

Citizen Science at NOAA: Update and Examples



A Presentation to the NOAA Education Council

type of brief: informational

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Purpose

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Inform the Council on developments and opportunities in the area of citizen science and crowdsourcing, including NOAA's response to new federal directives

Will present examples of successful NOAA projects

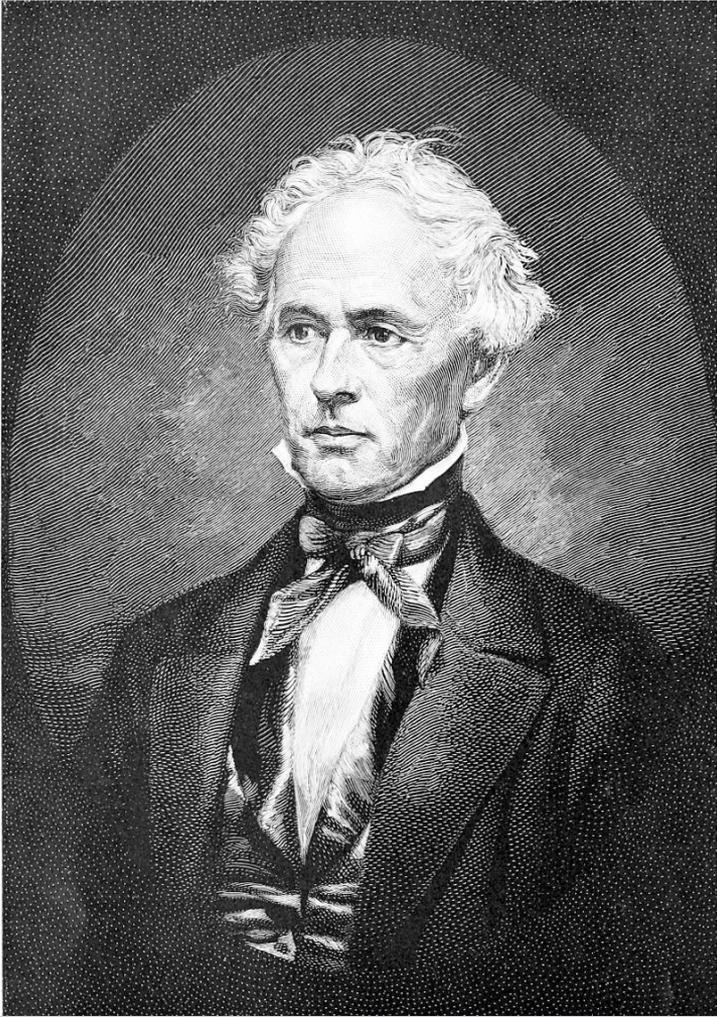
Outline

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- **Why is this something we care about?**
- **Review our previous discussion**
- **Overview FY15 activities**
- **Present example NOAA projects**
- **Discuss next steps**

Some History...

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William C. Redfield (1789-1857)

