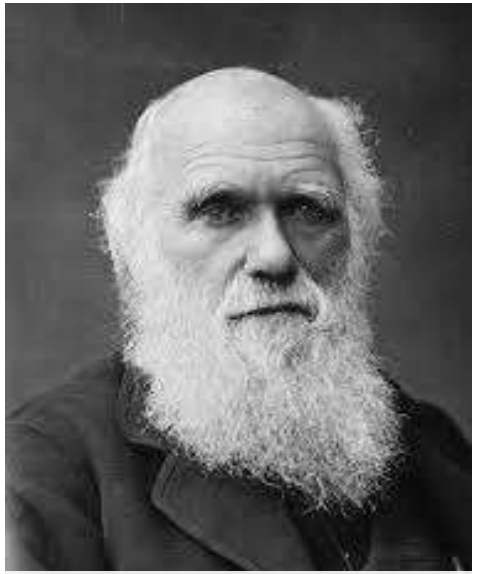
Citizen Science & Crowdsourcing

Jay Benforado
Acting Chief Innovation Officer, EPA Office of Research & Development

Presentation to EPA Tribal Science Council
December 1, 2015

If you had 100,000 people to help you with your work, what would you do?



Charles Darwin

“The Original Crowd-Sourced Scientist”

★★★★ FINAL

The Minnesota Citizen

3¢

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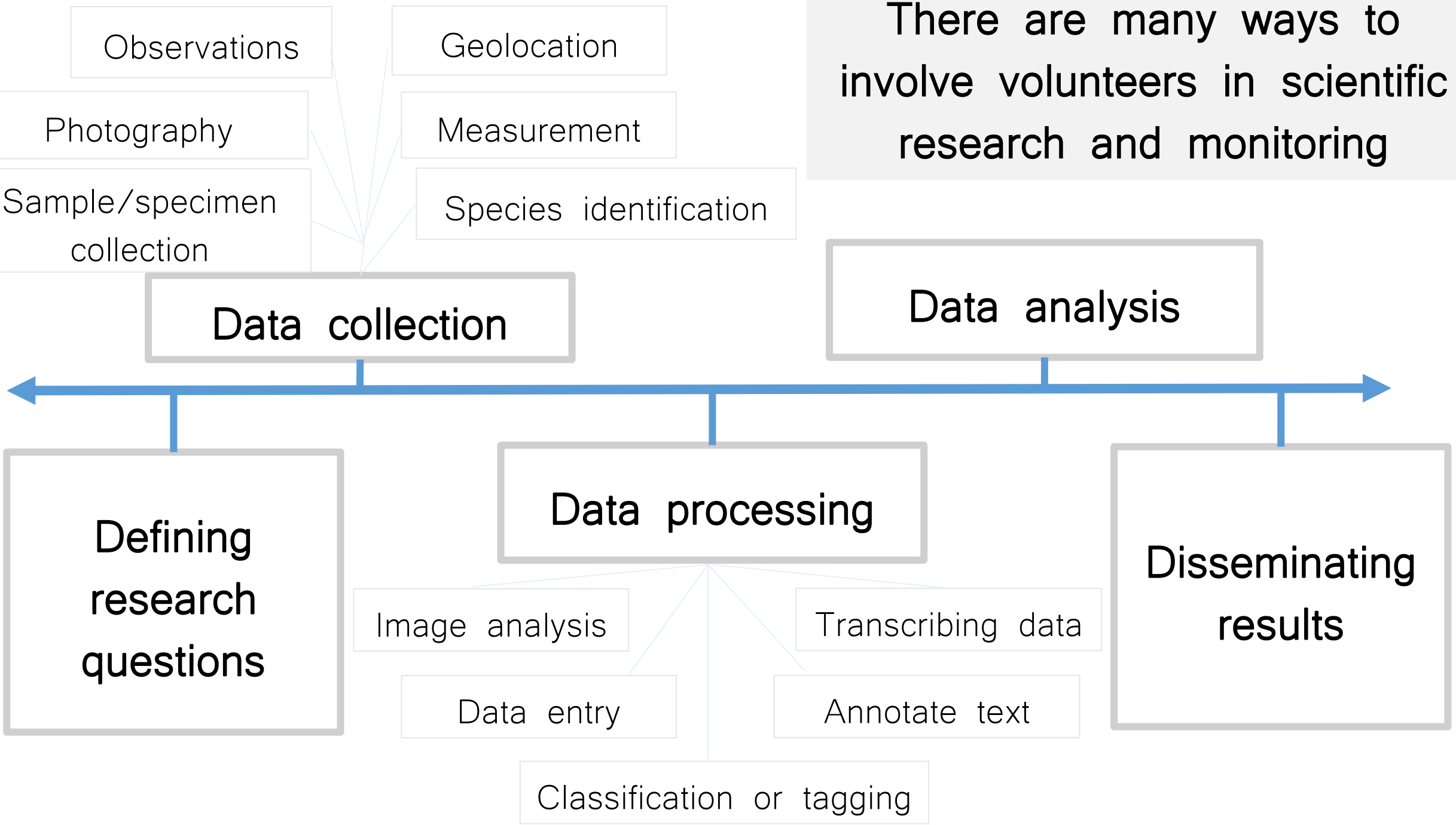
VOLUNTEERS TO INVESTIGATE THE MIGRATION OF MONARCH BUTTERFLIES

