

# Empowering Youth to Envision Community Resilience Actions around Natural Hazards

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## INTRODUCTION

Communities in Colorado and other western U.S. states are increasingly experiencing major disruptions from environmental hazards, such as fire, flood, drought and extreme heat (Colorado Resiliency Framework, 2015). With this rise in hazardous events, there is a pressing need for communities to become more resilient through better preparation and planning.

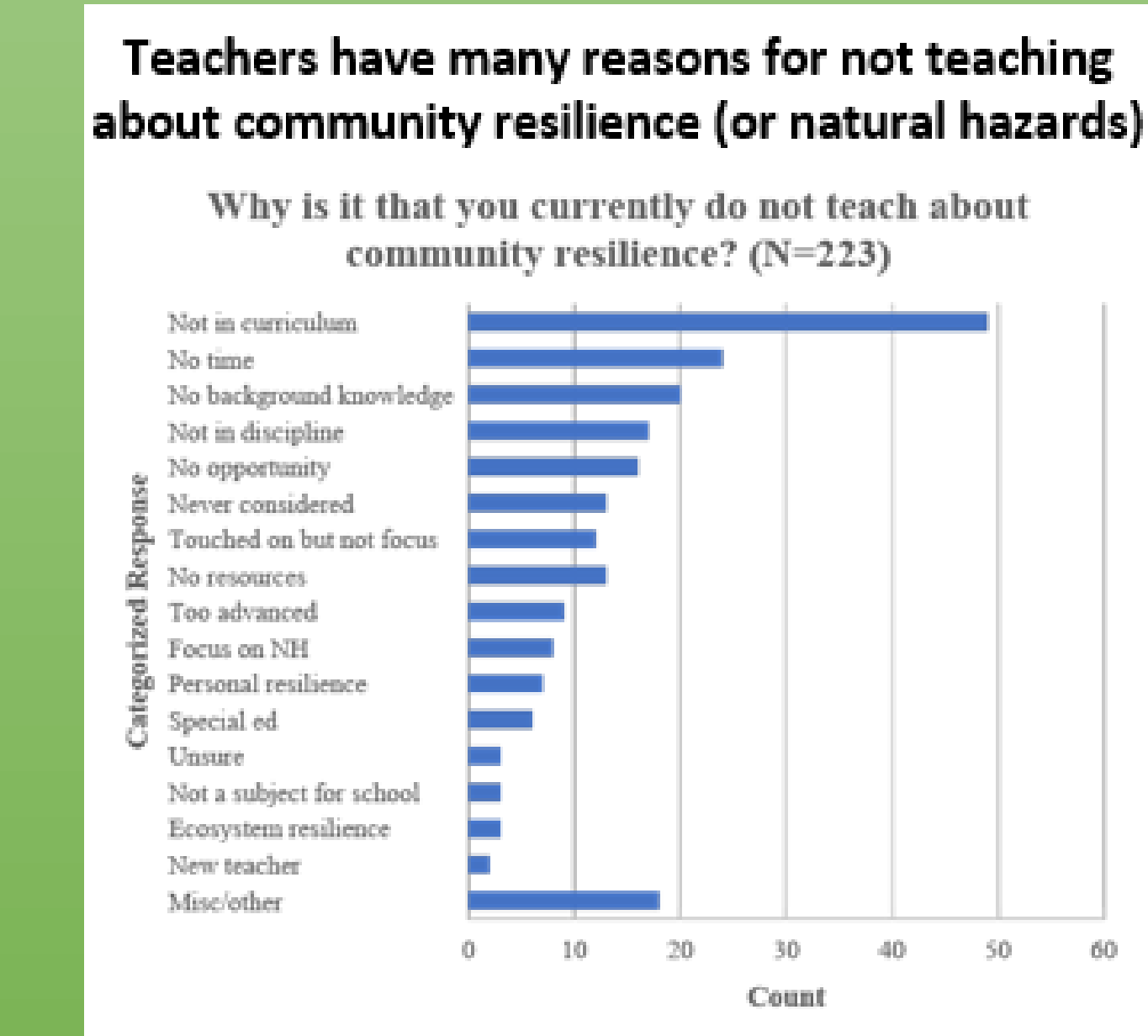
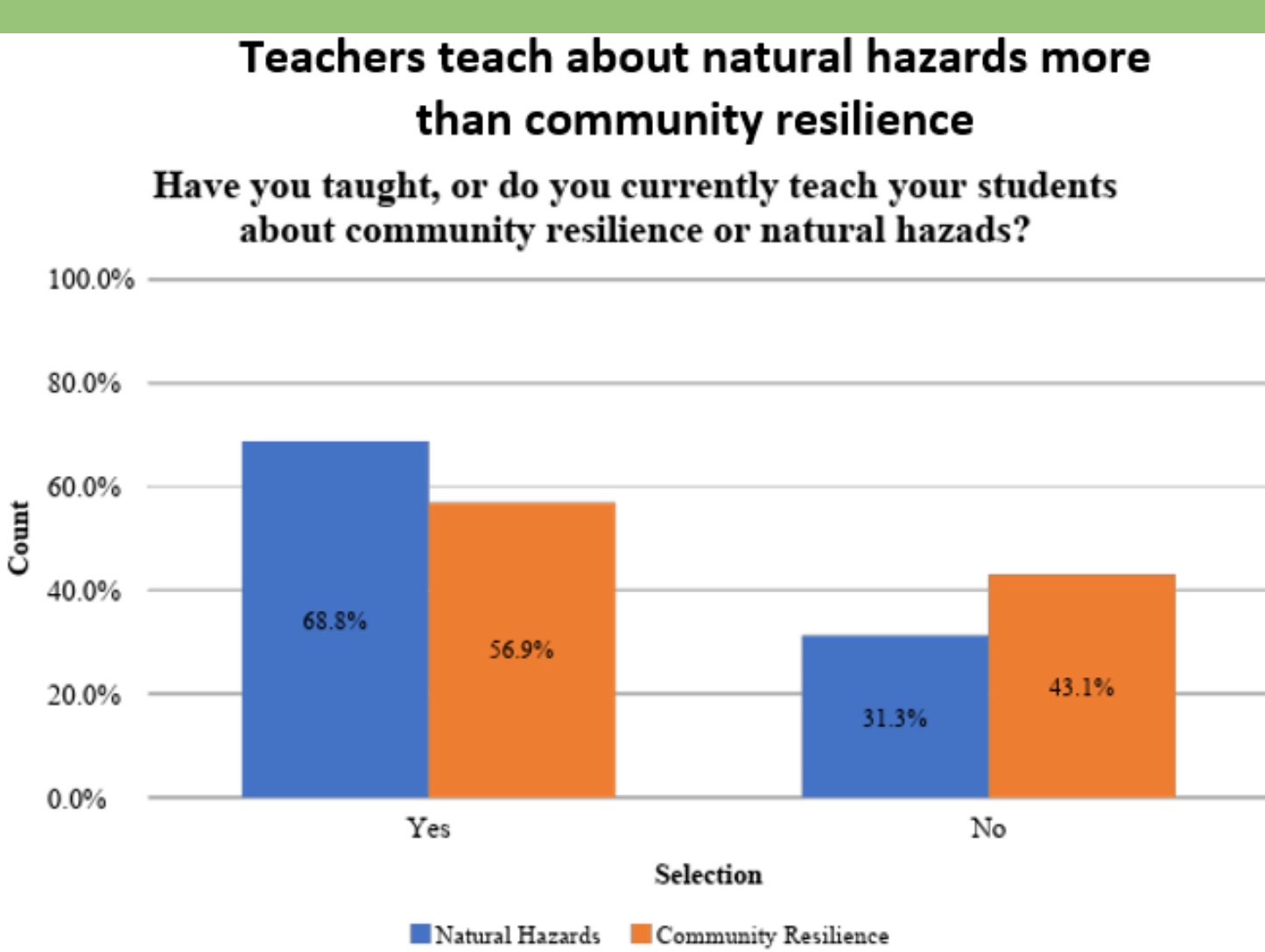
