GIS Day

2021: A SPATIAL ODYSSEY

Fairfax County's
GIS Excellence Awards

November 17, 2021

GIS Excellence Awards 2021

Agenda

Introduction
Michael Liddle
Director, GIS Division, Department of Information Technology

Featured Speakers
Gregory Scott
Chief Technology Officer, Department of Information Technology

Jeffrey C. McKay
Chairman, Fairfax County Board of Supervisors

Presentation of Awards
Michael Liddle
Sandy Woiak
Agency Geospatial Services Manager, GIS Division, Department of Information Technology

Closing Statements
Michael Liddle

GIS Excellence Awards 2021

Categories

- Cartographic Product/Presentation
- Use of GIS for Analysis
- Web Application
- Use of GIS for Public Outreach
- Data Contributor
- GIS Integration

GIS Excellence Awards 2021

Contributing Agencies

* Capital Facilities
* Community Services Board
* Department of Animal Sheltering
* Department of Information Technology
* Department of Management and Budget
* Department of Planning and Development
* Department of Public Safety Communications
* Department of Public Works and Environmental Services Director's Office
* Department of Tax Administration
* Department of Transportation
* Fire and Rescue Department
* Health Department
* Land Development Services
* Office of the County Executive
* Park Authority
* Police Department
* Public Library
* Soil and Water Conservation District
* Stormwater Management

GIS Excellence Awards 2021

Entries

2021: A Green Sheet Journey - Streamlining Drainage and Erosion Assistance to Property Owners - Soil and Water Conservation District; Laura Grape, Daniel Schwartz, Greg Bacon (DIT)

American Rescue Plan Act COVID-19 Recovery Index - Office of the County Executive; Katherine Miga, Robin Wilson

Arleigh Burke Pavilion Employee Density Analysis – Department of Transportation; Thomas Wampler, Marcus Moore

Census Tract Level Index: Identifying Areas of Concern for COVID-19 Disease and Vaccination - Health Department; Amanda Burton, Jennifer Brophy, Rene Najera, Benjamin Klekamp

Commercial Apartment Assessment Web Application - Department of Tax Administration; Yorka Crespo, Wanda Graham

Continuity of Immature Mosquito Operations during the COVID-19 Pandemic - Health Department; Lauren Lochstampfor, Rachel Kempf, Joshua Smith

Contour Extraction Tool – Department of Information Technology; Gregory Bacon

COVID-19 Vaccination & Health Equity: Directing Outreach Resources to High Value Opportunities - Health Department; Benjamin Klekamp, Amanda Burton, Jennifer Brophy

Department of Animal Sheltering – Growing Our Data to Increase Our Reach – Department of Animal Sheltering; Melanie Leopold, Stephannie Calderon Yanez (DIT), Diane Bentley (DIT), Irene Tang (DIT)

Drug Disposal Dropbox Locator - Community Services Board; Ellen Volo, Judy Lamey-Doldorf (DIT), Matthew Miller (DIT)

Eviction Prevention Dashboard - Department of Management and Budget; Terry Reardon, Stephannie Calderon Yanez (DIT)

Fairfax County 2021 Fire and Rescue Reference Map – Department of Information Technology; Daniel Cabrera, Eric Fisher (FRD), Katherine Good (FRD), John Hanke (FRD), John Morrison (FRD)

Fairfax County Police 2021 Recruitment Campaign – Police Department; Jeffrey Gallagher, Joe Davis, Veva Wallace, Tammy Russell, Tajwaar Beaufort

Fairfax County Police Department's Voyage Into Citizen Outreach – Police Department; Jeffrey Gallagher, Kathy Pham, Carolyn Kinney

Fairfax County Public Library - Understanding our Unique Communities – Public Library; Douglas Miller

GIS Excellence Awards 2021

Entries

Fairfax Hydrology – Department of Information Technology; Chip Galloway

Flood Prone Areas – Department of Public Works and Environmental Services Director's Office; Chip Galloway, Catherine Torgersen (SWM), Saurabh Raje (SWM), Matthew Meyers (CEX)

GIS Trail Assessments - Park Authority; Andrew DeLuca, Fariss Agatone, Justin Roberson, Karen Devor

Hidden Oaks Nature Center's Nature Scorecard - Park Authority; Fariss Agatone, Suzanne Holland

Locating New Public Urban Parks in Reston - Park Authority; Jasmin Kim, Daniel White (DPD), Justin Roberson

Major Wastewater Asset Survey for the Wastewater Utility Master Plan - Capital Facilities; Benjamin Neal, Vickie McEntire Anglin, Christopher Jensen, Cody Allen Harp-Taylor, Christian Alfonzo, Matthew Kocvara, T M Islam, Sujan Dhungana, Larry Randall, Michael Perry, Gregory Harper, Yilia Vega-Claudio, Yeoanny Venetsanos (DPWES-DO)

Public Drainage Basin Delineation Tool - Land Development Services; Brett Martin

Reston Zoning Activity Hub – Department of Planning and Development; Daniel White, Beth Elliott, Suzianne Battista

Service Delivery Analysis - Streetlight LED Conversions - Department of Public Works and Environmental Services Director's Office; Yeoanny Venetsanos

The Park Register Web Application - Park Authority; Fariss Agatone, Justin Roberson, Andrew DeLuca, Lynne Johnson

Tysons Tracker - Department of Planning and Development; Daniel White, Beth Elliott, Suzianne Battista, Christopher McCarthy

Use of ArcGIS 3D Analyst and the Fairfax County 2009 Digital Elevation Model for Walkway Preliminary Engineering Design – Department of Transportation; Daniel Stevens

Utilizing ArcGIS to Analyze Wireless Call Transfers in Fairfax County – Department of Public Safety Communications; Raleigh Maier, Timothy Menda

Vulnerability Index (V8) Applications – Office of the County Executive; Katherine Miga, Fariss Agatone (FCPA), Yeoanny Venetsanos (DPWES-DO)

GIS Excellence Awards 2021

Cartographic Product or Presentation

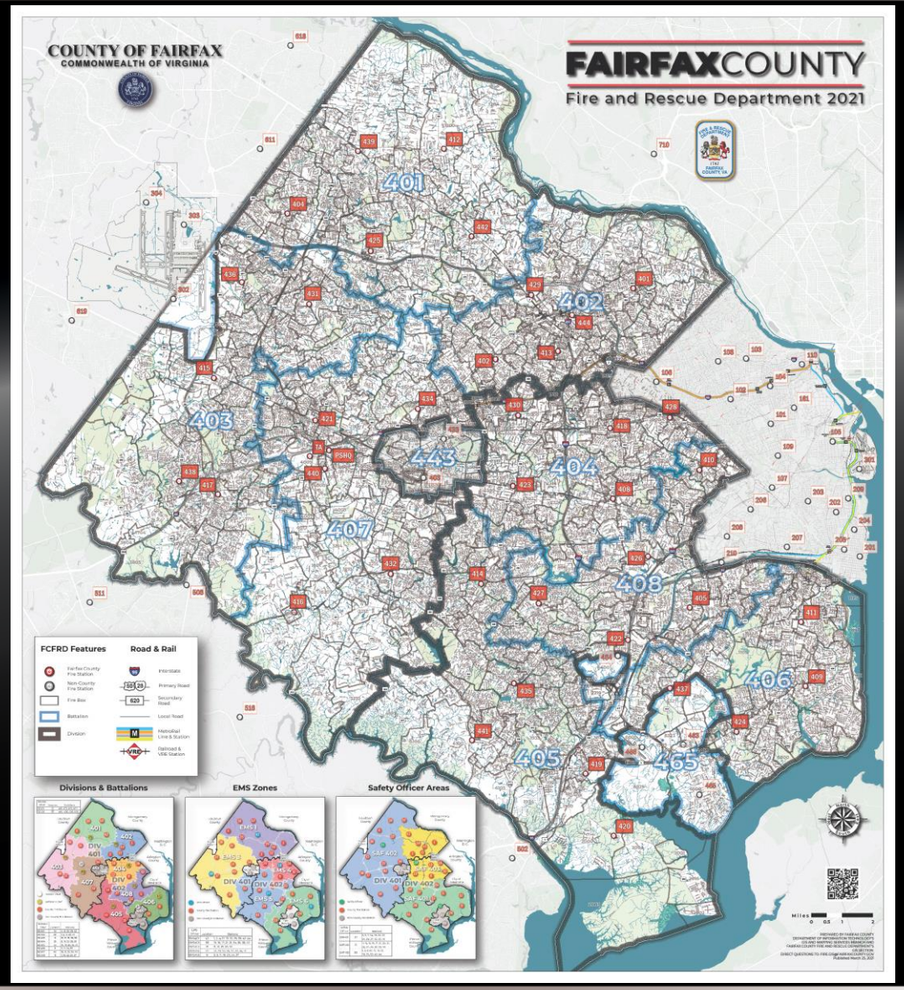
This award is intended to showcase the power of GIS tools in creating accurate, instructive, and visually-pleasing printed maps. The map must have been or plan to be used for Fairfax County business, and an original design is required.

