Climate Change & Health in Connecticut

CIRCA Webinar

September 8, 2020

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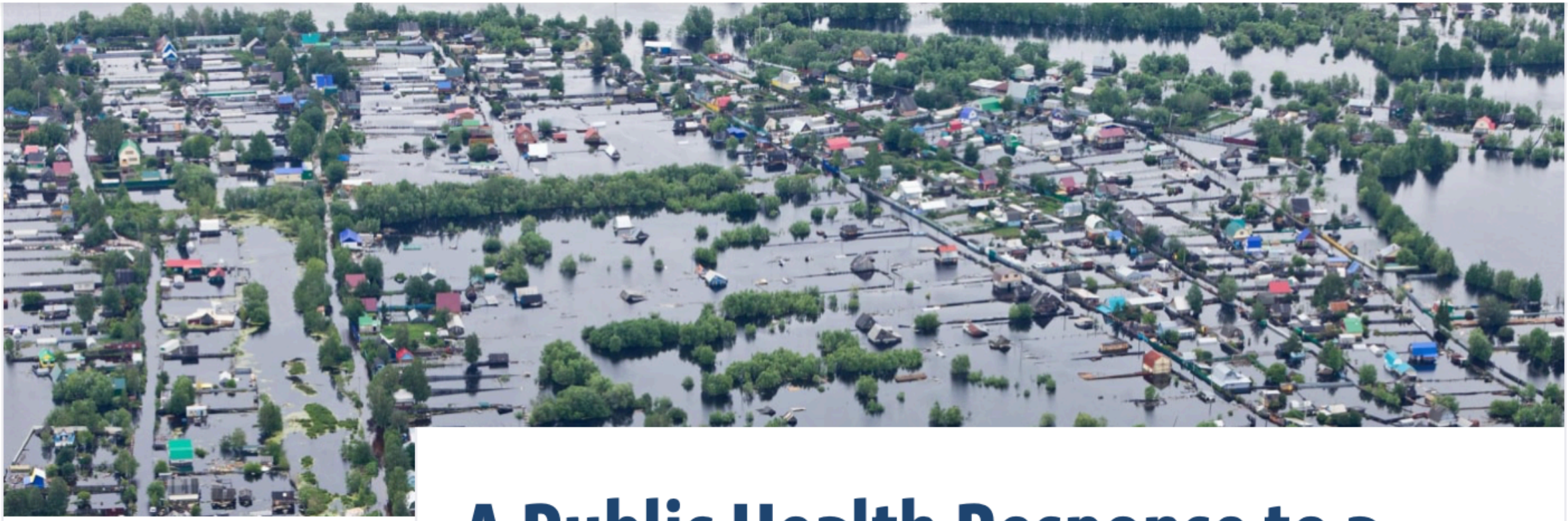
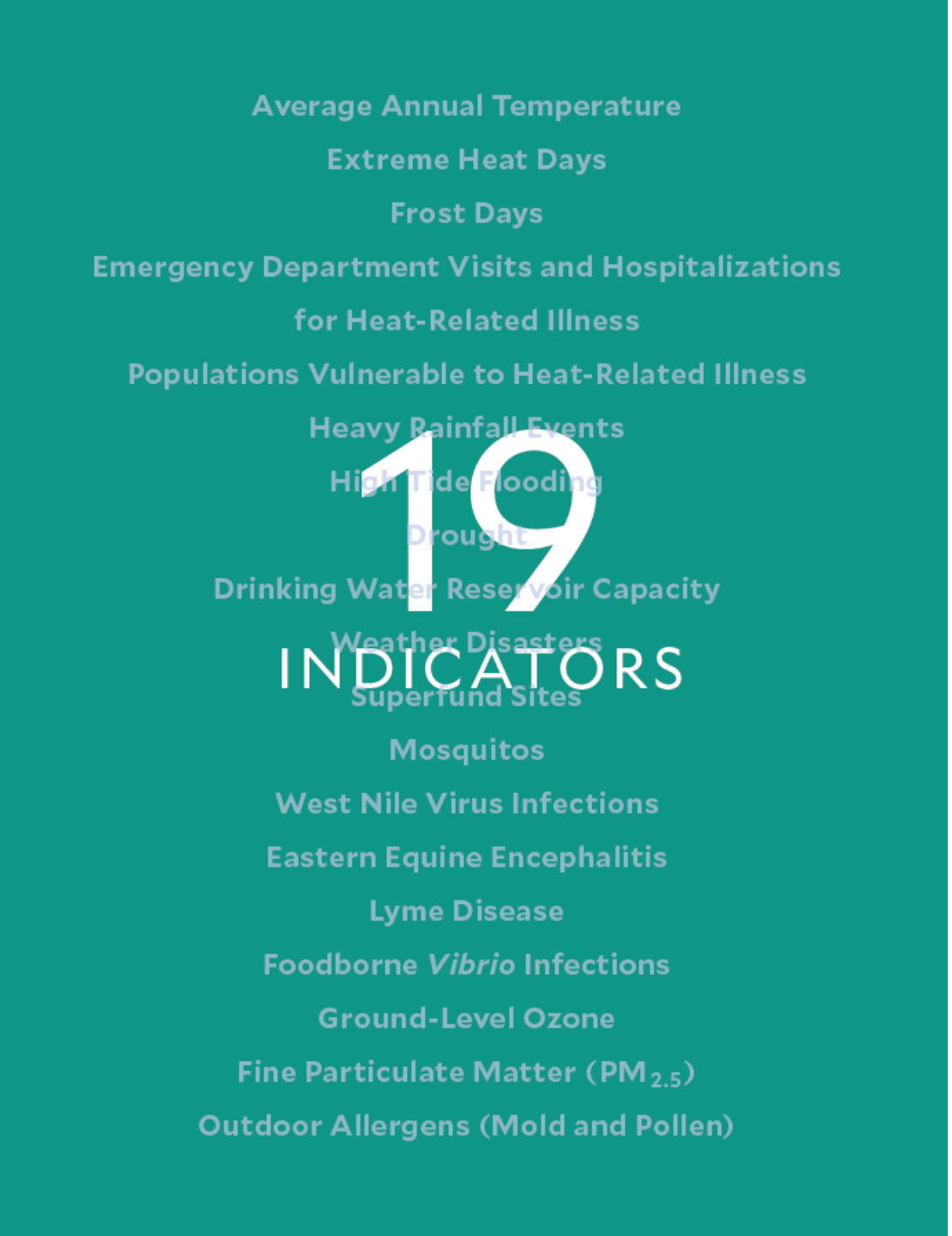


