Mosquito Habitat Mapper Project Migration: NASA GLOBE Observer to CitSci

Nik Clark, Zachary Cramton, Kasper Evenson, Sean Mateer, Sean Pearson, Blake Schultz, Madison Stroker, & Cooper Treu

Colorado State University

Department of Ecosystem Science and Sustainability

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A. Introduction

Background Information

NASA GLOBE Observer's Mosquito Habitat Mapper is a participatory science tool that empowers community members to track, monitor, and eliminate mosquito habitats worldwide. This tool is successful through its use of citizen science, a method that allows community members to engage in research projects through data collection and observation (GeoDI Lab, n.d.).

Mosquitoes are considered the world's deadliest vector of disease (Centers for Disease Control and Prevention, n.d.). Mosquito-borne illnesses such as malaria, dengue, and Zika virus are prevalent worldwide; therefore, by gaining a better understanding of mosquito biology, ecology, and behavior, we can prevent the spread of disease (Centers for Disease Control and Prevention, n.d.; GeoDI Lab, n.d.).

Involving the community in this process is a key component of the project. Tracking and identifying mosquito habitat is too much work for scientists and researchers alone. By giving the community an opportunity to record mosquito habitat, this project gives community members and planners the tools to remove them. These efforts will enhance the health and well-being of these communities by reducing the risk of mosquito-borne disease.

GLOBE Observer, a NASA-supported citizen science app, has hosted the platform since 2016. By the year 2022, over 32,000 observations had been submitted by citizen scientists from 84 countries, mostly Thailand, India, and the United States (Low et al., 2022). Researchers working with GLOBE Observer are also considering using CitSci as a data-collection component for the project. CitSci is also a global citizen science platform that supports project development and community-based research. While GLOBE Observer and CitSci share many features, it is important to highlight the differences between the platforms to ensure that CitSci has the tool capabilities to host the Mosquito Habitat Mapper.

Purpose

We have developed this report to summarize what the migration of the Mosquito Habitat Mapper from GLOBE Observer to CitSci would entail. This report compares the platforms, considering what data transfer from one platform to the other would require, and developing a new CitSci project. We have also included an analysis of historical mosquito habitat data for Fort Collins, Colorado, to better inform where monitoring should occur to help pilot the CitSci project. We conclude by providing recommendations to ensure the project migration is successful, based on our research and experience.

Stakeholder Needs and Deliverables

Our stakeholder requested three main deliverables at the onset of this project, including:

1. A fully built CitSci mosquito monitoring project modeled on GLOBE Observer
2. A comparative brief assessing similarities and differences between GLOBE Observer and CitSci for mosquito monitoring
3. An ArcGIS StoryMap showing Spatial analysis outputs (maps and summary statistics) identifying mosquito habitat patterns in Fort Collins

The CitSci project (Part C) and ArcGIS StoryMap (Part D) were completed as requested. The comparative brief (Part B) was updated over the course of the project to analyze the image resolution capacity of CitSci's platform, addressing a new stakeholder need. Finally, we developed this paper as a recommendation report deliverable that gathers our recommendations for CitSci in moving forward with this project. For an overview of the recommendations made in this report, reference Part E.

Links to External Deliverables
Access the CitSci Project: https://citsci.org/projects/mosquito-habitat-tracker/
Access the StoryMap: https://arcg.is/CS8f

Relevance to Fort Collins, Colorado

Fort Collins provides a good study site because the West Nile virus is so prevalent. According to UC Health, Colorado experienced the worst West Nile virus outbreak in the US. Furthermore, there was a 200% surge in West Nile virus in 2025. (McCrimmon, 2025) Laramie County has the highest rate of West Nile infection in the state (CDPHE, 2025), due to favorable climate conditions for *Culex sp.* mosquitoes to breed. Northern Colorado's abundant irrigated agriculture creates a lot of slow stagnant water, which these mosquitoes use to breed. Additionally, the dense population center of Fort Collins creates a perfect storm for high infection rates. These factors make it important to engage the public and raise awareness of the risk of mosquito-borne disease.

B. Platform Overview

NASA GLOBE Observer

GLOBE Observer is a NASA program launched in 1995 to encourage people to participate in environmental research (USAGov, n.d.). GLOBE Observer hosts citizen-generated data on the atmosphere, water, soil, and other environmental topics, with participants contributing more than 145 million measurements from 119 different countries (USAGov, n.d.). These measurements have been conducted by students, teachers, researchers, and community members around the world.

EMERGE has developed a curriculum that explains the purpose of the Mosquito Habitat Mapper, outlines the project protocol, and provides guidance on data analysis and project statistics. To participate in the Mosquito Habitat Mapper, users need to identify a site with standing water and open the GLOBE Observer app. The app will guide you through questions that ask about the type of habitat and the presence of mosquito larvae. Participants will also be encouraged to destroy mosquito habitats by eliminating breeding sites by dumping out the water after making their observations (GeoDI Lab, n.d.).