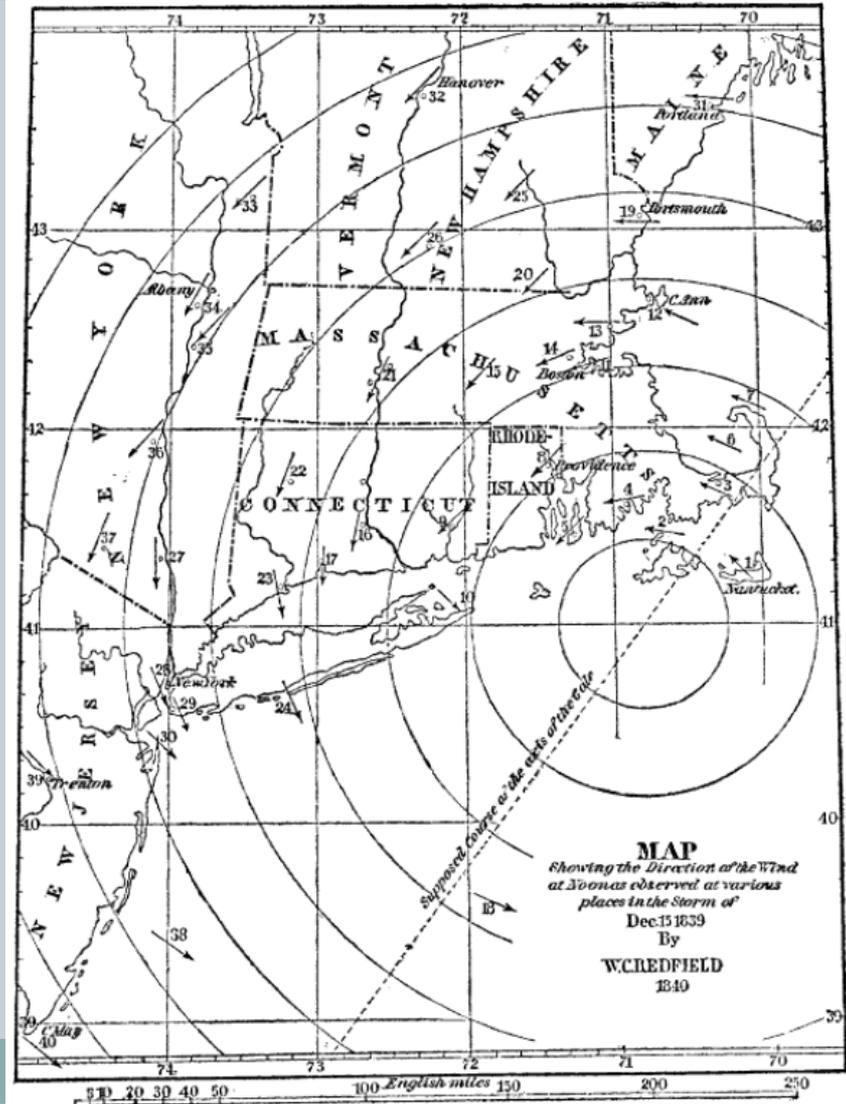
- A saddle maker, steamboat captain, and self-taught amateur meteorologist from Middletown, CT
- Noticed something interesting a few months after the New York Hurricane of 1921
- In 1931, he published his observations that trees had fallen northwestward in the eastern part of CT, and southeastward in the western part of the state

Some History...

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- During a 1939 storm, Redfield drew from a network of observers, including ships, that recorded wind direction at noon to show a circular wind pattern
- He became the first President of AAAS in 1848.

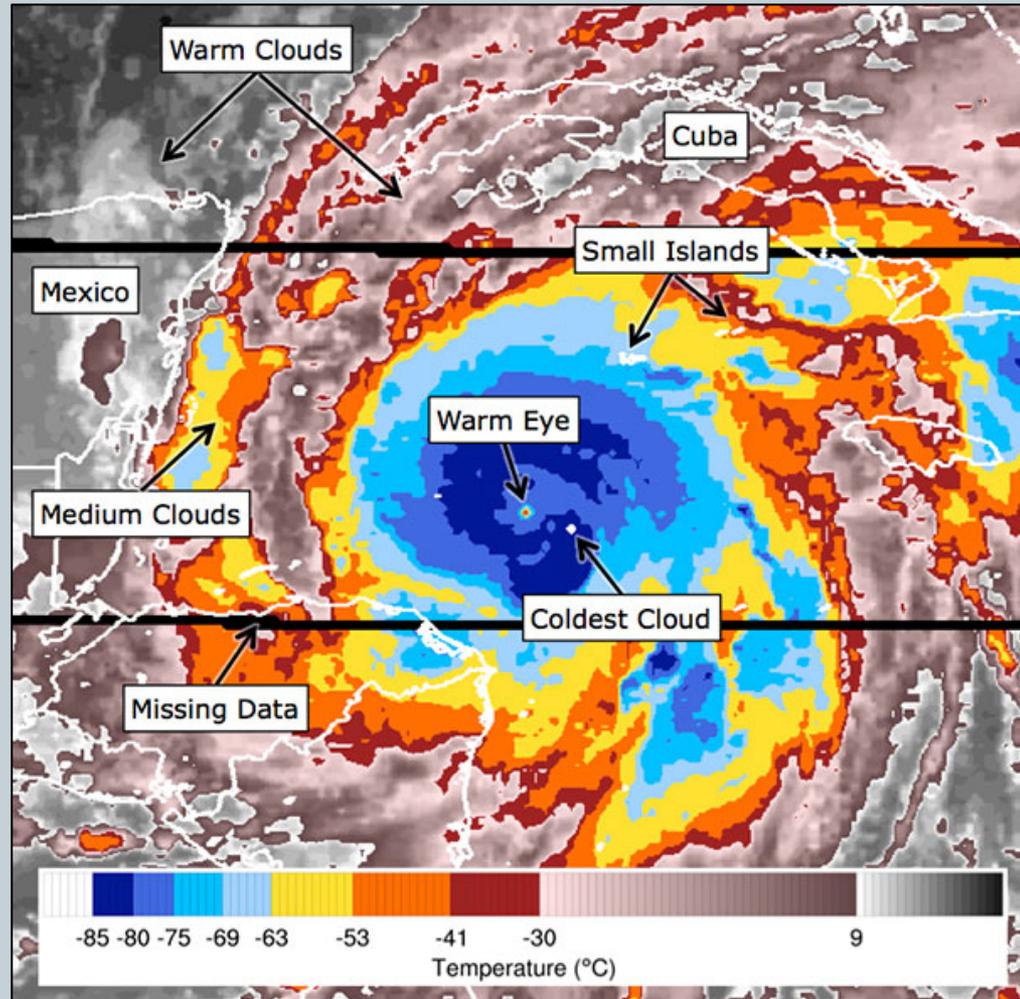
Observations on the Storm of December 15, 1839
William C. Redfield
Transactions of the American Philosophical Society, Vol. 8 (1843), pp. 77-82



