CITIZEN SCIENCE: GLOBAL EXPERIENCES TOWARDS MORE SUSTAINABLE COMMUNITIES



AGENDA

11:35 AM – CITIZEN SCIENCE AS A TOOL TO CLOSE THE DATA GAP IN LATIN AMERICA - GABRIELA BAWARSHI, COMMUNITY AND ORGANIZATIONAL MANAGER, NAWI

11:50 AM – CITIZEN SCIENCE IN EUROPE AND CHILE - MATÍAS VERDERAU DEL RÍO, DIRECTOR OF LICHEN AND JOAQUÍN GONZÁLEZ GARBARINI, THINK & DO TANK SINESTESIA.CC

11:40 AM - CITIZEN SCIENCE IN THE UNITED STATES - LESSONS FROM MINNESOTA'S CITIZEN LAKE AND STREAM MONITORING PROGRAM - SHANNON MARTIN, CITIZEN LAKE MONITORING SPECIALIST, MINNESOTA POLLUTION CONTROL AGENCY

12:00 PM – THE IMPORTANCE OF BUILDING ETHICAL AND TRUSTWORTHY PROCESSES AND METHODOLOGIES FOR CITIZEN SCIENCE - CAREN COOPER, ASSOCIATE PROFESSOR, FORESTRY & ENVIRONMENTAL RESOURCES, NORTH CAROLINA STATE UNIVERSITY

12:10 PM – DISCUSSION AND QUESTIONS
1:00 PM - CLOSING - NICOLE NOREL, EXECUTIVE DIRECTOR, NAWI



The Escazú Agreement is an international agreement between Latin American and Caribbean countries

- 1) Access to environmental information.
- 2) Public participation.
- 3) Access to environmental justice.

- Countries that have ratified the agreement
- Countries that have signed the agreement
- Countries that participated in negotiations but haven't yet signed
- Countries that could join the agreement



Environmental Information in Chile

- In Chile, the environment is a recurring theme and the unrest is related to the lack of information and lack of participation in the decision-making process.
- Law 20.417: Environmental Institutionality: Environmental Evaluation Service.
- Main Flaws:
- a) Lack of land planning, environmental quality standards, and regional and local environmental cleanup plans that work together with the environmental evaluation system.
- b) It generates mistrust → the information is produced by the same projects that are investing.
- c) Citizen participation is not binding, only generates observations.
- d) Lack of follow up and legitimate monitoring of the projects.





Benefits of Citizen Science

- Allows the community to build comprehensive scientific information, while facilitating environmental education.
- Recovers local knowledge, which is necessary to understand the complexity of the territories.
- Increases the participation and agency of communities by involving them in decision-making processes.
- Tool that allows citizens to monitor environmental conditions in the long run.



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MPCA CITIZEN WATER MONITORING

CLEAN WATER, ONE VOLUNTEER AT A TIME



Shannon Martin Citizen Lake Monitoring Coordinator



Citizen Science at the MPCA

Citizen Lake Monitoring
46 Years

Citizen Stream Monitoring
22 Years





2019 Participation Numbers

Lakes

- √ 970 volunteers
- √ 1,042 lakes
- ✓ 1,690 sites

Streams

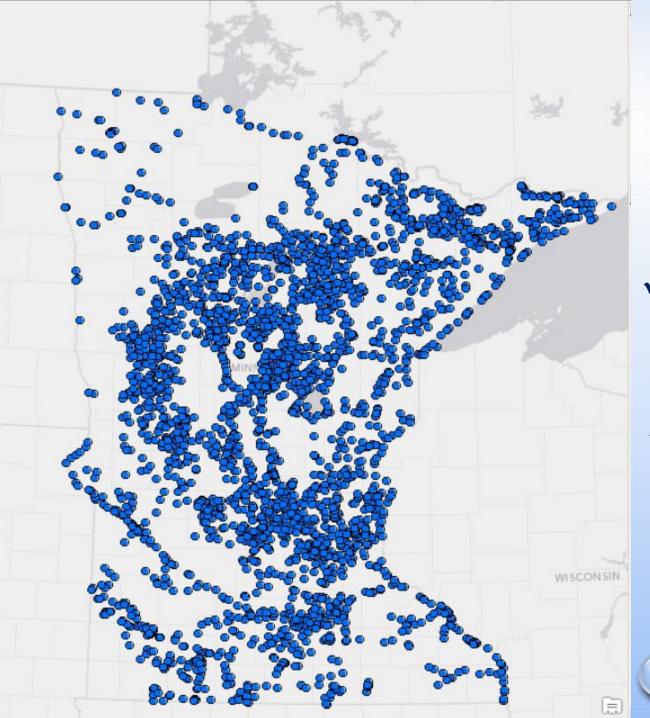
- √ 432 volunteers
- ✓ 617 sites





Minnesota's Water Resources

- ✓ 12,200 lakes
- √ 92,000 miles of streams
- ✓ Seen as a public resource for everyone to use



