

# Continuing Education for CDC EPIC Webinar

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Course Access Code Text

The course access code is EPIC**0901**





# Engaging with Disaster Citizen Science

Toolkits for Health Departments and Community Groups to Improve Community Preparedness

Ramya Chari, MPH, PhD and Sameer Siddiqi, PhD – RAND Corporation



# Our presentation roadmap



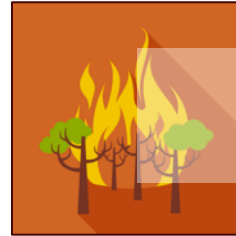
1. What is citizen science?



2. How can citizen science help with preparedness?



3. Introduction to the disaster citizen science toolkit



4. Presenting the five steps to designing citizen science projects



5. Responding to collegial projects and addressing challenges



*Part 1*

*What is citizen science?*





# A brief history of citizen science: an old tradition



# Citizen science can involve many different groups



# There are three main models of citizen science

Contributory.  
Science that  
leverages the people



Collaborative.  
Science done  
with the people



Collegial.  
Science done  
by the people





*Part 2*

*How can citizen science help with preparedness?*





# Flint, Michigan. Community members collected drinking water to document high lead levels

State officials acknowledged the problem and begin implementing mitigation actions

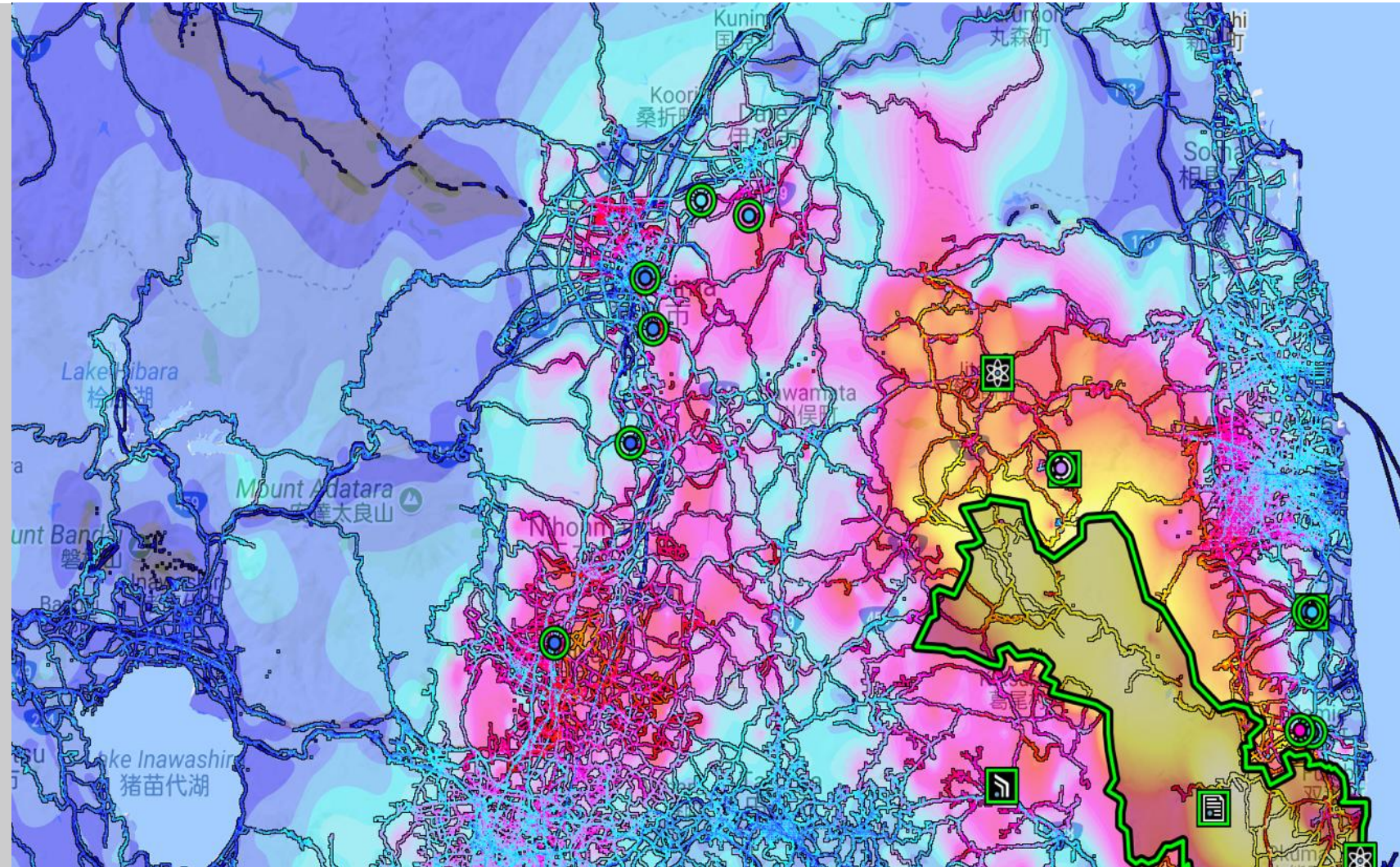




# Fukushima, Japan. Community members measured radiation levels after a nuclear power plant meltdown

Citizen scientists created radiation detectors that people could build themselves to collect their own data.

Formed Safecast, now houses the largest dataset of background radiation levels in the world

