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Citizen Science

An overview in the Sciences with emphasis on
Geosciences & including some specific
USGS projects

Louise Deis, Science & Technology Reference Librarian



PRINCETON UNIVERSITY

Definitions:

Citizen Science -- “Citizen science is the practice of public participation and collaboration in scientific research to increase scientific knowledge. Through citizen science, people share and contribute to data monitoring and collection programs. Usually this participation is done as an unpaid volunteer.” <https://www.nationalgeographic.org/encyclopedia/citizen-science/>

Crowdsourcing – term coined from crowd and outsourcing : “the practice of obtaining needed services, ideas, or content by soliciting contributions from a large group of people and especially from the online community rather than from traditional employees or suppliers”
<https://www.merriam-webster.com/dictionary/crowdsourcing>

“Citizen Participation refers to the process of providing private individuals an opportunity to influence public decisions.” <https://www.igi-global.com/dictionary/participation-informing-transforming-local-government/3832>

Reference from earlier GSIS meeting:

GETTING DOWN AND DIRTY: CITIZEN INVOLVEMENT IN SCIENCE poster by Cynthia Prosser and Monica Pereira

Presented at the 125th Annual Meeting of GSA, Denver, CO, October, 2013

<https://gsa.confex.com/gsa/2013AM/webprogram/Paper225183.html>

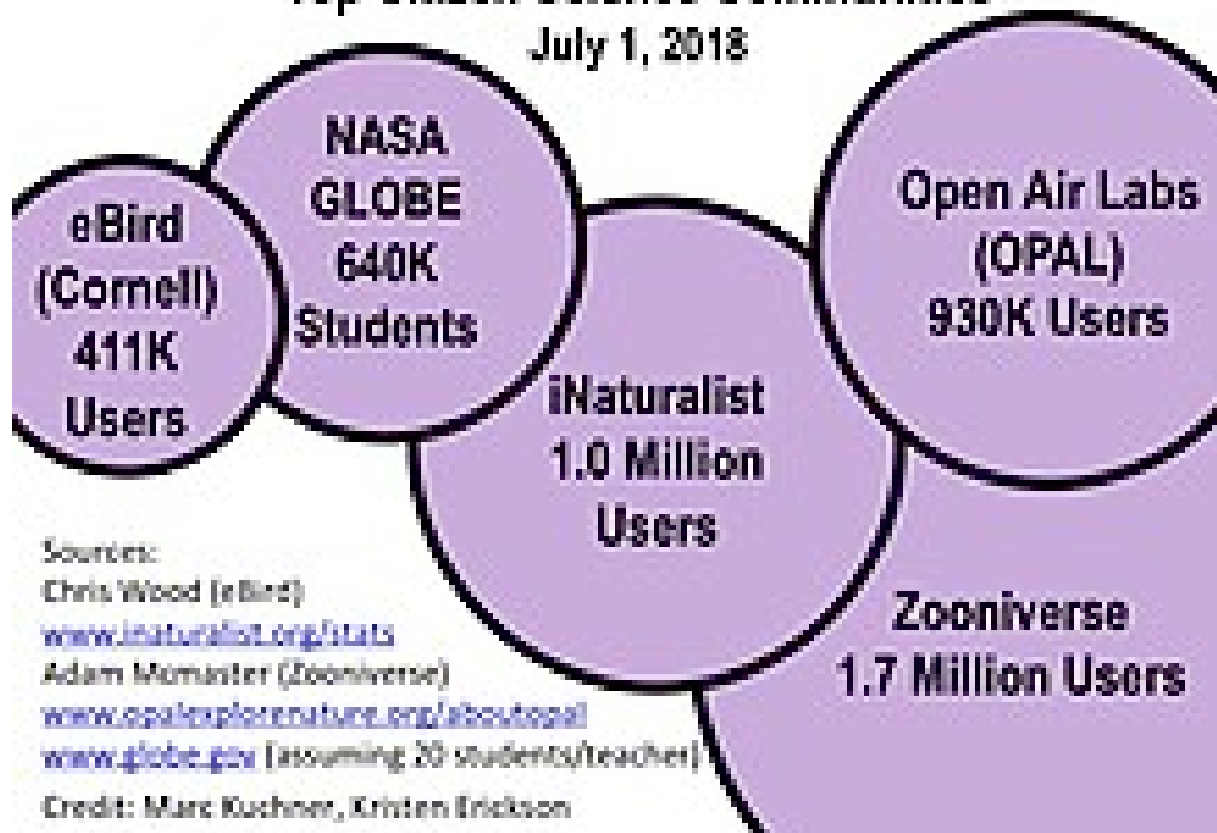


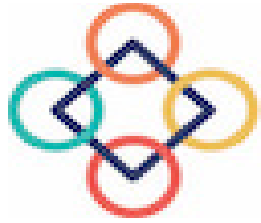
Wikipedia

https://en.wikipedia.org/wiki/Citizen_science

Date accessed 1/10/2019

Top Citizen Science Communities July 1, 2018





citizenscience.gov

“Through citizen science and crowdsourcing, the federal government and nongovernmental organizations can engage the American public in addressing societal needs and accelerating science, technology, and innovation.”