A Public Health Response to a Changing Climate



Climate Change and Health in Connecticut: 2020 Report

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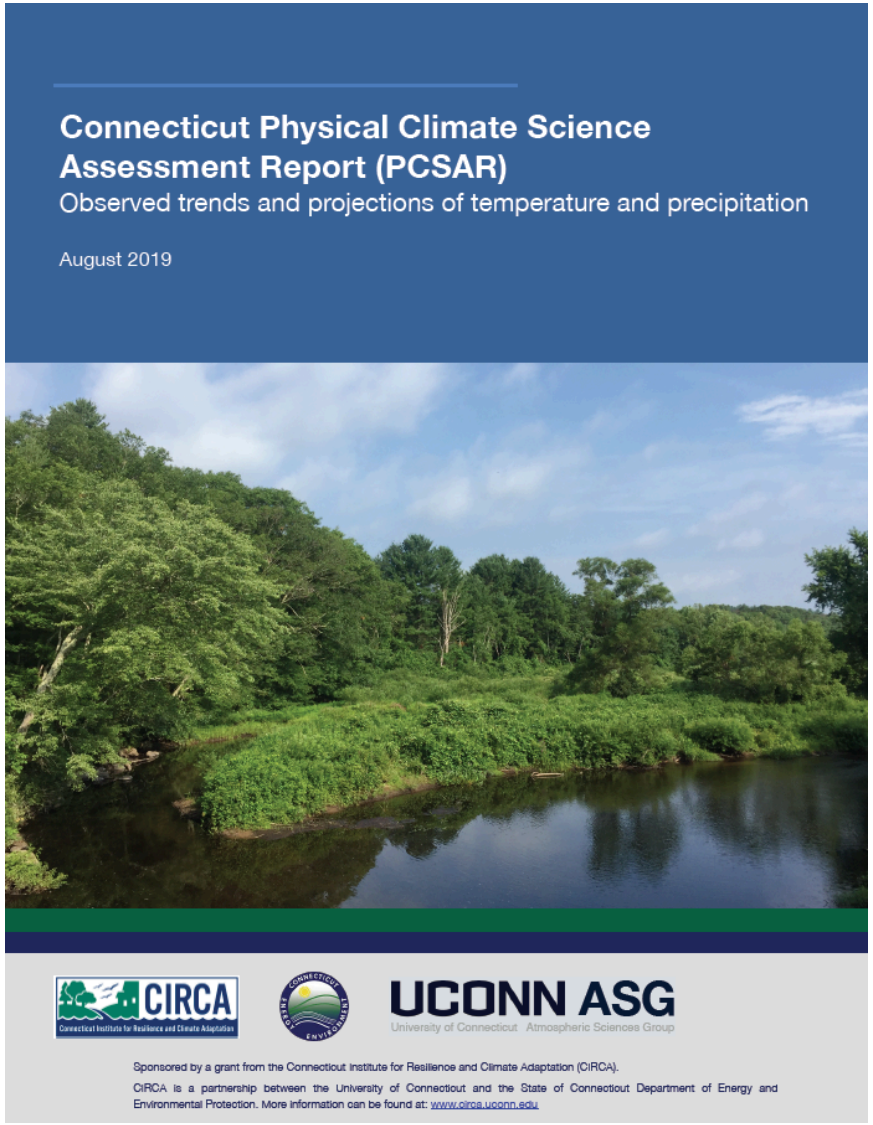
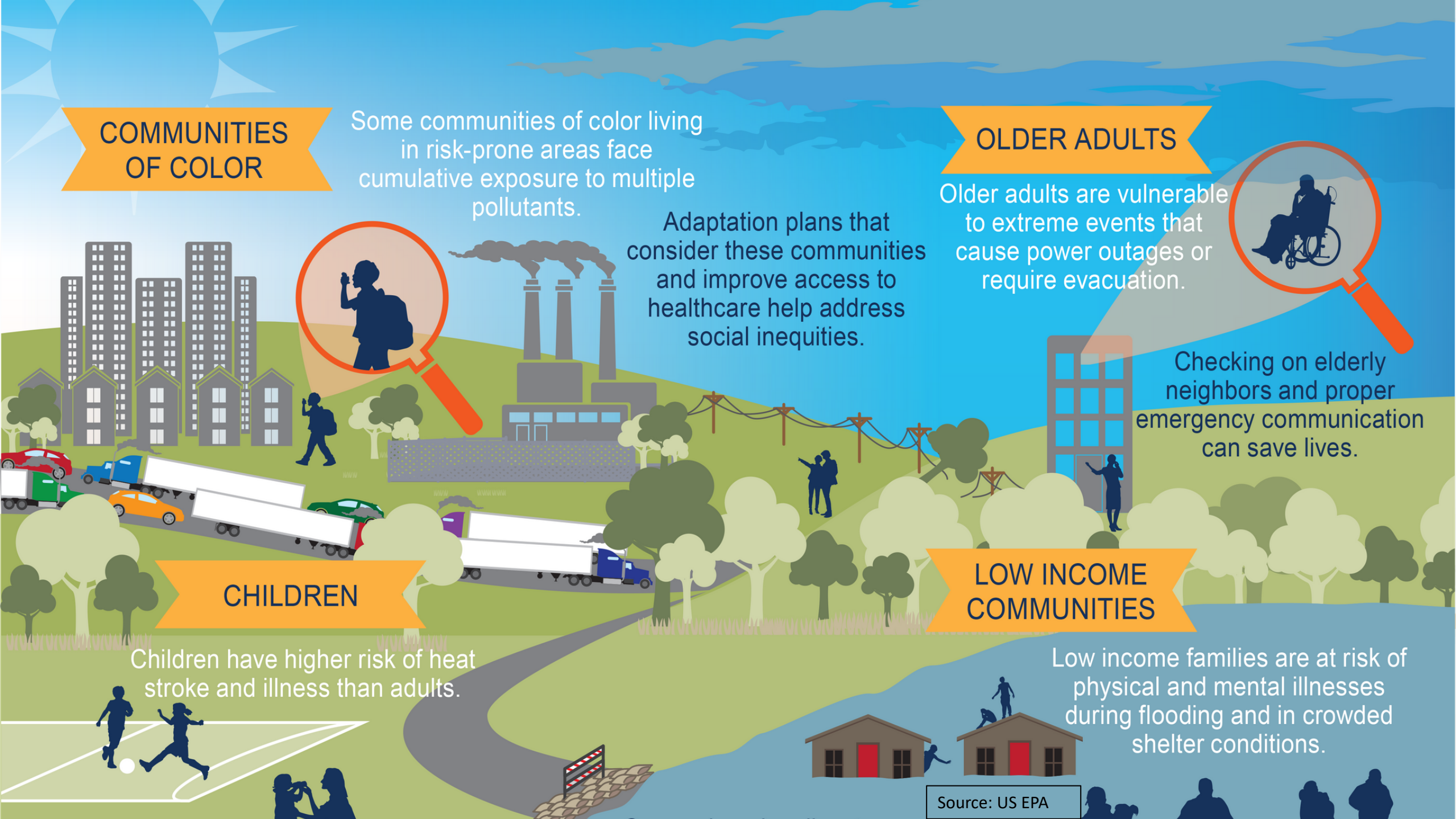
Projected Climate Change Physical Impacts