Now...

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- *How is the intensity of tropical cyclones changing?*
- Volunteers apply the Dvorak technique to provide valuable storm classification data
- 20k+ volunteers have classified almost 0.5M images, so far
- CycloneCenter.org
 - NCEI partnership with Zooniverse



Per OSTP, Citizen Science Can...

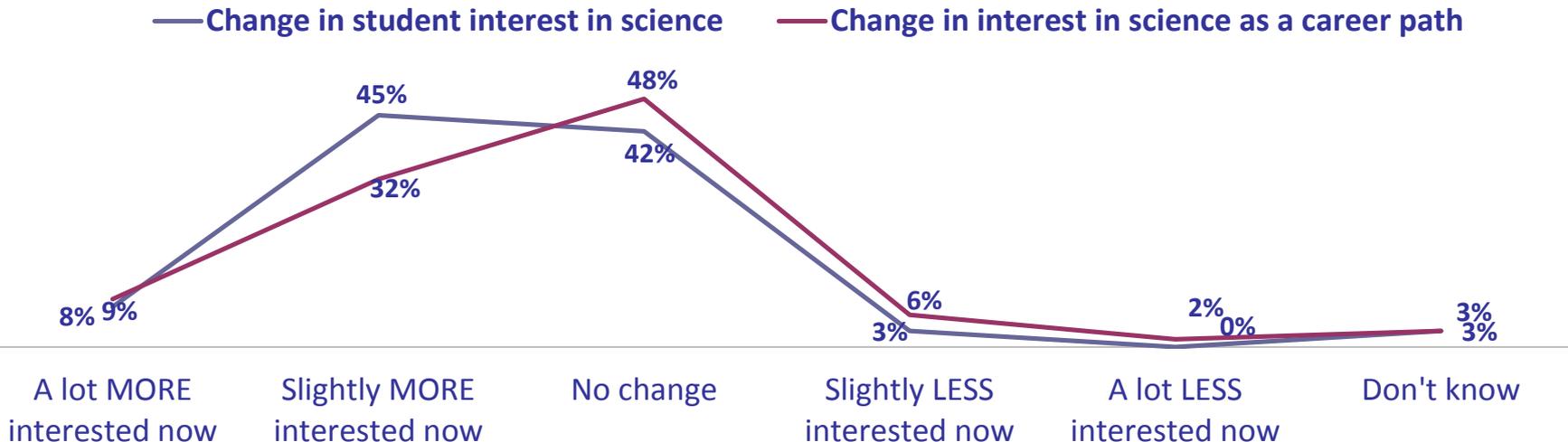
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- **Enhance scientific research**
 - volunteers can collect data over large areas and long periods of time
 - volunteers can provide unique perspectives and local expertise for interpreting data
 - human eye and brain can categorize millions of objects
- **Address societal needs**
 - allows government to leverage the skills, dedication, and ingenuity of the American people.
 - can facilitate diverse participation by all parts of society
- **Provide hands-on learning and increase STEM literacy**
 - work on real-world problems
 - exposure to and involvement in scientific process

About Learning...

