TNGIC Fall Forum

East Region

Thursday October 17, 2019
Plant Biotech Building
University of Tennessee Agriculture Campus
2505 EJ Chapman Drive
Knoxville, TN 37996

Keynote Speakers

Mr. Wil Tollefson

Geosciences Department,
ETSU

Developing the Tennessee Climate Office: Climate Data Services and GIS Applications for Community Resilience

Dr. Anne Berres

Computational Urban Sciences,
ORNL

Visualization: Your Map to Understanding Your Data

Hosted by the University of Tennessee and the Tennessee Geographic Alliance

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2019 Eastern Forum Committee

Conference Co-chairs: Michael Camponovo and Kurt Butefish

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Schedule at a Glance

2019 Eastern Regional Tennessee Geographic Information Council (TNGIC) Forum

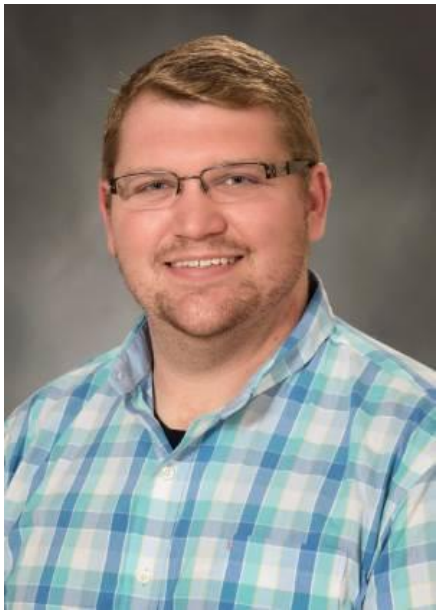
Thursday, October 17, 2019 – University of Tennessee Agricultural Campus

Hosted by the University of Tennessee and the Tennessee Geographic Alliance

7:00AM – 8:00AM	Vendor Setup (Atrium)	
8:00AM – 10:30AM	Registration Open	
8:00AM – 8:30AM	Breakfast (Atrium) *Sponsored by the Geography Department, University of Tennessee*	
8:30AM – 9:00AM	Morning Plenary, Opening Session/Announcements	
9:00AM – 10:00AM	AM Keynote – **Developing the Tennessee Climate Office: Climate Data Services and GIS Applications for Community Resilience** Wil Tollefson, East Tennessee State University, Geosciences Department (PBB 156/157)	
10:00AM – 10:15AM	Mid-morning break/vendor & map gallery area open (Atrium)	
Breakout Sessions	PBB 156/157	PBB 160
10:15AM – 10:45AM	**1 Pedestrian Road Safety Initiative** *William Brewer, Chris McPhilamy* *Tennessee Department of Transportation*	**2 Analyzing Winter Weather and Short-Term Climate Trends of the Ski Resorts in North Carolina Through the Use of Community Collaborative Rain, Hail & Snow Network (CoCoRaHS) Stations** *Danika Mosher* *East Tennessee State University*
10:45AM – 11:15AM	**3 Exploring Opioid Data for Tennessee** *Michael Camponovo, Dr. Quisheng Wu* *Geography Department, University of Tennessee*	**4 Building an Open Source Server for Henry County 911** *Randal Hale* *North River Geographic Systems, Inc.*
11:15AM – 11:45AM	**5 Not just for operations - Displaying demographic and economic data using Esri Ops Dashboard** *Tim Kuhn* *Tennessee State Data Center*	**6 Public Garden and Arboretum GIS - Pitfalls and Successes** *Joanne Logan, Sue Hamilton, Tim Prather, Alexandria Smith, Nancy Howell, and P.J. Snodgrass* *University of Tennessee, Department of Biosystems Engineering and Soil Science*
11:45AM – 1:15PM	Lunch (Atrium) *Sponsored by Woolpert*	
	PM Keynote – **"Visualization: Your Map to Understanding Your Data"** Anne Berres, Oak Ridge National Laboratory (PBB 156/157)	
Breakout Sessions	PBB 156/157	PBB 160
1:15PM – 1:45PM	**7 Introduction to ArcGIS Pro** *Mike Sweeney* *ESRI*	**8 Digital Twins** *Amanda O'Shea* *KCI Technologies, Inc.*
1:45PM – 2:15PM	**9 State of Tennessee Data Initiatives: LiDAR updates and more!** *Paul Dudley* *State of TN STS-GIS Services*	**10 Panel: Job Hunting for Students and Recent Graduates**
2:15PM – 2:45PM	**11 Getting Started with Attribute Rules and Arcade** *Jeff Kirchberg* *City of Johnson City*	
2:45PM – 3:00PM	Afternoon break/vendor & map gallery area open (Atrium)	
3:00PM – 3:30PM	**12 The Use of Small Unmanned Aerial Systems (sUAS) in the Referential Identification of Invasive Vegetation within the Old Woman Creek Estuarine Reserve** *Caleb Keoho* *University of Tennessee*	**13 Mobile Data Collection with ArcGIS** *Mike Sweeney* *ESRI*
3:30PM – 4:00PM	Closing Session, Map Gallery Awards, Door Prizes (PBB 156/157)	

