

National Geographic Society FieldScope:

An Online Geographic Information System for Education and Citizen Science

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This material is based upon work supported by the National Science Foundation under Grant No. DRL-1010749. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

What Is FieldScope?

National Geographic's FieldScope is a free online geographic information system that extends tools of exploration to citizen scientists, students, educators, and others. FieldScope puts the tools of exploration and investigation into the hands of students, citizen scientists, and the general public, enabling them to document, analyze, and better understand the world around them thereby allowing a two-way exchange between scientists, and the public.

This project was designed to address the need for more systematic research on the educational and organizational impact of citizen science projects on citizen scientists, student participants and citizen science organizations.



Partners

FrogWatch USA (a program of the Association of Zoos and Aquariums) is a citizen science project that invites individuals and families to learn about the wetlands in their communities and help conserve amphibians by reporting the calls of local frogs and toads. FieldScope is used by all volunteers to upload and view data and supported creation of nationwide network of FrogWatch Chapters.

Project BudBurst (a program of the National Ecological Observatory Network) is a network of volunteers across the United States who monitor plants by collecting important ecological data based on the timing of leaf out, flowering, and fruiting of plants, also known as plant phenophases. All BudBurst data is uploaded to FieldScope to allow volunteers and public to explore data.

Trash Free Potomac Watershed Initiative (a program of the Alice Ferguson Foundation) is designed to address the trash problem with a watershed-wide approach that challenges regional leaders to work collaboratively, brings together stakeholders, and improve awareness in order to shift behaviors. Use FieldScope to see where different types and amounts of trash have been collected around Washington, D.C.

Additional Projects Using FieldScope

- Delaware Bay Water Quality
- Chesapeake Bay Water Quality
- Great Lakes Water Quality
- GLOBE Watershed Dynamics
- Yukon Indigenous Observation Network
- Citizens Restoring American Chestnuts
- NatureBridge
- Mid-Atlantic Sustainable Schools
- North American Reporting Center for Amphibian Malformations
- Washington, D.C. Climate and Urban Systems Partnership
- National Park Service BioBlitz projects:

Project Goals

- Develop FieldScope as a GIS-based platform that enables organizations to engage students and members of the public in educational citizen science projects
- Implement successful FieldScope testbeds
- Develop research and evaluation frameworks for impacts on citizen science organizations and participants
- Develop Geospatial Reasoning Instrument (GRI)
- Build capacity in citizen science partners



Challenges Encountered

- Software development delays limited reach of FieldScope
- Use of FieldScope not of long enough duration to effect change in knowledge, skills, understanding, engagement
- Lack of research on how people learn to use GIS; usage required to have an impact
- Wide range of implementation approaches by partners
- Limited measures available to assess participant impacts

Evaluation

The Lawrence Hall of Science (University of California, Berkeley) was the evaluator for this project. Evaluation focused on the following outcomes:

Organizational outcomes:

- Meeting organizational goals in citizen science
- Reaching larger and more diverse audiences
- Collecting more and/or better scientific data and making larger contributions to scientific knowledge

Participant outcomes:

- Participant experience with the organization
- Participant self-efficacy, ability, and confidence to collect, analyze, and communicate about scientific data
- Participant learning about specific concepts
- Participant attitudes about the environment and stewardship

Methods included:

- Observations of workshops and citizen science data collection
- Surveys and interviews of partners, participants, project owners

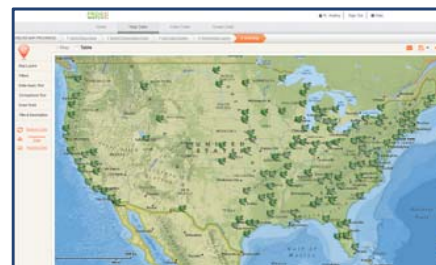
Additionally, the New Media Consortium and the University of Maryland Human-Computer Interaction Lab provided usability testing and design recommendations.

What Can You Do with FieldScope?

Enter and graph data; and visualize trends:



Map data:

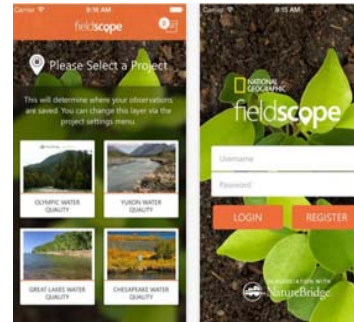


Compare and analyze data:



FieldScope App

The FieldScope App lets you collect and submit data from the field.



FieldScope Project Builder Tools

The Project Builder Tools allow citizen science organizations to construct new FieldScope projects using web forms. These tools are going through beta testing by several organizations including

- Illinois Stream Discovery (based at the National Great Rivers Research and Education Center).
- Globe at Night Sharks of San Diego (based at Ocean Sanctuaries):
- Resilient DC (a DC Department of Health collaborative project)
- Los Angeles River Monitoring

Geospatial Reasoning Instrument (GRI)

The GRI was developed to measure change in students who participate in a citizen science project and/or use FieldScope to record and work with their data.

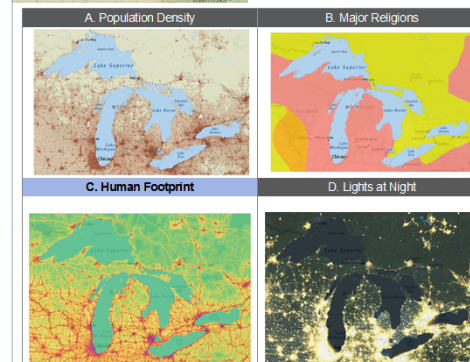
Items were designed to address the following geographic practices:

1. **Acquiring Geographic Data:** information connected to a location that includes data about physical and human characteristics or phenomena at any place on the planet.
2. **Organizing Geographic Data:** Once collected, the geographic information should be organized and displayed in ways that assist with analysis and interpretation
3. **Analyzing Geographic Data:** seeking patterns, relationships, and connections.
4. **Answering Geographic Questions:** answers must be based on provable and relevant facts that inspire interpretation, analysis, reasoning, and, when appropriate, the subtleties of inference.

Nadje is studying human impact on the local ecosystems around Detroit Michigan. Below is a map of the Detroit area.



What additional maps or layers may help her answer her question? (select all that apply)



For More Information www.fieldscope.org

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