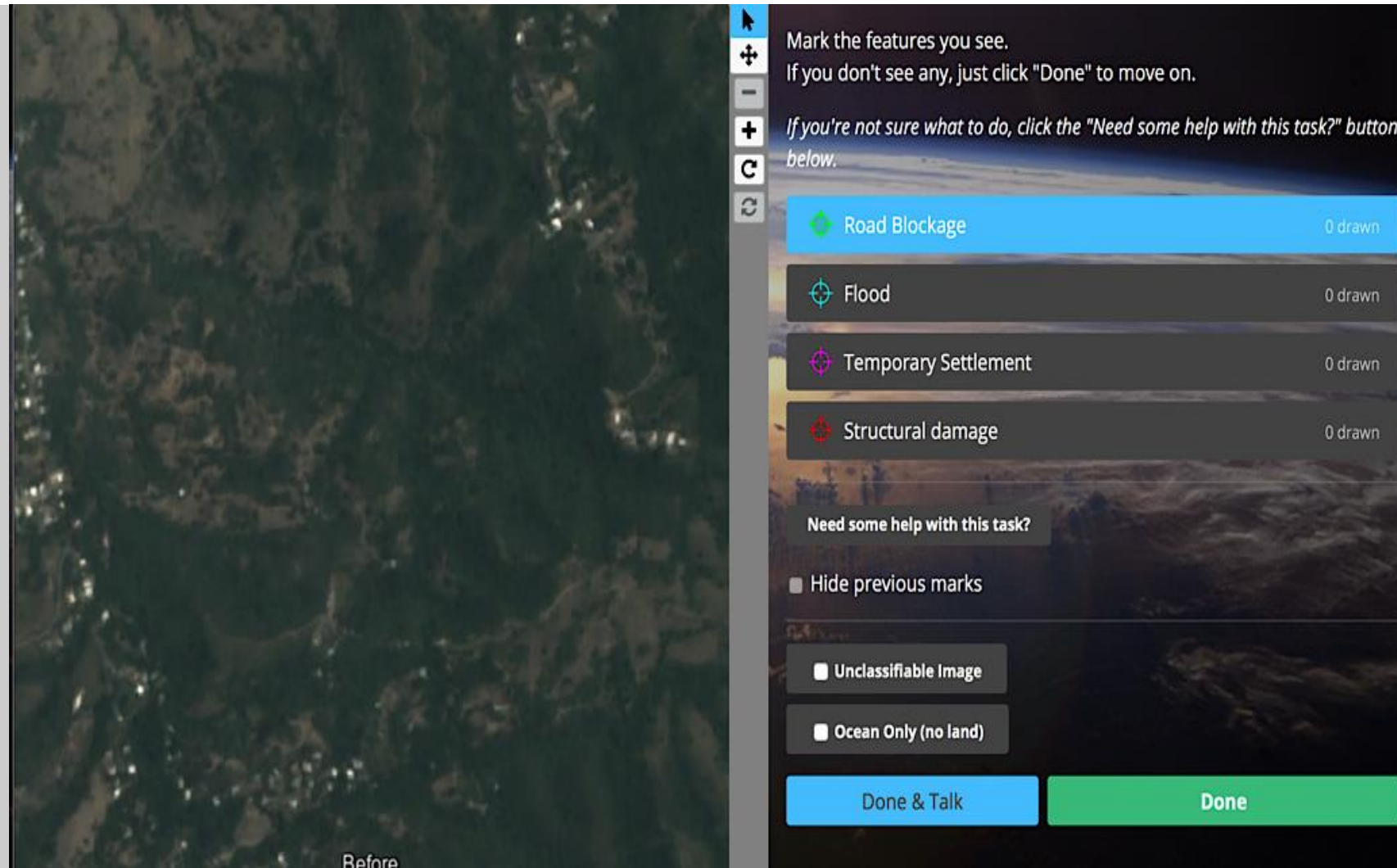




# Fall 2017 hurricanes. Community members helped with disaster response using their computers at home

“Digital humanitarians” analyzed satellite photos and information from people in affected areas to identify storm damage and areas in need

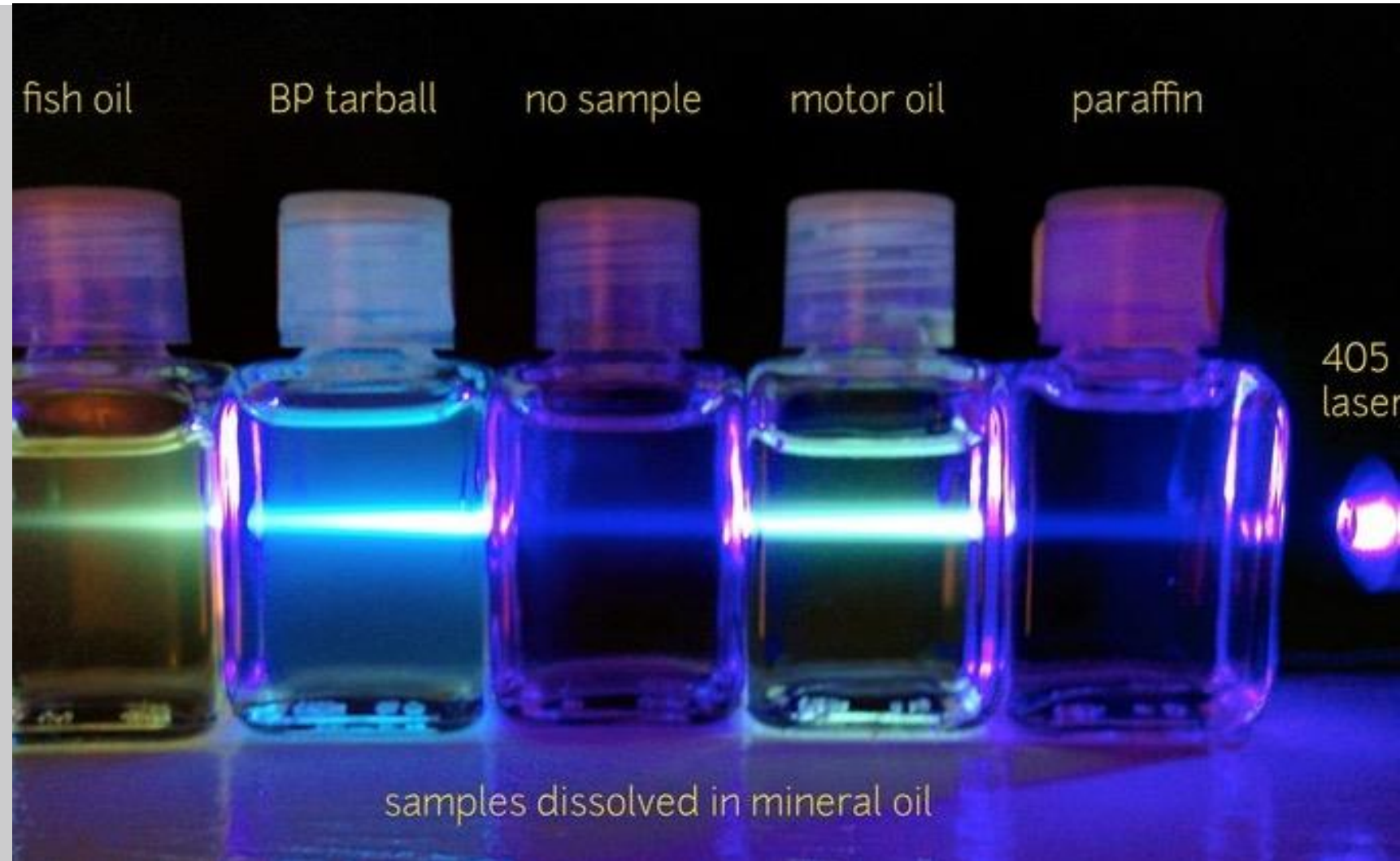
They greatly helped the relief effort on the ground





# Deepwater Horizon oil spill. Community members captured data with balloon-generated maps and home test kits

Centralized platforms and crowdsourcing apps empowered the public to contribute to disaster response in new ways



# The 1980s AIDS epidemic. Activists fought for better health care treatment by engaging with scientists

Direct engagement with the scientific establishment changed the nature of clinical trials for AIDS drugs and helped save lives





# The Graniteville chlorine disaster. Community and local government worked together to help recovery

After a train crash released chlorine gas into surrounding areas, community-based participatory research methods helped to identify victims and track long-term health risks





# The COVID pandemic. The public is engaging in data collection and analysis in many different ways

Citizen science projects for COVID-19 have been designed to

- detect early outbreaks
- track disease transmission
- monitor inventories of personal protective equipment

COVID-19  
Citizen Science

Fight COVID-19 in 5 minutes a day!

