Measuring and Monitoring Community and Ecosystem Resilience

CENTER FOR COMMUNITY AND CITIZEN SCIENCE

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Overview

- Analyze an existing community resilience assessment tool
- Improve the tool to meet our needs using new metrics
- Identify community and citizen science opportunities to support the curriculum

What is Community and Citizen Science?

Public involvement in scientific research!

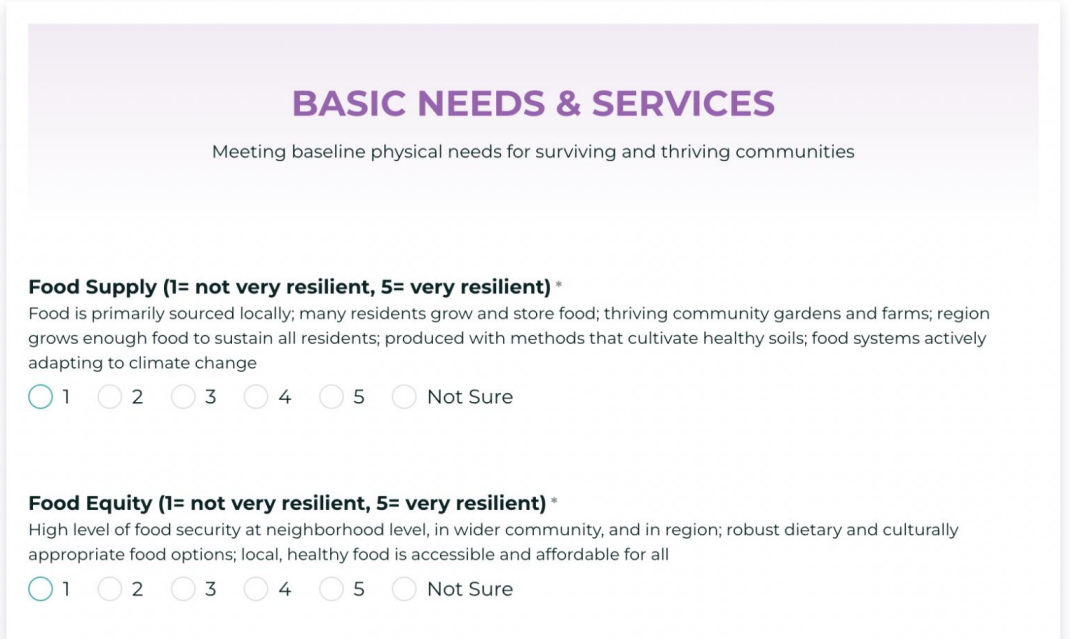
Harnessing expertise of community-members for better science and participant benefits

Why Measure Resilience?

1. Increase education and interventions
2. Identify how targeted efforts (like Climate Stewards!) might be affecting a community
3. Learn about resilience in a local area
4. Do Community and Citizen Science!

Community Resilience Assessment Tool

- Basic Needs & Services
- Environment & Natural Systems
- Physical Infrastructure
- Community Connections & Capacity



BASIC NEEDS & SERVICES

Meeting baseline physical needs for surviving and thriving communities

Food Supply (1= not very resilient, 5= very resilient) *

Food is primarily sourced locally; many residents grow and store food; thriving community gardens and farms; region grows enough food to sustain all residents; produced with methods that cultivate healthy soils; food systems actively adapting to climate change

1 2 3 4 5 Not Sure

Food Equity (1= not very resilient, 5= very resilient) *

High level of food security at neighborhood level, in wider community, and in region; robust dietary and culturally appropriate food options; local, healthy food is accessible and affordable for all