- [Crowdsourcing and Citizen Science Act of 2016 \(15 USC 3724\).](#)

MarciveWeb documents

- **Citizen Service Act of 2002 [electronic resource].**
- Author: [United States. Congress. House. Committee on Education and the Workforce \[Browse\]](#) Format: Book Language: English Published/Created: Washington : [s.n.], 2002. Description: 183 p. : digital, PDF file. Series: H. Rpt. 107-521 Notes: Record is based on bibliographic data in ProQuest U.S. Serial Set Digital Collection (last viewed June 2011). Reuse except for individual research requires license from ProQuest, LLC. Reproduction note: Electronic resource. [Bethesda, Md.]: ProQuest, 2011. (ProQuest U.S. Serial Set Digital Collection : no. 14782 H.rp.521). References: ProQuest U.S. Serial Set Digital Collection Subject(s):
 - [Federal aid to education \[Browse\]](#)
 - [Public service employment \[Browse\]](#)
 - [Youth \[Browse\]](#)
- SuDoc no.: Y 1.1/8:107-521
- Text <http://purl.access.gpo.gov/GPO/LPS21160>
- PDF <http://purl.access.gpo.gov/GPO/LPS21161>



This catalog currently lists 425 projects in citizen science and federal crowdsourcing.

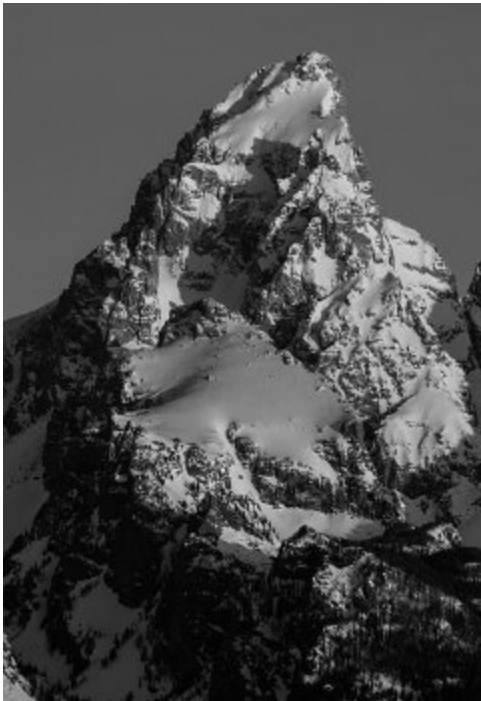
At right is an example of a project which involves photography. Anyone visiting the park is encouraged to snap photos in all (9) directions, including up, for cloud cover. This helps to document conditions which might be changing and thus explaining any deviations in the Wood Thrush's ideal summer home for nesting.

- National Park Service Rock Creek Park



Grand Teton National Park

Students and teachers can connect via the internet with Park Rangers, and view the Park remotely, plan field trips, and obtain curriculum materials.





Join Us

There are two primary groups within the federal government working collaboratively to advance the use of these tools, namely the Federal Community of Practice on Crowdsourcing and Citizen Science (CCS) and the Agency Citizen Science and Crowdsourcing Coordinators.



What is Citizen Science?

[Citizen Science \(Scientific American\)](#)

[Co-Founder of Innocentive Speaks on Challenge Authoring \(GovLab Video\)](#)

[Public Participation in Scientific Research \(Workshop, PDF\)](#)

[What Is Iterative Development? \(IBM, PDF\)](#)

How can I use Citizen Science?

[Choosing the Right Question for Crowdsourcing \(Nature Magazine\)](#)

[Citizen Science Central: Resources for Projects \(Cornell Lab of Ornithology\)](#)

[Citizen Science Central: Toolkit Conference \(Cornell Lab of Ornithology\)](#)

[Designing a Social Change Project \(GovLab Academy\)](#)

[Guide to Citizen Science \(UK Environmental Observation Framework, PDF\)](#)

[Most Participants in Citizen Science Give Up \(ARS Technica\)](#)

[Public Participation in Scientific Research \(Workshop, PDF\)](#)

Serious Games

[EyeWire: A Game to Map the Brain](#)

[FoldIt: A Game to Solve Puzzles for Science](#)

[Gaming for \(Citizen\) Science \(IEEE eScience Conference\)](#)

[Old Weather: Transcribing Ship Logs for Climate Modeling](#)

[What Is Gamification? \(Citizen Cyberlab\)](#)

Funding

[Experiment.com](#)

[Foundation Directory \(Foundation Center\)](#)

[Guide to Online Fundraising Campaigns and Crowdfunding Platforms](#)

[Kickstarter: A Global Crowdfunding Platform](#)

[National Science Foundation Funding and Awards](#)

Project Inventories

[Citizen Science Projects \(Scientific American\)](#)

[CitSci.Org: Resources for Citizen Science project managers](#)

[SciStarter: Project Finder for Citizen Scientists](#)

[Wilson Center Commons Lab: Federal Projects Inventory](#)

[Zooniverse: A Citizen Science Web Platform](#)

Landslides are a serious geologic hazard common to almost every state in the United States. "[Did You See It?](#)" is a crowd sourcing initiative launched by the [U.S. Geological Survey's Landslide Hazards Program](#) to collect data about the occurrence of landslides within the U.S.



National Map Corps

- Ultimately serving to complete topos (topographical maps), volunteers report structures in public use or of public significance in 50 states plus Puerto Rico and the U.S. Virgin Islands.

The National Map Corps



USGS Volunteer Map Editors update points in support of The National Map and US Topo maps.