- ▶ Identify symptoms
- ▶ Help prevent infection
- ▶ Track the impact

Use Study Key [COVID19](#) on Mobile.



Participate

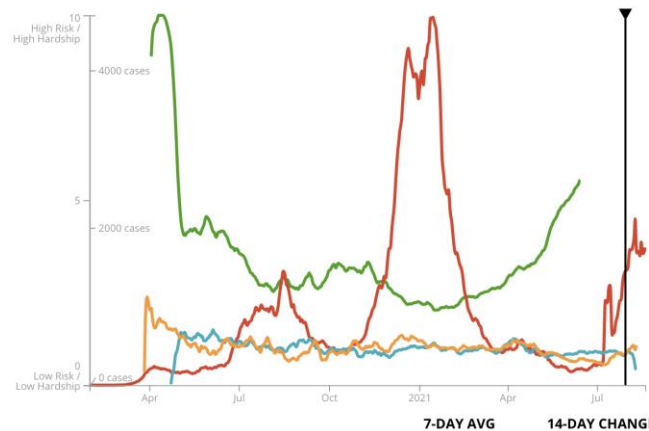
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**PARTICIPANTS**

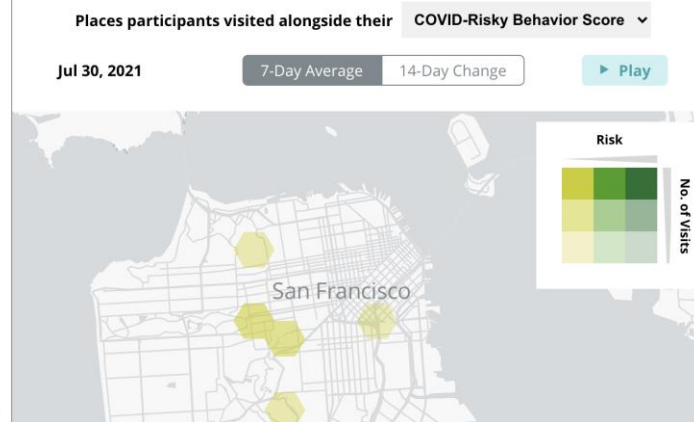
and counting.

Everyone 18+ years old with an internet connection can participate, whether or not you have been tested for COVID-19!

COVID Trends



Risk Map



# These examples are disaster citizen science



Disaster citizen science is the involvement of members of the public in scientific activities relating to disaster preparedness, response, and recovery. It can be done in collaboration with professional scientists or independently.