Citsci

CitSci is a global citizen science platform that supports community-based research by simplifying the design and implementation of projects (CitSci, n.d.). Founded in 2007, the platform was developed at Colorado State University in Fort Collins, Colorado. It has since grown into a large network of contributors interested in environmental and scientific questions at different scales. As of 2026, approximately 188,000 observations in 92,000 different locations have been recorded (CitSci, n.d.).

The platform is designed for public participation, enabling volunteers to contribute observations that support environmental monitoring, research, and decision-making. CitSci can gather data across broader areas and for longer time periods than smaller research teams can usually manage. The range of applications and strong, science-focused design make it a robust platform for projects that depend on consistent data collection and active community involvement, from small local efforts to large-scale environmental monitoring projects.

App Comparison

Citizen science platforms enable researchers and communities to collaborate in collecting environmental data. Two global platforms, NASA GLOBE Observer and CitSci, support public participation in scientific research and can host the Mosquito Habitat Mapper. NASA GLOBE Observer has demonstrated success in hosting the project, and CitSci shows the same potential. While both platforms are sufficient for allowing volunteers to contribute observations, they differ in project design, data structure, and user experience.

Shared Goals and Participation

Both platforms rely on citizen participation to gather observations. Volunteers contribute data that can support research, monitoring, and decision-making. In GLOBE Observer, observations are typically submitted by trained teachers, students, and citizen scientists. CitSci also allows volunteers to contribute observations, but participation occurs within projects created and managed by platform users' accounts.

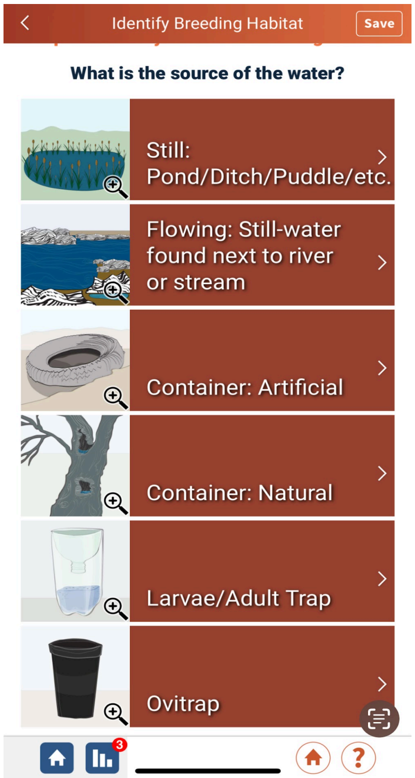

Figure 1. Recording an observation on GLOBE Observer's Mosquito Habitat Mapper.

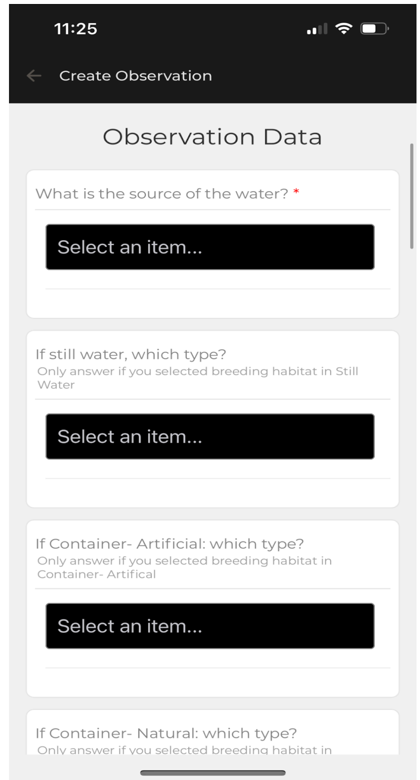

Figure 2. Recording an observation on CitSci.

Another similarity is the ability to organize and share observations geographically. Both platforms allow users to record data tied to specific locations and visualize information spatially, helping researchers understand environmental patterns across regions.

Project Structure and Flexibility

Both platforms can host a large-scale participatory science program. While CitSci operates primarily as a project-building platform where users can design their own citizen science initiatives, it also allows users to create a "Project Hub." A CitSci Hub allows an organization to run multiple citizen science projects through one centralized dashboard.

Similarly, GLOBE Observer follows a more structured framework that is connected to a larger scientific program. The platform focuses on collecting observations in specific environmental categories such as clouds, mosquito habitat, land cover, and trees. In addition to volunteer observations, the platform incorporates data from automated weather stations and individual data loggers.

Satellite Data and Monitoring

Another key distinction involves the use of satellite imagery and remote sensing data. GLOBE Observer integrates satellite observations with user-submitted data, allowing participants to compare ground observations with satellite measurements.

