Michael Liddle
Director, Geospatial Services Division
Department of Information Technology
**GIS Excellence Awards 2020**

**Agenda**

**Introduction**
- Michael Liddle, Director
  - Geospatial Services 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
- Sandra Wolak

**Closing Statements**
- Michael Liddle
GIS Excellence Awards 2020

Gregory Scott

Director / Chief Technology Officer

Department of Information Technology
December 16, 2020

GIS Excellence Awards 2020
Entries (alphabetically by title)

(Revised 12/2020)

2019 - 2020 South County Site-Specific Plan Amendment Process – Department of Planning & Development; Marshall Keeney, Graham Owen

COVID-19 Vulnerability Index – Office of the County Executive; Katherine Miga, Robin Wilson

Development of a Point Layer of Stream Roadway Crossings to Support Floodplain Mapping – Stormwater Management; Dipmani Kumar, Efatih Salim, Chip Galloway

Election Day 2020 – Polling Location Awareness – Office of Emergency Management; Paul Lupe, Avery Church, Matthew Miller (DIT), Judy Lamey-Doldorf (DIT), Mei Wang (DPSC)

Eviction Prevention Dashboard – Office of Strategy Management; Terry Reardon, Alexandra Krafchek, Stephanie Calderon (DIT), Daniel Cabrera (DIT)

Fairfax County Animal Shelter – Expanding Community Outreach – Department of Animal Sheltering; Melanie Leopold, Sandra Woiaik (DIT)

Fairfax County Congressional Districts and Supervisor Districts – Department of Information Technology; Daniel Cabrera

Fairfax County Food Resources Map – Department of Neighborhood and Community Services; Caroline Rankin, Matthew Miller (DIT), Judy Lamey-Doldorf (DIT), Franz Arend (DIT), Melanna Forys (DIT), Diane Bentley (DIT), Kathy Ryan (Fairfax County Public Schools)

Fairfax County Houses of Worship – Department of Neighborhood and Community Services; Caroline Rankin, Ramona Carroll, Gregory Bacon (DIT)

Fairfax County Park Authority Data Contribution – Park Authority; Andrew DeLuca, Justin Roberson, Farris Agatone, Lynne Johnson

Fairfax County Senate Districts and Supervisor Districts – Department of Information Technology; Daniel Cabrera

Fairfax County ZIP Codes and Post Offices – Department of Information Technology; Daniel Cabrera

Fairfax County’s Department of Public Safety Communications NextGen 9-1-1 Efforts – Department of Public Safety Communications; Raleigh Maier

FCDOT – Existing Bicycle & Pedestrian Network Dataset – Department of Transportation; Thomas Wampler, Zachary Kronmal, Lindsay Marfurt, Nicole Wynands

Fire Box Web Swipe App – Fire and Rescue Department; Katherine Good, Eric Fisher

Fire Data Changes in 2020 – Fire and Rescue Department; Katherine Good

Fires from Improperly Disposed of Smoking Materials – Fire and Rescue Department; Eric Fisher

FY2019 RECenter Scholarships with Vulnerability Index – Park Authority; Farris Agatone, Joshua Colman

Health and Human Services Needs Assessment (2019) – Office of Strategy Management; Susan Shaw, Alexandra Krafchek, Michelle Gregory (DMB), Sophia Dutton (DMB)
GIS Excellence Awards 2020

Categories

- Best GIS Cartographic Product/Presentation
- Best Use of GIS for Analysis
- Best Web Application
- Best Use of GIS for Public Outreach
- Most Significant Data Contributor
- Best GIS Integration
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 planned to be used for Fairfax County business, and an original design is required (i.e. the map must not be based on any commonly used templates). 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
Best GIS Cartographic Product/Presentation

