



2016 NASCIO Award Submission

STATE OF CALIFORNIA

Title: *Glassy-Winged Sharp Shooter (GWSS) Mobile Trapping App*

Category: *Information Communications Technology Innovations*

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Initiation: April 4, 2014

Completion: June 30, 2015

Executive Summary

The California Department of Food and Agriculture (CDFA) Glassy-Winged Sharp Shooter (GWSS) Trapping System started out as a system comprised of paper and handheld barcode devices on the front end and a static web page to display trapping information on the back end.

Investigators for the Pierce's Disease Control Program would capture data from insect traps on stakes in the field which were each labeled with a barcode sticker to give each trap its own unique trap ID. This has shown to be an unreliable and expensive method, as the barcode stickers would fall off or go missing, and the handheld devices could not reliably function to capture data. This often resulted in investigators logging data by hand on paper and faxing field notes to the office for data entry. The data would then be painstakingly plotted to a map and sent to the United States Department of Agriculture (USDA).

The outdated, time consuming, and expensive method of paper and barcode devices has been replaced by a mobile app on the iOS platform with a dynamic, data-driven web site as the user interface that is capable of generating maps based on real-time data.

The solution has succeeded in streamlining the efficacy of the program by:

- Allowing data to be entered on a daily basis, rather than biweekly
- Plotting data to maps in real-time
- Elimination of human error or duplicated data entries
- Allowing CDFA and USDA to respond to any potential pest findings outside of a quarantined zone for treatment to prevent an outbreak

Description of Business Problem and Solution

Problem

Some of the most common points of failure in the old device (**Figure 1**) and system were:

- Screens in the device were faulty.
- Laser scanner on old barcode device worked intermittently.
- The screen was difficult to read.
- The menu options were difficult to navigate due to changes in backend software, and device could not support system update.
- Bluetooth on devices were not 100% compatible in downloading function.

- Charging the device in the cradle was unreliable, and charging for too long resulted in decreased battery longevity.
- If the device went down, investigators had to collect data on paper, scan and fax to Pierce’s Disease Control Program at headquarters where data must be entered manually by the staff member responsible for oversight of Quality Control in collected data.
- If a barcode sticker had fallen off a trap stake, the field staff had limited resources to identify the trap ID to log data.
- Old barcode devices required annual maintenance contract of \$550 per device, as well as third party software for each field office in order to extract data; which was more expensive than the cost of replacing the device and an overall technology refresh.
- Third party software (**Figure 2**) was required to extract data from the barcode devices, then it was converted to a .csv file and imported and managed in an Access database.
- Due to the time consuming nature of data collection, data was only submitted biweekly to headquarters.
- Positive pest findings outside of a quarantine zone require a Pest Detection Report to be completed by a field office supervisor, and this would often be found at the conclusion of a two week trapping period, requiring extra paperwork to be completed and USDA to be notified.
- CDFA Headquarters staff had to manually plot the trap findings to a map on a biweekly basis by logging into the web service (**Figure 3**).

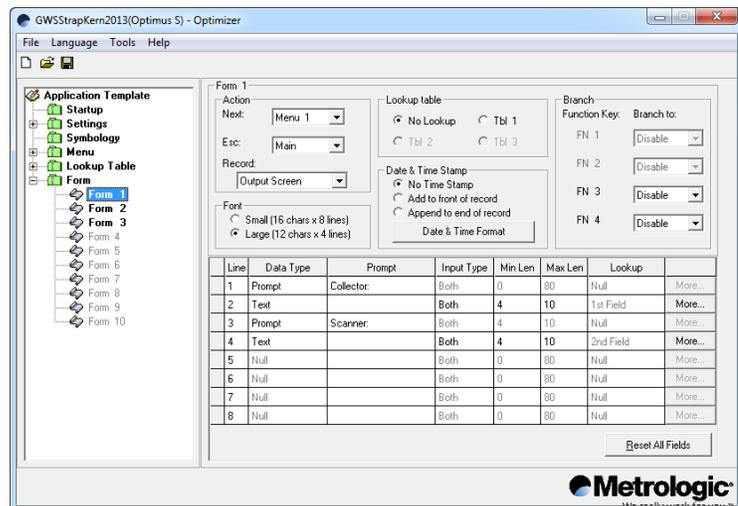


Figure 1 - Old barcode device and barcode sticker

Figure 2 – Third party software for data extraction

Start Date End Date

< March 2014 >

Sun	Mon	Tue	Wed	Thu	Fri	Sat
23	24	25	26	27	28	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

