GLOBE Mission Mosquito

Newsletter #8
June 19, 2019

Welcome Message: Dorian Janney, Campaign Coordinator

One of the things I always look forward to reading is the set of amazing science investigation reports from the GLOBE *International Virtual Science Symposium* (IVSS). This year was no exception, and I was delighted to see 23 fantastic science investigations from around the world which involved the use of the *Mosquito Habitat Mapper.* In our "*Tips and Tricks*" section, I share some ways in which students around the world used the *Mosquito Habitat Mapper* as well as other protocols to conduct research investigations. Take a look at our *Spotlight* on the ways in which the *Mosquito Habitat Mapper* is being used in public libraries across the United States, and pick up some ideas for developing programs for your community. Dr. Russanne Low will describe a new GLOBE Observer challenge this summer that is taking place worldwide, as well as on the Lewis and Clark National Historic Trail across the U.S. I found out that the nearest section of this trail is about a three-hour drive from me in Pittsburgh, PA. I am planning to take my nieces and nephew to the trail and make some GLOBE Observer measurements in the next few weeks. I hope to see a lot of measurements coming in from your GLOBE Mission Mosquito community as well.

As the weather here in Maryland gets warmer, I have begun to become even more aware of standing water. Today I saw a barbeque grill cover that had collected rainwater and thus provided a perfect place for a female mosquito to lay her eggs. After I did an observation using the *Mosquito Habitat Mapper*, I let the grill owner know that it was a good idea to ensure the water was emptied regularly. They thanked me and were totally intrigued by the GLOBE Observer app. Be sure to share this app and tools with others to help us reduce the threat of mosquito-transmitted disease.

Blog: Dr. Russanne Low, Science Lead

GO on a Trail with the *Mosquito Habitat Mapper*

You may have heard the news- there is an exciting challenge June-August for GLOBE Observer users! The challenge follows in the spirit of early cartographers, Meriwether Lewis and William Clark, and you can win one of two ways. First, use GLOBE Observer to map as much land cover as possible in any GLOBE country by September 2, 2019. The top data collectors in each GLOBE region will be recognized. Or, for U.S. users, head to the Lewis and Clark National Historic Trail, located between Pittsburgh, PA and the Oregon coast, and take *Land Cover* and *Mosquito Habitat Mapper* observations using the GLOBE Observer app. This three-month campaign kicks off on National Trails Day (June 1) and concludes on Labor Day (September 2). Each observation you make along

the trail will increase your chances to be one of our top observers and be eligible for a prize package. Learn more and plan to participate today.

Meriwether Lewis and William Clark's 28-month, 8,000-mile journey began just north of St. Louis, MO USA on May 14, 1804. Lewis and Clark and the expedition team, the *Corps of Discovery,* navigated up the Missouri River, crossed the prairies, navigated through the Rocky Mountains and followed the Columbia River to the Pacific Ocean.

Trained in natural history and in methods of collecting plant and animal samples, Lewis and Clark meticulously recorded the conditions of the rivers, prairies, forests, mountains, and wildlife of pre-industrial America. The journal entries of the expedition members are very important to science because without baseline information about past environmental conditions prior to European colonization of the west, "we don't know, in quantitative terms, where we have been or where we are going," (Botkin 1995:95).

In preparation for the journey, Lewis studied medicine, botany, astronomy and zoology as well as the available maps and journals for the region. The expedition was equipped with scientific instruments, including a quadrant, compass, surveying equipment (including an artificial horizon and a theodolite), thermometers, hydrometers and a microscope. Lewis also brought with him maps, charts, and books on botany, geography and astronomy.

The Lewis and Clark journals describe one of the first true Western scientific expeditions in the U.S. and it remains one of the most famous expeditions and trails in U.S. history. However, it is important to remember that the success of Lewis and Clark's journey was made possible by the centuries of knowledge shared by members of Indigenous Nations they encountered along the way, as well as that of their interpreter, Sacagawea, a member of the Shoshone Nation and the only woman on the expedition. Sacagawea shared her Indigenous understanding of the landscape and Nations they encountered as well as knowledge of edible plants that proved critical to the expedition team's survival.

