Act on Climate
Climate-Health Workshop

Technical questions about zoom: email
Matthew.Moretta.CTR@energy.ri.gov

We will get started shortly!

RIEC4

Act on Climate
Climate-Health Workshop

Quick poll before we get started!

Technical questions about zoom: email
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We will get started shortly!

RIEC4

Act on Climate

Climate-Health Workshop

May 19, 2022

RIEC4

Act on Climate Mandates

The Executive Climate Change Coordinating Council (EC4) coordinates climate change efforts across state agencies, including:

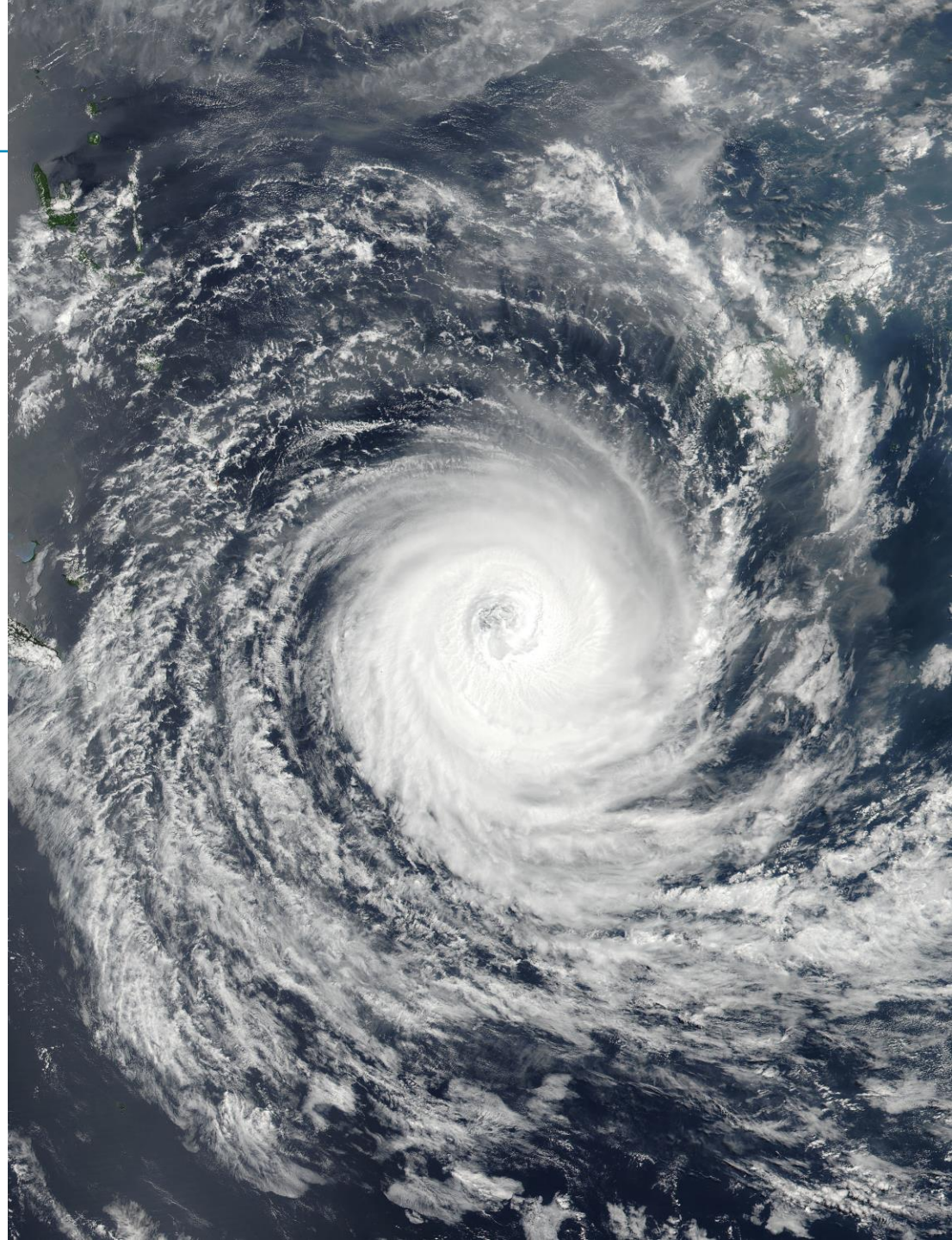
- Advance the state's understanding of the effects on climate change including health impacts
- Identify strategies to prepare for these effects and communicate them to Rhode Islanders

The 2021 Act on Climate establishes economy-wide emissions reduction mandates of:

- 10% below 1990 levels by 2020
- 45% below 1990 levels by 2030
- 80% below 1990 levels by 2040
- Net-zero emissions by 2050

Panel Discussion

1. How does climate affect health?
2. What are we seeing in Rhode Island?
3. What are we doing about it?



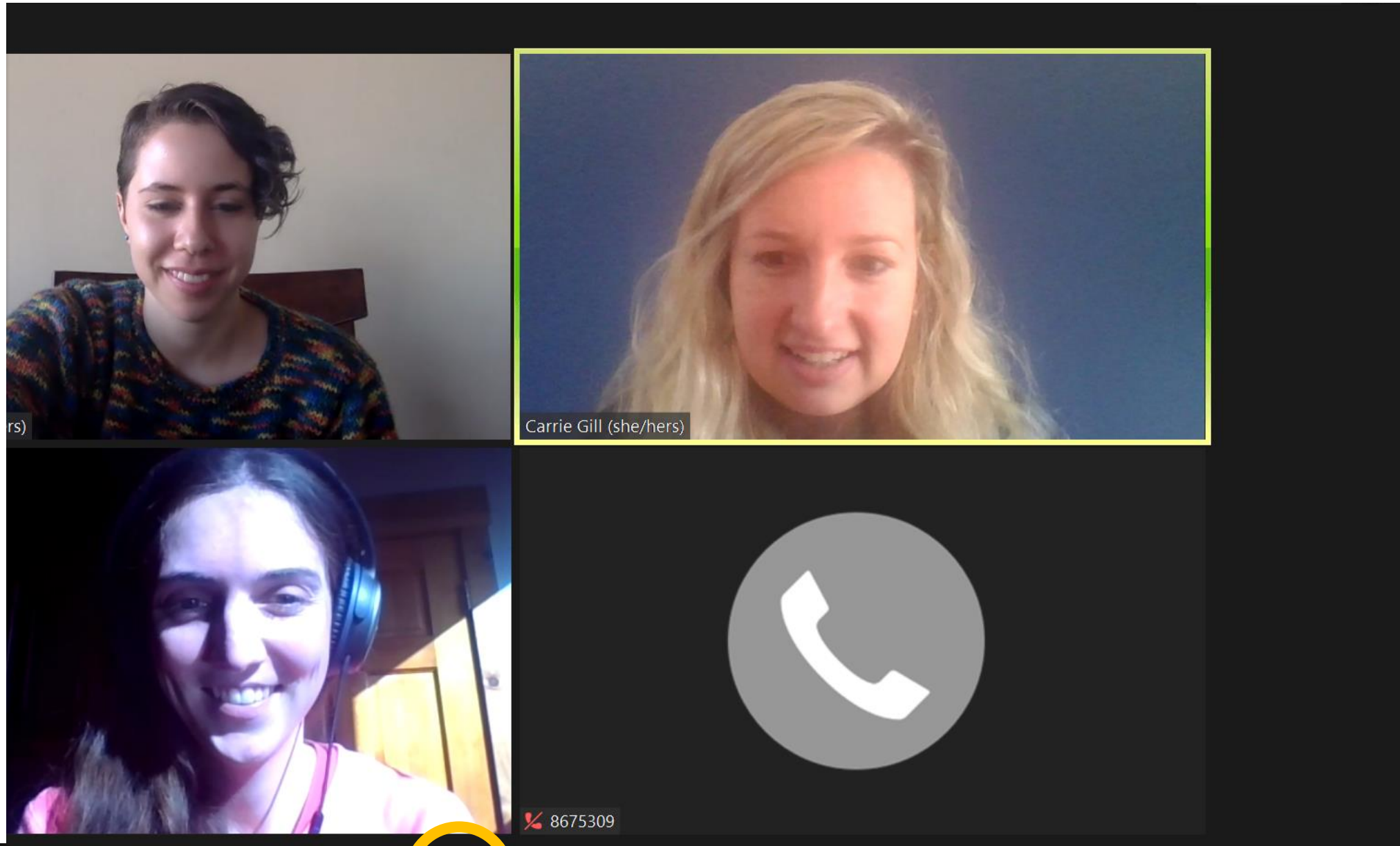
How to Participate

How to Participate

- **Unmute** yourself using the icon at the bottom right of the screen and speak your question or comment.

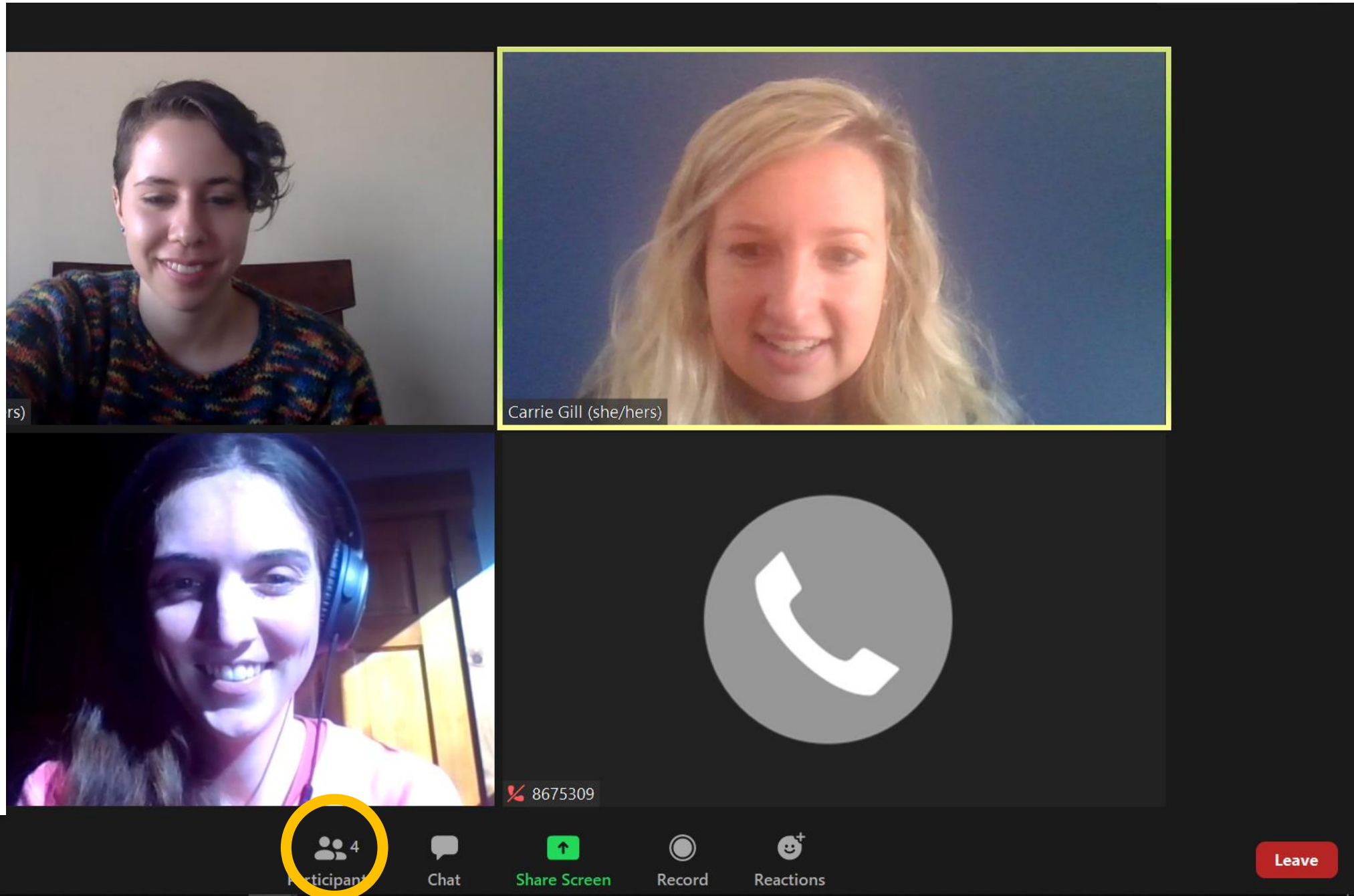
How to Participate

- Open the **chat box** by clicking on the icon at the bottom of your screen.
- Type your question or comment into chat.
- Type that you would like to speak in the chat.
- We will either read your comment or call on you to speak.



How to Participate

- Click the participants icon at the bottom of your screen then click the **raise hand** icon at the bottom left of the pop-up window to raise your hand.
- We will call on you to speak.