# Disaster citizen science could have many benefits

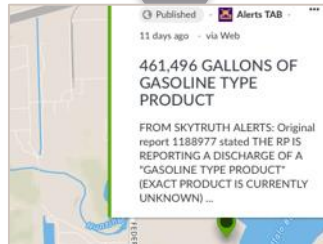
Education  
& scientific  
literacy



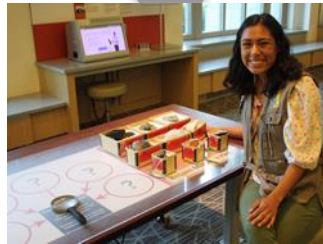
Social capital



Knowledge  
resources



Future leaders



Democratic  
decision  
making



Improved  
preparedness

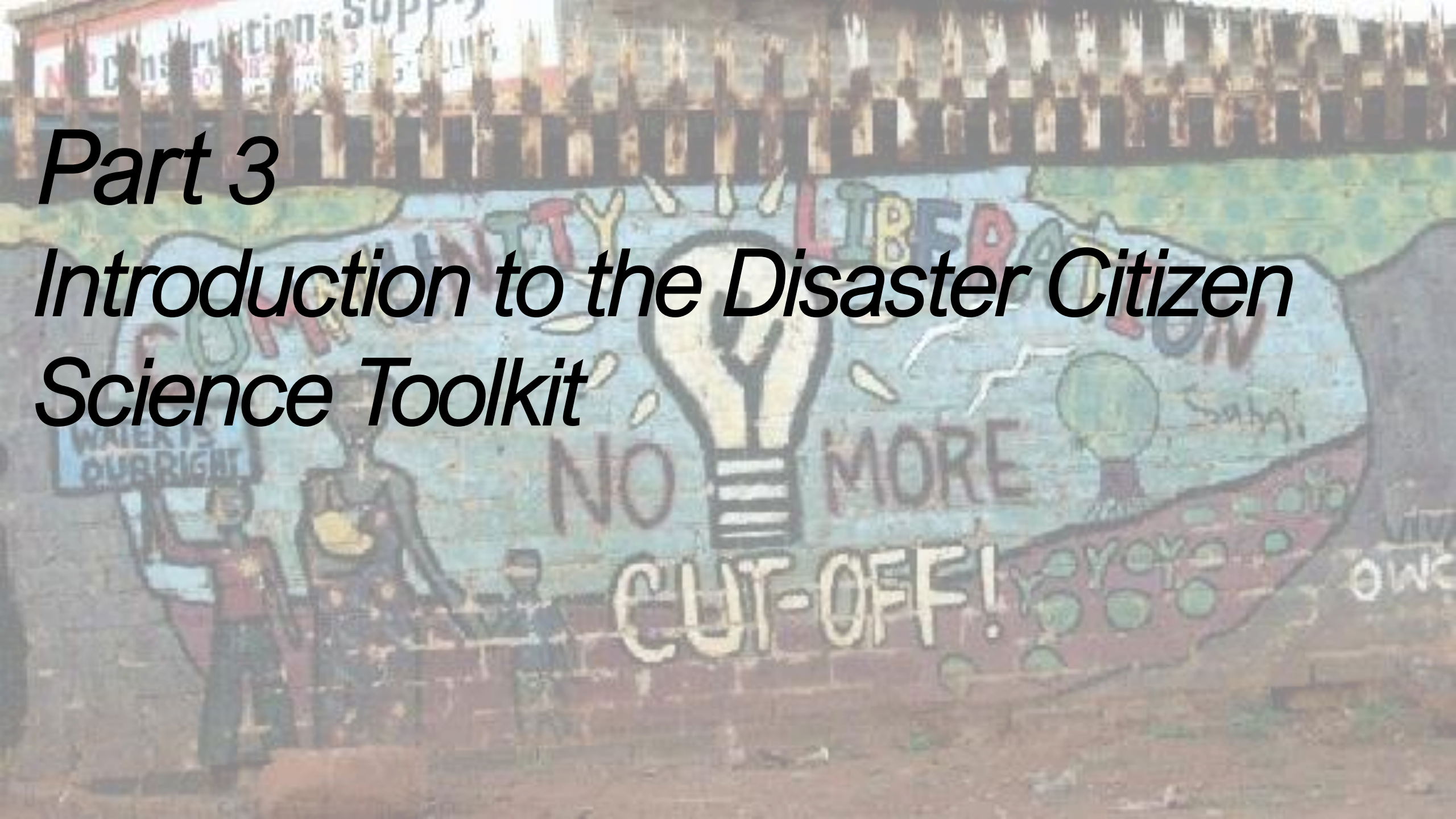


Community resilience

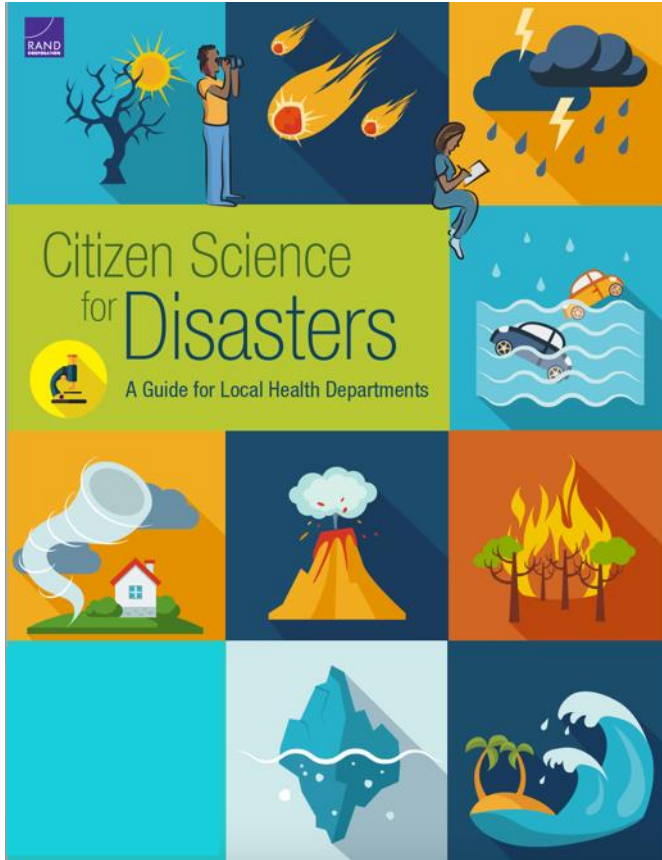


*Part 3*

*Introduction to the Disaster Citizen  
Science Toolkit*



# Purpose of the Disaster Citizen Science Toolkit



This toolkit is designed to:

- **raise awareness** of disaster citizen science activities related to preparedness
- **provide guidance** on how to design disaster citizen science projects and address implementation challenges
- **facilitate partnerships** to carry out disaster citizen science activities

Includes examples from various types of natural and man-made disasters, as well as rapid-onset and slow-moving events

# For Local Health Departments and Community Groups



## Toolkit for Local Health Departments

Provide guidance on responding to projects led or supported by community groups



## Toolkit for Community Groups

Focus on developing and implementing projects; managing common startup challenges



# Elements of the Toolkit

The toolkit provides educational information on disaster citizen science and walks users through the steps necessary to design a quality citizen science project of any size or scope.



Chapter 1, **Learn**, is a primer with background on disaster citizen science.



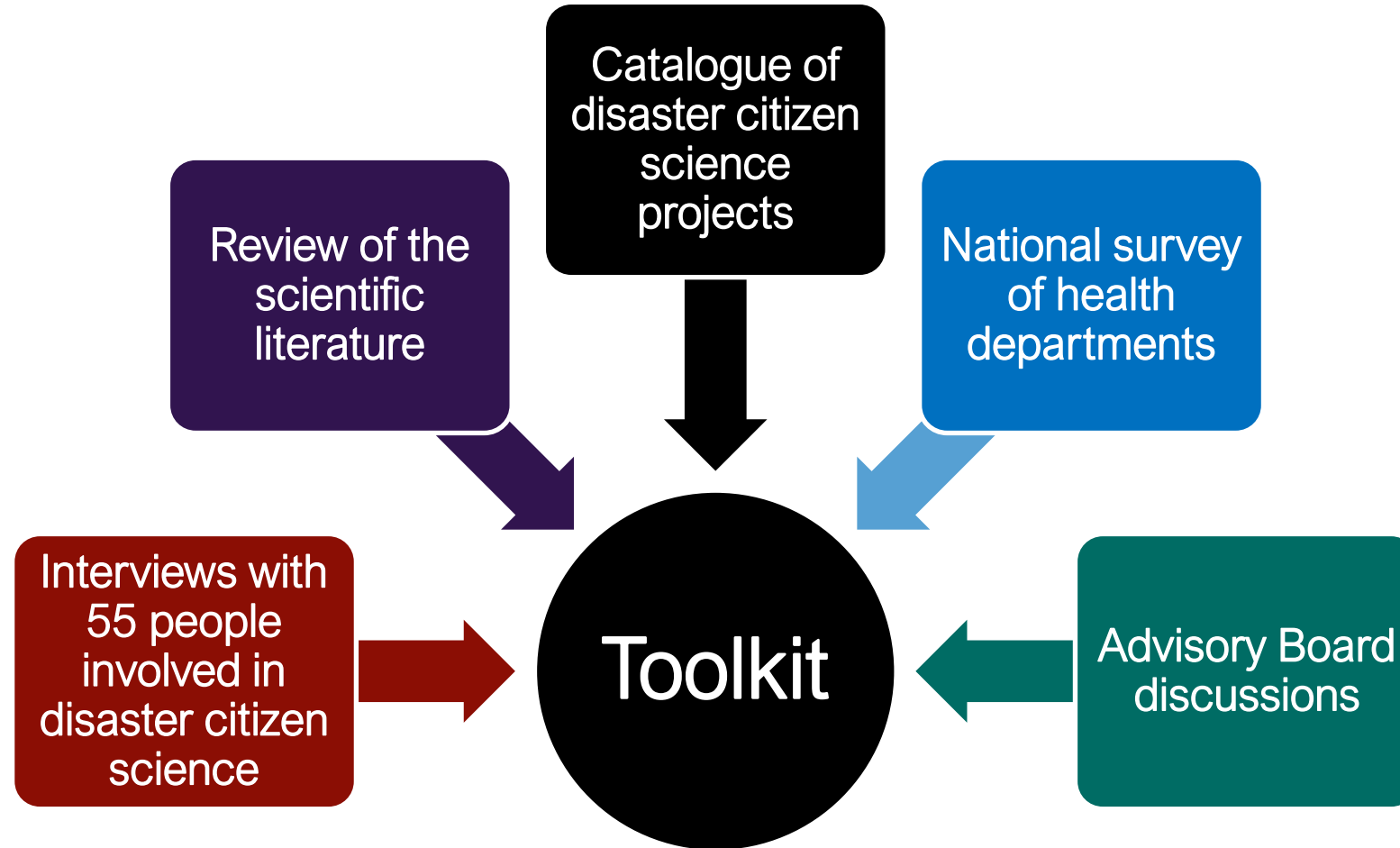
Chapter 2, **Act**, describes a five-step approach for designing disaster citizen science projects.

