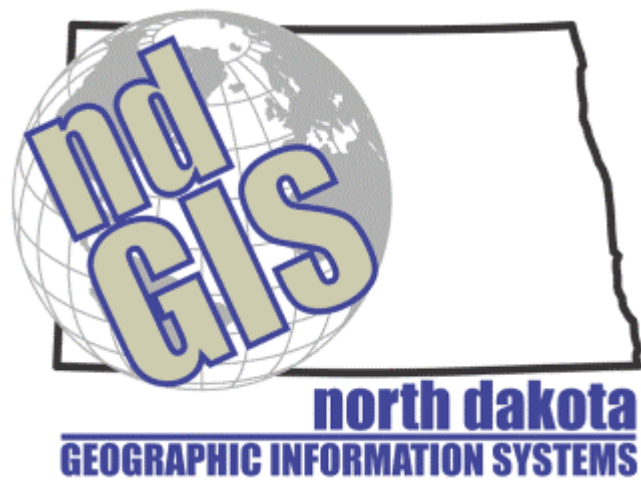


2015 North Dakota GIS Users Conference Program with Abstracts



September 28 – 29, 2015
Holiday Inn, Fargo, ND

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WELCOME!

On behalf of North Dakota State University, the Upper Great Plains Transportation Institute and the North Dakota GIS Technical Committee we welcome you to the 2015 North Dakota GIS Users Conference. We recognize that you took valuable time away from your personal and work lives and that by attending this conference you also committed financial resources. We hope that you enjoy your experience at the Holiday Inn and in Fargo. We have world class keynotes, presentations, workshops and a vendor showcase that we believe will give you an outstanding opportunity to network and gain valuable information about the ever changing world of geospatial technology. Please be sure to thank all of our conference sponsors and stop by the exhibitor's booths to make some valuable connections with them. Thank you again and enjoy the conference!

Ann Fritz and Eunsu Lee, Conference Co-Chairs

Planning Committee

Co-Chairs

Ann Fritz, North Dakota Department of Health

Eunsu Lee, NDSU-Upper Great Plains Transportation Institute/ New Jersey City University

Matt Fischer, ND Public Service Commission

Bob Nutsch, ND Information Technology Department

Jill Peterka, UND-Conference Services

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Gretchen Schatz, UND – Conference Services

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Association of Transportation and Logistics Students, North Dakota State University

Hamad Alqublan

Nick Aslaam

Poyraz Kayabas

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Yong Shin Park

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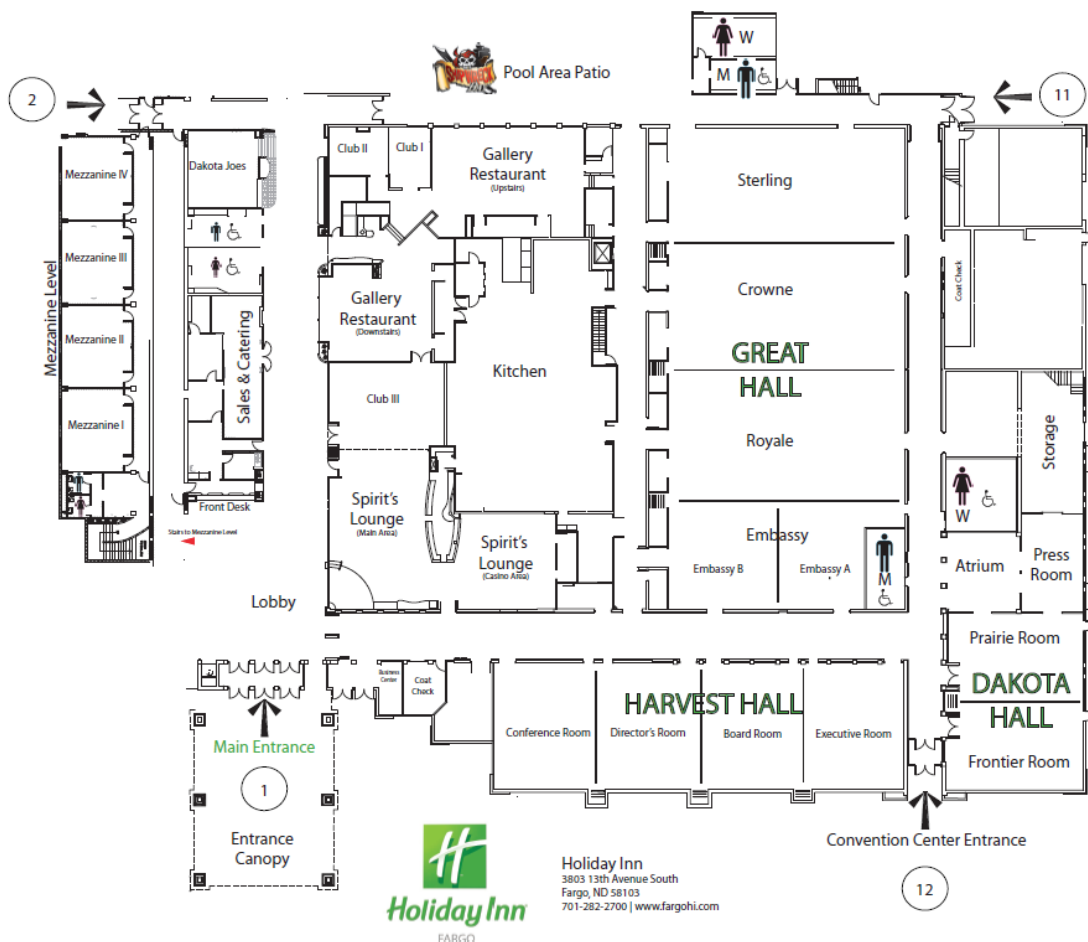
Ali Rahim Taleqani

