

CHARM

Roadmap to Resilience

for Populations At-Risk to Natural Hazards in Lake County

Community Health Adaptation & Resilience Mobilization



Lake County Board of Supervisors Meeting | July 22, 2025



OVERVIEW

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PHASE I: WHAT WE LEARNED

Community data collection

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Web-based summary of Phase 1 findings and resilience strategies

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CHARM Phase II

WHAT IS THE CHARM LAKE COUNTY PROJECT?



Phase 1: 2-year planning grant from National Institutes of Health (2023-2025)



Co-led by Tracking California and Big Valley Band of Pomo Indians



Goals:

1. Convene a diverse **working group** of Tribal and local governments, NGOs, and community advocates
2. Learn how **extreme heat, harmful algal blooms (HABS)**, and other climate-driven events impact Lake County residents
3. **Develop a plan** to improve coordination and planning during heat events, HABS, and other climate-driven emergencies



Tribes

Big Valley Band of Pomo Indians
Habematolel Pomo of Upper Lake
Middletown Rancheria of Pomo Indians
Robinson Rancheria of Pomo Indians
Scotts Valley Band of Pomo Indians

CBOs/NGOs

The Essential Public Information Center
Latinos United
North Coast Opportunities
Red Cross of America, Community
Adaptation Program

Lake County Agencies

Adult Services
Area Agency of Aging
Community Development
Health and Human Services
Office of Climate Resiliency
Office of Emergency Services
Public Health Department
Social Services
Tribal Health
Water Resources Dept

Municipalities

City of Clearlake
City of Lakeport

State Agencies

CDPH, Office of Health Equity

231

SURVEY RESPONDENTS

Representing all towns and
Tribes in Lake County

65

INTERVIEW PARTICIPANTS

From communities most impacted by
extreme heat, wildfires, harmful algal
blooms, and other climate-driven events

COMMUNITY DATA COLLECTION

13

WORKING GROUP MEETINGS

Information and guidance from
local and regional partners

74

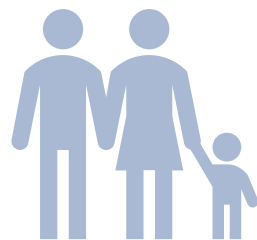
CLIMATE RESILIENCE RESOURCES

Compiled as part of the asset and needs
assessment and publicly available on the
CHARM website