University program relies on cooperation of individuals

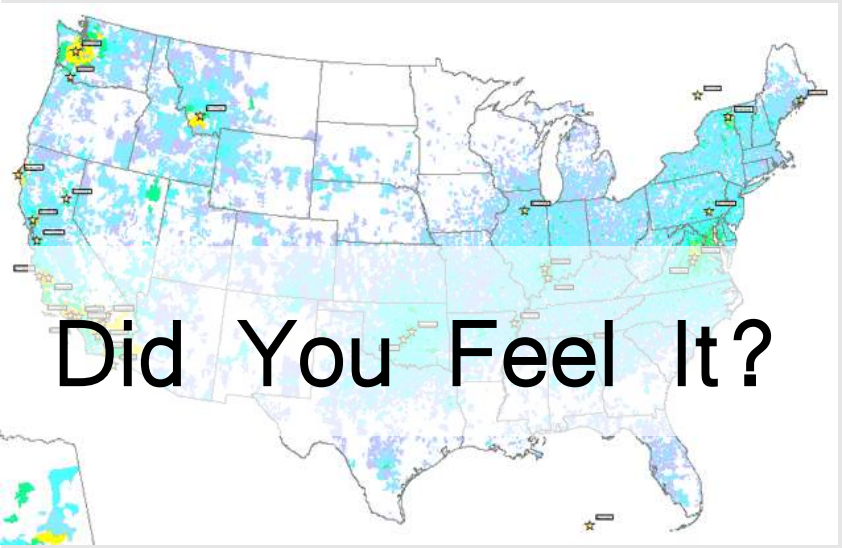
Examples of Tribal Citizen Science

- Local Environmental Observer (LEO) Network – Alaska Native Tribal Health Consortium
- Yukon River Inter-Tribal Watershed Council
- White Earth Nation -- Thriving Earth Exchange Water Quality Project
- Community-Based Monitoring of Alaska's Coastal & Ocean Environment (NOAA report)
- Harmful Algal Bloom Monitoring Program – Southeast Alaska Tribal Toxins (SEATT)
- Mandan Hidatsa Arikara Nation – Env. monitoring project w/ University of Colorado
- Fond du Lac Band of Lake Superior Chippewa – Water quality monitoring
- Whitebark Pine Survey – Consolidated Salish and Kootenai Tribes
- Akwesane Tribe & other tribes in New York State – Breast milk contamination study

