Citizen Science:
Science Learning to Science Communication? Case of the City Nature Challenge

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What is Citizen Science?

Public Participation in the generation of scientific knowledge

What is Citizen Science?

Members of the public engaging in real-world scientific research:

- Crowdsourcing
- Collaboration
- Community

By any other name…

- Community Science
- Community Based Monitoring
- Pro-Am Partnership
- Volunteer Monitoring
- DIY Science

Models/Typologies of Citizen Science

Contributory Model

- Collect/make observations
- Identify observations

Collaborative Model

- Collect/make observations
- Identify observations
- Analyze data from observations
- Design data collections methods
- Develop explanations

Co-Created Model

- Collect/make observations
- Identify observations
- Analyze data from observations
- Design data collections methods
- Develop explanations
- Define a question / an issue
- Interpret data
- Share conclusions
- Investigate further?

Integrating Citizen Science for Science Learning

What stays the same? What changes?

Closed

Open

Research lab

Contributing beyond the classroom

Organizing others

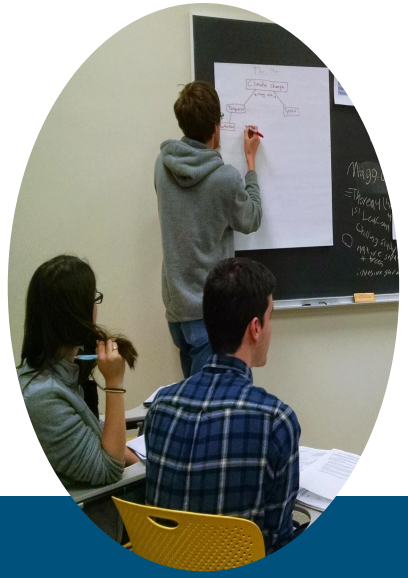
What Changes?

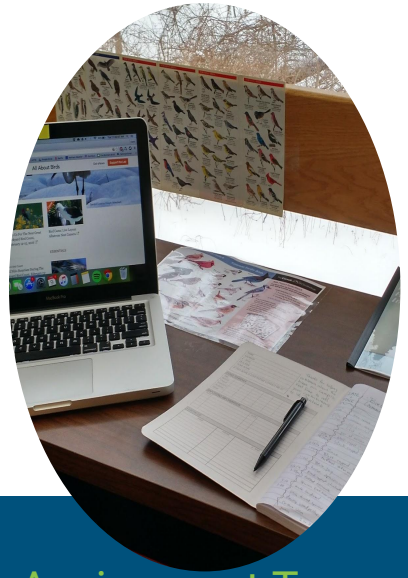
Cultivate a culture where...

- democratization of science is the norm
- open science happens alongside open education
- questions about data and quality are raised because it is science *not* because it is citizen science
- opportunities exist to support students regardless of their majors/minors
- students can connect beyond their discipline and beyond campus

Brandeis Course hosts an iNaturalist ID-a-thon in the campus library

Citizen Science in ***every*** course





Courses:

- EBio33 - Citizen Science
- Biol23 - Ecology
- Biol17 - Conservation Biology
- Biol50 - Animal Behavior
- Bisc11 - Biodiversity Connections

Experiential & Service Learning:

- Do research
- Increase awareness of science contributions today & into the future!
- Work products extend beyond the university

Assignment Types:

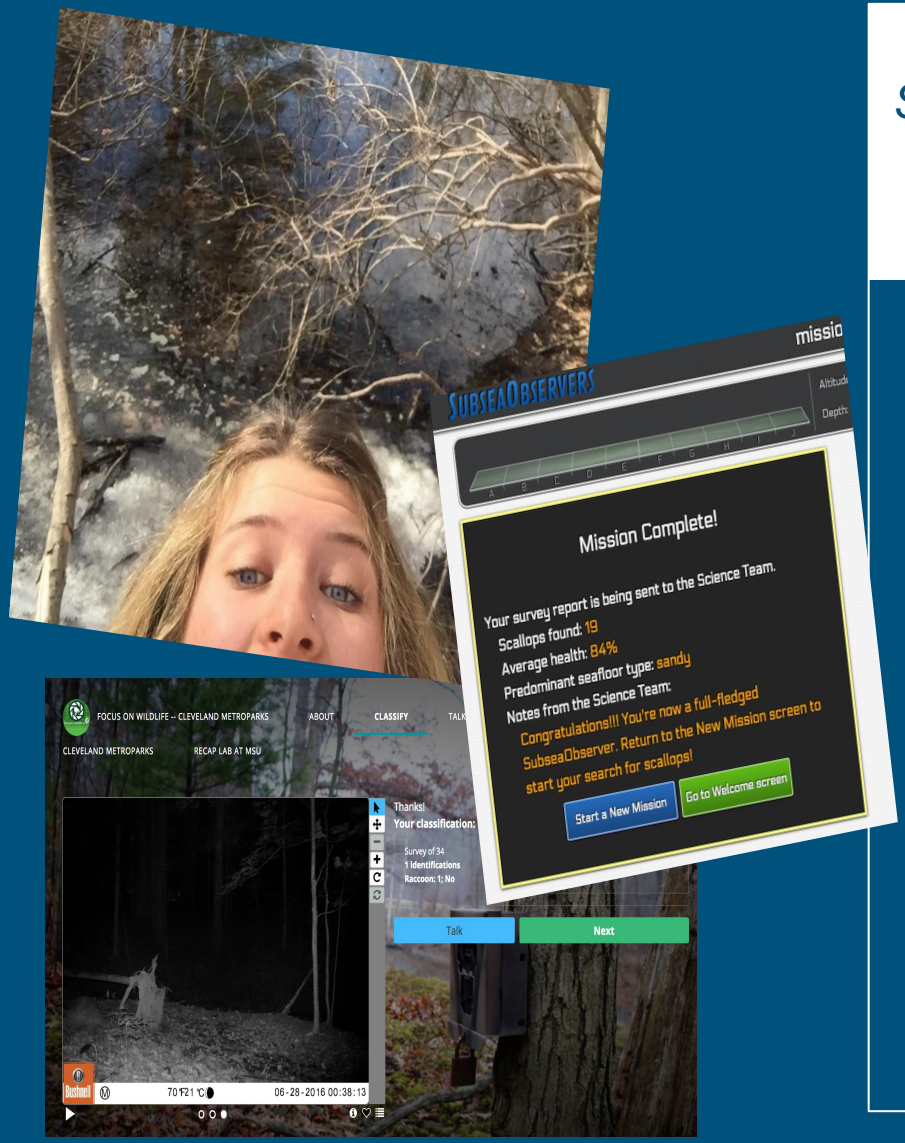
Learning about CitSci & doing CitSci:

- Brief out-of-class or in-class assignments
- Engagement over several weeks
- Semester-long individual or group research

Facilitate CitSci:

- ‘Deis does CitSci

Exploring Citizen Science….



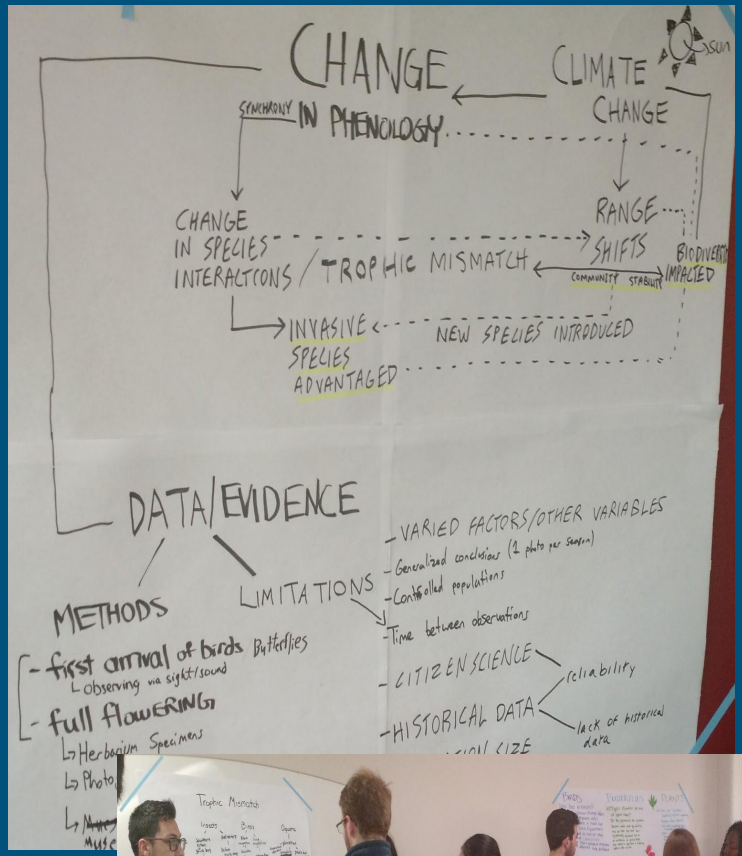
Students ask: What is Citizen Science?