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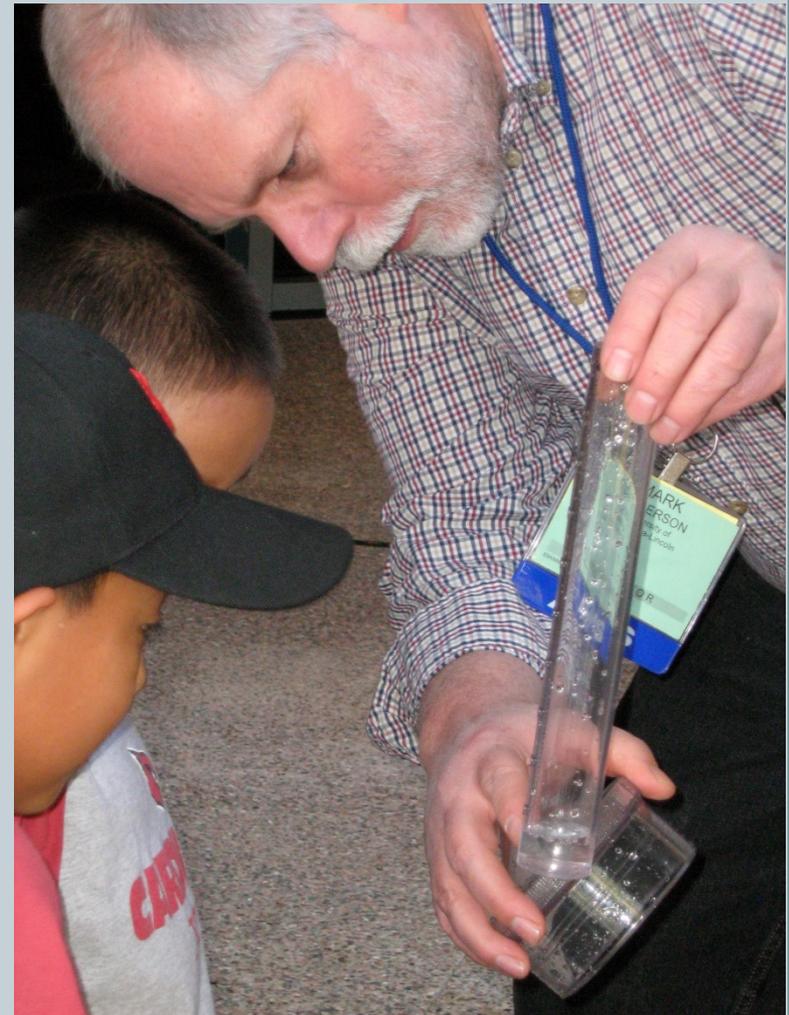
- Sanctuaries' LiMPETS Program has ~5,500 teachers and students along the coast of California collect rocky intertidal and sandy beach data
- Has demonstrated impact on student interest in science and science as a career path



About Learning...

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- The CoCoRaHS Network, a two time Environmental Literacy Grants recipient, has 20K+ active volunteers collecting precipitation data
- Recent evaluation found:
 - participating students made gains in their science skills
 - these students were more likely to aspire to a career in STEM
- Teacher stated: “That’s all my kids talked about ... They were so excited to think that ... what we record every day matters.”



When Last we Spoke (April 2014)

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- **Discussed the formation of the NOAA Citizen Science Community of Practice, and ideas for expansion and its focus on:**
 - compiling and sharing best practices,
 - sharing resources, and
 - creating a searchable database of NOAA's citizen science projects.
- **Highlighted need for an online collection of NOAA citizen science projects**
- **Touched on what other agencies were doing and how we might collaborate with them**
- **Introduced Obama Administration's call for expanded use of citizen science in the Open Government Directive**

Call for Federal Citizen Science and Crowdsourcing Getting Louder

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Accelerating Citizen Science and Crowdsourcing to Address Societal and Scientific Challenges