CitSci does not regularly update satellite imagery within the platform. While this limitation could affect projects that rely on remote sensing, such as identifying new standing water for mosquito habitats, it is not necessary for all projects focused on community-based field observations.

User Experience and Data Interaction

The two platforms differ in usability and data interaction. CitSci is designed to make project creation simple and accessible, and its webpages provide clear guidance for project creators, managers, and observers. These resources make the process of building a project and a dataset fairly intuitive. However, the platform provides fewer tools for directly manipulating and analyzing data internally. The website also tends to offer a more intuitive user experience than the mobile app for volunteer management and data manipulation. The website allows project managers to more effectively create and configure projects and visualize results through charts, maps, and statistics (CitSci, n.d.).

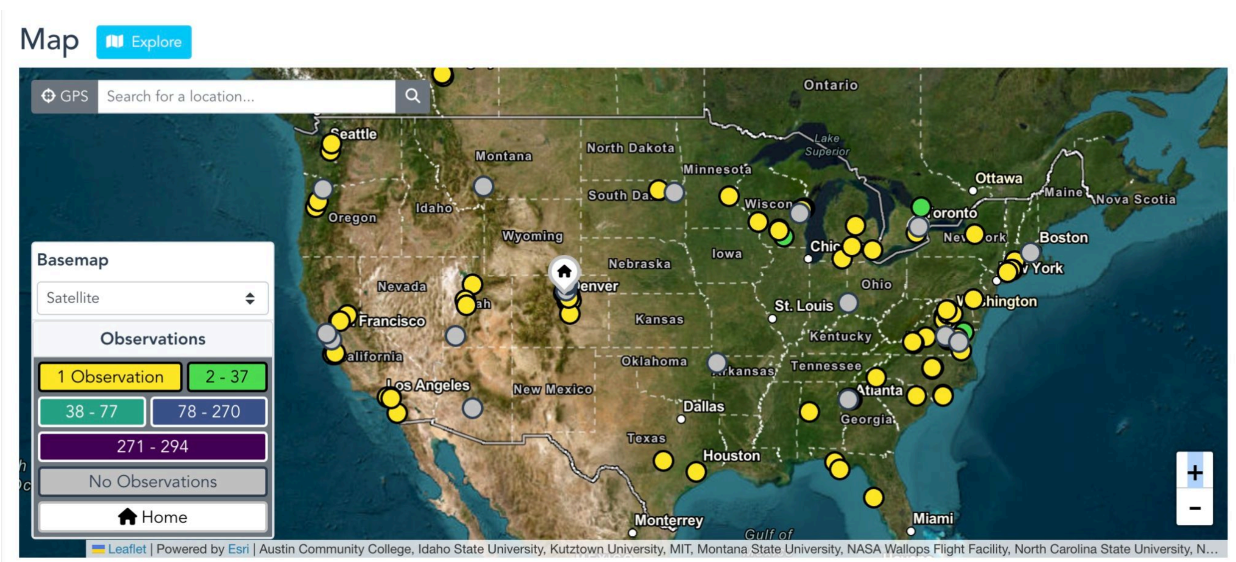

Figure 3. Map derived from CitSci.org demonstrating observations made in the Leave No Trash project.

GLOBE Observer does offer stronger built-in visualization tools; however, the platform's many features and datasets can make it feel overwhelming. Because it integrates large amounts of environmental and satellite data, users often need a clear understanding of what information they are trying to access. The GLOBE Observer app is available on Android and iOS and allows users to collect and submit observations to a project of their choice. This app is overall easier to use and navigate than the CitSci app because it offers clear step-by-step instructions for each observation type and in-app training modules (GeoDI Lab, n.d.).