There are many ways to involve volunteers in scientific research and monitoring



Federal citizen science projects are harnessing the efforts of volunteers

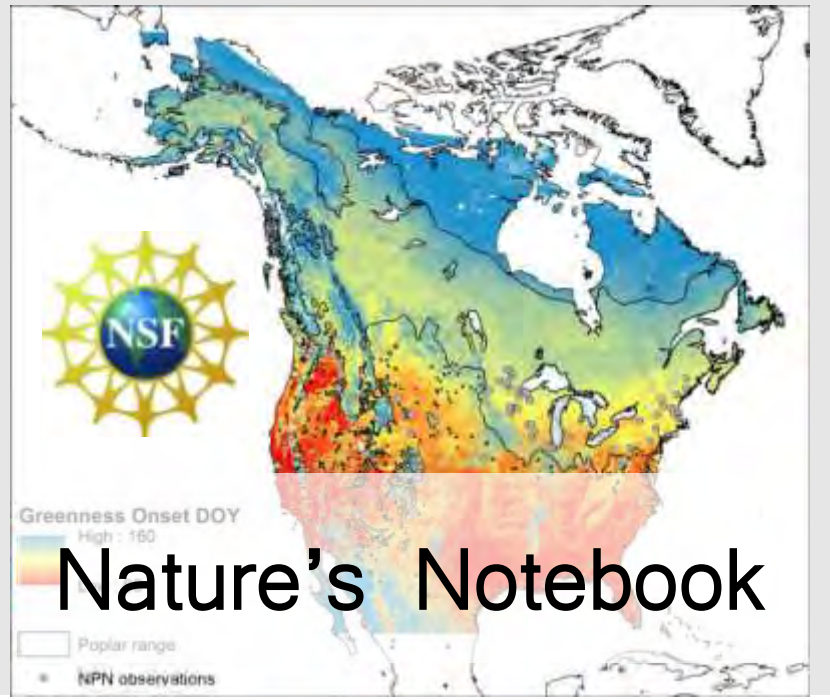


Did You Feel It?