Public Water Access in Minnesota

✓ Hundreds of public access points maintained by the state

✓ Access is free and open 24 hours a day

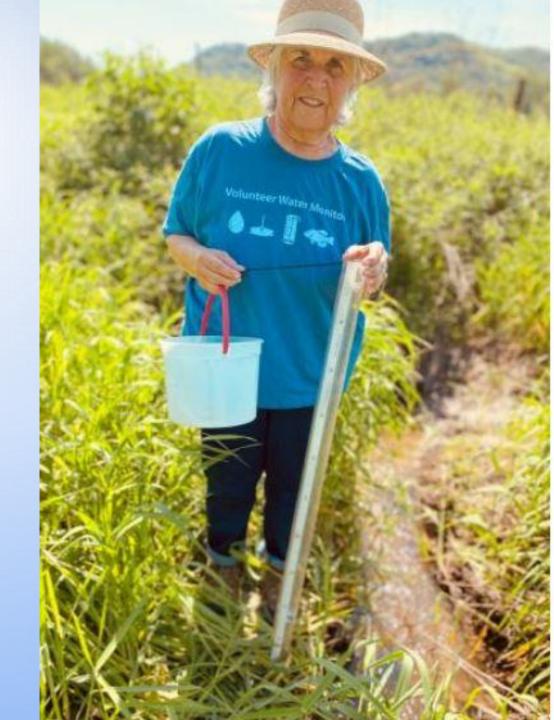


Why Volunteers Monitor

- ✓ Concerned about water quality
- ✓ Curious about their lake/stream
- ✓ Contribute to a larger understanding of water quality in MN

Who Can Monitor?

- ✓ Anyone who lives near or frequently visits a lake or stream
- √ Families
- ✓ Retirees
- ✓ Schools



Citizen Monitors are Local Water Advocates

- ▼ They possess invaluable place-based historical knowledge
- ▼ They are invested emotionally and financially
- ✓ They feel the impact of degraded water quality on their community



Mark Rauschenfels, 7-year Volunteer on Pike Lake, St. Louis County continued...



monitor water clarity...

Barb Lyndgaard, 1-year Volunteer on Kreigle Lake, Stearns County

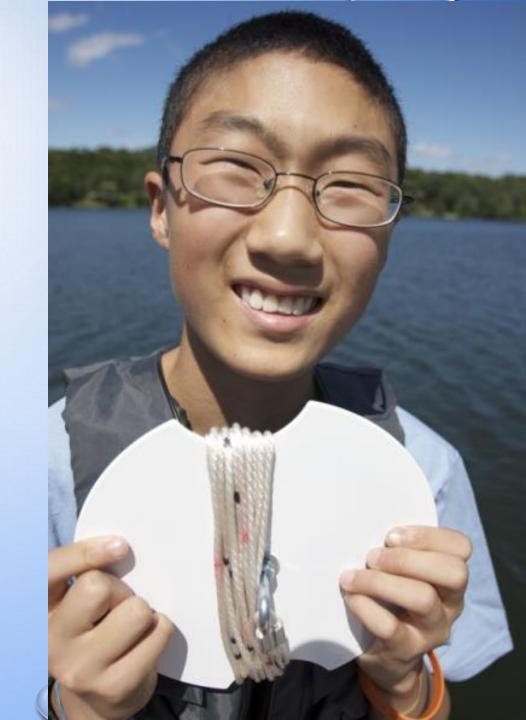
It was my first year monitoring the lake I live on, Kreigle Lake. It is great to be able to teach my grandchildren to understand and respect our natural resources. They love swimming in the lake which we averaged 20' clarity through the summer!

It's a great intergenerational family activity!



What Do Volunteers Monitor?

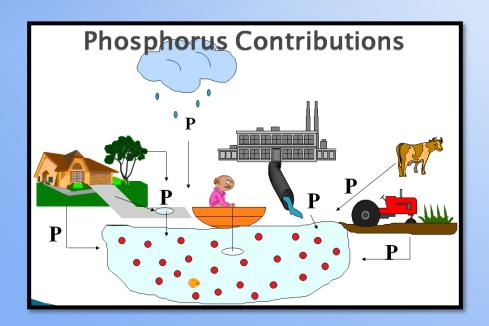
- ✓ Basic Water Clarity Monitoring weekly to monthly using a Secchi disk or tube
- ✓ Rate algae/sediment levels
- ✓ Record water color and levels
- ✓ Return to the same site year after year



What Causes Low Water Clarity?