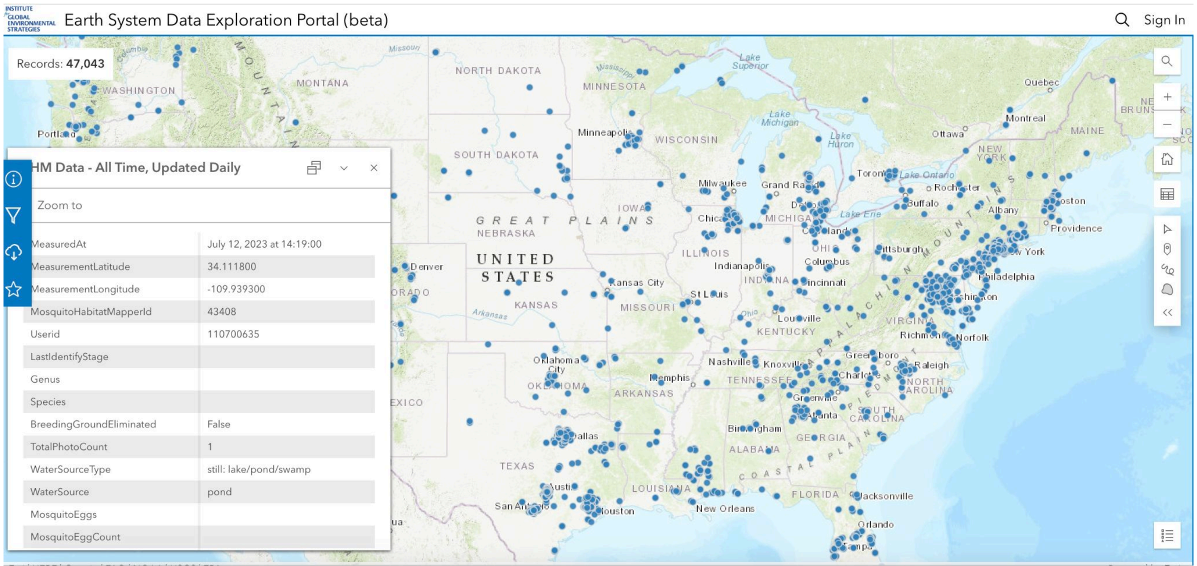

Figure 4. Map derived from GLOBE Observer's Mosquito Habitat Tracker.

Image Resolution Comparison

Peder Nelson raised the issue of image resolution as an existing deficiency in the GLOBE Observer framework. He identified the existing dataset as supporting 1080p (HD) images, but noted that higher resolutions were preferable at the expense of more storage space. Addressing this portion of the comparison and exploring the full capabilities of CitSci's database structure was beyond our group's skill set. The complexity of the imagery data and the associated database management for the photo collection and storage were not within our team's expertise. We confirmed that CitSci supports the 1080p images, but were unable to complete any testing beyond that.

An excellent future project for a group specializing in data science or database management would be to explore the platform's compression, data loss, and full capabilities. This future project should include discussions with the CitSci database engineers and users to hone in on the best balance between image resolution and storage capacity for each project. This group may also be better suited to explore the color gambit and metadata management, Peder mentioned as being valuable.

Data Migration

NASA GLOBE Observer Data Characteristics

The GLOBE Observer Mosquito Mapper dataset presents a substantial migration challenge due to both its volume and the complexity of its associated media. The dataset comprises 40,000–60,000 records, each containing over 50 attributes and up to 6–10 photographs captured at 1080p resolution or higher. Total imagery storage requirements are likely approximately 5 TB for the tabular data and associated image files. Any viable migration workflow needs to account for tabular data and the associations between records and their media, making it significantly more complex than a simple CSV import.

Obstacles to Data Migration

Several technical and logistical factors complicate the migration of this dataset to the CitSci platform:

- **Storage infrastructure:** Physical storage capacity at CitSci partner institutions must be confirmed before proceeding. It is unlikely that, even accounting for redundancy, there will be insufficient storage, but it is worth confirming to avoid running into problems partway through the migration process.
- **Media association and ingestion:** A migration system must support bulk media ingestion, validation, and proper linkage between image files and their corresponding records. Tabular upload alone is insufficient.
- **Platform limitations:** CitSci does not currently support bulk data imports from structured CSV or JSON sources with associated media, meaning any automated approach must work around or add features to the platform.
- **Bot countermeasures and automation complexity:** Any browser-based automation approach is likely to be blocked or throttled by CitSci's webform controls[1]. Multi-photo upload automation is substantially more complex than text field entry and may exceed the project team's current technical capacity.

The Best Path Forward

The recommended approach is to modify the CitSci backend to support bulk data imports from structured CSV or JSON files with associated media. This approach is the only option that addresses the migration comprehensively while also delivering lasting value beyond this project. A bulk import capability would serve as a reusable migration pathway for citizen science

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[1] This assumes industry standard web controls to limit cyber attack vectors including obstacles to mitigate distributed denial of service attacks (DDoS) from bots submitting many requests like a potential mass data entry bot would be doing (*National Cyber Security Centre (U.K)*, 2016).

databases retiring from other platforms, improve broader adoption of CitSci, and act as a safety net for similar future transitions.

While this represents a significant upfront development investment, the long-term return, both for this migration and for the CitSci platform as a whole, makes it the most defensible choice. Before development begins, storage availability at partner institutions should be confirmed, and off-site backups between institutions should be established. The required system modifications should be assessed to ensure the infrastructure can support bulk media ingestion and validation at scale, not only for this project but also for future projects.