USGS science for a changing world

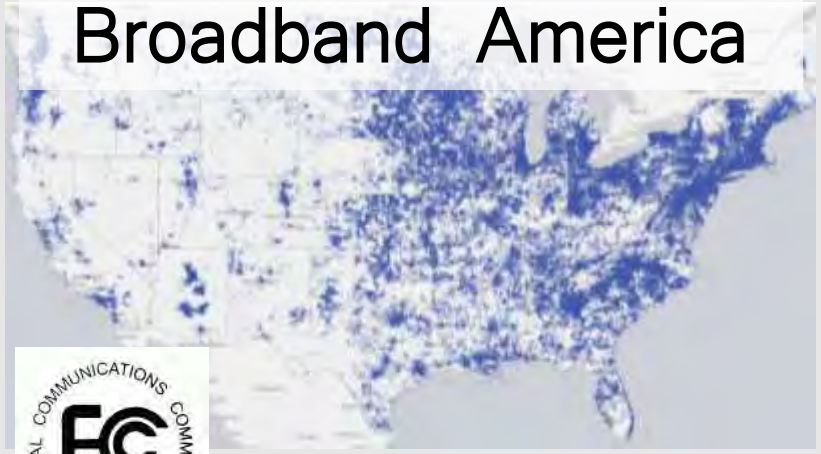
Citizen Archivist Dashboard

NATIONAL ARCHIVES

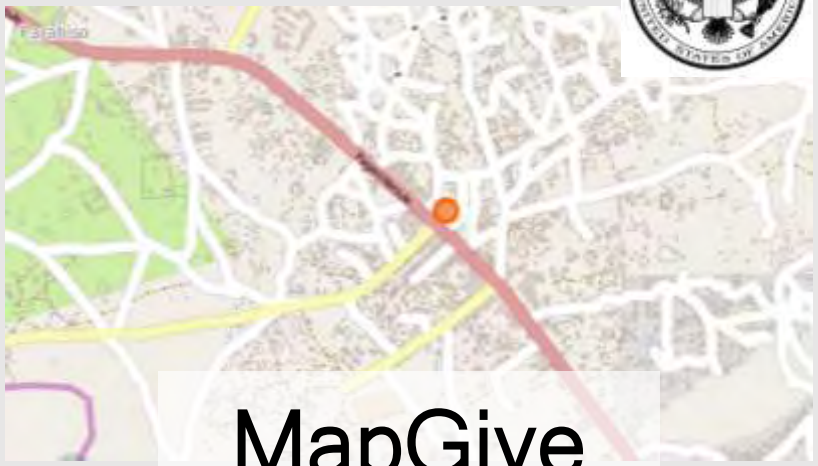


Nature's Notebook

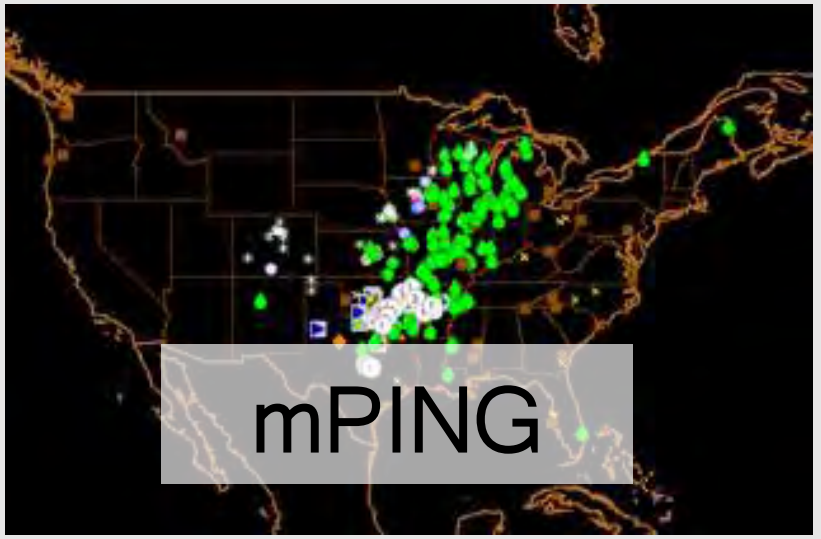
Measuring Broadband America



FEDERAL COMMUNICATIONS COMMISSION FCC USA

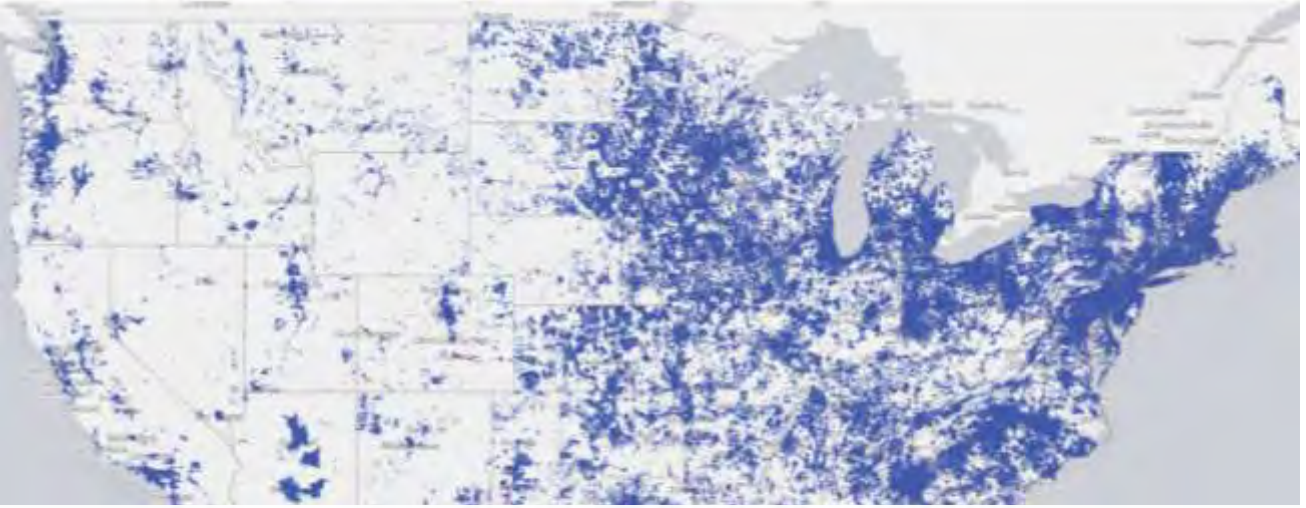


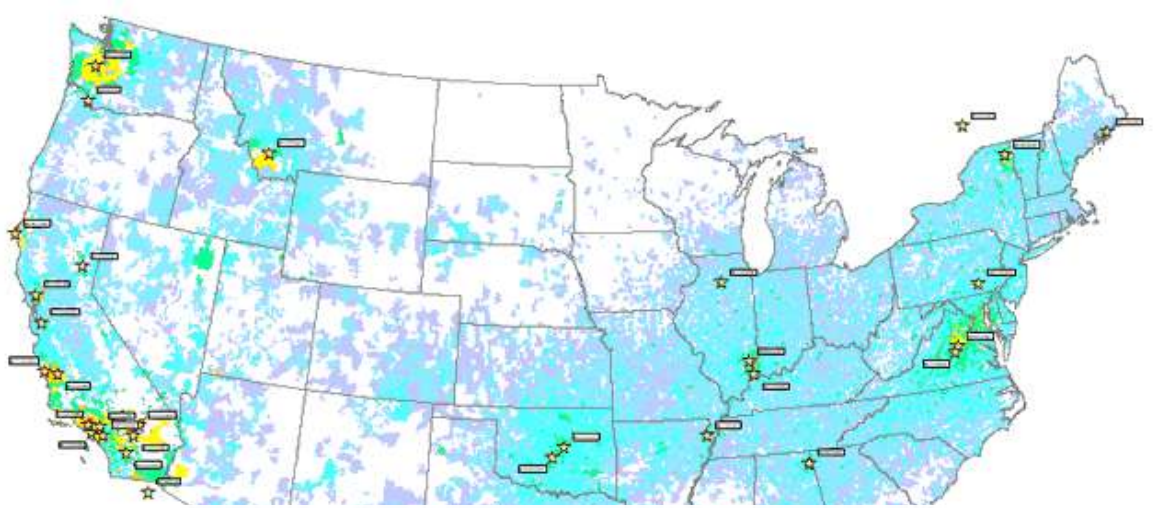
MapGive



mPING

NOAA





Federal Community of Practice for Crowdsourcing and Citizen Science

- 35 participating agencies