< April 2014 >

Sun	Mon	Tue	Wed	Thu	Fri	Sat
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	1	2	3
4	5	6	7	8	9	10

Create Servicing File
View Servicing
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8892 Records Copied to CSV File

NumAdults	NumNymphGWSS	Collector	Comments	Date	TrapID	Weeks In Field	East Facing Count	West Away Count	Wand	Scan Time	Data Source	Days In Field	NumSTSS	NumLBB	NumLW
0		Michael		3/3/2014	TS0061				TUL891	11:59AM	0				
0		Ryan		3/3/2014	TS0146				TUL745	06:44AM	1				
0		Ryan		3/3/2014	TS0147				TUL745	07:01AM	1				
0		Ryan		3/3/2014	TS0153				TUL745	01:26PM	1				
0		Ryan		3/3/2014	TS0154				TUL745	01:21PM	1				
0		Ryan		3/3/2014	TS0155				TUL745	01:23PM	1				
0		Ryan		3/3/2014	TS0159				TUL745	01:35PM	1				
0		Ryan		3/3/2014	TS0161				TUL745	01:29PM	1				
0		Ryan		3/3/2014	TS0162				TUL745	01:04PM	1				
0		Ryan		3/3/2014	TS0163				TUL745	01:06PM	1				

[1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) ...

Record Number: 8892

Figure 3 - Trap findings used for creating plotted maps

Solution

The new GWSS Trapping App (**Figure 4**) helps with:

- Reduced human error and duplicate data entries.
- Elimination of the need for use of expensive barcode devices requiring costly annual maintenance.
- Elimination of the use of logging data on paper.
- Enabling a faster response time in the event of finding an invasive insect outside of a quarantined zone.

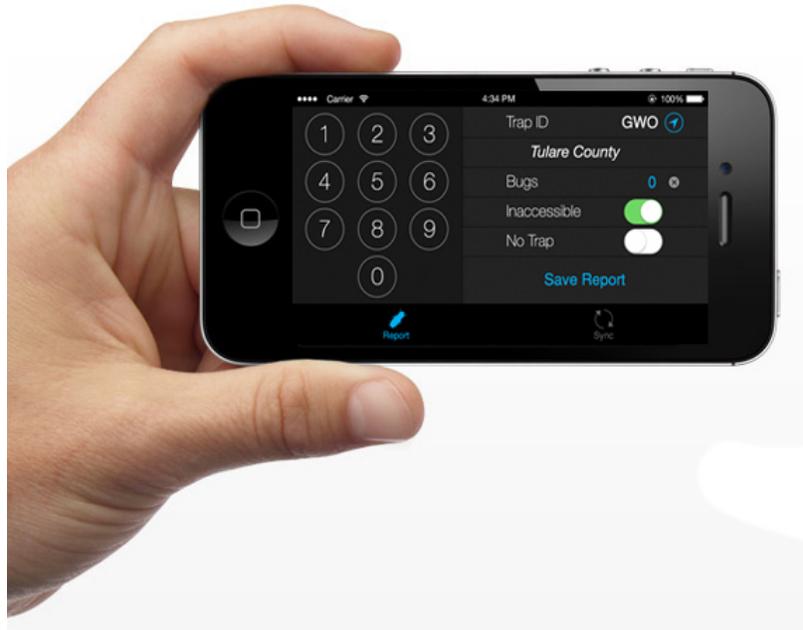


Figure 4 - New GWSS Trapping App

With the development of the GWSS Trapping App, data is now being submitted daily to the field office supervisors and to headquarters, rather than weekly. At the conclusion of each business day, the investigator has the ability to review the records for data entered for each trap before syncing the data to the database. The app works offline, allowing the investigators to work in remote areas where they may not have a cell phone signal, but where GPS is still enabled. In addition, the investigator can now sync – or submit – their captured data to the database by using a WiFi connection.