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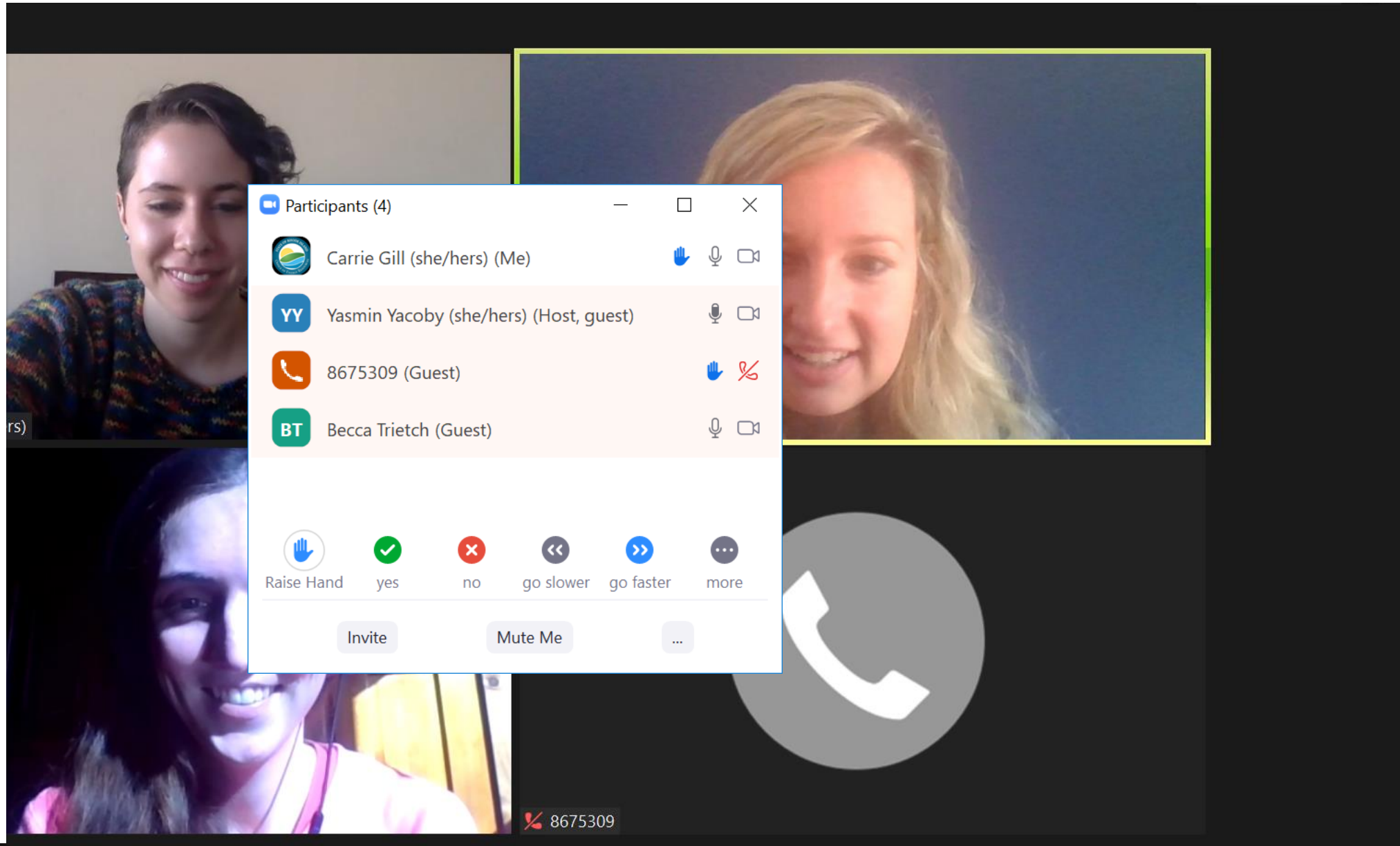

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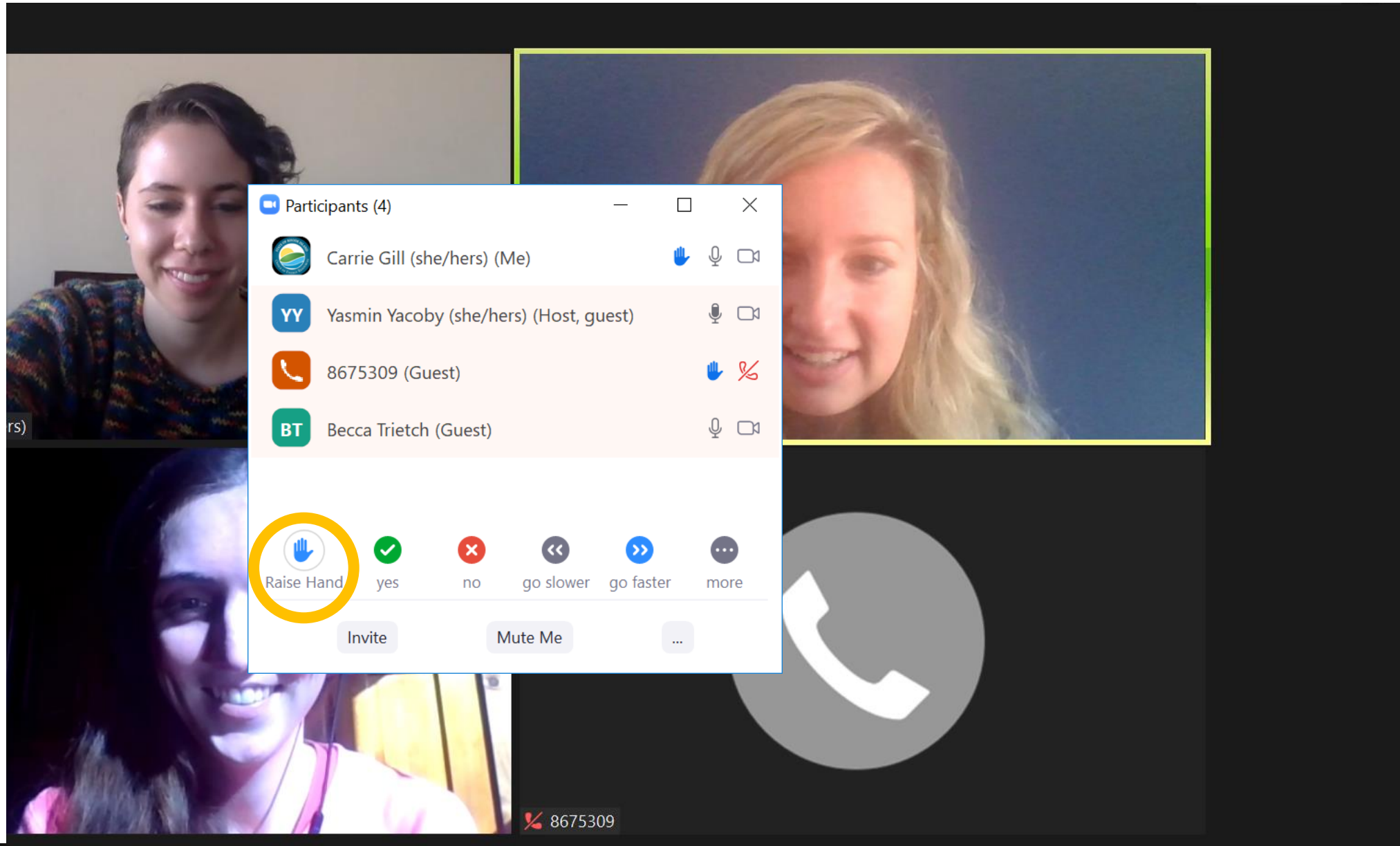
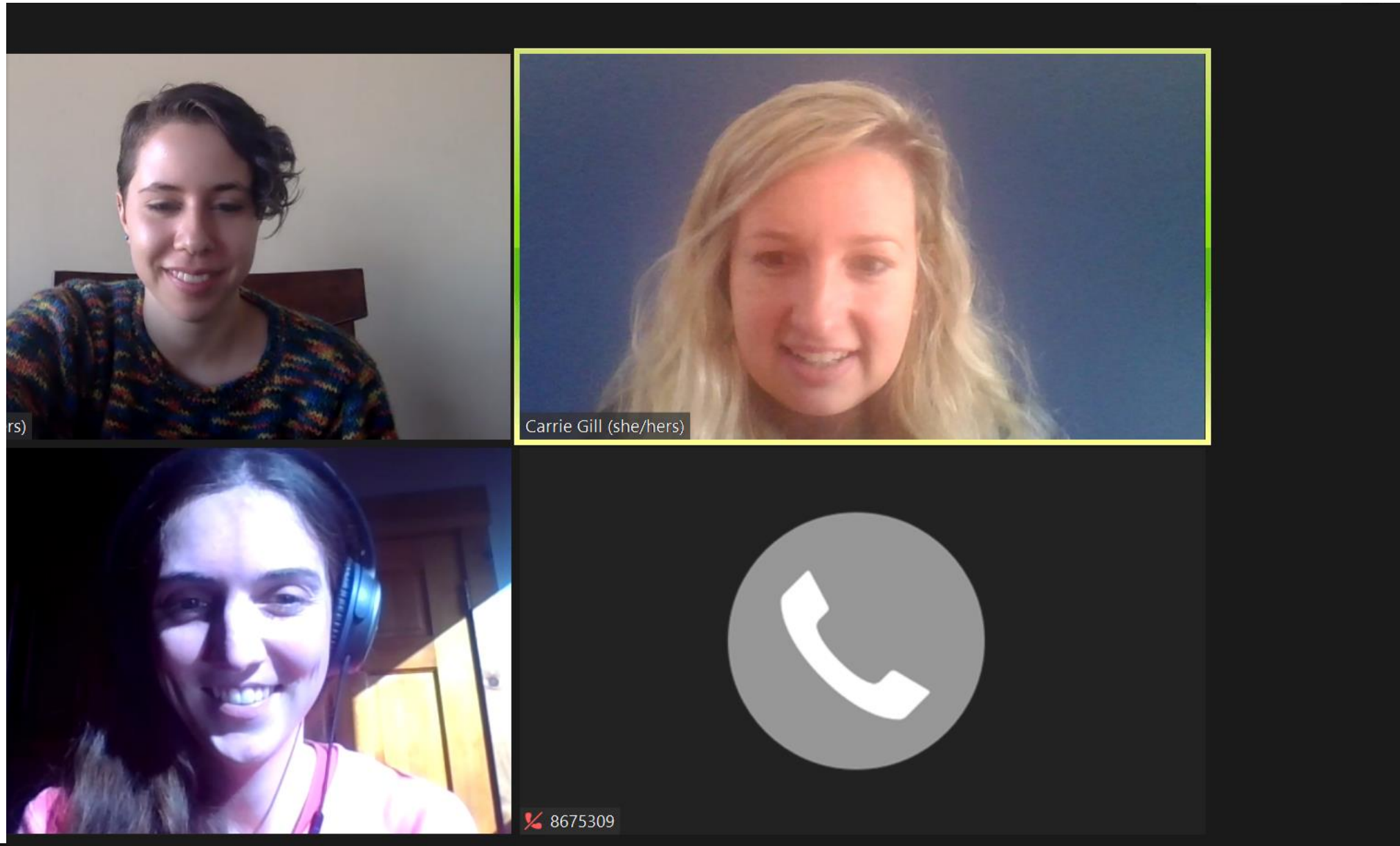


How to Participate

If you're calling in on the phone:

- Unmute yourself from your phone options and speak your question or comment.
- **Hit *6 to unmute** yourself and speak your question or comment.
- **Hit *9 to raise hand** and we will call on you to speak.