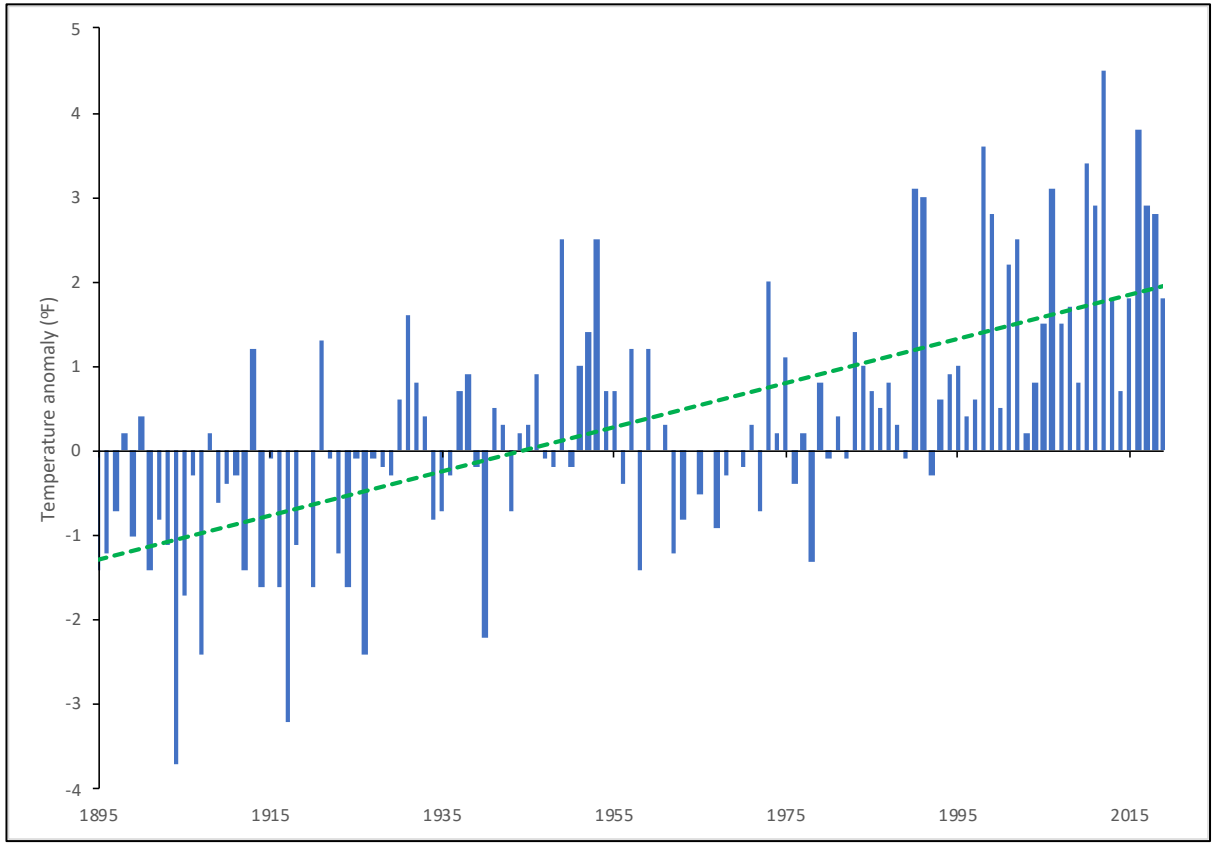
- UCONN/CIRCA Report: Under a high greenhouse gas emissions scenario (RCP 8.5), the following impacts are projected for mid-century (2040–69), compared with 1970–99:
  - 5 °F increase in annual average temperature
  - 8.5% increase in annual precipitation, due primarily to increases in winter and spring
  - Greater flood risk due to the increase in heavy rainfall events
  - Extreme summer droughts occurring 3 times as often
- CIRCA recommends planning for 20 inches (0.5 meters) of sea level rise by 2050, with continued sea level rise to occur after 2050
- Atlantic hurricanes are expected to become more intense, with greater amounts of precipitation




COMMUNITIES OF COLOR
Some communities of color living in risk-prone areas face cumulative exposure to multiple pollutants.
Adaptation plans that consider these communities and improve access to healthcare help address social inequities.
OLDER ADULTS
Older adults are vulnerable to extreme events that cause power outages or require evacuation.
Checking on elderly neighbors and proper emergency communication can save lives.
CHILDREN
Children have higher risk of heat stroke and illness than adults.
LOW INCOME COMMUNITIES
Low income families are at risk of physical and mental illnesses during flooding and in crowded shelter conditions.
Source: US EPA

TEMPERATURE

Annual Average Temperature



Average annual temperature increased by over 3 °F in Connecticut from 1895 to 2019.

What does this mean for health?