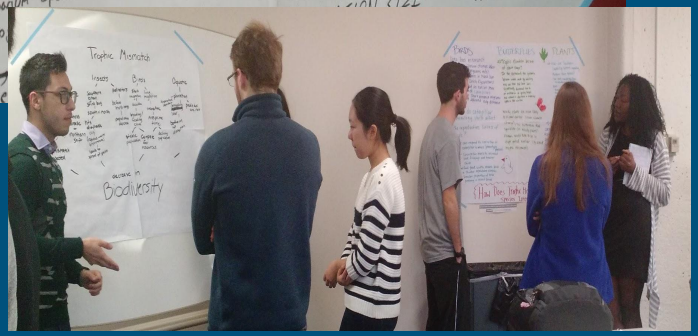
- Learn about CitSci as a science
- Engage in contributory projects
- Question, explore, & discuss
- Reflect on experience

Assignment example:

- Homework & Class Discussion
  - Explore SciStarter
  - Identify and participate in a contributory project
  - Connect experience to course, share, & reflect in class discussion

Complementing Course Content….





CitSci to | Explore Science

- Using examples of CitSci research in lectures
- Doing CitSci to complement content

Assignment Example:

- Campus Phenology Project
  - Semester-long participation in NPN
- Climate Change Jigsaw
  - Explore the primary literature

Professional Development

CitSci for | Professional Development & Mentorship

- Connecting students to the contributions they can make now and into the future
- CitSci to acquire marketable skills
  - Research, science communication, education & outreach

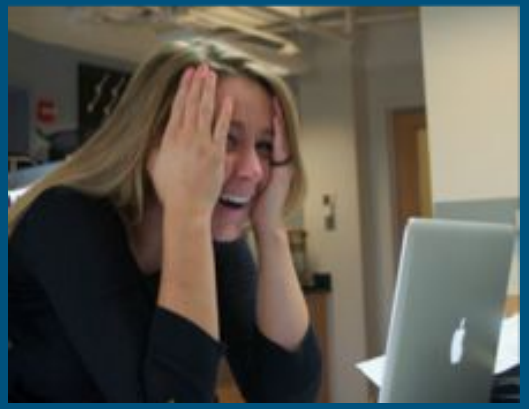
Assignment Examples:

- Partnering with outside organizations
- Bioliteracy Challenge (.. *science identity*)
  - iNaturalist

Citizen Science: Opportunities and Challenges

- What happens when students are evaluated by peers, by citizen scientists, by others? What are the fears that students have?

- What happens when students can see their data within the context of others? What questions can they ask? What questions do they ask?



Citizen Science as:

- An opportunity to collaborate with students and the community to understand how we can **all** contribute to science and education
- Filling the needs of the community

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- Filling the needs of the community

……unexpected outcomes!

Citizen Science as:

- Connecting with organizations and individuals such that student effort supports them
- Moving the results of student effort beyond Brandeis as the consumer of those projects/products being in service to the local, regional or broader community.
- Providing service learning opportunities in citizen science, science communication, community organizing, and outreach

