

NASCIO 2019 State IT Recognition Awards



Title: Mobile Field Data Collection
for Food Emergency Response

Category: Information Communications
Technology Innovations

State: Georgia

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EXECUTIVE SUMMARY



Hurricane Michael roared ashore along the Florida panhandle in October 2018 as a category 5 storm and devastated portions of Florida, Alabama, and Georgia.

Agricultural damage from the storm topped \$1.2 billion in Georgia, where an estimated 100 chicken houses were destroyed and more than 2,000,000 chickens were killed. (Source: [CNBC](#)).

In addition, the storm ravaged cotton and pecan crops. Damage to buildings and infrastructure, including electrical power and sewerage, significantly affected food facilities throughout the state, posing a potentially serious threat to food safety.



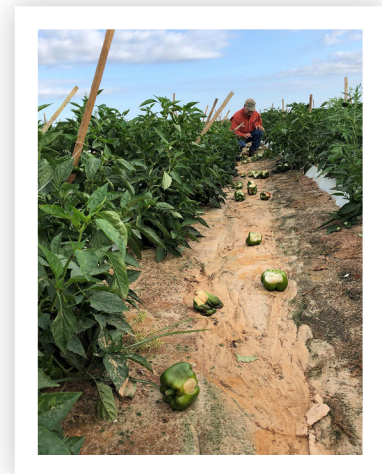
The Georgia Department of Agriculture (GDA) is responsible for ensuring unsafe food doesn't make its way to consumers. Immediately following Hurricane Michael, GDA's Food and Feed Rapid Response Team (RRT) used the agency's newly developed Geographic Information System (GIS) application for the first time to inspect food facilities affected by the storm.

GIS APP BENEFITS:

- Replaces paper forms with electronic surveys that are accessible on mobile devices, such as laptops and smartphones, and prefilled with data about the facility under inspection.
- Data is stored in the cloud and used for real-time dashboards.
- Program staff are able to download data and create advanced reports, which are used to identify facilities that require follow-up actions and to monitor enforcement decisions, such as embargoes on particular facilities.



The use of GIS technology resulted in a nearly four-fold increase in the number of facilities inspected, from the completion of 400 paper surveys following Hurricane Matthew in 2016 to 1,400 digital surveys following Hurricane Michael in 2018. The enhanced operational efficiency, made possible through leading-edge technology, helped GDA inspectors maintain the safety of Georgia's food supply.



>4x Facilities Inspected
400 Paper Surveys Hurricane Matthew
1,400 Digital Surveys Hurricane Michael

PROJECT CONCEPT



In dealing with any kind of disaster, the Georgia Department of Agriculture (GDA) must identify and inspect all facilities that may have been affected by the event to ensure that unsafe food is not being sold to consumers.



GDA implemented a mobile GIS application that allows inspectors to review and upload information quickly, and it also provides a dashboard with real-time status to program managers (Figure 1).

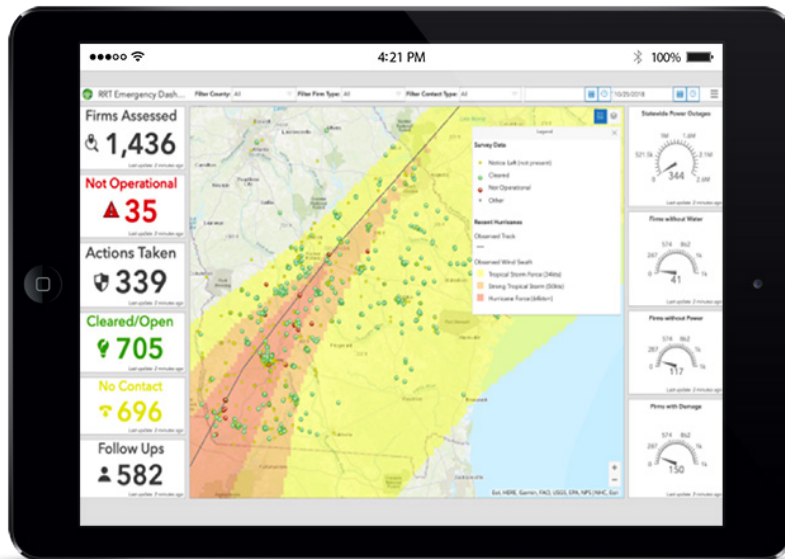


Fig. 1: Screenshot of the RRT Emergency Operations Dashboard, with real-time updates as data are added by inspectors as they complete assessments.