Lakes

- ✓ Algae growth due to high nutrients
- ✓ Sediment



Streams

Excess sediment from stream banks and runoff





Citizen Monitors are Important Data Collectors

- ✓ Their data is used directly in MPCA water quality assessments
- They extend state agency capacity beyond what staff can accomplish
- ✓ They contribute longevity and consistency to local monitoring

Citizen Monitors have an Amazing Return on Investment

Citizen Stream Monitoring Program

22 Years of Stream Monitoring in Minnesota!

Number of Sites Monitored

612

Economic Impact

\$77,816

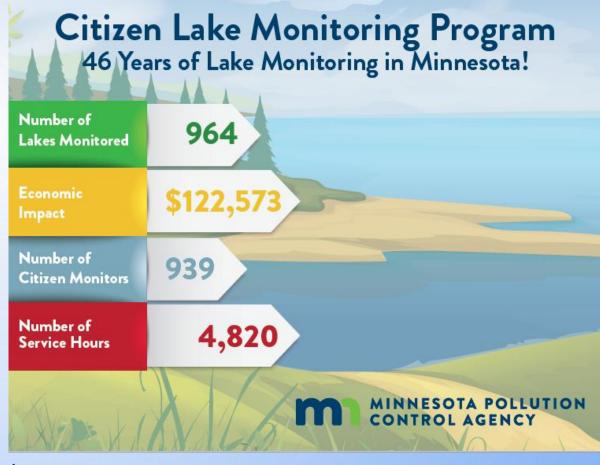
Number of Citizen Monitors

423

Number of Service Hours

3,060





- ✓ Monitoring is quick & easy
- ✓ Monitoring kits are inexpensive (~\$50/volunteer)
- ✓ Volunteer training can be done remotely



Citizen-Collected Data Directly Informs Watershed Management

Citizen data helps the MPCA answer 2 important questions:

- 1. Is lake or stream water clarity changing over time?
- 2. Is a lake or stream meeting state water quality standards?

Connecting With Our Volunteers



- ✓ Annual volunteering gathering
- √ Newsletter (3 times a year)
- ✓ Webinars in the off season

What We Hear From Our Volunteers



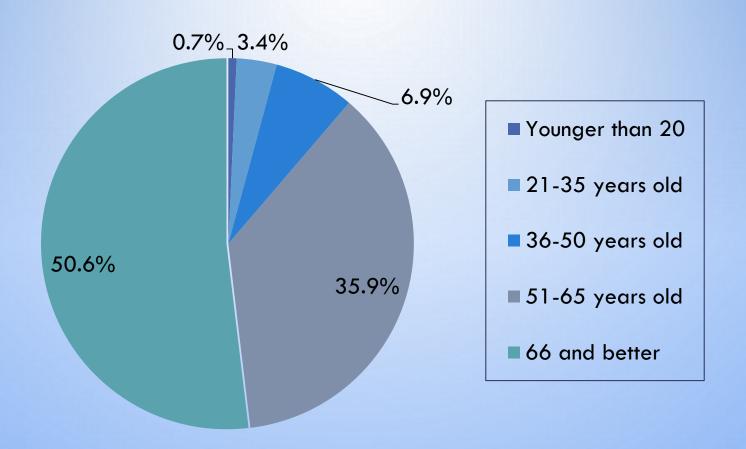
✓ Personal networks, such as family, friends and neighbors are key for sharing and receiving information about the program and lake and stream health in general

Why Volunteers Stick Around

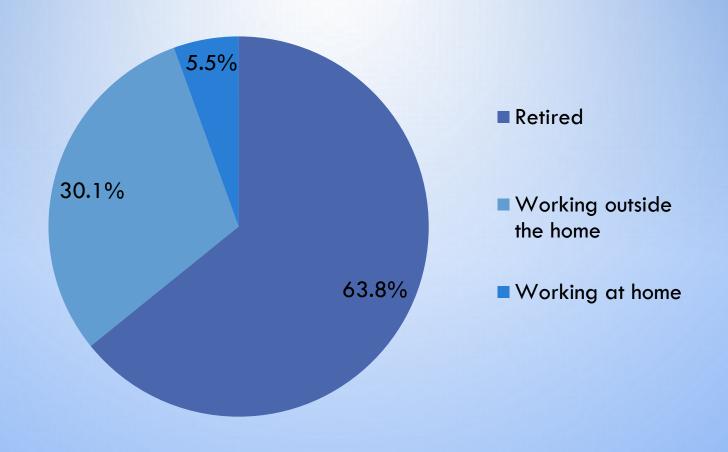
Preserving a deep connection with a particular lake or stream, sharing it and passing it on to future generations is of deep importance to volunteers



Program Demographics Age of Volunteers



Program Demographics Working Status



Recruitment - Challenges & Opportunities



- ✓ Outreach through County Watershed Districts, Nonprofits, Lake Associations
- ✓ Social media regular posts & FB ads
- Posters & Tabletop display
- √ Billboard
- ✓ Annual Spring Press Releases
- Online ads in newspapers, journals and radio





Citizen Water Monitors Matter!