1 2 3 4 5 Not Sure

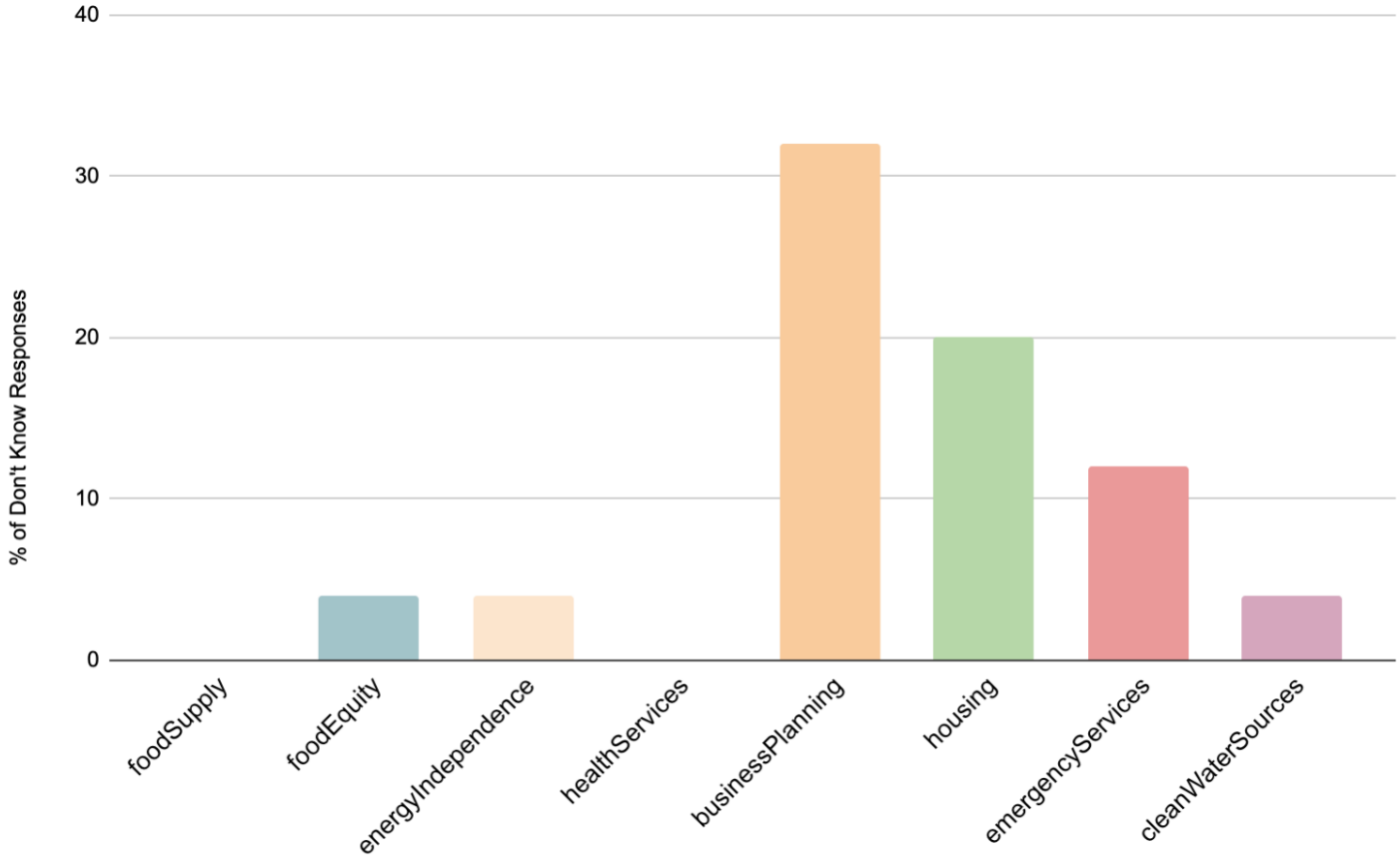
Community Resilience Organizations

Community Resilience Assessment Tool

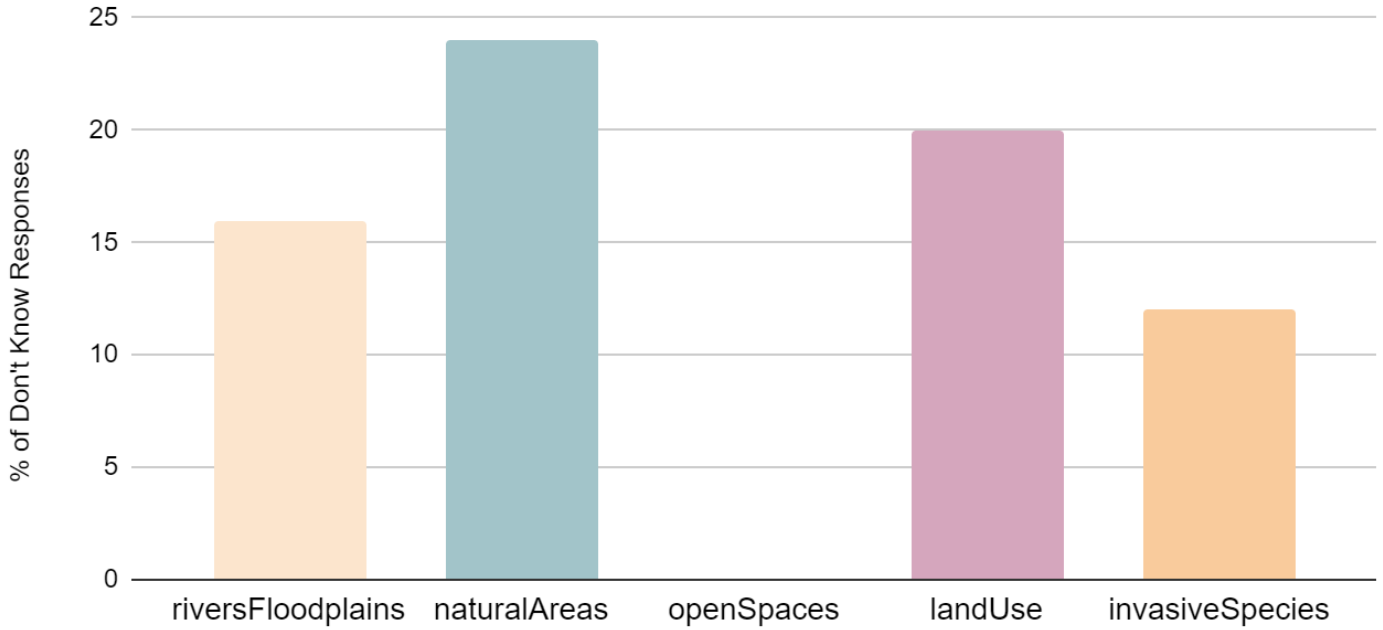
- Goals:
  - **Baseline assessments**
  - How participants were **thinking about resilience**
  - **Make suggestions**