Alternative Solutions

API + Webform Automation

Using the NASA GLOBE Observer API to programmatically extract the Mosquito Habitat Mapper dataset and automate data submission via CitSci's webform using a browser automation framework is the most viable interim approach. It falls beyond our team and this project's scope and would make a great future project for a team with stronger data and computer science experience if CitSci cannot add a feature for bulk data upload. That said, this approach faces several obstacles: webform bot countermeasures may block it entirely; checkpointing and recovery logic will be necessary given the data volume; multi-photo upload automation is likely beyond the project's current scope; and schema mapping between the two platforms will require significant time and effort. Code produced this way is also unlikely to be broadly reusable across other citizen science projects, even if it is made open source due to the specific nature of the project data.

Manual Data Entry

Manual entry at this scale introduces an unacceptably high risk of data error; transposed numbers, misread rows, and cumulative inaccuracies would undermine the scientific value of the dataset. Beyond data integrity concerns, manual entry incurs wage costs and creates a poor experience for data entry technicians. Repetitive mass data entry discourages skill development and may deter potential future researchers from pursuing data science. This option should only be considered as a last resort if all other approaches fail. This approach could also explore using AI assistants to fill out the web form using CSV or JSON data. That said, data security and accuracy are both concerns, and strict monitoring would be required even once a workflow was established.

C. Creation of the CitSci Project

Goals and Objectives

The general goal of building a CitSci version of the Mosquito Habitat Mapper was to test whether the platform can technically host the workflow that GLOBE Observer has been running for a while now. We set out to recreate the mosquito habitat mapper on Citsci without losing the working features from GLOBE Observer, which included habitat type, larvae presence, and photo uploads. We tried to make it simple for first-time volunteers to join, submit an observation, and see it appear on a map.

A second goal was to figure out where CitSci falls short compared to GLOBE Observer, so stakeholders know what to expect if a full migration moves forward. Some of the differences are clear from reading the document, but others started to emerge once we began building the CitSci project and seeing what it looks like from a volunteer side of things. We wanted to see those firsthand, so our later recommendations reflect the problems we encountered, not just what the platforms do. We also wanted to keep the project useful at the local level. Fort Collins has a long history with West Nile virus and an active mosquito control program through VDCI, so we built the project to be tailored for Fort Collins.

Using the CitSci Mosquito Habitat Mapper

Getting Started

1. Download the CitSci app on your Android or iOS device, or visit CitSci.org on your browser.
2. Create a free account.
3. Search for **"Mosquito Habitat Mapper"** and join the project.
4. Select the available data sheet to start submitting data.
5. The platform will walk you through the necessary questions to complete the data entry.

Submitting an Observation

When you're out on a walk or actively looking around your neighborhood, keep an eye out for standing or slow-moving water; these are the most common mosquito breeding sites.

1. **Find a potential habitat** — this could be a puddle, a container holding water, a drainage ditch, or any other area where water pools or sits still.
2. **Check for larvae** — look closely at the water's surface or just below it for small wriggling larvae. Note whether larvae are present or absent.

3. **Take photos** — photograph the habitat and, if visible, the larvae. Clear images help with data quality.
4. **Open the CitSci app** and navigate to the Mosquito Habitat Mapper project.
5. **Fill out the datasheet** — record the habitat type, whether larvae are present, and upload your photos. Make sure your location is enabled so your observation is mapped correctly.
6. **Eliminate the habitat if you can** — if it is safe and practical (like dumping out a bucket or flowerpot tray), do it. This step is optional but encouraged.
7. Submit your observation.

What counts as a mosquito habitat?

- Standing water in containers (buckets, flowerpots, bird baths, gutters)
- Puddles or low spots that hold water for several days
- Slow-moving or stagnant ditches and ponds
- Areas near the Poudre River or irrigation channels after snow melt or rain

Tips for best results

- Observations collected between **June and July** will be most valuable, that is, peak mosquito season in Northern Colorado.
- You do not need to find larvae to submit. Reporting a potential habitat with no larvae present is still useful data.
- Good lighting and close-up photos make a big difference for data quality.

Successes and Challenges

Our team successfully prompted questions that provide the same data as the GLOBE Observer platform. Challenges arose with the layout of the prompted questions, where the branching ability of the questions in the Observer platform was not supported by the CitSci platform.

D. Project Integration in Fort Collins

Climate Analysis and Seasonal Habitat Recommendations

Mosquito abundance due to temperature and other climate/habitat reasons.

In temperate and humid climates, standing water is the most common habitat for mosquitoes. This is due to the breeding habits of mosquitoes, as they lay eggs in bodies of water.

Different species of mosquitoes require different ideal habitats.

Varied mosquito species have unique breeding habits, which will lead to changes in the ideal habitat for mosquitoes. “Floodwater mosquitoes” prefer temporary water areas that allow their eggs to dry and go dormant before hatching following storms, irrigation, snowmelt, or stream alteration (CDC, 2024).

Mosquitoes that have seasonal life cycles; seasonality drastically affects mosquito abundance.

