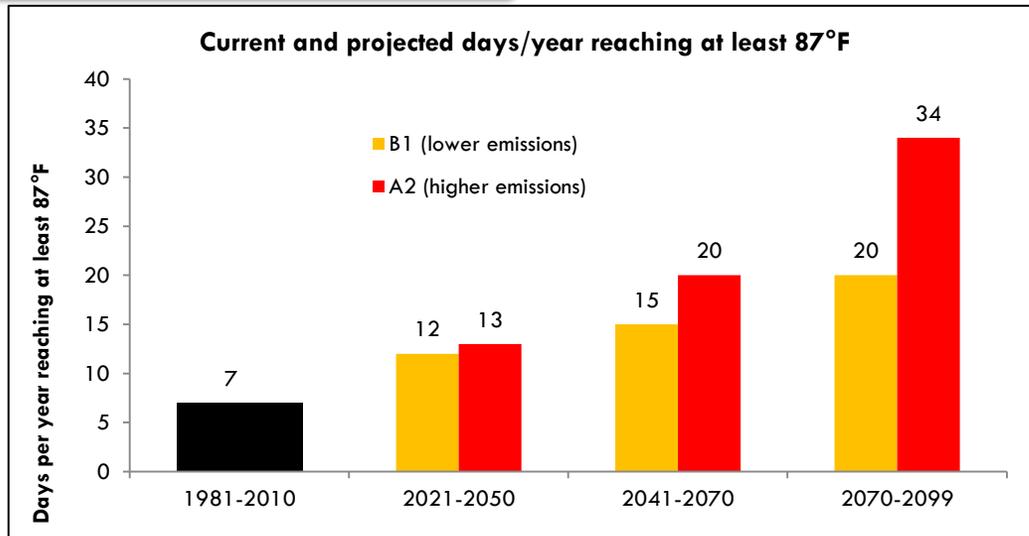
Current health burden

- Average of 80 emergency department visits per year for heat complaints
 - 26 occurred on days 87°F and warmer
- For those aged 65+, estimated 6 excess deaths per year on days 87°F and warmer

Exposure – outcome associations

- Emergency department visits were **8x more likely** on days when temperature reaches 87°F
- For those aged 65+, about **one additional death** on days 87°F and warmer

Expected change in exposure



Future health burden

Time period	Excess emergency department visits/year for heat complaints	Excess deaths/year attributable to heat
Baseline (2012)	26	6
2021-2050	44-48	10-11
2041-2070	55-73	12-17
2070-2099	73-125	17-28

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Climate change adaptation

Press releases



Department of Health
Agency of Human Services



Vermont.gov Home Contents A to Z Site Map Contact Us About Us Search



How Hot is too Hot?

 **For Immediate Release: July 28, 2015**
DEPARTMENT OF HEALTH

Media Contact:
Communication Office
802-863-7281

*Vermonters Experience Serious Health Effects
When Temperatures Reach Mid to Upper-80s*

BURLINGTON—A Vermont Department of Health analysis shows that Vermonters are at greater risk for serious illnesses, even death, when the statewide average temperature reaches or exceeds 87°F. Adults age 75 and older and 15 to 34 experience the highest rates of heat-related illnesses. Adults 65 and older are at higher risk for death on such hot days.

“Vermonters may be especially vulnerable because our bodies are not accustomed to hot temperatures and because many older homes and businesses are not well designed to deal with summer heat,” said David Grass, environmental health surveillance chief at the Health Department. “This explains why we see some of the highest rates of heat-related illnesses in the cooler counties. In general, Vermonters should take the necessary precautions when temperatures are forecast for the mid-80s or higher.”



The statewide average temperature of 87°F corresponds to a range from about 85°F in cooler counties like Bennington and Essex to almost 89°F in warmer counties like Chittenden and Windham. Those who work or exercise outdoors, infants and children, people who are obese or have a chronic medical condition, and people living in more urbanized areas also tend to be at greater risk. Some people will suffer heat-related illnesses at temperatures lower than this range.