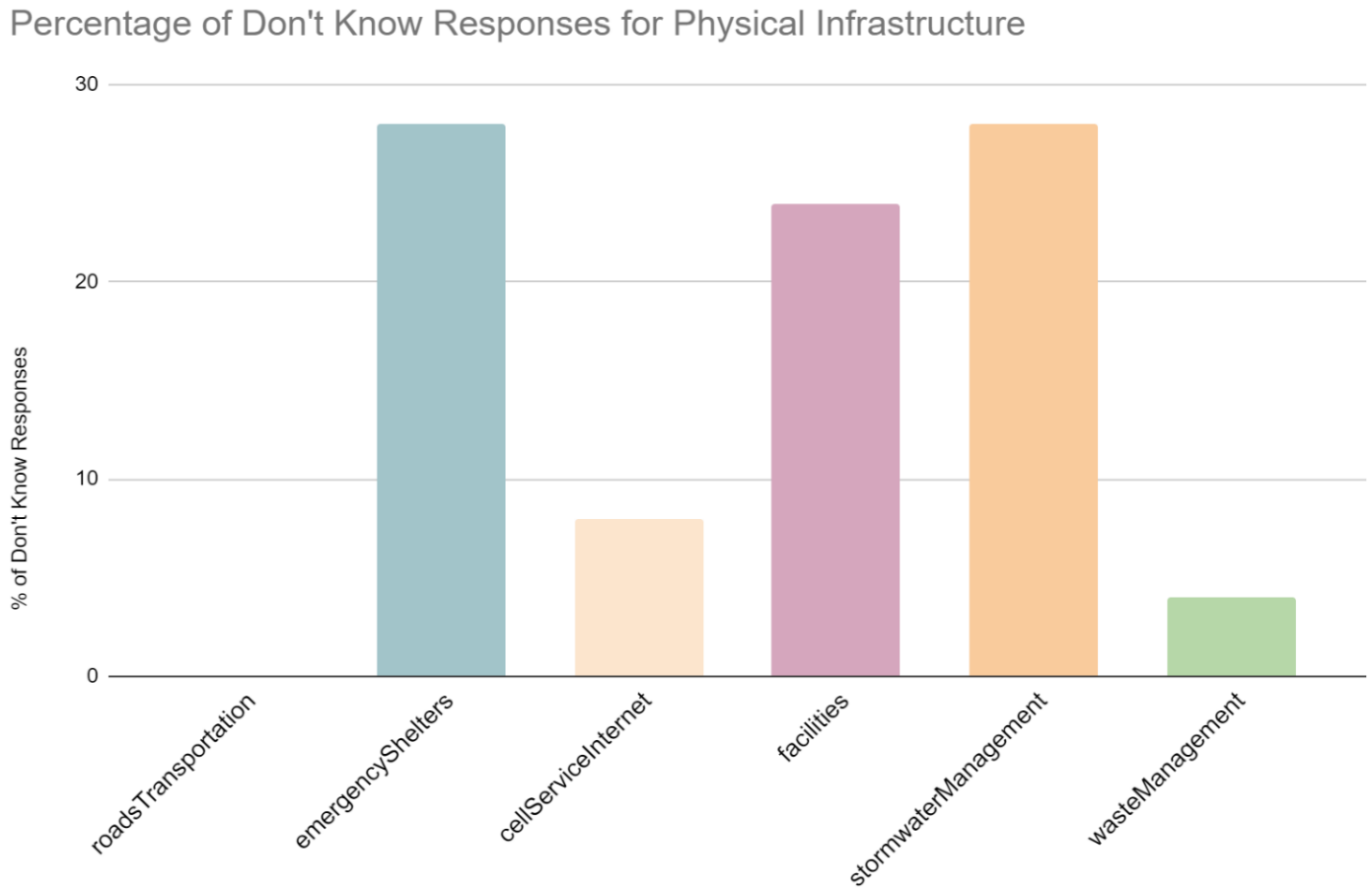
- 12 Partner Organizations
  - Instructor assessments, 2 organizations
  - Participant assessments, 8 organizations

