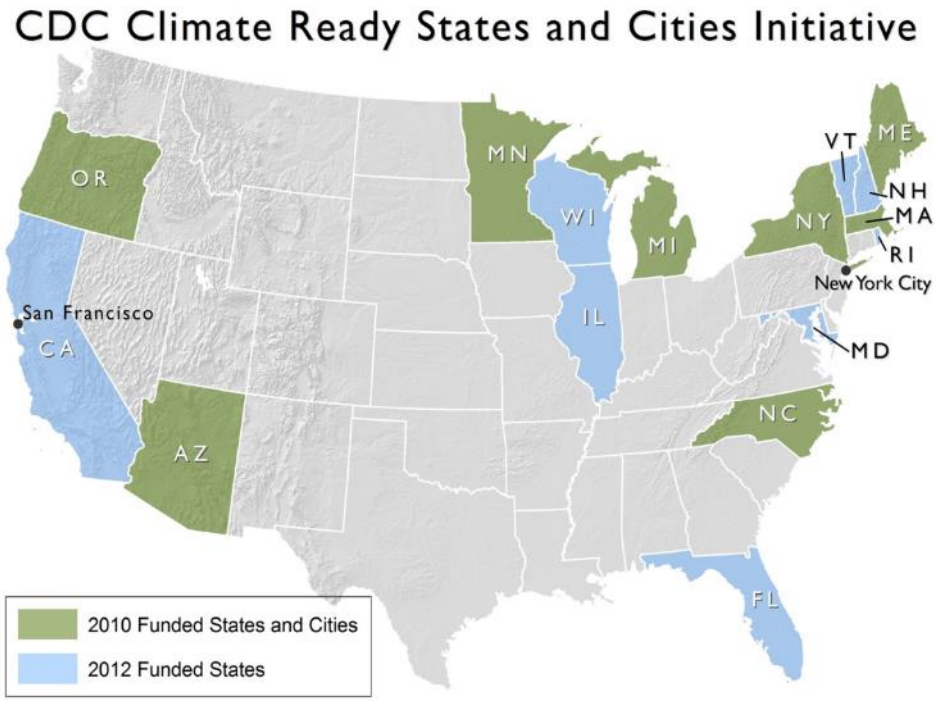
Building Resilience Against Climate Effects in Vermont

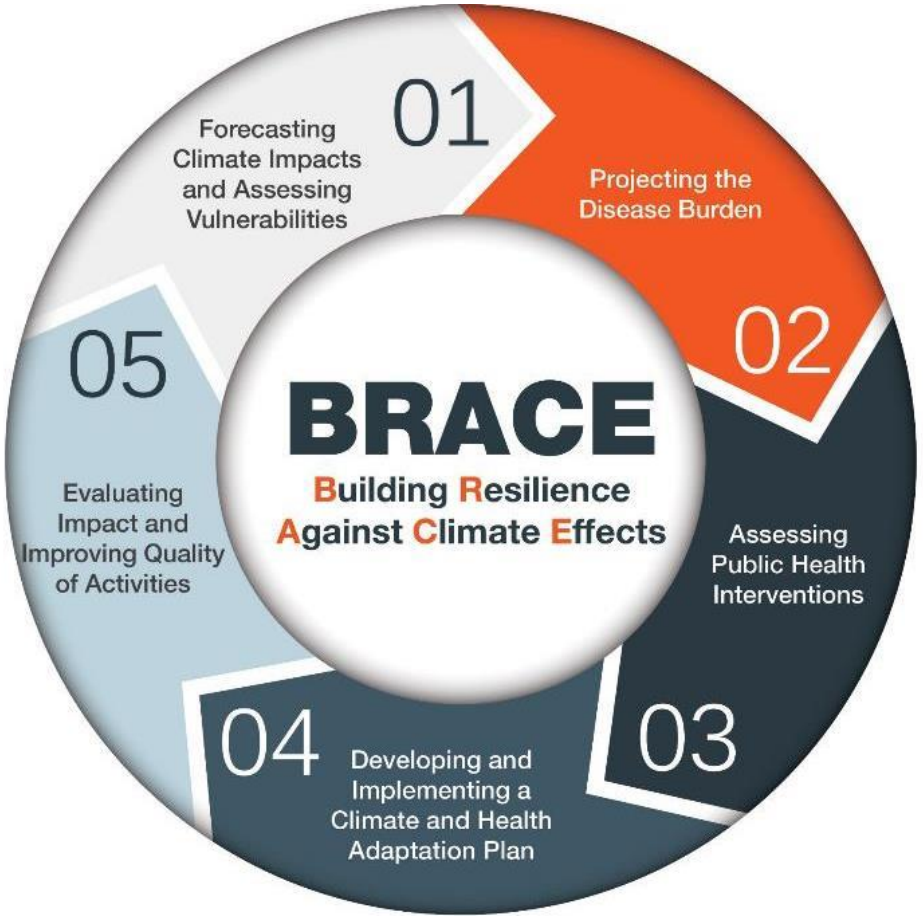
VERMONT
DEPARTMENT OF HEALTH

Jared Ulmer, MPH, AICP
Climate & Health Program Coordinator
January 25, 2018

Building Resilience Against Climate Effects



16 states, 2 cities

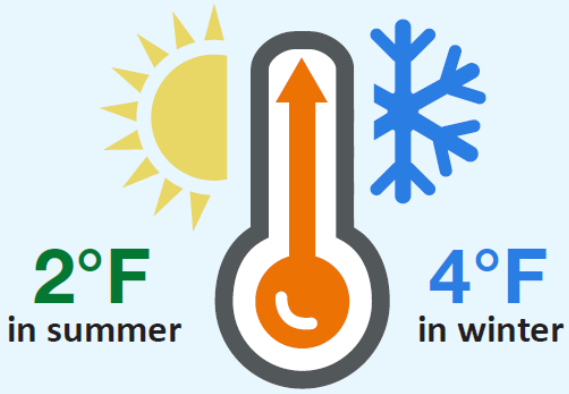


Key message #1:

Climate change is already happening, and is expected to continue

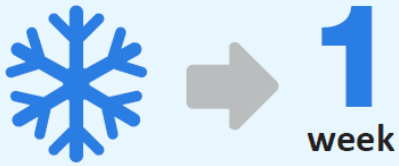
Climate change is already happening in Vermont

IN THE PAST 50 YEARS:

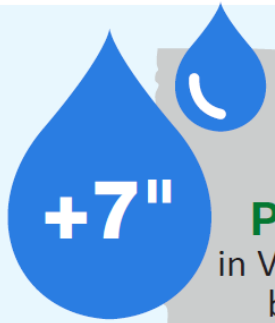


Average
AIR TEMPERATURES
have increased

SPRING
now arrives
two weeks
earlier



WINTER
starts
one week
later



ANNUAL PRECIPITATION
in Vermont has increased by almost 7 inches.

Days with more than 1 inch of rain occur almost twice as often as they did 50 years ago.

NEARLY 100% OF CLIMATE SCIENTISTS AGREE:

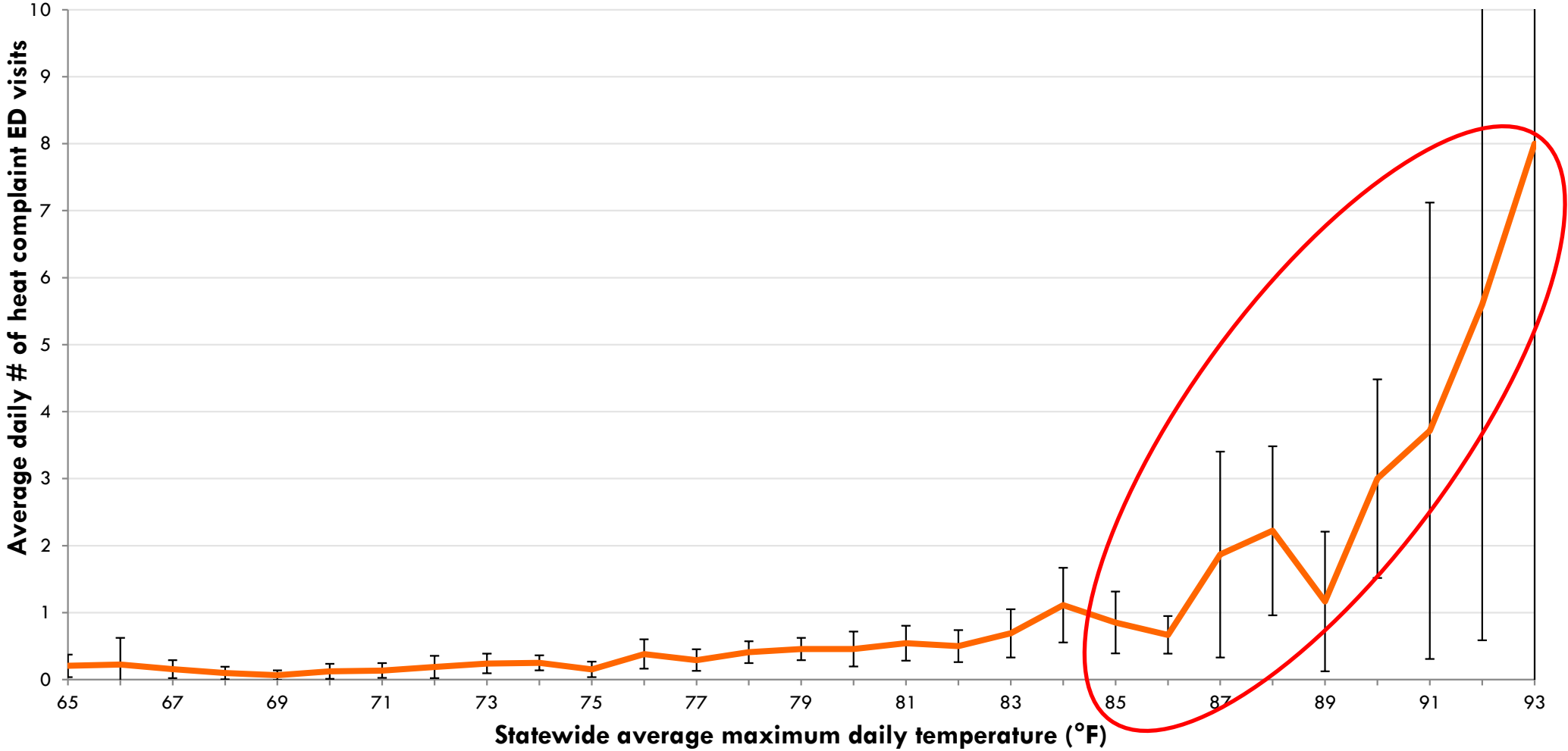
Greenhouse gas emissions from fossil fuel combustion in cars, power production, and manufacturing are causing the temperature of the earth to rise.