Jay Sandeen, UND Geography

Schedule at a Glance

Monday, September 28				
10:00 am – 12:30 pm	Registration Open - Room: Atrium			
	LUNCH ON YOUR OWN			
12:30 pm–1:15 pm	GISTC Meeting - Room: Harvest Hall – Executive/Board *Open to the Public			
1:15 pm – 1:30 pm	Welcome and Opening Remarks: NDSU President, Dr. Dean Bresciani Room: Royale/Embassy			
1:30 pm – 2:30 pm	Keynote Session: S.J. Camarata Jr., <i>Trends and Advancements in GIS: Directions That Can Lead to Transformation</i> Room: Royale/Embassy			
2:30 pm – 3:00 pm	Exhibitor Showcase Opens and Break - Room: Sterling/Crowne			
3:00 pm – 4:00 pm	Concurrent Sessions (A)			
	Harvest Hall Executive/Board	Harvest Hall Director's	Harvest Hall Conference Room	Royale/Embassy
	A1. Environment & Health	A2. WORKSHOP: Leveraging ArcGIS Online for your Organization	A3. ESRI Learning Lab (set up)	A.4 Government
4:00 pm – 5:00 pm	Poster Session Room: Sterling/Crowne			
5:00 pm – 6:00 pm	Social and Exhibits Room: Sterling/Crowne			
7:00 pm	No-host dinner at Granite City Food & Brewery, 1636 42 nd St. South, Fargo (south of West Acres Mall). RSVP required. See Registration Table for details.			
Tuesday, September 29				
7:30 am	Registration – Room: Atrium			
7:30 am – 8:00 am	Continental Breakfast and Exhibitor Showcase - Room: Sterling/Crowne			
8:00 am – 8:30 am	Platinum & Gold Sponsor Presentations - Room: Royale/Embassy			
8:30 am – 9:30 am	Keynote Session: Dr. Alex Philp, <i>Billions of Interconnected Things: A Revolution for the Geospatial Community</i> Room: Royale/Embassy			
9:30 am – 10:00 am	Break - Exhibitor Showcase - Room: Sterling/Crowne			
10:00 am–11:00 am	Concurrent Sessions (B)			
	Harvest Hall Executive/Board	Harvest Hall Director's	Harvest Hall Conference Room	Royale/Embassy
	B1. Engineering & Analysis	B2. Demo Theater	B3. ESRI Learning Lab	B4. Government
11:00 am–12:00 pm	Concurrent Sessions (C)			
	Harvest Hall Executive/Board	Harvest Hall Director's	Harvest Hall Conference Room	Royale/Embassy
	C1. Transportation & Analysis	C2. Workshop: Fundamentals of Remote Sensing	C3. ESRI Learning Lab	C4. Server and Mobile GIS
12:00 pm - 1:00 pm	Lunch, Exhibitor Showcase Room: Sterling/Crowne			