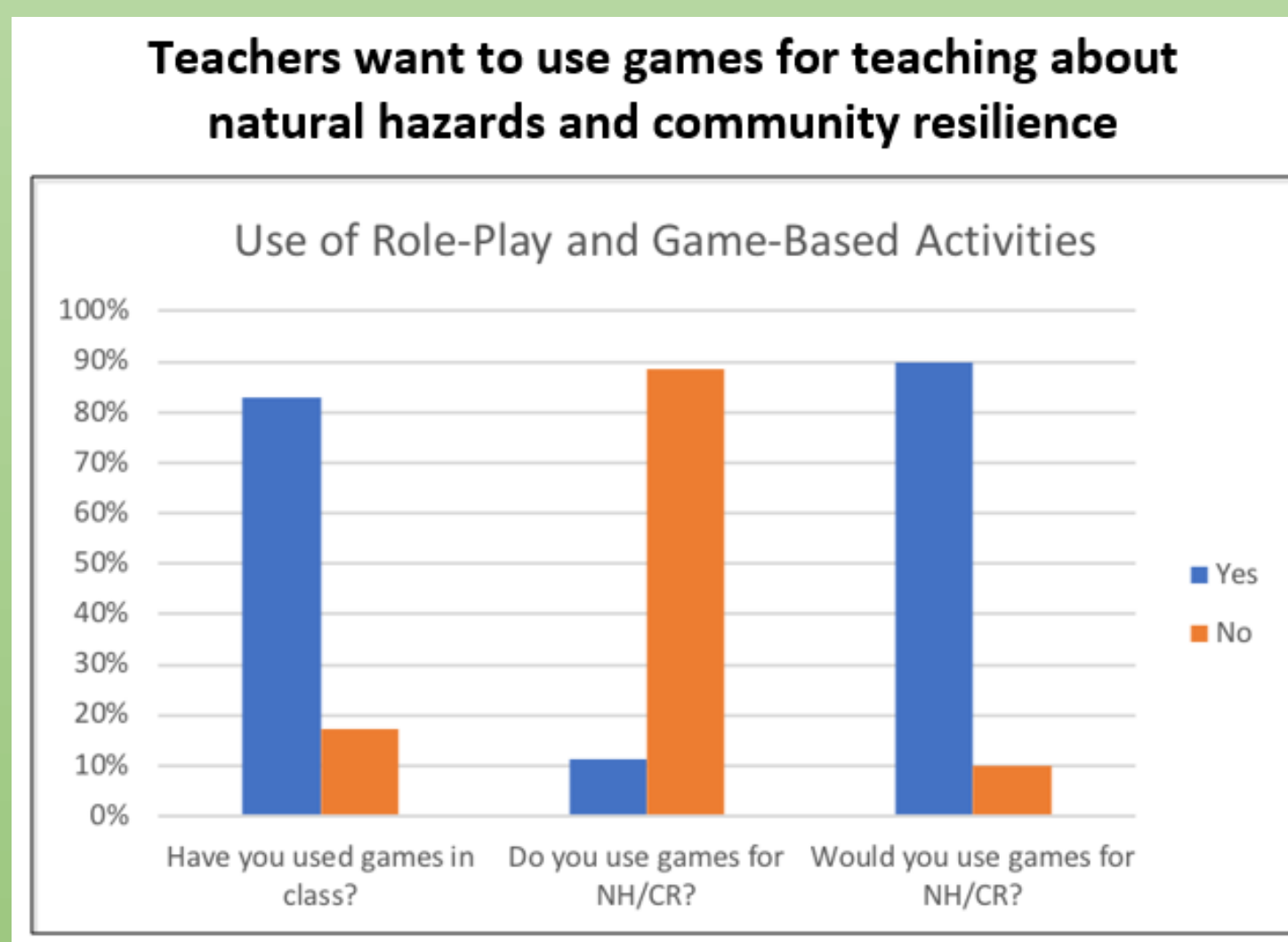
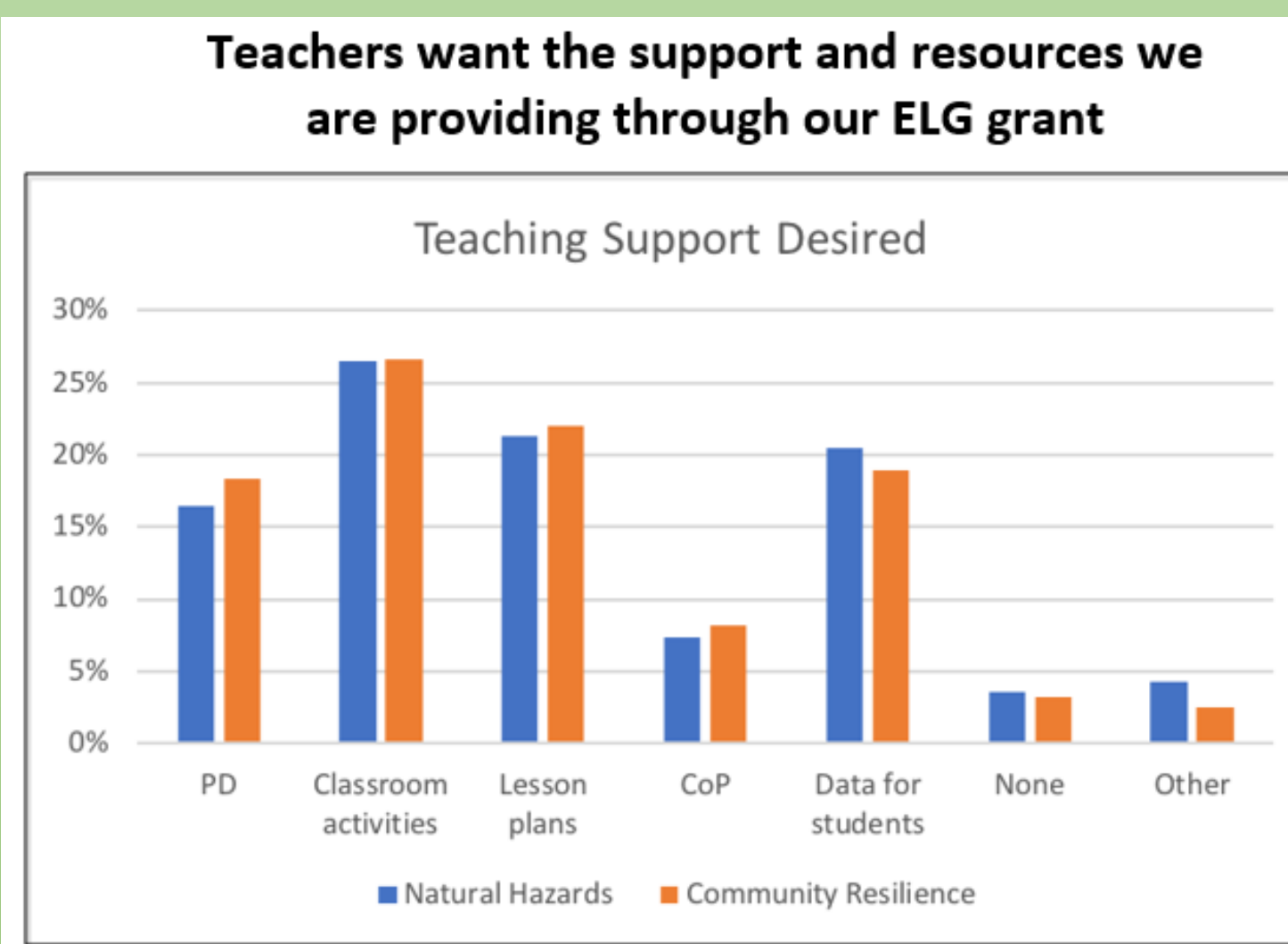
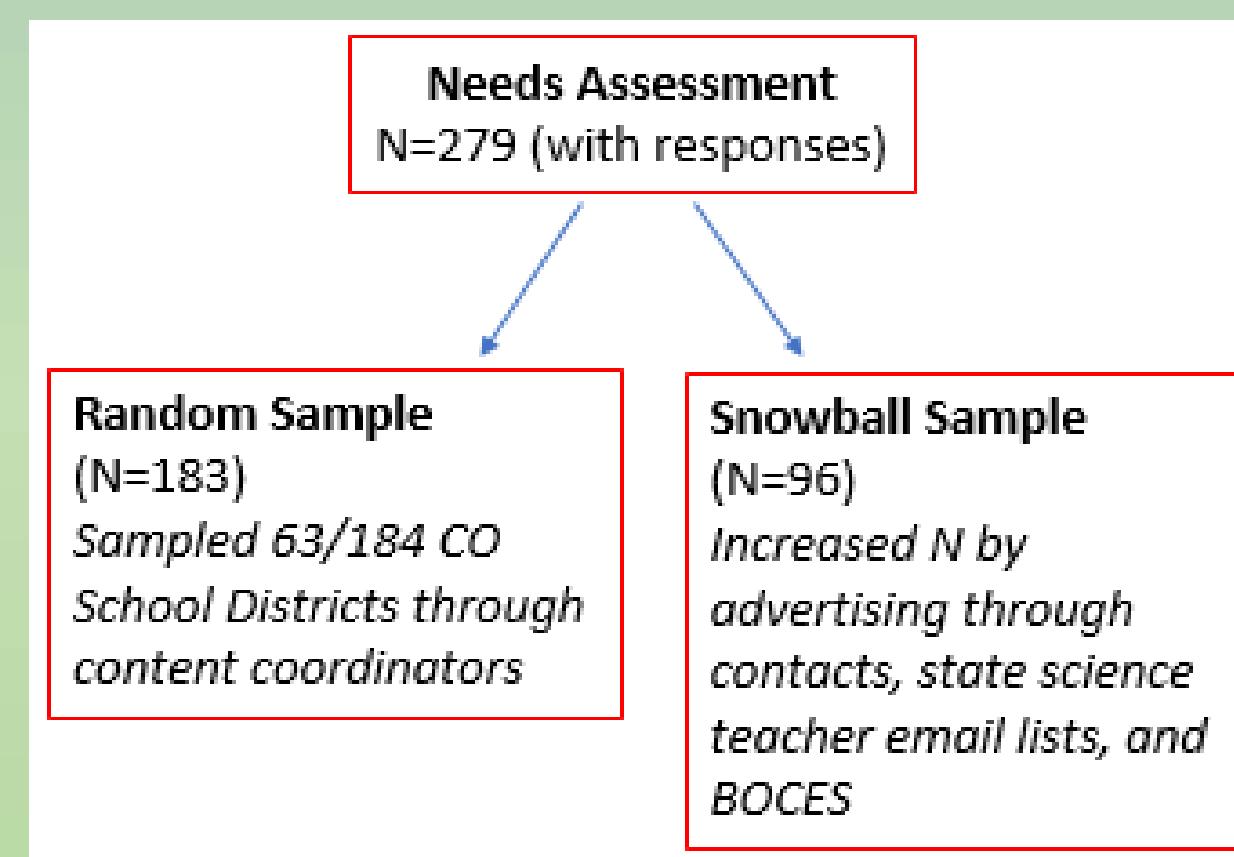
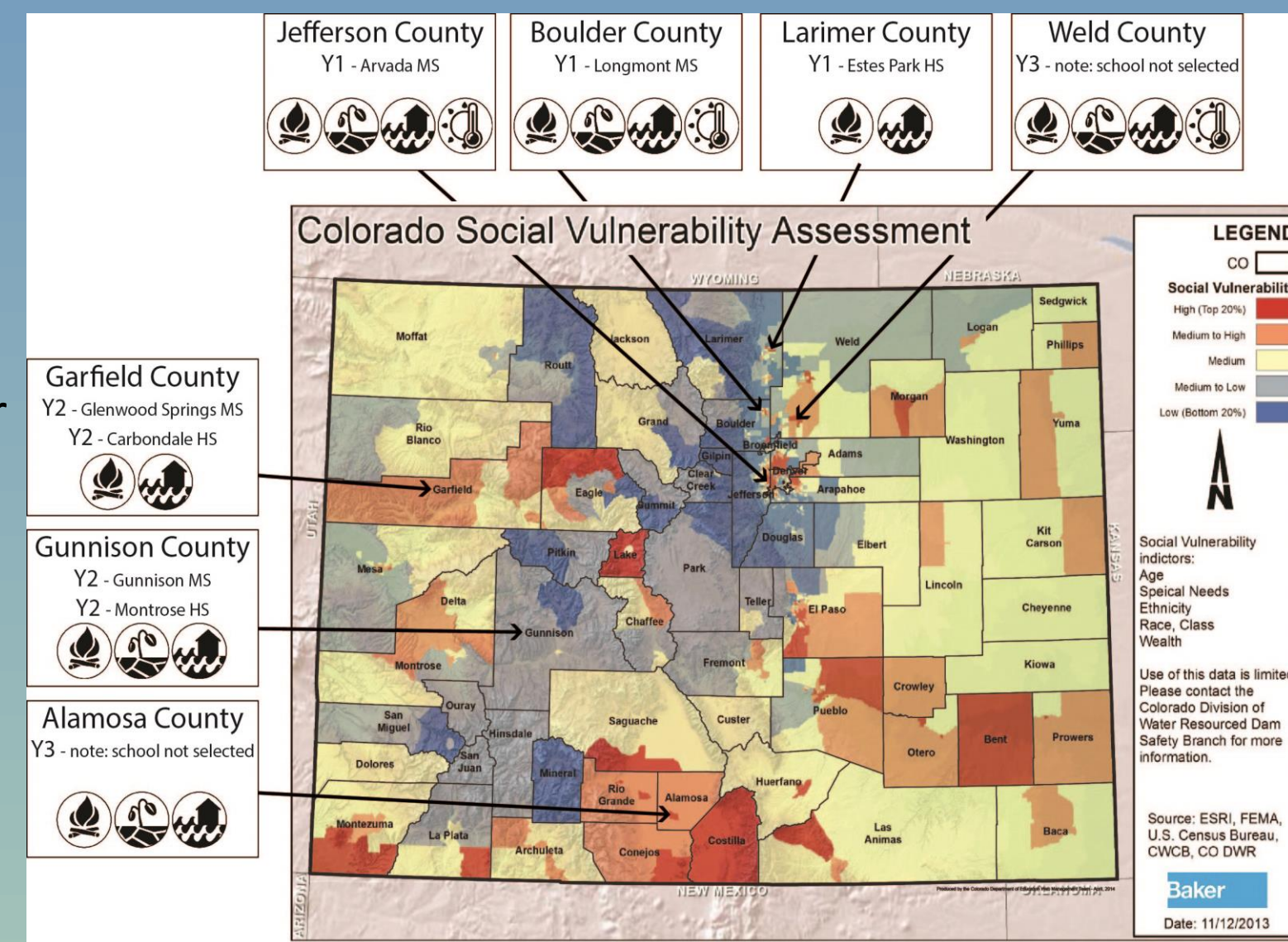
In the HEART Force program, we work with teachers and students in rural Colorado communities to learn about community resilience and inspire them to take steps towards community resilience, with students acting as local change agents. The model empowers youth:

- to learn about natural hazards through engaging, place-based lessons
- to envision community resilience through immersive scenario-based role play
- to initiate conversations about hazard preparedness and responses from within communities
- to develop and implement student-led resilience action projects.

## COLORADO TEACHER NEEDS ASSESSMENT

The Heart Force team conducted a needs assessment survey with teachers across Colorado during the 2018-2019 school year, sampling from school districts across a variety of settings described by the Colorado Department of Education (CDE)— Denver Metro, Urban-Suburban, Outlying City, Outlying Town, and Remote.

Results indicated that the needs expressed by teachers in Colorado match the goals for the HEART Force Environmental Literacy Grant (ELG) project and also helped to identify areas for the team to focus on.



## DROUGHT

Drought occurs when precipitation is below average levels for a sustained period of time

- Not all communities are at equal risk for drought, infrastructure and economic factors influence risk.
- Colorado and many western states are especially vulnerable to drought because projected increases in temperature are accompanied by a decrease in precipitation.
- The National Drought Mitigation Center and other groups are working to increase drought monitoring, citizen scientists can contribute to these efforts.

## FLOODS

Floods are linked to severe weather and high rain when the ground is unable to absorb additional water

- Floods are the most disruptive and expensive type of disasters in Colorado.
- Floods are caused by precipitation that exceeds the ground's ability to absorb it, usually from consecutive storms.
- Floods are often part of a cascading hazard event which happens when multiple hazards occur at the same time.
- Good flood maps exist for many rural communities, but not all community members are aware of them or understand their implications.



## HAZARD EDUCATION AWARENESS & RESILIENCE TASK FORCE

Extreme heat results in the highest death toll of weather-related hazards. An extreme heat event is defined as a long period (2-3 days) of high heat with temperatures above 90 degrees.

- Extreme heat is primarily a public health hazard and is most likely to affect those in urban environments.
- Extreme heat events are most deadly for the youngest and oldest members of a community, and often exacerbate existing health difficulties.
- Many steps can be taken by individuals to prepare their own homes for extreme heat through covering windows, adding insulation and installing fans and air conditioning.