The toolkit contains exercises to help you reflect on what you learn and worksheets to help design a project and document decisions made.

The appendix includes a compilation of the disaster citizen science project examples described in the toolkit.

The toolkit will be freely available on the RAND website following publication.

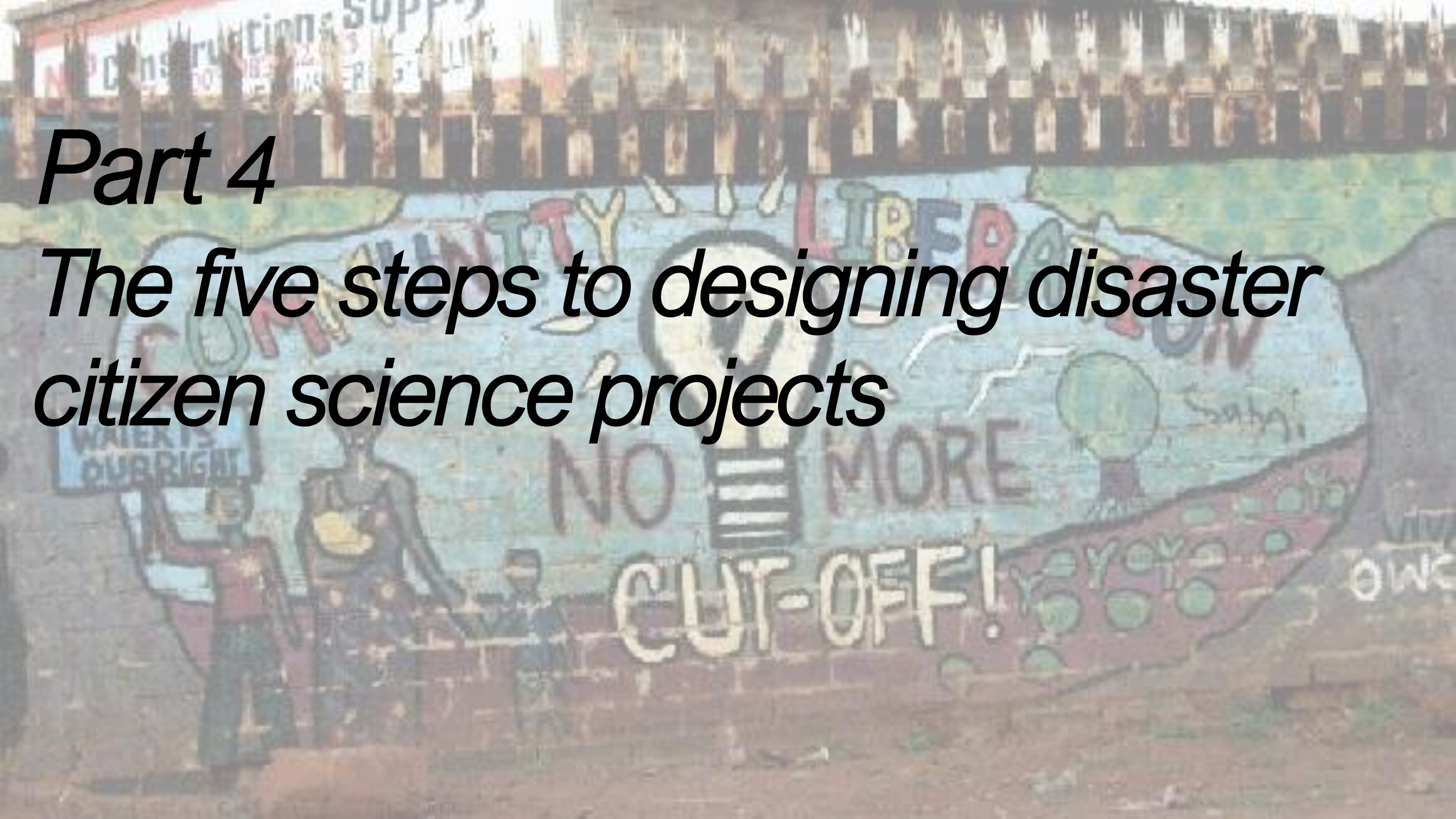
# How we developed the toolkit





# *Part 4*

## *The five steps to designing disaster citizen science projects*



# A five-step approach to project planning

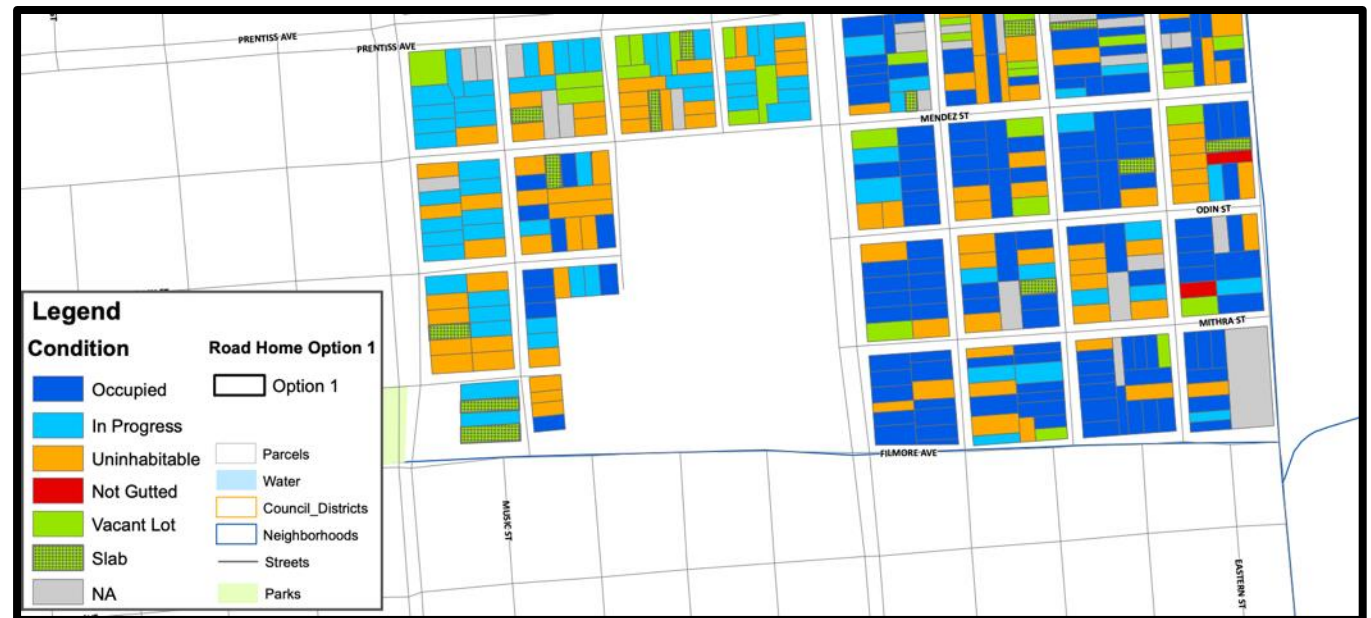


The toolkit describes a five-step approach to help health departments and community groups to participate in disaster citizen science



# Putting the steps together: how a community came together after Hurricane Katrina

In the aftermath of Hurricanes Katrina and Rita the Beacon of Hope (BOH) Resource Center worked to rebuild New Orleans' neighborhoods. The toolkit walks through how BOH approached different steps in its project design and implementation.



# Step 1. Determine your goals for engaging in disaster citizen science



Determine  
your goals

- Could the problem benefit from citizen science?
- What do you want to achieve?
- What has been done already?

**What was the problem BOH faced and what did they want to achieve?**

BOH wished to reduce blight in New Orleans following Hurricanes Katrina and Rita but the city's 311 telephone line and other programs were ineffective. BOH sought to combat blight and spur investment in communities.