Key message #2:

Climate change is increasing health risks in Vermont

Hot weather already leads to increased illness & death in Vermont

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

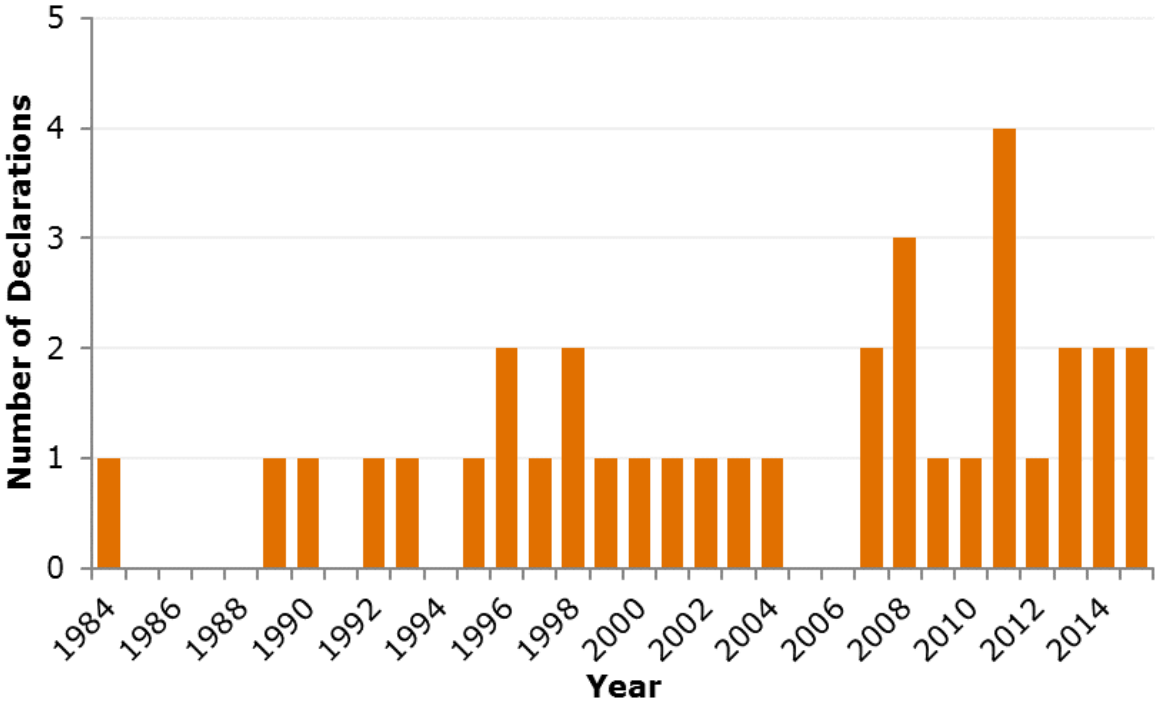


Source: Vermont Early Aberration Reporting System

Error bars indicate 95% confidence intervals

Extreme weather events have become more frequent and some have had serious health consequences

- Vermont had 18 federally-declared disasters from 2007-2016, twice as many as during the previous 10 years

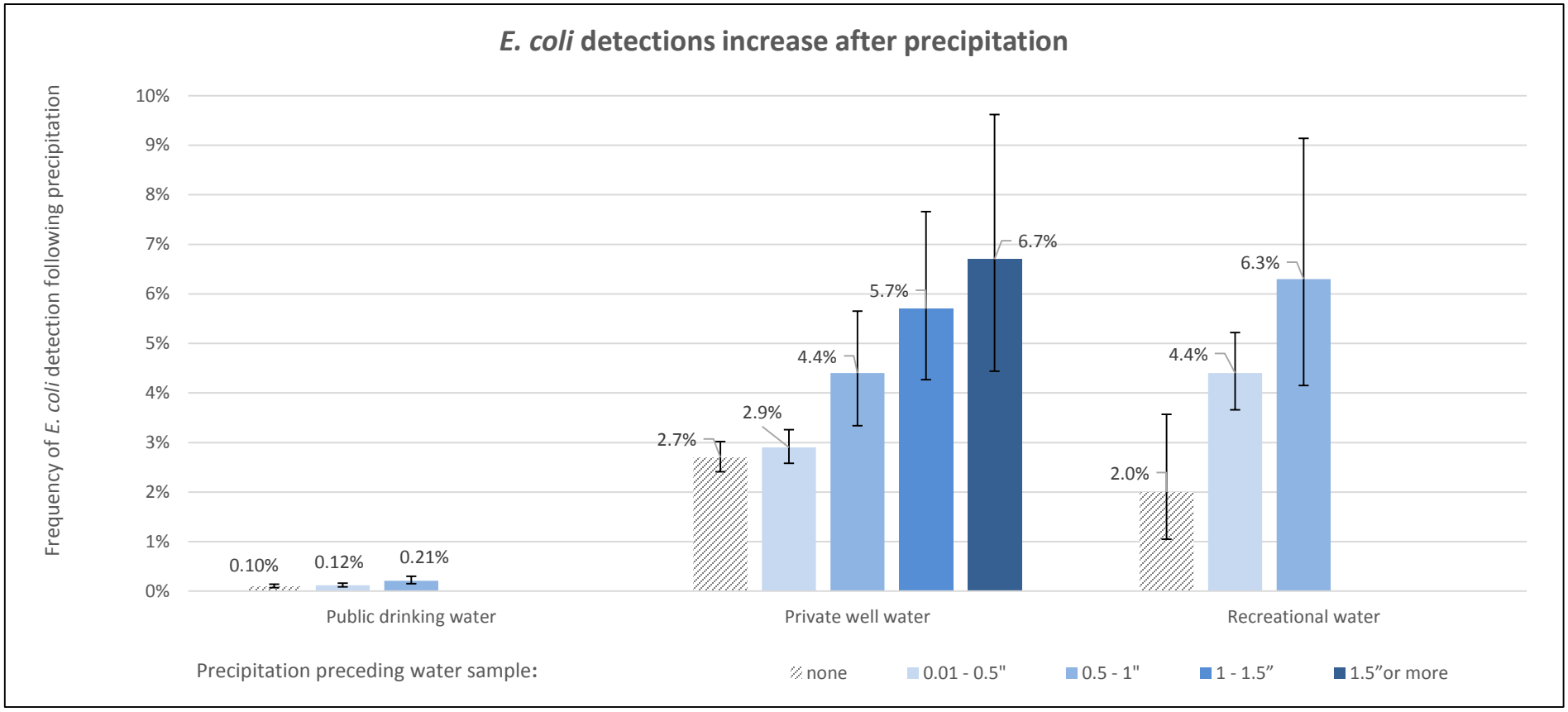


Disaster declarations in Vermont, 1984 to 2015 (data from FEMA 2016)

2017 windstorm, Colchester (source: Burlington Free Press)

2018 ice jam flooding, Hardwick (source: WCAX)

Heavy rains can increase **contaminated runoff** into drinking and recreational waters, leading to illness

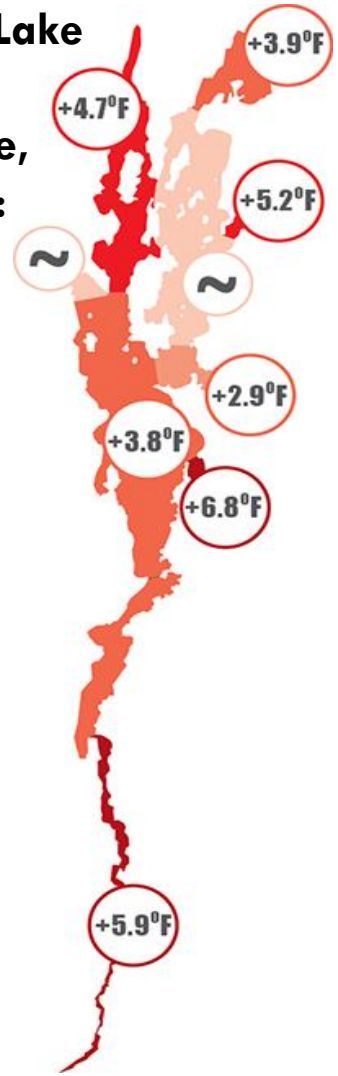


Percent of samples with *E.* coli detected in drinking water or *E.* coli above 235cfu/100 ml in recreational water following precipitation. *Few samples were available for public drinking water and recreational water for precipitation over 1 inch. These samples were combined with those from the 0.5 – 1” category. (*source: Vermont Department of Health)*

Cyanobacteria (blue-green algae) blooms occur each summer and can produce harmful toxins

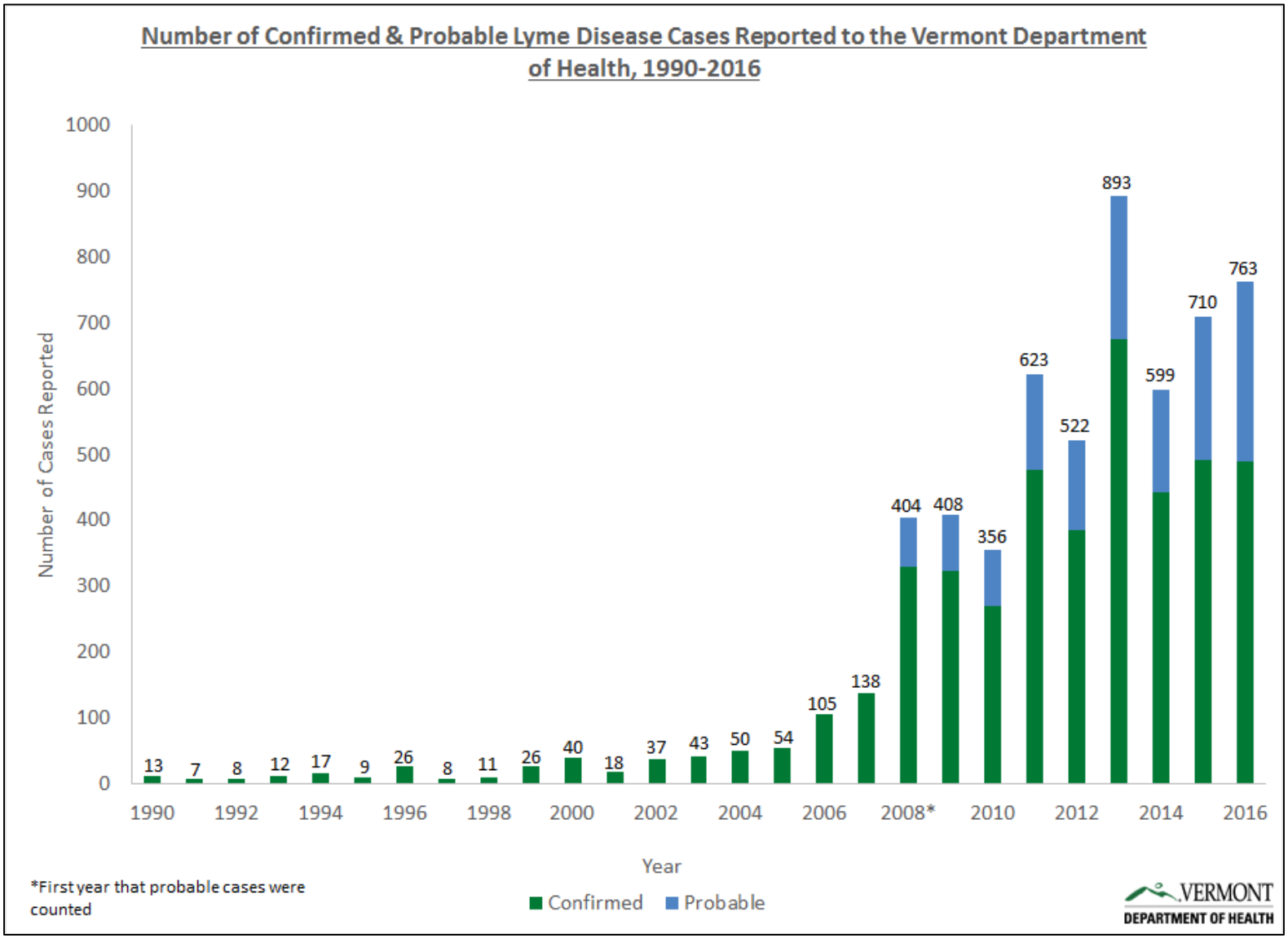
2017, Lake Carmi (source: Seven Days)