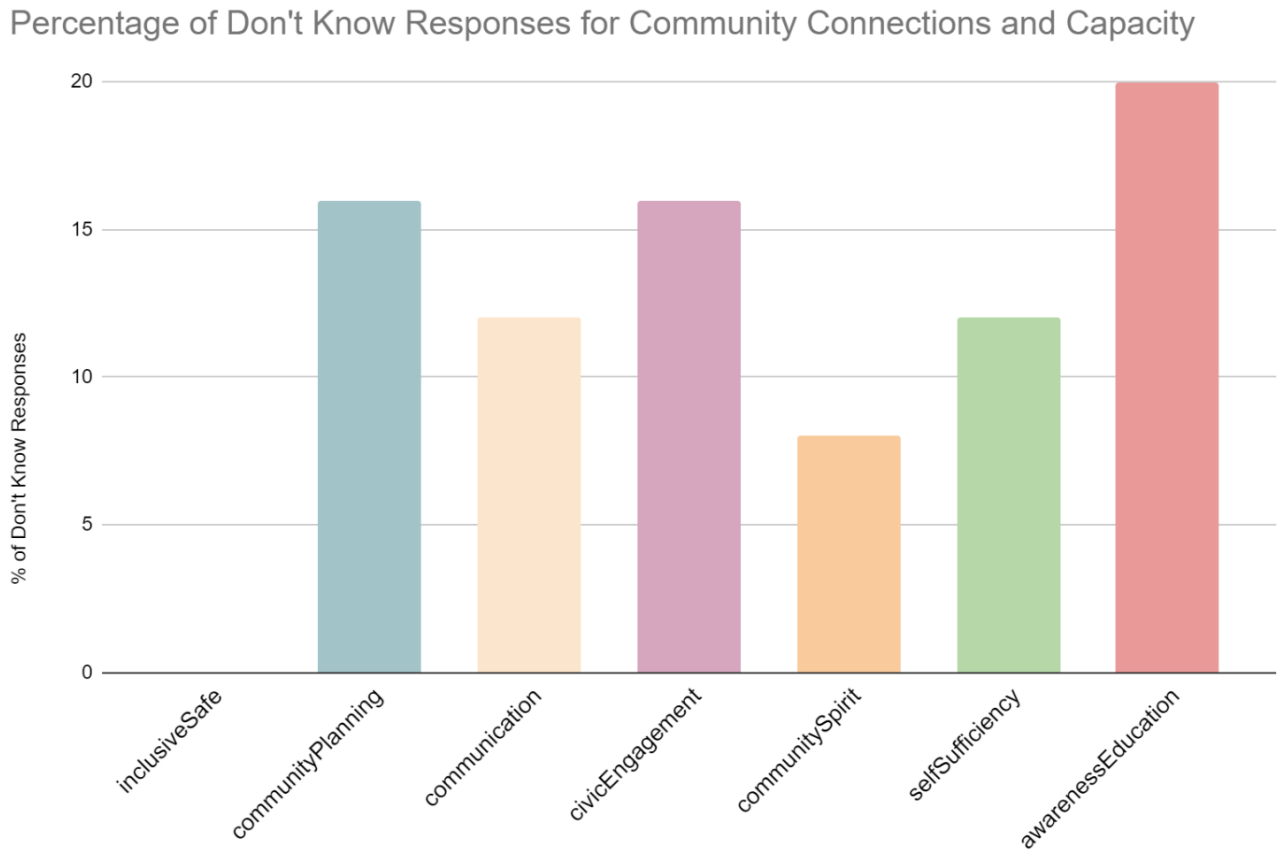
Percentage of Don't Know Responses for Basic Needs and Services



Percentage of Don't Know Responses for Environment and Natural Systems




Percentage of Don't Know Responses for Physical Infrastructure
% of Don't Know Responses
30
20
10
0
roadsTransportation
emergencyShelters
cellServiceInternet
facilities
stormwaterManagement
wasteManagement


Percentage of Don't Know Responses for Community Connections and Capacity
% of Don't Know Responses
20
15
10
5
0
inclusiveSafe
communityPlanning
communication
civicEngagement
communitySpirit
selfSufficiency
awarenessEducation

Challenges with this tool

- **Community variability**
  - *"Many of my rankings in this category could be moved up or down 1 slot. In part this is because **the "local" area is large** (ED County; American River and Cosumnes River watersheds) and there is a lot of variability within each topic."*