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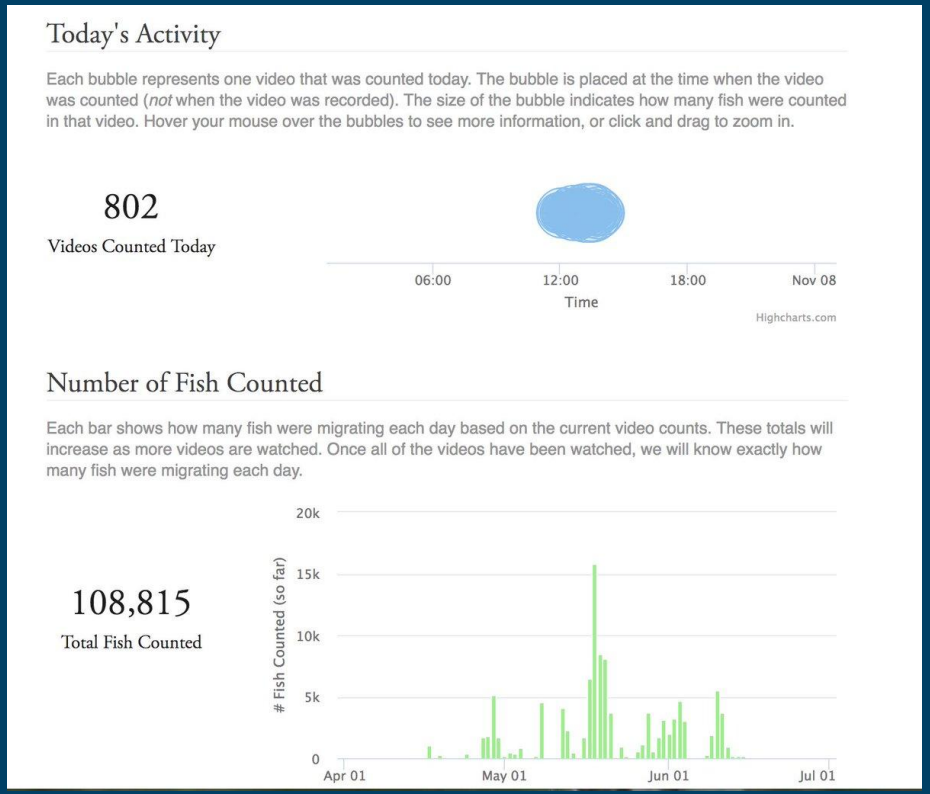
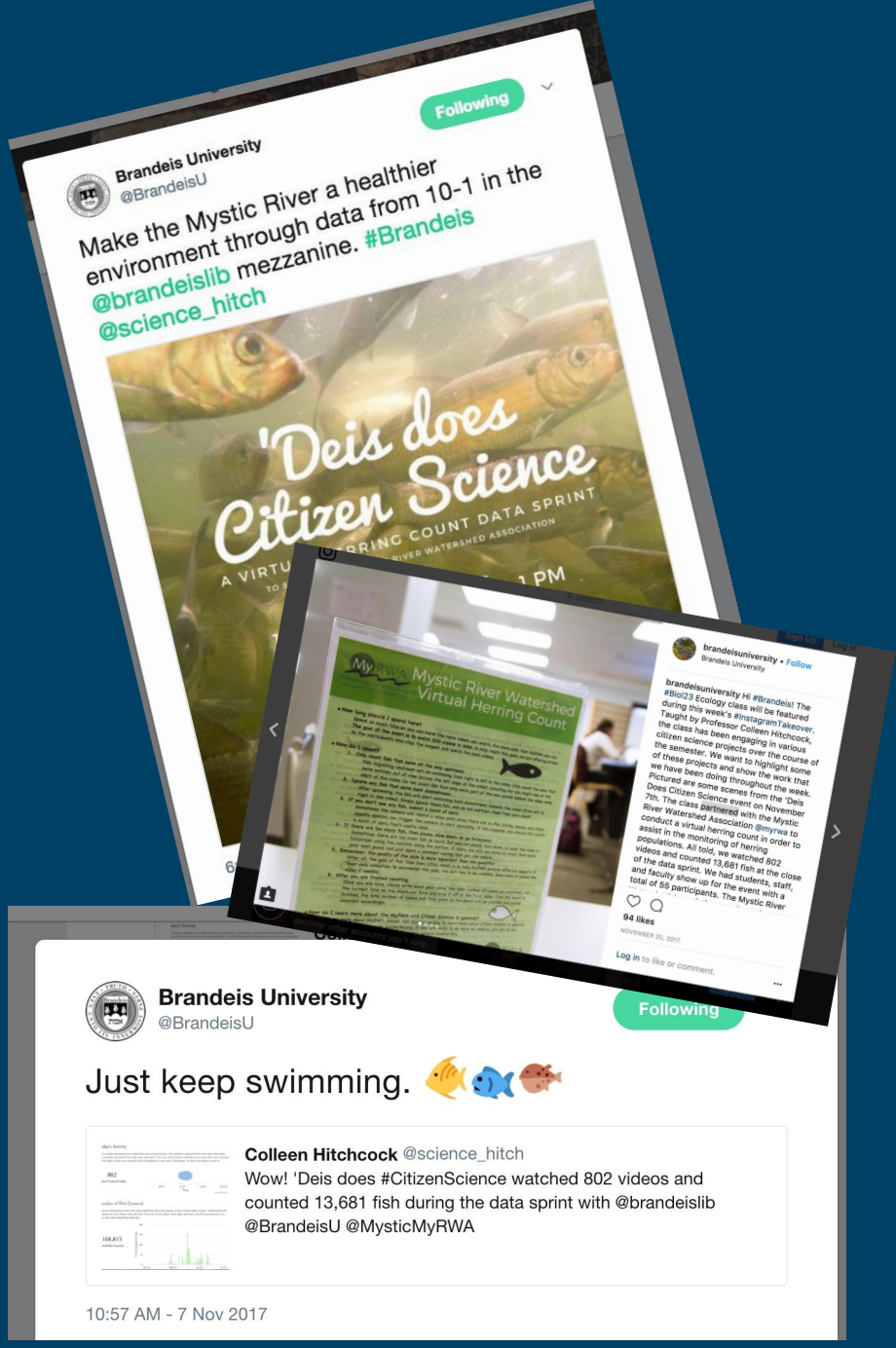


SciComm opportunities from facilitating CitSci

Case of ‘Deis does Citizen Science

- Designing a day of engagement
- Flyer design
- Social media take-over!



SciComm opportunities from facilitating CitSci

Case of City Nature Challenge

- On campus outreach
- Marine Science Center HS Symposium
- Cambridge Science Festival
- Party for the Planet at Zoo New England

Citizen Science to provide lifelong opportunities for learning and research

When my course is over and it is now three to five years later, what would I like to be true about students who have participated in my course?