Change in Lake Champlain temperature, 1964-2009:

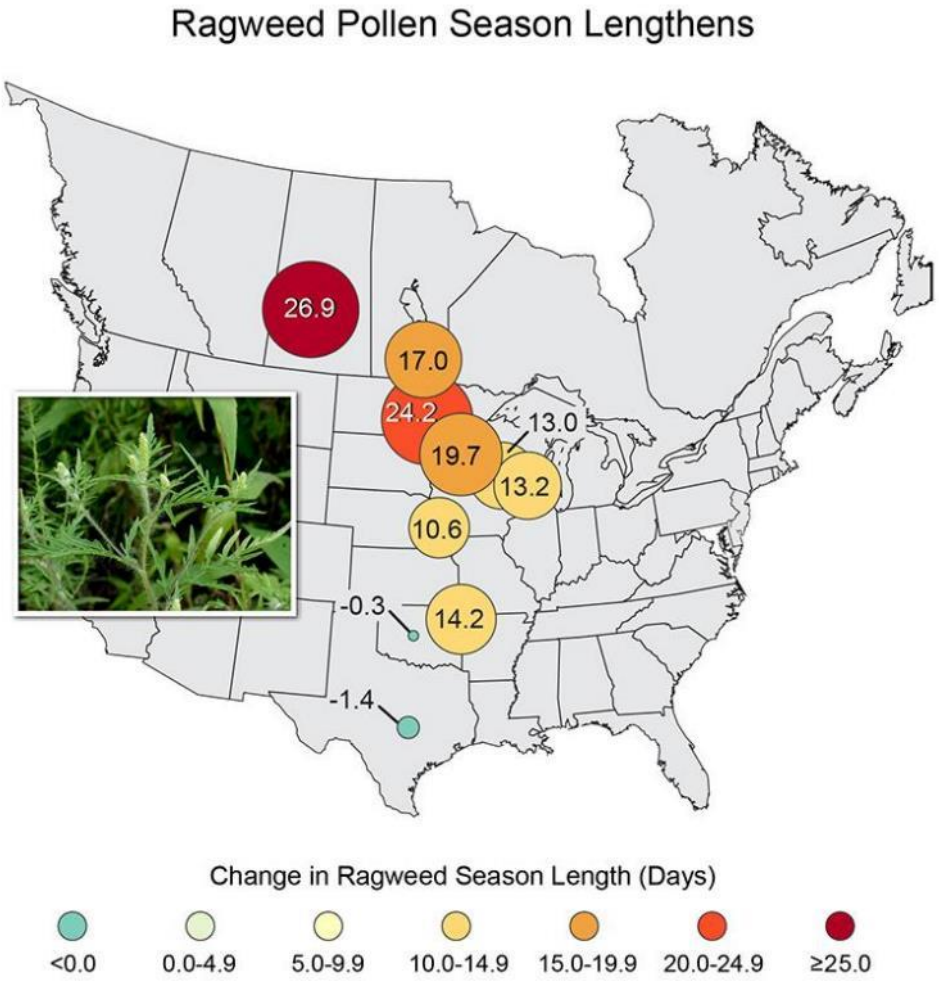


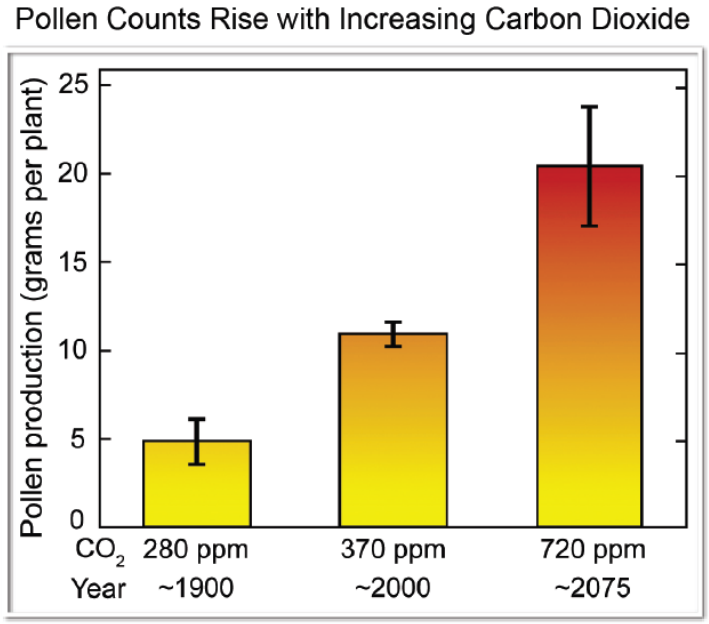
Source: Lake Champlain Basin Program, 2015 State of the Lake Report

Warming conditions contribute to increased risk of **tick and mosquito-borne diseases** in Vermont



Longer warm season and more CO_2 increases pollen, triggering **allergies & asthma attacks**.





Source: US GCRP 2016, adapted from Ziska 2011.

Climate change impacts and uncertainties can increase **stress, anxiety, and depression**

Source: US Air Force

Source: Burlington Free Press

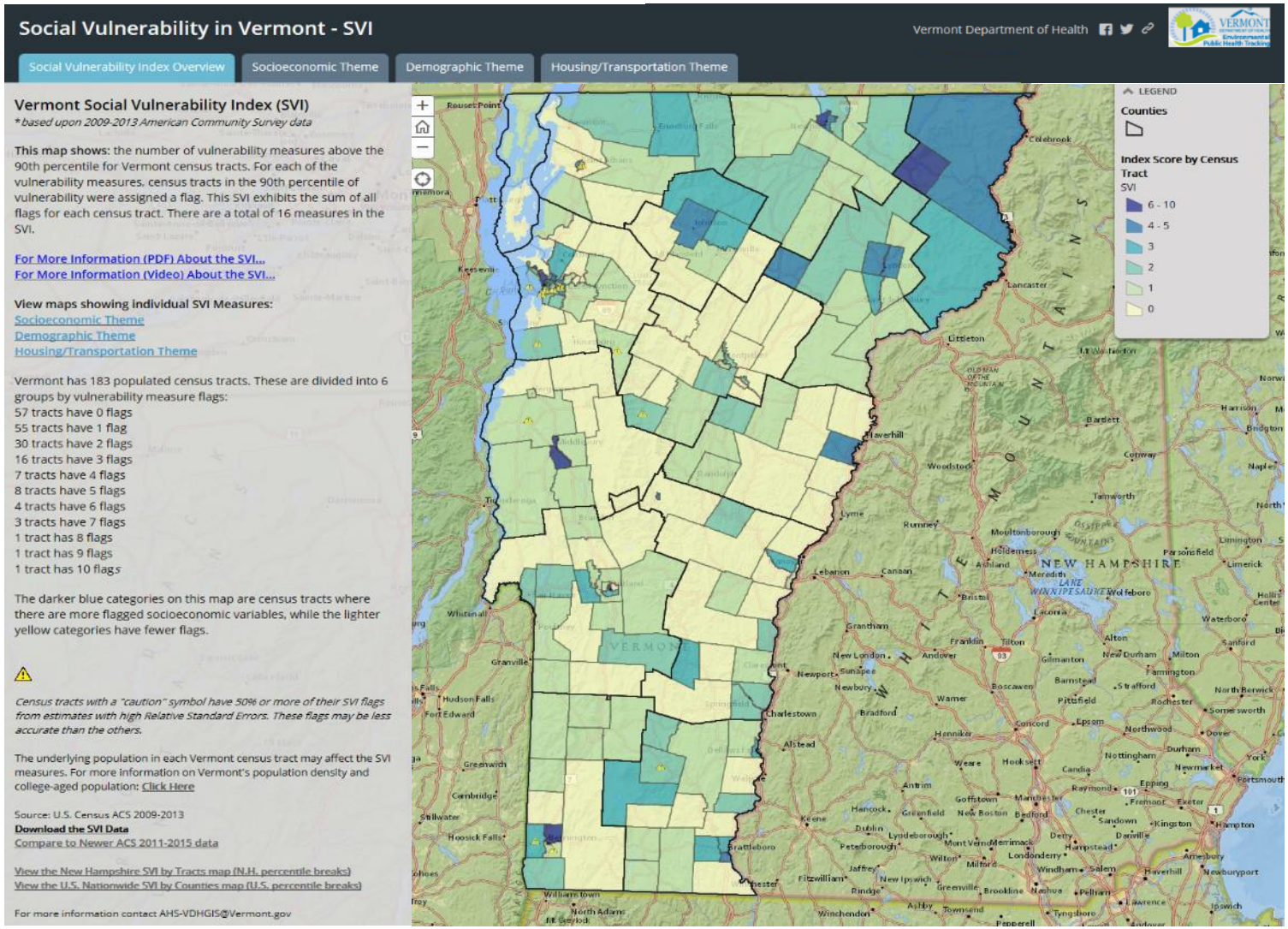
Key message #3:

Everyone's health is threatened by climate change, though the threat is greater for some

Climate & health vulnerability

- Climate change will disproportionately affect:
  - People more **exposed** to climate effects
  - People with pre-existing **health vulnerabilities**
  - People with limited **adaptation resources**

