Mosquito Mappers: Citizen Science Ground Validation of Mosquito Vector Risk Model Outputs

NASA Biodiversity and Ecological Forecasting Team Meeting
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Institute for Global Environmental Strategies, Arlington VA
GLOBE Observer: Mosquito Habitat Mapper

Malaria Risk

The Mosquito Challenge
Community Campaign

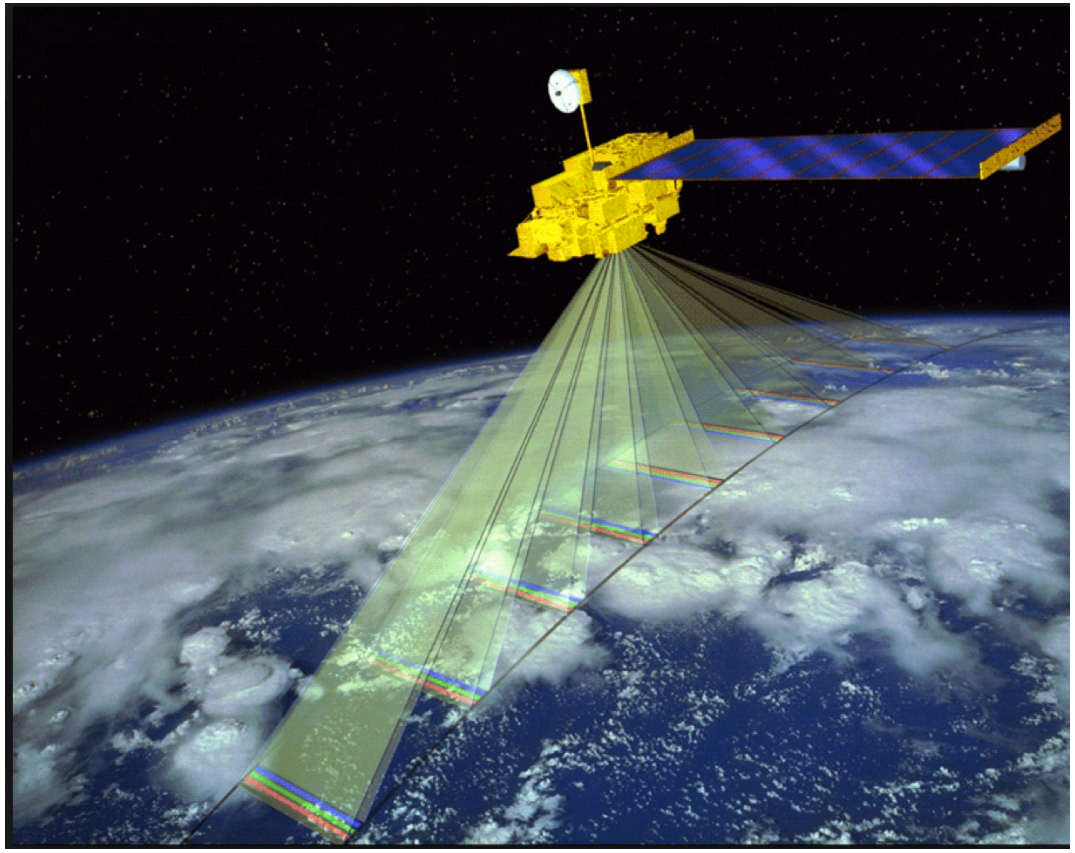
COMBATING ZIKA AND FUTURE THREATS