Criteria used to evaluate the entries include:

- clarity of purpose and intent
- the use of GIS tools, methods, and operations to go beyond basic cartography
- visual balance and appeal
- inclusion of necessary map elements and conventions
- quality control for typos or other errors

GIS Excellence Awards 2021

Cartographic Product or Presentation



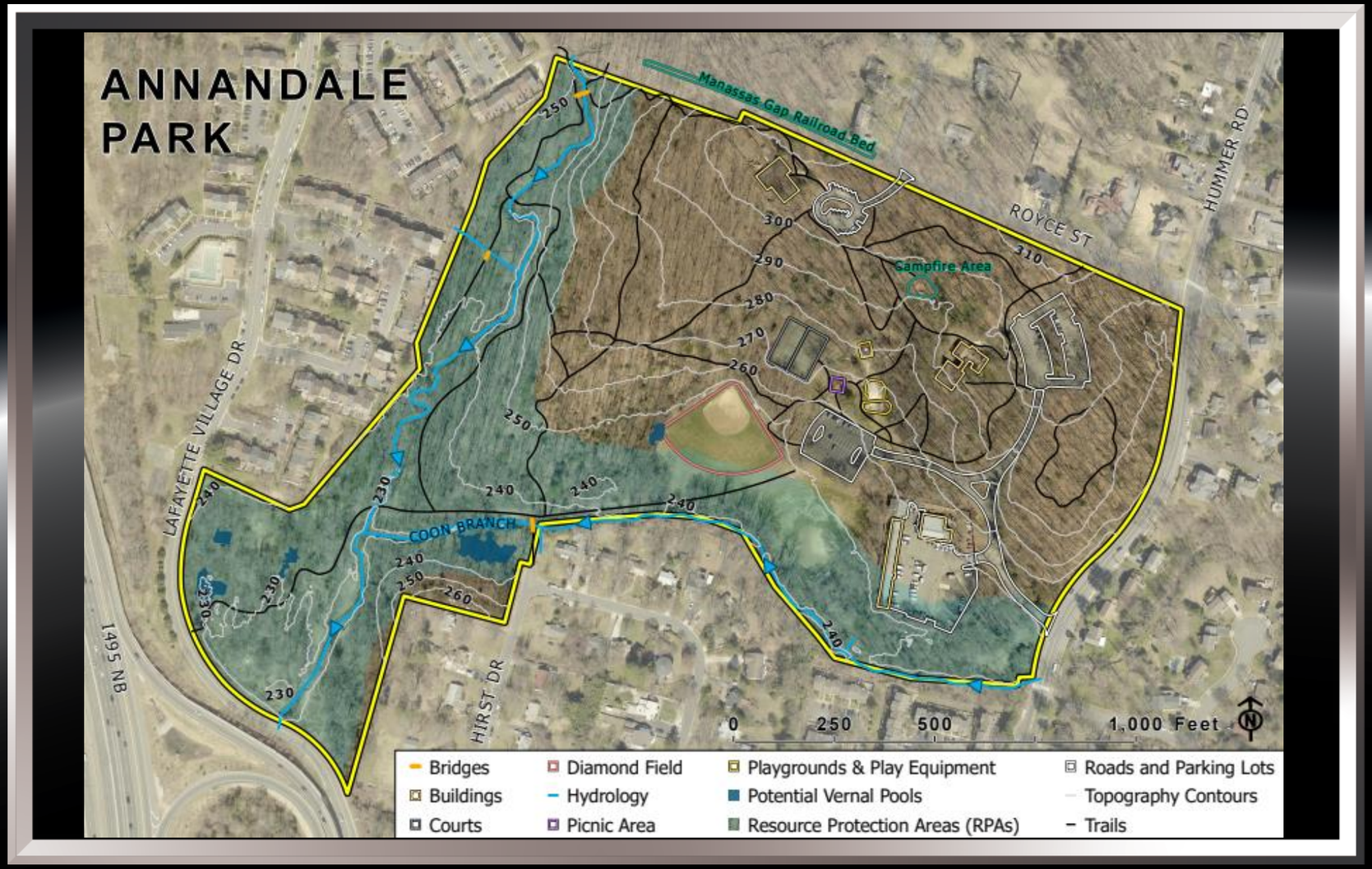
Fairfax County 2021 Fire and Rescue Reference Map

Department of Information Technology

Daniel Cabrera, Eric Fisher (FRD), Katherine Good (FRD), John Hanke (FRD), John Morrison (FRD)

GIS Excellence Awards 2021

Cartographic Product or Presentation



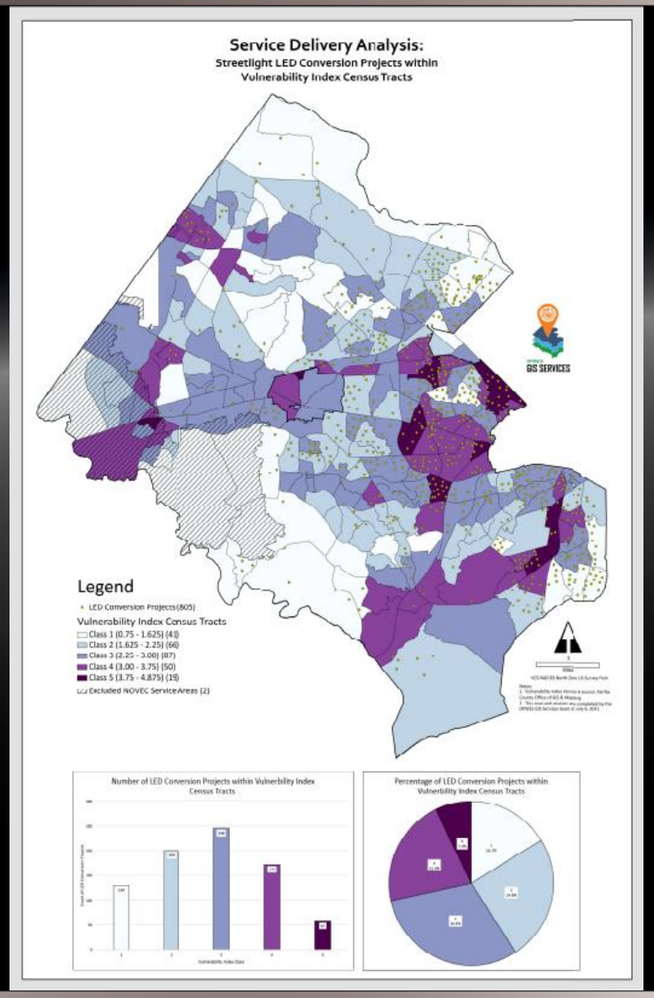
Hidden Oaks Nature Center's Nature Scorecard

Park Authority

Fariss Agatone, Suzanne Holland

GIS Excellence Awards 2021

Cartographic Product or Presentation



Service Delivery Analysis - Streetlight LED Conversions

Department of Public Works and Environmental Services
Director's Office

Yeoanny Venetsanos

GIS Excellence Awards 2021

Use of GIS for Analysis

This award is intended to showcase the power of GIS tools in undertaking sophisticated spatial analyses that aid County operations and answer significant questions.