Morning Keynote Speaker

Mr. Wil Tollefson, MS
Geosciences Department, East Tennessee State University



Developing the Tennessee Climate Office: Climate Data Services and GIS Applications for Community Resilience

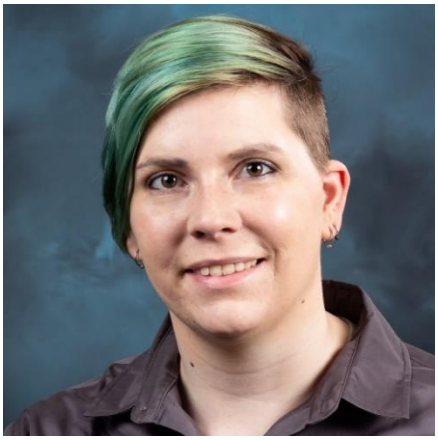
Tennessee has a diverse climate that varies greatly from west to east, with wide-ranging daily impacts on many parts of our economy including emergency management, public health, agriculture, transportation, tourism, recreation, and the environment. Currently, Tennessee is one of only two states in the country without an official state climate office, thus a major void exists regarding the development of readily available climate data and services. The mission of the 'in-development' Tennessee Climate Office is to provide climate-related services to state, local, and federal agencies, businesses, and the citizens of Tennessee. Through three primary 'mission' areas, the Office will study Tennessee's climate and inter-annual variability, and assist state agencies on extreme weather vulnerability assessments, public health concerns such as vector-borne disease patterns and indicators of heat stress, climate-environment interaction issues, and the integration of climate information into current applications. Example tools and data products will be presented with an emphasis on the central role that GIS data and analysis plays in developing climate data services for Tennessee.

Biography:

Mr. William Tollefson is a Lecturer in Geosciences at East Tennessee State University and the Director of Geospatial & Hazard Analysis for the Geoinformatics and Disaster Science (GADS) Lab. Wil teaches multiple GIS classes (e.g., Intro to Geospatial Technology, Digital Mapping with GIS, Open Source GIS, Intro to GIS, Earth and Society, UAV/UAS Applications) and serves as the Outreach Coordinator for the Department of Geosciences. He is also co-developing the Tennessee Climate Office at ETSU along with Dr. Andrew Joyner. He has a background in meteorology, climatology, and geospatial analysis, which he uses to provide expertise in hazard mapping and analysis and monthly climate summary reports for the state of Tennessee.

Lunch Keynote Speaker

Dr. Anne Berres
Computational Urban Sciences, Oak Ridge National Laboratory



Visualization: Your Map to Understanding Your Data

A good visualization tells a story and creates an understanding of the data. But this is easier said than done.

In this talk, I will discuss the seven sins of visualization by providing examples and explaining why the visualization choices are bad. Then, I will introduce important visualization paradigms to guide scientists in making great visualization choices. Finally, I will provide some guidance on useful tools for visualization.

Biography:

Anne Berres received a Ph.D. in Computer Science from the University of Kaiserslautern, Germany in 2015. Her core expertise lies in various aspects of data science and visual computing, most notably in-situ visualization, image processing, big data, and geometry. Through her work as postdoctoral researcher at Los Alamos National Laboratory (2015-2017), she gained experience conducting sampling and compression of large-scale simulation data and developing climate simulations in an HPC environment. During her work as postdoctoral research associate at Oak Ridge National Laboratory, Dr. Berres further developed and applied these skills to image-based deep learning on architecturally diverse HPC machines; web-based visualization and analysis for geographic data; coupling transportation simulations to population, emissions, and building energy models; and building a web-based situational awareness tool for regional mobility.