[TNMCorps Overview](#)

[TNMCorps Project Webpage](#)

[User Guide](#)

[Q&A Community](#)

[Getting Started...](#)

[Contact The National Map Corps Team](#)

[Recongnition & Leaderboards](#)

Tweets by @USGSTNM



The National Map @USGSTNM

Atlantic awarded multimillion dollar contract to support #3DEP: bit.ly/28VACYH
@AtlanticGrp #USGS #lidar



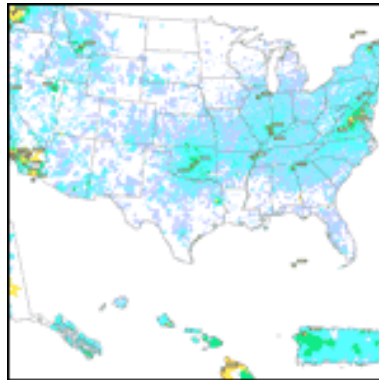
[Embed](#)

[View on Twitter](#)

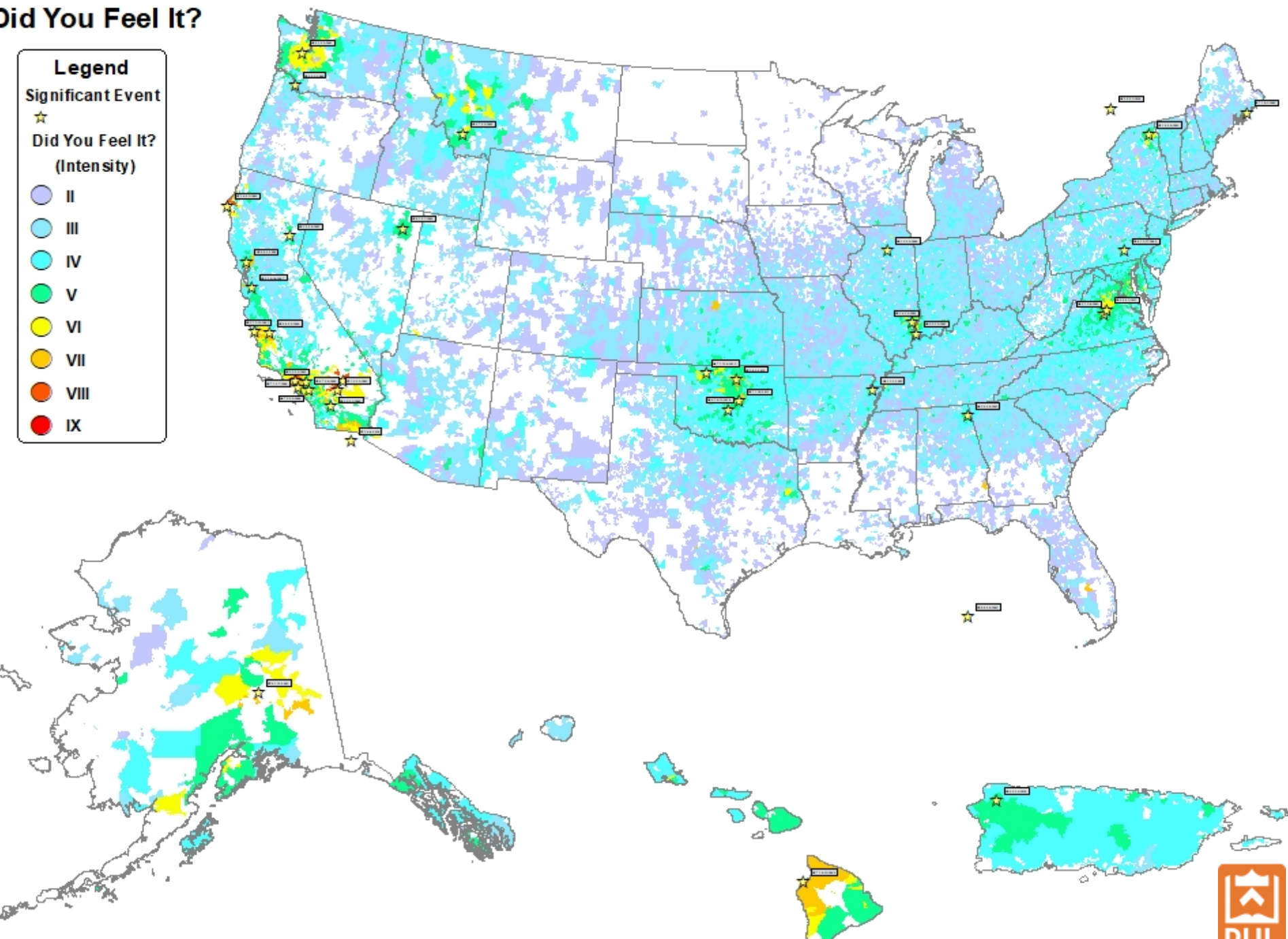


Earthquake Hazards Program -- USGS

- **Summary maps** from around the world, yearly and cumulative...created from people experiencing and reporting earthquakes and damage.
- **NetQuakes** is a program where people or institutions in select urban areas can borrow a digital seismograph to connect to WiFi



Did You Feel It?



<https://www.citizenscience.gov/toolkit/resource-library/#>

Examples of Citizen Science and Crowdsourcing

Web-based Projects

[EyeWire: A Game to Map the Brain](#)

[Galaxy Zoo: A Crowdsourced Astronomy Project](#)

[ISEE-3 Reboot Project: Crowdsourcing Spacecraft Data \(RocketHub\)](#)

[Patients Like Me: A Healthcare Advocacy Project](#)

Community-based Projects

[Community Project, Air Quality Monitoring: Newark, New Jersey \(EPA Video\)](#)

[Community Project, Air Quality Monitoring: South Bronx, New York \(EPA Video\)](#)

[Community Project, Air Quality Monitoring: Tonawanda, New York \(EPA Video\)](#)

Field-based Projects

[Crowdsourcing and Government: Case Studies](#)