QUICK LINKS

- Get Help Now
- Advance Directives
- Birth, Death, and Marriage Records
- Events & Meetings
- Food & Lodging Forms
- Health Insurance
- Hospital Report Cards
- Immunization
- Laboratory Services
- Medical Board
- Physician Profiles
- Restaurant Scores
- Rules & Regulations
- Town Health Officers

Alerts & Advisories

Children & Families

Data & Records



Department of Health
Agency of Human Services



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Vermont Drinking Water Systems Now Sampling for Blue-Green Algae Toxins

 DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DEPARTMENT OF HEALTH

For Immediate Release: July 7, 2015

Media Contacts:

Vermont Department of Health
Communication Office
802-863-7281

Vermont Department of Environmental Conservation
Drinking Water and Groundwater Protection Division
802-236-1483

BURLINGTON –All 22 of the drinking water systems on Lake Champlain began sampling this week as part of a new program to monitor public drinking water supplies for blue-green algae toxins.

Some blue-green algae blooms produce toxins that are harmful to humans and animals. Testing is the only way to know if an algae toxin is present in drinking water. This new 12-week monitoring program will bolster the state's current efforts to visually monitor for blue-green algae blooms and protect the public from potential toxins in drinking water.

Lake Champlain is the drinking water source for about 150,000 Vermonters. Since the U.S. Environmental Protection Agency does not require testing for blue-green algae toxins, participation in collecting samples is voluntary.

Thirty public drinking water system operators were trained this spring on visual bloom identification and toxin detection response. Water system operators are submitting samples to the Vermont Department of Health Laboratory for toxin analyses.

QUICK LINKS

- Get Help Now
- Advance Directives
- Birth, Death, and Marriage Records
- EMP Compliance
- Events & Meetings
- Food & Lodging Forms
- Health Insurance
- Hospital Report Cards
- Immunization
- Laboratory Services
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- Town Health Officers

Alerts & Advisories

Children & Families

Data & Records

Diseases & Prevention

Emergency Response

Radio, TV, and online advertising



http://www.healthvermont.gov - http://... healthvermont.gov [Go to this report](#)

Content Drilldown

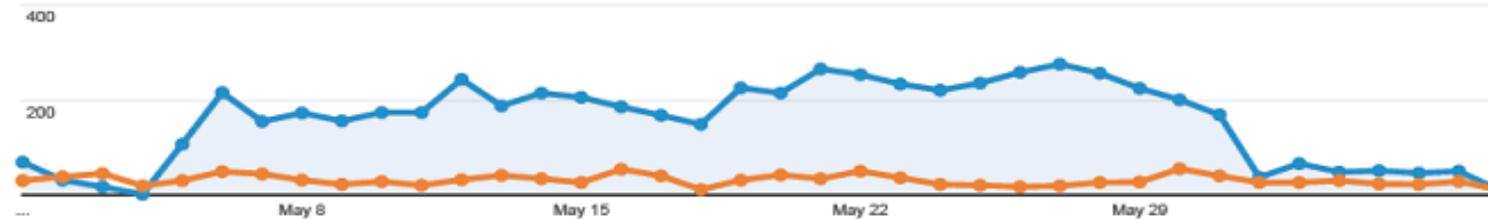
May 1, 2014 - Jun 7, 2014
Compare to: May 1, 2013 - Jun 7, 2013

ALL » PAGE PATH LEVEL 1: /prevent/ » PAGE PATH LEVEL 2: /lyme/ » PAGE: /prevent/lyme/lyme_disease.aspx

All Sessions
+1.42%

Explorer

May 1, 2014 - Jun 7, 2014: ● Pageviews
May 1, 2013 - Jun 7, 2013: ● Pageviews



Page	Pageviews	Unique Pageviews	Avg. Time on Page	Bounce Rate	% Exit
	420.42% ▲ 5,938 vs 1,141	464.11% ▲ 5,156 vs 914	19.88% ▼ 00:01:15 vs 00:01:34	23.55% ▼ 62.88% vs 50.89%	23.79% ▲ 58.42% vs 45.57%
1. /prevent/lyme/lyme_disease.aspx					
May 1, 2014 - Jun 7, 2014	5,938 (100.00%)	5,156 (100.00%)	00:01:15	62.88%	56.42%
May 1, 2013 - Jun 7, 2013	1,141 (100.00%)	914 (100.00%)	00:01:34	50.89%	45.57%
% Change	420.42%	464.11%	-19.88%	23.55%	23.79%