	Concurrent Sessions (D)			
1:00 pm – 2:00 pm	Harvest Hall Executive/Board	Harvest Hall Director's	Harvest Hall Conference Room	Royale/Embassy
	D1. Variety	D2. Workshop: New Data Collection and Editing Software Solutions	D3. ESRI Learning Lab	D4. Open Source
	Concurrent Sessions (E)			
2:00 pm – 3:00 pm	Harvest Hall Executive/Board	Harvest Hall Director's	Harvest Hall Conference Room	Royale/Embassy
	E1. Workshop: Introduction to Using the Census Bureau's American FactFinder Website	E2. Workshop: Story Maps: Harness the Power of Maps to Tell Your Story	E3. ESRI Learning Lab	E4. Remote Sensing
3:00 pm – 3:30 pm	Break and Exhibitor Showcase - Room: Sterling/Crowne			
	Concurrent Sessions (F)			
3:30 pm – 4:30 pm	Harvest Hall Executive/Board	Harvest Hall Director's	Harvest Hall Conference Room	Royale/Embassy
	F1. Workshop: New Hardware Technology for High Accuracy Data Collection	F2. Workshop: Winning with Land Records	F3. ESRI Learning Lab	
4:30 pm	Conference Conclusion			



Keynote Speakers

S.J. Camarata, Jr., Director, Esri, Inc.

S.J. Camarata is a Director of Esri. He focuses on the company's global corporate strategies. He also currently serves on a number of boards (both for profit and non-profit organizations) and has held a number of other board seats over the years. He has been a founder and co-founder of several companies in the GIS, technology and mobile medical industries. He holds a BS degree from the University of Utah and an MLA degree from Utah State University.



*Monday's Keynote Address presented by Mr. Camarata:
Trends and Advancements in GIS: Directions that Can
Lead to Transformation*

There are a number of astounding advancements that have occurred over the last several years that are helping to drive a new direction in GIS. Some of these have been evolutionary in nature and some more revolutionary. All take advantage of technological advancements and capabilities with GIS software, a greater availability and usefulness of content/data and a greater understanding of organizations on how they can more effectively use and deploy GIS. These advancements follow substantial leaps in the overall trends that have been occurring related but not limited to mobile devices, networks, cloud and web based computing, sensors and platforms (such as satellites and UAV's), big data, advanced analytics and more. The ease of use of GIS has also made enormous strides in recent years allowing for much broader adoption and use of GIS and mapping.

Dr. Alex Philp, Founder and President, GCS Research

Alex Philp, Ph.D is the founder of various advanced technology companies in Missoula, Montana, including GCS, Adelos and TerraEchos. Originally, Alex launched GCS as a spinout from NASA-funded research and development in advanced Earth System Science at The University of Montana. Adelos specializes in fiber optic sensor technology licensed from US Navy, and Terra was dedicated to leading edge cyber security problems for the US Government.



Dr. Philp received his Masters and Ph.D in Interdisciplinary Studies from the University of Montana, combining interests in history, geography, ecology, and geospatial IT into comprehensive examinations of historical landscapes and how and why they change over time. Prior to attending the University of Montana, he worked for the Lewis and Clark National Forest and as a Park Ranger in Glacier National Park. Alex's undergraduate degrees were in Philosophy and History from Seattle University, graduating as a life-long member of the National Jesuit Honor Society with a public commitment to scholarship, loyalty, and service.

In addition to his service work in recognizing and rewarding excellence in student scholarship, Alex serves as a board member at Providence Western Montana Health and Services, The University of Montana School of Business Administration Advisory Board, and as a Faculty Affiliate in the Department of Geography and School of Business at The University of Montana, evangelizing, lecturing, and speaking about interdisciplinary topics. Alex and his family reside in Missoula, Montana.