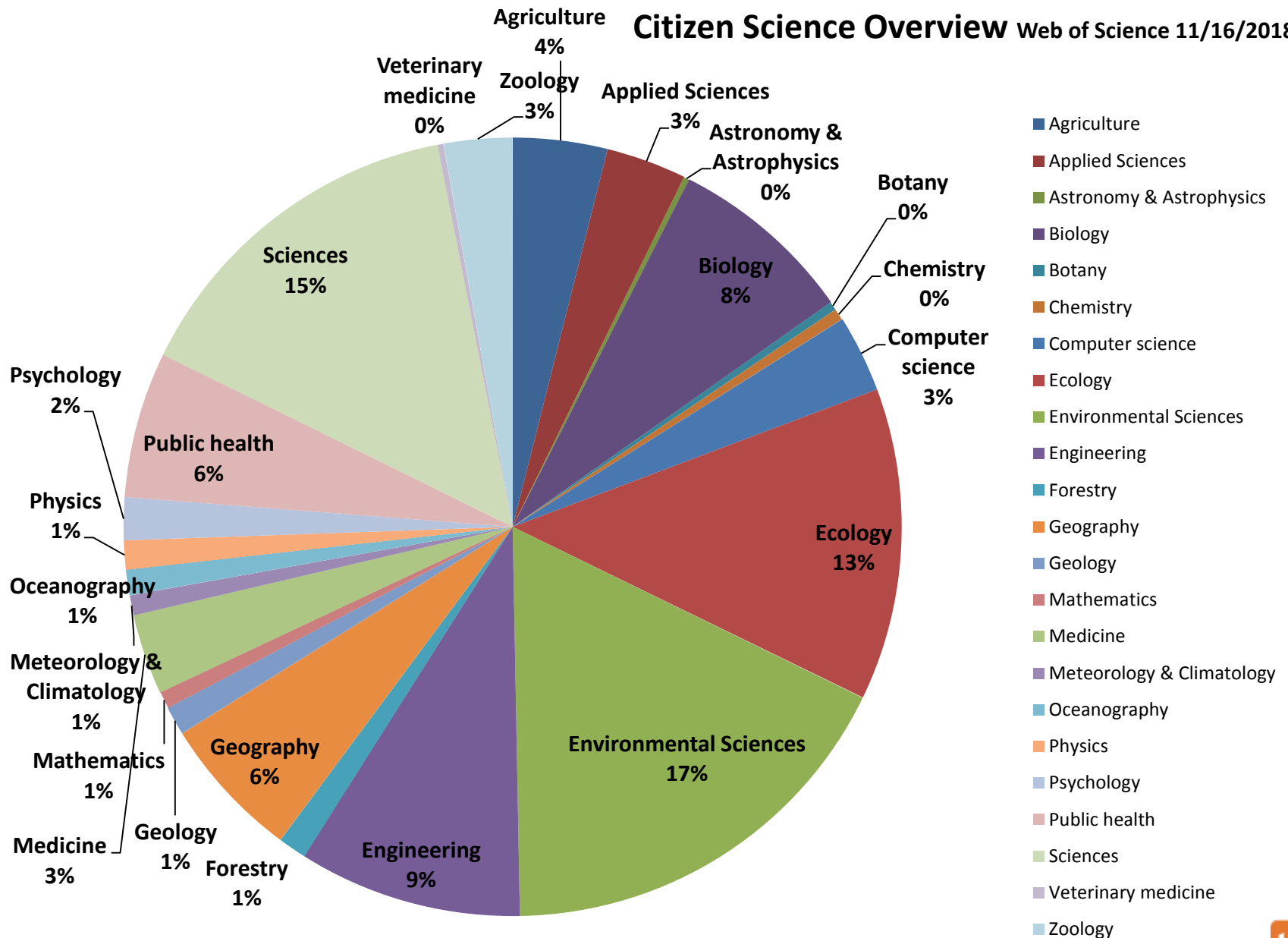
[HHS Uses Crowdsourcing in Booming mHealth Industry \(DigitalGov\)](#)

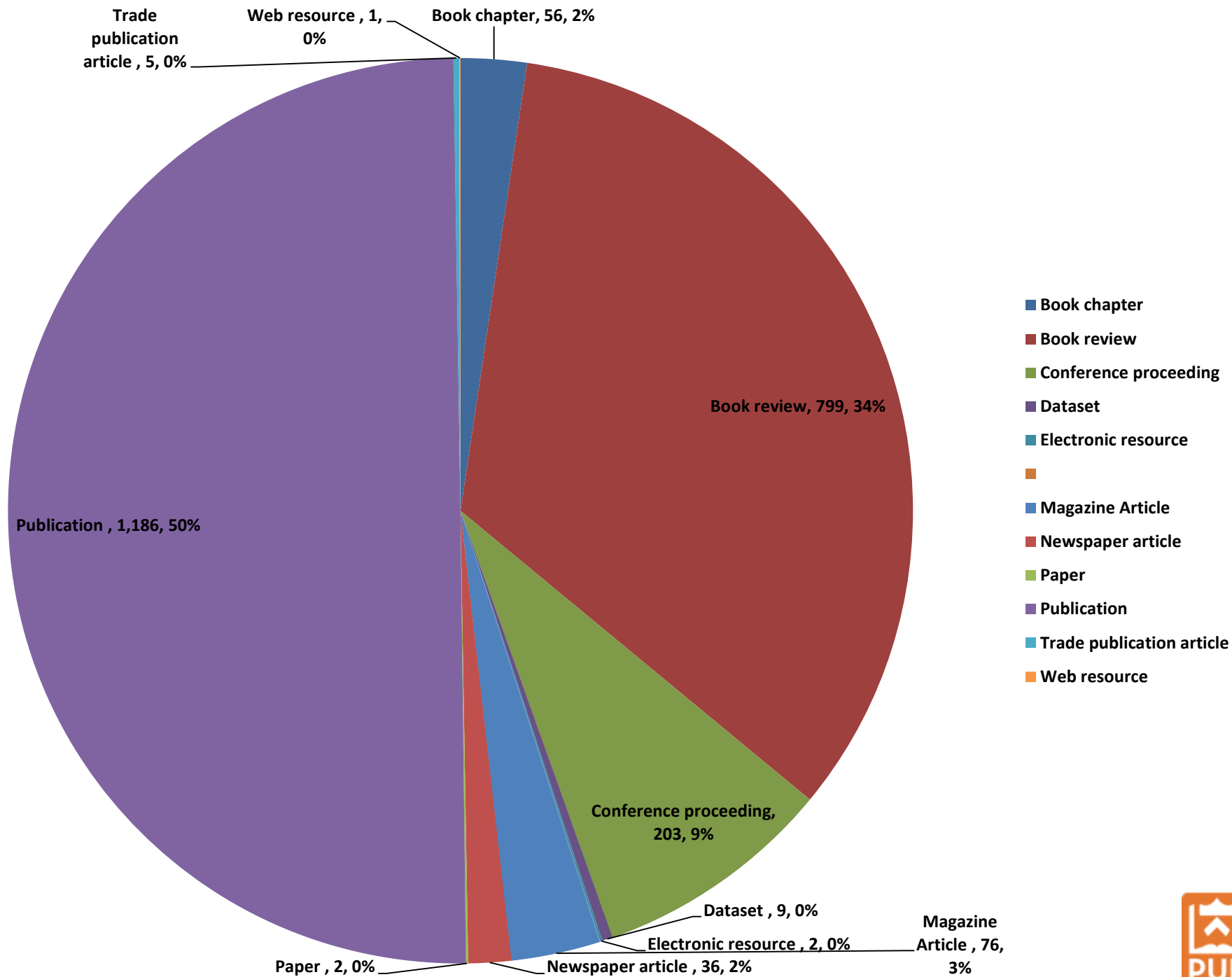
[Neighborhood Nestwatch \(Smithsonian Migratory Bird Center\)](#)