    - participant from American River Conservancy

Challenges with this tool

- **Representation**
  - *"i'm not sure on some of these. i'm also very concerned that **MUCH of the frontline communities are not represented in these responses**. As a white, cis-gender female my experience of resilience and services locally is VASTLY different than indigenous/bipoc community members, but is not being represented for analysis here."*

    - participant from Community Environmental Council

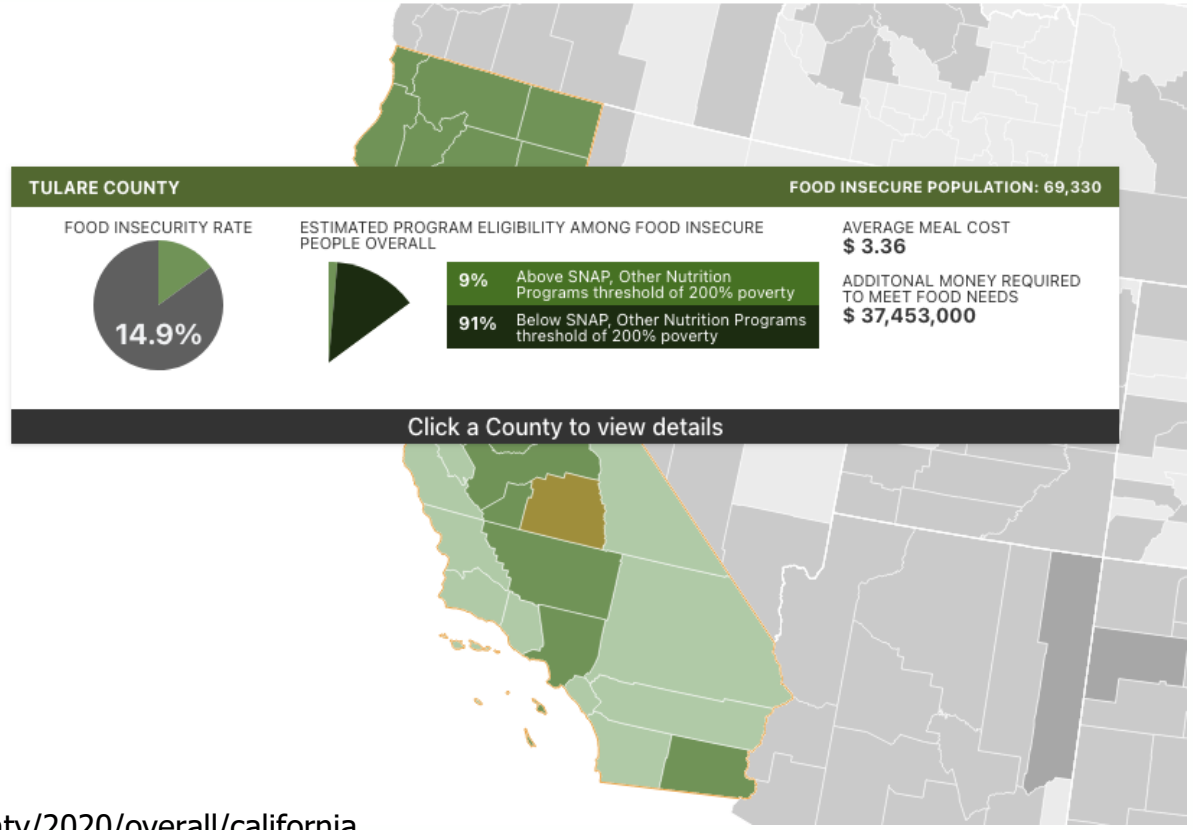
Moving Forward

- Keeping this version as an **instructional tool** to get **participants** thinking about climate resilience (though not Community and Citizen Science)
- Developing a new tool that has **instructors assess a few key indicators** of climate resilience in attempt to track changes in a site over time
- Indicators are based on:
  - Data availability and access
  - Relevance to climate change in California

Examples of Key Indicators the New Tool will Capture

- Extreme heat health events
- Food equity
- Energy reliability
- Tree equity scores
- Fire Safe Councils
- Adaptation planning capacity