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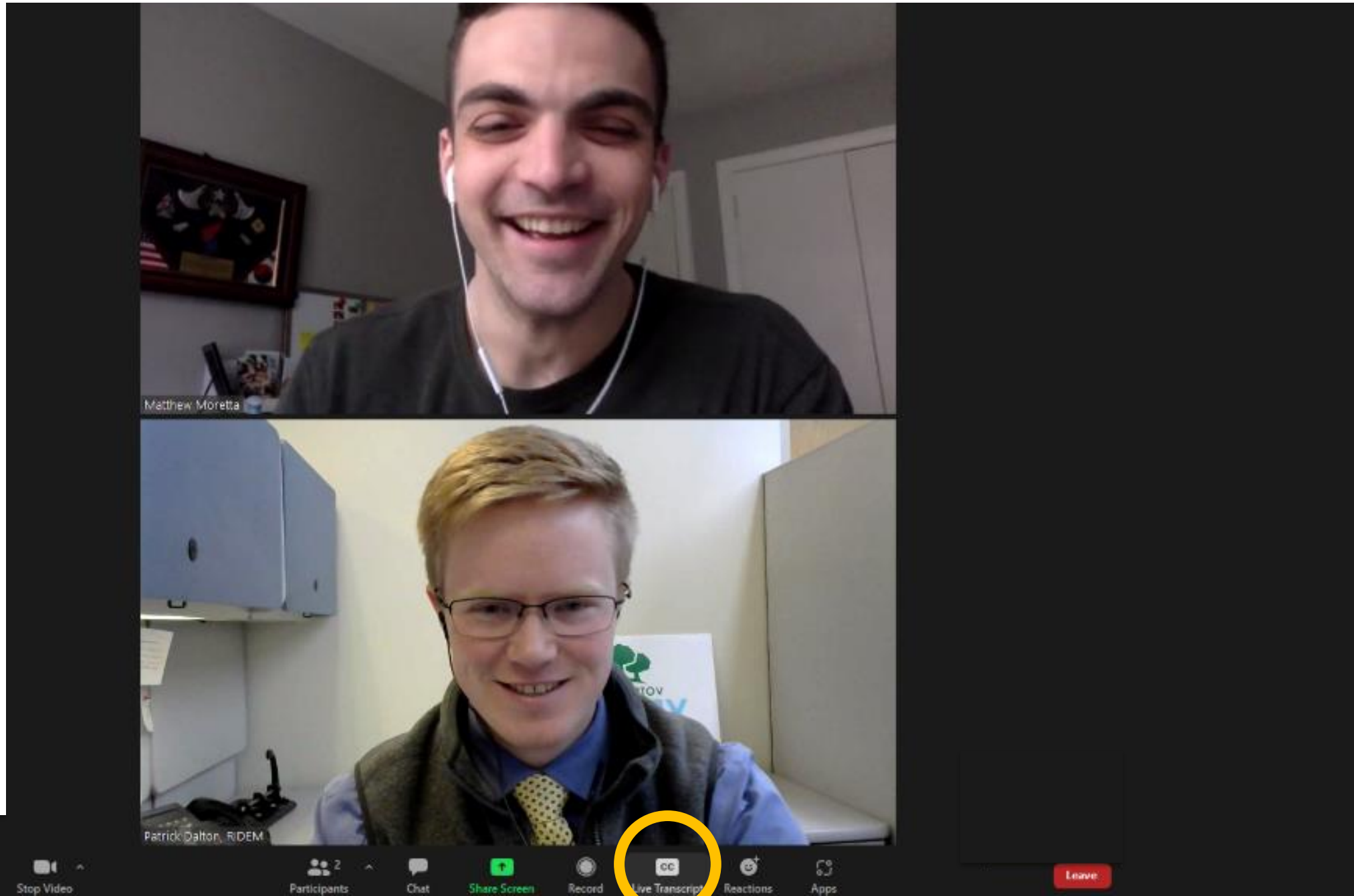
- You can also change the subtitle settings from this menu.



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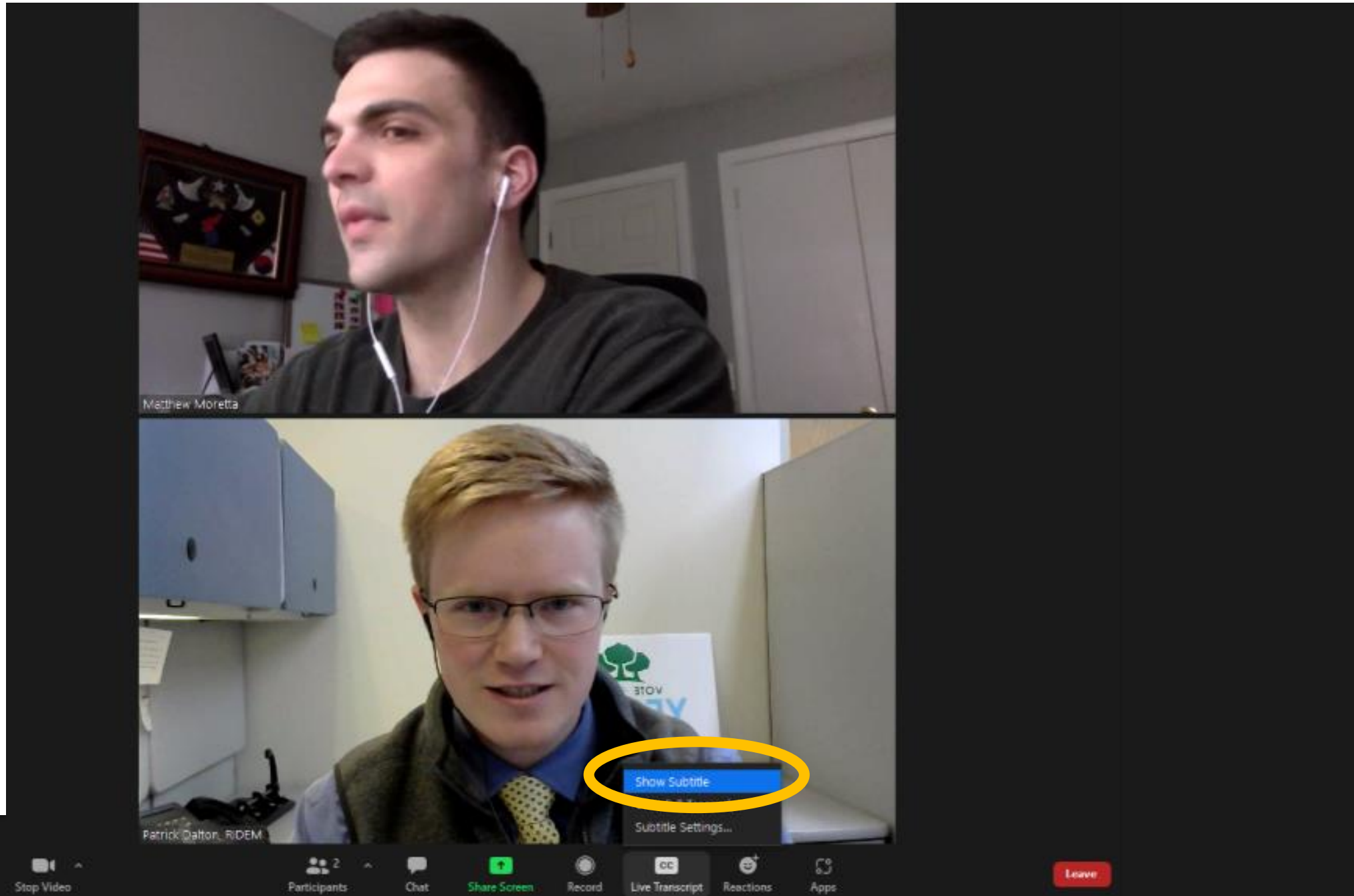

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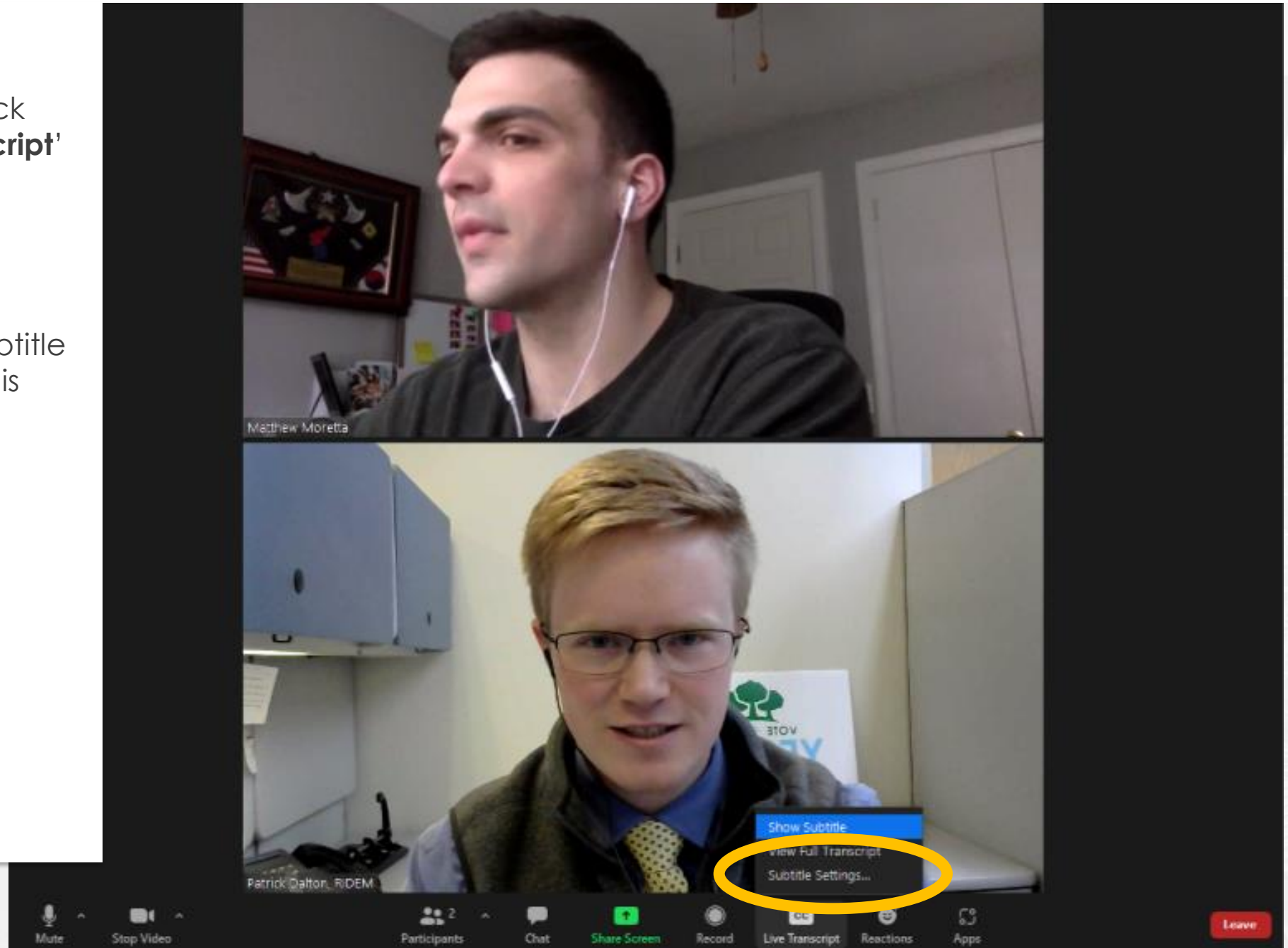

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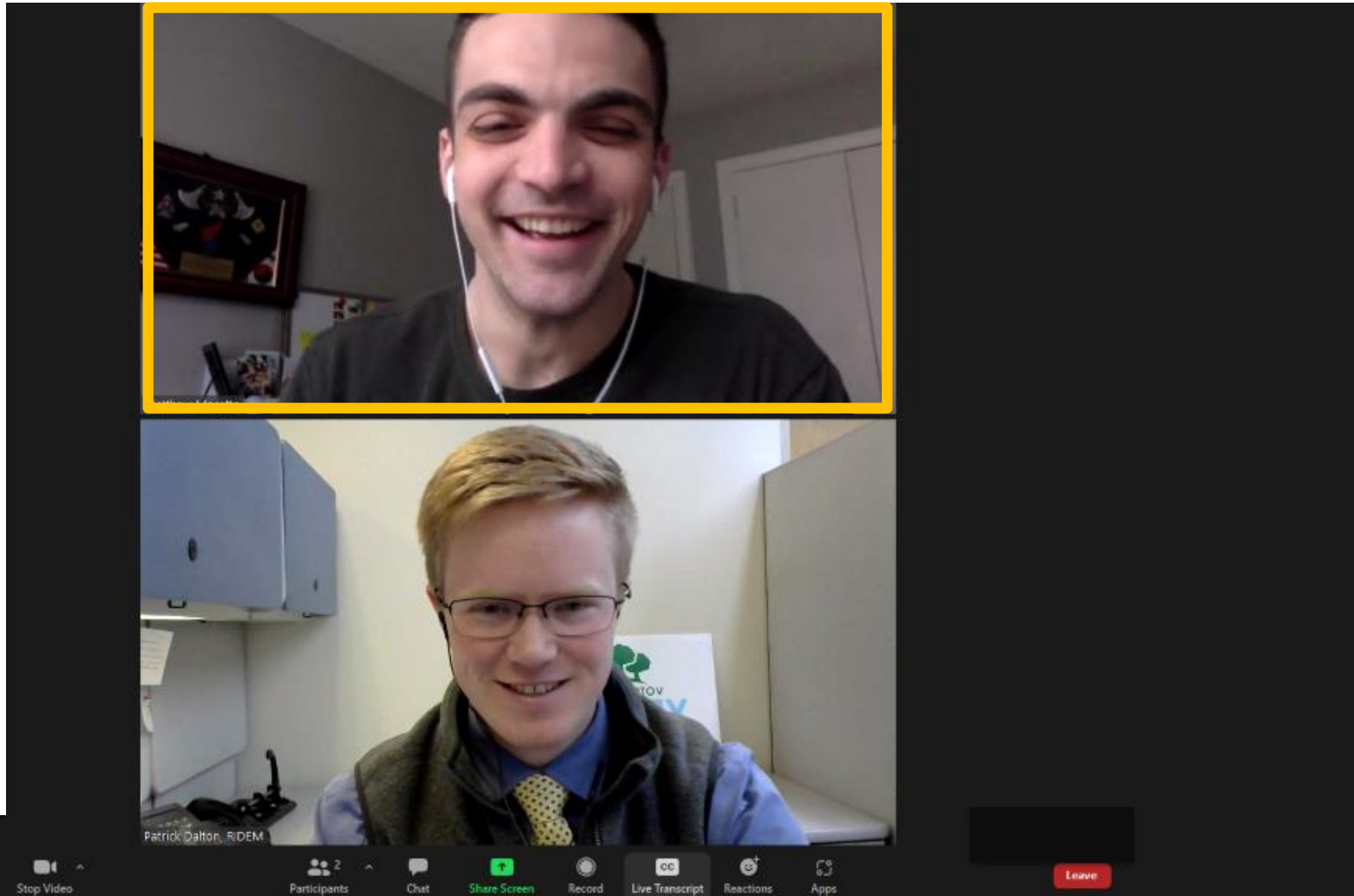

Housekeeping and Logistics

- This meeting is being **recorded** so we can be sure to capture your comments.
- We do not intend to post this recording publicly.