Fairfax County Congressional Districts and Supervisor Districts

Department of Information Technology

Daniel Cabrera
Best GIS Cartographic Product/Presentation

FY 2019 RECenter Scholarships with Vulnerability Index

Park Authority
Fariss Agatone, Joshua Colman

FY 2019 RECenter Scholarships with Vulnerability Index

The Fairfax County Vulnerability Index

The Vulnerability Index was created in 2019 for use by RECenter, as well as in the Human Services Needs Assessment produced by Office of Strategy Management. Eight different datasets from the 2007-2011 American Community Survey were used to create the Index. These datasets include: People of Color, Low English-Speaking ability, Low Educational Attainment, Propensity to Rent, Households without a vehicle, Population without Health Insurance, Housing cost burdened households, and Severely cost burdened renters. A score of 1 - 5 was given to each census tract for each indicator, with 3 representing the most vulnerable. The Index was calculated by adding all scores together and dividing by 8 - the validity was applied. For visualization purposes, the data was then classified into 5 classes using natural breaks.

FY 2019 RECenter Class Scholarships

In 2019, the Fairfax County Park Authority awarded $2,500 of scholarships. Of the 0.134 records shared from Park Services, 0.026 of these matched addresses in Fairfax County and City. This means that 90% of data is displayed in this visualization.
Best GIS Cartographic Product/Presentation

Mosaic District Cyberpunk Map

Department of Information Technology
Daniel Cabrera
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)
Best Use of GIS for Analysis

Development of a Point Layer of Stream Roadway Crossings to Support Floodplain Mapping

Stormwater Management

Dipmani Kumar, Elfatih Salim, Chip Galloway

Development of a Point Layer of Stream Crossings in Fairfax County to Support Floodplain Modeling

The Stormwater Planning Division has initiated a project to map regulated floodplains in the County, backed by limited detail hydraulic models utilizing estimated ultimate development flows. In order to (i) establish the level of effort and cost of developing hydraulic models, and (ii) locate points where bridge or culvert geometric data would be needed for the hydraulic models, it was first necessary to create a countywide point layer of stream crossings.

It was determined that a simple interest of existing stream hydraulics and the roadway centerline would result in identifying additional crossings that were not needed for the hydraulic modeling because the stream hydrography extends well upstream of the 70 acre threshold of regulated floodplains. An additional complication is that many major divided roadways are represented with two lines in the roadway centerline feature.

In order to obtain the desired point layer of stream crossings, the following analytical procedure was adopted:

1. A 70 acre stream network was first identified utilizing spatial Analyst functions within ArcGIS Pro, which consisted of the following steps:
   a. Using the CON function and an existing Flow Accumulation Grid derived from the most recent County Digital Elevation Model, a raster linear network grid that started at a 70 acre drainage point was created.
   b. The raster linear network was vectorized using the Stream to Feature tool within the Hydrology toolbox, available with ArcGIS Pro.
2. The 30 ac stream network created in the previous step was intersected with the roadway centerline, and a series of geoprocessing functions (buffer, multipart to singlepart, and feature to point) utilized to whittle multiple intersection points on divided highways and major roadways as chosen in the attached document.

The final crossings point layer contains 2,455 points representing the intersection of regulated floodplain streams and roadways. This layer will be used to develop initial cost estimates for hydraulic modeling to support the mapping of regulated floodplains in the County. Additionally, this point layer will be utilized to locate available sources of geometric data needed for the hydraulic modeling of crossings such as VDOT, existing FEMA models, or models previously created to support management plans for the County’s designated watersheds.

Steps in ArcGIS Pro:

1. Add data and addangesances,30- and 70 ac and roads
   entitled feature classes.
2. Intersect the streamlines, 70.ac and Roads
   feature
3. Buffer the crossings points feature as such:
   a. Stream
   b. 70 ac and roads
4. Explore the crossings points in 70 ac and
   Road as such:
5. Connect the exploded buffers to points as such:
6. The result is a single point at each road crossing
Best Use of GIS for Analysis

Katherine Miga, Robin Wilson

COVID-19 Vulnerability Index

Office of the County Executive

COVID-19 Vulnerability Index

Background

The COVID-19 Vulnerability Index, based on the COVID-19 Vulnerability Index, was designed to assess the vulnerability of communities to COVID-19 in Virginia, with a focus on socioeconomic and demographic factors. This index helps to identify communities that are at higher risk of COVID-19 spread, allowing for targeted interventions to mitigate the impact of the pandemic.