- Citizen monitors are local water advocates
 & important data collectors
- Citizen-collected data are critical to detecting trends in water clarity over time
- Citizen knowledge can make the difference in determining accurate water quality assessments

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Citizen Science Challenges



- Purpose
- Tools & Technology
- 3 Data Accuracy
- 4 Skills
- 5 Empowerment







Making Sense

Advances and experiments in participatory sensing







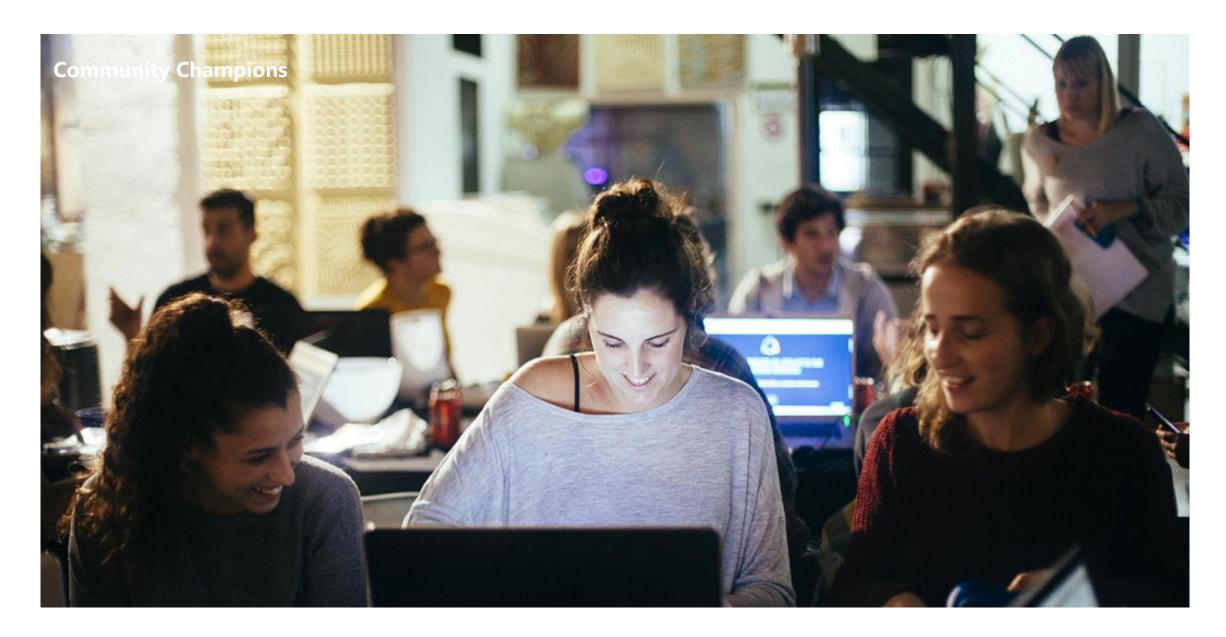




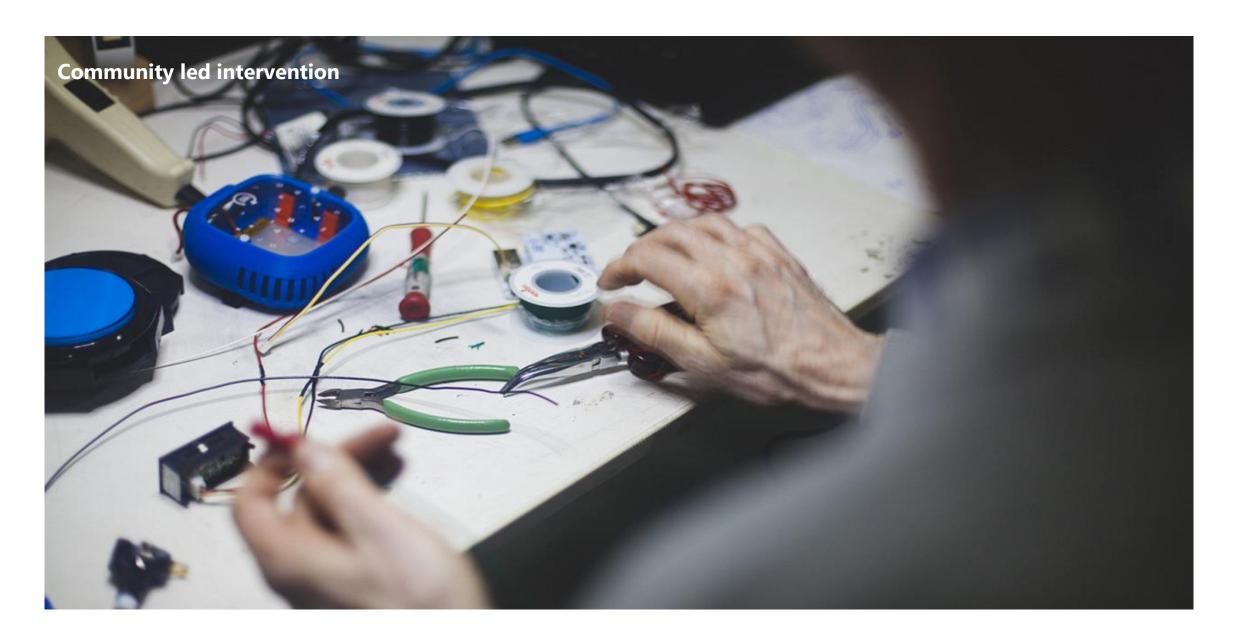
















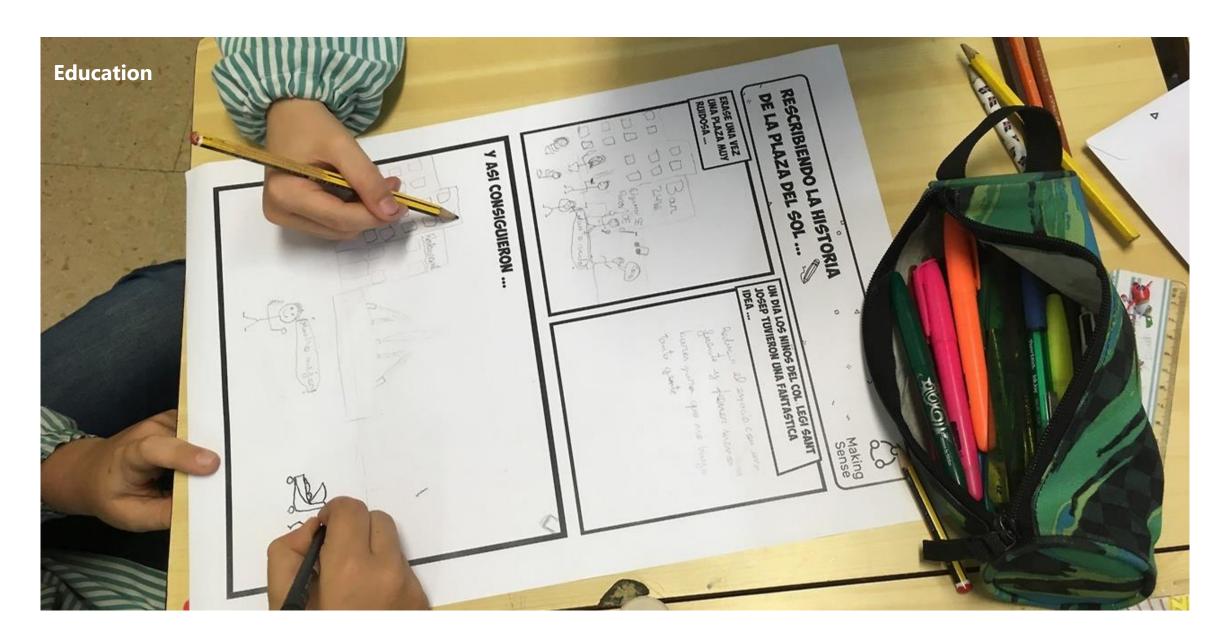






















Documentary





Other projects



We Count

We collaborate with Ideas 4 Change in a European Project that through technological tools, participatory processes and citizen science to generates data that allows to analyze how urban mobility affects people's lives and participate in the design of public policies.



Riografía

Educational program based on water issues, through Citizen Science methodologies and open environmental sensors. Collaboration with Sinestesia and Fieldkit at Conservify.org



Endèmic

Citizen Science project that encourage the democratization of knowledge and scientific dissemination (with focus on Antimicrobial Resistance and Virology) to raise awareness, promote healthy habits and resilience. Collaboration with ISGlobal

Barcelona



Blaucelona

Citizen Science-based educational methodology that seeks to generate collective awareness of the importance of our oceans and encourage people to become agents of change by working together with local initiatives and global networks. Collaboration with **BitLab**



Community Engagement Tips

A Community Champions

Narrative

B Openness

Collaboration

C Prototype

Commitmen





Contact

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Social Media: @lichen_is

Web: www.lichenis.com













TIMELINE

01

FUNDRAISING

Dream definition
Sales narrative art
Make a list
Show the plan
Follow up

02

PARTICIPATOR Y DESIGN

Multisectoral Directory
Strategy definition
Collective intelligence
Collaboration networks
Tutorships