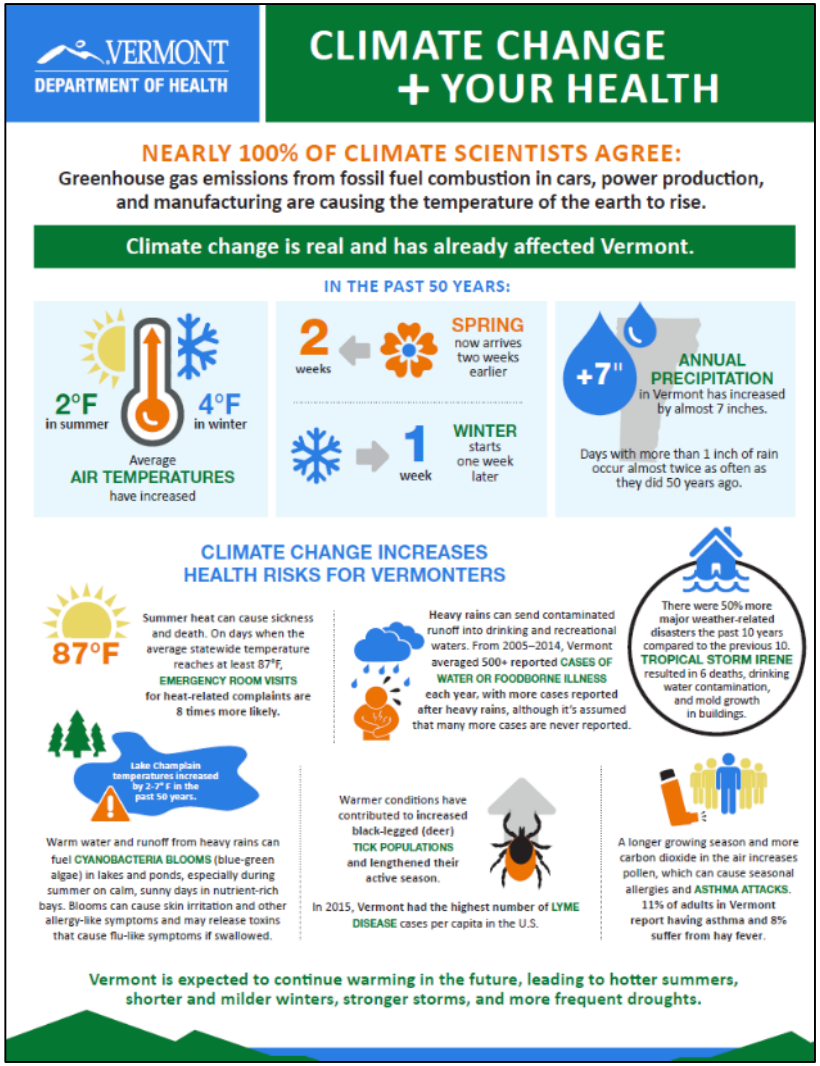
Vulnerability mapping



Key message #4:

Responding to climate change can benefit health now and in the future

General outreach & education



NEW ENGLAND PUBLIC HEALTH TRAINING CENTER

The UNIVERSITY of VERMONT

VERMONT DEPARTMENT OF HEALTH

Hot weather preparedness

VERMONT
DEPARTMENT OF HEALTH

Heat Safety Tips

When it starts to get hot outside, there are important steps you can take to keep yourself and your friends and family safe. Beat the heat with these tips.

Stay Cool

- Stay in the shade, in air-conditioning if you can, or in cool places such as basements
- Wear lightweight, light-colored, loose-fitting clothing
- Take cool showers
- Use fans, but don't rely on them as the only way to stay cool
- Go to public buildings that are air-conditioned

Stay Hydrated

- Drink more water than usual, especially if you are exercising or being active outdoors
- Be proactive, don't wait until you are thirsty to drink water
- Don't drink alcoholic and caffeinated beverages

Stay Informed

- Follow local weather and news reports
- Sign up to for weather alerts at vtalert.gov
- Try out the National Weather Service Experimental Enhanced Hazardous Weather Outlook Map: www.weather.gov/btv/ehwo
- Check Health Department and Vermont Emergency Management social media

Never leave children, people with disabilities or pets inside a parked vehicle.

Listen to Your Body

- Take it easy when it's hot
- Reduce outdoor work and exercise and limit it to the cooler parts of the day
- Ask for help if you feel sick
- Stop what you are doing if you feel faint or weak
- Be more cautious if you have a chronic health condition

Don't Be a Stranger

- Check on your loved ones and neighbors, especially if they are older or have chronic health conditions
- Make sure they are drinking enough water and staying cool
- Remind them to take heat seriously

Cool Your Home

- Draw shades to keep out the sun
- Close windows during the day when it's hotter outside than inside
- Open windows at night when it's cooler outside than inside
- Use fans to blow in cooler outside air or vent out warmer inside air
- Limit use of the stove, oven and other heat-generating appliances

108 Cherry Street • Burlington, VT 05402 • HealthVermont.gov • (802) 863-7220 or (800) 439-8550

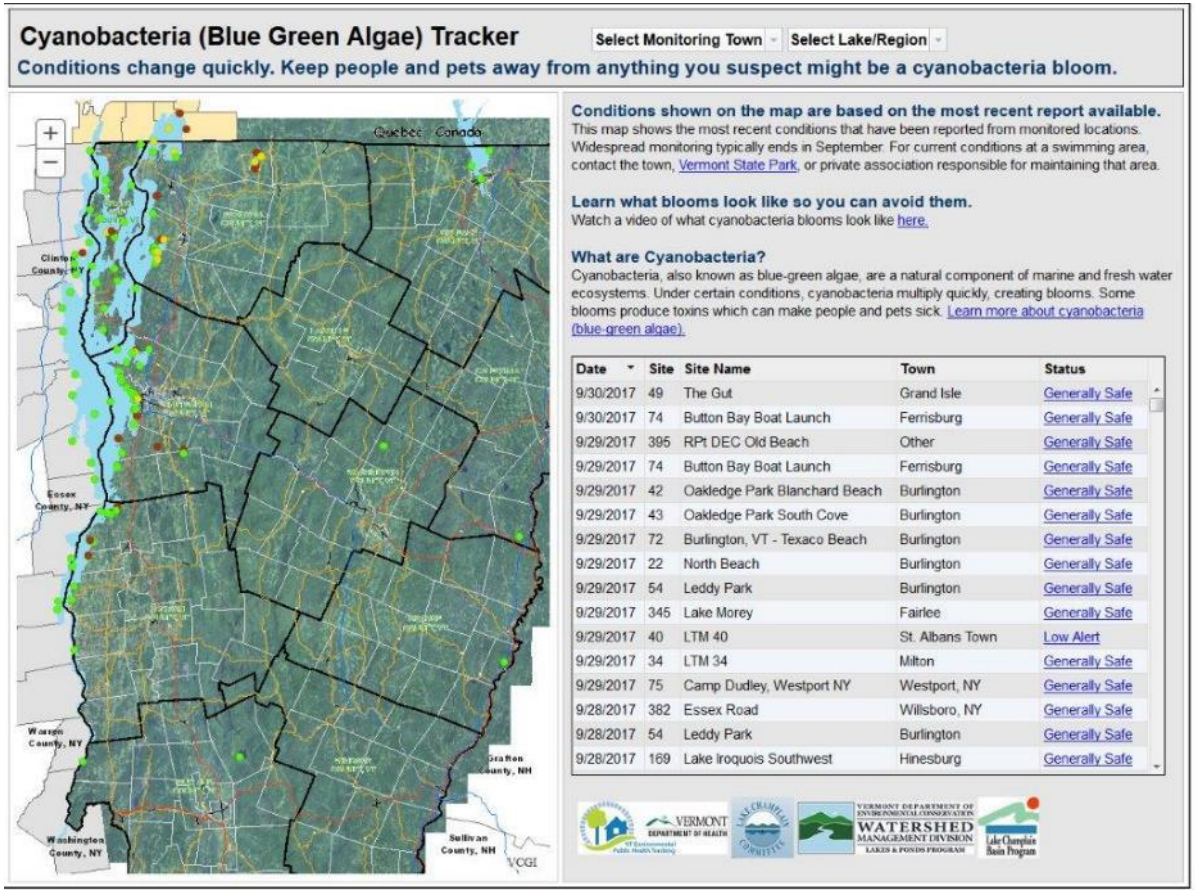
DRAFT: January 2018

Partners:

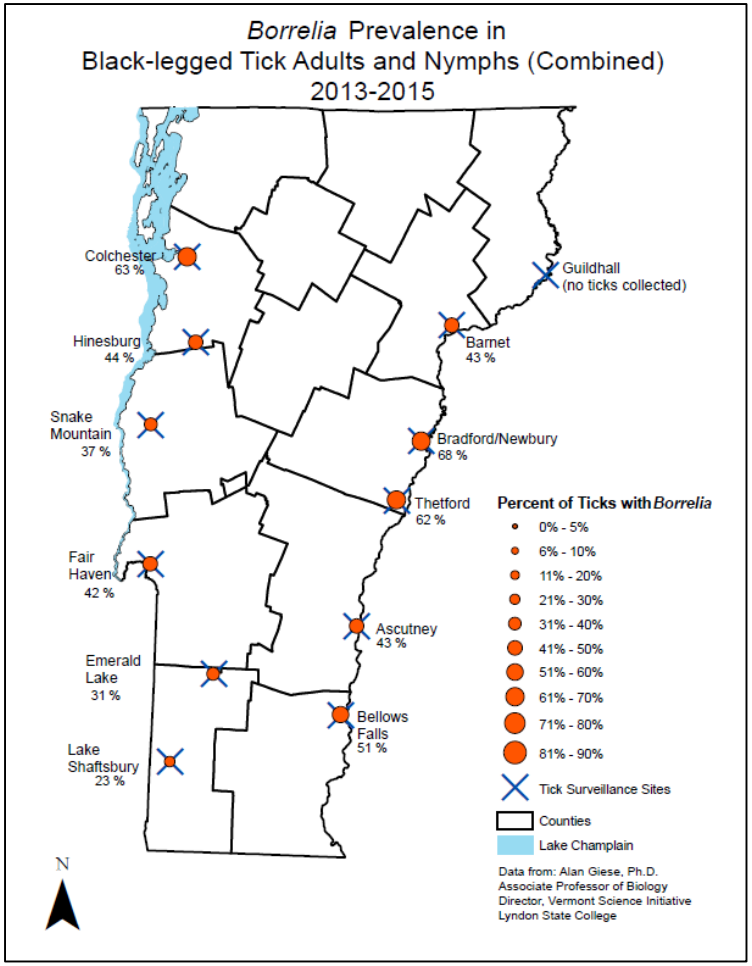
- National Weather Service
- Vermont Emergency Management
- VDH Division of Emergency Prep, Response, and Injury Prevention
- American Red Cross of New Hampshire and Vermont
- Vermont 2-1-1
- Agency of Human Services
- Department of Aging and Independent Living
- Vermont Occupational Safety and Health Administration
- Vermont Safety & Health Council
- Area Agencies on Aging
- Visiting Nurses Association
- Support and Services at Home
- Local Health Offices
- Denise Alosa (VT City Marathon & SBHS Athletic Trainer)

Cyanobacteria monitoring & preparedness

Source: Lake Champlain Committee



Tickborne disease monitoring & outreach



front porch forum™

Be Tick Smart: Repel, Inspect, Remove

Amelia Ray • amelia.ray@vermont.gov • Cherry S
Announcement

A growing number of Vermonters are falling ill with diseases spread by ticks, such as Lyme disease and anaplasmosis, which are caused by the black-legged tick, also known as deer tick.