Criteria used to evaluate the entries include:

- complexity of analysis; use of tools, scripting, model-builder, etc.
- ingenuity/creativity/originality of GIS methods used
- project benefits to a team or department
- effective demonstration of the information and insight gained (e.g., diagrams, maps, presentations, report, text)

GIS Excellence Awards 2021

Use of GIS for Analysis

Census Tract Level Index: Identifying Areas of Concern for COVID-19 Disease and Vaccination

Health Department

Amanda Burton, Jennifer Brophy, Rene Najera, Benjamin Klekamp

Census Tract Level Index: Identifying Areas of Concern for COVID-19 Disease and Vaccination

Amanda Burton, MPH; Jennifer Brophy, ScM; Ben Klekamp, MSPH; René Najera, DrPH
Fairfax County Health Department - Division of Epidemiology & Population Health

Introduction

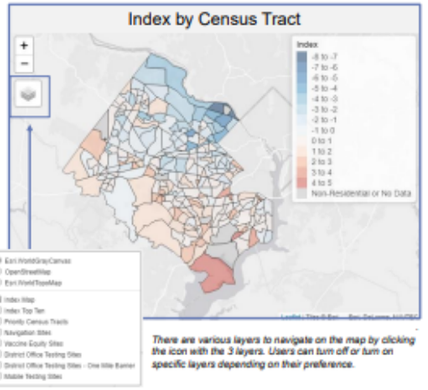
- COVID-19 risk differs among population and geographic areas. Targeting response resources to areas of greatest need maximizes disease prevention.
- Previously, targeted outreach and intervention was based on ZIP code-level analysis of COVID-19 cases and vaccination coverage.
- Given substantial heterogeneity within ZIP codes, analysis of smaller units can better inform Health Department and partner COVID-19 resource allocation decisions. Moreover, we recognize that areas with less testing may have artificially low case numbers and higher need than apparent from case and vaccination data alone.
- The inclusion of multiple indicators will best identify emerging hot spots where high case rates and low vaccination and test rates create an ideal setting for increased disease transmission.

Methods

- We performed all analyses and geographic visualizations in RStudio Pro (v1.4.1717-3).
- We geocoded COVID-19 case and testing data obtained from August 19, 2021, through September 19, 2021, from the Virginia Electronic Disease Surveillance System (VEDSS) and linked them to census tracts. We then calculated case and testing rates per 10,000 residents by census tract using data from the previous four-week period to identify recent disease and testing trends.
- We calculated vaccination coverage among those aged 12 to 64 years by census tract using data from the Virginia Immunization Information System (VIIS). An individual was considered vaccinated if they received at least one dose of COVID-19 vaccine. We excluded vaccination data from persons aged 65 years and older as coverage was uniformly high and coverage was artificially elevated in census tracts with more long-term care facilities.
- We calculated Z-scores for case rates, vaccination rates, and testing rates by census tract to create a census tract level index equally weighting case, vaccination, and testing Z-scores:

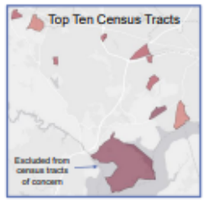
$$Index = Z_{case} + (-1)Z_{vaccination} + (-1)Z_{testing}$$

- We visualized our index with higher values (warmer tones, see Index by Census Tract) indicating census tracts of greater concern (i.e., higher case rates, lower vaccination rates, and lower rates of testing).



There are various layers to navigate on the map by clicking the icon with the 3 layers. Users can turn off or turn on specific layers depending on their preference.

- Next, we evaluated the ten census tracts with the highest index values to determine which five to prioritize for outreach and targeted intervention.
- We excluded the census tract with the second-highest index value as its low population density is not ideal for maximizing resource allocations. Most of the land in this census tract is protected parkland.
- All other census tracts in the top six were selected as census tracts of concern. These census tracts all included areas with high value opportunities such as apartment and townhome complexes.



Results

- The resulting index ranged from -7.98 to 4.35 with higher index values in the southern region of the health district.
- The five census tracts of concern identified by the index were areas of the health district where recent outreach efforts had not been heavily focused. They also included high proportions of individuals from racial and ethnic groups that have experienced a higher burden of COVID-19 disease such as African American and Hispanic populations.
- We shared the index visualization with outreach teams as an interactive html webpage along with a detailed report including driving factors and specific location recommendations for vaccination, vaccine navigation, and testing events.

Visualization includes past-month outreach events, vaccine clinics, and Health department testing sites with a one-mile radius indicated to show areas with local access to testing. The one-mile radius was not added to mobile clinics as they are held intermittently.

Census Tract GEO ID	Location	Case Rate (per 10,000 Residents)	Vaccination Rate (Percentage with at least one dose)	Testing Rate (per 10,000 Residents)	Index
5105941XXXXX	Woodlawn	59.37	53.08	552.73	4.35
5105941XXXXX	Springfield	73.29	58.60	704.64	3.87
5105941XXXXX	Springfield	72.82	49.20	1106.80	3.17
5105941XXXXX	Kingstowne	93.17	69.71	858.82	3.12
5105941XXXXX	Fair Oaks	84.13	64.05	905.27	3.06

Rates in red are driving factors for index value (e.g. highest Z-score). Complete census tract ID omitted for privacy concerns.

Conclusions

- The indicators included in the index, which reflect a high burden of COVID-19 (high case rate), a high risk of infection (low vaccination coverage) and a high probability of under-detection (limited testing), are amenable to intervention through Health Department outreach to increase testing and vaccination.
- This index allows for rapid, objective selection of target areas. Ease of replication allows us to sustainably update geographic targets for intervention as the COVID-19 pandemic evolves.
- This interactive tool facilitates data driven decisions as outreach teams can easily visualize activities already completed and identify areas to prioritize for future community interventions.

Acknowledgements
Health Department Outreach and Navigation Teams for providing information on events; The Virginia Department of Health for maintaining and providing COVID-19 case, testing, and vaccination data.

Presented at Fairfax County GIS Day November 2021

GIS Excellence Awards 2021

Use of GIS for Analysis

Continuity of Immature Mosquito Operations during the COVID-19 Pandemic

Continuity of Immature Mosquito Operations during the COVID-19 Pandemic

Using historic inspection records to prioritize sites for inspection and maximize efforts towards West Nile Virus prevention during staffing reductions due to the COVID-19 pandemic

Objective:

Utilize mobile data collection software to track inspection and laboratory results of immature mosquito surveillance and control. Use those results to make operational decisions and changes due to COVID-19 impacts to operation resources.

Background:

- The Health Department's Disease Carrying Insects Program (DCIP) helps protect County residents from illnesses spread by mosquitoes, ticks, and other insect pests.
- West Nile virus (WNV) is endemic in Fairfax County and found in mosquitoes every year.
- There are more than 40 species of mosquito found in Fairfax County.
- Not all mosquito species are vectors (transmit disease). Monitoring where and when the vector mosquito are present is important for disease prevention. *Culex pipiens* and *Culex restuans* are the main vectors of West Nile Virus in Fairfax County, thus identifying locations where they develop is important to WNV prevention.
- Routine site and species collection data from immature mosquito surveillance has been collected by DCIP since 2016.
- Prior to the COVID-19 pandemic DCIP used 8 technicians to perform larval mosquito surveillance and control at 1400+ County-maintained stormwater ponds during mosquito season (April through October), resulting in thousands of inspections each summer.