WHO IS AT RISK IN LAKE COUNTY



Seniors



Unhoused people



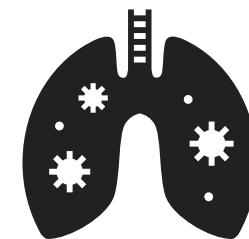
Outdoor workers



Physical disabilities



Mobile home residents



People with chronic illness



Limited transport



Exposure to Clear Lake



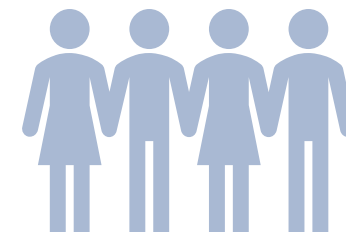
Mental health challenges



Substance use disorders



Durable medical equipment



Tribal members

STRATEGIES FOR RESILIENCE



Resilient homes and housing security

Resilience centers

Transportation



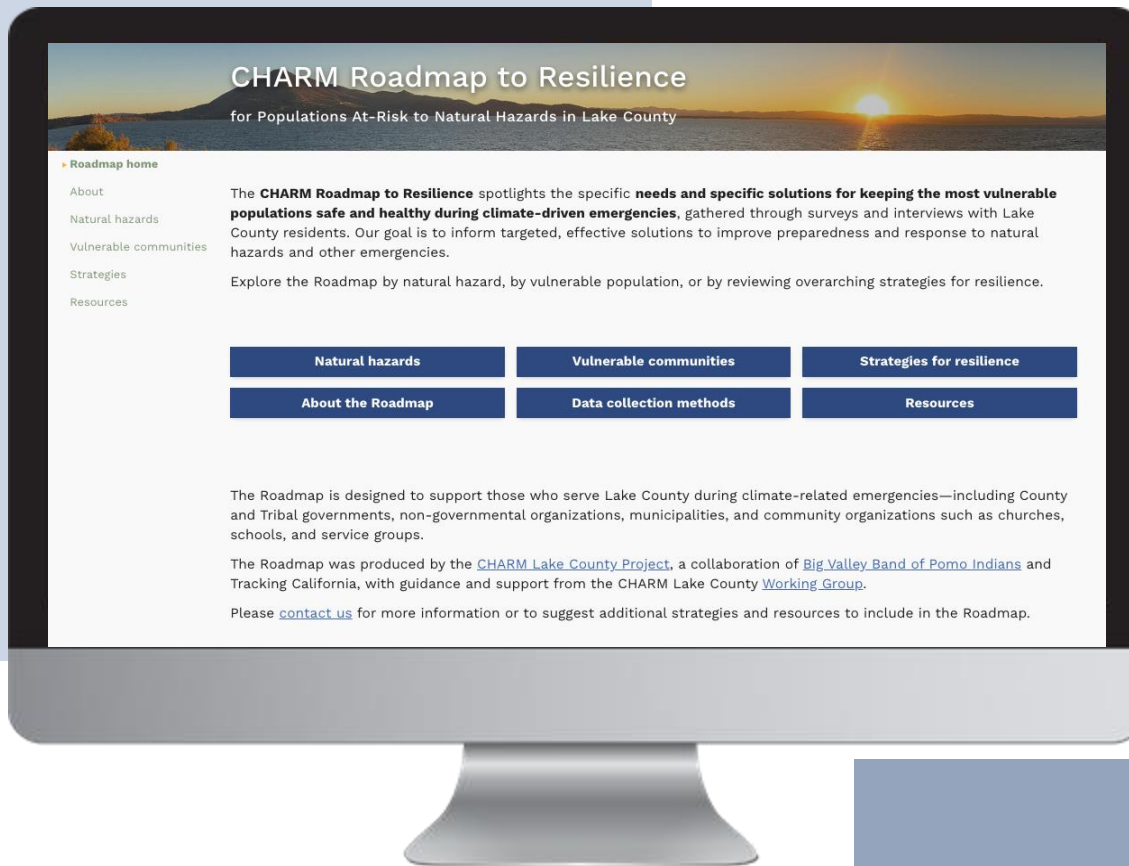
Communication and coordination

Education and training

Data and monitoring

ROADMAP PREVIEW

A web-based report of what we learned, focused on the most vulnerable communities and strategies for resilience



<https://trackingcalifornia.org/projects/charm/roadmap>

WHAT'S NEXT?



CHARM Roadmap Eval Form

Sharing the Roadmap

Who else should know about the Roadmap?

Gathering feedback

Is the Roadmap helpful to your work?

Do you have feedback on things you'd like to see included or corrected?

This QR code will send you to our eval form, or please reach out

CHARM PHASE II



Community-engaged development of intervention modules and staff training at trusted community centers



Evidence-based **heat resilience Kit**, with items requested by community members in Phase 1



12-week **Climate Adaptation & Resilience Intervention (CARI)** in-person modules at trusted community centers



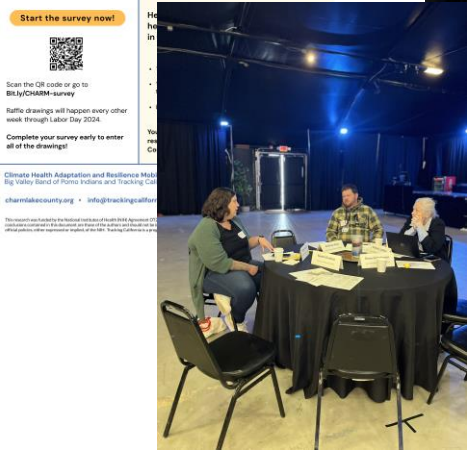
1-on-1 sessions for service enrollment and individualized support with taking preparedness actions with staff

Project Collaborators

- Barrio Resiliency
- Big Valley Band of Pomo Indians
- CA Tribal Emergency Response & Relief Agency
- Clearlake Senior Center
- Habematolel Pomo of Upper Lake
- Lake County Behavioral Health
- Lake County Office of Climate Resiliency
- Lakeport Senior Center
- Red Cross
- North Coast Opportunities

- 4-year **intervention research project** funded by NIH
- Focus on at-risk groups: seniors, unhoused individuals, Tribal members, and outdoor workers
- “Does participation in a Climate Adaptation & Resilience Intervention improve resilience to extreme heat and other climate-driven events?”