A GRAND CHALLENGE FOR DEVELOPMENT

INSTITUTE for GLOBAL ENVIRONMENTAL STRATEGIES

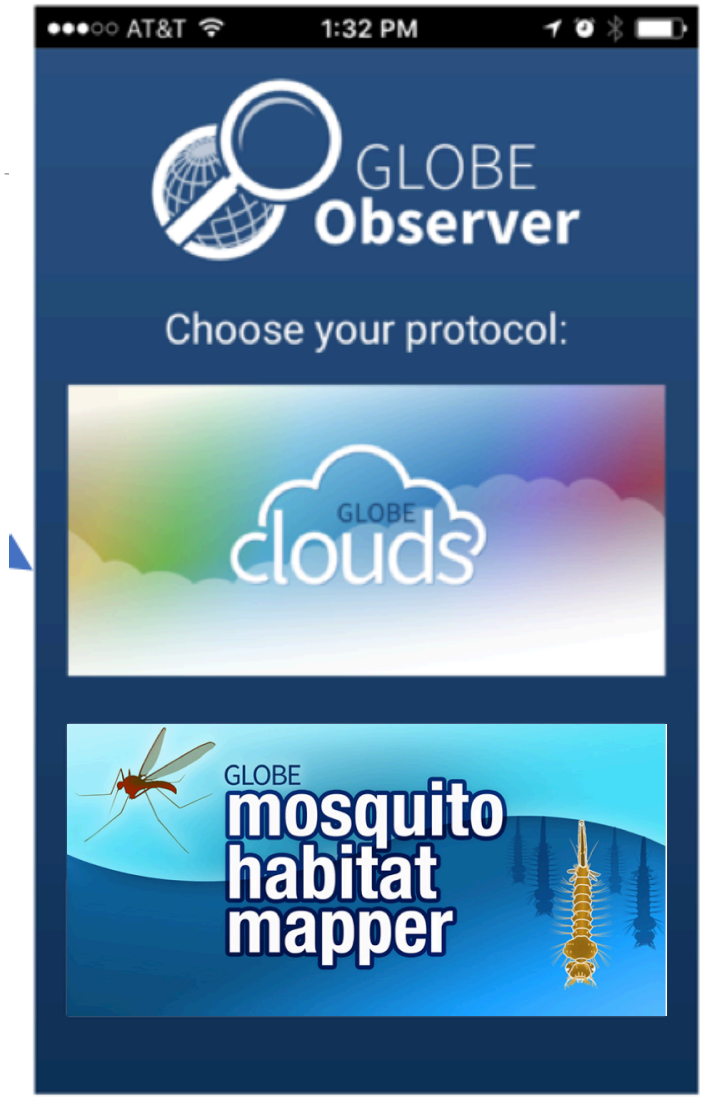
The GLOBE Program

You can’t quite see mosquitoes from here….

Through ground-based observations, GLOBE Observer citizen scientists are able to augment broad scale satellite-based research with highly targeted ground-based observations at a high level of granularity.



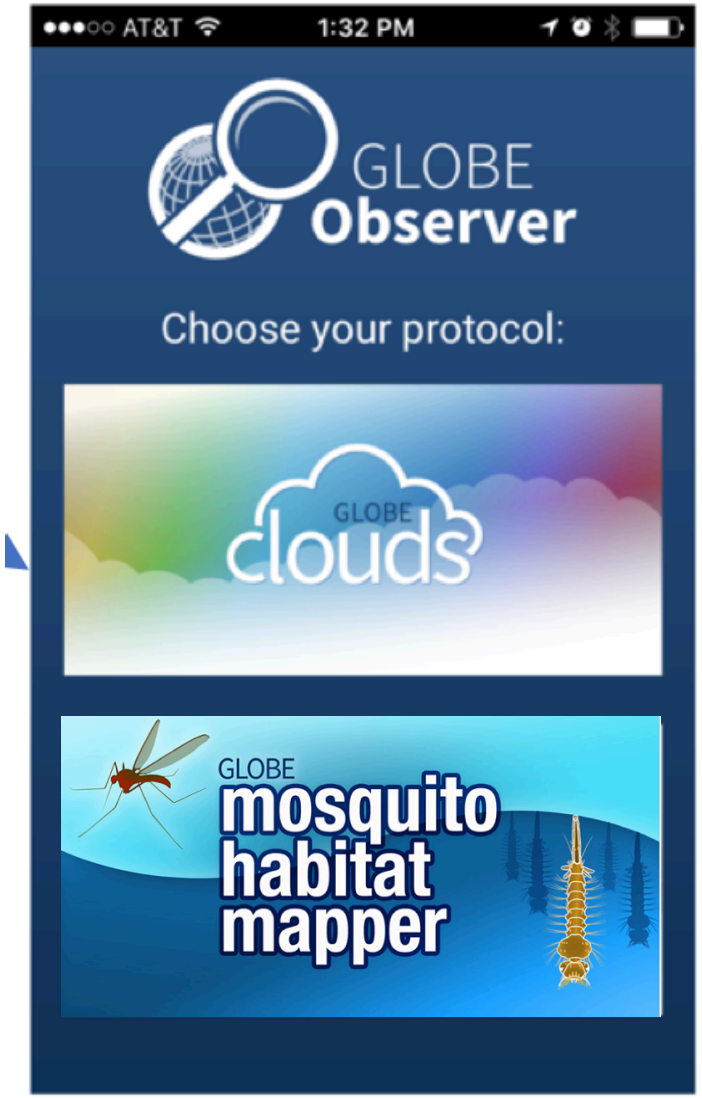
Terra (NASA)