- Please **mute** your mic when not speaking.
- OER will monitor noise levels and mute folks who may have accidentally unmuted themselves.

- **Make space and take space**
- Each person will be allotted a maximum of 3 minutes to speak initially to ensure we are allowing everyone an opportunity to be heard

- We recognize there may be inherent **power dynamics** in this conversation.
- We **encourage** everyone to voice both support *and* concerns, and invite you to challenge our assumptions and our thinking.

- Thank you in advance for your good intentioned comments and questions and for your **respect** toward everyone present.
- Please refrain from interrupting or speaking over others – this will ensure we hear and understand all speakers.

Panel Discussion

But first, a quick poll!

Today's Panel

Kate Moretti

Assistant Professor of Emergency Medicine

Brown University

Meredith Hastings

Deputy Director of Institute at Brown for Environment and Society

Professor

Brown University

Rachel Calabro

Climate Change and Health Program Manager

Rhode Island Department of Health

Lou Allard

Urban and Community Forestry Program Coordinator

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Julian Drix

Sustainability Commission

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Breathe Providence: A Hyperlocal Air Monitoring Project

Meredith Hastings
May 18, 2022

An Introduction

Research Areas:
Atmospheric chemistry
Biogeochemistry
Climate

Current Teaching:
Weather & Climate
Air Pollution & Chemistry

Meredith Hastings, Ph.D. (she/her/hers)

Professor of Earth, Environmental, and Planetary Sciences (DEEPS) and Environment and Society

Deputy Director, Institute at Brown for Environment and Society (IBES)

meredith_hastings@brown.edu

I'm also a Providence resident, a mom of 2 elementary school-aged daughters, and President of a non-profit called the Earth Science Women's Network that is dedicated to supporting more diversity in science and promoting professional development of early career scientists.

Breathe Providence: A Hyperlocal Air Monitoring Project

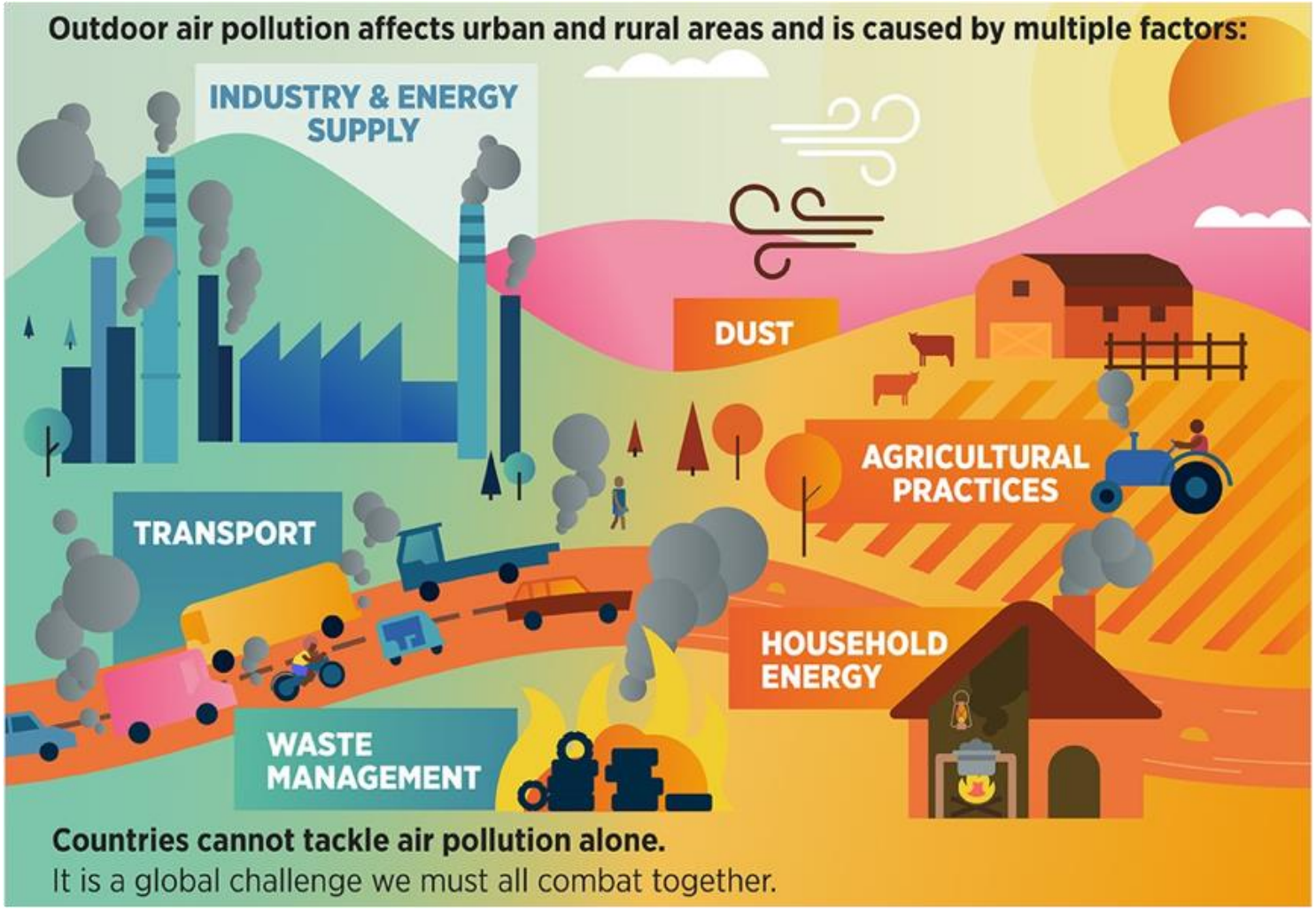
The vision for this project is to improve local air quality, reduce greenhouse gas emissions and support the communities of Providence to reach health and climate related goals.

To do this:

- We need to understand the landscape of air pollution and climate related emissions in Providence, RI at a resolution that reflects human's exposure to air pollution in their everyday lives,
- We want to use data to support improved policy and local environmental and sustainability initiatives,
- And we want to engage Brown University and university and high school students more directly in contributing to the City of Providence's health, wellness and climate related goals.

Air pollution…

- Variety of sources, both human--made and natural
- Primary pollutants
  - Emitted directly
  - E.g. carbon monoxide (CO), nitrogen dioxide (NO_2) and particulate matter (PM)
- Secondary pollutants
  - Formed secondarily
  - E.g. ozone (O_3), PM
- Greenhouse gases
  - Carbon dioxide (CO_2), methane (CH_4)



World Health Organization

Slides provided by Grace Berg a ‘21 graduate from Brown U.

What pollutants are monitored and how?

National Ambient Air Quality Standards **(NAAQS)**

States are required to maintain monitoring networks

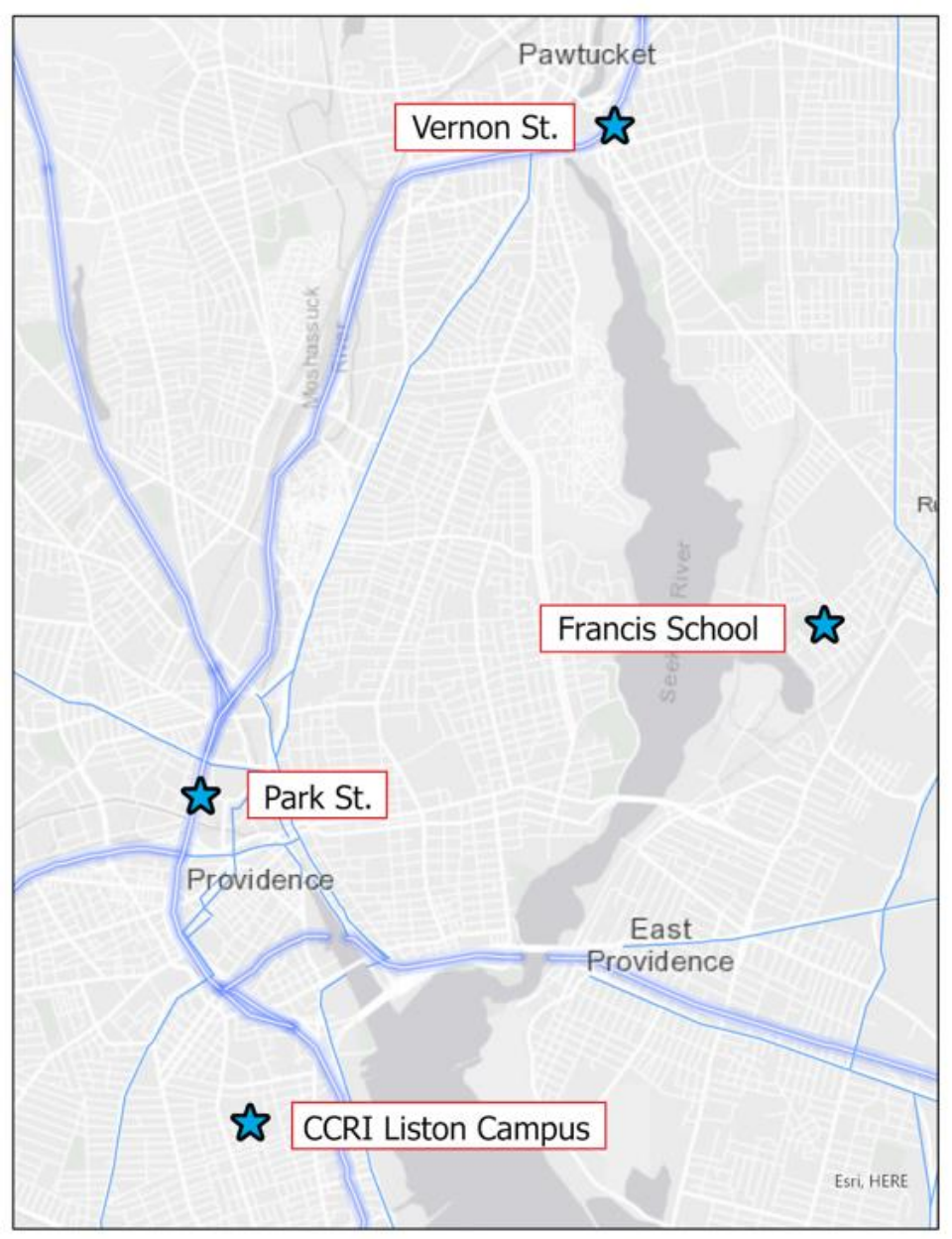
Due to resource constraints, states are unlikely to monitor beyond minimum requirements

Pollutants can vary on much finer scales (in space and time), especially in urban environments

Pollutant [links to historical tables of NAAQS reviews]		Primary/ Secondary	Averaging Time	Level	Form
Nitrogen Dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	primary	1 year	12.0 $\mu g/m^3$	annual mean, averaged over 3 years
		secondary	1 year	15.0 $\mu g/m^3$	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 $\mu g/m^3$	98th percentile, averaged over 3 years

https://www.epa.gov/criteria-air-pollutants/naaqs-table

BUT, we don't breathe 8-hour averaged air



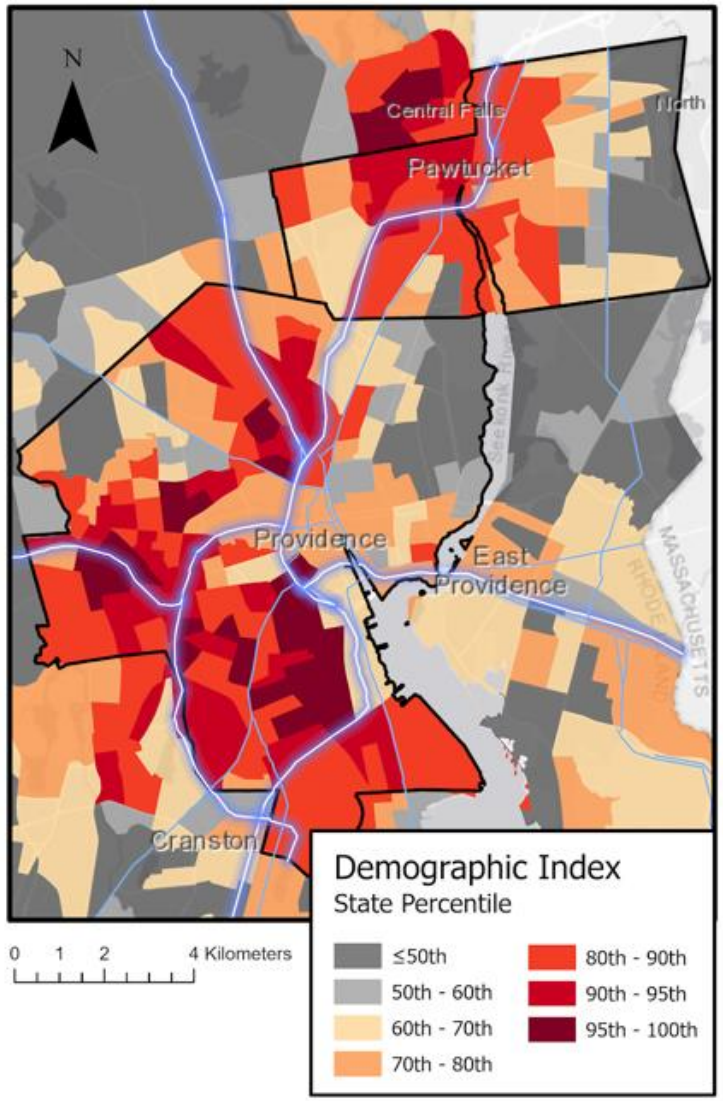
Current continuous air monitoring in Providence, RI

