

Crowdsourcing Aquatic Resource Data Collection

Exploring Effective Methods to Collect
and Rectify Citizen Contributed Data

Presented By Jon Soderberg
Advised By Frank Hardisty. Ph.D.

A satellite-style map of the world is shown in the background. A white rounded rectangle with a black border is overlaid on the left side of the map, containing the text. The map shows the Americas on the left and Asia and Australia on the right.

What We Will Cover

My Project

Definition of Crowdsourcing

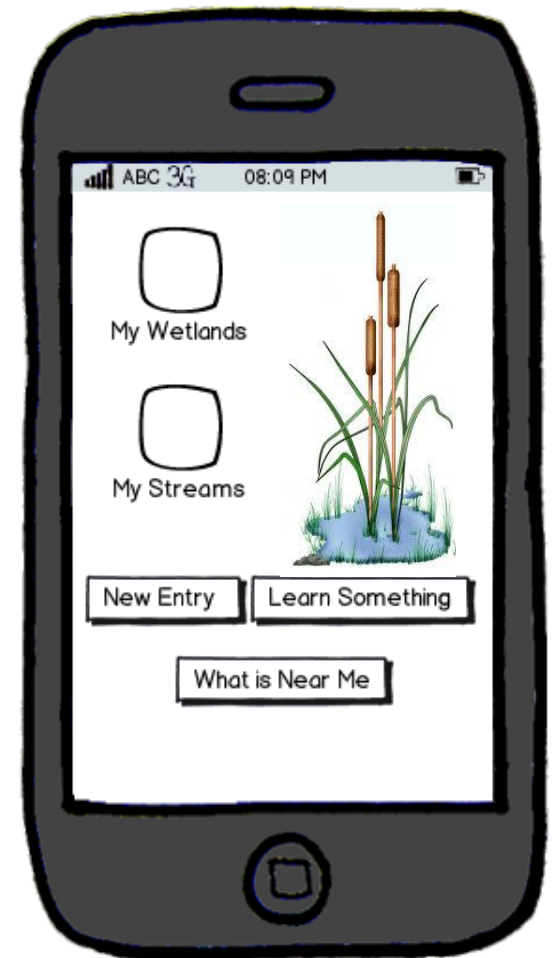
Crowdsourcing in the Sciences

Concepts and Examples

Timeline and Desired Outcome

My Project

Endeavor to increase the quality of data collected about aquatic resources with the use of mobile devices and harnessing the collective power of the general public



created with Balsamiq Mockups - www.balsamiq.com

Definition

Jeff Howe (2006) coined the term “Crowdsourcing” in his is Wired Magazine article “The Rise of Crowdsourcing”

Howe later defines crowdsourcing as;

“the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call”

Crowdsourcing in the Sciences

The concept of an open call to an large group to perform a task is not new and is akin to the concept of the Citizen Scientist. The increasing use of mobile computing and geopositioning technology gave birth to crowdsourcing.

Notable use of the general public to accomplish a scientific task

- Longitude Prize
- Citizen Weather Observer Program
- Cornell Lab of Ornithology
- NASA Lunar Impact

Longitude Prize

British government established the Board of Longitude in 1714 offered a prize to anyone who could develop an accurate way of determining longitude

One of the most known contributions to the effort was the marine chronometer (time piece) developed by Clock Maker, John Harrison



Image Credit:
Britannica

Citizen Weather Observer Program

Their mission is to:

collect weather data contributed by citizens;