- Heat-related illness
- Suitable conditions for larger and more active tick and mosquito populations
- Longer season for ragweed pollen
- Amplified ozone pollution (smog)

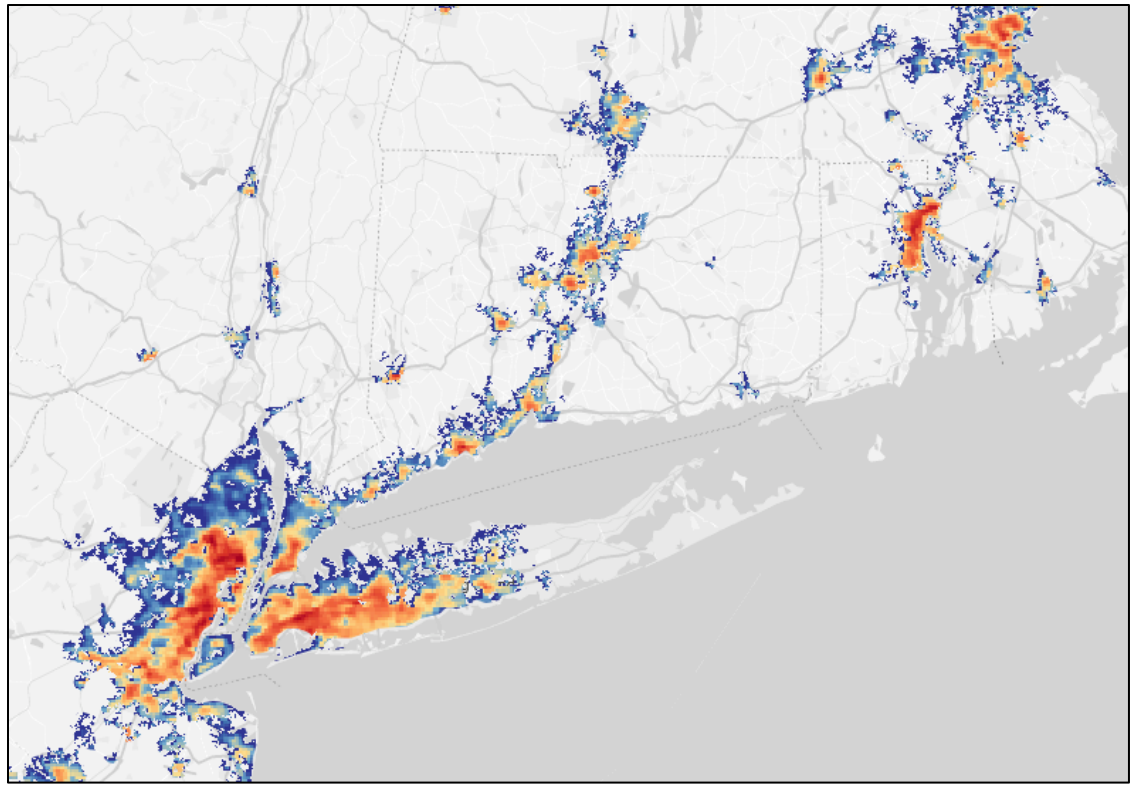
Data source: NOAA National Centers for Environmental Information. Climate at a Glance: Statewide Time Series. 2020; available online at https://www.ncdc.noaa.gov/cag/

Heat-Related Illness

From 2007 to 2016, there were on average **422 emergency department visits** and **45 hospitalizations** per year for heat stress in Connecticut.

Vulnerable populations:

- Elderly
- Young children
- People with pre-existing medical conditions (especially respiratory or cardiovascular disease, and mental illness)
- People with limited social or financial resources, and/ or social isolation (particularly those experiencing homelessness)
- Outdoor workers
- Athletes



Source: TC Chakraborty. Based on *The Global Surface Urban Heat Island Explorer, https://yceo.users.earthengine.app/view/uhimap*

Data source: Connecticut Department of Public Health Environmental Public Health Tracking Program. Connecticut Public Health Data Explorer. 2020; online at https://stateofhealth.ct.gov.

EXTREME EVENTS

Weather Disasters

INCIDENT PERIOD	DISASTER TYPES	DESIGNATED COUNTIES							
		FAIRFIELD	HARTFORD	LITCHFIELD	MIDDLESEX	NEW HAVEN	NEW LONDON	TOLLAND	WINDHAM
October 14–15, 2005	Severe Storms and Flooding		■	■			■	■	■
April 15– April 27, 2007	Severe Storms and Flooding	■	■	■	■	■	■		■
March 12– May 17, 2010	Severe Storms and Flooding	■			■	■	■		■
October 29–30, 2011	Severe Storm	■	■	■	■	■		■	■
August 27– September 1, 2011	Tropical Storm/ Hurricane (Tropical Storm Irene)	■	■	■	■	■	■	■	■
January 11–12, 2011	Snowstorm	■	■	■		■	■	■	
October 27– November 8, 2012	Hurricane (Hurricane Sandy)	■		■	■	■	■	■	■
February 8–11, 2013	Severe winter storm and snowstorm	■	■	■	■	■	■	■	■
January 26–28, 2015	Severe winter storm and snowstorm					■	■	■	■
September 25–26, 2018	Severe Storms and Flooding				■		■		
May 15, 2018	Severe Storms, Tornado, and Straight-line Winds	■				■			