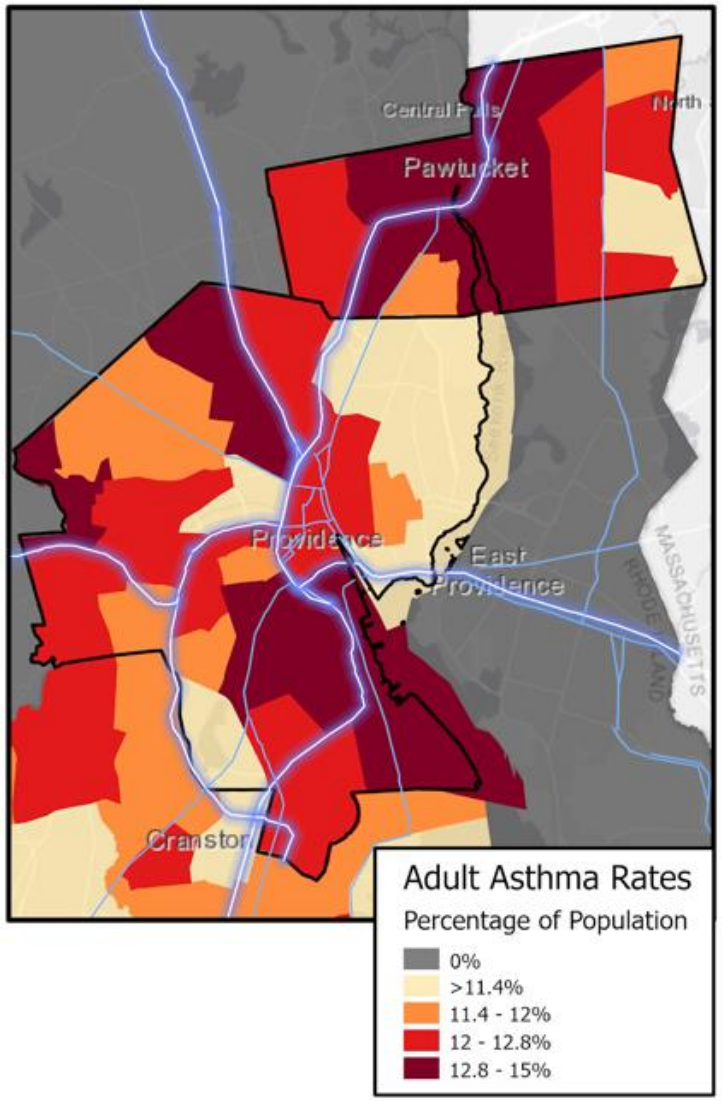
The RI Department of Environmental Management (DEM) operates four sites in the Providence area:

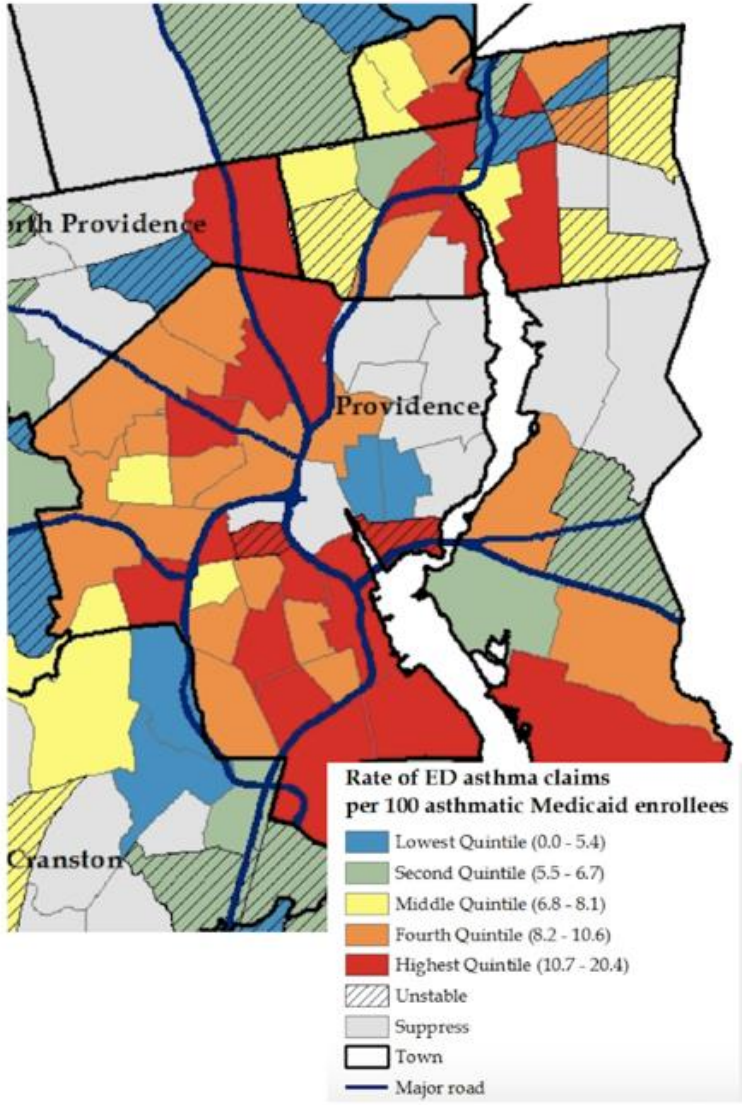
Site	$PM_{2.5}$	NO_2	Ozone
CCRI (urban residential)	X		
Park St. (near-road)	X	X	
Francis School (suburban	X	X	X

The American Lung Association rates Providence County as an "F" for Ozone Pollution, "A" for particle pollution

Vulnerable communities, socially and economically = “frontline communities” who directly experience immediate impacts of pollution and climate change







Slides provided by Grace Berg a ‘21 graduate from Brown U.

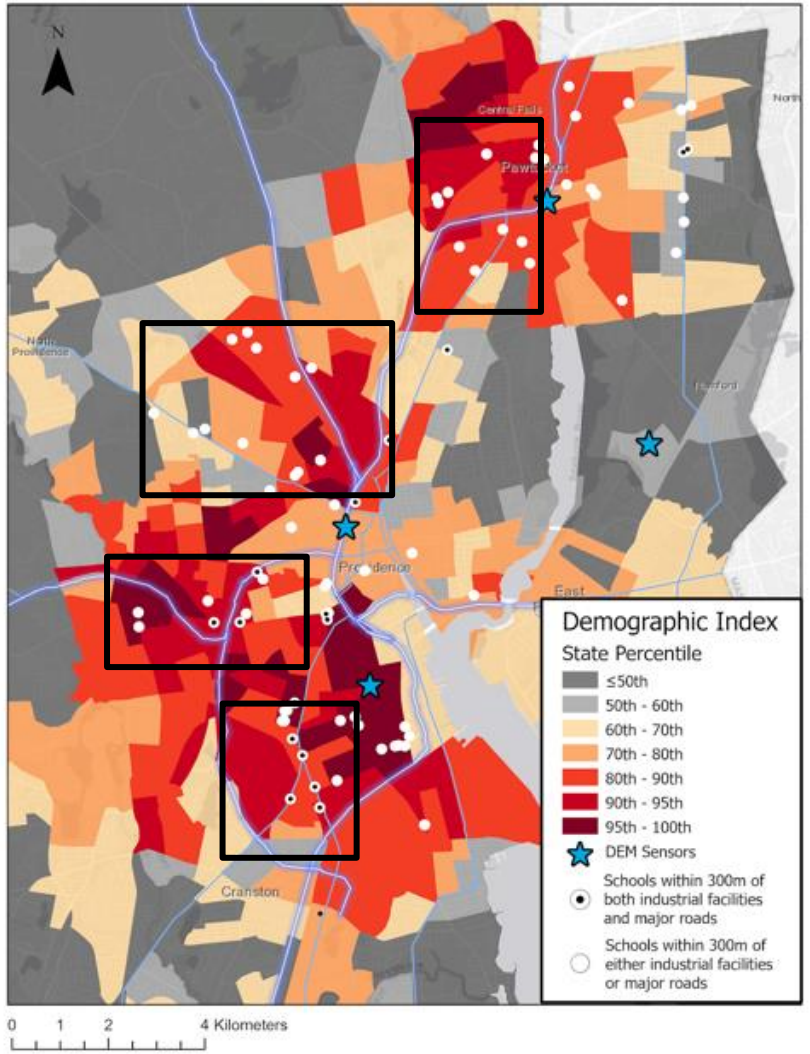
Vulnerable groups and sensitive locations (schools!) experience air quality on very different scales than represented by current air monitoring

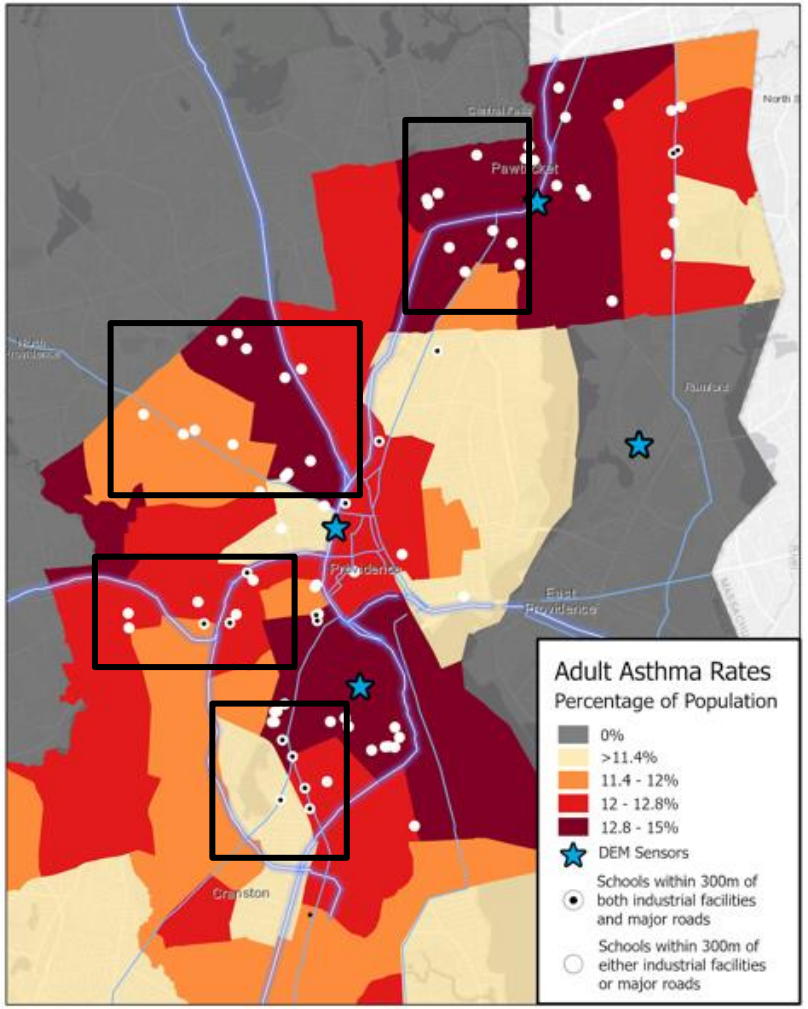
White dots = schools

Stars = DEM monitors

Dark red = most vulnerable demographic (left) and highest adult asthma rates (right)

We don't monitor in the locations that have the highest vulnerability AND (likely) the greatest rates of pollution exposure





Slides provided by Grace Berg, a 2021 graduate from Brown

Are emissions reductions enough to erase the disparity between the most and least polluted sites?