Methodology

The COVID-19 Vulnerability Index was developed using a combination of demographic, socioeconomic, and health-related data. The index incorporates factors such as age, race, income, education, employment, and access to healthcare. These factors are weighted to reflect their relative impact on vulnerability.

Impact

The COVID-19 Vulnerability Index was used to inform public health interventions and resource allocation. Communities identified as being at higher risk were prioritized for targeted public health interventions, such as increased testing, contact tracing, and outreach to vulnerable populations.

The COVID-19 Vulnerability Index is an important tool for understanding the vulnerability of communities to COVID-19 and informing public health strategies to mitigate the impact of the pandemic.
Best Use of GIS for Analysis

Health and Human Services Needs Assessment (2019)

Office of Strategy Management
Susan Shaw, Alexandra Krafchek, Michelle Gregory (DMB), Sophia Dutton (DMB)
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
Best GIS Web Application

RISE Grant Program Awards

Department of Economic Initiatives

Scott Sizer, Ingrid Abernathy, Wendy Lemieux, Chase Suddith, Theresa Benincasa, Tanya Burrell (DOF), Stephanie Calderon (DIT), Elliott Stroud (DIT), Patricia McCay (OCA), Andrew Janos (DPMM), Donna Hurwitt (EDA), Dana Mariano (Community Business Partnership)
Best GIS Web Application

The Fairfax County LiDAR Resources Hub Site

Department of Information Technology

Gregory Bacon
Best GIS Web Application

Web Based Drainage Area Delineation Using LiDAR

Land Development Services

Brett Martin, Gregory Bacon (DIT)
Best GIS Web Application

Where Can I Picnic in Fairfax County, You Ask? Let Us Show You!

Park Authority
Fariss Agatone, Morgan Chapin
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. A totality of an agency’s GIS public outreach efforts over the last 12 months will be evaluated rather than just one specific project. 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
Best Use of GIS for Public Outreach

Fairfax County Food Resources Map

Department of Neighborhood and Community Services

Caroline Rankin, Matthew Miller (DIT), Judy Lamey-Doldorf (DIT), Franz Arend (DIT), Melanna Forys (DIT), Diane Bentley (DIT), Kathy Ryan (FCPS)
Best Use of GIS for Public Outreach

**Police Data Transparency Initiative**

Supplemental Information:

Jeffrey Gallagher, Carolyn Kinney, Kathy Pham, Amy Milliman, James Krause
This award is presented to the agency that has created or refined the most significant spatial data for the County. 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
Most Significant Data Contributor

Fairfax County Park Authority Data Contribution

Park Authority

Andrew DeLuca, Justin Roberson, Fariss Agatone, Lynne Johnson
Most Significant Data Contributor

Katherine Good

Fire Data Changes in 2020

Fire and Rescue Department
This award is presented to the agency that has integrated GIS into their operations to the greatest degree. 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
Best GIS Integration

Fairfax County Animal Shelter - Expanding Community Reach

Department of Animal Sheltering
Melanie Leopold, Sandra Woiak (DIT)

Fairfax County Animal Shelter – Expanding Community Reach

Laws in 2013 the Department of Animal Services reached out to the GIS Division to assist in visualizing the services we provide to the community. The result was three interactive mapping applications focused on the location of animals utilizing our services. These apps have been hugely helpful in understanding the distribution of our customers as well as expanding to better serve our community.