to make these data available for weather services and homeland security; and

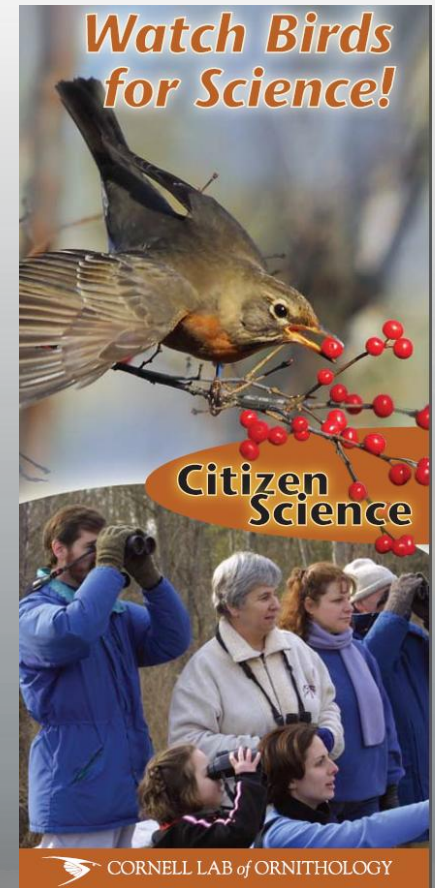
to provide feedback to the data contributors so that they have the tools to check and improve their data quality.



Image Credit: CWOP

Cornell Lab of Ornithology

The Great Backyard Bird Count is an annual four-day event that engages bird watchers of all ages in counting birds to create a real-time snapshot of where the birds are across the continent.



NASA Lunar Impact

Mission statement: Use Earth-based observations of the dark portion of the moon to establish the rates and sizes of large meteoroids (greater than 500 grams or 1 pound in mass) striking the lunar surface



Image Credit: NASA

Using the Crowd to Gather Data

Problem

Data collected by crowdsourcing may need to be rectified prior to use by the scientific community

Can these rectification challenges can be overcome

Can the collective power of the crowd be harnessed to gather standards-based geographic data about aquatic resource

Rectification of Crowdsourced Data



Using mobile applications to educate the crowd, support for the targeted environmental data desired, coupled with thoughtful design of mobile applications can potentially aid the process of rectification



Target Audience

Citizen Wetland Scientist (the crowd)

- Support their key Interests (cohort groups)

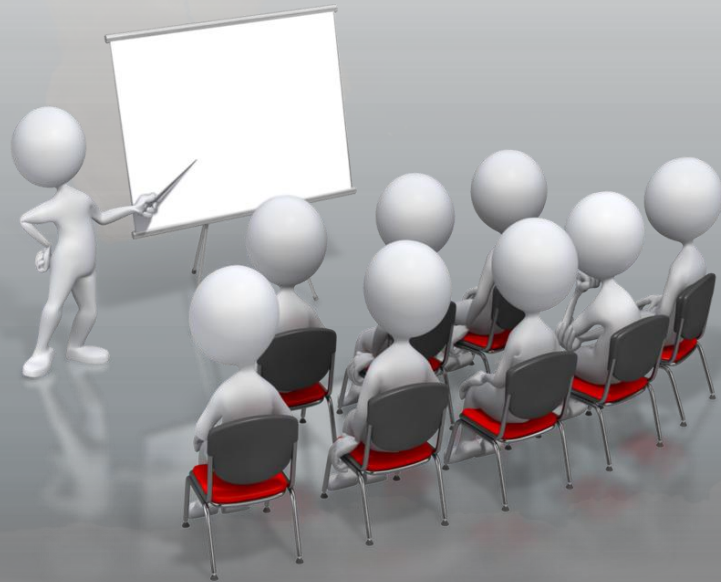
Communicate the Intent or Desired Outcome

- Why would they gather the data for you?
- Who will use the data?