*Tuesday Keynote Address by Dr. Philp:
Billions of Interconnected Things: A Revolution for the Geospatial Community*

The Internet of Things (IoT) is upon us as geospatial professionals, a world of billions of IP-addressable devices, sensors, systems, and interconnected things. What does this mean? How is this relevant to spatial analytics and how do we embrace the IoT? Dr. Alex Philp, an interdisciplinary thought leader in the geospatial community, will provide a basic overview of the Internet of Things. Dr. Philp will explore significant and timely examples of how connected things are already transforming various industries. He will explore contemporary and futuristic examples of how the geospatial community can benefit from and participate in this transformative technology revolution. The IoT will challenge every GIS specialist and geospatial expert professionally, conceptually, and technically. The IoT will further redefine both the academic and applied side of our massive industry. Identifying, harnessing and building applications that leverage the spatial dimension of billions of connected things, things that are located some place, represent the next-generation for our community. This will be first time Dr. Philp presents his most recent work in this field and will focus on health, agriculture, and government examples and experience.”

Monday September 28th

Registration Open	10:00 am – 12:30 pm	Room: Atrium
State GIS Technical Committee Meeting	12:30 pm – 1:15 pm	Room: Harvest Hall Executive/Board
<p>*Open to the Public*</p> <ul style="list-style-type: none"> • Introductions • Executive GISTC Report <ul style="list-style-type: none"> • Recent activities • Current and upcoming work • Other • Roundtable Discussion – Data Needs 		
Welcome and Opening Remarks Ann Fritz, ND GIS Users Conference Co-Chair and NDSU President Dean Bresciani	1:15 pm – 1:30 pm	Room: Royale/Embassy
Keynote Address SJ Camarata, Jr., Director, Esri, Inc TRENDS AND ADVANCEMENTS IN GIS: DIRECTIONS THAT CAN LEAD TO TRANSFORMATION	1:30 pm – 2:30 pm	Room: Royale/Embassy
Exhibitor Showcase Opens & Break	2:30 pm – 3:00 pm	Room: Sterling/Crowne
Concurrent Session A	3:00 pm – 4:00 pm	Room: various, see below

Concurrent Session A

3:00 PM – 4:00 PM MONDAY September 28, 2015

A1	Environment and Health	Room: Harvest Hall Executive/Board
	A1.1	Jennifer Olson, Tetra Tech, Saint Paul, MN; Doug Norton, US EPA, Washington DC; Ann Fritz, Division of Water Quality, North Dakota Department of Health, Bismarck, ND; and Peter Cada, Tetra Tech, Research Triangle Park, NC, jennifer.olson@teteratech.com , WATERSHED RECOVERY POTENTIAL IN NORTH DAKOTA: USING GIS-BASED TOOLS TO TARGET AND PRIORITIZE WATERSHEDS FOR NUTRIENT MANAGEMENT
	A1.2	Thomas Sayward, GIS Department, Moore Engineering, West Fargo, ND 58078, Tyler Maasjo, Water Resources Department, Moore Engineering, West Fargo, ND 58078, tsayward@mooreengineeringinc.com , MAPPING WATER INUNDATION USING HYDRAULIC MODELS, GIS AND PYTHON
	A1.3	Aziz Şatana, Department of Field Crops, Seyrani Faculty of Agriculture, Erciyes University, 38030, Kayseri, Turkey, azizsatana@erciyes.edu.tr . GEOGRAPHICAL DISTRIBUTION OF SOME MEDICINAL AND AROMATIC PLANTS ON MOUNT IŞIKLAR (GANOS), TEKİRDAĞ, TURKEY.
A2	WORKSHOP	Room: Harvest Hall Director's
		Jesse Adams, North Point Geographic Solutions, Duluth, MN 55802, jesse@northpointgis.com . LEVERAGING ARCGIS ONLINE IN YOUR ORGANIZATION.
A4	State and Local Government	Room: Royale/Embassy
	A4.1	Kay Anderson, Cass County Government, Fargo, ND 58108, andersonk@casscountynnd.gov . DATA REPLICATION AND SHARING: THE CASS COUNTY EXPERIENCE.
	A4.2	Brad Anderson, City of Moorhead, Moorhead, MN 56560, brad.anderson@ci.moorhead.mn.us . TRANSFORMING YOUR ENTERPRISE GIS. THE IMPACT OF NEW CITY GOVERNMENT DATABASE DEPLOYMENT ON YOUR ENTERPRISE GIS.
	A4.3	Bob Nutsch, Information Technology Department, State of North Dakota, Bismarck, ND 58503, bnutsch@nd.gov , STATE OF NORTH DAKOTA GIS PROGRAM UPDATE