Presentations

1: Pedestrian Road Safety Initiative

Presenter Name(s): William Brewer, Chris McPhilamy

Brief Presenter Bio(s)
Chris McPhilamy is a Planning Manager at the Tennessee Department of Transportation in the Long Range Planning Division. Within the Data Management Office he oversees the Data Visualization and Forecasting Offices. Chris received his bachelor's degree in geography from Central Michigan University and his Masters in geography from East Carolina State University. (Hint: The State of East Carolina does not exist). Chris has held his GISP since 2009. William Brewer is a Planning Supervisor in the Long Range Planning Division at the Tennessee Department of Transportation. As the Supervisor of the Data Visualization Office, he manages the daily operations which involve interpreting complex transportation planning data into various methodologies, maps, and tools. Mr. Brewer received a Master of City and Regional Planning from Clemson University, and his background includes comprehensive planning through public engagement, graphic design, GIS analysis, and zoning administration.

Description of Paper or Abstract
The intent of this analysis is to produce a data-driven methodology to assist the Tennessee Department of Transportation's Multimodal Transportation Resources Division in identifying high-risk corridors and intersections for potential safety project development. The output of this analysis will be developed as a tool to support the planning and decision-making process in determining pedestrian safety project recommendations. Additionally, this TDOT program will be funded as part of FHWA's Highway Safety Improvement Program, and is entitled the Pedestrian Road Safety Initiative (PRSI).

2: Analyzing Winter Weather and Short-Term Climate Trends of the Ski Resorts in North Carolina Through the Use of Community Collaborative Rain, Hail & Snow Network (CoCoRaHS) Stations

Presenter Name(s): Danika Mosher

Presenter Bio(s)
Danika Mosher is currently a graduate student at East Tennessee State University majoring in Geosciences and concentrating in Geospatial Analysis. Her undergraduate experience consisted of attending Appalachian State University where she obtained a major in Environmental Science and three minors in Geology, Atmospheric Science, and Studio Art. With developing her skills in geospatial analysis, she is able to combine multiple research interests such as ecology, weather, and climate. Current research projects include looking at Southern Appalachian Spruce-Fir Forests and climate change, snowfall at NC ski resorts, Guatemalan coffee and climate change, and soil drydown in Kansas. Mosher also likes to give back to the community by volunteering her time and participating in clubs and groups. Her career goals are similar to her current activities that involve ecology, weather, and climate aspects in addition to community involvement.

Description of Paper or Abstract
Changes in climate can result in economic impacts, especially for businesses that rely on consistent weather patterns. The North Carolina ski resorts (Beech Mountain, Appalachian, Sugar Mountain, Wolf Ridge, Cataloochee, and Sapphire Valley) are the southernmost resorts in the eastern US. The diverse terrain and elevation of the Appalachian Mountains result in colder temperatures and traditionally higher snowfall amounts compared to other areas of the Southeast, making these businesses viable. Within the past two decades, resorts have extended their snowmaking period to compensate for reduced natural snowfall. This generates concern for businesses that may be in areas that are not entirely snow reliable. To understand what may happen in the future, it is pertinent to examine past and ongoing trends. early snowfall data from 2010 to 2018 were obtained from the Community Collaborative Rain, Hail & Snow Network (CoCoRaHS) to observe weather trends and short-term climate variability.

Additional Information/Comments
The snowfall data was interpolated using co-kriging, a Gaussian process using covariances along with other variables. Various teleconnections were examined to compare years in similar phases to negate influences and observe snowfall trends. Random points with interpollated snowfall amounts were spatially analyzed by universally kriging their regression slopes to determine how climate change may affect those areas. A kernel density surface was created from active CoCoRaHS stations. This aided in observing which areas need more stations and locations that have experienced a decline in stations. Precipitable water, sea level pressure, air temperature, and vector winds were observed to see which conditions generate worst case and best case scenarios for natural snowfall. The results can aid in the analysis of weather trends for the Southern Appalachians and contribute to long-term climate analysis while also promoting the use of citizen science to advance research efforts.