GIS Application:

- In 2018, DCIP began to utilize Collector and Survey123 to track details of immature mosquito inspections and control measures in stormwater ponds located through the County.
- The geodatabase contains multiple feature layers with a one-to-many relationship built between the static "Sites" layer and the "Inspection" layer. The inspection layer has an additional one-to-many relationship built between that layer and a table containing pesticide application data.
- Collector for ArcGIS is used to navigate between sites, to update site inspection status symbology, and to maintain consistent site-specific details such as parking areas, nearby trails, site addresses, and site access comments. Custom URL call-outs in the pop-up for each site in Collector will launch either the Inspection or Identification survey in Survey123.
- Survey123 for ArcGIS mobile application is used in the field to record inspection specific details such as wet/dry status, immature mosquito presence, pesticide application details, habitat description, site photos, and stormwater-related issues. Survey123's web-based forms are used to record numbers and species of larval mosquitoes identified in positive inspections.
  - The Inspection survey opens in the mobile application and creates a feature for the inspection.
  - The Identification survey opens from inspection features into Edit mode in the web application. This survey will edit the inspection record to add the species-specific immature mosquito identification results.

Field Inspectors "dipping" for immature mosquitoes

DCIP staff identifying immature mosquitoes

Collector Application

Inspection Survey *Identification Survey*

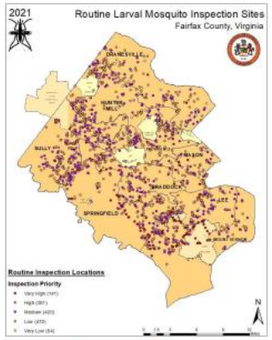
COVID-19 Program Impacts:

- Routine WNV surveillance and prevention activities (adult mosquito trapping; immature mosquito inspections and control) were scaled back in 2020 and 2021 due to Environmental Health staff deployments to the COVID-19 response and limitations on hiring seasonal employees. Full time DCIP staff was reduced to 1 staff member from 5, and overall seasonal staff from 16 employees to 4.
- To ensure continuity of operations, staff identified ways to scale back operations while still providing a meaningful service to the residents of Fairfax County. The previous plan of routinely inspecting 1400+ sites monthly and setting 175+ adult mosquito traps in the County weekly was no longer feasible. Program staff developed a strategy to prioritize WNV monitoring at trapping locations and inspections of stormwater ponds based on site inspection history.

Analysis:

- Databases and data collection schema for larval inspections had a lot of variation from pre-GIS data collection to beginning GIS use to the current model being used.
- Historical inspections, pesticide applications, and species-specific identification data were joined in ArcMap and then exported to Excel. Multiple years of non-GIS data were then combined with the downloaded GIS data set and cleaned up to be able to compare inspection and treatment details over time at each routine inspection location.
- This new dataset of roughly 34,000 inspections was then analyzed with Pivot Tables in Microsoft Excel to create counts of the following records for each routine inspection site: total number of past inspections, wet inspections, and dry inspections, number of times immature mosquitoes were present, number of times a pesticide application was made, and if the presence of vector species of West Nile Virus was ever detected during an inspection.
- Using the counts created from the Pivot table analysis, the site-specific information was summarized by calculating percentages of occurrence (ex. Percentage of wet inspections or percentage of inspections resulting in pesticide application).
- After reviewing those results, sites were then assigned a priority based on the criteria present in the chart located below.
- Inspection sites were then filtered by priority to focus resources on productive sites with historical presence of WNV vector species
  - Early season inspections and periods after heavy rainfall focused on Medium, High, and Very High priority sites.
  - Mid and later season inspections focused on High and Very High priority sites(WNV activity peaks during August and September).
  - All 1400+ sites are inspected annually to confirm priority level as sites will change over time due to environmental and site conditions.

Inspection Priority	Criteria
Very High	• Presence of WNV vector species • > 50% of all inspections with immatures present
High	• Presence of WNV vector species • 20-49% of all inspections with immatures present • All newly added sites
Medium	• Presence of WNV vector species • 0-19% of all inspections with immatures present
Low	• No historical presence of WNV vector species at site
Very Low	• 0% of all historical inspections are Wet



Summary:

- **During 2020 and 2021 larval inspection staffing was reduced from 8 seasonal staff to 2 seasonal staff members. During that time, roughly half of the total inspections made during a "normal" season were performed (~5000 vs ~10,000).**
- **Thus, by prioritizing our inspections with a greater focus on more productive sites, our inspection effort was only reduced by roughly 50% even when faced with a 75% reduction in staffing.**

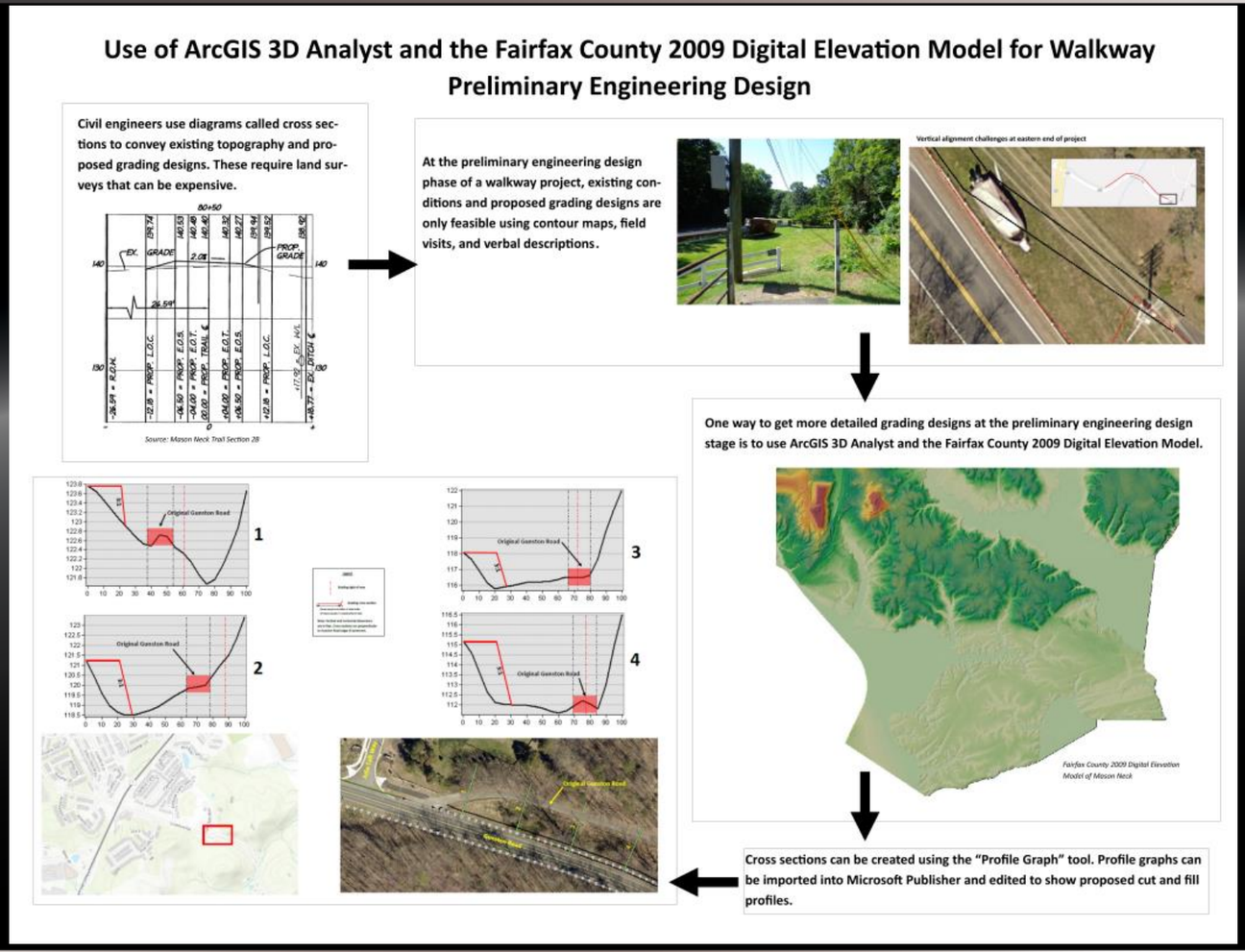
Presented by: Lauren Lochstampfor, Senior Environmental Health Specialist, Disease Carrying Insects Program, Division of Environmental Health, Fairfax County Health Department

Health Department

Lauren Lochstampfor, Rachel Kempf, Joshua Smith

GIS Excellence Awards 2021

Use of GIS for Analysis



Use of ArcGIS 3D Analyst and the Fairfax County 2009 Digital Elevation Model for Walkway Preliminary Engineering Design

Department of Transportation

Daniel Stevens

GIS Excellence Awards 2021

Web Application

This award is intended to showcase the ever-increasing presence of GIS web applications. These applications are a significant foundation for bringing maps, geospatial data, and analysis/data collection tools to a varied audience of County staff and residents.