- Memo issued by Dr. John Holdren on September 30th
- Outlines principles that agencies should apply to citizen science and crowdsourcing initiatives
- Directs agencies to:
 - a. identify an agency coordinator for citizen science and crowdsourcing projects; and
 - b. catalog agency-specific citizen science and crowdsourcing projects on a government-wide online database and website — to be developed by the General Services Administration (GSA)
- Recommends agency actions to build capacity for citizen science and crowdsourcing
- Provides examples of successful completed and ongoing applications of citizen science and crowdsourcing at Federal agencies (2 NOAA projects, plus GLOBE)

<https://www.whitehouse.gov/blog/2015/09/30/accelerating-use-citizen-science-and-crowdsourcing-address-societal-and-scientific>

Call for Federal Citizen Science and Crowdsourcing Getting Louder

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The Crowdsourcing and Citizen Science Act of 2015

- Introduced in late September
- Provides clarification to government agencies, removing ambiguity about whether an agency can use citizen science crowdsourcing techniques
- Senator Coons (D-DE) and Senator Daines (R-MT) co-sponsored the bill.
- Public briefing featured Nolan Doesken of CoCoRaHS as one of four panelists

<http://coons.senate.gov/download/?id=063AEFE6-CB5C-42FD-8FD6-57F58BD1AC5B>

Some FY15 NOAA Activities

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- NOAA Citizen Science Community of Practice membership exceeds 160 people
- Webinar on evaluation best practices
- Supported the *Tracking a Changing Climate with Citizen Science Forum*
 - Keynote address by NOAA Chief Scientist Dr. Spinrad
- Presentations and in-person meeting at the inaugural Citizen Science Association Conference
- Installed a rain gauge in the First Lady's Kitchen Garden
 - Dr. Sullivan did a live TV interview with Al Roker
- Awarded a gold star for Crowdsourcing apps by DigitalGov
- Projects featured in a Mini Page edition focused on citizen science

More FY15 NOAA Activities

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- **Supported the creation of the Federal Citizen Science and Crowdsourcing Toolkit**
- Participated in visioning retreat for the Federal Community of Practice for Crowdsourcing and Citizen Science
- Participated in a White House Forum to advance citizen science and crowdsourcing
 - WH blog featured mPING as the example of successful implementation
 - Dr. Holdren's opening remarks covered learning outcomes from CoCoRaHS
- **Created an online catalog of projects in the publicly-accessible Database of Federal Crowdsourcing and Citizen Science Projects**
- Ran a call for photos from our projects w/ submissions from 13 projects
- Created a new web page:
http://www.oesd.noaa.gov/leadership/citizen_sci.html

Federal Crowdsourcing and Citizen Science Toolkit

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- Helps Federal agencies design, carry out, and manage citizen science and crowdsourcing projects
- Collaboration between OSTP and the federal community of practice
 - NOAA participated in design workshop and content creation teams
 - led the *Build a Community* team
- All content went through robust editing process, user testing, and General Council review
- 3 of the 21 case studies of successful implementation are from NOAA



Federal Crowdsourcing and Citizen Science Toolkit, Continued...

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<https://crowdsourcing-toolkit.sites.usa.gov>

enter search terms



Federal Crowdsourcing and Citizen Science Toolkit

HOME HOW TO CASE STUDIES RESOURCE LIBRARY LAW AND POLICY

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

Database of Federal Crowdsourcing and Citizen Science Projects

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36 NOAA projects entered since September

<https://ccsinventory.wilsoncenter.org>

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

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AGENCIES

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[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)