Temperate climates will show peak virus transmission in warmer months, and tropical climates, hot months, and precipitation will align with disease outbreaks, respectively (Meuti, 2026). When sampling mosquitoes, there is significant variation in the time of year at which samples were collected. It is common for mosquito numbers to be higher in the summer months between May and June (Kirik et al., 2021).

Northern Colorado mosquito species and abundance

Seasonal runoff is the largest source of standing water during the winter months in poorly drained areas.

Pippins and Culex mosquitoes are the most prevalent in Northern Colorado and have the highest vector potential. Species within the *Culex* genus, particularly *Culex pipiens* and *Culex quinquefasciatus*, are primary vectors of West Nile virus and other arboviruses that affect both human and wildlife populations (Centers for Disease Control and Prevention [CDC], 2023).

Photoperiod and temperature also regulate overwintering strategies. In northern latitudes, *Culex pipiens* females enter diapause (hibernation) during shorter day lengths and cooler temperatures, allowing populations to persist through winter (Spielman & Wong, 1973). This adaptation is why the Culex genus can survive the cold winter months. These mosquitoes in diapause will not be readily viewable in their respective habitats.

Recommendations and limitations for the best times to prepare and collect data

Land cover mapping has been analyzed with GIS to define seasonal differences in Northern Colorado (Schurich et al., 2014). In this analysis, areas susceptible to high snowmelt could be remedied for the summer months, and areas susceptible to irrigation could be remedied before the summer months (Schurich et al., 2014). Seasonal variation plays a crucial role in mosquito habitat and abundance. Modeling, preparation, and data collection during off-peak months are feasible for temperature, precipitation, land cover, and habitat type.

The Citsci application will include a heatmap with mosquito habitat data. It will allow data collection during the off-season to compare mosquito abundance with data from when mosquitoes are in season. Seasonal high-abundance data suggest mosquito habitats will be most visible and accessible from June-July in northern Colorado.

This project was undertaken in the early months of 2026, which was not an ideal time (June-July) to collect habitat data using CitSci. We recommend that any CitSci researchers in Fort Collins conduct data collection during peak mosquito season.

Historical Data Collection

The data collection and visualization teams collected a variety of historical data sources to better contextualize the effects of mosquitoes in Fort Collins and ensure our CitSci project will be useful and relevant. These data sources were built on the literature reviews conducted for previous sections of this report to create visual outputs that contributed to our final deliverables.

This data benefits more than just the outcome of our project. Making this information publicly available and digestible allows Fort Collins residents to better understand the complexity and scope of mosquito-borne disease transmission in their community. This understanding has previously been linked with the effectiveness of vector control strategies (Lopes-Rafegas et al., 2023). This is also the principle behind the GeoEMERGE curricula, which teaches citizen scientists with no prior knowledge how to interpret and present data collected through the current GLOBE Observer project (GeoDI Lab, 2025). In this way, our historic data collection and deliverables contribute towards the future goal of creating similar curricula for the CitSci project.

Data Collection Process

Since we were unable to collect our own data due to seasonally unfavorable conditions for mosquito life cycles, we outsourced data collection. The data collection team reached out to the City of Fort Collins disease control and the Larimer County data center. They discovered that they work with a company called Vector Disease Control International (VDCI). The data collection team got in touch with a local VDCI representative. We were able to gain insight into what makes a mosquito habitat, how prevalent West Nile is, and how they collect their data. We found that they had data on trap locations and the number of mosquitoes trapped. We worked with them to acquire non-contemporary data, which was used to create an ArcGIS StoryMap. The function of this map was to visualize hotspots of trapped mosquitoes, allowing CitSci to identify mosquito hotspots and breeding areas.

Collecting Survey Data

One of the main goals of the data visualization team was to create a survey to better understand how people in Fort Collins interact with mosquitoes. The survey was distributed online using Google Forms and shared primarily through Reddit, and a total of 17 responses were collected. We looked at where participants commonly encounter standing water sources and experience mosquito activity throughout Fort Collins.

After collecting responses, we identified patterns and trends in the data. Common standing water sources reported by participants included ponds (15 responses), puddles (13 responses), reservoirs/lakes (10 responses), and ditches (9 responses). Many respondents also identified locations such as City Park, Horsetooth Reservoir, Rolland Moore Park, and the CSU campus as areas where they commonly encounter mosquitoes.

We then used these results to create visualizations that clearly displayed common mosquito bite locations and habitat types. These visualizations made it easier to interpret survey results and better understand how environmental conditions and human activity may influence where mosquitoes are frequently found. The survey also helped us compare locations where residents reported mosquito activity with existing VDCI monitoring sites throughout Fort Collins. By combining survey responses with historical mosquito trap data, we were able to better identify areas where future mosquito monitoring and data collection efforts may be most useful.