That is why May is the first annual Tickborne Disease Awareness Month in Vermont.
These diseases are preventable, and the Vermont Department of Health is educating Vermonters about what they can do to stay safe while enjoying the outdoors in the warmer months ahead.

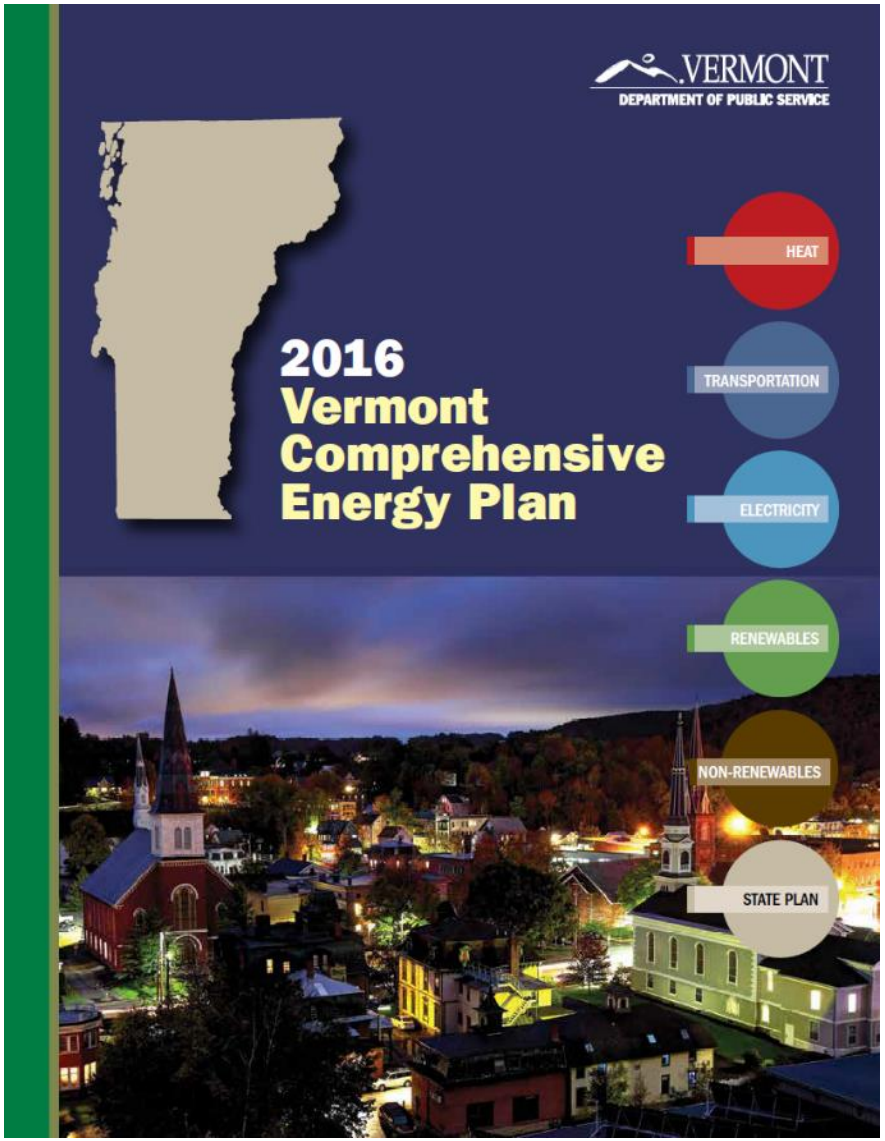
Before going outside, be sure to use insect repellent (EPA-approved for ticks), inspect yourself, your children and pets for ticks after coming indoors and remove ticks promptly with tweezers.

And be sure to repel, inspect, and remove when youre out for Green Up Day on May 7.

For more information about tickborne diseases, go to:
http://healthvermont.gov/prevent/zoonotic/tickborne/Tickborne_diseases.aspx
For information on Green Up Day, visit: http://www.greenupvermont.org/

EMAIL AUTHOR REPLY TO FORUM

Integrating health into energy planning



Guiding Goals When Developing and Evaluating Energy Policy

Healthy Vermonters

- **Encourage active lifestyles** and reduced energy use through compact development and by providing safe opportunities for walking, biking, and using public transit.
- **Improve outdoor air quality** by reducing emissions from transportation, home and business heating and energy usage, and energy production.
- **Improve the health of indoor environments** and reduce energy bills through improved building weatherization and the use of advanced heating and ventilation technologies.
- **Reduce negative health impacts** expected to occur as a result of climate change.
- **Assess health impacts of our energy system** in order to avoid or mitigate potential negative impacts, especially for the most vulnerable population groups such as the elderly, low-income households, and those with chronic or pre-existing medical conditions.

and toxins, by using efficient and clean combustion technologies, along with shifting away from fossil fuels.

Using trees to save energy and protect health

- **200 trees** provided to residents of Bennington and Newport in June 2017
  - High historic rate of heat illnesses
  - Lacking urban tree canopy
- Expected benefits include:
  - Increased shade & cooling
  - Reduced energy costs
  - Many other health & environmental benefits!

Partners:

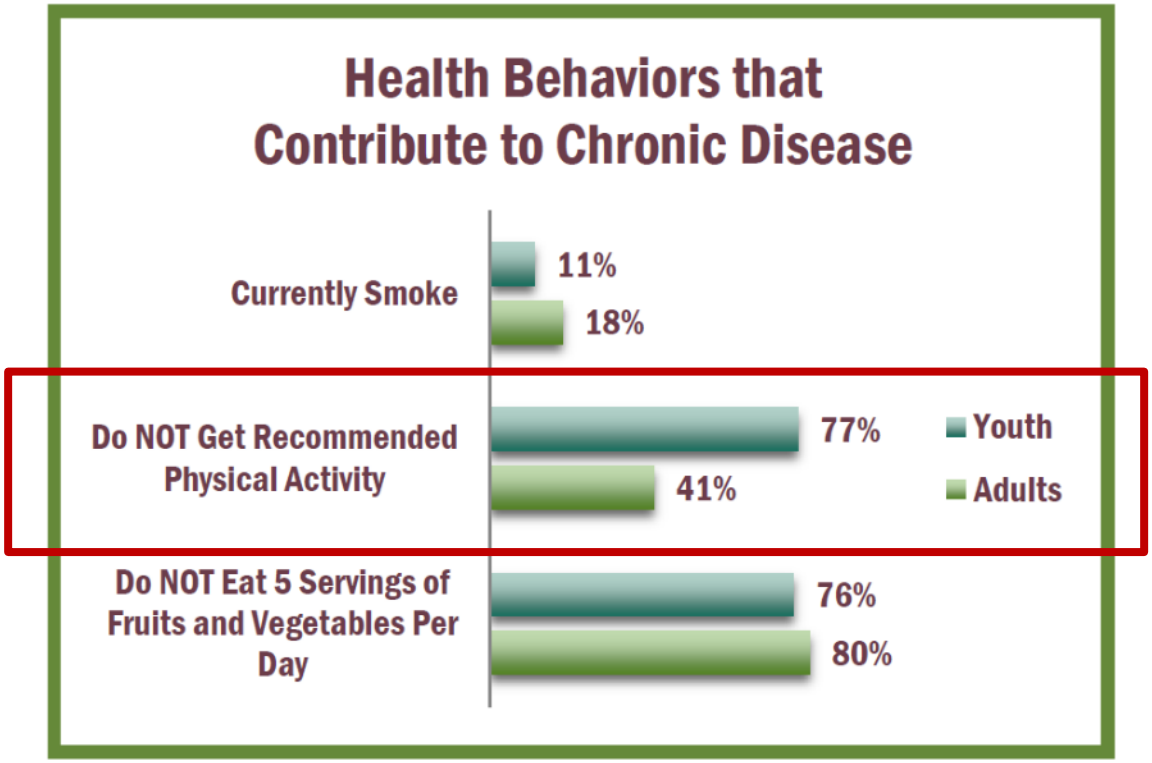
VERMONT URBAN & COMMUNITY FORESTRY
Cultivating connections to grow trees in our communities

VERMONT DEPARTMENT OF HEALTH

Arbor Day Foundation

ENERGY-SAVING TREES

Supporting active transportation strategies



Data Source: 2016/2015 BRFSS and 2015 YRBS
Data are age-adjusted to the U.S. 2000 population

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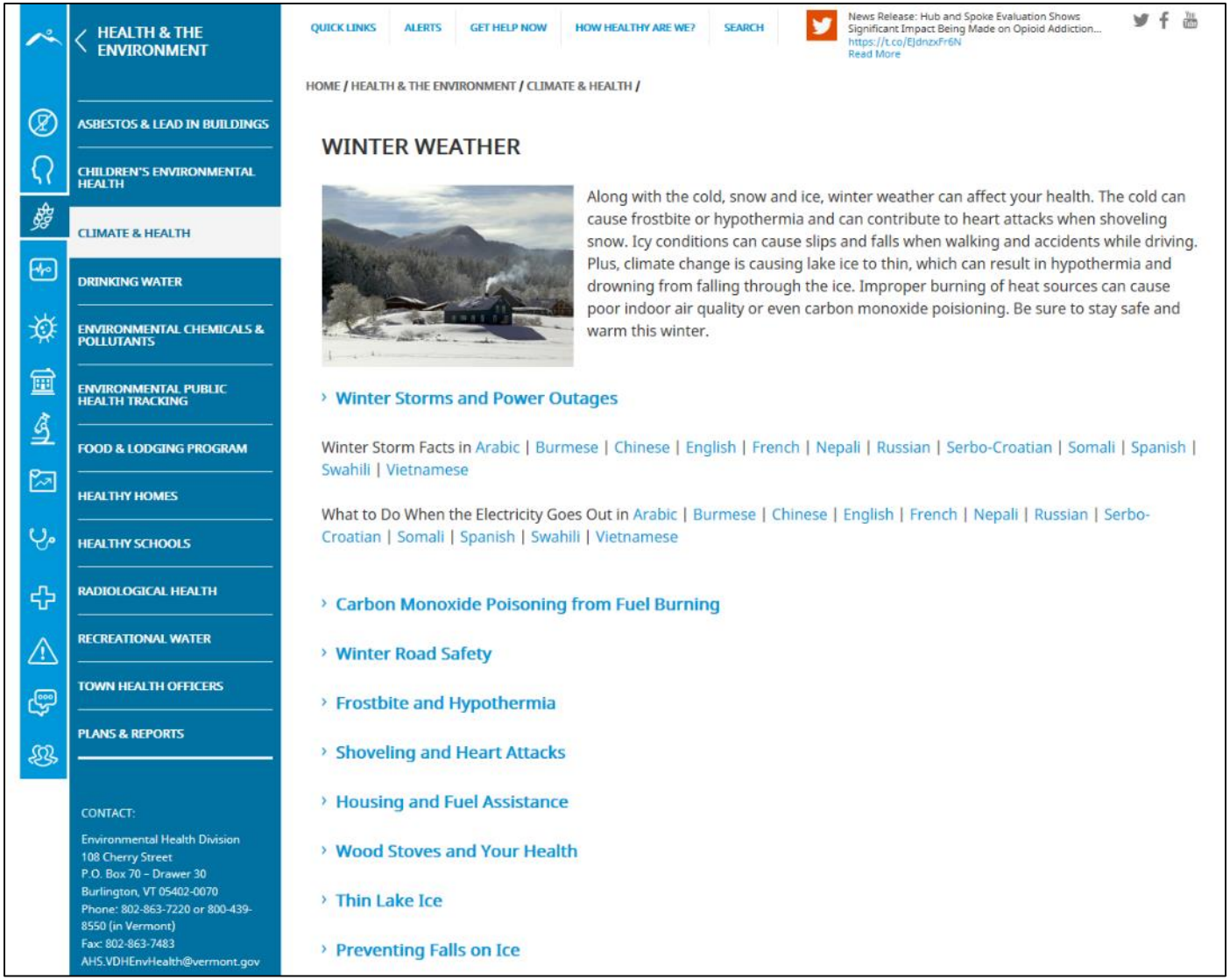
healthvermont.gov/climate