The application was first implemented for GDA's Food and Feed Rapid Response Team (RRT), which was responsible for dealing with the aftermath of Hurricane Michael on food sellers in October 2018.



Before the mobile GIS solution, post-disaster inspections were completed using paper forms. The time needed to enter and process inspection data meant that program managers could not quickly analyze the inspection results. Monitoring problems that could result in unsafe products reaching the market is a crucial responsibility of the RRT, and tracking results manually made the work more difficult, cumbersome, and time-consuming. Program managers needed a solution that would be easy to use in the field but still capture complex data and make it available for decision making. They needed an application that would let them focus on results rather than process.

In addition to the need for a more effective inspection system, pre-event disaster preparedness activities could be greatly improved. With the rollout of a new GIS solution, the RRT could geographically visualize essential information to allow for better decision making in determining not only the areas to focus on in a response but the most efficient and effective way to pre-stage logistics, plan the response, and ultimately conduct the assessments. By identifying and applying new layers of data such as historical storm surge levels, wind, and rain projections (**Figures 2 and 3**), the RRT was prepared to make science-based decisions quickly and effectively.

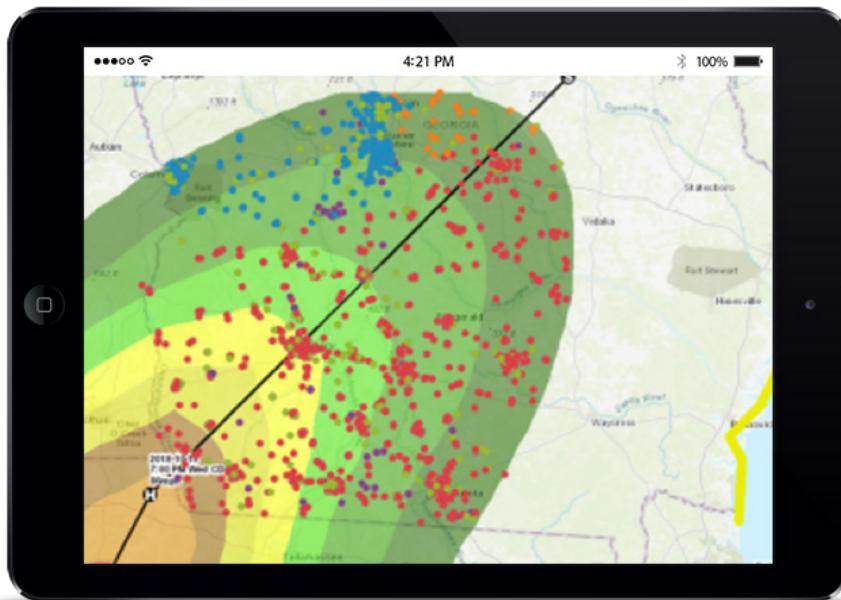
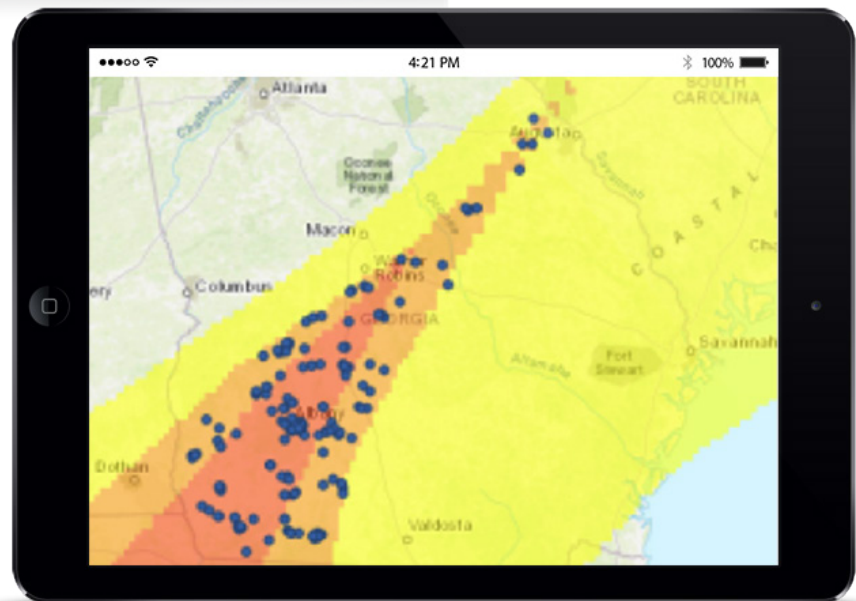