GLOBE Observer is an international network of citizen scientists, of all ages and scientists working together to learn more about our shared environment, changing climate and its impacts.

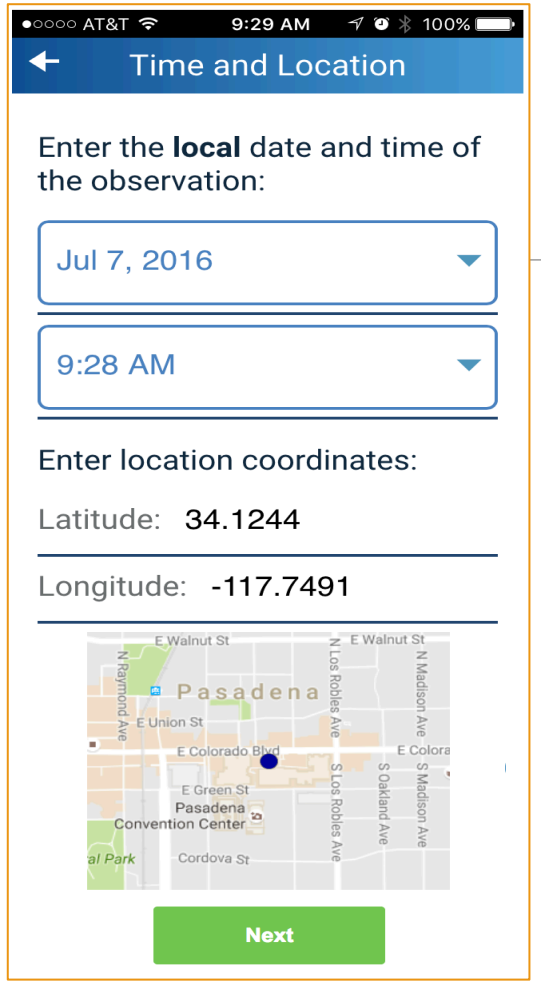
GLOBE Stats

117	Countries
30,776	Schools
28,193	Teachers
141,856,866	Measurements
518,056	Measurements this month



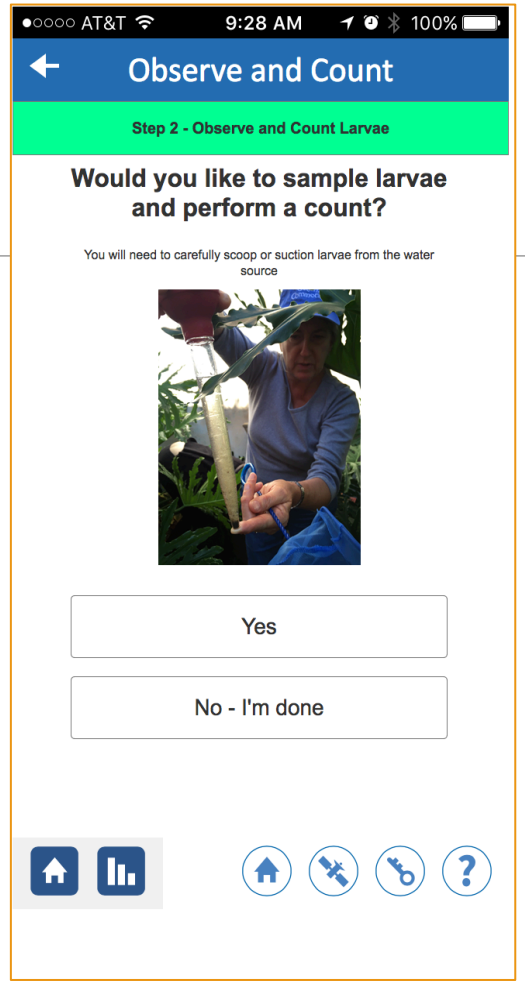
The mosquito is the world's most dangerous animal.