New Winter Weather webpage



HEALTH & THE ENVIRONMENT

ASBESTOS & LEAD IN BUILDINGS
CHILDREN'S ENVIRONMENTAL HEALTH
CLIMATE & HEALTH
DRINKING WATER
ENVIRONMENTAL CHEMICALS & POLLUTANTS
ENVIRONMENTAL PUBLIC HEALTH TRACKING
FOOD & LODGING PROGRAM
HEALTHY HOMES
HEALTHY SCHOOLS
RADIOLOGICAL HEALTH
RECREATIONAL WATER
TOWN HEALTH OFFICERS
PLANS & REPORTS

CONTACT:
Environmental Health Division
108 Cherry Street
P.O. Box 70 – Drawer 30
Burlington, VT 05402-0070
Phone: 802-863-7220 or 800-439-8550 (in Vermont)
Fax: 802-863-7483
AHS.VDHEnvHealth@vermont.gov

QUICK LINKS | ALERTS | GET HELP NOW | HOW HEALTHY ARE WE? | SEARCH

News Release: Hub and Spoke Evaluation Shows Significant Impact Being Made on Opioid Addiction... https://t.co/EJdnzxFr6N Read More

HOME / HEALTH & THE ENVIRONMENT / CLIMATE & HEALTH /

WINTER WEATHER

Along with the cold, snow and ice, winter weather can affect your health. The cold can cause frostbite or hypothermia and can contribute to heart attacks when shoveling snow. Icy conditions can cause slips and falls when walking and accidents while driving. Plus, climate change is causing lake ice to thin, which can result in hypothermia and drowning from falling through the ice. Improper burning of heat sources can cause poor indoor air quality or even carbon monoxide poisioning. Be sure to stay safe and warm this winter.

› Winter Storms and Power Outages

Winter Storm Facts in Arabic | Burmese | Chinese | English | French | Nepali | Russian | Serbo-Croatian | Somali | Spanish | Swahili | Vietnamese

What to Do When the Electricity Goes Out in Arabic | Burmese | Chinese | English | French | Nepali | Russian | Serbo-Croatian | Somali | Spanish | Swahili | Vietnamese

› Carbon Monoxide Poisoning from Fuel Burning
› Winter Road Safety
› Frostbite and Hypothermia
› Shoveling and Heart Attacks
› Housing and Fuel Assistance
› Wood Stoves and Your Health
› Thin Lake Ice
› Preventing Falls on Ice

Wood Heat & Indoor Air Quality

VERMONT

Wood Heat and Indoor Air Quality

Wood provides a local, renewable and affordable heating fuel for many Vermonters. In fact, 38% of Vermont homes burn wood for heat, either as their main or second source of heat.

Using an older stove or not burning wood properly can result in poor air quality both inside and outside your home, which can cause health problems. Following a few simple steps will reduce air pollution, burn less wood, and save you money.

1. Burn dry wood.

Wood that isn't properly dried won't burn easily and will produce a lot of smoke.

- "Season" split cord wood for six months to one year before you burn it by stacking it off the ground in a pile or in a wood shed. Keep the pile covered while allowing for plenty of air flow.
- Use a moisture meter or look for other signs of dryness—such as cracking on the ends of the logs or a hollow sound when two pieces are knocked together.
- Burn cord wood when its moisture content has dropped to 15 to 20%.

2. Maximize your stove's efficiency.

- **Start your fire from the top down.** Stack larger logs on the bottom, then thinner logs, and add sticks, birch bark or wood chips on top. Light the top of the pile.
- **Burn it hot—a hot fire is a cleaner fire.** Use a stack thermometer to monitor the temperature. A hot fire produces little-to-no visible smoke. In very cold weather, you may see harmless water vapor.
- **Only burn dry, natural wood.** Burning trash, plastic or treated wood releases dangerous fumes, and it's illegal.
- **Don't let it smolder.** A smoldering fire doesn't give off much heat, wastes fuel, creates excessive smoke, and builds up creosote in your chimney. Don't overload the fire box or close the damper. For overnight use, burn it hot in the evening and re-light it in the morning.

3. Switch to a cleaner, more efficient stove

Modern wood stoves are certified by the EPA (Environmental Protection Agency). They reduce wood smoke and burn less wood for the same level of heat as older stoves. Older, uncertified stoves should be recycled or thrown away.

Pellet stoves are even more efficient and generate less pollution and wood ash. Wood pellets have a very low moisture content that provides a cleaner, more consistent fire. Pellet stoves can be loaded with several days' worth of pellets that are automatically fed to the fire. Ask your stove dealer to recommend a quality pellet brand suited for your stove.

4. Seal air leaks and add insulation.

Seal and insulate around doors, windows and electrical outlets to stay comfortable and spend less money on heating and cooling. This also helps keep outdoor air pollutants outside.

5. Maintain your stove and chimney.

Make sure your stove is installed and serviced by a professional and your chimney is swept once a year to clean out any accumulated creosote, which is a fire hazard.

December 2017

How Wood Burning Can Affect Your Health

Wood smoke contains small particles and pollutants. Breathing it in can cause lung and eye irritation, headaches, asthma attacks, acute bronchitis, and other breathing difficulties. It can also cause health effects over the long term—such as reduced lung function, chronic bronchitis, heart conditions, and even premature death.

People most affected by wood smoke include:

- Babies and children
- Older adults
- Anyone with existing heart or lung conditions

You also may be affected by wood smoke when you go outside or from the air that comes into your home through doors, windows and cracks. In winter, outdoor pollution tends to be worst at night, especially on the coldest nights when the sky is clear and wind is calm. Air quality conditions usually improve later in the day after the sun comes up, but can sometimes stay poor for several days in a row. During these conditions, air pollution tends to be worse in low-lying valleys surrounded by hills or mountains.

Protect Your Health from Wood Smoke

- **Improve ventilation and filtration.** Proper ventilation exchanges stale indoor air for fresh, filtered air. Some heating and cooling systems or standalone systems—such as heat recovery ventilators—vent and filter indoor air.
- **Install air purifiers.** High efficiency particulate air (HEPA) filters are available for $50 to $300. Be sure to clean and replace filters regularly.
- **Use an indoor air monitor.** It can help alert you to activities that worsen air quality. Many options are available for $100 to $200.
- **Install smoke and carbon monoxide detectors.** Carbon monoxide is a colorless, odorless gas that can cause sickness and death. It can come from wood burning stoves and fuel burning appliances that aren't venting properly.
- **Reduce outdoor activity and unnecessary wood burning when air quality is poor.** This is especially important for people sensitive to wood smoke. See the resources below to help you find out when air quality conditions are poor.

To Learn More

Asthma and other lung diseases, including treatment and management strategies:

- Vermont Asthma Program: healthvermont.gov/prevent/asthma or 802-863-7330

Weatherization and efficiency improvements:

- Vermont Weatherization Program: dcf.vermont.gov/benefits/weatherization
- Efficiency Vermont: efficiencyvermont.com

Wood burning wood information, including clean burning tips and assistance programs:

- Dept. of Forests, Parks and Recreation: fpr.vermont.gov/forest/wood_biomass_energy
- BurnRight Vermont: burnrightvermont.org
- Dept. of Environmental Conservation: dec.vermont.gov/air-quality/compliance/owb

Air quality conditions in Vermont: airnow.gov and **sign up for alerts:** enviroflash.info/signup.cfm

VERMONT DEPARTMENT OF HEALTH
DEPARTMENT OF FORESTS, PARKS & RECREATION

December 2017

Community Resilience Organizations

CROs website: gocros.org

Community Resilience Self-Assessment: gocros.org/community-resilience-selfassessment

Vermont Climate Change Tools

VERMONT OFFICIAL STATE WEBSITE

VERMONT

SEARCH

CONTACT

STATE OF VERMONT

Climate Change in Vermont

- Vermont's Changing Climate
- Climate Change Effects
- Vermont's Goals
- Our Climate Solutions
- Take Action
- Data
- Interactive Tools
  - Climate Change Mapping Tool
  - Climate Data Grapher

INVESTIGATE CLIMATE CHANGE IN YOUR AREA

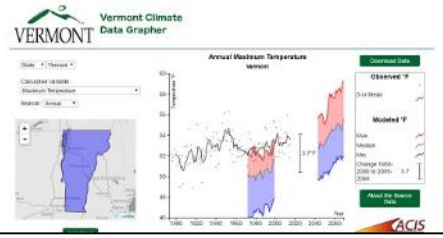
The State of Vermont is pleased to introduce two ***new*** tools developed to help Vermonters explore what climate change will mean for the state and for particular regions and communities. These tools are your gateway to scientifically sound and cost-effective decision-making relevant to climate change in Vermont. Understanding and preparing for those changes is one of the best investments we can make.