POSTER SESSION

4:00 PM – 5:00 PM MONDAY September 28, 2015

POSTER	Room: Sterling/Crowne	
	Christopher J. Atkinson and Lisa Pimentel, Department of Geography, University of North Dakota, Grand Forks, ND 58202, christopher.atkinson@email.und.edu . NEW CHILDREN IN MINNESOTA, 2013.	
	Patrick Bright, MA, Abdimajid Ahmed, BS, Mandi-Leigh Peterson, MA, and Gary Hart, PhD, Center for Rural Health, University of North Dakota, School of Medicine & Health Sciences, Grand Forks, ND 58202, Patrick.bright@med.und.edu . PHYSICIAN WORKFORCE DISTRIBUTION IN NORTH DAKOTA.	
	Morgen W. V. Burke and Bradley C. Rundquist, Department of Geography, University of North Dakota, Grand Forks, ND 58202, morgen.burke@my.und.edu . SHELTERBELT DENSITY DYNAMICS AND THEIR DRIVING FORCES IN GRAND FORKS COUNTY, NORTH DAKOTA, 1962 TO 2014.	
	Earl L. Klug, Morgen W.V. Burke, Bradley C. Rundquist, Lawrence L. Burkett, Mitchell P. Braget, Department of Geography, and Brett J. Goodwin, Department of Biology, University of North Dakota, Grand Forks, ND 58202, earl.klug@gmail.com . INTEGRATION OF GROUND-LEVEL AND SATELLITE DATA FOR MONITORING VEGETATION PHENOLOGY AT THE OAKVILLE PRAIRIE.	
	Bradley C. Rundquist, Michael A. Niedzielski, Megan R. Quinlan, Dillion J. Skogen, Morgen W.V. Burke, Mitchell P. Braget, Austin R. Braget, Department of Geography, Benjamin C. York, Department of Geology and Geological Engineering, University of North Dakota, Grand Forks, ND 58202, and Sebastian F. Braun, Department of Anthropology and American Indian Studies, Iowa State University, Ames, IA 50010. WEB-ENABLED GIS FOR BAKKEN OIL BOOM DATA WITH A FOCUS ON THE FORT BERTHOLD RESERVATION	
	Navin Thapa, Mary Mortensen, and Enrique Delgado, Beaver Creek Archaeology, Bismarck, ND 58501, nthapa@bcarch.org . MAPPING PRE-HISTORIC BURIAL MOUNDS USING LIDAR	
	Dasuni Ranapathi Arachchige and Gregory S. Vandeberg, Department of Geography and Geographic Information Science, University of North Dakota, Grand Forks, ND 58202, gregory.vandeberg@und.edu . MAPPING FLASH FLOOD POTENTIAL IN THE TURTLE AND FOREST RIVER BASINS, NORTH DAKOTA USING GIS.	
GIS for Everybody - Student Poster Competition	Sarah L. Anderson and Devan McGranahan, Department of Range Science, North Dakota State University, Fargo, ND 58108, sarah.anderson.4@ndsu.edu . SPATIAL TRENDS IN AIRBORNE DUST INTENSITY AND EXTENT IN WESTERN NORTH DAKOTA	
GIS for Everybody - Student Poster Competition	Isaac J. Simon, Department of Earth System Science and Policy, Bradley C. Rundquist, Department of Geography, and Ty M. Reese, Department of History, University of North Dakota, Grand Forks, ND 58202, ijsimon@sbcglobal.net . A WEB-ENABLED GIS OF NORTH DAKOTA'S FUR TRADE-ERA MISSOURI RIVER CORRIDOR	
GIS in Transportation Poster Competition	Yong Shin Park and Osama Khan, Transportation and Logistics Program, North Dakota State University, Fargo, ND 58105, Yong.park@ndsu.edu , SPATIOTEMPORAL ANALYSIS OF OIL SPILL IN CASE OF TRANSPORTATION ACCIDENTS IN NORTH DAKOTA, USA	
Social & Vendor Showcase Open Trivia Contest! Door Prizes!		5:00 pm – 6:00 pm
No-host dinner at Granite City Food & Brewery RSVP required. Please contact the Registration Table for more information.		7:00 pm 1636 42 nd St. South (south of West Acres Mall). Transportation not provided, but venue is within walking distance