What do students say?

Personally, I greatly enjoyed this assignment because it is hands-on, forced me outside, but the most amazing part is how aware I became of all the varying wildlife present on our campus. It truly made me appreciate the campus more. … I can really see how citizen science would make it much easier for scientists to complete higher levels of research when they have access to a much greater amount of data.

My other main criticism of citizen science that I remain unsure about is whether it can truly accomplish the goal of inclusivity & democratization. …..Although I freely share my criticisms, I thoroughly enjoyed my citizen science experience and feel that it may be a very powerful tool for the future - I look forward to seeing how citizen science progresses!

Before I started working on this campus phenology project, I had doubts about the credibility of citizen science because it is based on the volunteer researchers. However, after doing research online, I realize that many important scientific research projects have been possible because of the citizen scientist volunteers.

Citizen Science to provide lifelong opportunities for learning and research

I am hoping to go to graduate school and conduct my own research to help inform mitigation, conservation and restoration efforts. I think that citizen science is important to incorporate into that work because it can not only help my research to move forward, but it can also help people to appreciate and understand the importance of ecology and conservation.

- Science Major's reflection after participating in Citizen Science.

Citizen Science to provide lifelong opportunities for learning and research

I definitely find myself looking at birds and using the Merlin app or iNat to find out what they are. I also am more in tune to the biodiversity around me and the different animals/ plants I encounter on a daily basis. It makes me feel more connected and makes me see the world in a different way. I can also see the benefit of children participating in citizen science projects, and if I do have a family in the future, I would have them participate in citizen science projects.

- *Non-science Student's reflection after participating in Citizen Science research.*

City Nature Challenge (CNC)

Celebrating urban biodiversity through an international community competition

CNC: Four-day “BioBlitz”

BioBlitz (n)

A brief, intensive survey of biodiversity over a set area and time

CNC Timeline

April 14-21, 2016
San Francisco vs. LA

→

April 14-18, 2017
16 US Cities

→

April 27-30, 2018
70+ cities worldwide

City Nature Challenge 2018 Boston

Steering Committee

Encyclopedia of Life

MIT senseable city lab

EARTHWATCH INSTITUTE

Environmental Studies Program
Brandeis University

ZOO NEW ENGLAND
Franklin Park Zoo • Stone Zoo

UMASS BOSTON

NEOSEC
New England
Ocean Science
Education Collaborative

City Nature Challenge 2018 Boston


City Nature Challenge 2018
Greenland
Iceland
Finland
Sweden
Norway
Russia
Canada
Ukraine
Kazakhstan
Mongolia
China
South Korea
North Pacific Ocean
North Atlantic Ocean
Turkey
Iraq
Iran
Afghanistan
Algeria
Libya
Egypt
Saudi Arabia
India
Thailand
Mexico
Mali
Niger
Chad
Sudan
Ethiopia
Kenya
DR Congo
Tanzania
Angola
Namibia
Botswana
Madagascar
South Africa
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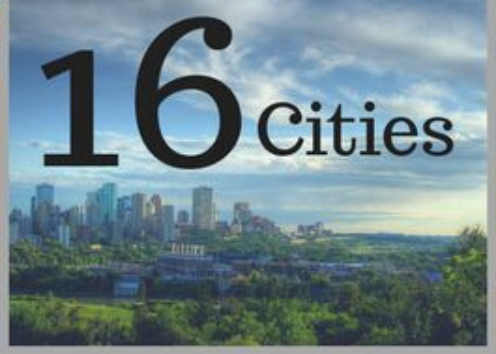
Indonesia
Papua New Guinea
Australia
New Zealand
Colombia
Peru
Brazil
Bolivia
Chile
Argentina
South Atlantic Ocean



City Nature Challenge 2017

Take the City Nature Challenge 2017

April 14 – 18

Event Stats

Totals

126007
Observations »

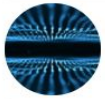
8630
Species »