One of the many features built into the new GWSS Trapping app includes alerts for situations in which an investigator may need to contact their field office supervisor. One such instance would be if an investigator found a GWSS insect in a trap located outside a quarantine zone.

Finding an invasive pest outside of an area that is not known to be in quarantine requires the field office supervisor to complete a Pest Detection Report (PDR), and notify state or county personnel should treatment of the crop be necessary. In the past, with the use of data collected through a barcode device or even manually collected on paper, field office supervisors would not be aware until the conclusion of the business week of insects found outside a quarantine zone, resulting in a delayed response in treatment or further action necessary to ensure the protection of the crop.

With the GWSS Trapping App, however, CDFA can respond to possible infestation within the same business day by alerting the field staff when they should notify their supervisor of a pest finding outside of a quarantined zone.

When data collected in the field is synced to the database through the mobile app, it is reviewed and approved by a field office supervisor who has the authority to submit data to the main database at headquarters. When the data is released to the main database, the data layer is auto-generated to Google Maps (**Figure 5**) to show the level of insects found in traps rather than being manually plotted by staff at headquarters. The data is auto-plotted onto Google Maps and is then utilized by both CDFA and the USDA and can be surveyed in real-time as it is collected.

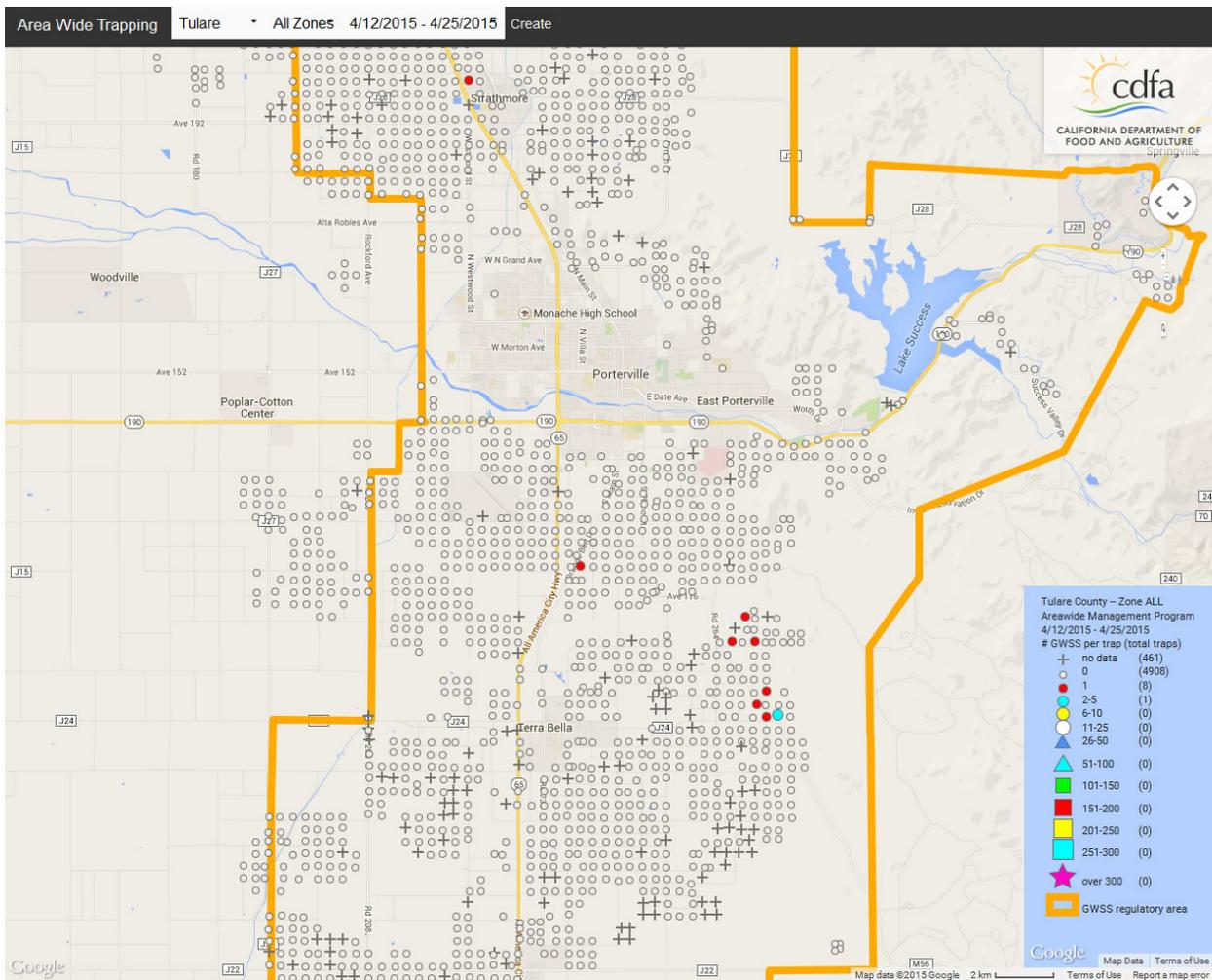


Figure 5 - GWSS trap findings plotted to Google Maps in real time

Significance of the Improvements to the Information Communications Technology

The CDFA GWSS Trapping System has taken advantage of the digital mobile revolution to innovate a faster, more accurate, and clearer way to capture and present data. Having started out as a system comprised of paper and handheld barcode devices on the front end and a static web page on the back end, the GWSS Trapping System has become a dynamic and fully electronic solution. The GWSS Trapping System represents the first successful instance of a mobile database application in a growing portfolio which will streamline processes and add value to CDFA programs engaged in data collection in the field throughout the organization.