EPA Awards More than $4.8 million for Clean Diesel Projects in New England

10/19/2020

POLITICS RHODE ISLAND

Rhode Island Governor Sets Ambitious Renewable Energy Targets

January 23, 2020

RESILIENT RHODY

AN ACTIONABLE VISION FOR ADDRESSING THE IMPACTS OF CLIMATE CHANGE IN RHODE ISLAND

RI among 8 states signing action plan to promote clean cars

Zeroing in on Healthy Air

A National Assessment of Health and
enefits of Zero-Emission
ation and Electricity

American Lung Association.

n Healthy Air" shows the tremendous public
imate benefits if the United States accelerates
d transition to a zero-emission transportation
ed with non-combustion, renewable
urces like wind and solar.

NEWS

RI to become founding member o regional program to cut road emissions

Alex Kuffner The Providence Journal

Published 11:59 a.m. ET Dec. 21, 2020 | Updated 7:30 p.m. ET Dec. 21, 2020

STATE OF RHODE ISLAND
OFFICE OF ENERGY RESOURCES

State of Rhode Island
Zero Emission Vehicle
Action Plan

2016

Road Map

Scientific Understanding

Set up ~25 multi-pollutant sensors (CO, CO_2, NO_x, Ozone, PM + (potentially) CH_4, HCHO) across Providence County, particularly in neighborhoods not captured by current monitoring

Diagnose sources of pollutants and connections to weather

Community Engagement & Empowerment

Partner with communities for sensor placement

Use data to empower community-driven initiatives and understanding

Engage with community partners on translation of data to bolster better health outcomes

Improve policies to reduce inequities and support change

Education & Awareness

Raise awareness of local air quality

Support improved policy and local environmental and sustainability initiatives within an environmental justice framework

Engage students and community members in projects that can support community initiatives

Thank you for your attention!

Meredith_Hastings@brown.edu

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Key Climate Challenges

According to a 2014 survey, 6 in 10 Americans have given little or no thought to the issue of how climate change might affect people's health.

Rhode Island's average temperature has increased about three degrees since 1900. The rest of the continental United States has had an average temperature increase of about 1.5 degrees.

Rhode Island has seen a 76% increase in the number of heavy downpours since 1950 and has had the nation's largest increase of extreme precipitation events since the 1950s.

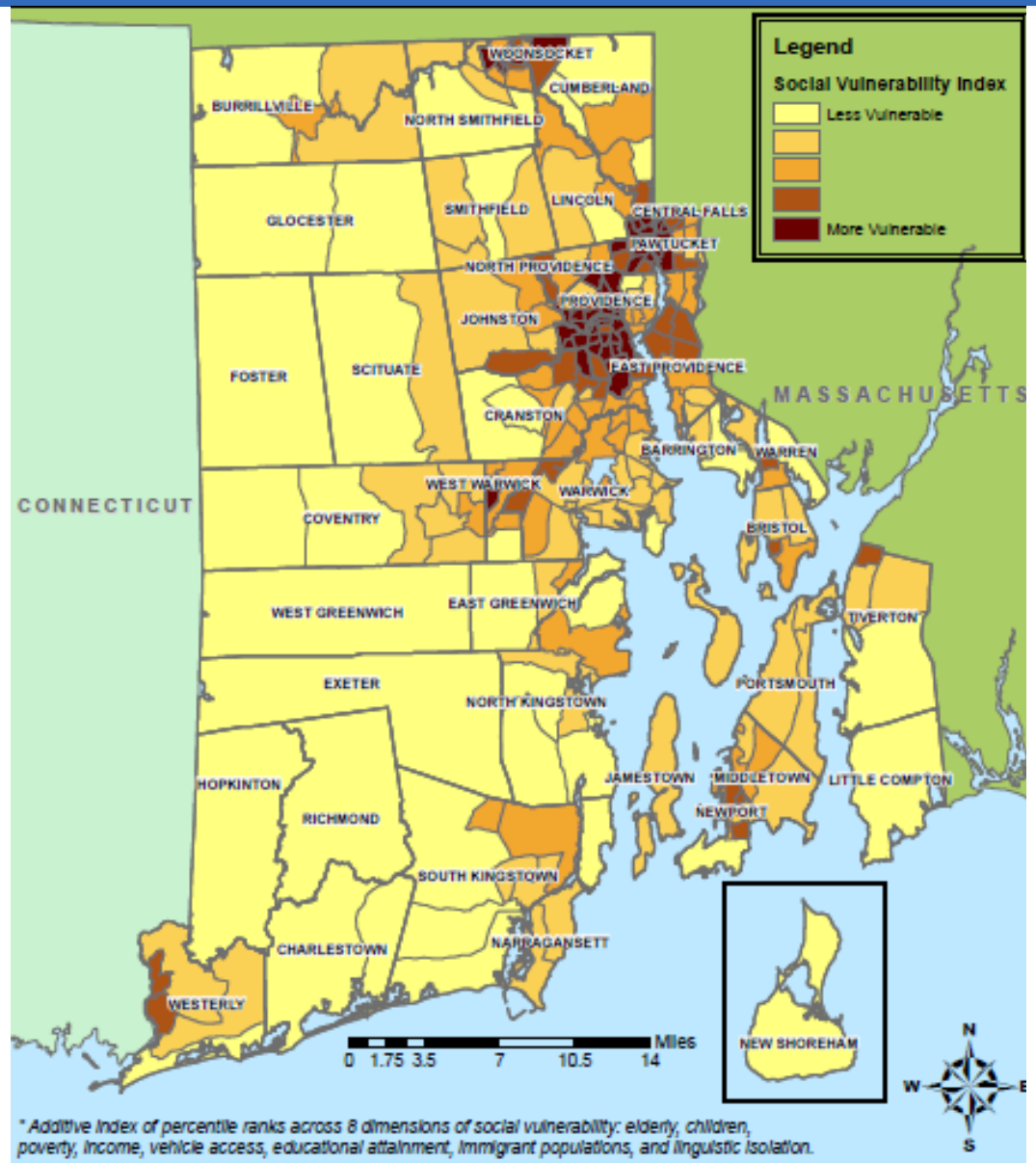
Spring is arriving earlier and bringing more precipitation, and summers are hotter and drier.

Heavy rainstorms are more frequent. Severe storms cause more floods that damage homes, businesses, and utilities.

Warmer weather could increase the risk of insect-borne diseases.

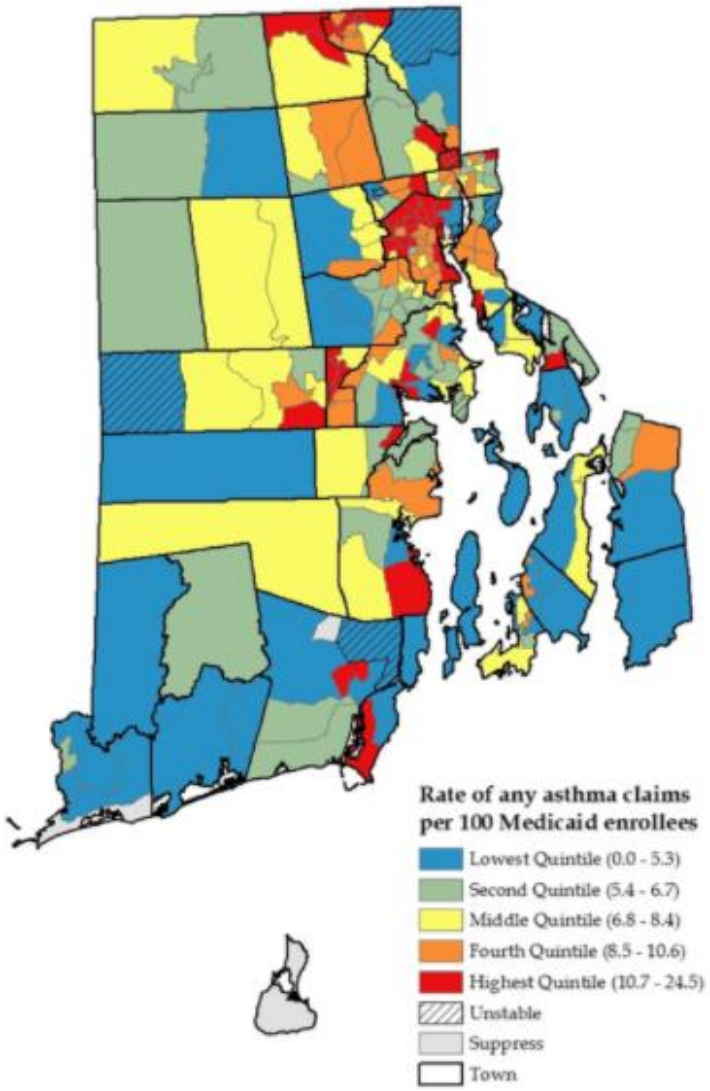
Ticks that transmit Lyme disease and other diseases are active when temperatures are higher than 45 degrees.

Climate Change is a *Risk Amplifier*

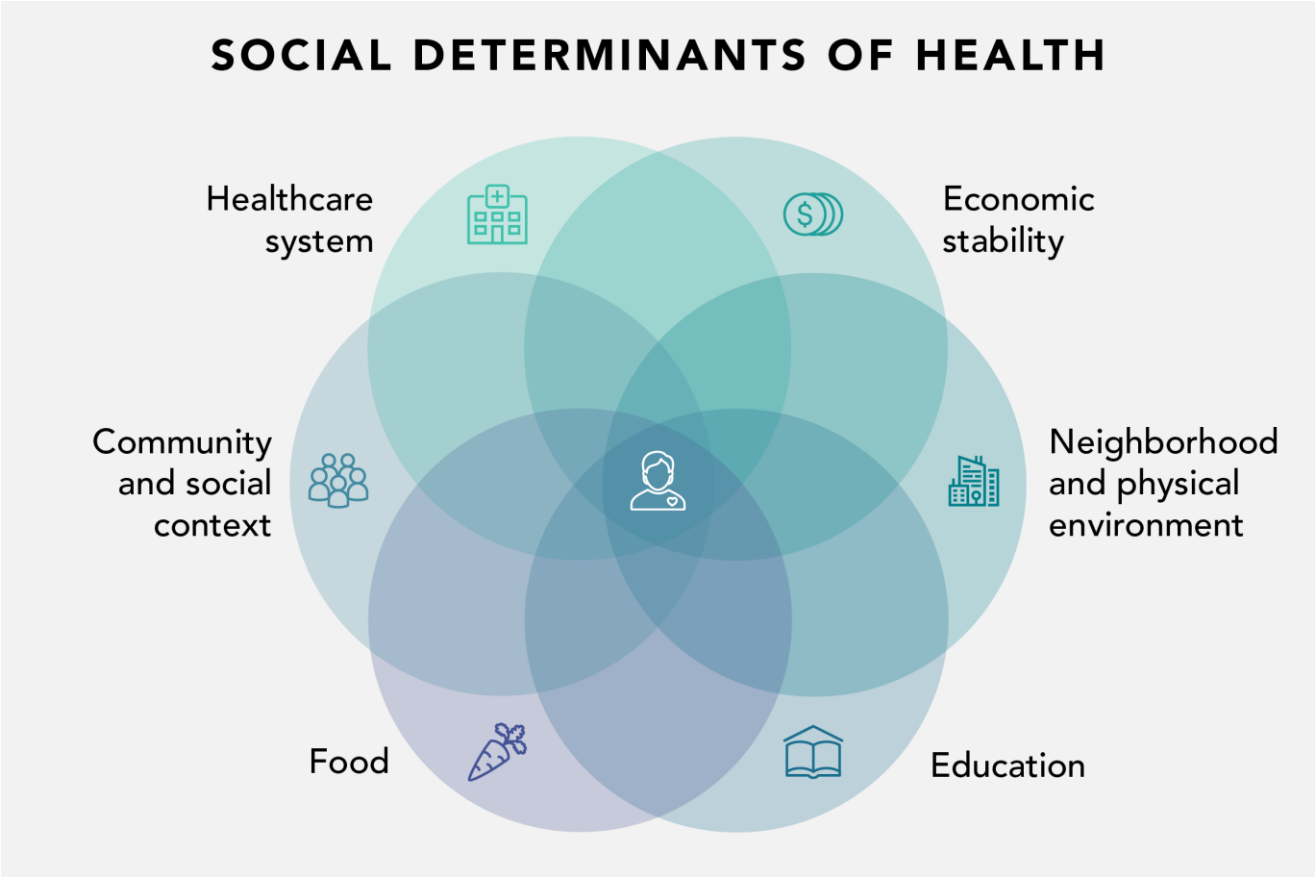


*Additive index of percentile ranks across 8 dimensions of social vulnerability: elderly, children, poverty, income, vehicle access, educational attainment, immigrant populations, and linguistic isolation.