[School of Ants: Project for School Children](#)



Citizen Science Overview Web of Science 11/16/2018





Note: Journal Articles comprised by far the largest portion of formats: 20,210 out of 20,880 or ~97% . The designation “Publications” also includes journal articles, which are not pictured/visualized. See pie chart (above, 2nd) of publication types.

“Funding Agencies” Web of Science

- National Science Foundation 48
- Natural Environment Research Council 19
- Engineering and Physical Sciences Research Council 9
- Joint Nature Conservation Committee 9
- NSF 9 (National Science Foundation)

Search run on “citizen science” in title, only, in both Web of Science and Scopus, 11/2018 (A sampling of funding sources)

Scopus “Funding sponsor”:

- National Science Foundation (NSF) 72
- Natural Environment Research Council (NERC) 12
- Engng & Physical Sciences Research Council 11
- Leon Levy Foundation 8
- Australian Research Council 7
- City, University of London 6
- National Aeronautics and Space Administration (NASA) 6

Field: Web of Science Categories	Record Count	% of 494	Bar Chart
ENVIRONMENTAL SCIENCES	122	24.696 %	
ECOLOGY	96	19.433 %	
BIODIVERSITY CONSERVATION	62	12.551 %	
WATER RESOURCES	56	11.336 %	
MARINE FRESHWATER BIOLOGY	55	11.134 %	
MULTIDISCIPLINARY SCIENCES	34	6.883 %	
GEOSCIENCES MULTIDISCIPLINARY	33	6.680 %	
OCEANOGRAPHY	31	6.275 %	
ASTRONOMY ASTROPHYSICS	30	6.073 %	
REMOTE SENSING	26	5.263 %	

Web of Science Categories continued	Record count	Percentage of 494
ZOOLOGY	17	3.441 %
ENVIRONMENTAL STUDIES	15	3.036 %
FISHERIES	15	3.036 %
GEOGRAPHY PHYSICAL	14	2.834 %
GEOCHEMISTRY GEOPHYSICS	13	2.632 %
GEOGRAPHY	13	2.632 %
METEOROLOGY ATMOSPHERIC SCIENCES	13	2.632 %
COMPUTER SCIENCE INFORMATION SYSTEMS	12	2.429 %
BIOLOGY	10	2.024 %
COMPUTER SCIENCE INTERDISCIPLINARY APPLICATIONS	9	1.822 %
ENGINEERING ENVIRONMENTAL	9	1.822 %
PUBLIC ENVIRONMENTAL OCCUPATIONAL HEALTH	9	1.822 %
ENGINEERING CIVIL	8	1.619 %
EVOLUTIONARY BIOLOGY	7	1.417 %
ORNITHOLOGY	7	1.417 %

Chart above gives statistics for 494 records for **TOPIC:** ("citizen science") **AND TOPIC:** (geology OR geophysics OR geochemistry OR earth OR water OR planet OR rock* OR sediment* OR tectonic OR fossil* OR ocean OR earthquake OR volcano OR mineral OR hurricane OR storm OR flood OR drought OR landslide) Chart shows the top 25 of the 57 categories assigned to records involving citizen science in the Web of Science.