Presenting the Data using ArcGIS StoryMap

We used the data we collected to inform our ArcGIS StoryMap final deliverable. Over the course of the semester, the StoryMap went through many forms. The final recommendation incorporates land cover, mosquito locations and densities, and imagery collected during site visits to determine where citizen science will be most effective in Fort Collins.

The first step in creating the StoryMap was cleaning the data we received from VDCI to load it into ArcGIS Pro. The data visualization team did this in RStudio by loading the provided CSV files into a new project and performing a full join of the two tables on the common column that listed trap ID. The joined table was then exported as a new CSV and imported into ArcGIS using the latitude and longitude for each trap site.

Using this data, we were able to determine several important points. For one, by overlaying the bite map generated from our survey results with trap locations, we found that places where Fort Collins residents have interacted with mosquitoes do not necessarily align with locations where VDCI monitors mosquito populations.

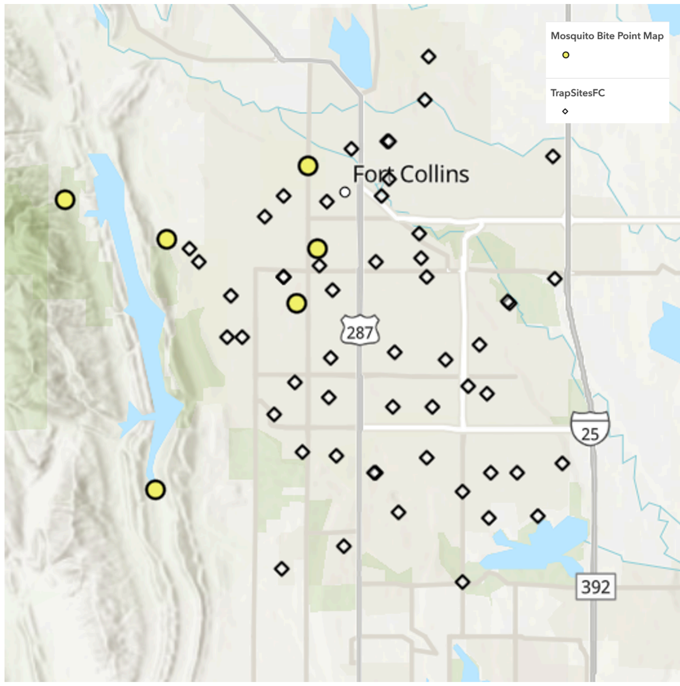

Figure 5. A map showing where survey respondents reported interacting with mosquitoes (yellow circles) compared with VDCI trap sites (white diamonds) in Fort Collins.

We were also able to use trap-catch data to create heatmaps showing mosquito density. Figure 6 shows both heatmaps; one calculated using the number of species caught per trap between June and September, and one showing the total number of mosquitoes caught at each trap using the species catch count variable provided in the original CSV. When comparing the Bite Map, there is no clear pattern between sites with higher mosquito density and those with lower bite rates, which suggests Fort Collins residents are not experiencing mosquitoes in their primary habitats.

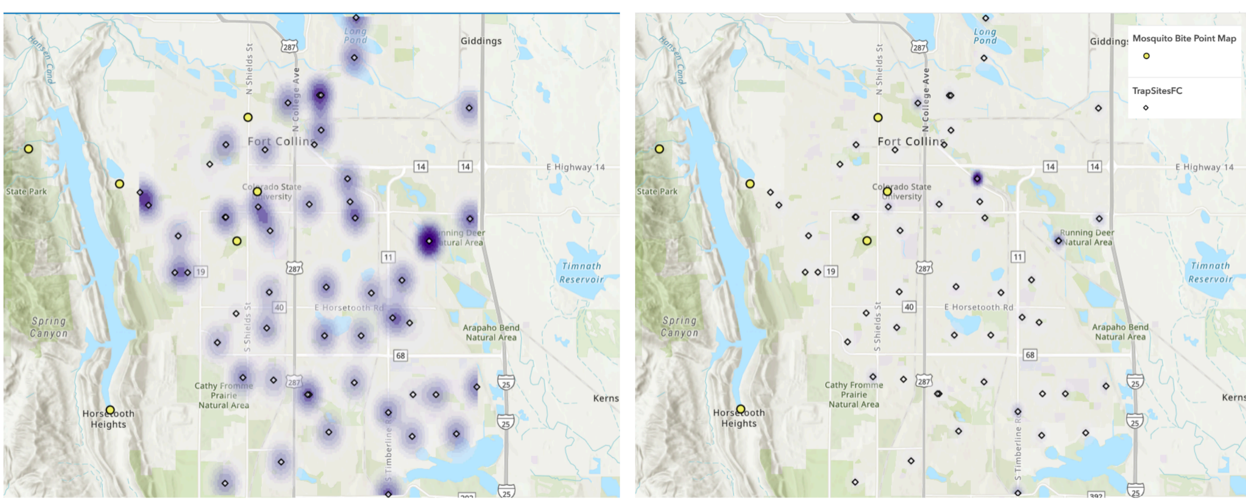

Figure 6. ArcGIS-generated heatmaps showing the number of unique species found in VDCI traps between June and September, 2023 (left) and the total number of mosquitoes captured over that same time frame (right).