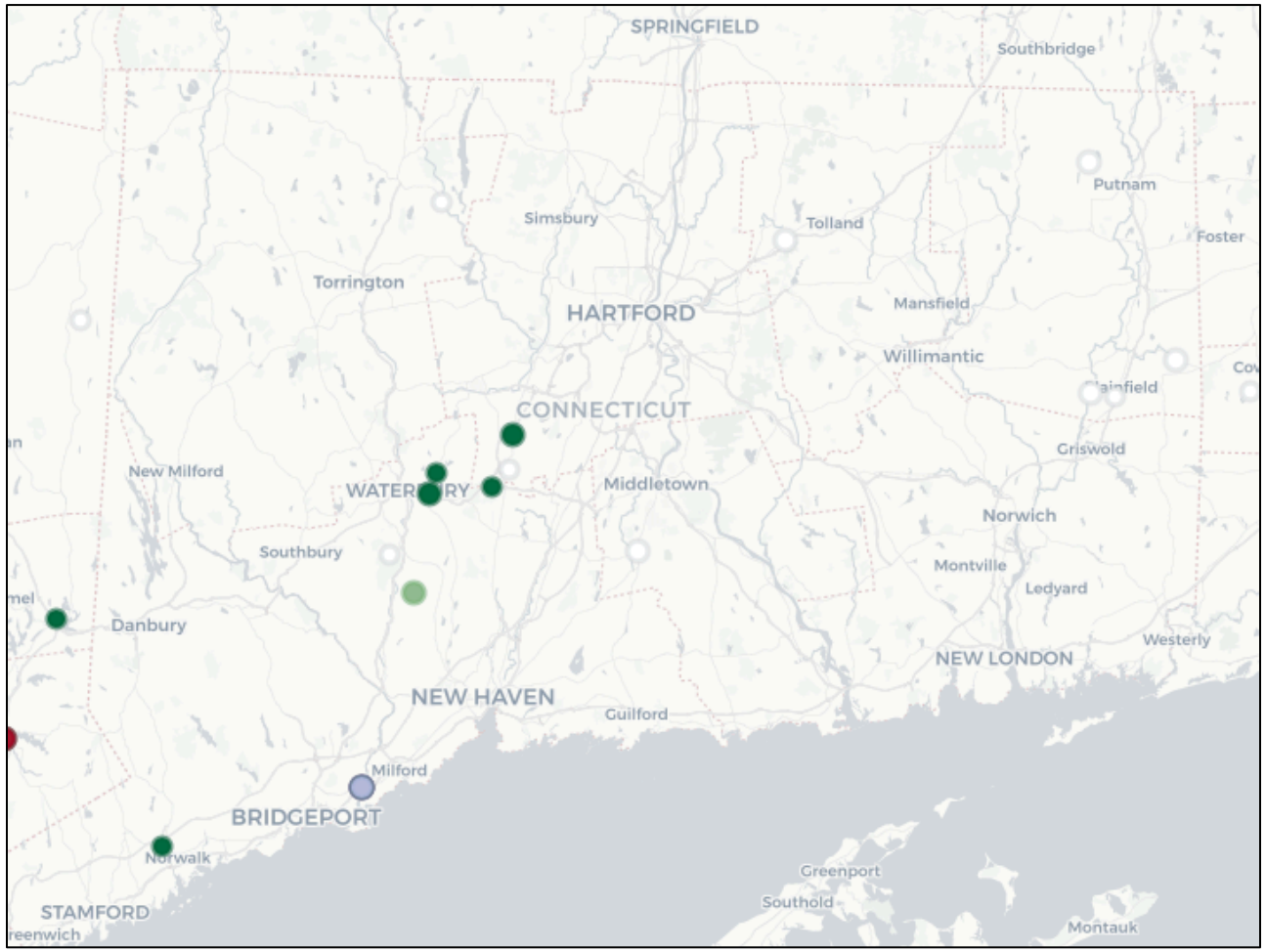
From 2010 to 2019, nine federal disaster declarations for weather events were issued for Connecticut, compared to only 13 in the previous 56 years (1954-2009).

What does this mean for health?

- Direct dangers from drowning
- Disruption to critical infrastructure & loss of access to medical care
- Mental health impacts from trauma
- Structural inequality in impacts across communities

Data source: Federal Emergency Management Agency. Disasters. 2020; online at https://www.fema.gov/disasters.

Superfund Sites



Seven of Connecticut's 16 Superfund sites are vulnerable to climate change impacts, including flooding, hurricane storm surge, and sea level rise.

Data source: US Government Accountability Office. SUPERFUND: EPA Should Take Additional Actions to Manage Risks from Climate Change. 2019; online at https://www.gao.gov/products/GAO-20-73.

INFECTIOUS DISEASES

Mosquito Abundance

- During 2001–2019, of 28 mosquito species found in Connecticut to carry viruses that cause human disease, **10 show trends of increasing abundance and 3 show trends of decreasing abundance.**

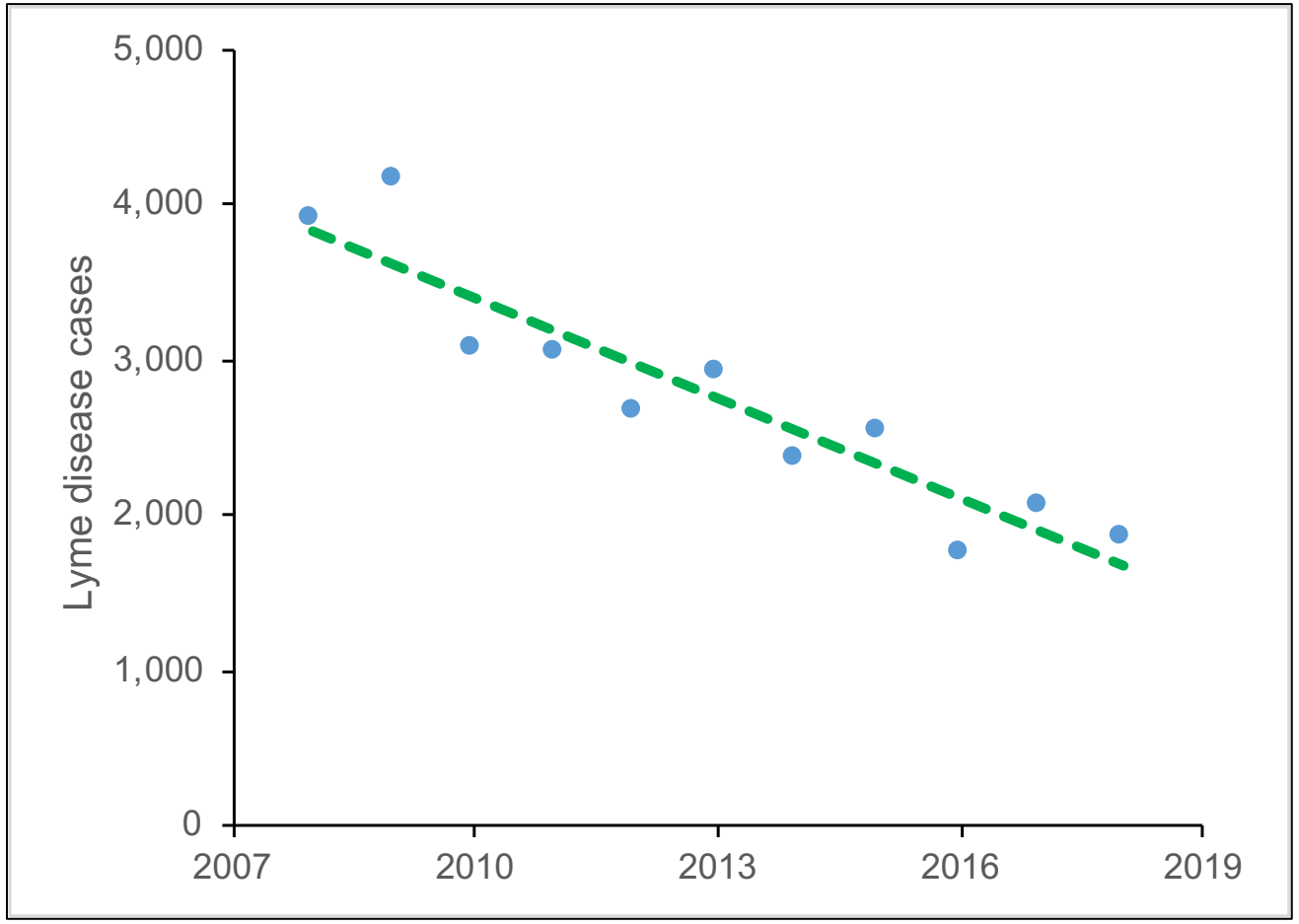
- Each of the mosquito species we tracked has been found in Connecticut to carry one or more of the following viruses that infect humans:
  - Cache Valley (CV)
  - Eastern equine encephalitis (EEE)
  - Jamestown Canyon (JC)
  - Trivittatus (TVT)
  - West Nile Virus (WNV)