A similar search on title, abstract and keywords in Scopus produced 531 documents:

Environmental Science 253
Agricultural and Biological Sciences 228
Earth and Planetary Sciences 133
Social Sciences 78
Computer Science 63
Engineering 53
Biochemistry, Genetics and Molecular Biology 39
Physics and Astronomy 32
Medicine 20
Multidisciplinary 15; Math 11; Chemistry 9

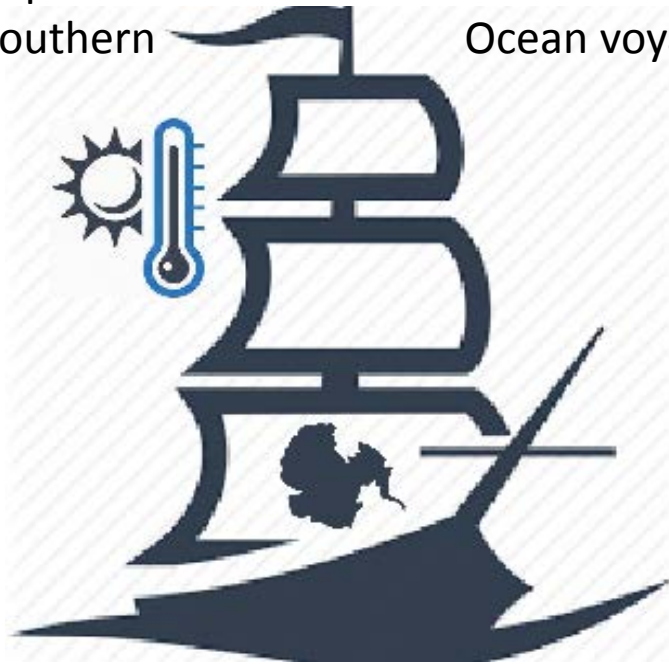
Zooniverse.org Opportunities for everyone! E.G:

Southern Weather Discovery & Fossil Atmospheres, in

which ratios of stomatal to epidermal leaf cells are calculated to determine atmospheric changes
(ginkgo leaf at right)

Southern Weather Discovery

Capture old weather data from historic
Southern Ocean voyages



Solar Storms Protection (Zooniverse)

Identifying severity of solar storms

Getty image <https://www.express.co.uk/news/science/944541/solar-storm-weather-forecast-space-weather-technology> April 2018



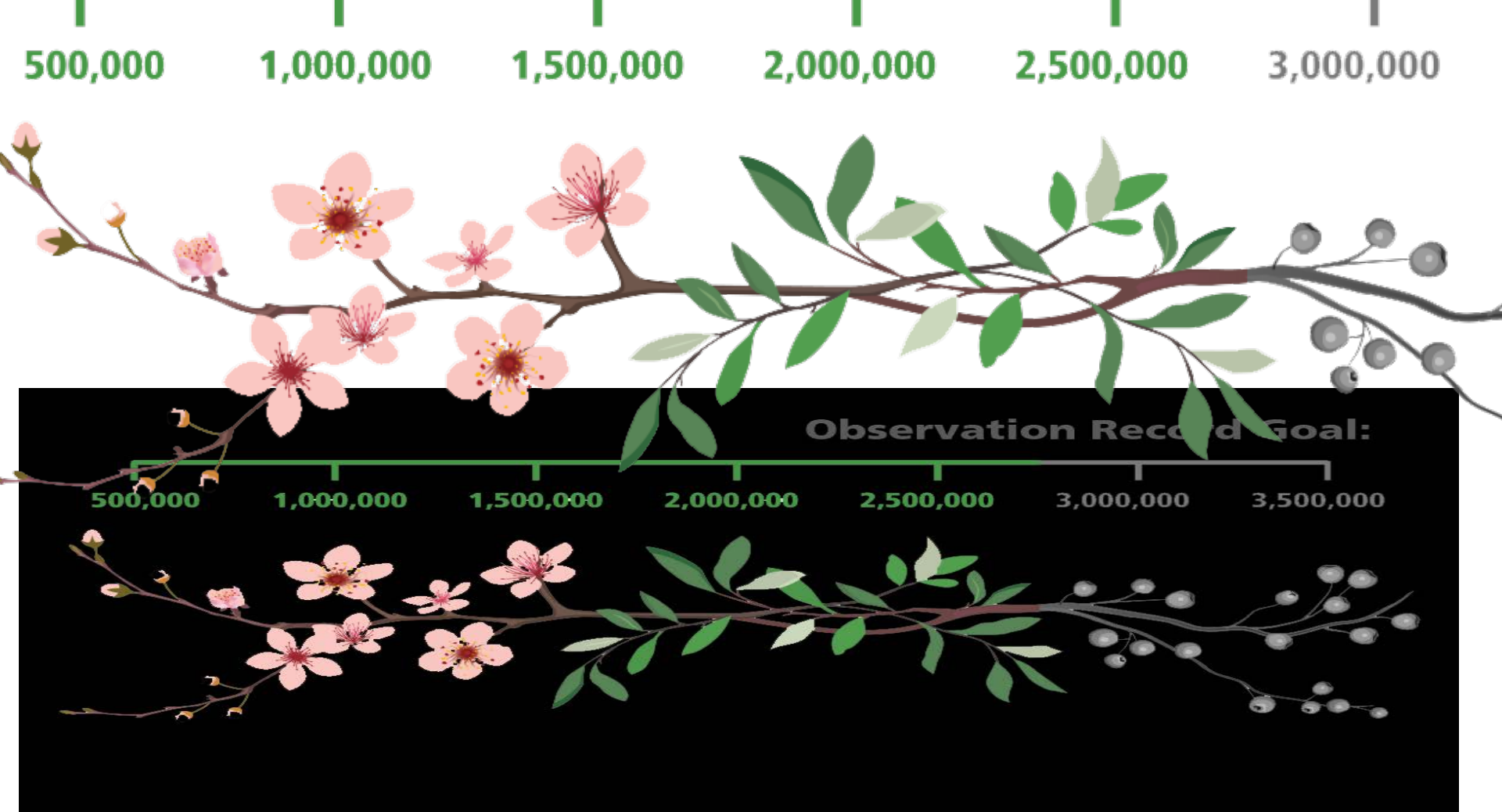
Native Bee Inventory and Monitoring Lab

Patuxent Wildlife Research Center



Volunteer Repeat Photography of glacier loss in Glacier National Park, Northern Rocky Mountain Science Center