# Step 2. Select the best approach for achieving your goals



Select the  
best  
approach

- How do you focus your research question?
- What data collection methods should you use?
- How do you ensure data quality?

## **What data collection methods did BOH use?**

BOH realized they needed to track the condition of community properties and utilities. They used a participatory mapping approach with residents to identify and color-code properties.

## **What skills and resources did BOH need?**

BOH needed funding to cover administrative and supplies costs, volunteers, and expertise on survey and mapping methods.

## **How did BOH ensure research quality?**

To maintain data quality, multiple resident volunteers mapped the same area and maps were updated monthly. BOH held community given clear roles and ensured strong oversight.

# Step 3. Build your team




- Who is the potential partner of interest?
- How are they involved in the problem?
- What is their position on the problem or motivation?

## Who were the project partners?

BOH collaborated with several academic partners that assisted in data collection and data quality activities.

# Step 4. Assess your readiness and Step 5. Plan for action



Assess your  
readiness

- Are you ready to implement a disaster citizen science project?
- Are the right resources, leadership, team skills, and volunteer management supports in place?



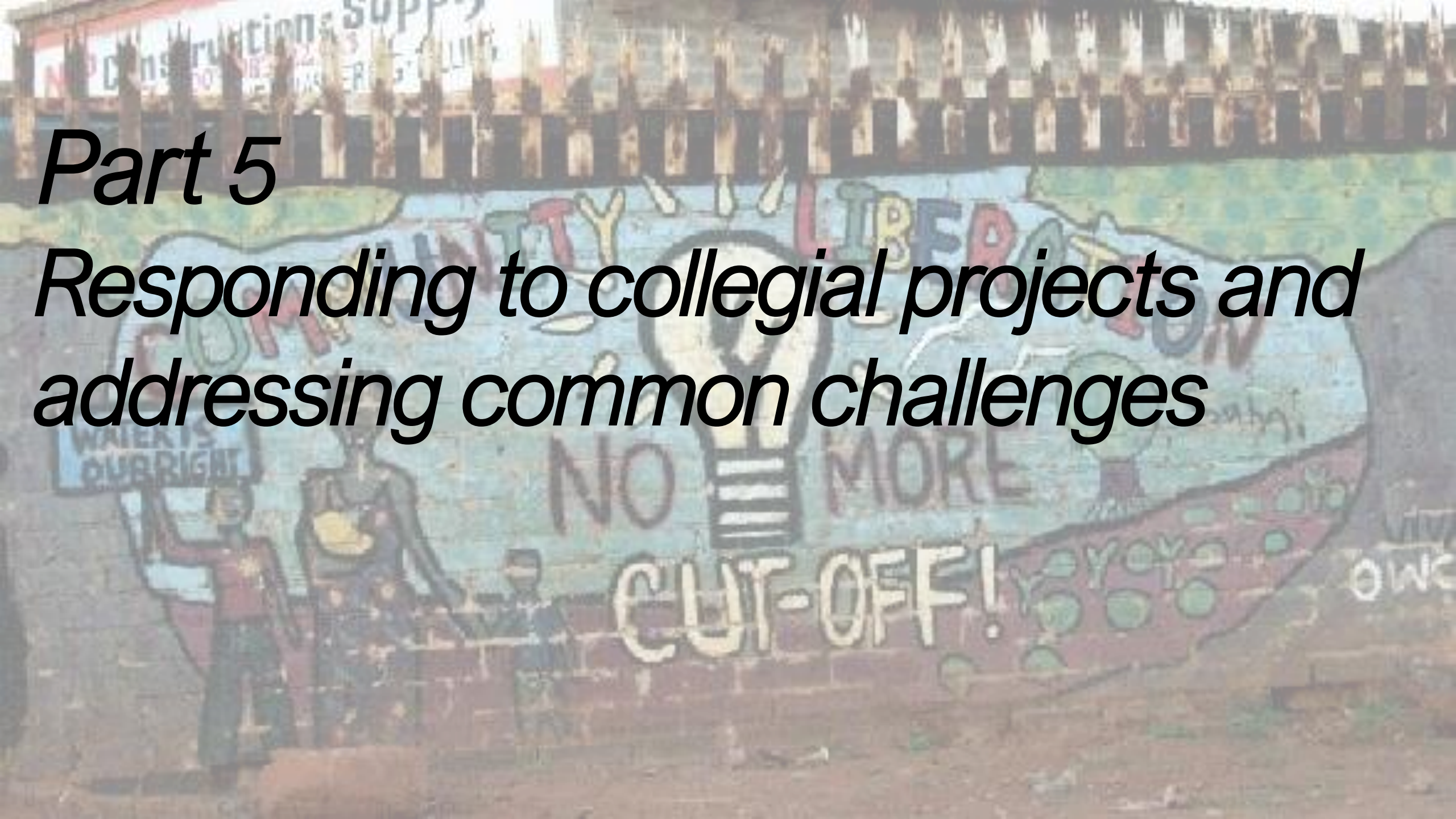
Plan for  
action

- How can you anticipate unplanned events or scenarios?
- How should you communicate findings in a manner that maximizes credibility?