SPECIES	TIME TREND, 2001–2019 [A]	MOSQUITOS/TRAP-DAY, 2015–2019 [B]	VIRUSES CARRIED [C]
Aedes albopictus	0.020	0.28	CV, WNV
Aedes cinereus	-0.052	7.51	CV, EEE, JC, WNV
Aedes vexans	-0.050	9.88	CV, EEE, JC, WNV
Anopheles punctipennis	0.083	2.79	CV, EEE, JC, TVT, WNV
Anopheles quadrimaculatus	0.025	0.60	CV, EEE, WNV
Anopheles walkeri	0.163	2.80	CV, EEE, JC, WNV
Coquillettidia perturbans	1.314	33.34	CV, EEE, JC, TVT, WNV
Culex pipiens	-0.054	1.65	EEE, WNV
Culex restuans	-0.008	2.33	EEE, JC, WNV
Culex salinarius	0.849	17.61	EEE, WNV
Culex territans	0.005	0.13	EEE
Culiseta melanura	0.247	8.49	CV, EEE, WNV
Culiseta morsitans	-0.0004	0.11	EEE
Ochlerotatus abserratus	0.045	2.22	JC
Ochlerotatus aurifer	0.119	3.02	JC
Ochlerotatus canadensis	0.511	19.74	CV, EEE, JC, WNV
Ochlerotatus cantator	-0.021	1.90	CV, EEE, JC, WNV
Ochlerotatus communis	-0.002	0.01	JC
Ochlerotatus excrucians	0.005	0.66	JC
Ochlerotatus provocans	0.009	0.15	JC
Ochlerotatus sollicitans	-0.067	0.51	CV, EEE, JC
Ochlerotatus sticticus	-0.314	0.62	CV, EEE, JC, TVT, WNV
Ochlerotatus stimulans	-0.021	0.82	JC
Ochlerotatus taeniorhynchus	0.279	7.53	CV, EEE, JC, WNV
Ochlerotatus triseriatus	-0.072	0.93	CV, EEE, JC, WNV
Ochlerotatus trivittatus	-0.447	1.66	CV, EEE, JC, TVT, WNV
Psorophora ferox	0.242	5.30	CV, EEE, JC, TVT, WNV
Uranotaenia sapphirina	0.012	2.45	EEE, WNV

Mosquito species that carry human viruses found at 87 trapping stations across Connecticut: time trends in abundance (2001–2019); recent abundance (2015–2019); and viruses carried. Green indicates statistically significant trend.

Data source: Connecticut Agricultural Experiment Station. Mosquito and arbovirus surveillance network data. New Haven, CT; n.d.

Tick-borne Illnesses



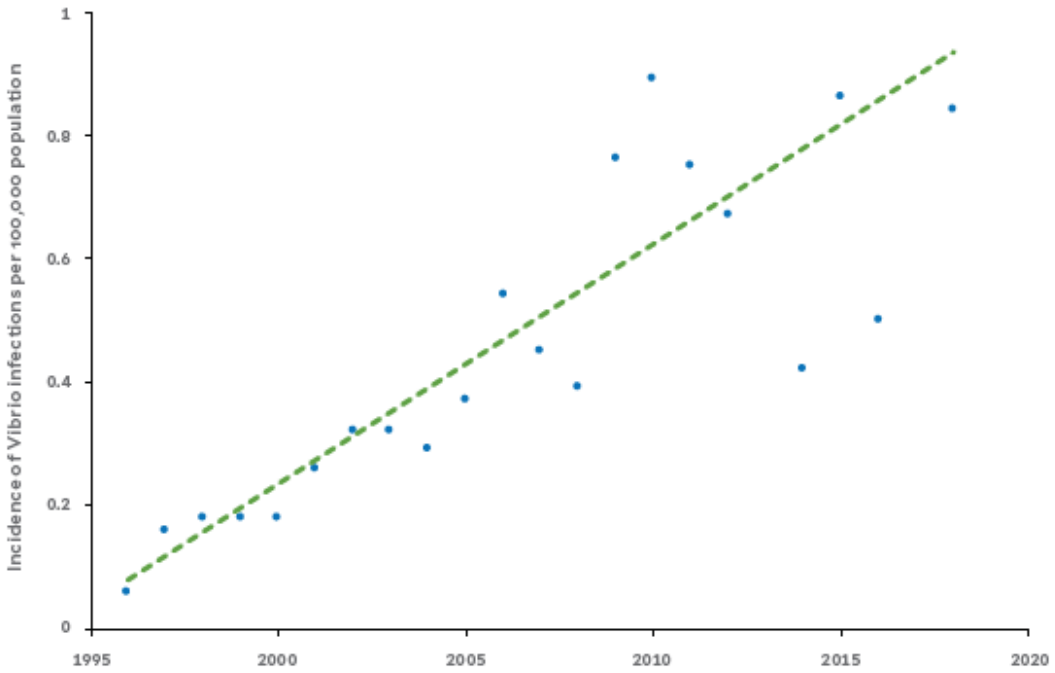
Total confirmed and probable Lyme disease cases in Connecticut, 2008–2018. The number of reported cases has declined significantly in Connecticut.