Food Equity



https://map.feedingamerica.org/county/2020/overall/california

Tree Equity Score

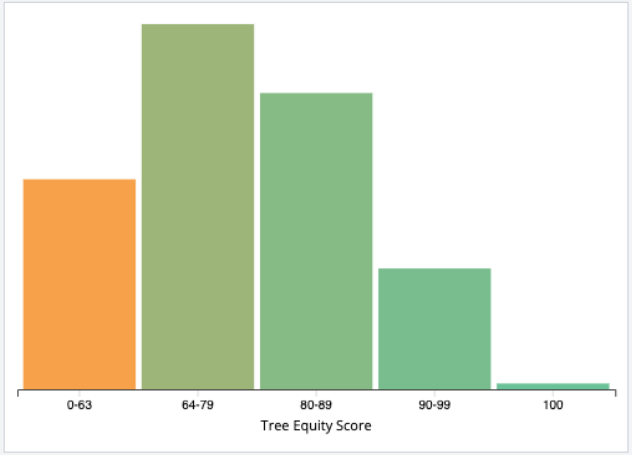
TREE EQUITY SCORE | NATIONAL EXPLORER

Sacramento

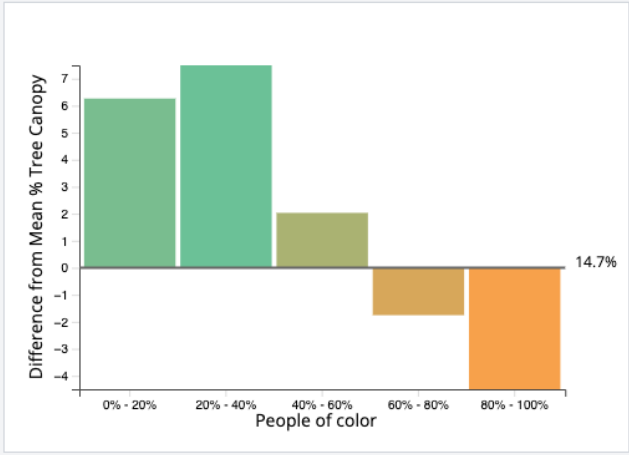
Tree Equity Score: 75

MUNICIPALITY
Tree Equity Score

Distribution of Tree Equity Scores



% Tree Canopy vs. % People of Color



Each bar represents the mean tree canopy % for block groups within the specified range of people of color . The amount above or below the thick horizontal line indicates the difference from the area-wide mean canopy %.

Presence of Fire Safe Councils

Fire Safe Councils within a 10 mile radius of Placerville, CA

cafiresafecouncil.org

Energy Reliability

13. Sacramento Division Performance Assessment

Sacramento Division Performance

Table 21: Sacramento Division Performance

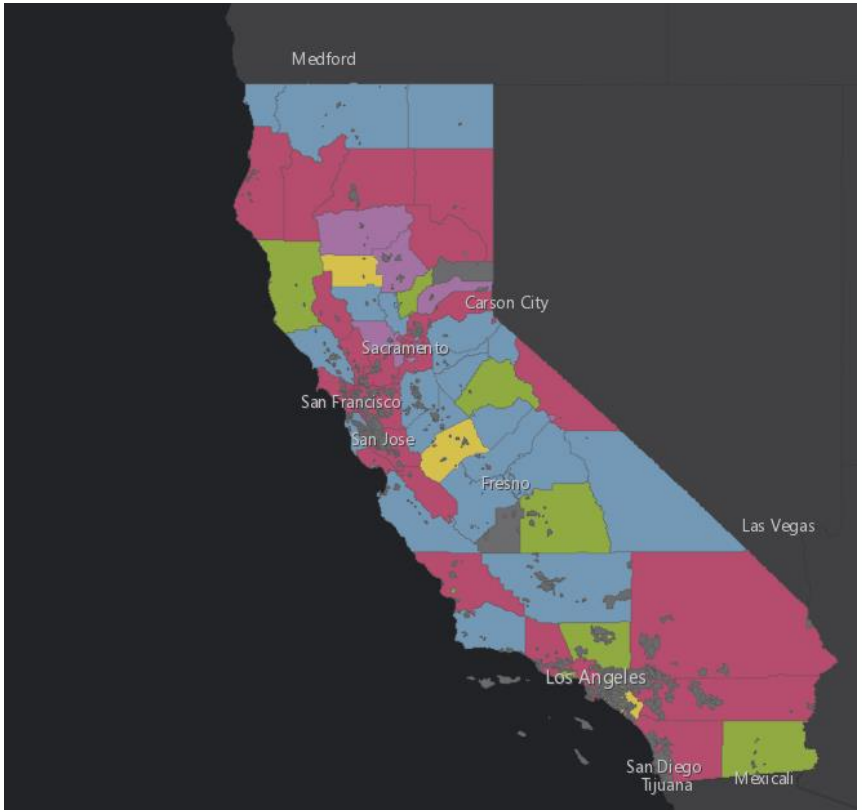
Division/System	Year	SAIDI	SAIFI	MAIFI	CAIDI
SACRAMENTO	2015	80.1	0.799	1.556	100.3
SACRAMENTO	2016	83.6	0.944	1.539	88.5
SACRAMENTO	2017	121.2	1.070	1.708	113.2
SACRAMENTO	2018	101.0	1.021	1.825	98.9
SACRAMENTO	2019	98.9	0.866	1.574	114.3
5-Year Average	15-19 Avg	97.0	0.940	1.640	103.1
SACRAMENTO	2020	173.6	1.350	1.499	128.6
	%Difference	79.1%	43.6%	-8.6%	24.7%