## EXTREME HEAT

Wildfires are unplanned fires that burn in natural areas; they can occur as part of natural cycles but are often caused by human actions

- Most wildfires that damage communities are human-caused.
- Wildfires can interact with other hazards (e.g. drought and extreme heat) and negatively influence natural resources such as air and water.
- Wildfires are a hazard that humans have agency to control, but humans also engage in behaviors that greatly increasing fire risk.

## WILDFIRE

## HEART FORCE NATURAL HAZARDS UNIT

### HAZARD LESSONS

Each unit on drought, floods, extreme heat, or wildfires includes place-based lessons with historical examples from natural hazard events in Colorado. The lessons are designed based on the following CDE and Next Generation Science Standards (NGSS):

- MS-ESS3-GLE9: Mapping the history of natural hazards in a region and understanding related geological forces
- HS-ESS3-GLE10: Natural hazards and other geological events have shaped the course of human history at local, regional, and global scales.

### SCENARIO-BASED ROLE PLAY GAME

Students use curriculum modules and scenario-based role-playing games to explore the effects of natural hazards on their community. These games draw on the structure of existing hazard games and are specific to the four hazards most common to Colorado: drought, floods, extreme heat and wildfires. Our four games use different styles of play to reflect differences in timing between fast-acting (floods, wildfires) and more gradual (drought, heat waves) hazards.

Each game emphasizes tasks and skills that are appropriate for kids and makes use of their talents and interests (e.g. in communicating, transporting, supporting roles).

**Flood Response Guidelines**  
As the flood progresses, your community will face increasing risk. Use this guideline to think about what resources you need to respond to the changing situation.

Flood Levels	Immediate Actions	Secondary Actions
Level 0 No Flooding	• No flood control action needed—address the Community Challenge.	
Level 1 Flood Warning	• Task 1: Send alert with automated alert/notifications via email, social media, reverse 911 to encourage best practices. • Task 2: Confirm alternate evacuation routes. • Task 3: Emergency preparedness on water and ready. • Task 4: Postpone non-urgent jobs; offices to be available with traffic reduction.	• Task 5: Have sandbags or sand barriers ready to deploy to vulnerable locations. • Task 6: Confirm alternate school facilities. • Task 7: Arrange alternative work schedules. • Task 8: Arrange emergency response meeting.
Level 2 Minor Flooding	• Task 1: Send alert with automated alert/notifications. • Task 2: Deploy volunteer teams to vulnerable people and businesses in the flood zone. • Task 3: Preparation of logs. • Task 4: Use sand barriers.	• Task 5: Prepare shutoff flood pumps. • Task 6: Assemble volunteer safety squads. • Task 7: Coordinate evacuation routes to assist those who need help evacuating.
Level 3 Moderate Flooding	• Task 1: Send alert with automated alert/notifications. • Task 2: Provide volunteer assistance. • Task 3: Move sandbags. • Task 4: Activate city flood pumps. • Task 5: Use a volunteer to help with evacuation of flood zone.	• Task 6: Post flood zone. • Task 7: Assemble volunteer safety squads. • Task 8: Coordinate evacuation routes to assist those who need help evacuating.
Level 4 Major Flooding	• Task 1: Send alert with automated alert/notifications with flood warning. • Task 2: Activate city flood pumps. • Task 3: Activate secondary support help responses.	

**FLOOD GAME**  
Estes Park, CO

**Emergency Update #1**  
The rains have been falling for several days and parts of your community are starting to see signs of flooding. In addition, your community experiences a communication outage has occurred that will require resources to manage.

**ZONE A: Level 2 Flooding is already occurring in 100-year flood zone.** Zone A: Level 2 Flooding (partial) with water some rising quickly, you should evacuate immediately and head to higher ground. Other areas in your zone are considered vulnerable. The additional amount of rainwater are likely to need evacuation soon.

**ZONE B: There are no flood warnings for your zone, your team has been alerted to see the threat addressing the Community Challenge.**

**ZONE C: There are no flood warnings for your zone, your team has been alerted to see the threat addressing the Community Challenge.**

### RESILIENCE EXPO

Following the role-play game, students develop hazard mitigation strategies for their communities and present them in a Resilience Expo to local stakeholders and community leaders. Through this instructional sequence, participating middle and high school students explore a locally relevant natural hazard scenario and learn about existing mitigation and response plans. Students are also encouraged to develop their ideas into action with mini-grants that will be awarded to encourage students to implement projects that increase resilience in their community.