4293
People »

Most Observations


wbsimey
1145 observations


sambiology
1126 observations


quantron
1108 observations


gcwarbler
1090 observations

natureinla
1065 observations

Most Species


gcwarbler
765 species


anewman
656 species


sambiology
592 species


dpom
541 species


ncowey
529 species

Most Observed Species


Mallard
585 observations

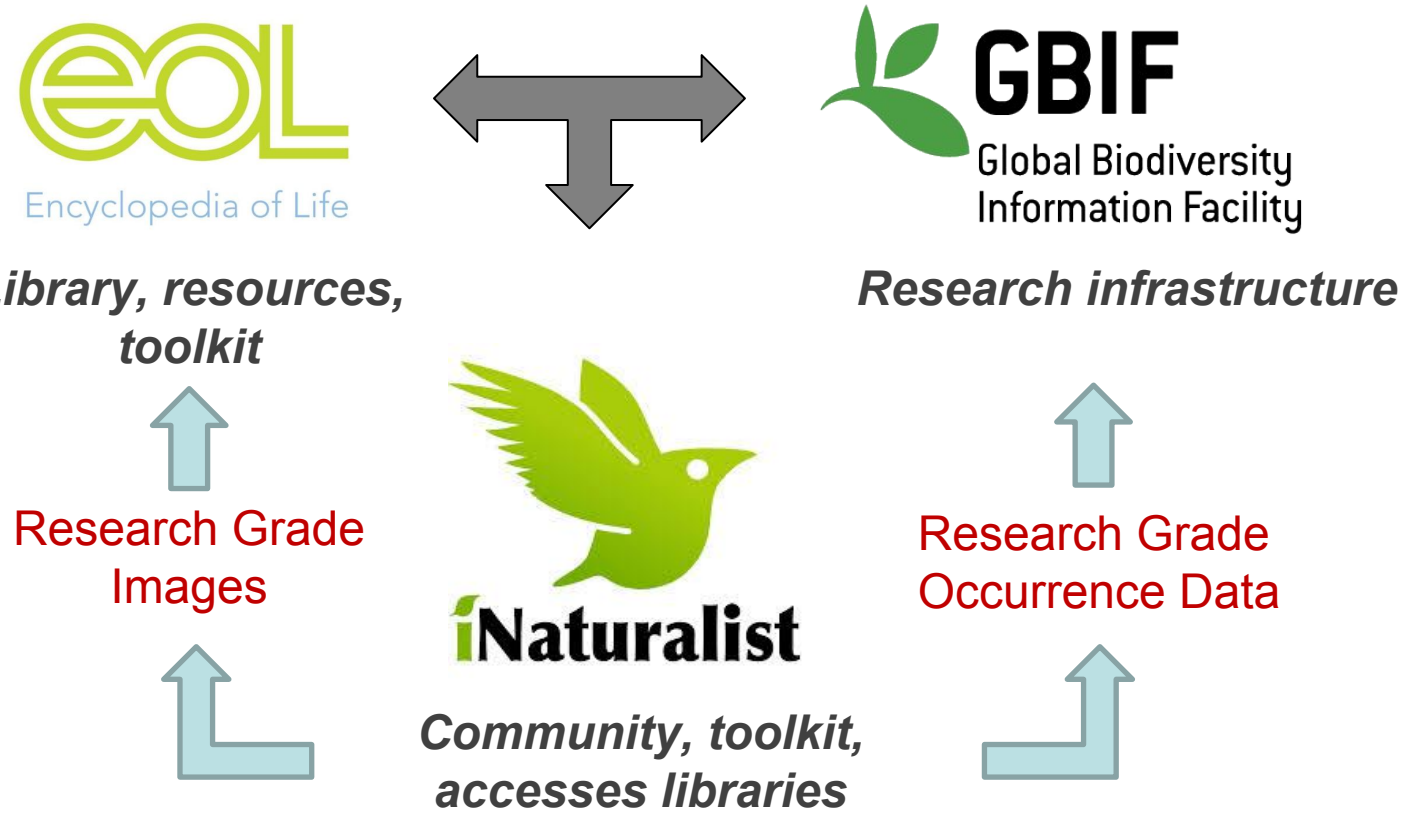

Honey Bee
473 observations


Western Fence Lizard
457 observations


American Robin
440 observations


Fox Squirrel
421 observations

Global biodiversity platforms



2017 Boston area + participation

Event Stats

Totals

3941
Observations »

747
Species »

261
People »

Most Observations

berkshirenaturalist	392 observations
alorenz	286 observations
markchandler	191 observations
neosec	172 observations
sylviascharf	162 observations