Criteria used to evaluate the entries include:

- effectiveness of the web application in meeting stated purpose
- benefit to the public and/or agency
- incorporation of application into business practices
- aesthetics and ease of use
- use of well-thought-out cartography
- inclusion of innovative and unique tools

GIS Excellence Awards 2021

Web Application

Contour Extraction Tool

CONTOUR EXTRACTION TOOL

Many visitors to the GIS Division's web site are interested in getting data for their own use. Topographic data is one of the most requested datasets and contour lines have been at the top of the list. Delivery of this data has been relatively challenging in the past as the number of contour lines have increased significantly as better data has become available to produce them. With the release of the Contour Extraction Tool, data consumers can easily get the data for an area of their choosing in a user-friendly interface. Since its release, the number of email requests for contours have decreased dramatically.

This public application allows users to download elevation contours for the area shown in the map extent. The size of the download area is limited by the scale of the map and is intended to accommodate several subdivisions at a time. This prevents overly large datasets from being packaged, keeping processing wait times to a minimum.

Users can select from multiple formats (e.g., .shp, .gdb, .dxf) for the contours to be placed in a zip file for download. The zip file will contain the same data visible in the map at the time the tool was run. The latest contours are a 1-ft. interval dataset generated from the county's 2018 Light Detection and Ranging (LiDAR) data.

Click image or scan the QR code to open the application

Fairfax County Information Technology

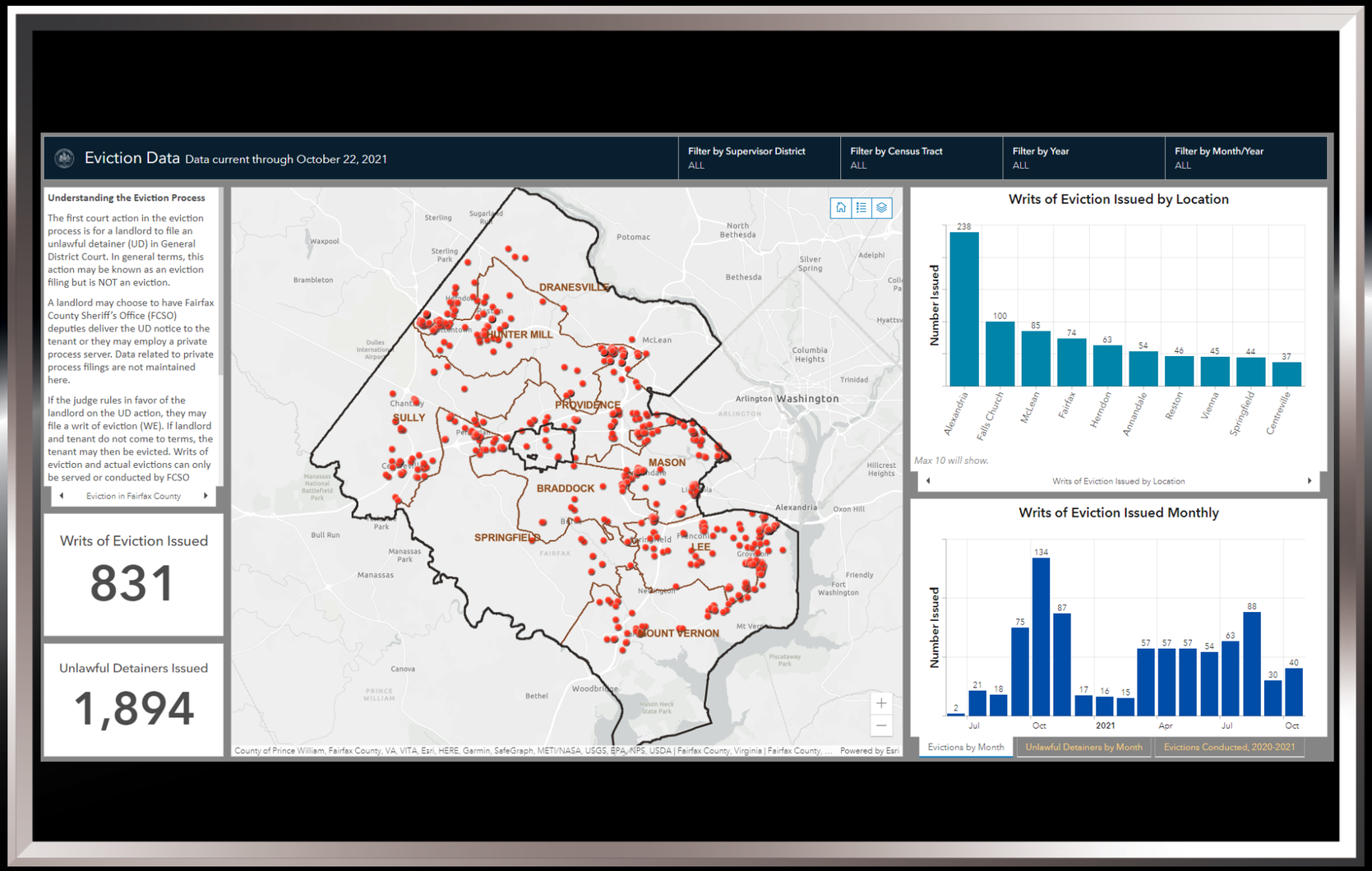
Submitted by Greg Bacon
GIS & Mapping Services Division