State of Climate Adaptation Plans

The ResilientCA Adaptation Planning Map (RAP-Map)

Legend

- Unknown/uncategorized
- Acknowledges climate risk or adaptation efforts
- Completed vulnerability assessment
- Completed adaptation policy development
- Completed vulnerability assessment and adaptation policy development
- Updated and adopted Safety Element



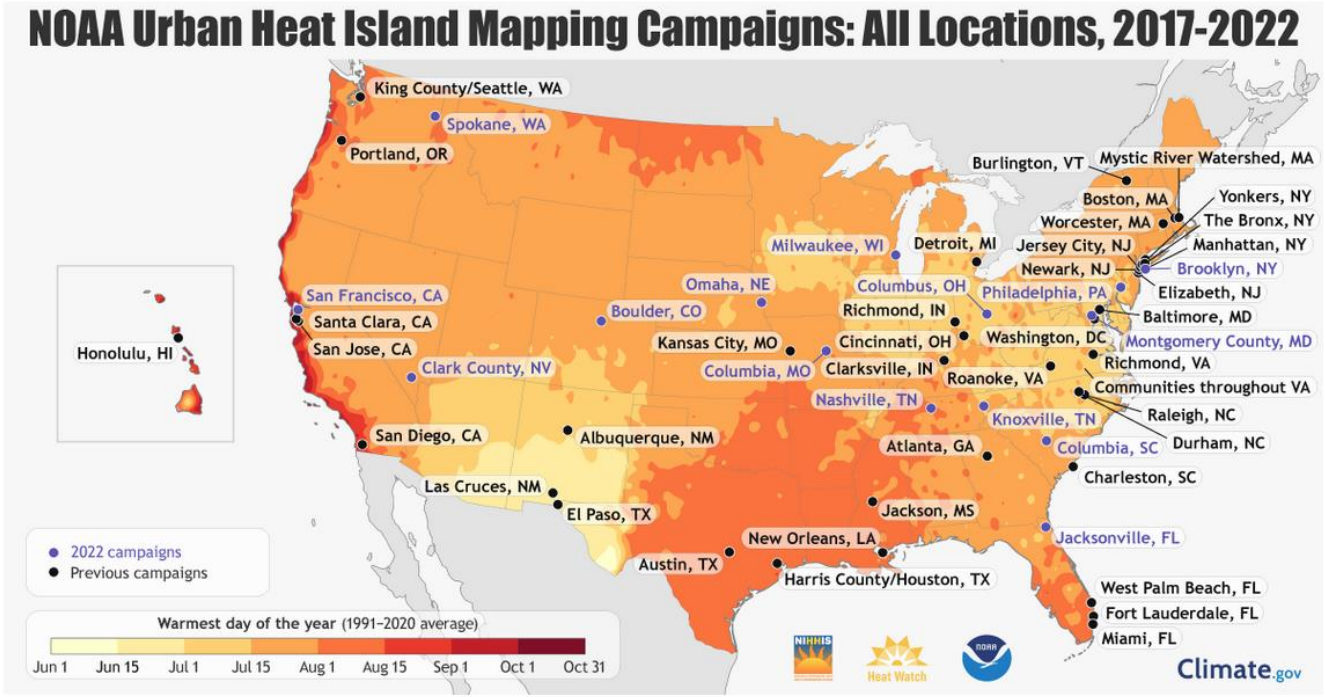
Instructor Validation is Key

- Instructors will…
  - Validate or explain the relevance of these scores for their service areas:
  - Are they meaningful metrics of resilience?
  - Could the course address any needs or opportunities identified by these metrics?