Educate the Crowd

Expect to provide the crowd with education and training

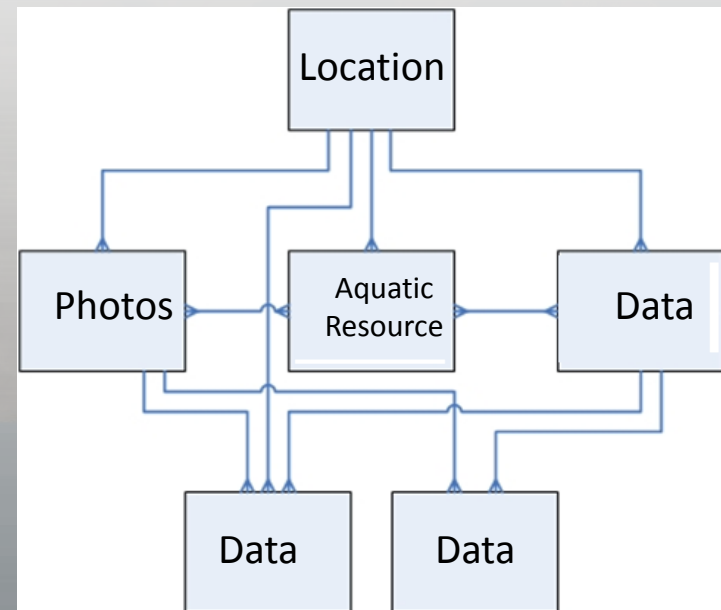
- Can be done directly in the mobile application
- Targeted cohorts
- Know your audience



Targeted Environmental Data

Application and Data Structure

- Garbage in garbage out
- Step the user through the data collection process
- User access to existing data sources





Apply Standards

Existing Aquatic Resource Data and Mapping Standards

Use of the Federal Wetland Mapping Standard

- National Wetland Inventory
- US Army Corps of Engineers

National Atlas Water Features: Streams and Waterbodies

- US Geological Survey

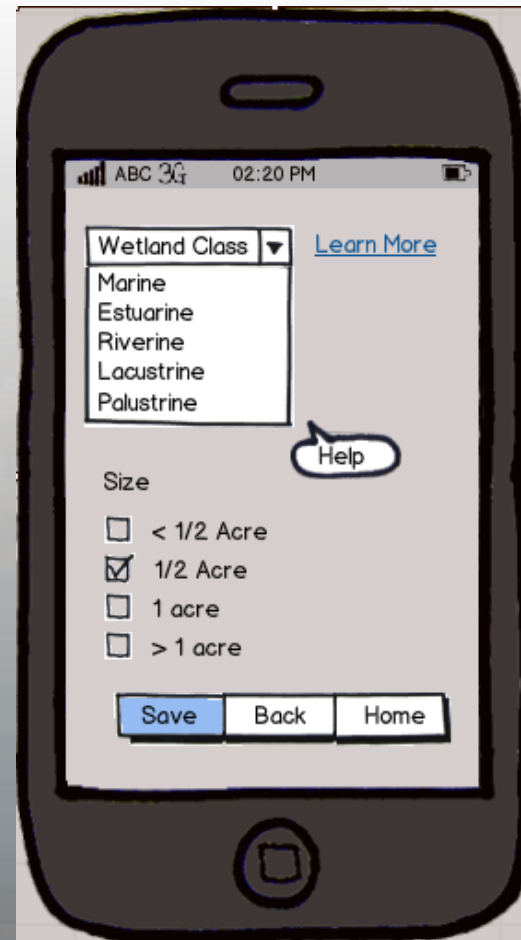
Watershed Assessment, Tracking & Environmental Results

- US Environmental Protection Agency

Application Design

Let the mobile device do the work and limit potential user error with an educated workflow.

Ask dichotomous questions only reveal the next data element when it applies.



Use the Devices Capabilities

Built in GPS capabilities

Photos ≥ 5 mega pixels (MP)