This mapping has been instrumental in helping us understand our reach into the community—both areas we are serving well and other areas where there is great potential. We are looking atnuance and vaccinations since 2016 and we update the information quarterly. Analyzing this data in a report format has been very helpful in visually seeing where we are strong and where we have room to grow. The clustering functionality allows us to easily identify areas where we have a strong presence and, conversely, where we do not.

Understanding our reach in the community and where our animals are going when VALIENDA's mandatory intake has ended is incredibly helpful. With this information we are targeting our Outreach and Community programs to areas where adopted animals are living. It has also helped in identifying areas where potential adopters may not know about us and the resources we provide. In the examples you can easily see the benefits of filtering the data—it makes the data so much clearer and actionable. In the first instance we added adoption for all ages together. In the second instance we separated out the 0-6 months from the 7-9 months to get a better understanding of where in the county those have been adopted within the county in 2018.

These three tools have been fundamental in helping us understand our reach into the community.
Best GIS Integration

Site Records Viewer – Utilizing GIS and OpenText to Map Site Records

Land Development Services

Brett Martin, Bill Edwards, Bushra Khan, Jose Baez, Pragnaya Katiki, Matthew Logie, Julia Ward, Radha Avala (DIT), Harish Reddy (DIT)
**GIS Excellence Awards 2020**

**Judges (alphabetically by last name)**

Sue Carlson - GIS Web Administrator, Loudoun County GIS – Sue has been with Loudoun County for 13 years. She has a master’s degree in GIS from the University of Redlands and is a GISP.

Tom Conry - GIS Manager, Fairfax County (retired) – Over the course of Tom’s 20-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 2019 and spends much of his time traveling.

Tim Ernest - GIS System Administrator, Arlington County GIS – Tim has been with Arlington county’s GIS program for 29 years in various roles. He started his GIS career in the Army as a military geographer and analyst. In ’90 he left the Army to work for Arlington and became the County’s first Cartographer in ’93 and then their GIS System Admin in 2000.

Kathryn Kearanen - 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.

David Khoeler – IT Program Manager, DC Department of Public Works – David is a certified GIS Professional with 26 years of experience in the field of GIS and information technology. He works with other GIS team members at DPW and throughout District government to develop and maintain applications that capture data and track operations in the field, to provide data analysis opportunities, and system integration capabilities for DPW and coordinating agencies.

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 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.

Billie Leff – Cartography and Information Products Lead, Esri – Billie has been with Esri Professional Services for 10 years. She is a graduate of the University of Wisconsin – Madison, with a master’s degree in remote sensing and geospatial information technology. She also holds degrees in environmental science, anthropology, and business administration. Prior to working for Esri, Billie was the GIS manager at National Geographic for 6 years, managing the team which provided all content for Society-created maps.

Greg Licamele - Public Information Officer, Fairfax County Office of Public Affairs – Greg leads digital content strategy for the county website and social media. He has served the county for nearly 15 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.
Dawn Matasic - Account Manager, Esri – Dawn is a senior account manager with Esri’s Local Government Team. She has over 22 years of experience in the GIS industry and over 13 years of experience working with Esri. She has been working with Fairfax County since 2016.

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 2003 from George Mason University.

Ian Stack – Chief, GIS Services, Fairfax Water Authority – Ian has been at Fairfax Water since 2007 primarily responsible for GIS Enterprise architecture, managing GIS data collection and dissemination solutions, end user support, and staff management. He graduated from the University of Maryland in 1993 with a degree in Civil Engineering and obtained his Master’s Degree in Civil Engineering, Water Resources in 2006 also from the University of Maryland.

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.

Daniel Wickens - Solution Engineer, Esri – Daniel has worked for Esri for over four years and is a graduate of the University of Pittsburgh with a degree in environmental studies and GIS. In his role as solution engineer for Esri’s Philadelphia regional office, he works extensively with local and state governments to implement Esri’s new ArcGIS Hub technology, which helps organizations bring people, data, and engagement tools together to accomplish initiative goals.
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