Tuesday September 29th

Registration Open	7:30 am	Room: Atrium
Continental Breakfast & Exhibitor Showcase	7:30 am – 8:00 am	Room: Sterling/Crowne
Platinum and Gold Sponsor Presentations	8:00 am – 8:30 am	Room: Royale/Embassy
Keynote Address Dr. Alex Philp, President and Founder, GCS Research, BILLIONS OF INTERCONNECTED THINGS: A REVOLUTION FOR THE GEOSPATIAL COMMUNITY	8:30 am – 9:30 am	Room: Royale/Embassy
Exhibitor Showcase Opens & Break	9:30 pm – 10:00 am	Room: Sterling/Crowne
Concurrent Session B	10:00 am – 11:00 am	Room: various, see below

Concurrent Session B

10:00 AM – 11:00 PM TUESDAY September 29, 2015

B1	Engineering & Analysis	Room: Harvest Hall Executive/Board
	B1.1	Dave Kirkpatrick, GIS Specialist, Houston Engineering Inc, Fargo, North Dakota, 58102 dkirkpatrick@houstoneng.com , SURVEY COORDINATION USING ARC GIS ONLINE AND COLLECTOR
	B1.2	Lucas R. Rengstorf, GIS Coordinator, GISP, Advanced Engineering and Environmental Services (AE2S), Grand Forks, ND 58201, Jonathan Braski, City of Fargo, GIS Technician II, Fargo, ND 58102, Lucas.Rengstorf@ae2s.com, USING RELATIONSHIP CLASSES WITH ASSET MANAGEMENT
	B1.3	Megan M. Grove, Energy & Environmental Research Center, University of North Dakota, Stop 9018, Grand Forks, ND 58202-9018, mgrove@undeerc.org. USING SPATIAL STATISTICS TO INVESTIGATE PRODUCTION TRENDS IN THE BAKKEN PETROLEUM SYSTEM.
B2	DEMO THEATER (10:00 AM – 10:20 AM)	Room: Harvest Hall Director's
	B2.1	Brandon Tourtelotte, Regional Technical Manager, Pictometry, brandon.tourtelotte@pictometry.com . LATEST GIS INNOVATIONS FROM PICTOMETRY
B3	ESRI Hands On Learning Lab (see description, page 12)	Room: Harvest Hall/Conference Room
B4	State and Local Government	Room: Royale/Embassy
	B4.1	Bob Nutsch, Information Technology Department, State of North Dakota, Bismarck, ND 58503, bnutsch@nd.gov , STATE OF NORTH DAKOTA VISUAL ND
	B4.2	Gerry Fisher and Jayden Pascua, Energy Infrastructure and Impact Office, Department of Trust Lands, State of North Dakota, Bismarck, ND 58501, Sam Giebner, North Point Geographic Solutions, Duluth, MN 55802, samg@northpointgis.com. GIS SOLUTIONS FOR MANAGING AND VISUALIZING GRANT DATA - A LOOK AT A REGIONAL EXAMPLE.
	B4.3	Kay Anderson and Ben Prather, Cass County Government, Fargo, ND 58108, andersonk@casscountynd.gov . FIGHTING THE BITE IN CASS COUNTY WITH ARCGIS & SHAREPOINT.

Concurrent Session C

11:00 AM – 12:00 PM TUESDAY September 29, 2015

C1	Transportation & Analysis	Room: Harvest Hall Executive/Board
	C1.1 (GIS Student Competition)	Mohammad M. Molla, Department of Civil and Environmental Engineering, North Dakota State University, Fargo, ND 58108, mohammad.molla@ndsu.edu . LEVERAGING ORIGIN-DESTINATION (O-D) TRAVEL TIME DATA COLLECTION TECHNIQUE USING GOOGLE MAPS API