Department of Information Technology

Gregory Bacon

GIS Excellence Awards 2021

Web Application



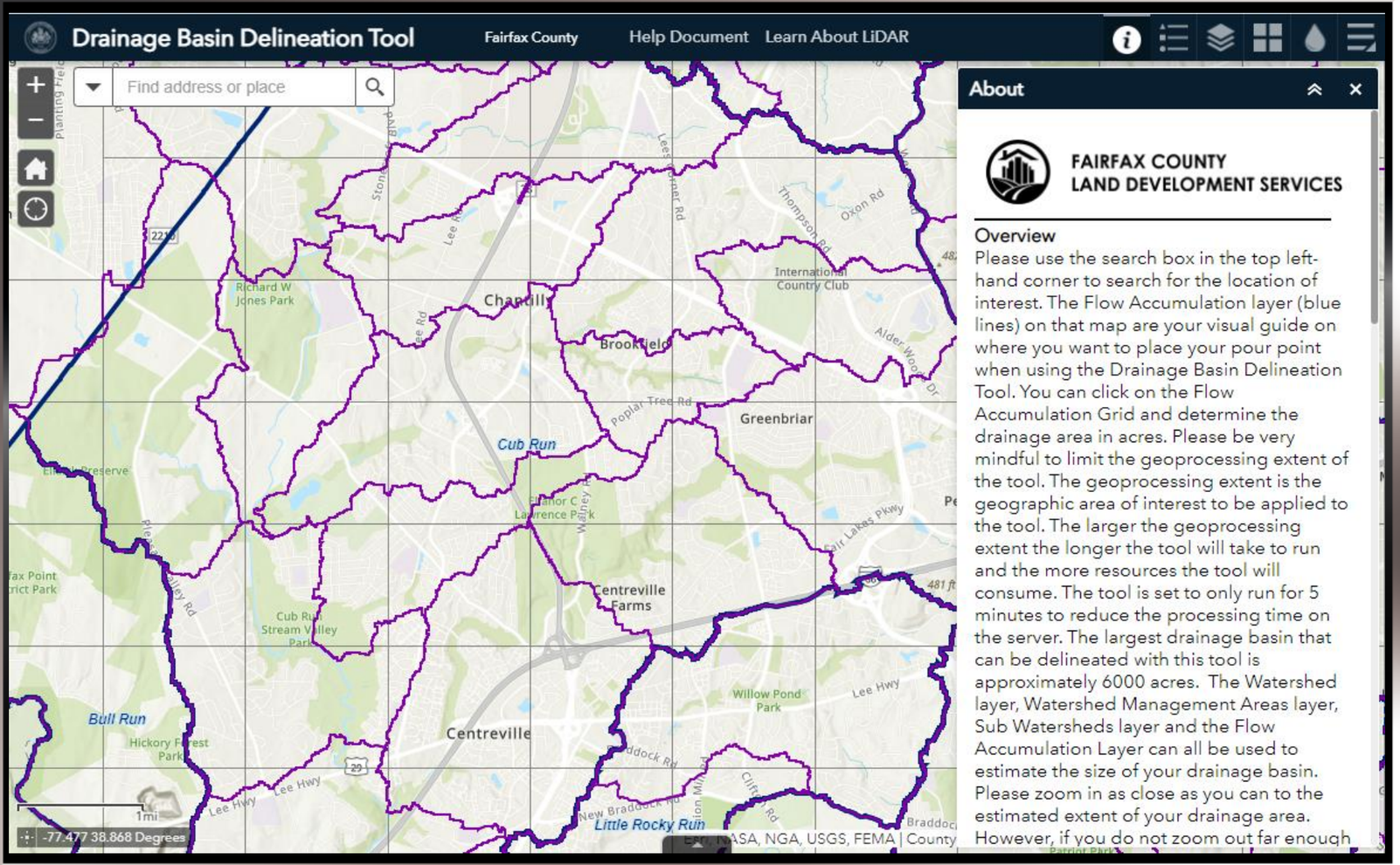
Eviction Prevention Dashboard

Department of Management and Budget

Terry Reardon, Stephannie Calderon Yanez (DIT)

GIS Excellence Awards 2021

Web Application



Public Drainage Basin Delineation Tool

Land Development Services

Brett Martin

GIS Excellence Awards 2021

Use of GIS for Public Outreach

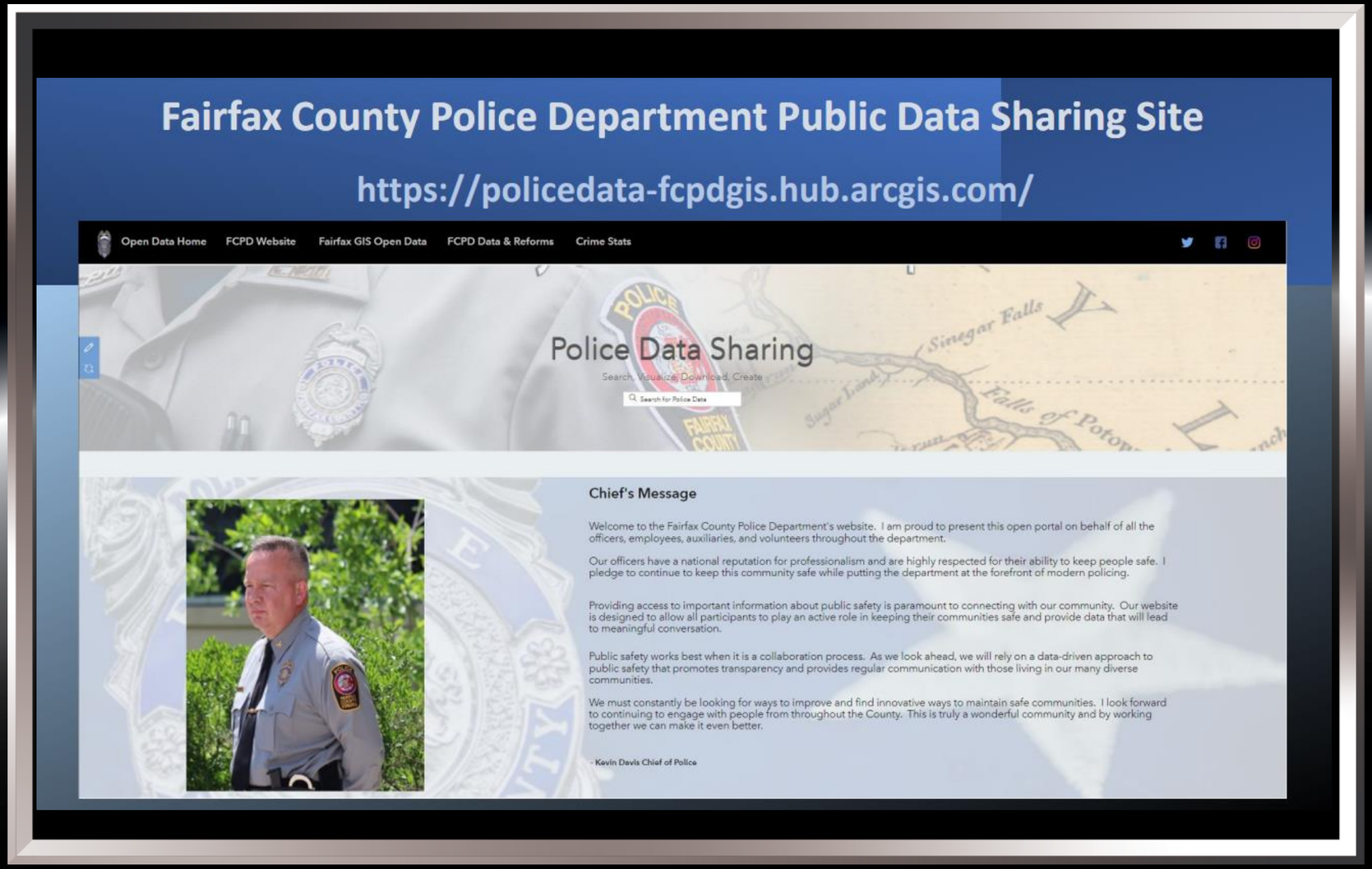
This award is presented to the agency that best utilizes GIS to serve the public with map documents, customer service operations, press relations, or public events.