- Networking: monthly meetings, active listserv, guest speakers
- Impressive array of projects and approaches
- NSF has funded hundreds of citizen science projects!

COMMONS LAB

Home | Add project | About

Database of federal crowdsourcing and citizen science projects

FIND PROJECTS:

Search for

FILTER BY:

- Project Topic
- Agency Sponsor
- Agency Partner
- Geographic Scope
- Participant Age
- Intended Outcomes

PROJECTS	AGENCIES
104	20

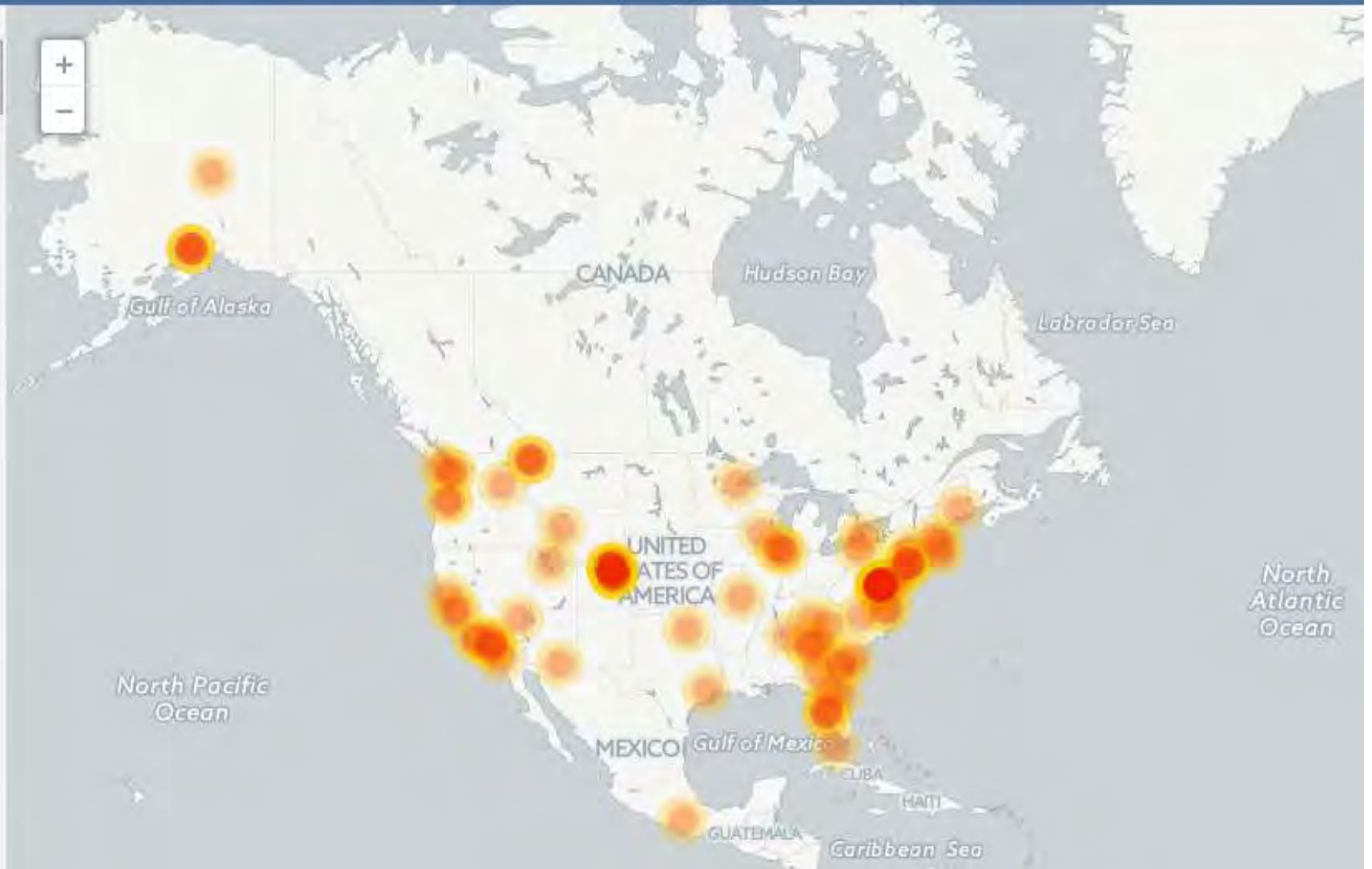
Advancing Energy Efficiency in Buildings
by Department of Energy (DOE)