Surveillance and reporting

Vermont Blue Green Algae Tracker

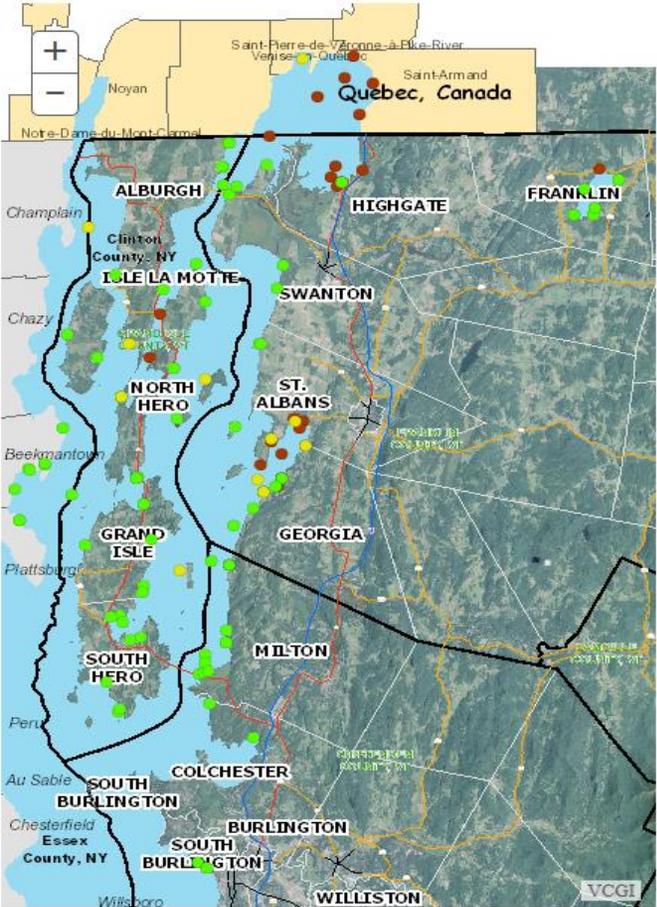
Select Lake/Region ▾
Select Monitoring Town ▾

Blue-Green Algae Testing Results

- High Alert
- Low Alert
- Generally Safe



VERMONT
DEPARTMENT OF HEALTH
VT Environmental
Public Health Tracking



Site	Site Name	Date	Test Type	Status
	Black Bridge	9/3/2015	Visual	Low Alert
31	St. Albans Bay Park	9/1/2015	Visual	High Alert
31	St. Albans Bay Park	8/31/2015	Visual	High Alert
	Black Bridge	8/26/2015	Visual	High Alert
31	St. Albans Bay Park	8/24/2015	Visual	High Alert
31	St. Albans Bay Park	8/19/2015	Visual	High Alert
	Black Bridge	8/18/2015	Visual	High Alert

About Blue-green Algae and blooms
Wind and waves can move algae around. Blooms can appear or disappear very rapidly 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, or a private association.
- It is not possible to tell whether algae blooms are toxic by looking at them. Everyone should become familiar with the appearance of blue-green algae blooms and avoid them.
- See examples of what Blue-green Algae does and does not look like [here](#).

Be cautious and avoid blooms

- Children are at higher risk because they are more likely to play near the shoreline and drink water while swimming.
- Pets will also drink the water and lick off algae that may be caught in their fur.
- Avoid boating, jet-skiing and swimming through blooms

If you become ill
If you or someone you know may have become ill because of exposure to Blue-green Algae, seek medical attention and then contact the Health Department at 1-800-439-8550.

 [Department of Health Blue-green Algae website](#)
[Environmental Public Health Tracking Portal](#)




VERMONT DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

**WATERSHED
MANAGEMENT DIVISION**



Surveillance and reporting

To report a tick sighting:
1. Zoom to location on map.
2. Click on "New Report" icon.
3. Click on map to mark location.
4. Fill out the form, then submit by clicking 'X'.

[Tick Identification Help](#)
[More help with tick ID here](#)

 New Report

Hover over or click on a tick icon to view report detail.