Appreciation and thanks to our funder, partners, the CHARM Working Group, and survey and interview participants



Thank you

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CHARM Roadmap to Resilience

for Populations At-Risk to Natural Hazards in Lake County

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The **CHARM Roadmap to Resilience** spotlights the specific **needs and specific solutions for keeping the most vulnerable populations safe and healthy during climate-driven emergencies**, gathered through surveys and interviews with Lake County residents. Our goal is to inform targeted, effective solutions to improve preparedness and response to natural hazards and other emergencies.

Explore the Roadmap by natural hazard, by vulnerable population, or by reviewing overarching strategies for resilience.

[Natural hazards](#)[Vulnerable communities](#)[Strategies for resilience](#)[About the Roadmap](#)[Data collection methods](#)[Resources](#)

The Roadmap is designed to support those who serve Lake County during climate-related emergencies—including County and Tribal governments, non-governmental organizations, municipalities, and community organizations such as churches, schools, and service groups.

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CHARM Roadmap: Natural hazards

Natural hazards in Lake County

The CHARM Lake County project focused on extreme heat and cyanobacterial blooms, while also exploring other climate-driven events (CDEs) in the region. Select a CDE to learn about its impacts on Lake County communities, results from the CHARM surveys and interviews, and ways to improve resilience.

Extreme Heat

**Cyanobacterial
Blooms (Harmful
Algal Blooms)**

Power Outages

Wildfires

**Other Natural
Hazards**

CDEs are becoming more frequent and severe. In Lake County, these events are expected to have increasing impacts on the county as a whole and especially on [vulnerable communities](#).

CHARM Roadmap: Extreme Heat

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About extreme heat

Extreme heat refers to prolonged periods of excessively high temperatures, often worsened by humidity and limited nighttime cooling. It can strain the human body, increasing the risk of heat-related illnesses such as heatstroke and dehydration, especially among vulnerable populations like the elderly and outdoor workers. Extreme heat is expected to become more frequent and intense in the future.

Impacts of extreme heat

In 2022, Lake County [ranked in the top 15%](#) of all counties in California for emergency room visits for heat-related illness. Extreme heat poses serious [health risks](#), including:

- Physical effects such as dehydration, fatigue, muscle cramping, heat exhaustion, and heat stroke
- Worsening of chronic conditions, including respiratory and cardiovascular diseases, kidney disorders, and diabetes

See the [California Department of Public Health](#) for more information about impacts of extreme heat.

Highlights from the CHARM survey and interviews

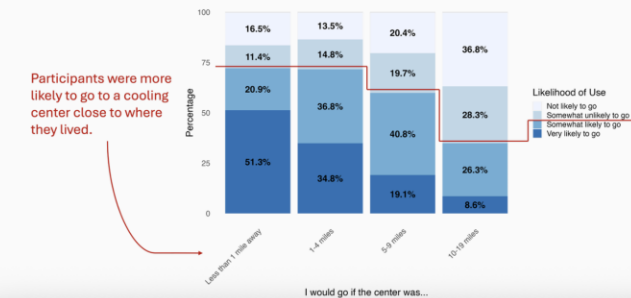
Survey and interview respondents were asked questions about their experiences during extreme heat events.

Housing and air conditioning

- **Nearly 1 in 10 respondents (10%) were not in permanent housing.**
- **23% reported they may not be able to stay cool during heat waves**, despite only 5% lacking AC or relying only on a fan.
- **21% said they had AC but couldn't afford to use it.**
- **41% lacked any backup power source**, leaving them especially vulnerable during simultaneous heat and power shutoff events.

Cooling (resilience) centers

- **Cooling centers were described as essential**, especially for residents without resilient housing and during PSPS outages.
- **72% of respondents would go to a cooling center within 1 mile**, but willingness dropped by 12% if it was 5–9 miles away, and by 37% if over 10 miles away. Proximity and convenience play a big role in decision to utilize a cooling center.