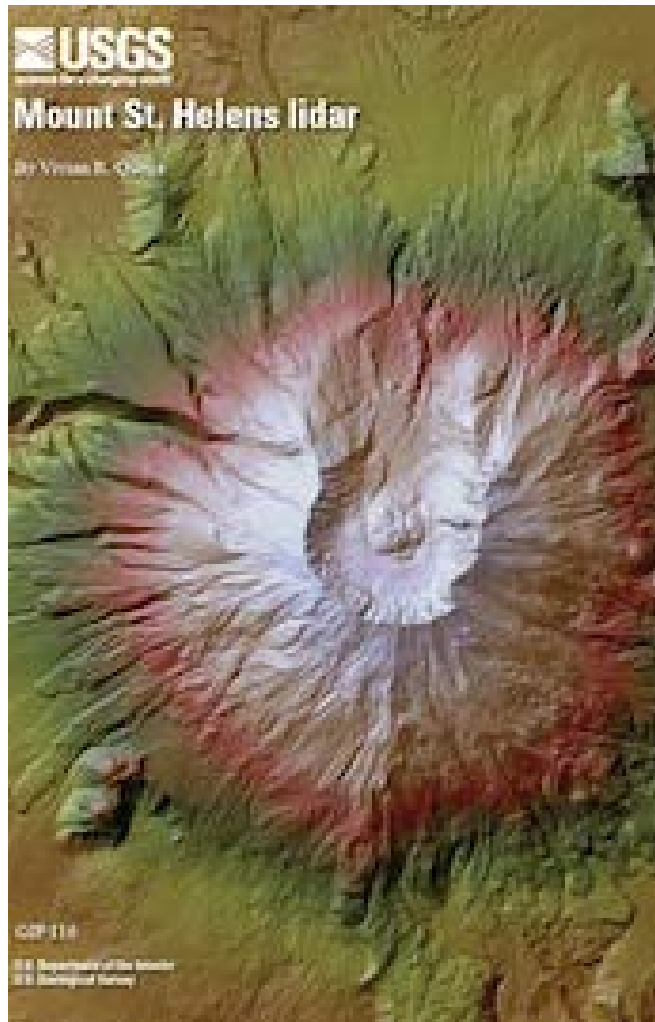
Nature's Notebook is celebrating its 10 Anniversary of phenological observations tracking seasonal changes in plants and animals. There are 1262 species for which protocols exist. U.S. A. National Phenology Network.



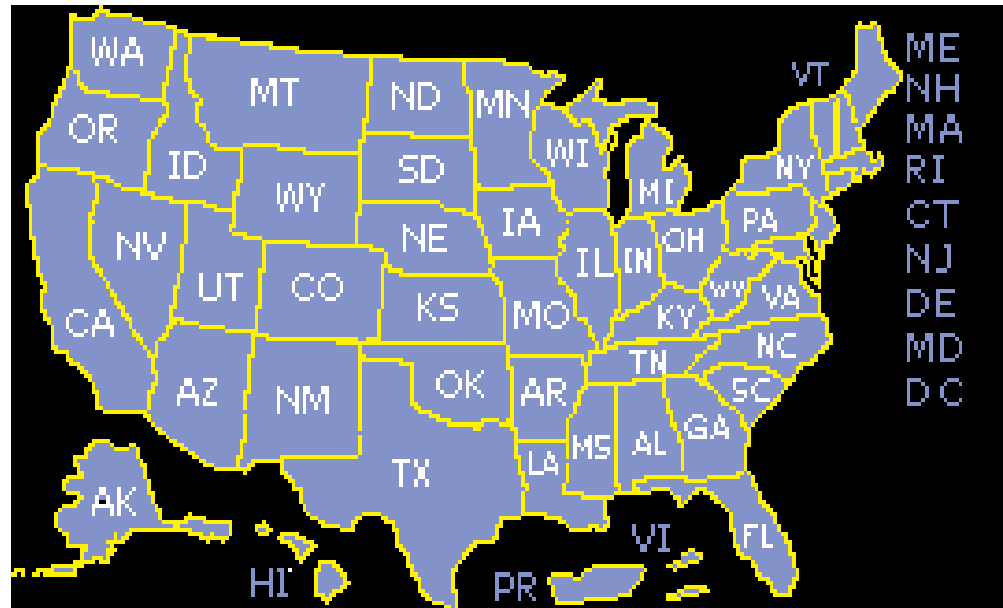
Invasive Plant Atlas of New England



Volunteer.gov



- Partners include USACE, NPS, USFW, BLM, USFS, USGS, NRCS, NOAA, USBR



Project Budburst

The 300 reportable plants are divided into 5 groups: deciduous trees and shrubs, conifers, evergreen trees and shrubs, grasses, and wildflowers and herbs. Phenology deals with timing of natural events. Below: *Aquilegia*

caerulea



North American Breeding Bird Survey

Probably one of the oldest “citizen science” projects is the Annual Christmas Count sponsored by the National Audubon Society. (Photo at left is from <https://www.audubon.org/conservation/science/christmas-bird-count>)





<http://www.worldwatermonitoringday.org/>

Protecting water resources throughout the world:

1,554,534 participants, 146 countries and 77,685 bodies of water

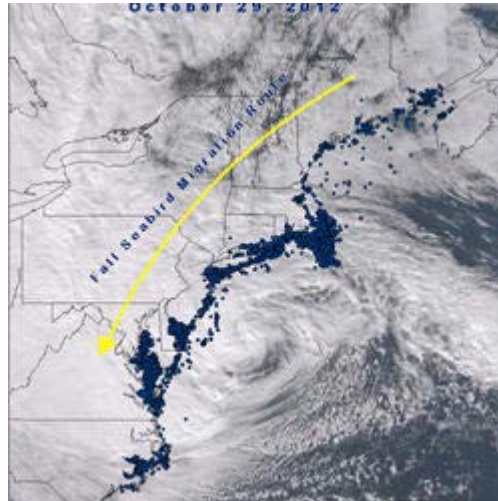
“The EarthEcho Water Challenge (formerly World Water Monitoring Challenge) is an international program that runs annually from March 22 (the United Nations World Water Day) through December and equips anyone to protect the water resources we depend on every day.”