Alaska Volcano Observatory Citizen Network Ash Collection and Observation Program
by U.S. Geological Survey (USGS)

Aurorasaurus
by National Aeronautics and Space Administration (NASA), National Science Foundation (NSF)

Citizen Archivist
by National Archives and Records Administration (NARA)

Coastal Observation



EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20502

September 30, 2015

MEMORANDUM TO THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: John P. Holdren
Assistant to the President for Science and Technology and
Director of the Office of Science and Technology Policy

SUBJECT: Addressing Societal and Scientific Challenges through Citizen Science and Crowdsourcing

OSTP Memo on Citizen Science and Crowdsourcing

September 30, 2015

- Outlines **principles** to guide government activities -- for greatest value & impact

- Requests specific actions from each agency:
  - Identify a citizen science **coordinator**
  - Describe projects on a government-wide **online website** (i.e., to make projects easier for the public to discover, to improve collaboration across agencies, and to reveal opportunities for new projects)

- Encourages agencies to build internal capacity and increase support

- Appendix -- lists **examples** of successful Federal activities

IN THE SENATE OF THE UNITED STATES

Mr. COONS introduced the following bill; which was read twice and referred to the Committee on _____

A BILL

To harness the expertise, ingenuity, and creativity of all people to contribute to innovation in the United States and to help solve problems or scientific questions by encouraging and increasing the use of crowdsourcing and citizen science methods within the Federal Government, as appropriate, and for other purposes.

Federal Crowdsourcing and Citizen Science Toolkit

Welcome!

Crowdsourcing and citizen science help federal agencies to innovate, collaborate and discover. In this toolkit, you will learn how to design and maintain projects. You can also read through case studies and access additional resources related to communities that practice crowdsourcing and citizen science.

What Is Crowdsourcing?

Crowdsourcing involves an open call for volunteers to provide information or help solve a particular problem. A large group of either unknown or trusted individuals ("the crowd") responds.

What Is Citizen Science?

Citizen science involves voluntary public participation in the scientific process to form research questions, conduct scientific experiments, collect and analyze data, interpret results, make discoveries, develop technologies and applications, and solve complex real-world problems.

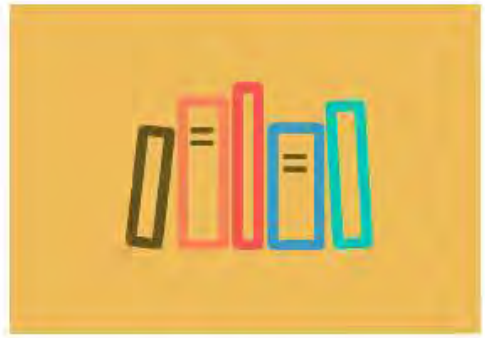
Featured Case Studies

How To: Step by Step

This toolkit shows five basic process steps for planning, designing and carrying out a crowdsourcing or citizen science project. At each step, you'll find a list of tips you can use to keep your project on track. See the process steps

Case Study Overview

Case studies in this toolkit serve as models and provide success stories and challenges to consider while planning a project. You can browse through agency case studies to get ideas for a project of your own. Browse case studies



Resource Library

The resource library provides a list of all resources in this toolkit which you can browse through by category. You can also find resources within each of the process steps in the "How To" section of the toolkit. View resources

Map of Federal Crowdsourcing and Citizen Science Projects

Database of federal crowdsourcing and citizen science projects courtesy of the Commons Lab.