Asthma Claims Among Children on Medicaid, 2013-2017 (asthma prevalence)



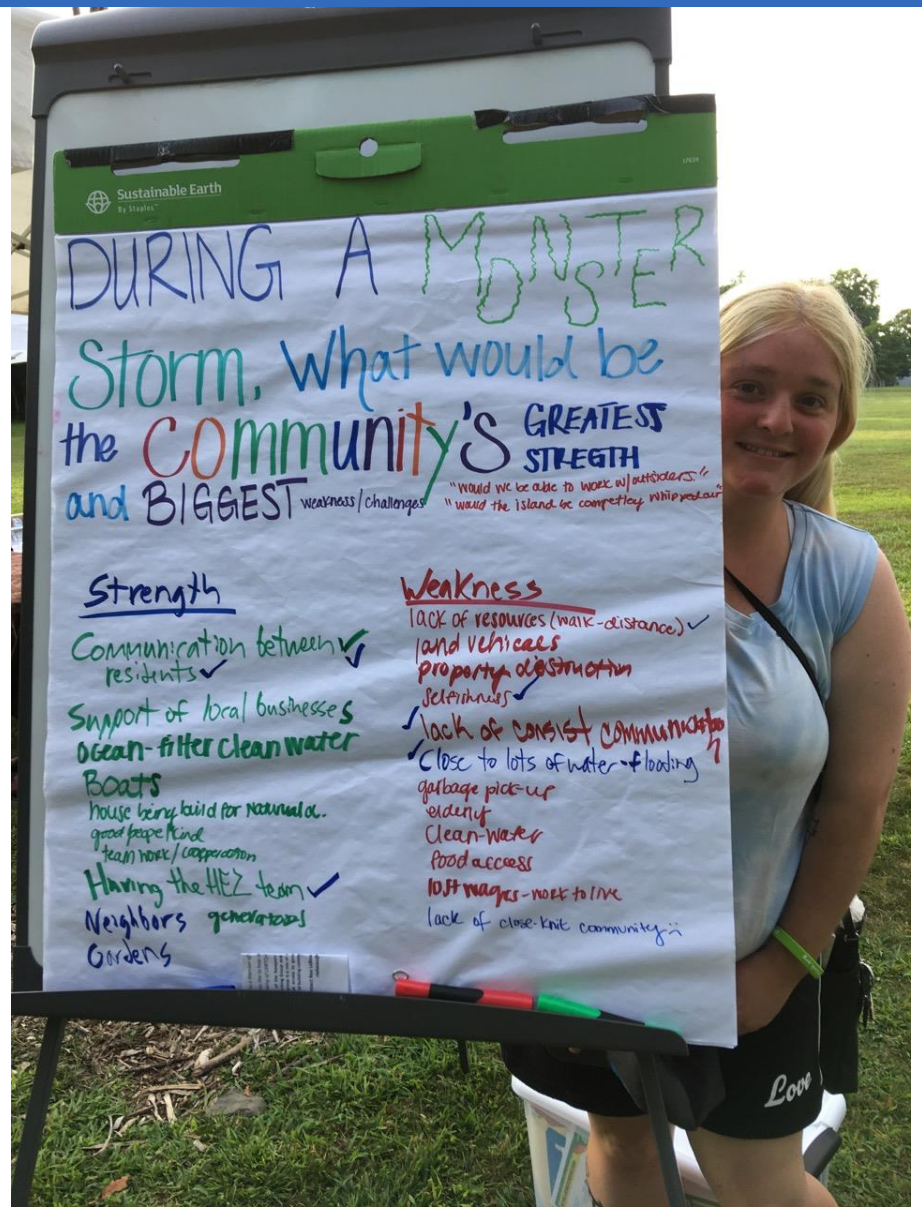
Social Determinants of Health



If you want to learn about the health of a population, look at the air they breathe, the water they drink, and the places where they live.

-Hippocrates, in the 5th century B.C.

Health Equity Zone Community Resiliency



Health Equity Zone Community Resiliency

Urban Forests for Climate and Health

AMERICAN FORESTS

DORIS DUKE CHARITABLE FOUNDATION

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

DEM RHODE ISLAND

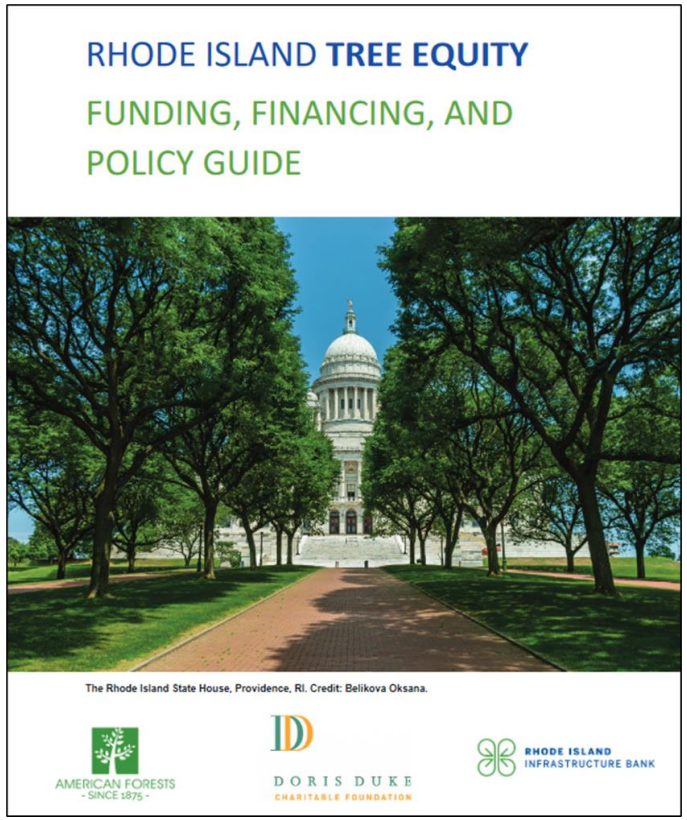
NIACS Northern Institute of Applied Climate Science

GREEN • HEALTHY • EQUITABLE CITY FOREST CREDITS

RHODE ISLAND INFRASTRUCTURE BANK

Urban Forests for Climate and Health

1. Tree Equity Score
2. Species List for RI Urban Forests
3. Climate & Health Action Guide
4. Policy
5. City Forest Credits
6. Community Engagement



TREE EQUITY SCORE

Right Tree Right Place

https://www.treeequityscore.org/

RHODE ISLAND CLIMATE AND HEALTH SPECIES LIST

A tree species vulnerability assessment was created for urban forests in Rhode Island to consider how climate change would affect tree species used in urban forestry projects, as well as outline the benefits of various tree species on human health and carbon mitigation.

Climate Vulnerability

Trees can be vulnerable to a variety of climate-related stressors such as intense heat, drought, flooding, and changing pest and disease patterns. Some species are more susceptible to climate impacts, while others have a greater capacity to adapt.

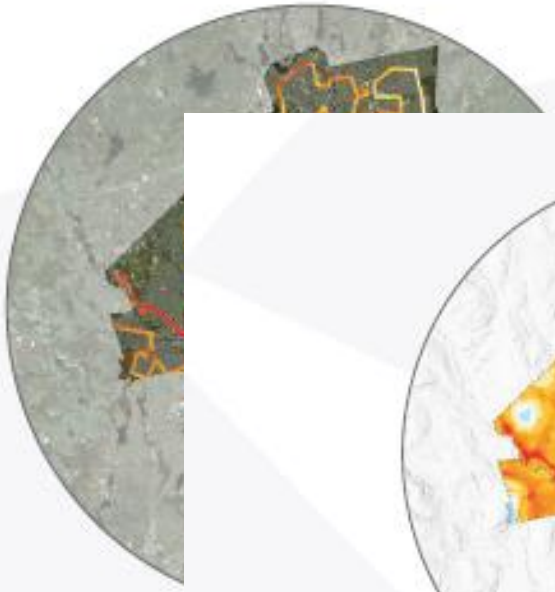
Carbon

Trees can reduce greenhouse gases in the atmosphere by directly storing carbon in their leaves, wood, and roots. Further, tree cover can moderate temperatures and help reduce the energy needed to heat or cool buildings.

Human Health

Trees can help reduce human health risks that may be faced under a changing climate, such as heat stress and reduced air quality, by providing shade, cooling through transpiration, and absorption of pollutants. However some trees can negatively impact human health, such as by producing allergenic pollen.

CAPA Heat Watch



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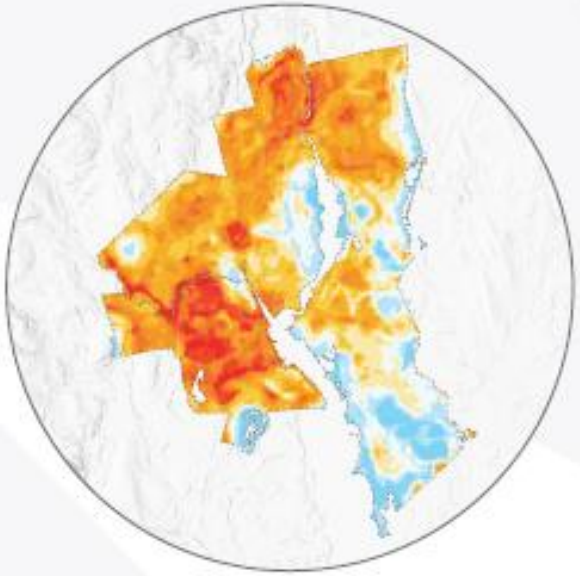
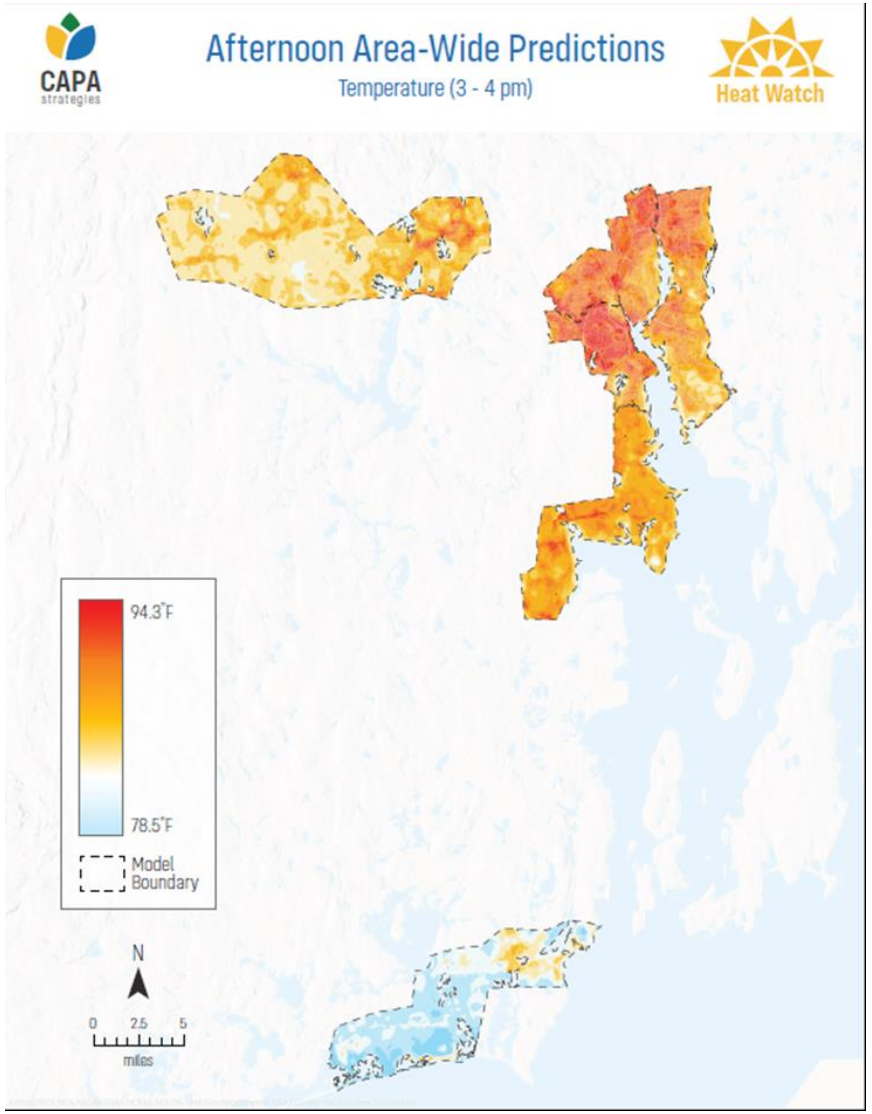


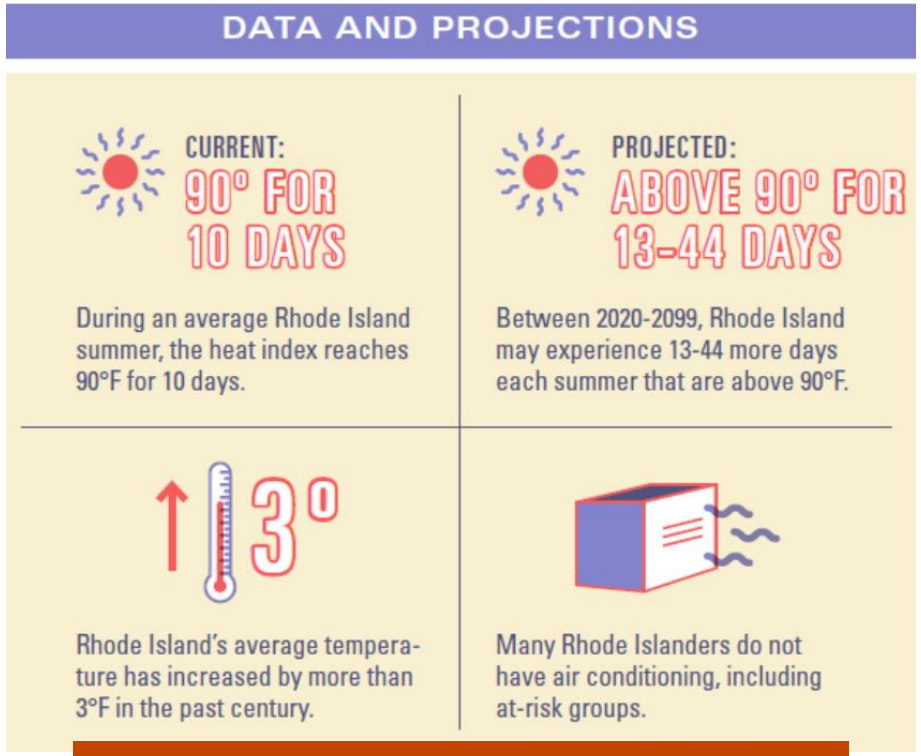
Area-wide heat maps, displaying either the modeled temperature or heat index across the entire study area at each traverse period.