Benefits and Impact of the Project (Financial and Non-Financial)

The development of the GWSS Mobile Trapping application has reduced data entry errors made by both the field staff, field office supervisors, and headquarters staff; eliminated the possibility of duplicate data entries; ultimately saving field office supervisors and headquarters staff 20 hours monthly.

With the mobile application fully deployed, CDFA has eliminated the need for use of expensive barcode devices which required costly annual maintenance of \$550 *each unit*, and the use of barcode stickers which were placed on plant stakes in crops that the department was monitoring for the presence of the GWSS insect. The estimated savings on supplies is approximately \$10,000 annually.

The new system and mobile application has also eliminated the use of logging data on paper in the event that a device would be faulty, or the battery malfunctioned. This was a typical point of failure for the previous device, and roughly 30% of trap findings had been logged on paper and submitted via fax. By eliminating the barcode stickers and scanning devices, the GWSS trapping app has saved office staff from roughly 40 hours of data entry monthly.

With the previous system, when a positive trap finding was located outside of a quarantine zone, the field staff would need to contact their field office supervisor to alert them to the finding so that the field office supervisor could complete a Pest Detection Report to submit to the counties and the USDA for recommendation of treatment. However, because some staff may not have been aware they were collecting data outside of a quarantined zone, the positive finding would have to be verified by the field office supervisor with the field staff, and a report completed, at the biweekly increment in which data was processed.

With the deployment of the GWSS Trapping app, CDFA has enabled a faster response time in the event of finding an invasive insect outside of a quarantined zone, from 2-3 weeks to 1-2 days, by adding an alert to the application which will let the field staff know that they have made a positive finding outside of a quarantine zone and to contact their supervisor immediately.