03

IMPLEMENTATION

Execution of program initiatives
Monitoring

Report

Documentary record

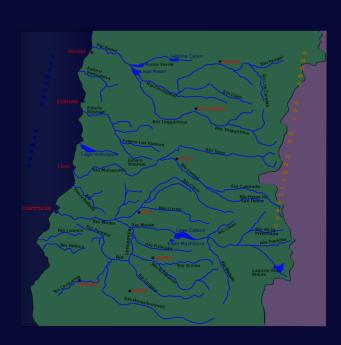
04

VISIBILITY

Construction of narratives based on metrics, results and success stories. Social leadership

Preparation of communication artifacts and dissemination in the media.

WATERSHED MAPPING

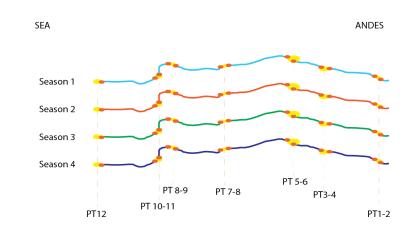


STRATEGY









STRATEGY

SAME RIVER

Different realities
Different times
Different communities



















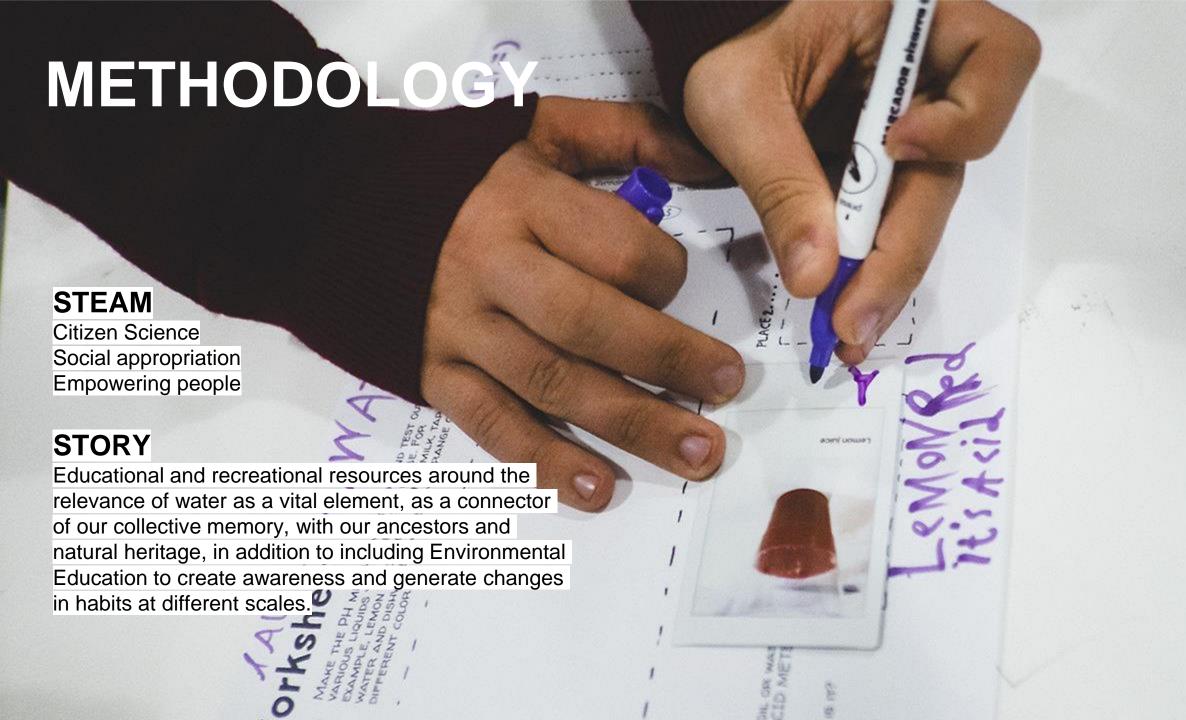




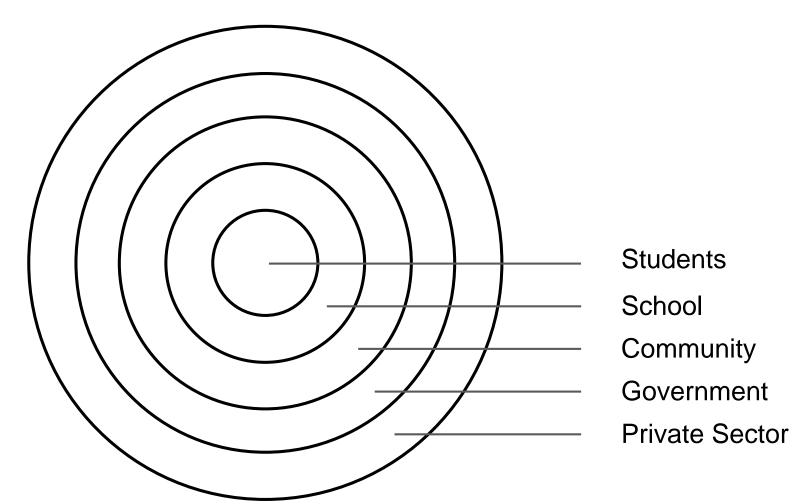








COLLABORATIVE MODEL



TOOLS



Digital tools, Waterkit, and analog tools for measuring water elements.