A Role for Community and Citizen Science

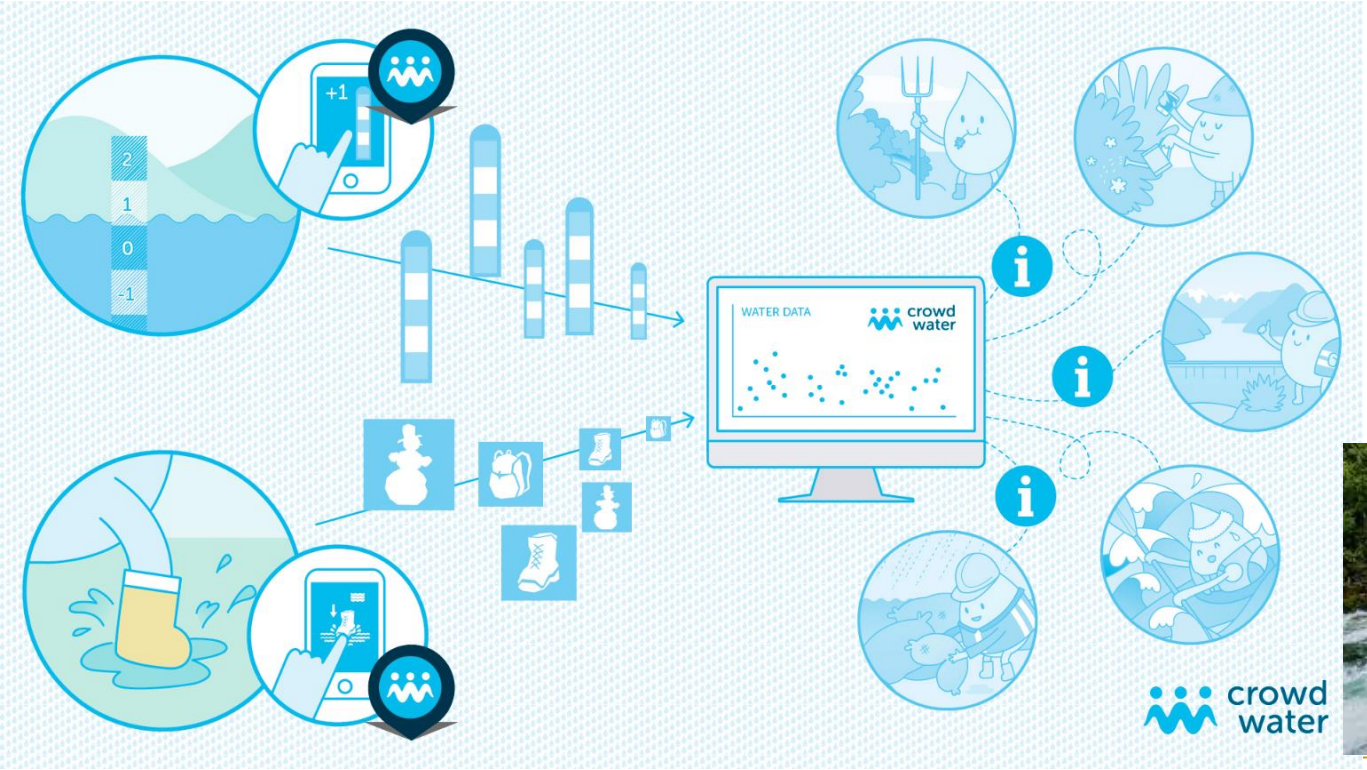
- Criteria:
  - Existing projects that participants could readily engage with
    - **precipitation changes,**
    - **extreme heat,**
    - **wildfire and smoke,**
    - **and climate justice.**
- **8 projects** met our criteria

Participatory Science for Extreme Heat



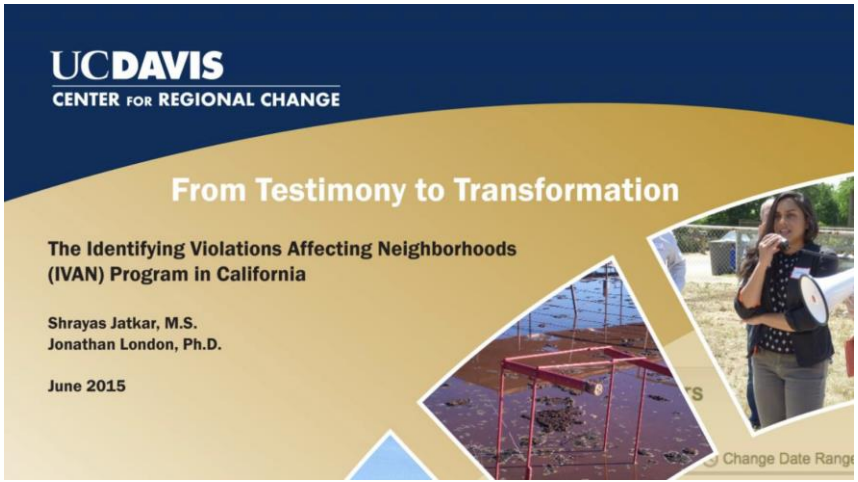
NOAA Urban Heat Island Mapping Campaigns: All Locations, 2017-2022

Citizen Science for Floods and Droughts



Citizen Science for Wildfires

Climate Justice



Some Key Takeaways

Measuring climate resilience is hard! It is easier to measure impacts

There are more opportunities to engage with science that contributes to our understanding of climate impacts than there are for climate resilience

Public education and community and citizen science can offer valuable opportunities to get people thinking about and acting on resilience in their communities

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Thank You!