STATE & LOCAL GOVERNMENT

User

Noxious Weed Control Program in King County, Washington

Challenge

Find a solution to increase efficiency of field data collection that is app-based and GPS aware

Solution

Implementation of ArcGIS QuickCapture on mobile phones of field staff to rapidly collect data

Results

Postprocessing reduced by 90 percent, significant improvements in field coverage and accuracy of data

Real-Time Data Supports Control of Invasive Plants in King County

Preserving the unique ecosystem of King County, Washington—home to diverse landscapes, animals, and exotic native plants—requires tailored programs and dedicated individuals. In this area, noxious weeds pose a danger to the regional habitat. These invasive, non-native plants threaten agricultural crops, local ecosystems, and fish and wildlife habitats; cost millions in lost agricultural production; and harm the environment.

King County introduced its Noxious Weed Control Program to reduce the countywide impact of invasive plants including knotweed. Knotweed primarily affects riparian areas—the spaces between land and a river or stream—and completely alters the habitat where it's present.

"Knotweed has had a major ecological impact on our rivers and plant communities," explains Sasha Shaw, King County communications specialist. "It's outcompeting the native plants, and that's really had a big impact on the in-stream salmon habitat. It has also reduced diversity for birds, native wildlife, and native plant habitats."

The program's staff work with private agencies and landowners on detection and prevention, conduct public education and outreach, and perform crucial field surveys. They use field data collection as an essential tool in tracking and reducing noxious weeds.

2018 ALLPET GPS Log Sheet

Your Full Name: _____
GPS Unit Name: _____
Date: _____ Survey Org: _____
Project: _____ Control Org: _____

Max Growth Stage:	☐ Vegetative	☐ Pre-Flower
	☐ Flowering	☐ Seed Set
	☐ Senescent	

| Activity: | ☐ Survey | ☐ Foliar |
| | ☐ Manual | ☐ _____ |

Herbicide:		Surfactant:	
☐ Element 3A	____%	☐ Agri-Dex	____%
☐ AquaNeat	____%	☐	____%
☐ _____	____%		

| Notes: | ☐ No exceptions | ☐ No points |

Default point = 1 sq ft @ 100% - Only log points greater than 1 sq ft
For area greater than 200 sq ft, take multiple points, each 200 ft or less

Pt # (s)	Sq. Ft.	% Cover	Notes

The Challenge

According to Patrick Sowers, a noxious weed specialist with the King County Noxious Weed Control Program, field crews control large areas and are responsible for tracking exact locations of weeds to monitor progress. They must document areas they inspect and note whether a weed is decreasing over time.

To do this, crews were using paper forms to record data and take notes on individual points. Post-fieldwork included combining paper notes with downloaded GPS data and manually entering it at the office. Crew members were also responsible for manually recording attributes on cards that captured GPS points and were processed at the end of the season. This data was then entered into ArcGIS Desktop for mapping and analysis. Each point had to be manually updated with attribute data.

Staff described this process as time-consuming and labor-intensive. Manual processing also meant information was not immediately available, making it more difficult to share.

The program staff needed a way to streamline field data collection, eliminate manual entry to improve accuracy, and reduce the amount of time it takes to process information.

"There's a lot of sharing of data because our program interfaces and communicates with other agencies, other crews, and members of the public," explains Shaw. "And because we didn't have the data until the end of the year, we weren't able to share that data in real time and when it would have been useful."

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The Solution

To streamline field data collection, the Noxious Weed Control Program staff sought a solution that was app-based, GPS-aware, and available on handheld devices. The staff chose ArcGIS QuickCapture, an app that can help them improve field collection and reporting, transmit information in real time for instant viewing and analysis, and monitor progress over time. They did a trial use of ArcGIS QuickCapture in 2018 to track knotweed locations, beginning with 15 users on either an iPhone 6 or 7.

"We selected ArcGIS QuickCapture because it allows us to rapidly collect data and has an easy-to-use interface," says Sowers. "It seemed like the best option to do what we were looking for."

Implementation of ArcGIS QuickCapture, as well as the training process, was straightforward. The field crew had already been using iPhones, so the app was just added to their current devices with no need for additional equipment. Also, because the crew had been collecting similar data in past years, training was simple: they were shown an overview of the app and how resulting data was displayed.

The Results

The Noxious Weed Control Program has seen significant improvements in work processes since deploying ArcGIS QuickCapture, both in and outside the office.

The switch from manual processing to real-time data transmission streamlined the staff's workflow. They have reduced postprocessing by 90 percent, which translates to days and weeks of time saved. Staff members now have more time to continue their work in the field and focus on other projects.

Harkeerat Kang, GIS specialist master with King County, says the ability to configure the buttons quickly in ArcGIS QuickCapture has simplified data collection and reduced the complexity of data capture in the field.

The speed of data collection substantially improved with the use of ArcGIS QuickCapture, says Sowers, noting that they can now capture points at rapid speed. It has also eliminated the need to bring back devices to the office and download data, saving time for field users.

"ArcGIS QuickCapture enables us to get real-time data back since we don't have to download data off the units, which has been one of the biggest time savers. That and the manual postprocessing of data was a lot of extra work that ArcGIS QuickCapture got rid of," says Sowers.

Data accuracy has also improved with ArcGIS QuickCapture. Kang explains that with the end-of-season processing, it was difficult to remember changes in the data or to know whether something had gone wrong during recording. However, with real-time data, staff can quickly review collected data and make changes, if needed, to ensure accuracy.

Real-time data transmission also improved field coverage. According to Sowers, in the past, staff wouldn't know until the end of the season which areas had been visited by field crews. Now, staff members have the data needed for better area coverage, and they can see in real time the places that still need a visit during the season.

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ArcGIS QuickCapture also provides data in a hosted format ready to share. In the past, GPS data was collected, processed, and stored locally. Information was sent to requesters via email. Now, staff have the option to send maps with live views as opposed to static images.

"Being able to show where the weeds are in time for [external agencies and field crews] to actually control them will improve the overall management of the noxious weeds in the long term," says Sowers.

The successful implementation of ArcGIS QuickCapture will lead to its use in other areas of the program. For example, this year the staff plan to use it to track plants on roadsides. External agencies that work with the program, like the Washington Conservation Corps, will also use the app to collect field data.

A total of 30 people are now using ArcGIS QuickCapture in the field, and that number is growing.

"The users really like it, and so far, it's been really good reviews. We don't have any downsides yet," says Sowers. "We are excited to keep using it to improve how we share and collect data."