Declination

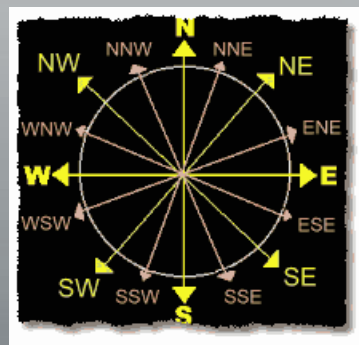
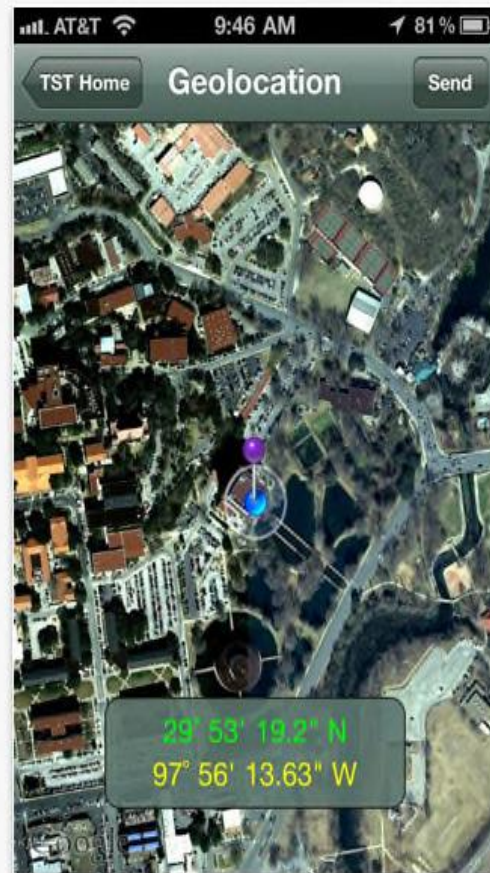


Photo Credit: Jon Soderberg

Creek Watch



Texas Stream Team



Leaf Snap



Time Line

October-November- Early December

Develop a mock application exemplifying concepts and best practices for collecting aquatic resource data

Develop final presentation

Draft peer reviewed journal submission



Presentation

American
Geophysical Union



AGU FALL MEETING 2011

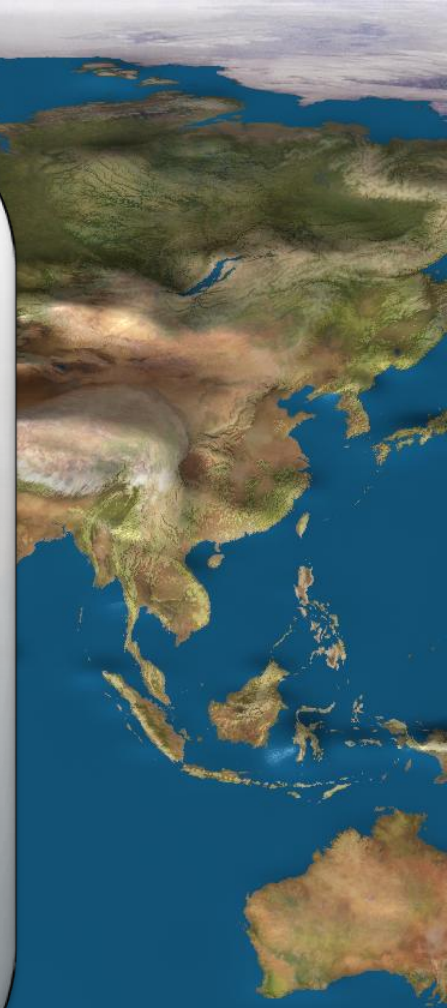
San Francisco, California, USA | 5-9 December



Accepted!

Peer Reviewed Journal

International Journal of Digital Earth





Abstract

Increasing use of mobile computing and ge positioning technology has provided the environmental sciences with vast new pools of data. Prominent among the gathering methods which produce this data is “crowdsourcing”, in which citizen scientists volunteer data. Environmental data collected by crowdsourcing may need to be rectified prior to use by the scientific community. Using mobile applications to educate the crowd, support for the targeted environmental data desired, coupled with thoughtful design of mobile applications can potentially aid the process of rectification. This presentation will outline the use of crowdsourced data, cohort groups and design options for mobile applications that can be used to collect aquatic resource information. If rectification challenges can be overcome, the collective power of the crowd can be harnessed to gather standards-based geographic data, information about environmental conditions, and detailed biological data about aquatic resources.



Acknowledgements

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My Wife Nicole and Daughter Anna Grace

Questions? Comments?