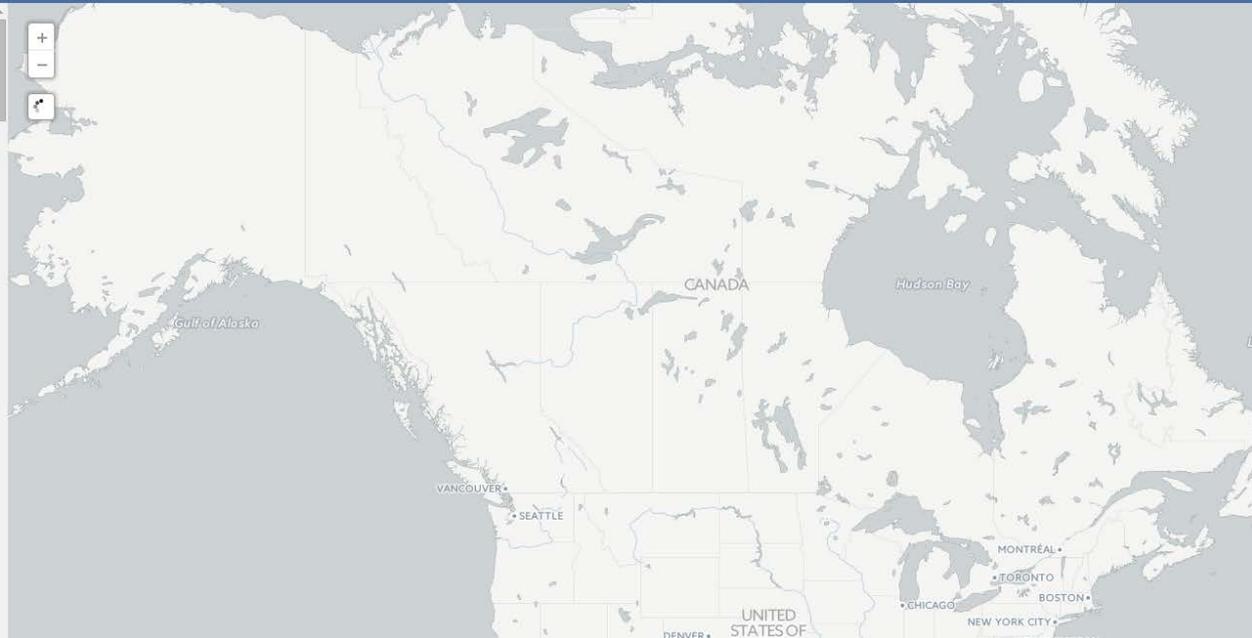
[Coastal Observation And Seabird Survey Team \(COASST\)](#)
by National Oceanic and Atmospheric Administration (NOAA), National Science Foundation (NSF)

[Common Loon Citizen Science Project at Glacier National Park](#)
by U.S. National Park Service (NPS)

[CrowdHydrology](#)
by U.S. Geological Survey (USGS)

[CrowdMag](#)
by National Oceanic and Atmospheric Administration (NOAA)

[Cyclone Center](#)
by National Oceanic and Atmospheric Administration (NOAA)

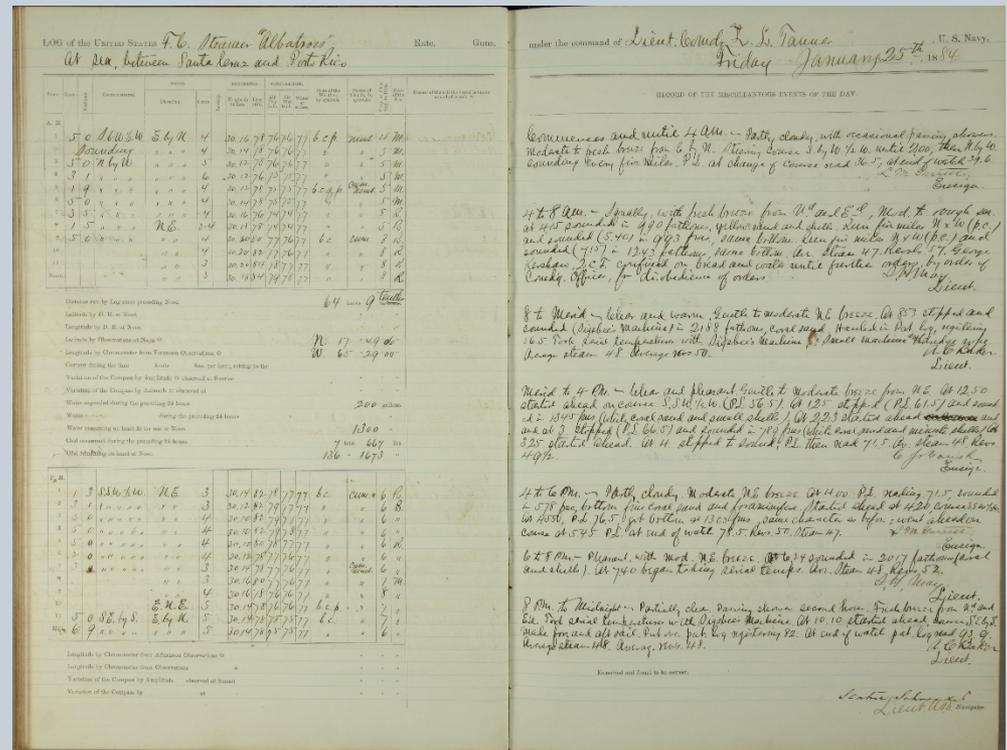


Old Weather: Our Weather's Past, the Climate's Future

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Old Weather Project - <http://oldweather.org>