And while the expedition delivered 140 maps and succeeded in documenting more than 100 animals, 178 plants unknown to Western science, it is important to contextualize the expedition within the economic and political goals of the U.S. Government. President Jefferson tasked Meriwether Lewis to explore the territory unknown to the U.S. government that was recently acquired from France in the 1803 Louisiana Purchase to affirm sovereignty of the U.S. government in the region. In particular the economic desire to identify "…the most direct and practical water communication across the continent for purposes of commerce," shaped the direction of the Lewis and Clark trail.

Read the rest of the blog and how your Mosquito Habitat Mapper observations will contribute to this campaign here: https://www.globe.gov/web/mission-mosquito/overview/science-cafe

Bibliography

Botkin, D.B. 1995 Our Natural History: The Lessons of Lewis and Clark. NY: G. P. Putnam's Sons.
Twaites, R. G., Ed. 1905 Original Journals of the Lewis and Clark Expedition 1804-1806. NY: Dodd, Mead and Co.
Find complete journal entries here: https://lewisandclarkjournals.unl.edu

Tips and Tricks: Science Investigations

The GLOBE Mission Mosquito campaign was delighted to have 23 IVSS projects submitted that used the *Mosquito Habitat Mapper* tool in their research. These projects came from students in elementary school through graduate students in college and were submitted from 15 different countries. You can view an interactive map of these projects here.

During the *GLOBE Mission Mosquito* Education webinar on June 5th, we invited three of these groups of students and their teachers to share these projects and some "Best Practices" with us. You can view the archived webinar here.

Ines Mauad from the Escola Minas Gerais middle school in Rio de Janeiro, Brazil led her students in an investigation to try to determine which type of water appeared most likely to attract adult female mosquitoes to lay their eggs. See the video of their presentation. The students made a video of their answers to some questions about their research as well as suggestions they have for other students who wanted to use the *Mosquito Habitat Mapper*.

Patchara Pongmanawut and her students from Princess Chulabhorn Science High School- Trang in Thailand did research to learn more about the species and number of mosquitoes that were found in various tourist locations in a beach resort area near their school. Watch this video to hear them tell about their investigation.

Jeff Bouwman had a team of students from Shumate middle school in Gibraltar, Michigan who looked into the humidity, precipitation, and temperature conditions that were associated with active mosquito season in their area. Take a look at their poster and hear the students' responses to questions about their findings.

Did you know that Student Research Projects can be submitted any time during the year? Click here to see the requirements for these types of reports.

Are you interested in having your students use the mosquito habitat mapper to do an investigation? Feel free to reach out to Dorian Janney (dorian.w.janney@nasa.gov) with any questions you might have or support you would like. The GLOBE Mission Mosquito team will be happy to assist you and your students!

Spotlight: Community Programs

Using the Mosquito Habitat Mapper in Library Programs Across the U.S.

Over the past few months, the Institute for Global Environmental Strategies and Oregon State University have been working with seven libraries that have been field testing GLOBE Observer activities in community programming with library patrons of all ages. The *Mosquito Habitat Mapper* activities have been the buzz of participating libraries.

Amy-Jane McWilliam is Youth Services Programming Coordinator for Lee County Library System and oversaw field testing in their branch libraries. She forwarded the following report from their Young Adult/Youth Services Library Associate, “Thirteen young patrons took a walk around our Pine Island branch to complete the Mosquito Habitat Audit activity. To bring the walk home patrons completed drawings of their homes and items around them that could breed mosquitoes. They also

drew portraits of either male or female mosquitoes and learned how to make a mosquito trap to use at home."

Another tip from participating libraries is to have a recycling box out one to two weeks before their program to collect plastic bottles to use for the mosquito trap activity, which was extremely popular. You can find a video demonstrating how to build a trap at https://youtu.be/fQU0j7Q1gpU

You can find the *Mosquito Habitat Mapper* Audit and Build a Mosquito Trap activities in the GLOBE Observer Toolkit for Informal Educators at: https://observer.globe.gov/toolkit/

Check out the section for *Mosquito Habitat Mapper* where you will find activities, books, videos, and more that can be used in programming.
https://observer.globe.gov/toolkit/mosquito-habitat-mapper-toolkit

What's the Buzz? Mosquitoes in the News

Malaria control efforts require implementation of new technologies that manage insecticide resistance. *Metarhizium pingshaense* is a fungus that provides an effective, mosquito-specific delivery system for potent insect-selective toxins. This new technology is detailed in the May 31st edition of Science.
https://science.sciencemag.org/content/364/6443/894