Most Species

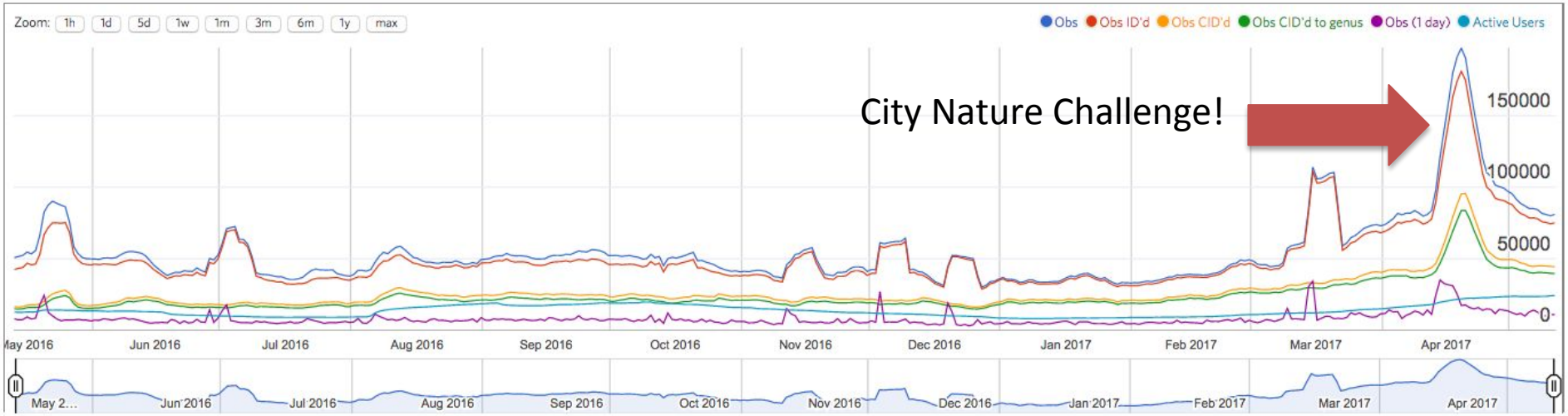
berkshirenaturalist	146 species
bmvig	102 species
alorenz	101 species
kellyfuerstenberg	71 species
nlblock	62 species

Most Observed Species

Canada Goose	60 observations
American Robin	52 observations
Common Dandelion	48 observations
Eastern skunk cabbage	46 observations
Mallard	44 observations

iNaturalist

Observations (1 week moving window)



Vision

By building scientific knowledge and literacy, the **Boston Area CNC** envisions a community that:

- Understands the importance of biodiversity and healthy environments
- Can respond to and monitor a changing environment
- Feels empowered to contribute to civic decisions

Mission

The **Boston Area CNC** aims to increase scientific knowledge by:

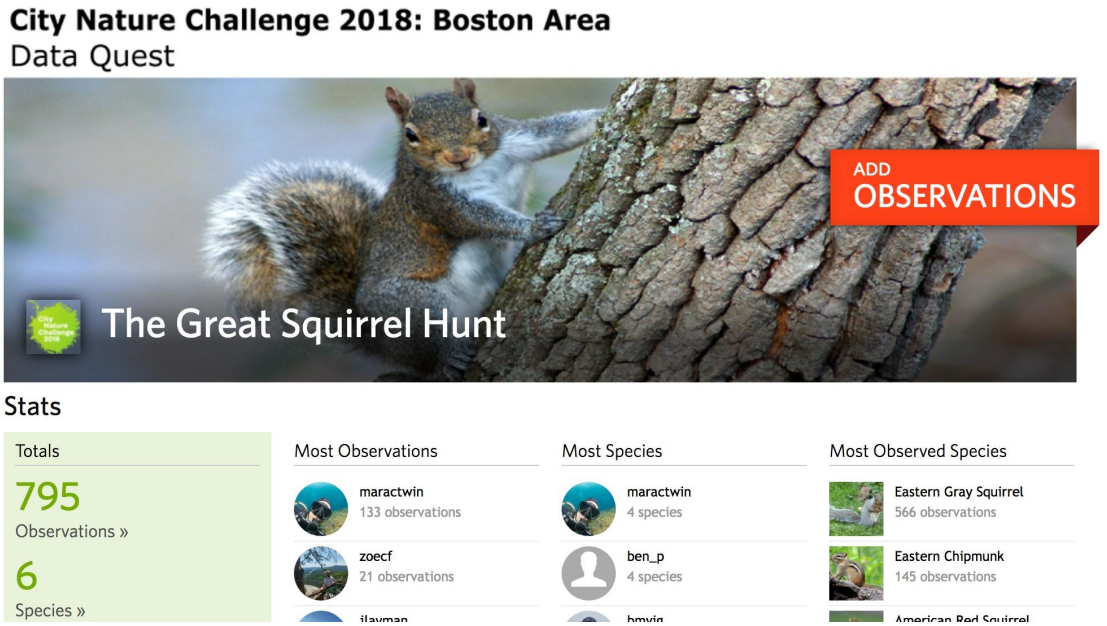
- Building a diverse community of observers, recorders, and biodiversity identifiers (a.k.a. a community of citizen scientists)
- Contributing to and accessing information from open biodiversity platforms to advance research, education, and civic engagement.