Fieldkit: Temperature, PH, Dissolved Oxygen, Conductivity

Training **students** in the generation, **management**, reading, interpretation and **visualization** of **data**.

In this way, it seeks to integrate knowledge of science, technology, engineering, arts and mathematics, causing holistic learning through theory and practice.

IMPACT

The result of the entire process will be presented in an interactive webdoc, which integrates the data obtained in each community, with an audiovisual and infographic record for the dissemination and open communication of the results at a national and international level.

Interactive Webdoc



Participatory Riography







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Caren Cooper
North Carolina State University

Lisa Rasmussen University of North Carolina-Charlotte

Elizabeth Jones North Carolina State University









Participatory Sciences

Distributed Computing

Crowdsourcing

Participatory Sensing

Community Mapping

Volunteer Monitoring

Community-based Research

Participatory Action Research

Community-owned and Managed Research

DIY

High

Low

Volunteer investment













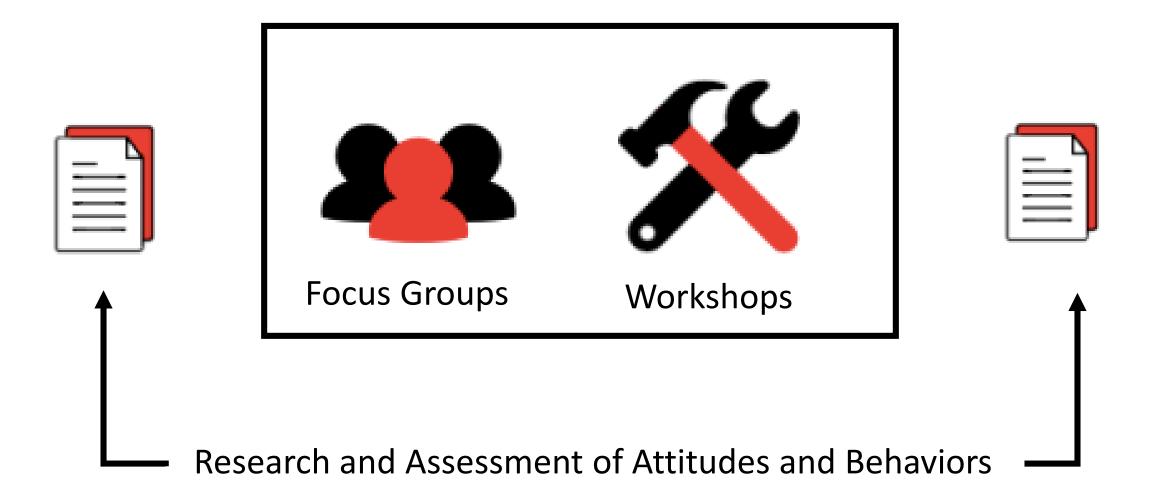
Norms

equity Personal conduct leadership collaboration management **Ethics** transparency attribution relationships Professionalism privacy stewardship

ETHICAL RIGOR + TECHNICAL RIGOR =

TRUSTWORTHY DATA

Co-creating tools and resources with practitioners



DATA PRACTICE TOPICS

DATA OPENNESS



DATA PRIVACY



TRANSPARENCY



CREDIT



RETURN OF RESULTS



Example: some aspirations do not match reality

Survey:

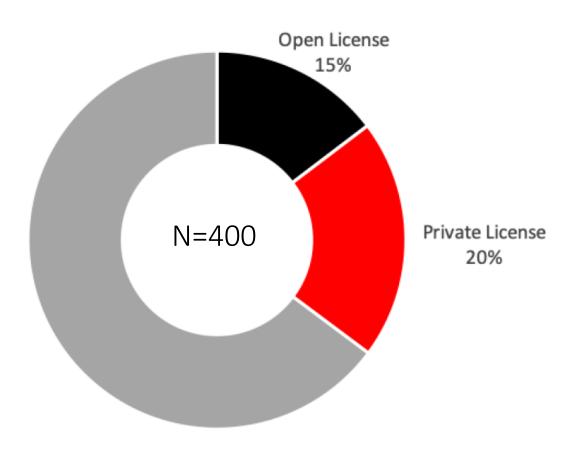
>3/4 agree norm & attitude towards open data license