Lone Star Ticks

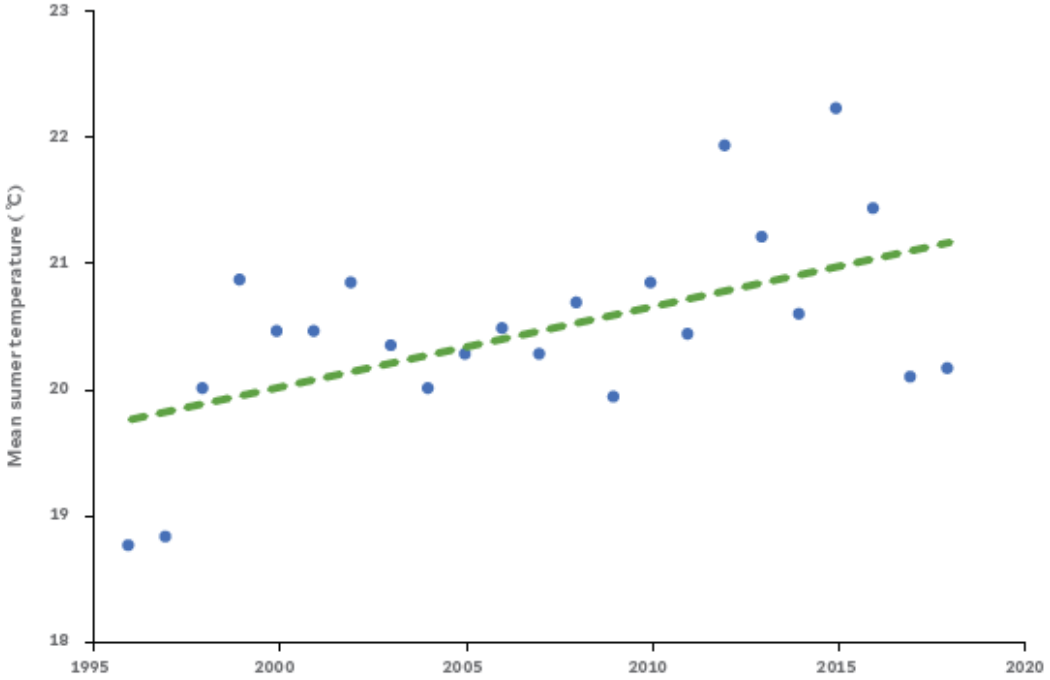
- Expanding into CT
- Transmit tularemia, ehrlichiosis, Heartland virus disease, southern tick-associated rash illness, red meat allergy, and likely, Bourbon virus disease

Data source: Connecticut Department of Public Health. Lyme Disease Annual Statistics. 2019; online at: https://portal.ct.gov/DPH/Epidemiologyand-Emerging-Infections/Lyme-Disease-Statistics.

Foodborne *Vibrio* Infections



Confirmed foodborne Vibrio infections per 100,000 population in Connecticut, 1996–2018. The annual incidence of confirmed cases of foodborne *Vibrio* infections has significantly increased.

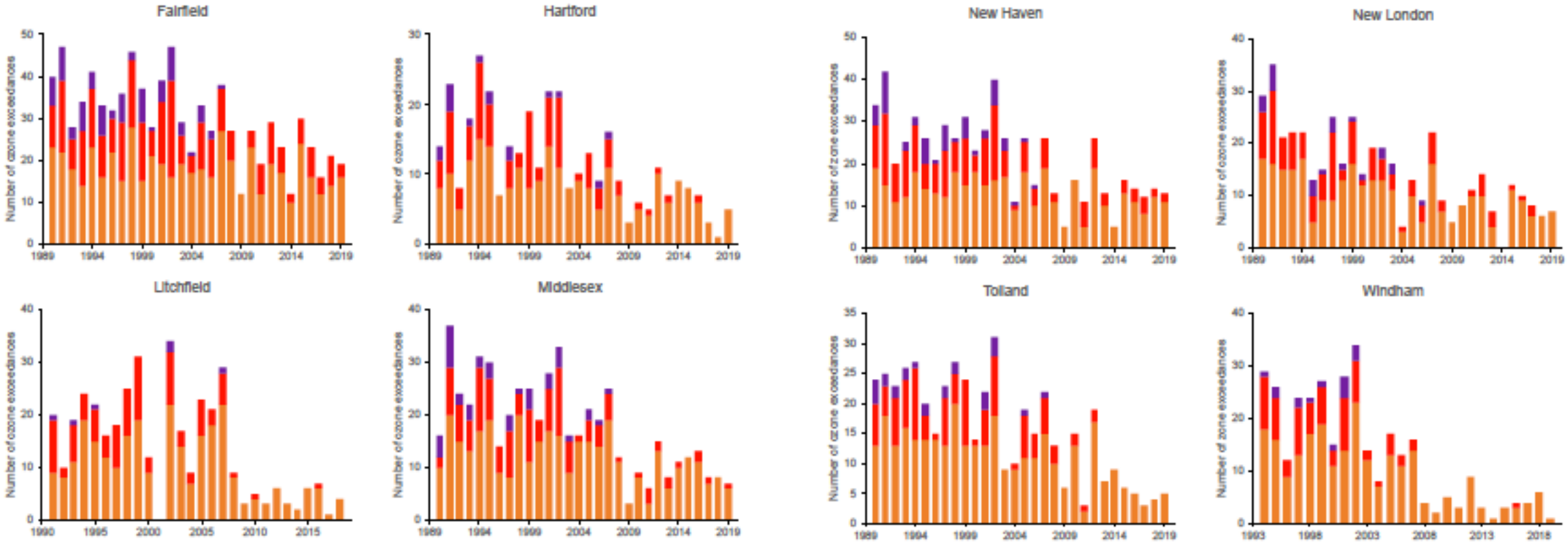


Near–surface water temperature in Niantic Bay, CT, summer (July–September), 1996–2018.