-  Deer tick
-  Dog tick
-  Lone star tick
-  Other
-  Don't know

Enter a town name:

[Contact us](#)

Quick Links
[Deer Tick Seasonality Chart](#)
[Deer Tick Life Cycle](#)

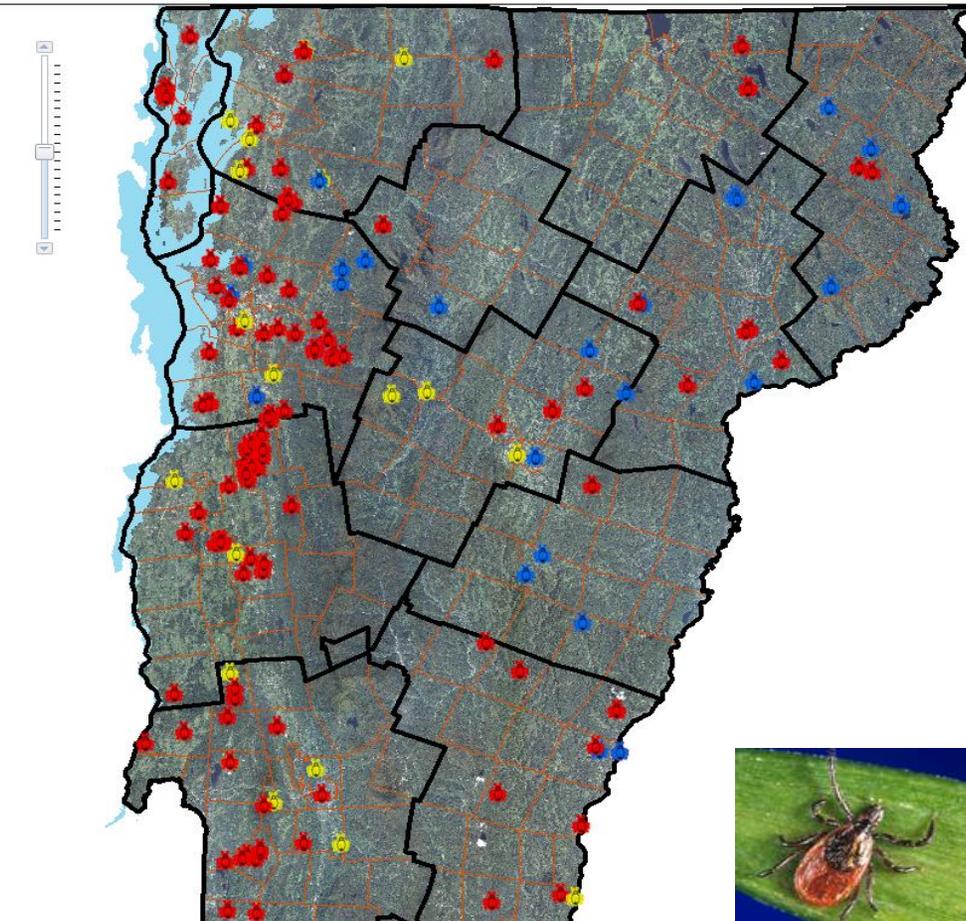
You will leave Tick Tracker site using the links below:
[Tickbite Prevention Tips](#)
[Vermont Tracking Portal](#)

Vermont Tick Tracker

A resource to help us [Be Tick Smart](#)



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DEPARTMENT OF HEALTH
VT Environmental
Public Health Tracking



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Partnerships

Partnerships

- Extreme heat
 - National Weather Service
- Blue-green algae
 - Lake and drinking water monitoring
 - Drinking water system response plans
- Tick & mosquito monitoring
- ECO AmeriCorps
- State agency plans
 - Comprehensive Energy Plan
 - Hazard Mitigation Plan
- Non-governmental organizations
 - Community Resilience Organizations
 - Resilient Vermont

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Next steps

Next steps

- Additional analyses and disease projections
- Identify potential interventions
- Develop & implement **Adaptation Plan**
 - Enhanced surveillance
 - Heat Response Plan
 - Local vulnerability assessment guidance
 - Green infrastructure initiatives
- Evaluation

Acknowledgments

- Centers for Disease Control and Prevention, Climate and Health Program
- Vermont Department of Health
 - Nate Schafrick, Climate Change Adaptation Program Epidemiologist
 - David Grass, Environmental Health Surveillance Chief
 - Heidi Hales, Vermont Agency of Natural Resources (former Climate Change Adaptation Program Coordinator)
 - Martin Fogl, McGill Medical School (former Climate Change Adaptation Program Epidemiologist)
 - Many others...
- Vermont State Climate Office
 - Lesley-Ann Dupigny-Giroux, Vermont State Climatologist
 - Evan Oswald, PACE Post-doctoral Fellow, University of Vermont



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Climate Change Adaptation Program

Vermont Department of Health