

## **Citizens + Science = Innovative Insights Webinar Sept 23, 2015 Responses to Questions**

### **Article Links**

In addition to the links to ArcGIS resources provided in the Citizen Science Resource blog, several attendees requested links to articles referred to during Dawn Wrights' presentation. Following are links to the articles themselves for people without library access to legally download:

Kerski (2015) - <http://dusk.geo.orst.edu/Pickup/Esri/Kerski-Geog-Compass.pdf>

PNAS (2013) - <http://dusk.geo.orst.edu/Pickup/Esri/citizen-sci-PNAS.pdf>

People Power, Nature News item (2010) - [http://dusk.geo.orst.edu/Pickup/Esri/citizen\\_science\\_nature.pdf](http://dusk.geo.orst.edu/Pickup/Esri/citizen_science_nature.pdf)

### **Questions regarding Citizen Science Reporter and Citizen Science Manager**

**Question: During the Citizen Science Reporter app presentation, Charmel mentioned several sign in options, please elaborate.**

Citizens sign into the Citizen Science Reporter app by using either a social media accounts, including Facebook, Google+ and Twitter; a guest login; or ArcGIS Online. These various sign in options are configurable for your citizen science app. To get started and learn more about login configuration, [click here](#).

**Question: My greatest concern is how to validate this citizen collected data to be able to use it in science.**

You are not alone in this concern of data quality. For this reason a companion application the [Citizen Science Manager](#) app is available for data management. With this app the researcher is provided control over the data and can utilize attributes to designate the quality of the data collected. The methodology applied to data validation for your research depends on the project. Many scientist from various fields are looking at this same issue of data validation methodologies. Consider reaching out to the [Citizen Science Association](#) and contribute to this ongoing discussion.

**Question: What are the security considerations or methods for accepting citizen generated photos into a corporate geodatabase?**

Every organization has different security requirements for adding data including multimedia files to their corporate geodatabase. For additional information on how to protect your data go to [Data Management](#) and [Trust.ArcGIS.com](#). If you need to restrict access to data submitted by the public through the Citizen Science Reporter application, follow [these instructions](#) to limit access to public ArcGIS Online layers.

### **Questions regarding WyoBio**

Thanks to Teal Wyckoff for providing additional information in response to attendee questions.

**Question: In my state sharing spatial data that include rare species occurrence hits obstacles due to requirements of data owners or programs like Natural Heritage Inventory, which are often the logical place to house data from emerging citizen science programs. Even when sharing is enabled, the larger program isn't funded at a level to support it. How does Wyoming or others enable sharing?**

[Teal] Wyoming has similar issues with sharing data for sensitive species. The Wyoming Natural Diversity Database – Wyoming’s heritage program, works with data contributors and sets ‘error’ associated with each observation. This means that most data in their database are not provided to anyone as a ‘dot’ on the map, but rather as a polygon layer with many different sized polygons for observations. Secondly, WyoBio data will eventually be fed into the heritage program database – at least for the vetted data. So although we are collecting the information, and will always house it for the public, it will also be contributed to the greater observation database effort.

**Question: Teal Wyckoff discussed the data validation process during her section. How many authorized data vetters does WyoBio require to filter observations? Is there a problem showing real-time data to users before they are properly vetted?**

[Teal] WyoBio is in the early stages of establishing the vetting process, for right now, we have a handful of vetters, and they have been able to handle the volume. We hope to grow this network, and are also considering crowdsourcing options instead of using professionals. In terms of showing data ahead of vetting, that was a decision we made early on – there is no filter on showing data right away, although we do have backend filters that review the data for inappropriate language, and we reserve the right to hide any content that is deemed inappropriate.

## Questions regarding CrowdMag

Thanks to Manoj Nair for providing additional information in response to attendee questions.

**Question: Love the global magnetic fields. How might that become a youth science project?**

[Manoj] Great question. NOAA in partnership with University of Colorado developed a geomagnetism outreach project for school students. More info here. <http://cires.colorado.edu/education-outreach/resources/curriculum/geomaglinks/>. Also check our other outreach material here <http://geomag.colorado.edu/magnetic-field-overview.html>

**Question: What gravity data do you use with the magnetic data for positioning and orientation applications?**

[Manoj] The data from vector accelerometer data ( $G_x$ ,  $G_y$ ,  $G_z$  in  $m^2/s$ ) is used to determine the vertical direction.

**Question: Do you have to correct for sampling bias in your modelling?**

[Manoj] I assume that by sampling bias you mean uneven spatial sampling by CrowdMag users. Land areas are sampled much more than (for obvious reasons) the oceanic regions. Within land areas, some countries and cities are sampled more than others. Currently, we set the resolution of the global model to more than several thousands of kilometers because of this uneven sampling. In the future, we plan to develop, higher resolution magnetic maps/model for specific locations with larger spatial data coverage.

## From Educators

### **Question: How did you go about getting input from the K-12 community for citizen science projects?**

The Education Team has engaged student-scientists networks since the mid-1990s with a variety of groups from GLOBE and Journey North to individual classrooms creating local (community- to school-focused) investigations using GIS to facilitate data collection and analysis. The team welcomes input from any educator. To help understand our work, feel free to review a few sites:

- Esri Education Community – <http://edcommunity.esri.com>
- Esri K-12 Information – <http://www.esri.com/k12>
- General K12 instructional support with GIS -- <http://esriurl.com/k12gis>
- Esri's ConnectEd commitment – <http://connected.esri.com> (which provides a link for U.S. K12 schools to request a free account for instruction)

The websites above describe our program for K-12 educators. In brief, the Esri Education team likes to work directly with educators by supporting a community of educators who engage project-based learning with GIS and share materials with others. Through various communication avenues (social media, email, GeoNet, listservs, blogs, newsletters) we directly appeal to educators for input and share classroom work. In addition, the team participates in the Citizen Science Association. Email [k12schools@esri.com](mailto:k12schools@esri.com) to get connected or have any questions/comments. The team is definitely open to suggestions!

Teal Wyckoff, WyoBio citizen science app presenter, added that the Wyoming Biodiversity Institute at the University of Wyoming has an education coordinator who envisioned that we would develop an education committee. We did so, bringing about a dozen educators together from around the state that also represented the gradient of needs from elementary, middle and high school levels. The vision, coordination, and involvement of this committee early on was critical for the development of the project. Since the release of the application, we have presented at our science educators meetings, and worked where possible to coordinate with teachers individually to visit their classes. We also have begun to develop curriculum (lesson plans) that directly tie to the NGSS science standards.

### **Question: In working with youth and making it more meaningful and authentic for them, I'm looking for citizen science projects which provide those opportunities and sparks for youth to create their own investigations, or use the data to make their own conclusions to investigate. Suggestions?**

The Esri Education Team has found that local, relevant projects for students typically engender the greatest student interest. This might begin by asking students what matters the most to them and in small groups defining a question to guide project development, followed by clarifying the data that needs to be collected. We have seen a wide variety of successful student projects in science and social studies – from documenting architectural influences, signs of cultural discord (e.g. resource distribution, graffiti, vandalism, even active bullying), or safety hazards in a town - to mapping air quality using tree lichen, or water quality via test kits.

Teachers often teach the processes with small activities, school-based projects such as local cell phone or wifi signal strength, or parking lot studies, before moving out to larger but finite projects like fire hydrant mapping, cemetery mapping, invasive species documentation, roadkill studies, and so on. There are several projects linked from the Citizen Science blog web page.