USGS Citizen Science projects

(additional) There are 62 as of Nov. 1, 2018

https://www.usgs.gov/science-explorer-results?es=Citizen+Science&classification=science_project

Estuaries and large river deltas in the Pacific Northwest (left) and at right, Basin Assessments; Hurricanes (center)



Eclipse Megamovie

- <https://eclipsemega.movie>

“The primary goal of the Eclipse Megamovie Project was to produce a high definition, time-expanded video of the total solar eclipse that crossed North America from the northwest to the southeast on August 21, 2017. The [Megamovie video](#) was pieced together from images collected by citizen scientists at various points along the [eclipse path](#). This provided a continuous datasets that far exceeds what any one person could capture from a single location.”

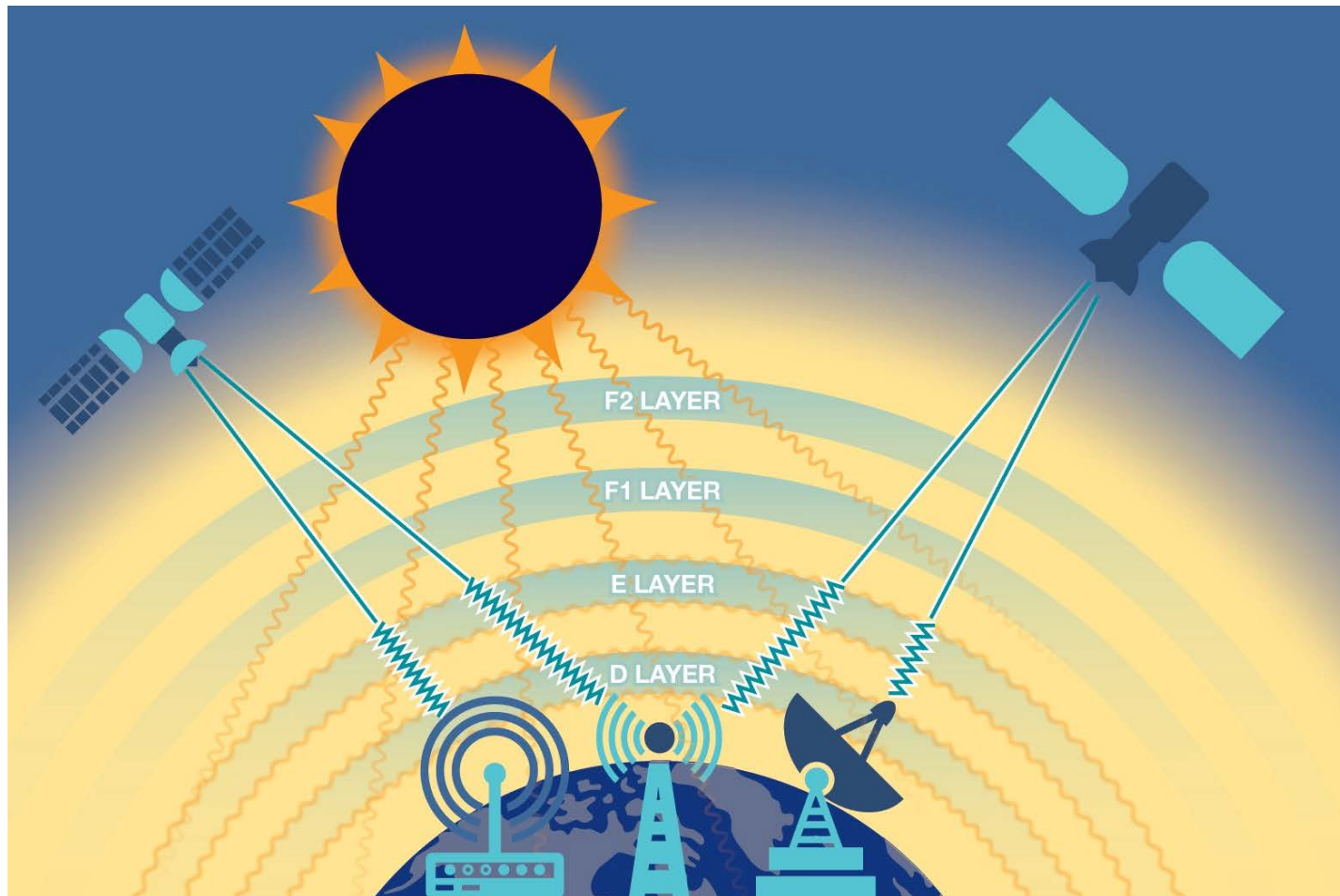
From Samantha Teplitzky, Berkeley
Produced by the Space Sciences
Laboratory.



EclipseMob is a collaborative effort to conduct a crowdsourced measurement of low-frequency radio wave propagation during the August 2017 solar eclipse.

Reported by Shaun Hardy, Carnegie Science, <http://eng.umb.edu/~eclipsemob>

Illustration by Marcia Staimer/George Mason University



<https://scistarter.com/citizenscience.html>

At this site, there is a Tedx talk given by
Dr. Caren Cooper. (18.5 min.)

There is a link to many (1500+) vetted citizen
science projects listed.

Also included are book listings, samples of
research articles, online resources and website
listings.

Accessed 1/10/2019