Criteria used to evaluate the entries include:

- effectiveness of the GIS work to the outreach effort
- degree to which a difficult message was clearly communicated
- complexity of cartography, data analysis, customization and/or programming
- adaptability to future expansion/modification
- contribution of GIS as a planning tool for the outreach effort

GIS Excellence Awards 2021

Use of GIS for Public Outreach



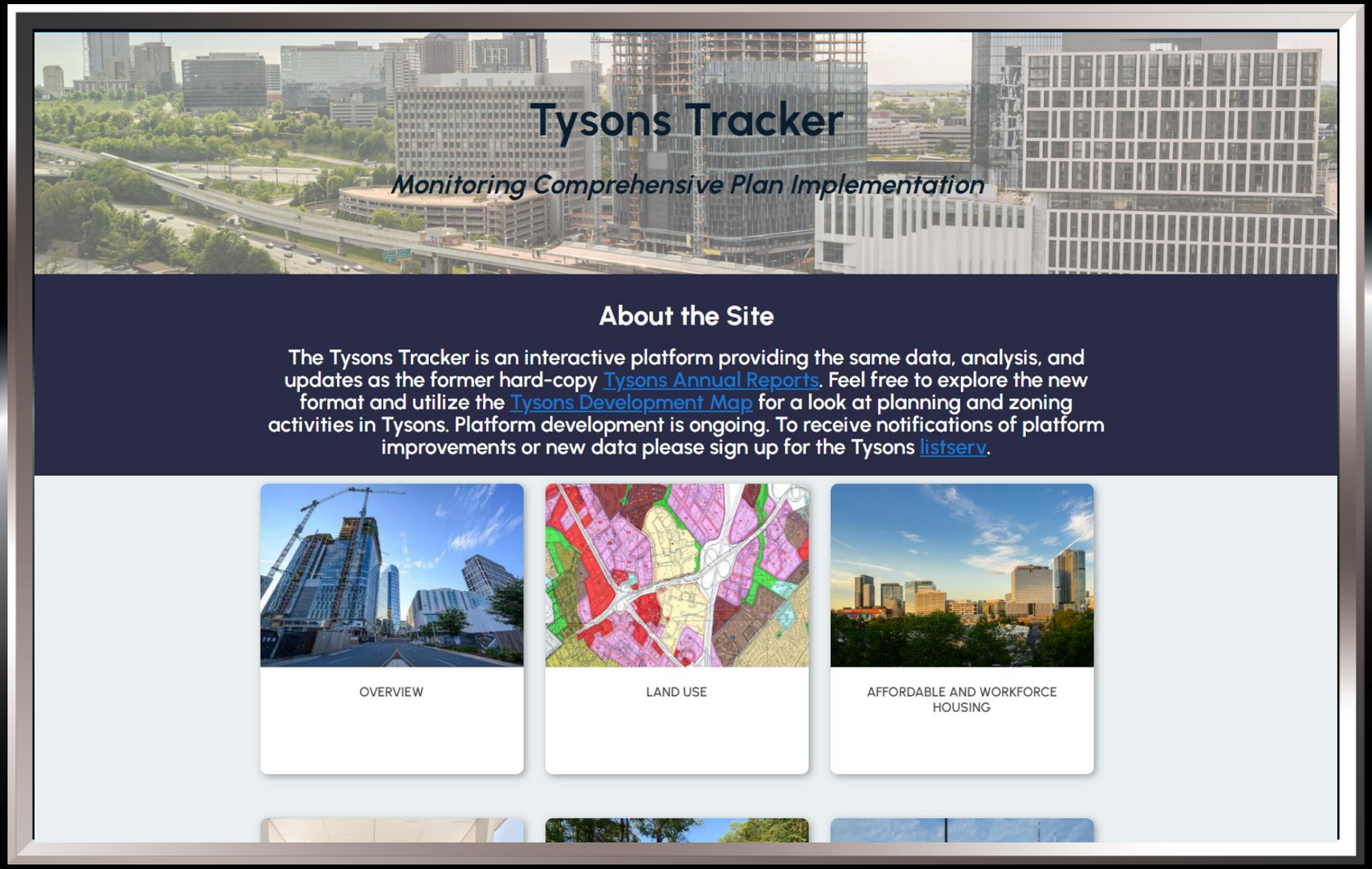
Fairfax County Police Department's Voyage Into Citizen Outreach

Police Department

Jeffrey Gallagher, Kathy Pham, Carolyn Kinney

GIS Excellence Awards 2021

Use of GIS for Public Outreach



Tysons Tracker

Department of Planning and Development

Daniel White, Beth Elliott, Suzianne Battista, Christopher McCarthy

GIS Excellence Awards 2021

Data Contributor

This award is presented to the agency that has created or refined the most significant spatial data for the County in the last 12 months.

Criteria used to evaluate the entries include:

- significance of the data for the county and/or agency
- importance to agency's long-term business processes
- level of effort required to create/maintain the data
- sophistication of process to create/maintain the data

GIS Excellence Awards 2021

Data Contributor

Department of Animal Sheltering – Growing Our Data to Increase Our Reach

Beginning in late 2019 the Department of Animal Sheltering (DAS) started working with the GIS Division, gathering data to better understand our reach within the county and to identify gaps. In 2020 we developed datasets that enable us to easily find communities that utilize our spay/neuter surgery and vaccine services and Community Rabies Clinics, and those that do not. In 2021 we have been able to grow and refine our use of spatial data to further ensure we are proactively reaching all Fairfax County residents, both under normal operations and, more recently, COVID-driven operations. Working with our Shelter staff and APP to provide consistent intake data for strays, along with the addition of Vet Clinics and Virtual Humane Education Tours data, has helped us further expand and target our reach into the community.

Virtual Tours

Prior to COVID we conducted many tours of the shelter each week for Girl Scouts, Boy Scouts, and other organizations for children, enabling them to meet our animals, learn about the animals, and see how we care for them. COVID actually opened up an opportunity for more involvement for children who have not generally participated in these types of programs. Children attending school virtually have shared in "Virtual Tours" of the Fairfax County Animal Shelter. Our Humane Education programs are a great way for teachers to introduce their students to companion animals. Using data that identifies underserved areas in the county we have targeted schools for these "tours." The response has been overwhelming.

Veterinary Clinics

Fairfax County has 73 Vet Clinics. These Clinics have varying services – some provide care for all types of companion animals, others specialize in just one or two species, some care for large animals, etc. There are also differences in the level of care provided – some are 24/7 while others are only open part of the day. We have gathered data on all on these Clinics and now have a tool to easily determine the closest Clinic that provides the necessary care. This data has been instrumental in identifying areas in the county that can benefit from our Pet Services Events, a program that brings veterinary care to underserved communities.

Enhanced Stray Animal Data

DAS currently has a dataset that includes information about the stray animals that come into our care. Multiple organizations provide information on where the animals were found but the format of the data was not consistent. Working with our own teams and GIS staff we have designed a standard way of reporting the data, resulting in a much more accurate tool. We have started the process to gather another layer of this information to help us better understand which of these animals are reclaimed by their owners. This information will enable us identify gaps in our outreach to the community. For example, do residents know to contact us when their pet is lost, do residents have the means to come to us if their pet is with us, is cost a barrier? We can then reevaluate our marketing, contact methods (email, phone, FB, etc.), and requirements to reclaim.

Department of Animal Sheltering – Growing Our Data to Increase Our Reach

Department of Animal Sheltering

Melanie Leopold, Stephannie Calderon Yanez (DIT), Diane Bentley (DIT), Irene Tang (DIT)

GIS Excellence Awards 2021

Data Contributor

Locating New Public Urban Parks in Reston

Park Authority

Jasmin Kim, Daniel White (DPD), Justin Roberson

GIS Excellence Awards 2021

GIS Integration

This award is presented to the agency that has integrated GIS into their operations to the greatest degree in the last 12 months. Agencies that have a long history of GIS, as well as agencies that are in the beginning stages of GIS integration, will be evaluated separately.

Criteria used to evaluate the entries include:

- effectiveness of the integration in meeting its stated goal
- increased use of GIS in the agency, either directly or through agency-generated GIS products
- increased agency efficiency as a result of GIS
- demonstration of significant effort to train staff in GIS
- ingenuity/creativity/originality of GIS methods utilized
- ability to gain insights into data/project/issue as a result of the integration
- potential for further GIS-related growth

GIS Excellence Awards 2021

GIS Integration

2021: A Green Sheet Journey - Streamlining Drainage and Erosion Assistance to Property Owners

Soil and Water Conservation District

Laura Grape, Daniel Schwartz, Gregory Bacon (DIT)

GIS Excellence Awards 2021

GIS Integration

GIS Trail Assessments

Fairfax County Park Authority Trail Assessments

Authors: Andrew DeLuca, Karen Devor, Justin Roberson, Fariss Agatone
Questions? Email: Andrew.DeLuca@fairfaxcounty.gov

Introduction

Every 5 years the Park Operations Division of the Fairfax County Park Authority commits to assessing the quality of trail throughout the entire park system. This involves visiting over 300 different parks and assessing over 300 miles of trail, which had previously been reported on paper and kept in cabinets. This assessment cycle, the Park Operations Division approached the GIS team to digitize this process and more accurately capture the location of the assessed trail.