Project samples and examines larvae, an immature developmental stage of the mosquito that lives in water, doesn't bite and doesn't pose a health hazard to humans



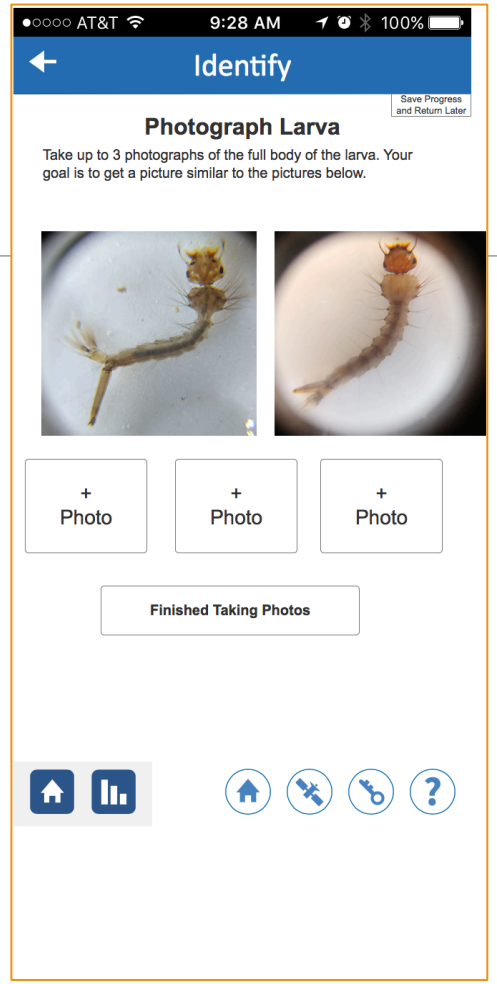
locate

1



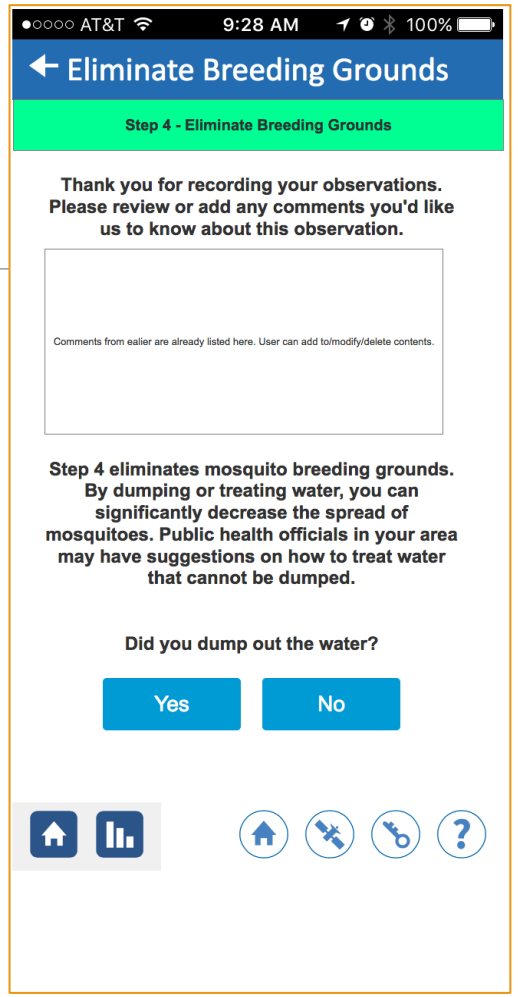
sample & count

2



identify

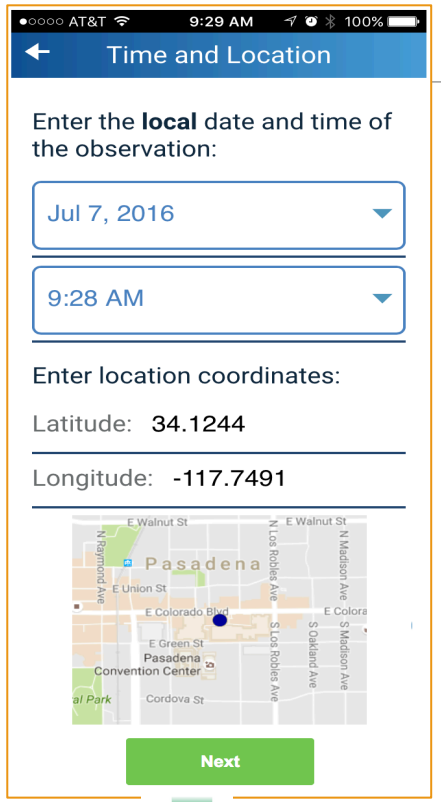
3



decommission

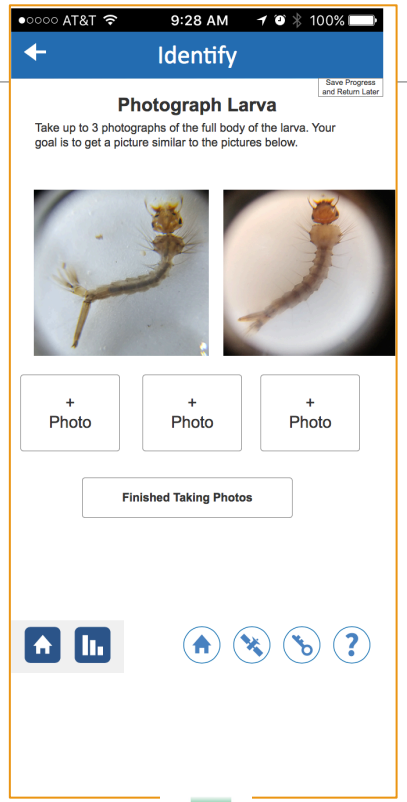
4

adopt geolocation standards



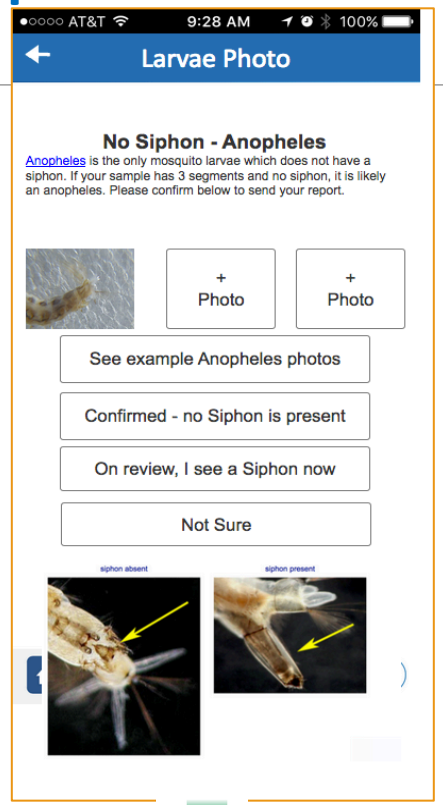
ISO 6709

comparability of submitted data from CS



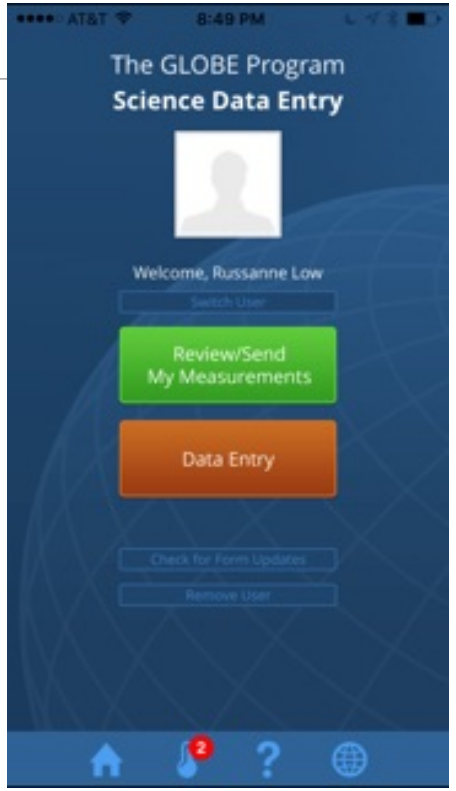
Standardized voucher specimen capture

apply disciplinary standards to protocols



Adopting accepted protocols

shared metadata and vocabulary



Metadata standardization across 50+ protocols GLOBE

The Mosquito Challenge Community Campaign

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Project Overview

The Institute for Global Environmental Strategies (IGES) is partnering with the University Corporation of Atmospheric Research (UCAR) on a crowd-sourced science and action initiative that leverages existing capacity and established GLOBE Program networks of scientists, teachers, students, and citizen scientists and its public citizen science counterpart, GLOBE Observer.

Focusing on Brazil and Peru, the idea is simple: citizen scientists collect and share mosquito data and then use the data to develop a local mitigation strategy that reduces the risk of disease in their communities.

- **GLOBE Observer Mosquito Habitat Mapper release: May 29, 2017**
- **USAID has funded proof-of concept in Brazil and Peru**

UN environment

EUROPEAN CITIZEN SCIENCE ASSOCIATION

Woodrow Wilson International Center for Scholars

PRESS RELEASE

Pioneering UN Backed, Citizen Led Alliance against Mosquito Borne Diseases Joins Global Fight to Save 2.7 Million Lives Every Year