3: Exploring Opioid Data for Tennessee

Presenter Name(s): Michael Camponovo, Dr. Qiusheng Wu

Brief Presenter Bio(s)
Michael Camponovo manages the GIS Outreach and Engagement Laborotory. This lab promotes GIS and geospatial technologies and encourages people to pursue a career in geography. Michael has a Master's Degree in Geography from the University of New Mexico. Qiusheng Wu's research interests include Geographic Information Science (GIS), remote sensing, and environmental modeling. More specifically, he is interested in applying geospatial big data, machine learning, and cloud computing (e.g., Google Earth Engine) to study environmental change, especially surface water and wetland inundation dynamics. Dr. Wu received his Ph.D. from the University of Cincinnati.

Description of Paper or Abstract
The Washington Post recently released a massive dataset of all the orders for hydrocodone and oxycodone in the United States between 2006 and 2012. We have been exploring the Tennessee data in detail as well as supporting data such as opioid deaths and treatment centers. Join us for a deep dive into the data as well as the logistics of working with nearly 6 million records of data. We will be sharing the results of our analysis as well as where you can access the data for your own communities in Tennessee.

Additional Information/Comments
Supporting story map at https://storymaps.arcgis.com/stories/92678e77f9f9467bbad17c06f68ac67b

4: Building an Open Source Server for Henry County 911

Presenter Name(s): Randal Hale

Brief Presenter Bio(s)
Owner and operator or North River Geographic Systems, Inc. I've been in the industry for 25+ years. I mainly work with Free and Open Source Software for Geoinformatics. I volunteer with the QGIS Community and Serve as an "at large" member of osgeo.us. You will hopefully find me either sitting in data or in a canoe - hopefully a canoe.

Description of Paper or Abstract
NRGS built an open source server for Henry County 911 in 2018. Up until then they were using an Commercial off the Shelf (COTS) mapping software to maintain their addresses for 911. Now we're working in PostGIS for a database, QGIS for a desktop, and have spread GIS to everyone in the Department. This is the good the bad and the ugly behind the rollout and move to an open source GIS.

5: Not just for operations - Displaying demographic and economic data using Esri Ops Dashboard.

Presenter Name(s): Tim Kuhn

Brief Presenter Bio(s)
Tim Kuhn is Director of the Tennessee State Data Center, housed in the Boyd Center for Business & Economic Research at The University of Tennessee, Knoxville. He oversees the Data Center's operations including outreach and dissemination of Census related materials, analysis and serves as Tennessee's representative to the Federal-State Cooperative for Population Estimates. He has over 20 years of experience in local government and planning, much of it based in the Knoxville-Knox County area. His worked has focused on geographic information systems, web-technology, census programs and enrollments projections. He a recent recipient of the 2019 Data Visualization Award in State and Local Government from the Association of Public Data Users. Kuhn has a bachelor's degree in Political Science from the University of Iowa.

Description of Paper or Abstract
The estimated population of every Tennessee county is updated on an annual basis by the United States Census Bureau. The numbers are important benchmarks, but the spatial trends and time series information about growth rates, births, deaths and migration that accompany this data release are not readily visualized through the tools used to retrieve them. To help Tennessee communities better understand this annual Population Estimate Data, the Tennessee State Data Center created a county-level dashboard using Esri's Operations Dashboard platform focused on current and historic population estimates dating back to 2010. The presentation will provide users with a brief overview of the underlying estimate data, discuss the design considerations for the final dashboard design. It will then delve into some lessons learned about the Esri dashboard product and important database design considerations to best take full capability of the software platform.

Additional Information/Comments
Desktop dashboard: https://myutk.maps.arcgis.com/apps/opsdashboard/index.html#/0a25caa68c9e4399a65449bc94ff3a49
Mobile dashboard: https://myutk.maps.arcgis.com/apps/opsdashboard/index.html#/76f10afb1525497483d76c285e05c879

6: Public Garden and Arboretum GIS - Pitfalls and Successes

Presenter Name(s): Joanne Logan, Sue Hamilton, Tim Prather, Alexandria Smith, Nancy Howell, and P.J. Snodgrass

Brief Presenter Bio(s)
Joanne has taught GIS at the University of Tennessee since 1988, as well as published research using GIS as an analysis and visualization tool. Constantly on the hunt for real-world applications and case studies, she has recently become involved with the UT Garden GIS mapping project.