This new trail assessment methodology using QuickCapture will allow us to both assess current trail inventory as well as update the inventory with newly constructed trail since the initial date of trail data collection in 2009. In the absence of a true asset management system, this workflow will both serve as a prototype for future trail assessment projects as well as an opportunity to update the Park Authority's GIS trail inventory.

Trail Assessment Application

The Trail Assessment Application is an esri QuickCapture project built on Fairfax County's Enterprise GIS Portal. The application is internal to Fairfax County only and is intended for use exclusively by Park Authority staff. Using the buttons on the application (image on the left is from a user's iPad) the user can quickly capture point-based data and stream linear data. Additionally, for the point-based layers, the user has the option to capture images for each point.

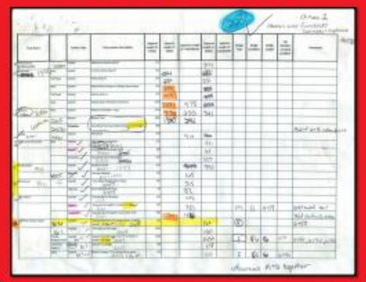
The users have high accuracy GNSS receivers from EOS Positioning Systems to retain high accuracy in wooded locations. Upon record collection, each record is verified prior to being displayed on a reporting dashboard. Upon project completion, the data will be available to the agency for analysis and funding allocation.

Assessment Layers

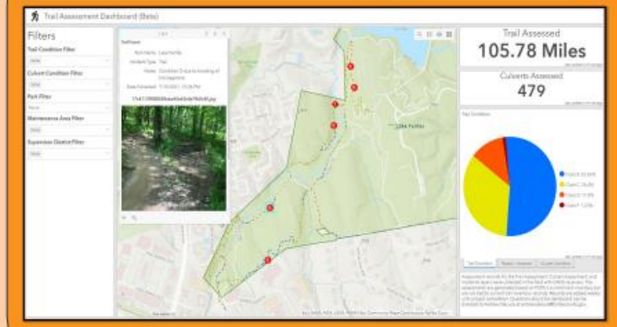
- **Trail Assessment** – This line layer serves as the inventory of trail assessments. The application allows for capture of the trail surface based on the button selected and includes a list-based condition based on a user input.
- **Culvert Assessment** – This point layer serves as the inventory of culvert assessments. The application allows for capture of pictures, culvert type based on the button selected, and includes a list-based condition based on a user input.
- **Incident** – This point layer serves as an inventory of notes. When a specific problem needs to be called out, the user would collect an incident record, optionally add a photo, and provide an explanation via an open text user input.

Previous Paper Assessments

In 2016 the Park Operations Division used the template below to assess all the trails throughout the Fairfax County Park Authority. This template provided all the essential assessment information, but only provided a text description to the trail location and a length of trail segment which was based on an out-of-date inventory which caused confusion when assessing the trail network in the field.



Reporting Tools



A dashboard was created to track the completed trail assessments by park and report on the quality of the trail based on the assessments. This dashboard contains pie charts to break down trail collection condition by percentage of linear foot, break down of culvert assessment condition, and overall assessed paved versus unpaved trail by linear foot. There are also counts for total culverts assessed and linear mileage of trail assessed.

The filters on the left provide users the ability to break down the data by condition of assessment as well as by geographic areas, such as by park, maintenance area, or supervisor district. These geographic areas represent either areas significant to funding or staff time allocation. The breakdown of trail by geographic area in this dashboard will be used to prioritize maintenance funding for the next 5 years until the trail assessment project is completed again.

Park Authority

Andrew DeLuca, Fariss Agatone, Justin Roberson, Karen Devor

GIS Excellence Awards 2021

Judge Biographies

- Tom Conry - GIS Manager, Fairfax County (retired) – Over the course of Tom's 19-year career with Fairfax County, the GIS Department evolved into one of the most respected local government GIS offices in the country. He has a B.A. in Chemistry from LaSalle University, an M.S. in Chemistry from the University of Maryland, and an M.S. in Computer Science from John Hopkins University. Tom retired to the Palmetto state in 2018 and spends much of his time with his wife Michelle travelling, enjoying the Charleston area arts, and playing pickleball!
- Brendan Ford – GIS Analyst/IT Specialist, District of Columbia - Brendan worked for the Fairfax County GIS Department since its inception until December 2020 when he retired after nearly 33 years of service to Fairfax County. He currently is a senior GIS Analyst / IT Specialist for the District of Columbia Department of Public Works. He is a graduate of Virginia Tech University.
- Kathryn Keranen - HS Program Coordinator, James Madison University – Kathryn is an instructor at James Madison University and the co-founder of the dual enrollment Geospatial Semester. She taught GIS at Thomas Jefferson High School for 7 years before retiring from Fairfax County Public Schools. She is a Wake Forest University graduate, a certified K-12 Esri trainer, and has co-authored six training manuals for Esri Press.
- Ken Lanfear - USGS (retired) – Mr. Lanfear was a leader in introducing Geographic Information Systems (GIS) within the U.S. Geological Survey (USGS) and built some of the earliest spatial data sets of the U.S. watersheds. He developed USGS's Advanced Arc/INFO training course and trained many of USGS's top GIS scientists and was the founding chair of the Federal Geographic Data Committee (FGDC) Spatial Water Data Subcommittee. He currently is the Hunter Mill representative on the Environmental Quality Advisory Council.
- Greg Licamele - Public Information Officer, Fairfax County Office of Public Affairs – Greg leads digital content strategy for the county website, editorial planning and social media, as well as providing leadership for inclusive community engagement. He has served the county for nearly 16+ years in a variety of public affairs roles. He holds a bachelor's degree in journalism from St. Bonaventure University and two master's degrees (media/public affairs and homeland security/emergency management) from The George Washington University.

GIS Excellence Awards 2021

Judge Biographies

- Anthony Myers - Solution Engineer, Esri – Anthony is a team lead on the Local Government Team. He has a Masters of Geospatial Information Science & Technology and has Esri certifications for System Design, Enterprise Geodatabase Management, Enterprise Administration, and Desktop. He has worked in City government and the AEC industry prior to joining Esri. He has been with Esri for eight years where he focuses on web GIS technology to support government operations
- Dieter Pfoser - Professor, George Mason University – Dr. Pfoser is Chair of the Department of Geography and Geoinformation Science at George Mason University. He received his Ph.D in computer science from Aalborg University, Denmark. His research interests include data management and data mining for spatial and spatiotemporal data, graph algorithms for dynamic networks, and mining user-generated content.
- Michael Smith - Division Chief, IT Services Department, City of Alexandria – Michael has 20+ years of experience, predominantly in local government. During his tenure with Alexandria, he has directed and managed the strategic GIS implementations of the City's asset and work order management system (Cityworks), the 911 CAD system (TriTech), the permitting and land use system (Energov) and the custom developed Stormwater Utility system. He leads a team of GIS Analysts who are responsible for nearly 500 GIS data elements that support more than 20 City departments and the public.
- Jason Smolinski - Teacher, Fairfax High School – Jason teaches Geospatial Analysis at Fairfax High School. A former GIS analyst at SAIC, he earned his master's in education in 2012 and his bachelor's degree in information technology in 2005 from George Mason University.
- Rachel Weeden - Mid Atlantic Regional Manager, Esri – Rachel's role with Esri allows her to combine her interests in geography, applied technology and improving government services. Prior to Esri, she worked for the City of Philadelphia and Chester County PA as a GIS Specialist, a career path introduced to her as a Geography undergraduate at Penn State University.