CHARM Roadmap: Profiles of vulnerable communities

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Vulnerable communities in Lake County

Select a vulnerable community to learn how they are impacted by climate-driven events, results from the CHARM surveys and interviews, and ways to build resilience in this community.

Seniors

People who are disabled, home-bound, or use medical equipment

Mobile home residents

People experiencing homelessness

Outdoor workers

Tribal communities

People with chronic health conditions

People who live, work, or recreate near Clear Lake

People with limited transportation & rural residents

Other vulnerable communities

Community voices

*"I remember during COVID when we're all in lockdown, there was like a big fire...it was near Clear Lake, and they were going to be doing evacuations. So **I was calling my disabled elderly, people in wheelchairs, people on oxygen, trying to figure out what the plan was to get them out.** Or how they were going to get out. I ended up working with the fire department in Clear Lake and actually went through and called every patient and... gave the fire department the list of all of our people who were immobile or couldn't get out."*

"Yesterday, they had a fire up in Ukiah and my mom, you know, she was ready to go, but she didn't know what direction to go in, you know. So since I'm disabled, you know, I don't know if PG&E will help me out, or who will help me out."

[Interviewer] "In an evacuation situation, where would you go, what would you do?"

[Interviewee] "I'd probably just stay in my house until the last possible moment."

"Our apartment is kind of small and tight and doesn't really accommodate a walker or a wheelchair very well, so I act as her crutches... I really can't conceive of a good outcome of another evacuation."

CHARM Roadmap: Strategies for Resilience

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Strategies for strengthening resilience in Lake County

This Roadmap highlights a set of **strategies to improve resilience to climate-driven events** like extreme heat and harmful algal blooms, identified through CHARM Lake County's collaborative, data-informed process. These strategies emerged from surveys, interviews, and the input of the CHARM Lake County Working Group.

**Resilient Homes and
Housing Security**

Resilience Centers

Transportation

**Communication and
Coordination**

**Education and
Training**

Data and Monitoring

CHARM Roadmap: Resilience Centers

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Resilience centers are safe, accessible spaces that provide shelter and vital resources during climate and public health emergencies such as wildfires, extreme heat or cold, and smoke events. These centers vary by type and operator: county-operated resilience centers may be public spaces like libraries that are already open, while others may be run by community-based organizations, Tribal governments, or trusted local partners without direct county support. Regardless of who operates them or whether they identify as resilience centers, these spaces play a crucial role in serving vulnerable populations—including unhoused individuals, seniors, and people without reliable heating or air conditioning—by offering relief and a place of refuge when it's most needed.

In Lake County, the [Lake County Community Organizations Active in Disaster \(COAD\)](#) plays a key role in facilitating communication, coordination, and support of resilience centers throughout the county. Lake County Tribes also provide resilience centers and spaces for Tribal members and other community members. Other trusted spaces, such as peer support centers and senior centers, also play a critical role in providing safe and accessible spaces for the community.

Key issues and strategies for Lake County

1. **Resilience centers that are accessible, open, trusted, and accommodating**
2. **Public awareness and access to updated information**
3. **Resources and trainings for resilience centers**

CHARM Roadmap: Resources

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Below are selected resources and collections related to the CHARM Roadmap, which we will continue to build over time. Please [contact us](#) to recommend additional resources.

Information and data sources

- [CHARM Data & Resources Inventory](#)- This inventory was developed in partnership with the CHARM Working Group to be used as a resource for policy, planning, research, and advocacy purposes. The inventory includes data; research publications; local, state, or federal planning documents and regulations; and emergency preparedness information.
- [CHARM General Resources Guide](#)- Resources for Lake County residents to keep safe and healthy during extreme heat or cyanobacterial blooms (HABs).
- [CDPH Center for Preparedness and Response](#)
- [California Governor's Office of Emergency Services](#)
- [Lake County Office of Climate Resiliency](#)
- [Lake County Office of Emergency Services](#)
- [Lake County Housing Resources Guide](#)

Maps and data visualization tools

- [Big Valley Rancheria's Clear Lake Cyanotoxin Monitoring Tool](#)