2018 Boston Area Goals:

1. Get more people involved - double the amount of participants from 262 to 500.
2. Achieve more observations with a higher percentage of “research grade” observations. Last year 48 % of our 3,945 observations were research grade. This year we hope to have 8,000 observations with at least 50% of the observations be “research grade” quality.
3. Encourage more observations of invertebrates in iNaturalist. Last year, 97 participants observed 215 species of invertebrates. This year we would like to have more than 37% of our observers recording invertebrates.
4. Be able to increase our knowledge about changes in biodiversity along the urban to rural gradient as a result of the data collected in the 2018 CNC.

Data Quests:

1. Spring marvels - vernal wetlands
2. Great squirrel hunt
3. Delightful dandelions
4. Delectable oysters
5. Early flyers
6. Invasive Alert



Welcome to City Nature Challenge 2018: Boston Area

Massachusetts is home to a great diversity of life, from the Berkshires to Boston to the Bay. Join us for the Boston iNaturalist City Nature Challenge – a fun competition with cities across the country to document the most species during April 27 – May 1, 2018. You can participate by joining an event or documenting the plants, animals, and fungi you see anywhere in the greater Boston area with the iNaturalist app. See the map below for the area we will cover.

The Boston City Nature Challenge is organized by Environmental Studies at Brandeis University, UMass Boston, Zoo New England, New England Ocean Science Education Collaborative, Mass Audubon, Encyclopedia of Life at Harvard Museum of Comparative Zoology, MIT Senseable lab, and Earthwatch Institute.

» Members 11 members

The 2018 City Nature Challenge will take place in two parts

Taking pictures of wild plants and animals

Identifying what was found

Thousands of people from across the globe will get outside to look for nature in their cities! Results will be announced on Friday May 4th. Will your city win?

Protect

Around the Globe

Here in New England

Boston Area City Nature Challenge

- Where Can I Go To Observe?
- Data Quests
- Help Validate Observations
- Educator Resources
- Recent Observations
- Calendar of Events

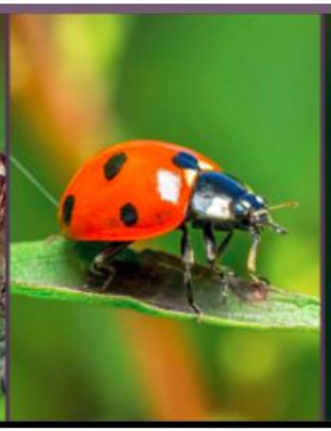
Grassroots Wildlife Conservation

Franklin Park Biodiversity Project

FrogWatch

Neponset River Watershed Association

Inside our Zoos



BOSTON AREA CITY NATURE CHALLENGE

Join us for the Boston City Nature Challenge, a fun competition across the world – 65 cities, 17 countries, and 5 continents – to document the most species from April 27 - 30!

We need people (i.e. you) to help us take observations (e.g. taking photos with your phone) of as many species as possible to record nature in and around Boston. All species count! This information will help create a more accurate picture of Boston's biodiversity. Massachusetts is home to a great diversity of life, from the Berkshires to Boston to the bay. Any observation of plants, animals, fungi, even microbes, in the greater Boston area made during these days will count for the challenge. Scroll down for tips and resources on

Partial list of project partners

- Ocean Bay Girl Scouts (Swampscott)
- Mass Audubon's Boston Nature Center
- Bridgewater State University
- Mystic River Watershed Association
- Harvard Forest
- Stonehill College
- Mount Auburn Cemetery
- Emerald Necklace Conservancy
- Charles River Watershed Association
- The Arnold Arboretum of Harvard University
- MIT Seagrant
- New England Aquarium - live blue Service Corps
- Cambridge Wildlife Puppetry Project
- The Trustees of Reservations
- City of Somerville
- City of Cambridge
- City of Medford
- Swampscott Conservation Commission
- Quincy Park Dept. Environmental Treasures Program
- U.S. Fish & Wildlife Service/Assabet River National Wildlife Refuge
- Salem Maritime and Saugus Iron Works National Historic Sites
- National Park Service
- Boston Harbor Islands National & State Park
- MA Office of Coastal Zone Management

Next Steps: How can *you* help?

- **Learn More:**
  - International CNC website: http://citynaturechallenge.org/
  - Boston Area Overview Website: zoonewengland.org/citynaturechallenge
  - Boston Area Project page on iNaturalist: inaturalist.org/projects/city-nature-challenge-2018-boston-area
- **Social Media**
  - https://www.facebook.com/bostoncnc
  - https://twitter.com/bostoncnc
  - https://www.instagram.com/bostoncnc/
- **Helping with Identifications**

Next Steps: How can *you* help?

- **Helping with Identifications**
- **Become a Social Media ambassador**
- **Become a CNC iNaturalist ambassador**
  - Work during the CNC as Quest Manager
  - Help encourage participants on iNaturalist
  - Help acknowledge participant contributions both on iNat and on Social Media
  - Curate interesting data
  - Make journal posts within iNat