Description of Paper or Abstract
Over the past several years, we have periodically tried to initiate a GIS /mapping approach for the UT Garden and Arboretum at the University of Tennessee-Knoxville campus. Over the years, the garden staff developed a very haphazard approach to managing their plantings, events, volunteers, outreach, and maintenance work, and had expressed an interest in merging all this disjointed information into one GIS/database system. There are GIS programs that can be purchased to do some aspects of this vision, such as BG-Map, but since our university has a site license to ArcGIS, we decided to pursue this avenue. This presentation will provide insights about the pitfalls and successes as we have migrated to this new system to map and manage the garden.

7: Introduction to ArcGIS Pro

Presenter Name(s): Mike Sweeney

Brief Presenter Bio(s)
Mike Sweeney works as a Solution Engineer in the Charlotte regional office of Esri. He has over thirty years of GIS implementation experience in many diverse application areas. Most of his time is spent exploring and explaining new releases of the ArcGIS software and working with clients in the Southeast. Mike earned a BA in Geography with a minor in Computer Science from SUNY-Albany and a MS in Geography from the University of South Carolina.

Description of Paper or Abstract
A modern desktop GIS should be sleek and visually appealing. It should be packed with powerful tools to streamline authoring, editing, and analysis workflows. The modern user interface interacts with the analyst and provides the right tools at the right time. This workshop will familiarize you with the look and feel of ArcGIS Pro. ArcGIS Pro options, the ribbon interface, and general capabilities will be discussed. We'll also show you how to create maps and layouts, edit your data, and perform analysis using ArcGIS Pro.

8: Digital Twins

Presenter Name(s): Amanda O'Shea

Brief Presenter Bio(s)
Mandy O'Shea is a KCI Project Manager with 19 years' experience helping local and state organizations adopt technology and optimize processes to achieve business goals.

Description of Paper or Abstract
Planning, engineering design, and GIS is increasingly being conducted in 3D. New surveying methods such as Lidar scanning, unmanned aerial systems, and gradiometers can provide previously unheard-of capabilities to capture below-ground, indoor, and above ground assets in three dimensions. This presentation will demonstrate how resulting building information models (BIM) can serve as foundational datasets supporting multiple objectives within an agency's asset management program.

9: State of Tennessee Data Initiatives: LiDAR updates and more!

Presenter Name(s): Paul Dudley

Presenter Position/Title(s): GIS Analyst

Presenter Organization(s): State of TN STS-GIS Services

Brief Presenter Bio(s)
Paul Dudley is a GIS Analyst working with the State of Tennessee's Strategic Technology Solutions GIS Services Group. Paul is a 2007 graduate of the University of Tennessee Geography Department. With the state his primary focuses are on imagery, LiDAR and cadastral data.

Description of Paper or Abstract
This presentation will cover the State of Tennessee's wealth of data available to government entities and the public. Topics will include status update of the USGS 3DEP LiDAR program in Tennessee, Imagery products, and TNMap services available to the public.

10: Job Hunting for Students and Recent Graduates

11: Getting Started with Attribute Rules and Arcade

Presenter Name(s): Jeff Kirchberg

Brief Presenter Bio(s)
Jeff Kirchberg is the Geospatial Analyst for the Public Works Department for the City of Johnson where he performs database development, software implementation (such as Cartegraph, Survey123, and Collector), and education and training of end users. He is passionate about the further education of both office and field workers and developing systems to allow better data driven decisions. Jeff is especially interested in developing new ways for data managers to design systems, educate users, and manage data in an effort to fully realize the goals of an organization.

Description of Paper or Abstract
Come learn the tips and tricks you need to know before getting started with Attribute rules and Arcade.

12: The Use of Small Unmanned Aerial Systems (sUAS) in the Referential Identification of Invasive Vegetation within the Old Woman Creek Estuarine Reserve

Presenter Name(s): Caleb Keoho

Brief Presenter Bio(s)
Caleb Keoho UTK Sophomore Majors: Microbiology & Ecology and Evolutionary Biology Minor: GIS GIS Experience: Photogrammetry and Remote Sensing: REU 2019, Dr. Richard Becker, UToledo Other Research: Gray-Miller Bsal Lab, Kivlin Microbial Ecology Lab, Camponovo-Kivlin Independent Research Project

Description of Paper or Abstract
The introduction of invasive vegetation can permanently alter the ecological interactions that determine the health and stability of an ecosystem. The advancement of the use of sUAS (small unmanned aerial systems) allows for the application of specialized imagery equipment to discern the presence of invasive species with a high resolution. This study acts to prove the validity of the use of an RGN equipped sUAS to discern invasive vegetation with a high degree of accuracy proving its feasibility in future invasive management. sUAS flights were conducted over the Old Woman Creek Estuary using the Phantom 3 commercial drone equipped with a MAPIR Survey RGN camera. It was found that sUAS employment alongside NDVI analysis projected invasive vegetation distribution with a high degree of accuracy when referenced with ground-truthing confirmation. This proof of concept suggests that UAV systems are a valid method through which data regarding invasive vegetation management can be drawn.