Fig. 2: Anticipated wind projections for Southwest Georgia on Wednesday evening, October 10, 2018, with potentially affected food facilities regulated by the GDA represented by different colored dots on the map.

Fig. 3: The blue dots represent food processors and manufacturers in Georgia that were in the pathway for hurricane and tropical storm force winds as Michael moved across the state.



PROJECT SIGNIFICANCE



The mobile GIS solution is a custom survey (*Figure 4*) that captures the impact to Georgia’s food facilities and assists inspectors in making decisions to protect public health. Designed to replace inefficient paper forms, it integrates existing facility data from GDA’s inspection system with ArcGIS Online and Survey 1-2-3 to create inspection surveys that are prefilled with facility data. The survey is also designed using “If – Then logic,” meaning if an inspector marks a facility as damaged, the survey prompts the inspector to respond to additional damage-related questions. This logic greatly improves the quality and efficiency of emergency assessments. The inspection data are stored in the cloud and used for real-time dashboards. Program staff are also able to download data and create advanced reports.

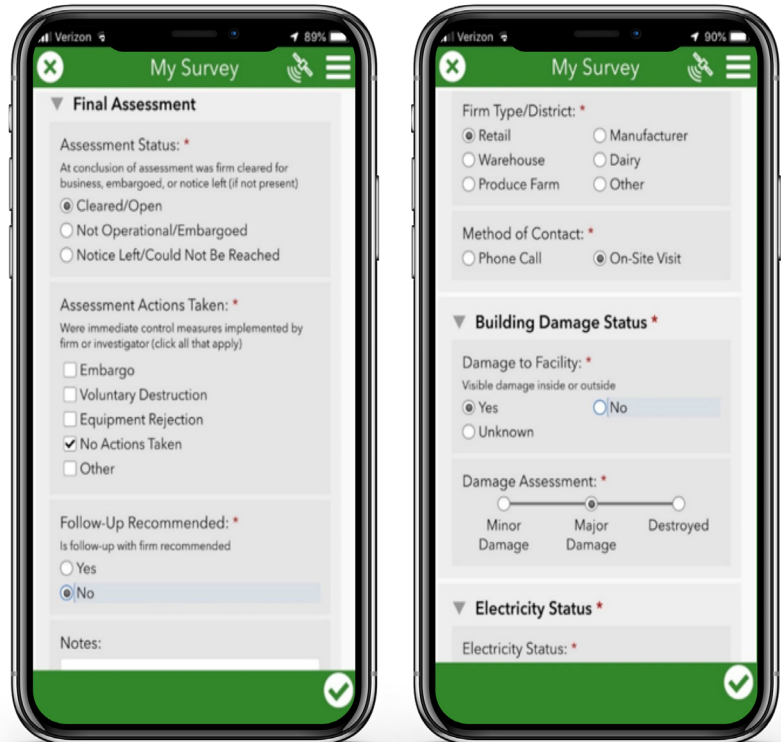


Fig. 4: Screenshots of the RRT Mobile Survey Application.



The type of data collected included a review of each facility’s status of electricity, potable water, sewage system, food handling and preparation areas, and lost food product due to physical damage, loss of power, flooding, and any other circumstance. The survey also tracks whether a food inspector takes any regulatory action, such as witnessing a facility’s destruction of product or rejecting equipment such as a refrigerator that no longer works due to loss of electrical power.