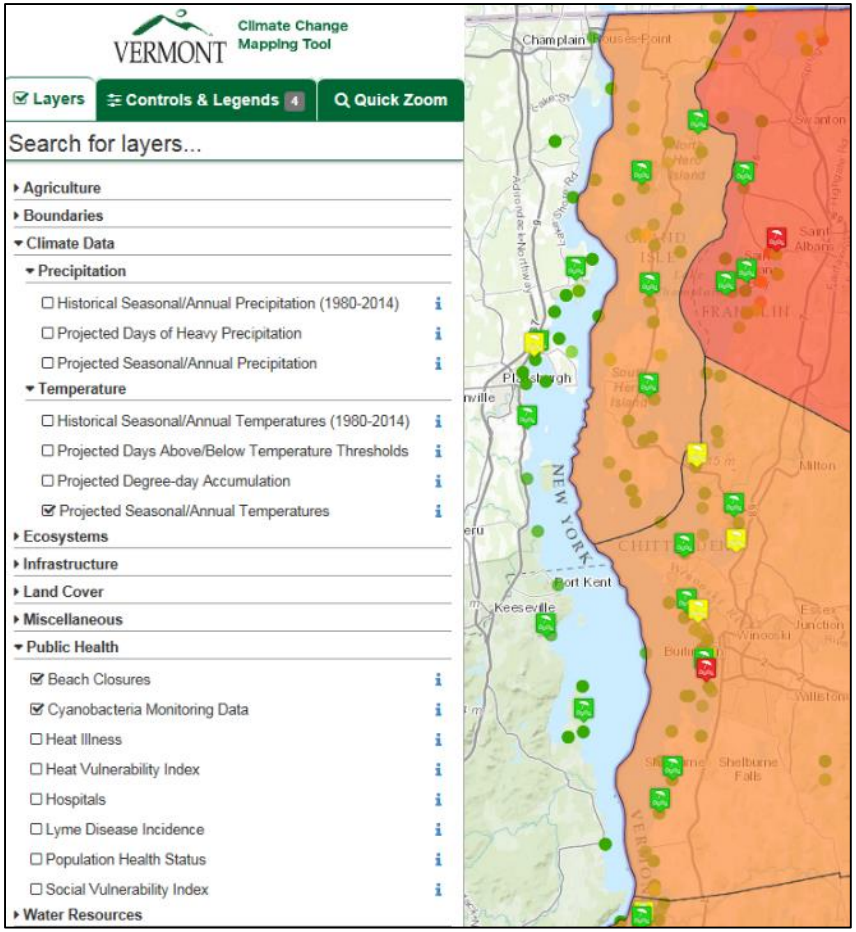
Climate Change Mapping Tool

An interactive map of climate change and related data for Vermont.

Climate Data Grapher Tool

A graphing tool that displays historic, current, and projected future climate data. Details about the map can be found here.



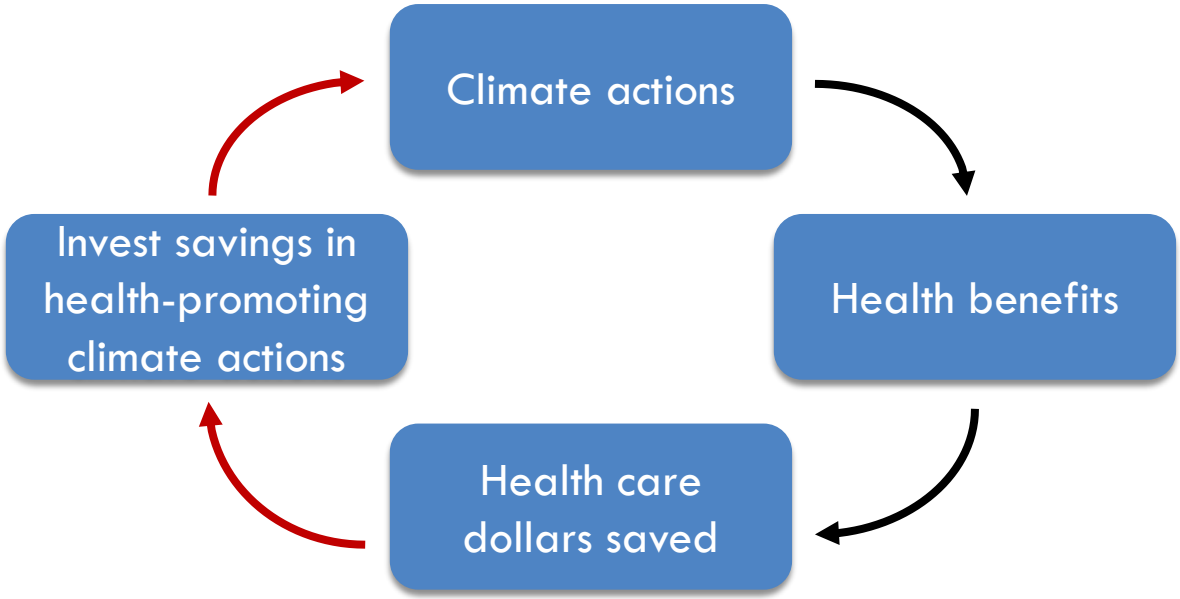


How can we support healthy climate actions?

- **Assess health and equity impacts** of proposed climate actions
- Offer language to help **communicate** about the health benefits of climate actions
- **Support funding requests** by including language about health benefits in funding proposals
- **Help develop new funding sources** to support healthy climate actions

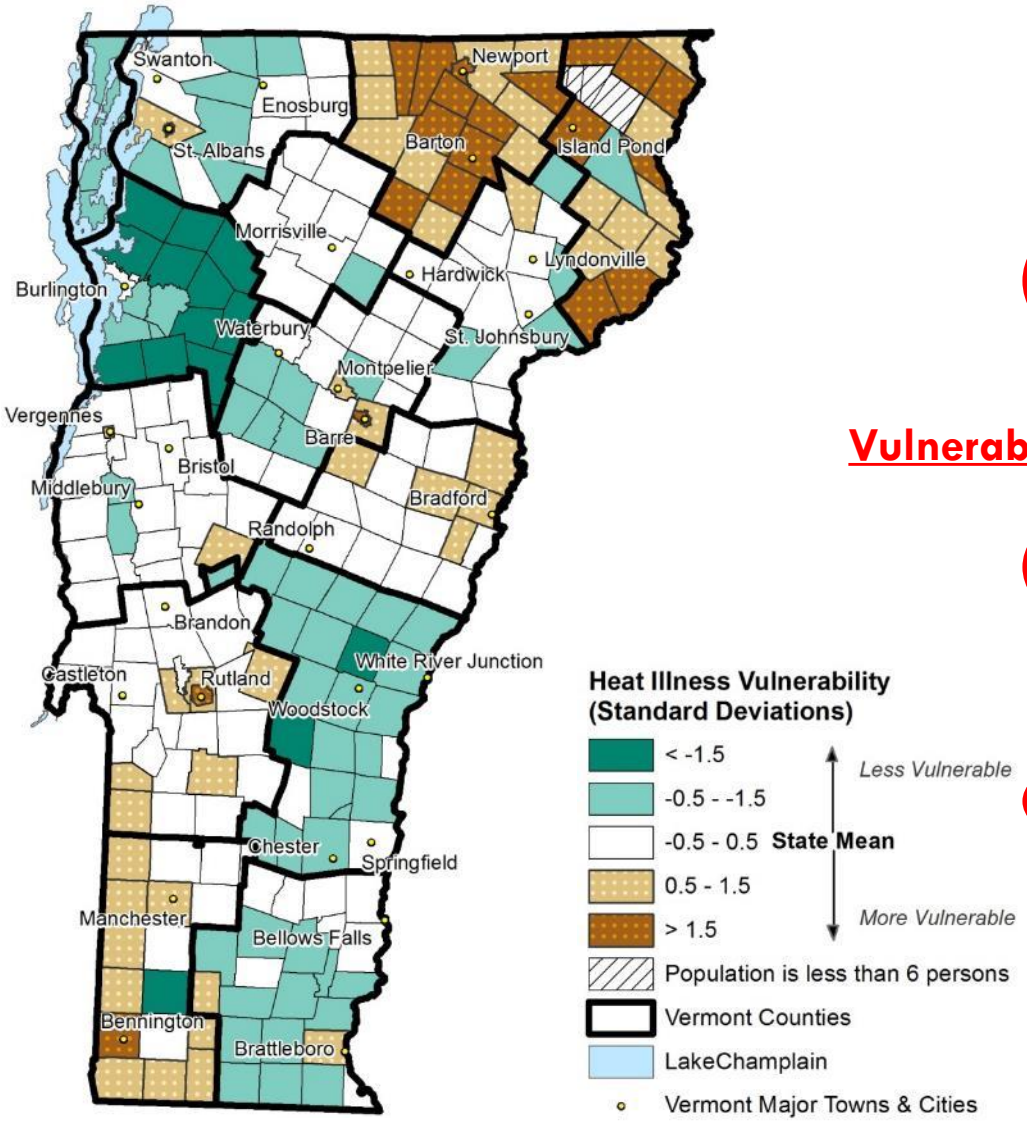
Funding healthy mitigation actions

- Develop funding streams for healthy climate actions



- Potential partners:
  - Hospitals / providers
  - ACOs / ACHs / etc.
  - Fed/state/local health care funders (e.g. Medicaid)
  - Private insurance companies
  - Philanthropic organizations
  - Banks, academic institutions, businesses

Heat Vulnerability Index



- Factors:

Exposures

- Environmental characteristics
- Climate acclimation

Vulnerabilities

- Age
- Pre-existing medical conditions

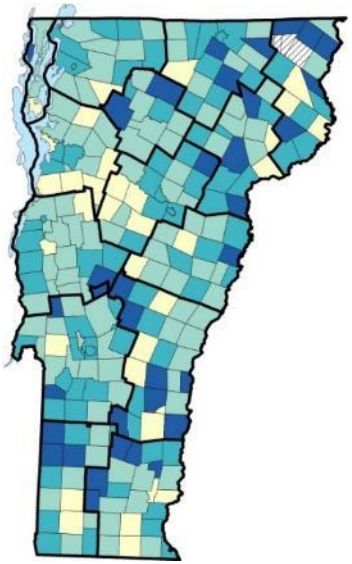
- Socioeconomic status
- Isolation

Barriers to adaptation

- Historic heat illness

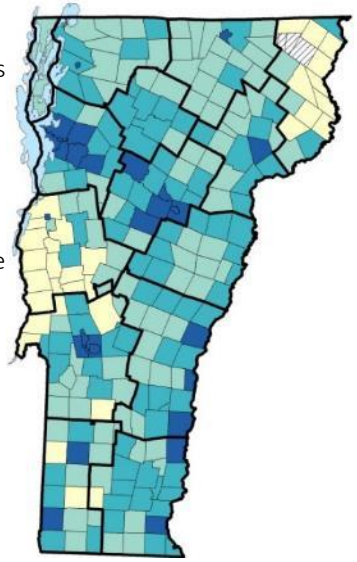
Population

This theme indicates vulnerability based on the population composition of the town. Young children and older adults are age groups at higher risk for heat-related illnesses.