13: Mobile Data Collection with ArcGIS

Presenter Name(s): Mike Sweeney

Brief Presenter Bio(s)
Mike Sweeney works as a Solution Engineer in the Charlotte regional office of Esri. He has over thirty years of GIS implementation experience in many diverse application areas. Most of his time is spent exploring and explaining new releases of the ArcGIS software and working with clients in the Southeast. Mike earned a BA in Geography with a minor in Computer Science from SUNY-Albany and a MS in Geography from the University of South Carolina.

Description of Paper or Abstract
There are several options for field data collection within the ArcGIS platform: Collector, Survey123 and QuickCapture. Come learn about the capabilities of these products and which one is right for your data collection needs.

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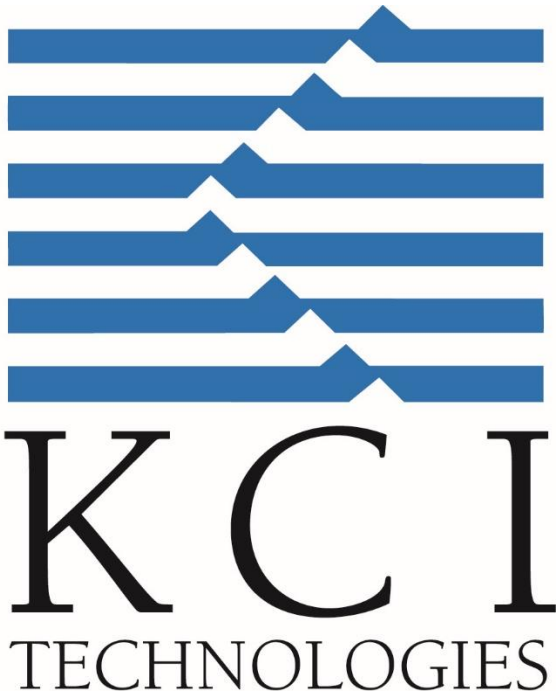

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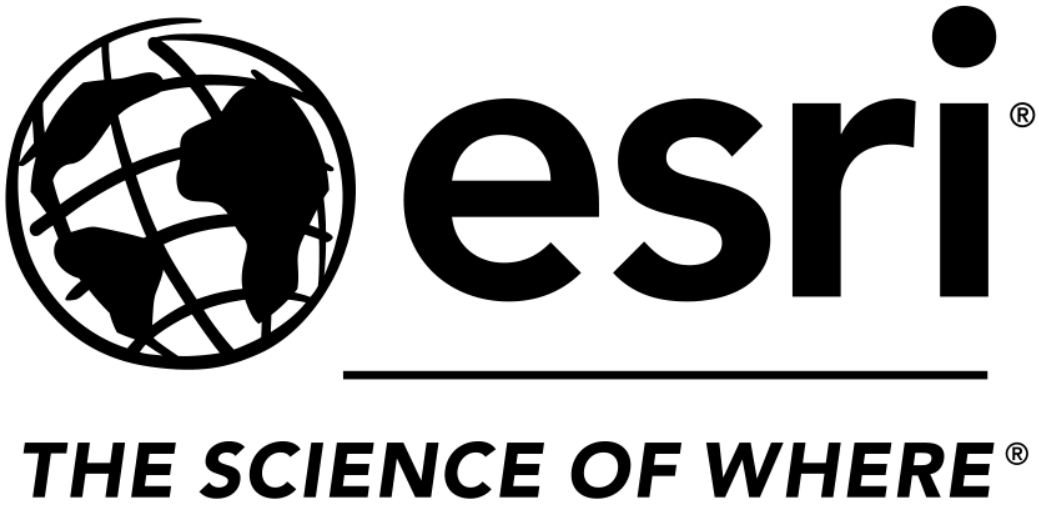

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