Initiative Empowers National Networks, Stakeholders and Governments to Generate and Access Real-time Data and Tools through UN Electronic Platform 'Environment Live"

Geneva, 8 May, 2017 – A new alliance of citizen-science organizations and UN Environment will be launched, Monday, in an effort to escalate the global fight against mosquito-borne diseases, responsible for killing close to 2.7 million people annually, mostly in Africa and Latin America. Overall mosquito borne cases are estimated at 500 million every year.

The new initiative, launched under the name '***Global Mosquito Alert***', brings together thousands of scientists and volunteers from around the world to track and control mosquito borne viruses, including Zia, yellow fever, chikungunya, dengue, malaria and the West Nile virus. It is the first global platform dedicated to citizen science techniques to tackle the monitoring of mosquito populations.

- **UNEP *Environment Live* funding Proof of Concept: shared international data base and visualization for citizen scientist observations of mosquito vectors**

- **Future concept; contextualizing citizen science data to environmental data, including remotely-sensed Earth data**

Dr. Assaf Anyamba

Research scientist with the Universities Space Research Association at NASA Goddard Space Flight Center, Biospheric Sciences Laboratory.

My research basic involves time series analysis of satellite vegetation index measurements from a variety of satellite sensors (Terra/Aqua, Moderate-Resolution Imaging Spectroradiometer [MODIS], National Oceanic and Atmospheric Administration -Advanced Very High Resolution Radiometer (NOAA-AVHRR) and follow-on missions with a focus on determining and understanding land surface response to interannual climate variability associated