Federal Crowdsourcing and Citizen Science Community

The Federal Community of Practice on Crowdsourcing and Citizen Science (CCS) meets monthly to share lessons learned and develop best practices for designing, implementing, and evaluating crowdsourcing and citizen science initiatives. Learn more about the CCS

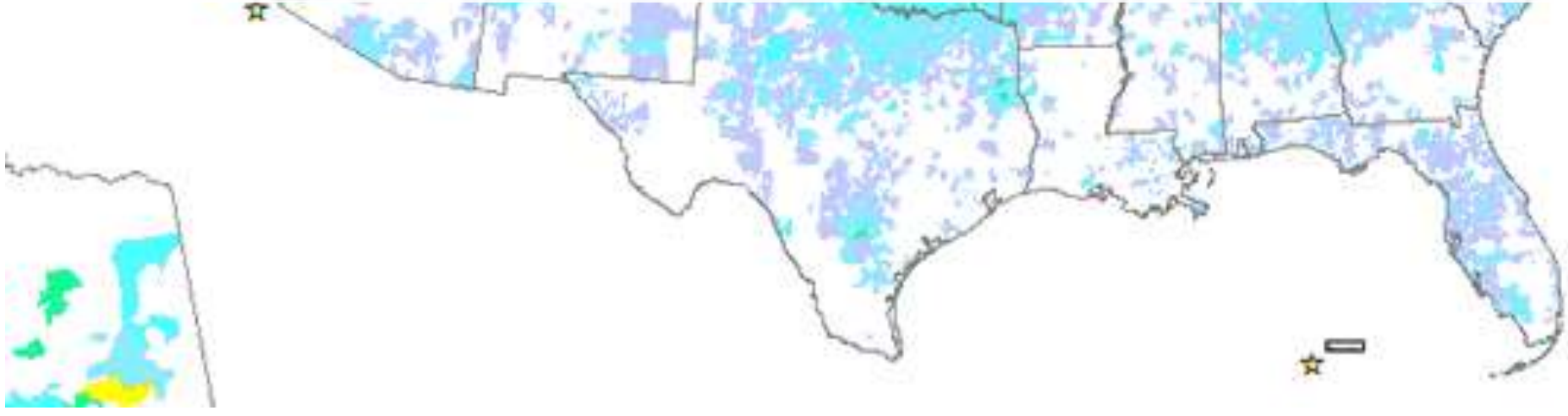
Other Innovation Communities

- Challenges and Prizes
- OpenGov
- Ideation CoP
- DigitalGov
- Data.gov
- SocialMedia CoP

Learn about these communities

Summary: Substantial Interest in Federal Agencies

- Many agencies have started projects
- Federal Community of Practice on Crowdsourcing and Citizen Science
- Crowdsourcing & Citizen Science Toolkit for Federal agencies
- Citizen Science Association – new network with many organizations



Citizen Science at EPA: 1) Work with **communities** to understand local problems; 2) **Monitor** the environment for environmental protection; 3) Engage volunteers in **research** relevant to EPA's mission; 4) **Educate** the public about environmental issues.