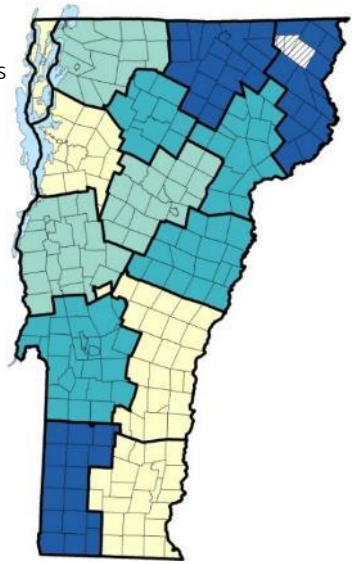
Environmental

This theme indicates vulnerability based on environmental characteristics. Summer heat is exacerbated in locations with dense housing, a high proportion of paved areas and rooftops, and few trees.



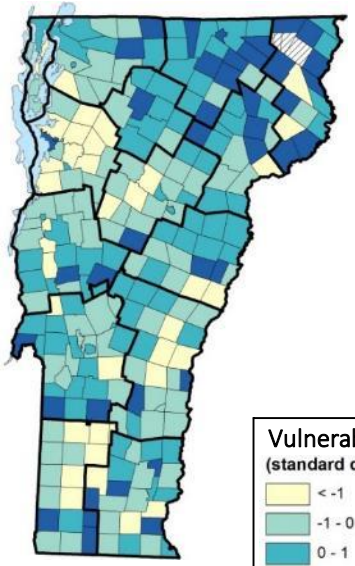
Acclimatization

This theme indicates vulnerability based on how acclimated residents are to hot summer temperatures. Those experiencing fewer hot days per year tend to be less adapted to the impacts of summer heat.



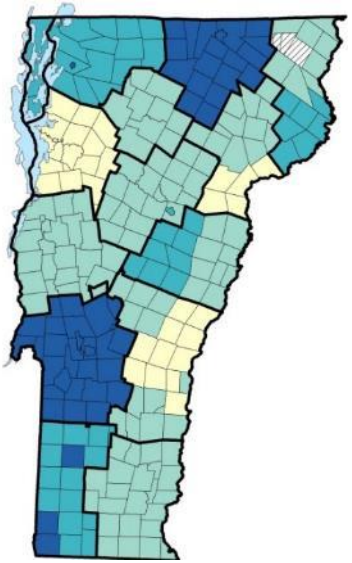
Socioeconomic

This theme indicates vulnerability based on social and economic resources available to town residents. Older adults living alone, those with less education, and those with fewer economic resources are often less able to find relief during summer heat.



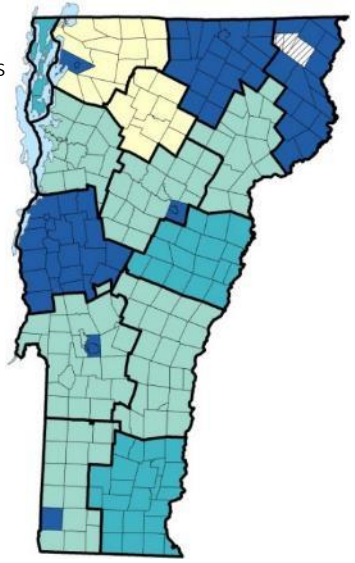
Health

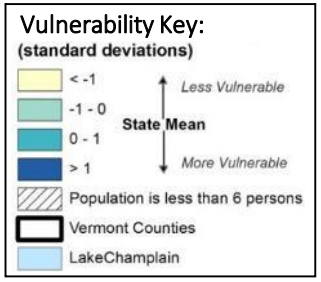
This theme indicates vulnerability based on the health status of town residents. Those with pre-existing medical conditions are more likely to suffer health impacts during summer heat events.



Heat Emergencies

This theme indicates vulnerability based on emergency department visits for heat illness in recent years. Towns that currently experience a high rate of heat-related emergencies are expected to continue experiencing a high rate in the near future.

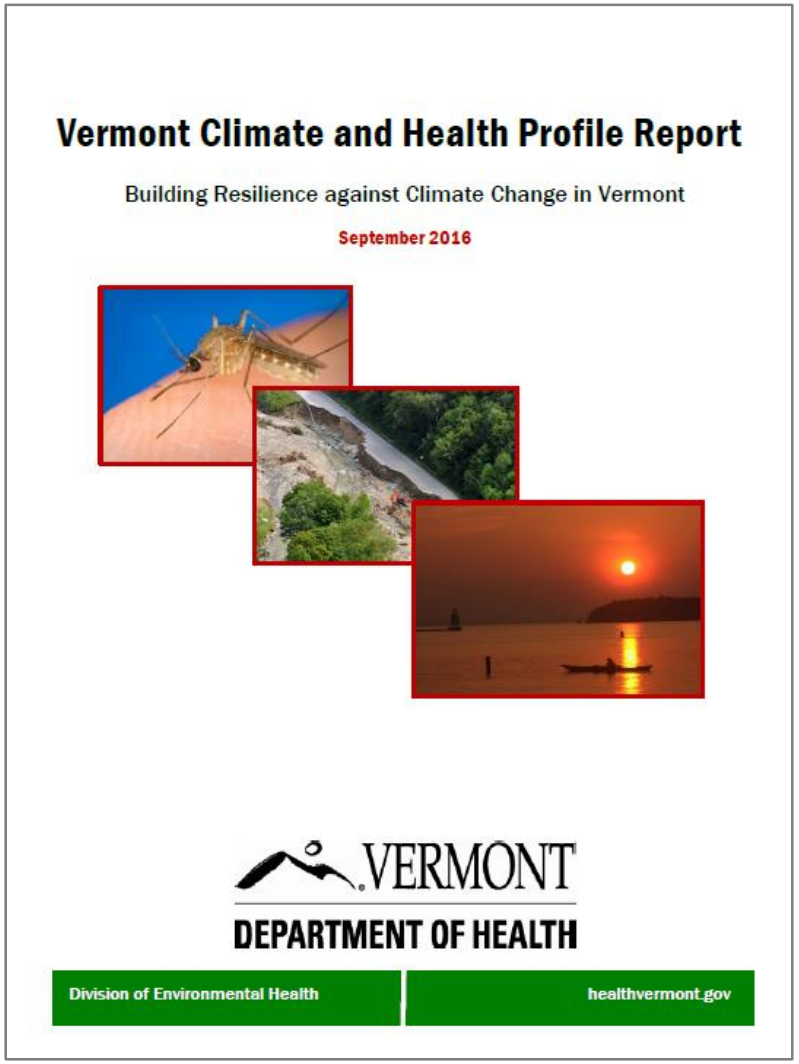




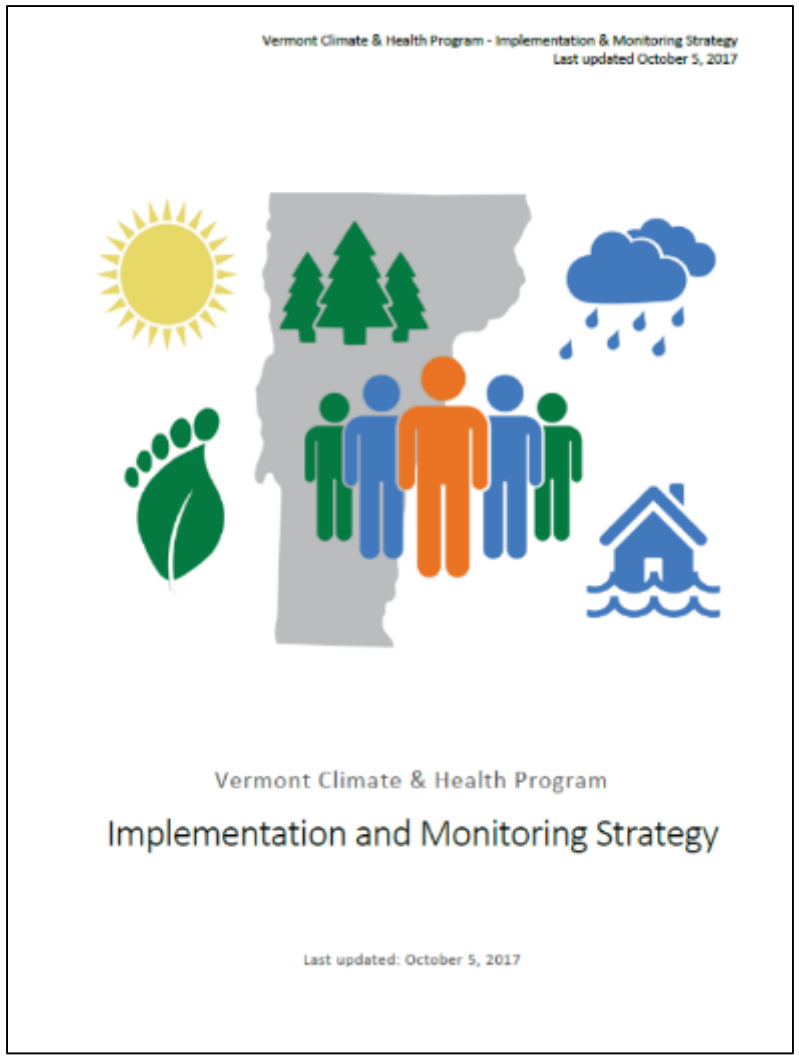
Vermont guiding data & analysis

- Historical and projected climate data, provided by Vermont Climate Office:

	1981-2010 average	2021-2050 projection	2070-2099 projection
Length of growing season	134 days	**+9-12 days**	+19-38 days
Average winter low temp	9°F	**+2.2-2.9°F**	+5-10°F
Average summer high temp	75°F	**+1.7-2.1°F**	+4-7°F
Days with max temp > 87°F	6 days	**+5-6 days**	+14-28 days
Yearly total precipitation	44”	**+0.9-1.4”**	+3-10”
Frequency of heaviest 0.1% precipitation events	Once every 7 years	**Once every 3-6 years**	Once every 2-3 years



Draft Implementation & Monitoring Strategy



Primary Goals

Goal	Desired outcome
1. **Raise Climate & Health Awareness**	Vermont residents, organizations, and local and state leaders are aware of climate-related health impacts and the health impacts of climate actions
2. **Support Healthy Climate Mitigation Actions**	Vermont residents, organizations, and local and state leaders pursue climate change mitigation actions that provide health co-benefits
3. **Strengthen Community Resilience**	Vermont communities are prepared to reduce climate-related health impacts

Secondary Goals

Goal	Desired outcome
4. **Build Health Department Capacity**	The Vermont Department of Health is prepared to reduce climate-related health impacts
5. **Reduce Environmental Hazards**	Natural and built environments in Vermont are resilient to the impacts of climate change
6. **Strengthen Individual Resilience**	Vermont residents are prepared to protect themselves from climate-related health impacts