El Niño/Southern Oscillation (ENSO). On GLOBE Observer my contribution will on the links between weather/climate variability and vector-borne disease outbreak, continuing research focused on understanding how weather and climate variability influences patterns of floods, drought and how it impacts agricultural production and vector borne disease emergence globally.

If this project is selected, Assaf has agreed to be a mentor for interns who participate in the NASA DEVELOP project

Dr. Sara Paul

POSTDOC FELLOW II, NCAR Directorate, Advanced Study Program, University Corporation for Atmospheric Research, Boulder CO

Testable hypothesis: it has been suggested that heavy rainfall events could flush the larvae of container-breeding mosquitoes, and that this effect may depend on the stage of development, mosquito species, or water temperature (Koenraadt and Harrington 2008). Similarly, extreme high temperatures could eliminate the mosquito larval populations in breeding sites that surpass the critical thermal limit for survival (Morin and Comrie 2013). The citizen science data on mosquito larvae and breeding site type will provide us with a unique opportunity to test some of these hypotheses about the effects of extreme temperatures and precipitation on mosquito larval survival in a field setting**.**

Another critical component of citizen science projects is the ability to conduct particularly meaningful scientific outreach. By involving the public directly in the full scientific process, we enhance the public's understanding of science, and ultimately their confidence in the scientific process. To enhance this aspect of the project, I have completed a 'scientist biography' that will be posted on the GLOBE website, and I plan to write several blogs on topics related to citizen science.