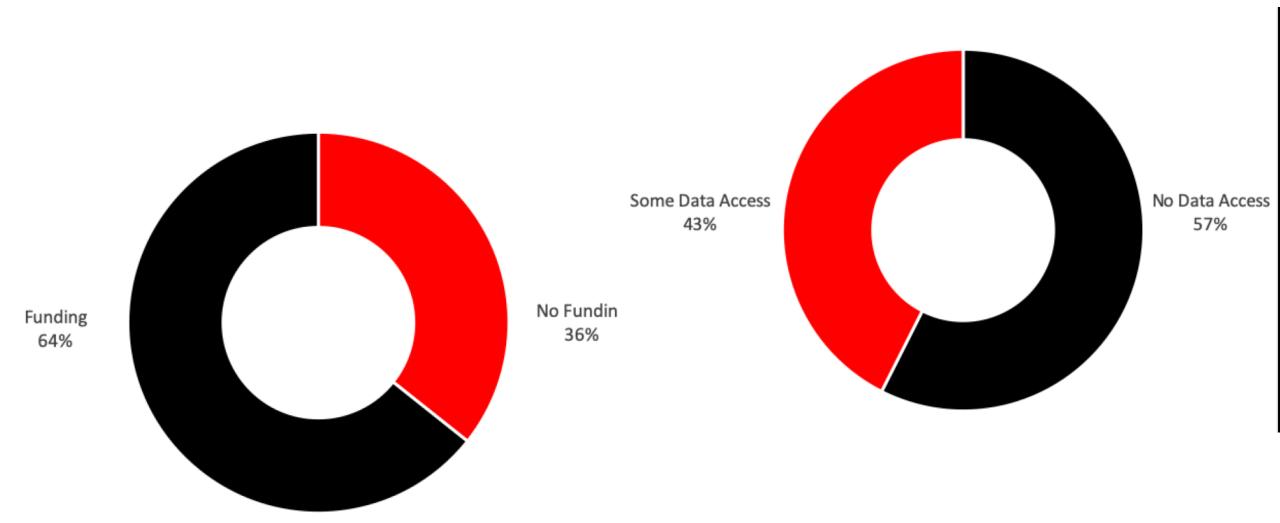
>1/2 claim **ability** to create an open data license

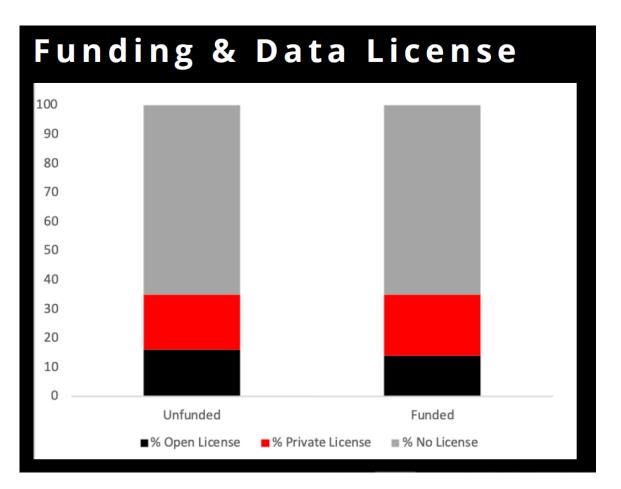
No License 65%

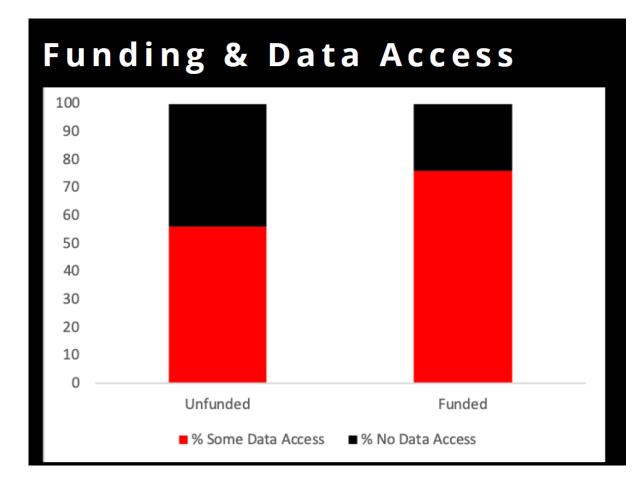
90% have **intention** for open data license in *community* project; <70% in *contributory* project.

Inventory:









YOU ARE INVITED TO TAKE PART

https://www.citizenscience.org/data-ethics-study/

Questions? citsci data ethics@ncsu.edu

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