The survey interface is simple and user-friendly to ensure that inspectors are able to focus on the facility’s conditions rather than on completing forms. Using survey data, program staff can identify areas for follow up and monitor enforcement decisions such as embargoing facilities.

As Hurricane Michael approached, mapping technologies allowed staff to predict which food facilities might be affected and to what degree so they were able to allocate resources appropriately in advance of the storm's actual impact. As the storm made landfall and data were collected, the GIS assisted the RRT in making critical decisions in real-time to identify and prioritize areas of the state and even specific food facilities that needed immediate assistance and assessment (Figure 5).

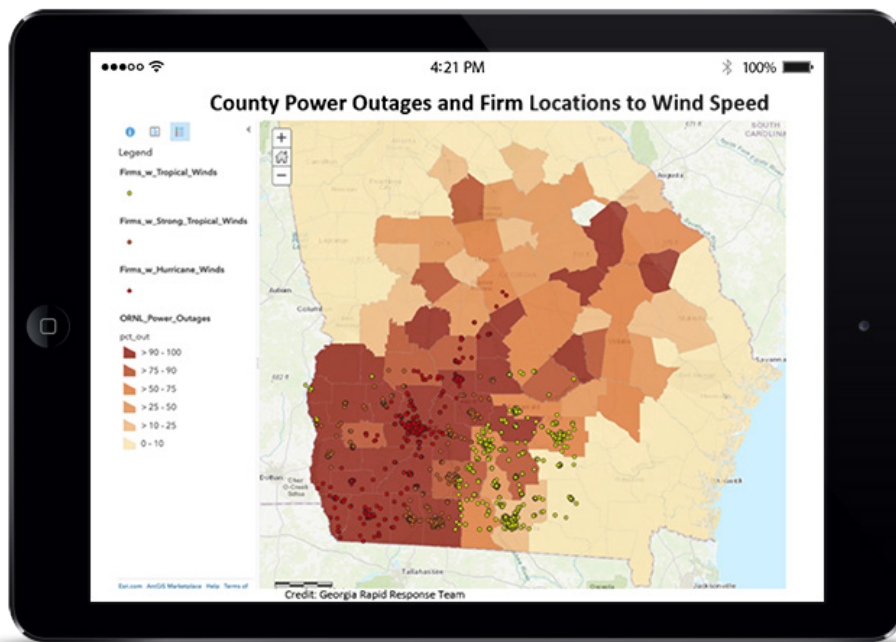


Fig. 5: Shades of brown represent the percentage of county-wide power outages overlaid with food facilities indicated by colored dots representing different observed wind speeds.

GIS technology made it possible for RRT staff to complete surveys from their mobile device or computer even without internet access, either remotely by phone or onsite at a food facility. Because many of the facilities were in areas without cell phone coverage or internet access, inspectors could complete their surveys offline and upload them later if necessary.

Real-time reporting guided continuing response efforts and provided stakeholders and the public with useful information on a timely basis. Staff were also able to provide other state and federal agencies with reports and data as requested.

PROJECT IMPACT



The mobile GIS survey application enabled GDA to inspect all potentially affected food facilities within three days after Hurricane Michael hit Georgia, a task which would have taken more than one week in the past.



The use of GIS in public health preparedness and response was a significant new tool for the RRT, which completed more than 1,400 assessments of food processors, dairy farms, warehouses, distributors, and retail grocery and convenience stores both by phone and in person.

The use of GIS technology resulted in a nearly four-fold increase of facilities reviewed, from 400 paper surveys completed following Hurricane Matthew in 2016 to 1,400 digital surveys following Hurricane Michael in 2018 (**Figure 6**).

Hurricane Matthew (2016)	Hurricane Michael (2018)
400 assessments	1,400+ assessments

Fig. 6: A comparison between the 2016 and 2018 hurricane responses indicated a drastic difference in results.

The GIS application allowed the RRT to effectively enhance pre-response planning, collect electronic data, improve response coordination and timeliness, prompt decision making, and better allocate resources, all of which resulted in cost savings.

The results helped determine the impact to Georgia's food and agriculture sector and guide the state's path to recovery.