Air Sensor Toolbox for Citizen Scientists

provides guidance on affordable, next-generation air quality sensors

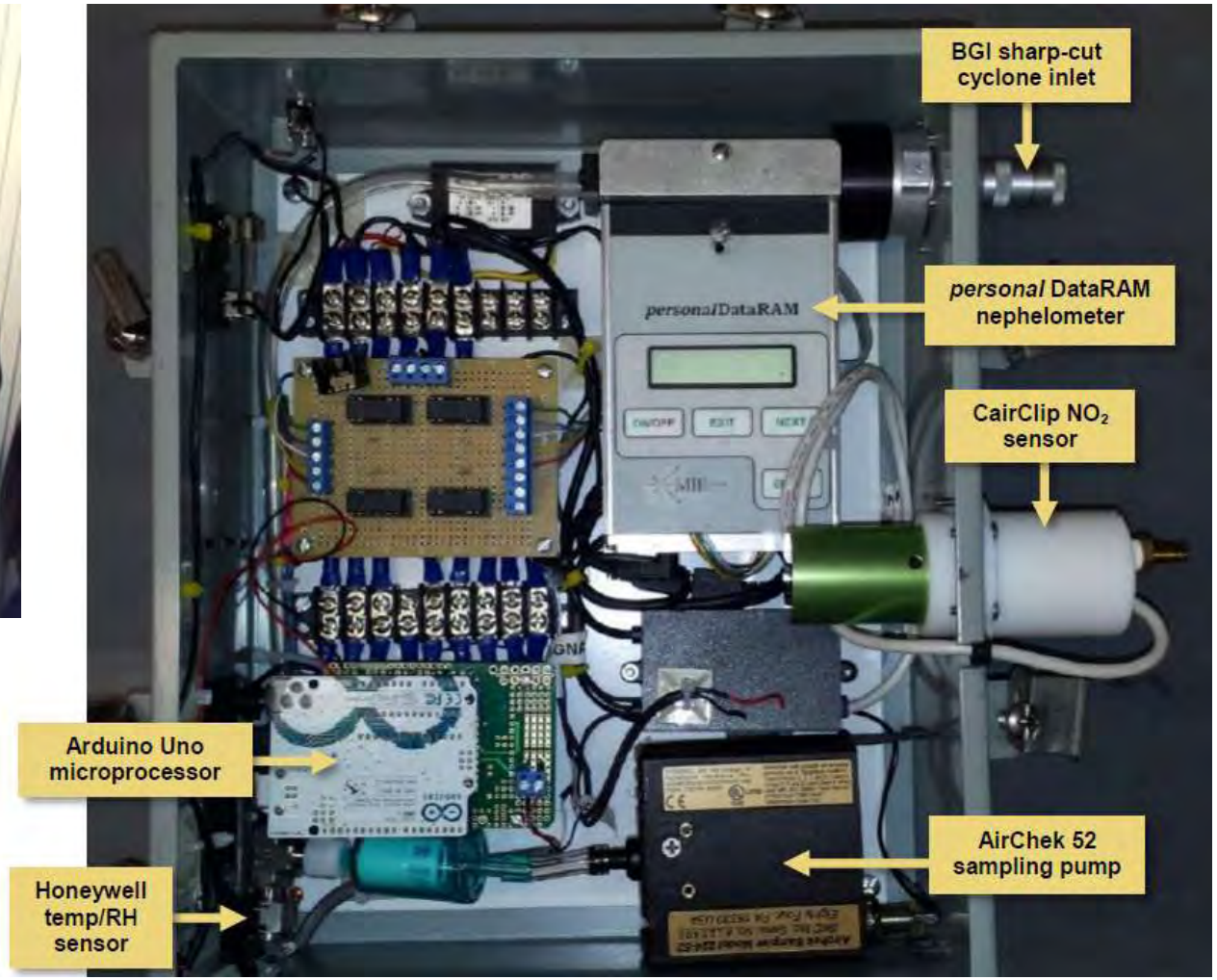
Air Sensor Citizen Science Toolbox EPA Measure • Learn • Share

Environmental Justice -- Ironbound Community, Newark NJ

Community members conduct air monitoring with EPA

- NO_2 sensor
- $PM_{2.5}$

High quality instruments and data



Instruments in "briefcase-sized" package

National Advisory Council for Environmental Policy and Technology (NACEPT)

Yearlong process with multi-stakeholder group

Will provide advice and recommendations to EPA on how to strategically use citizen science to advance EPA mission

Opportunity to focus on tribal needs

What can we achieve at EPA using citizen science?

- An educated and engaged citizenry to help solve environmental problems
- Greater use of local data to support communities
- Filling current gaps in environmental data collected
- Valuable contributions to environmental and health research at lower cost
- Improved environmental governance

Questions for NACEPT Advisory Council

How can we . . .

1. sustain and improve current EPA projects and programs?
2. invest in citizen science approaches for the greatest gain?
3. increase the impact of knowledge/data generated via citizen science?

1. *How can we sustain and improve current EPA projects/programs?*

Consider four areas of emphasis:

- Empowering communities
- Monitoring the environment and human health
- Conducting environmental research
- Educating the public about environmental issues

2. *How can EPA invest in citizen science approaches for the greatest gain?*

- What citizen science opportunities, directions and collaborations should EPA consider to assist the agency in accomplishing its mission?

- How should EPA address concerns related to:
  - Data quality,
  - Data management,
  - And instrument evaluation?

3. *How can EPA help increase the impact of knowledge and data generated via citizen science?*

- How can EPA support the use of citizen science knowledge and data for environmental protection at the local, state, and federal level?

- How can EPA work with the public to interpret data from citizen science efforts?

Goals for today's session

1. Tribal perspectives on citizen science

2. Review examples of tribal citizen science projects

3. Ideas for tribal input for NACEPT process