This then led us to ask the question: How can we ensure that citizen scientists will accurately identify mosquito habitat?

To answer this question, the data collection team conducted site visits at one Bite Map location and one trap location. They photographed useful visual indicators at each site to show citizen scientists what to look for when identifying mosquito habitat. This showed that at the trap site (left), vegetation touching the water, along with trash and other pollution, provides the shade and nutrients that mosquito larvae need to thrive. At the Bite Map location (right), these features are absent, likely due to more frequent human use.

Figure 7. Comparison of a VDCI trap site (left) and a citizen-reported mosquito bite site (right). The trap was found at Red Fox Meadows Natural Area, and the mosquito bite occurred at Rolland Moore Park, both located in Fort Collins.

Finally, we wanted to ensure this feature would benefit the citizen scientists using our app. We gauged interest through our survey.

1. Would you track mosquito sightings and habitats in a citizen science app?
2. Would you be more likely to participate if you were assigned an area to collect?

While a majority of respondents had no change in opinion or were unsure what it meant, some indicated that it would positively influence their interest in the program, suggesting this feature may also contribute to the app's recruiting potential.

After taking all this data into account, we recommend that CitSci partner with VDCI to assign data-collection areas to citizen scientists participating in our project. By using citizen scientists to increase the surface area and frequency with which mosquitoes can be surveyed, and habitat can be destroyed in assigned areas of interest, we can ensure that the data collected will be relevant to public health efforts.

E. Recommendations

Summary of Recommendations

CitSci Image Resolution

We recommend that a group specializing in data science or database management conduct a future project to explore compression, data loss, and the full capabilities of the CitSci platform. This future project should include discussions with the CitSci database engineers and users to hone in on the best balance between image resolution and storage capacity for each project.

Data Migration

The recommended approach is to modify the CitSci backend to support bulk data imports from structured CSV or JSON files with associated media. This is the only option that addresses the migration comprehensively while also delivering lasting value beyond this project. Alternative options may include API and Webform automation, as well as manual data entry.

Seasonal Variation

Due to seasonal variability in mosquito abundance, mosquitoes are most abundant from June through July in northern Colorado. With this, areas susceptible to high snowmelt and irrigation are predictable and could be remedied or studied for June-July. Recommendations for citizen science users include analyzing areas with seasonal runoff, as the biggest source of standing water through the winter months, in not properly drained areas from snowpack and irrigation.

Survey Data and Citizen Science Participation

We recommend continuing to explore ways to improve participation in CitSci. Survey responses suggested that many participants may be more willing to contribute if the project provides a clearer structure and guidance. One possible approach would be assigning volunteers specific areas within Fort Collins for mosquito monitoring and data collection. This could help spread data collection out across the city and give participants a clearer idea of where to collect observations.

ArcGIS StoryMap

We recommend that CitSci partner with VDCI to assign data-collection areas to citizen scientists working on our project, ensuring the data collected is relevant to public health efforts.

Next steps for the Cit Sci project

Step-by-step video guide
A short video guide should be created after the CitSci datasheet is finalized to supplement user comprehension and clarity. A video guiding users through the process of making an observation was very helpful in familiarizing our team with the GLOBE Observer app, and a similar video should be made available for the project on the CitSci platform.

Updating science kits and implementation
Taxonomic keys need to be created as infographics that are supported in GLOBE Observer for participant use, but are not in the CitSci datasheet. Once these keys are created, they should be made accessible both on the web and in physical copies and added to the science kits that are available in local public libraries.

F. Conclusion

This report has helped determine CitSci's capabilities to host GLOBE Observer's Mosquito Habitat Mapper. By comparing the tools and features offered by each platform, analyzing the potential to migrate mosquito habitat data to CitSci, and developing a CitSci model of the Mosquito Habitat Mapper, we have determined the feasibility of this project. Overall, CitSci would serve as an effective second platform to host the Mosquito Habitat Mapper due to its ability to support large-scale public projects, provide clear step-by-step instructions, and display observation data in an accessible format.

However, challenges related to data migration and CitSci's ability to store high-resolution images still need to be addressed. While these are certainly barriers, they do not fully restrict CitSci's ability to host the project. Using CitSci as a second platform for the Mosquito Habitat Mapper will likely increase the project's visibility and enhance public participation, accessibility, and long-term data-sharing capabilities.

G. Acknowledgments

Peder Nelson, NASA

Caroline Nickerson, NASA GLOBE & CitSci

Jason Williams, VDCI

CitSci & Poudre Libraries

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