# *Part 5*

*Responding to collegial projects and  
addressing common challenges*



# Working with collegial citizen scientists

In Hawaii, the State Department of Health is working with citizen scientists to ensure safe and clean recreational waters.

The Surfrider Foundation oversees a national network of volunteers, the Blue Water Task Force, that performs water-quality testing of recreational waters in communities.

The Hawaii State Department of Health receives testing results from the local Blue Water Task Force chapter for smaller recreational areas that are not covered under state testing procedures. In addition, the State works with the Task Force on public notifications of poor water quality conditions.

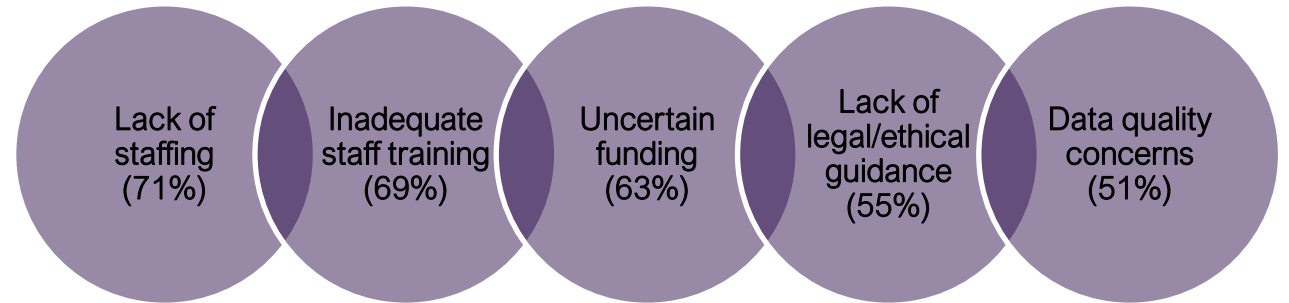


1. **Brown Water Advisories.** In Hawaii, and many other coastal states, beach managers don't wait until test results are ready 24 hours after sampling, before advisories are issued when rain and runoff conditions occur that are known to wash bacteria and other pollutants off the land and into the sea. Precautionary advisories are issued to warn the public of the potentially poor water quality conditions. In Hawaii, Surfrider staff and volunteers are working together with the State Department of Health (HDOH) and lifeguards to improve posting and warning of these advisories.

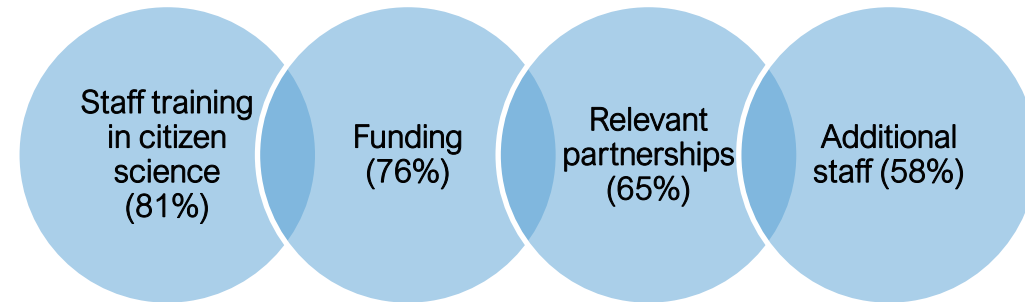


# Major challenges to citizen science for health departments

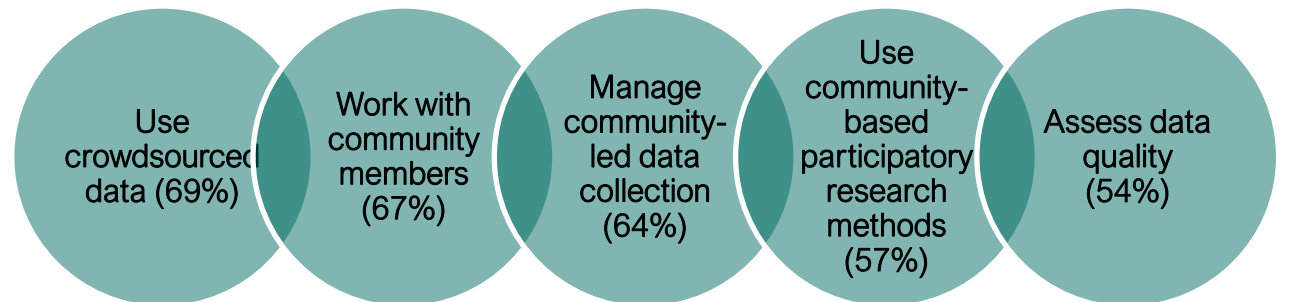
From our health department survey, the top barriers to engaging with citizen science included:



To overcome existing barriers, respondents reported needing resources to improve readiness for citizen science, including:



Respondents reported specific training activities to help LHDs engage in citizen science activities, including how to:





# Addressing Common Challenges

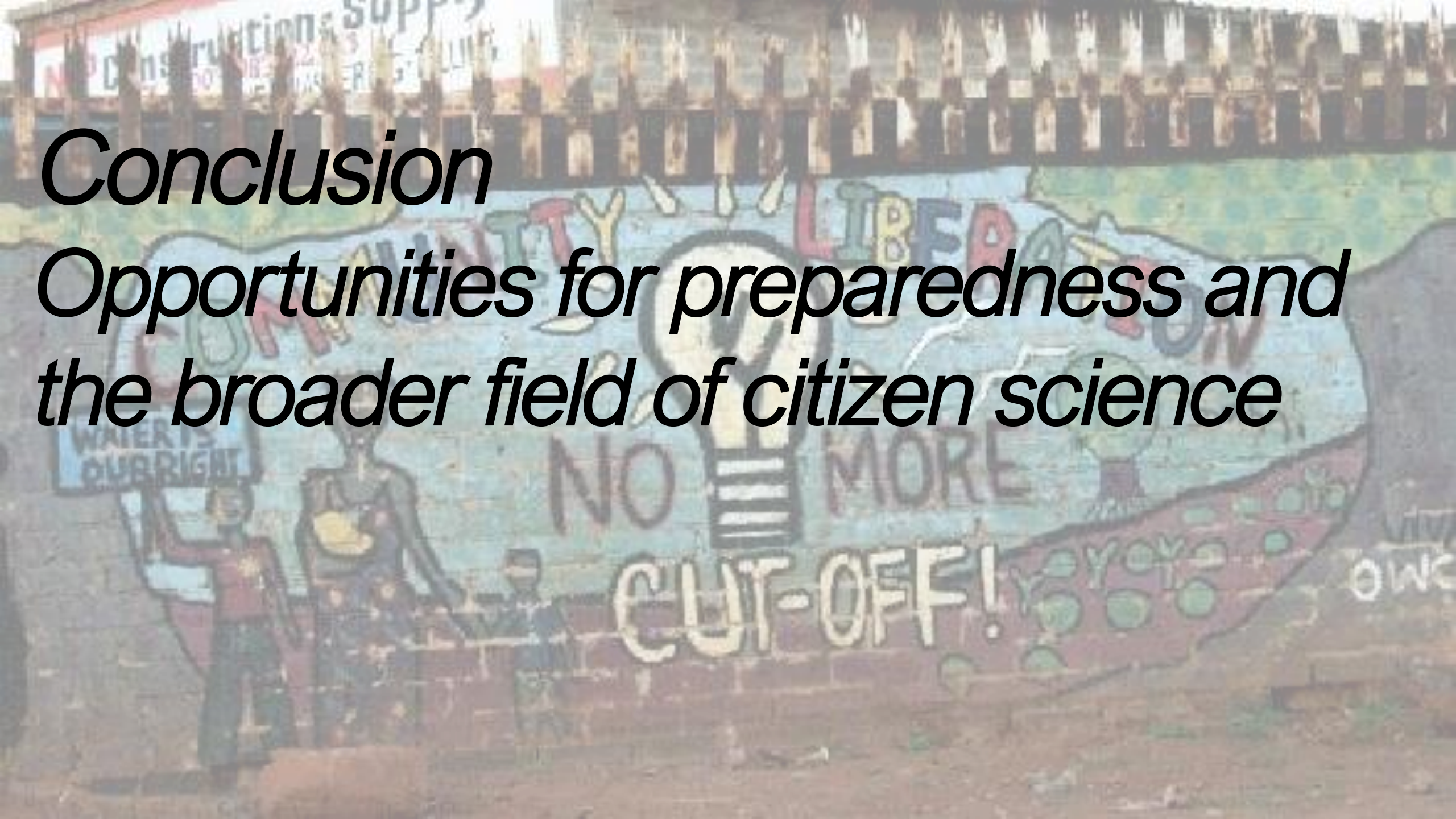
The toolkit walks through how departments/groups can address common challenges related to:

- Insufficient support from peer or organization leadership
- Insufficient resources to support activities
- Ethical, regulatory, and legal issues
- Conflicts with partners and unplanned events
- Strategies to ensure the quality of community-based research and data

Advice from the project leaders on implementing citizen science projects

# *Conclusion*

*Opportunities for preparedness and  
the broader field of citizen science*



# Opportunities and challenges

- Citizen science empowers communities to take collective action
- Potential to expand PHEP capabilities to inform recovery needs, situational awareness, and community risk
- Next steps

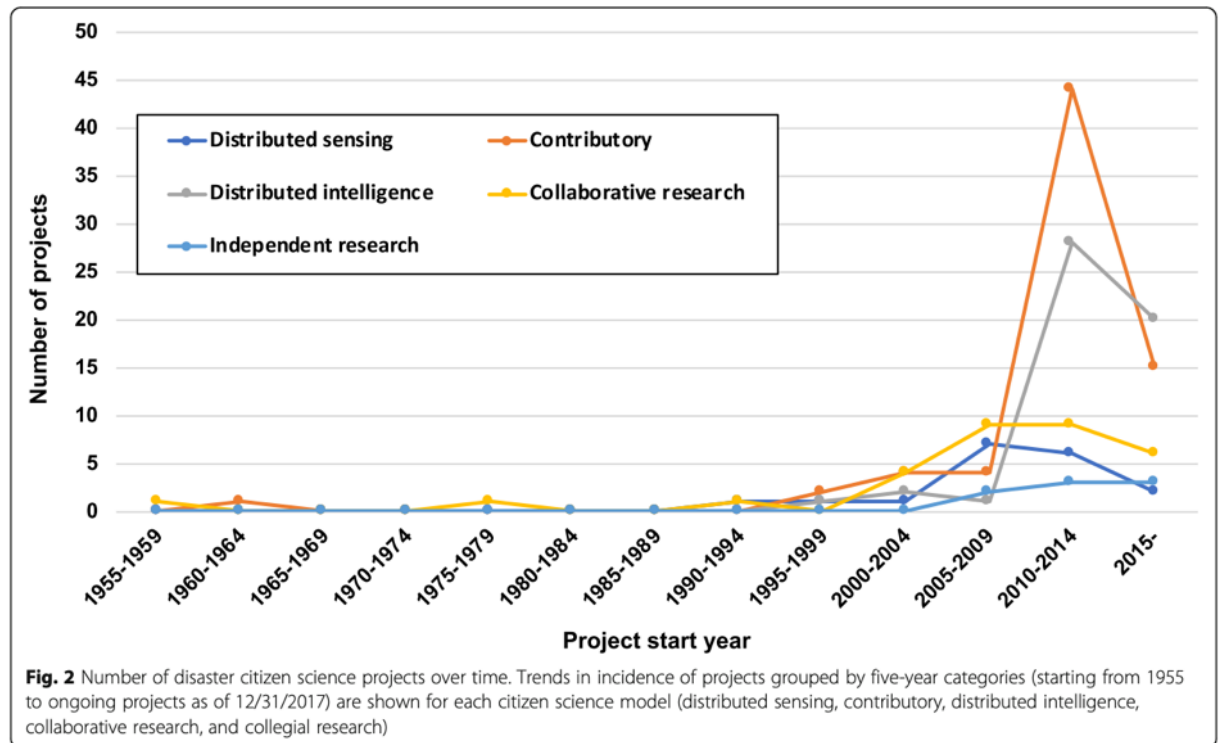
RESEARCH ARTICLE

Open Access

Enhancing community preparedness: an inventory and analysis of disaster citizen science activities



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# Acknowledgements

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Local health department toolkit evaluators

Interview participants

Local health department survey respondents

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