- Historical weather data recovered from digitized ship logs, mid 1800s-1900s
- Citizen scientists transcribe weather data to be used in models of historical data
- Many types of info (weather, historical, wildlife, cultural)



Old Weather – Project metrics to date

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- **20,760** people have transcribed at least 1 full page
- In total, Old Weather volunteers have transcribed **7,599,288** weather observations from **1,279,878** pages
- This translates to **2,519,762** quality-controlled records; **1,844,347** records have been transferred into the International Comprehensive Atmosphere Ocean Data Set
- **Volunteers from many countries**
 - e.g. Australia, Great Britain, Canada, Poland, Netherlands, Germany, Italy, France, Russia, U.S.A.

Education Connections

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- Citizen science – learning by doing
- Arctic Rediscovery Project –
<http://www.pmel.noaa.gov/arctic/rediscover/index.html>
 - Arctic records of Old Weather project – weather, sea ice
 - Student projects – internships in digital imaging, historical research, document preservation, web-based research tools; comparison of historical and modern temperature measurement methods
 - Photo gallery
- Connections to local communities in Alaska

Old Weather: Whaling

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- New sister project to be released October 22
- Arctic logs from whaling ships – 23 voyages from 1857-1907
- Partnerships with New England Whaling Museums
- Potential for local Alaska connections



Old Weather contacts and info

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- Kevin Wood, U.S. Old Weather-Arctic lead investigator – kevin.wood@noaa.gov

University of Washington Joint Institute for the Study of the Atmosphere and Ocean; NOAA Pacific Marine Environmental Laboratory

- Old Weather is a collaboration of many team members:
<http://www.oldweather.org/team>
- Great videos on why scientists need to enlist the help of the public
http://www.oldweather.org/why_scientists_need_you

SoundToxins Project

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- Diverse partnership of Washington state shellfish and finfish growers, environmental learning centers, Native American tribes and Puget Sound volunteers
- Monitoring program (weekly sampling at 31 sites) to provide early warning of harmful algal bloom events in Puget Sound
- Funding:
 - NOAA Fisheries/Northwest Fisheries Science Center
 - Environmental Protection Agency
 - Washington Department of Ecology
 - Initially funded as part of the NOAA Oceans and Human Health Initiative
- Contacts: Dr. Vera Trainer – vera.l.trainer@noaa.gov
- Teri King, Jennifer Runyan – soundtox@uw.edu



Pseudo-nitzschia spp. – produces domoic acid



Alexandrium catenella
– causes Paralytic Shellfish Poisoning

Other Successful Regional Citizen Science Programs

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- **Puget Sound Seabird Survey**

- Tracks occurrence of 18 seabird species at 62 sites around Puget Sound, October through April
- Coordinated by Seattle Audubon Society – tobyr@seattleaudubon.org



PSST volunteers

- **COASST – Coastal Observation and Seabird Survey Team**

- Developed to address conservation questions and establish baseline monitoring; program started in 1999
- 300+ beaches in CA, OR, WA, AK; 500+ volunteers
- Survey for beached birds, marine debris, and sea stars
- Data used for a wide variety of science and management projects; also expanding through sister programs
- Contact: Julia Parrish – jparrish@u.washington.edu



Horned puffin, 2/27/05
Barbara and Mike Patton, COASST

Proposed Next Steps

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- **Renew focus on supporting the NOAA Citizen Science Community of Practice**
 - Please continue to spread word (email John to join)
- **Collaborate with Chief Scientists Office to identify gaps in our agency's research portfolio where citizen science and crowdsourcing can play a role**
- **Host a series of brown bag talks to highlight our portfolio of projects and build awareness**
- **Participate in first National Citizen Science Day (April 16, 2016)**
- **Other ideas/suggestions?**