Acknowledgements

Mosquito Habitat Mapper Team
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Pablo Munoz, Brooklyn College

Flyover Country
Amy Myrbo, UMN- Twin Cities
Reed McEwan, UMN-Twin Cities
Shane Loeffler, UMN-Twin Cities

GLOBE Data and Information System
Travis Andersen- GIO
Roller Angel- GIO

GLOBE Observer Citizen Scientists
&
GLOBE Program Participants

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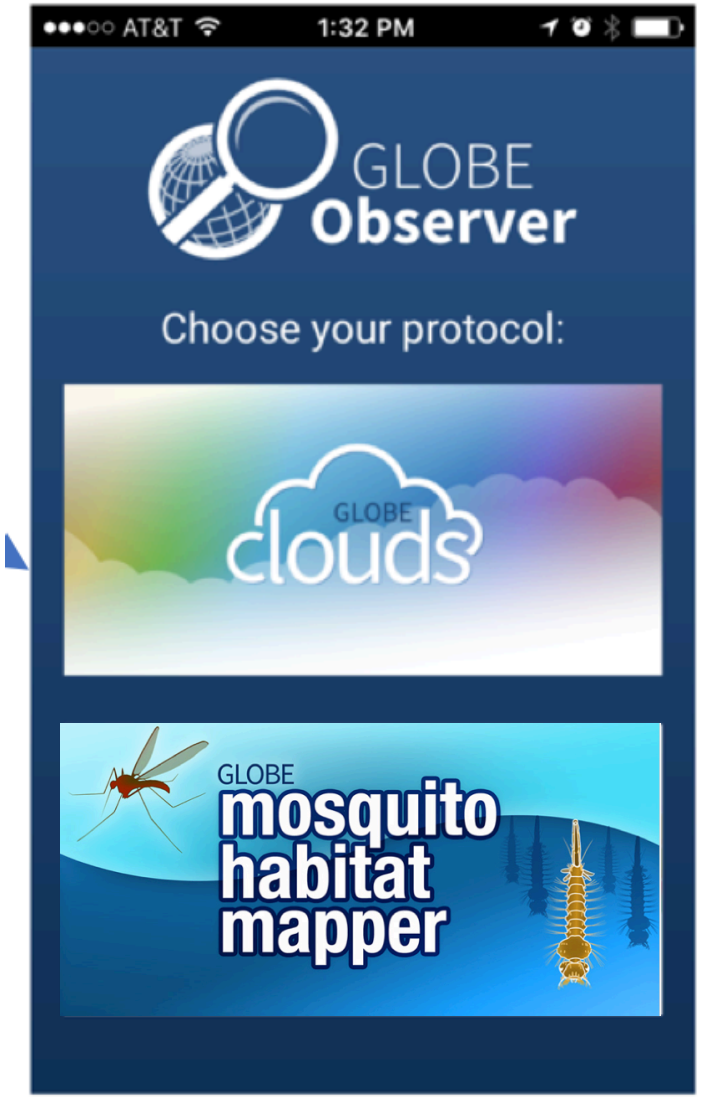
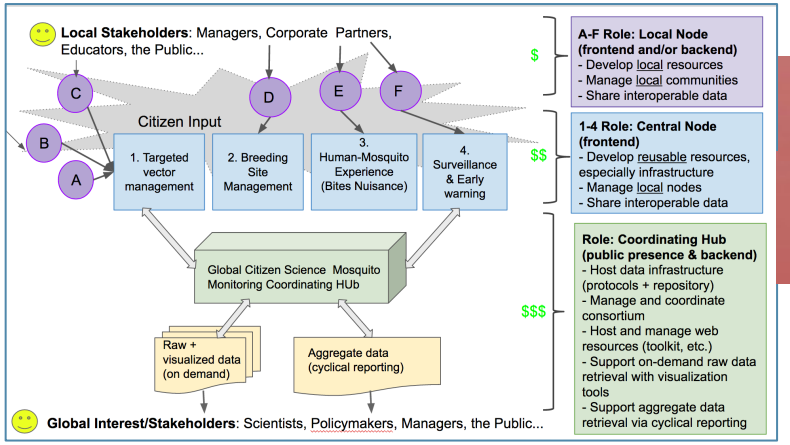
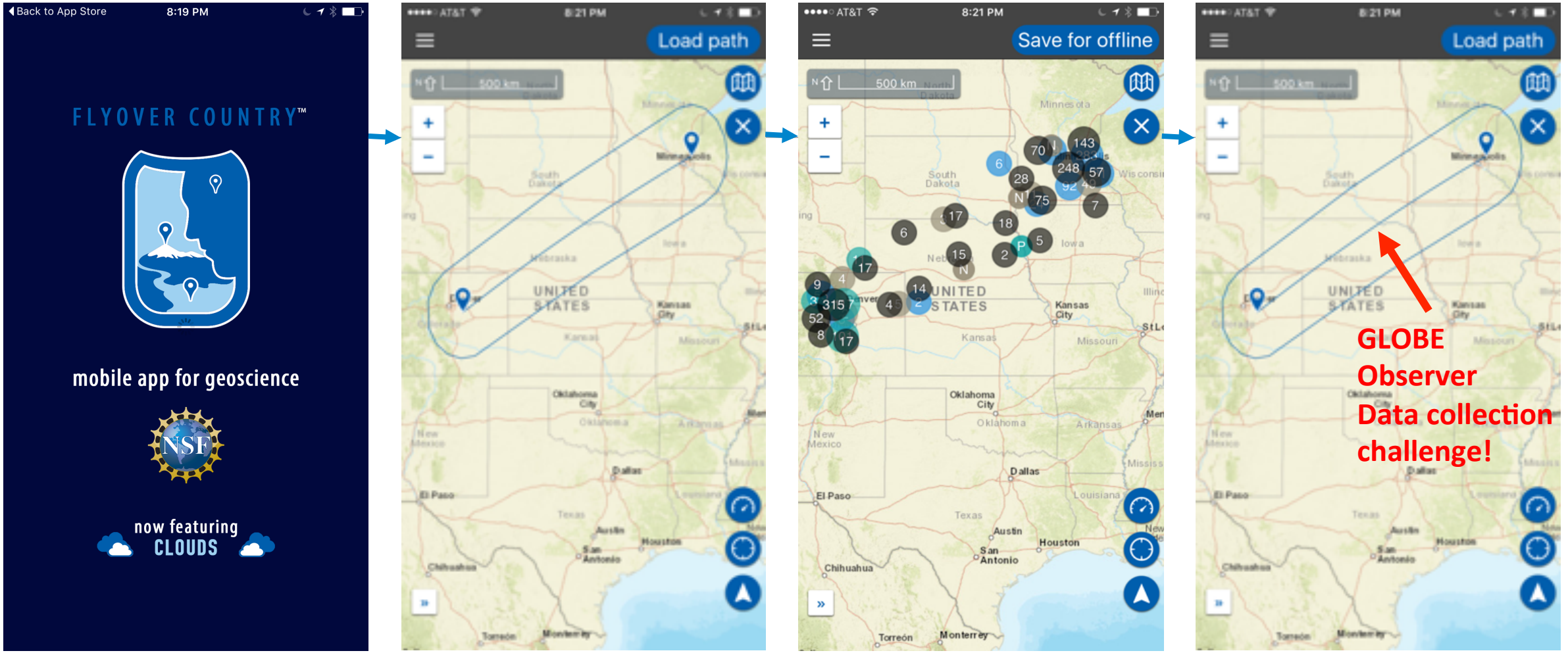




GLOBAL MOSQUITO ALERT



JSON to GeoJSON via REST API