Data sources: (1) Centers for Disease Control and Prevention. FoodNet Fast: Pathogen Surveillance Tool. 2020; online at http://wwwn.cdc.gov/foodnetfast. (2) O'Donnell JO. Water Temperature. Dataset published in Long Island Sound Study. n.d.; online at https://longislandsoundstudy.net/ecosystem-target-indicators/water-temperature/.

AIR QUALITY

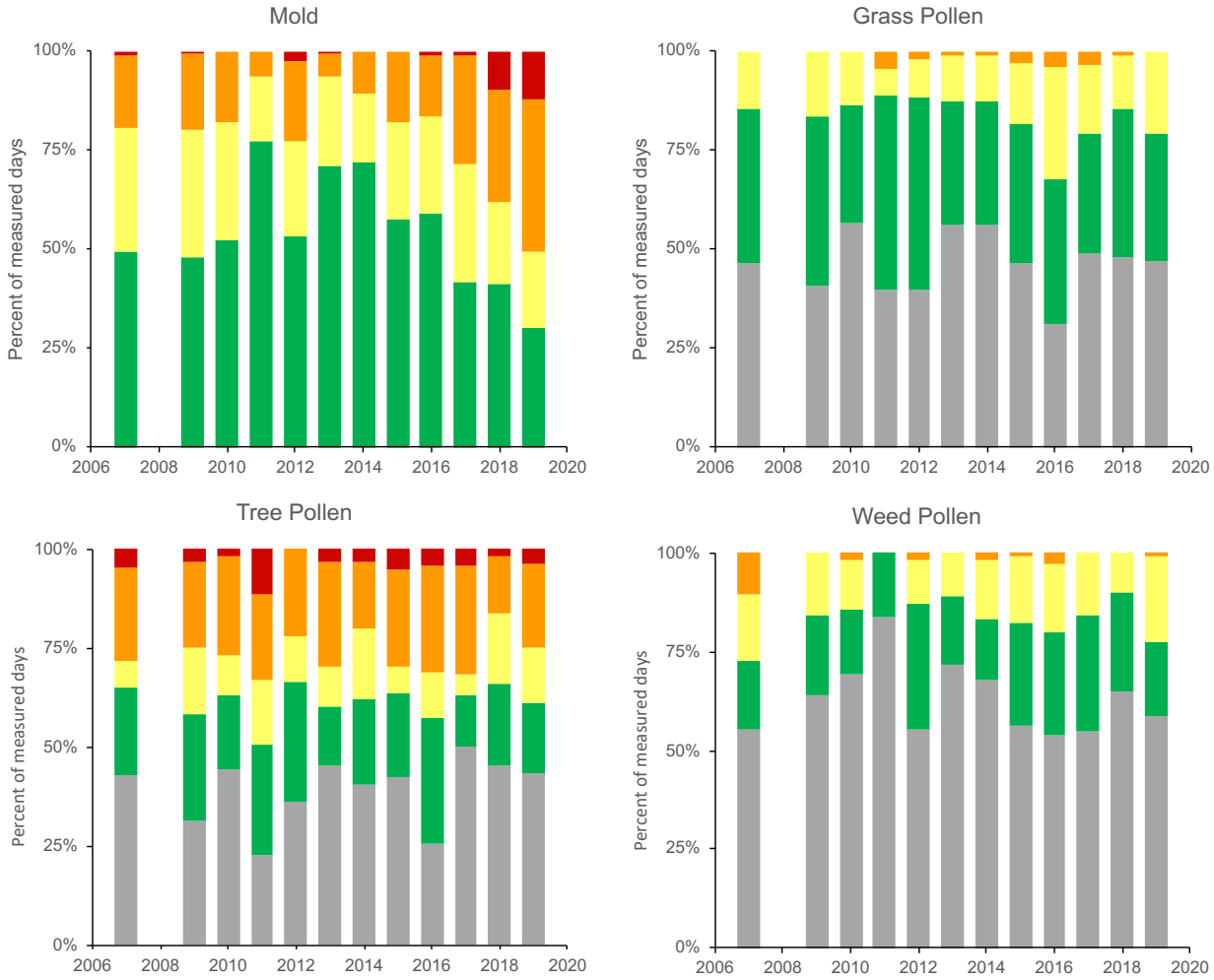
Ground-level Ozone



Number of ground-level ozone exceedance days per year by EPA Air Quality Index (AQI) alert levels, 2000–2019, by Connecticut county. An exceedance day occurs when the daily maximum 8-hour ozone average is 71 parts per billion or higher. AQI alert levels displayed are as follows: unhealthy for sensitive groups (71–85 ppb) (orange), unhealthy (86–105 ppb) (red), very unhealthy (106–200 ppb) (purple). Due to no data/ insufficient data, Litchfield County figure excludes 1990 and 2001, and Windham County figure excludes 1990–1993.

Data source: US Environmental Protection Agency. Outdoor Air Quality Data: Download Daily Data. n.d.; online at https://www.epa.gov/outdoorair-quality-data/download-daily-data.

Aeroallergens: Mold and Pollen



Since 2007, the percent of measured days with "high" or "very high" outdoor mold concentrations has increased.

Allergen concentration levels, percent of measured days by National Allergy Bureau (NAB) Scale category, Waterbury, CT monitoring station, 2007–2019, April–September. No data available for 2008. NAB Scale categories are as following: grey = absent; green = low; yellow = moderate; orange = high, red = very high.

Data source: American Academy of Allergy, Asthma & Immunology. NAB: Pollen & Spore Levels – Northeast. 2020; online at https://www.aaaai.org/global/nab-pollen-counts/northeast-region.

To download the report or to sign up for our newsletter, visit https://publichealth.yale.edu/climate/

Questions/ comments? Contact me at: laura.bozzi@yale.edu

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