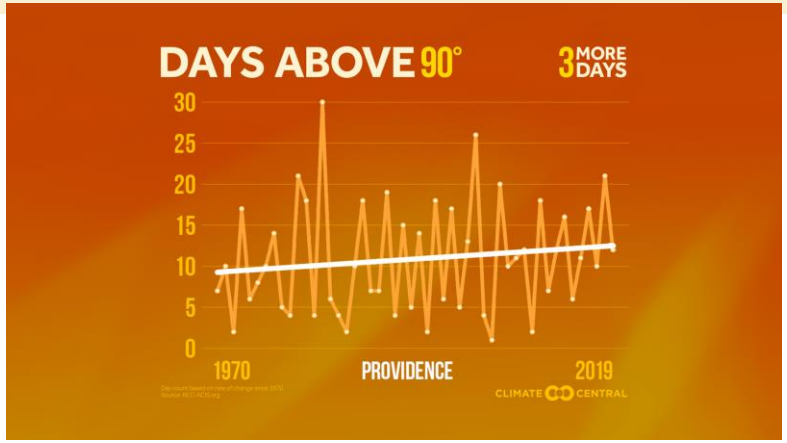
CAPA strategies

Heat Watch

Extreme Heat







How we're using the data

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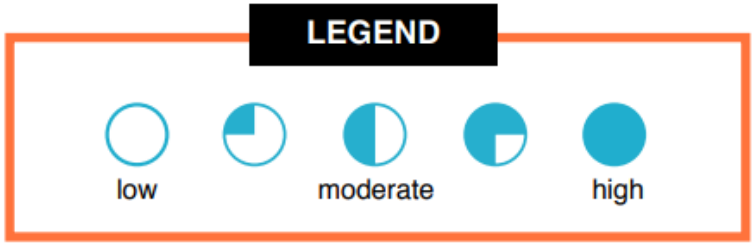
Sustainability Commission

City of Providence

Rhode Island Urban and Community Forestry Program

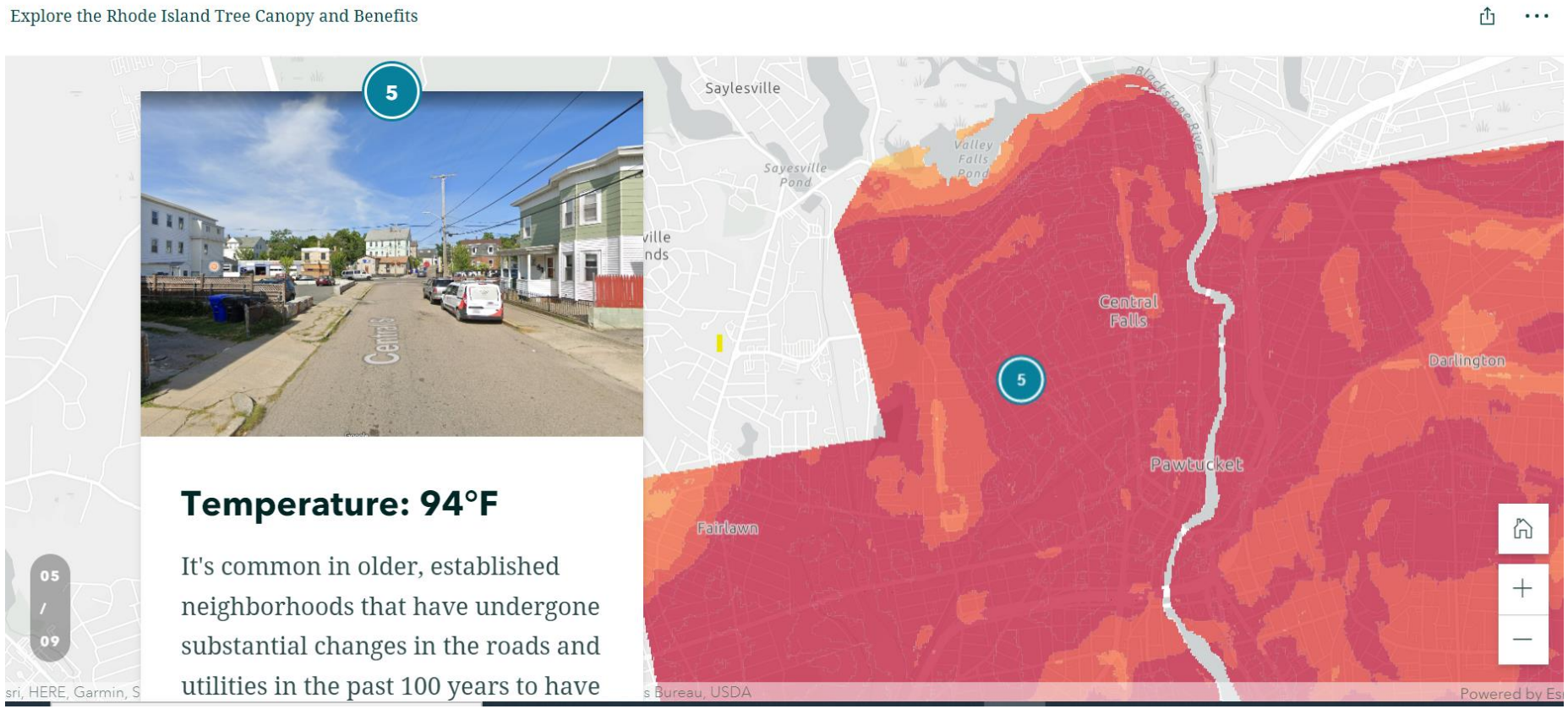
Lou Allard | RI Urban and Community Forestry Program Coordinator | May 19, 2022

Climate & Health Species List for RI Urban Trees



Scientific Name	Common Name	Climate Vulnerability	Carbon Benefit	Health Benefit	Health Disservices	Notes
Acer campestre	Hedge maple	○	○	○	◐	can be invasive
Acer ginnala	Amur maple	◕	◔	◕	◐	can be invasive
Acer griseum	Paperbark maple	◐	○	◔	◕	
Acer negundo	Boxelder	◕	◐	◐	◐	can be invasive
Acer rubrum	Red maple	◐	●	●	◕	
Acer saccharinum	Silver maple	◐	◐	◕	◕	
Acer saccharum	Sugar maple	◔	◕	●	◕	

Tree Canopy Exploration StoryMap



Resources

RI DEM Urban and Community Forestry

www.dem.ri.gov/urbanforestry

RI Trees for Climate and Health Page

http://www.dem.ri.gov/programs/forestry/urban-forestry/climate-health.php

RI Tree Canopy Exploration ArcGIS StoryMap

https://storymaps.arcgis.com/stories/ae50e9672cea4c329a7ab2f65eca1790

Climate and Health Species List for RI Urban Trees

http://dem.ri.gov/programs/bnatres/forest/pdf/urban/climate-health-species.pdf

Today's Panel

Kate Moretti

Assistant Professor of Emergency Medicine

Brown University

Meredith Hastings

Deputy Director of Institute at Brown for Environment and Society

Professor

Brown University

Rachel Calabro

Climate Change and Health Program Manager

Rhode Island Department of Health

Lou Allard

Urban and Community Forestry Program Coordinator

Rhode Island Department of Environmental Management

Julian Drix

Sustainability Council

City of Providence

Time for Questions for our Panelists

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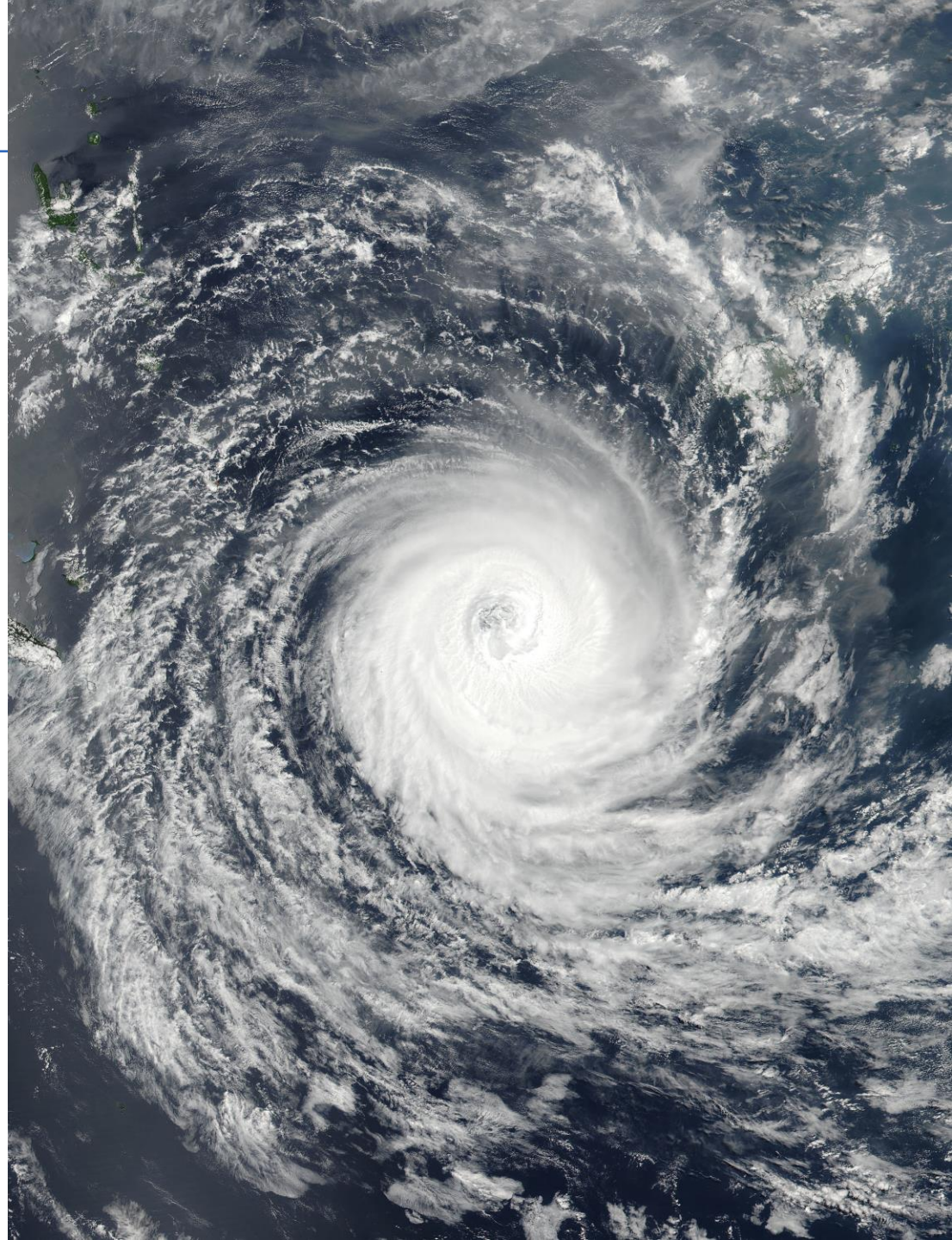
Next Steps

Quick post-session poll!

June

- 6/14-15 Sharing Sessions on Thermal Sector
- 6/23 EC4 Council Meeting

More info & comment form:
www.climatechange.ri.gov/aoc



Act on Climate

Thank you!

Comments may be submitted: www.climatechange.ri.gov/aoc

Check back for updated project materials: www.climatechange.ri.gov/aoc

All climate-related activities will be posted to the EC4 calendar: www.climatechange.ri.gov

RIEC4