Another description of the approach of trying to reduce the population of malaria-transmitting mosquitoes using a genetically modified fungus. https://www.bbc.com/news/health-48464510

One of the complicating factors with vaccine development for Zika is the antibodies produced could amplify symptoms from a dengue infection. One approach using an attenuated adenovirus did not produce such antibodies.
https://www.sciencedaily.com/releases/2018/12/181220104733.htm

Unfortunately, there is no West Nile Virus vaccine (WNV) available for humans. There are a number of WNV vaccines for horses. Apparently, horses do not have opinions on vaccines.
https://www.niaid.nih.gov/diseases-conditions/wnv-vaccines

The Fairfax County Health Department has posted a "West Nile Story" that uses rap to send the message about West Nile virus prevention. https://youtu.be/fQU0j7Q1gpU

In the Washington, D.C. area, it is highly likely three species of *Aedes* mosquito have become established in the region since 2001. These species are *Aedes albopictus* (Asian tiger mosquito), *Aedes aegypti* (yellow fever mosquito), and *Aedes japonicus* (Asian rock pool mosquito). Learn more here: https://dchealth.dc.gov/page/mosquito-borne-diseases

A Guide to Mosquito Repellents, From DEET to… Gin and Tonic?
Ever wonder the best way to avoid being bitten by mosquitoes? This article from NPR covers a variety of effective methods as well as helps shed light on some ineffective methods.

News from the GLOBE *Zika Education and Prevention Project*

Students from the 30 countries participating in the GLOBE Zika Education and Prevention Project submitted a total of 18 mosquito-related research projects for the GLOBE 2019 International Virtual Science Symposium (IVSS). The student reports offered a wide range of research topics, including mosquito behavior analysis (combining protocols from the GLOBE mosquito protocol bundle); collecting mosquito species-type and quantity data over diverse geographic regions; and providing community-specific education and engagement recommendations to reduce the spread of mosquito-borne diseases. GLOBE would like to thank all of the students, teachers, and advisors for their mosquito-based IVSS report submissions.

Two student teams from each of the regions participating in the Zika project were selected to present their mosquito research at GLOBE's 23rd Annual Meeting:

Africa Region
Kenya (St. Scholastica Catholic School): "Research on mosquitoes and the diseases they transmit"
Madagascar (University of Antanananarivo): "Surveillance of Aedes albopictus mosquitoes vectors of ZIKA in urban area"

Asia and Pacific Region
Philippines (Batasan Hills National High School): "Community-based mosquito vector prevention model: conceptual approach to mitigating the risk of mosquito threats through community empowerment and education"
Thailand (Montfort College Primary Section): "Dengue situation with different ecological and environmental factors in the sub-district in Chiang Mai, Thailand"

Latin America and Caribbean Region
Argentina (Science Club Huechulafquen): "Distribution and abundance of mosquitoes in the world. Preliminary report"
Colombia (Colombia GLOBE v-School): "Comparative studies of larvae of mosquitoes present in the gardenia's urbanization, Barranquilla-Colombia"

Honor Roll

Most active over the past 30 days (as of June 10th)

GLOBE Member	School/ Institution	Country
G. Palacios	I.E. Enrique Lopez Albujar- Piura	Peru
E. Taborda	Columbia GLOBE v-School	Columbia
I. Mauad	Escola Minas Gerais	Brazil
G. Aikpon	University of Abomey Calavi	Benin
J. Bouwman	Shumate Middle School	U.S.A.
P. Pongmanawut	Princess Chulabhorn Science High School-Trang	Thailand
F. Gueye	lycee Thilmakha	Senegal
M. Ndiaye	lycee Thilmakha	Senegal
H. Akoffodji	Centre de Recherche Entomologie CREC	Benin

Upcoming Events

June 19th: Citizen Science webinar 2 PM ET
Making Maps: Introduction to data reporting mapping tools

June 25th: American Library Association annual conference, Wash., D.C.
GLOBE Mission Mosquito will be at the NASA booth promoting the new “Zika Zine” booklets.

July 9th: Education webinar 2 PM ET
Using NASA Earth Observations for Mosquito-borne Disease Applications

July 14th through 18th: GLOBE Annual Meeting, Detroit, MI

GLOBE Mission Mosquito is an initiative of **NASA Goddard Space Flight Center** and the **Institute for Global Environmental Strategies**, in partnership with **The GLOBE Program**.

Learn more at **www.globe.gov/web/mission-mosquito**.