	C1.2	Osama Khan and Yong Shin Park, Transportation and Logistics Program, North Dakota University, Fargo, ND 58105, Osama.khan@ndsu.edu , IMPACT OF WEEKDAYS, SEASON AND POPULATION DENSITY ON MOTOR VEHICLE FATALITIES IN NORTH DAKOTA, A HOTSPOT ANALYSIS
	C1.3	Mohammad M. Molla, Department of Civil and Environmental Engineering, North Dakota State University, Fargo, ND 58108, mohammad.molla@ndsu.edu . LOCATION ACCURACY OF TRAFFIC CRASH EVENTS USING LINEAR REFERENCING SYSTEM
C2	WORKSHOP Room: Harvest Hall Director's	
		Bradley C. Rundquist, Department of Geography, University of North Dakota, Grand Forks, ND 58202. bradley.rundquist@und.edu . FUNDAMENTALS OF REMOTE SENSING.
C3	ESRI Hands On Learning Lab Room: Harvest Hall/Conference Room	
C4	Server and Mobile Room: Royale/Embassy	
	C4.1	James A. Mertz, Engineering and GIS Specialist, Ward County, Minot, ND 58702, jim.mertz@wardnd.com . ARCGIS ONLINE: OPEN DATA AND WEBAPP BUILDER.
	C4.2	Jesse Adams, North Point Geographic Solutions, Duluth, MN 55802, jesse@northpointgis.com . MOBILE DATA COLLECTION WITH ARCGIS ONLINE.
	C4.3	Chad R. Nunemacher, GIS Project Manager, Houston Engineering, Maple Grove, MN 55369, cnunemacher@houstoneng.com . THE WEB APPBUILDER FOR ARCGIS: WHAT IS IT AND HOW CAN IT HELP YOU CREATE WEB APPLICATIONS?

Lunch and Exhibitor Showcase	12:00 pm – 1:00 pm	Room: Sterling/Crowne
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Concurrent Session D

1:00 PM – 2:00 PM TUESDAY September 29, 2015

D1	Variety Room: Harvest Hall Executive/Board	
	D1.1	Jason Horning, ENP, North Dakota Association of Counties, Bismarck, ND 58501, jason.horning@ndaco.org . NEXT GENERATION 9-1-1 (NG9-1-1) GIS.
	D1.2	Gwendolyn R. Jakel, GIS Specialist, Bartlett & West, 3456 E. Century Avenue, Bismarck, ND 58503, gwen.jakel@bartwest.com . AUTOMATING WORK FLOWS USING MODEL BUILDER AND PYTHON SCRIPTING
	D1.3	David Enns, CEO, VisualSpection Inc., Winnipeg, MB, david@visualspection.com , USE CASE ON SWITCHING FROM TABLETS TO SMART GLASSES
D2	WORKSHOP Room: Harvest Hall Director's	
		Danielle Bailly and Jake Wittenberg, Frontier Precision, Inc. Bismarck, ND 58504, djbailly@frontierprecision.com . NEW DATA COLLECTION AND EDITING SOFTWARE SOLUTIONS
D3	ESRI Hands On Learning Lab Room: Harvest Hall/Conference Room	
D4	Open Source Room: Royale/Embassy	
	D4.1	Damon Grabow, Water Development Division, North Dakota State Water Commission, Bismarck, ND 58505, dmgrabow@nd.gov , INTRO TO GRASS GIS AND PYTHON SCRIPTING.
	D4.2	Mitch Weier, Water Development Division, North Dakota State Water Commission, Bismarck, ND 58505, mweier@nd.gov , AN OVERVIEW OF QGIS.

Concurrent Session E**2:00 PM – 3:00 PM TUESDAY September 29, 2015**

E1	WORKSHOP	Room: Harvest Hall Executive/Board
	Kevin C. Iverson, Manager, Census Office, North Dakota Dept. of Commerce, Bismarck, ND 58502, kciverson@nd.gov . INTRODUCTION TO USING CENSUS BUREAU'S AMERICAN FACTFINDER WEBSITE	
E2	WORKSHOP	Room: Harvest Hall Director's
	Sam Giebner, North Point Geographic Solutions, Duluth, MN 55802, samg@northpointgis.com . STORY MAPS: HARNESS THE POWER OF MAPS TO TELL YOUR STORY.	
E3	ESRI Hands On Learning Lab	Room: Harvest Hall/Conference Room
E4	Remote Sensing	Room: Royale/Embassy
	E4.1 Brandon Tourtelotte, Regional Technical Manager, Pictometry, brandon.tourtelotte@pictometry.com . INNOVATIONS IN AERIAL IMAGERY	

Break and Last Chance for Exhibitor Showcase	3:00 pm – 3:30 pm	Room: Sterling/Crowne
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Concurrent Session F**3:30 PM – 4:30 PM TUESDAY September 29, 2015**

F1	WORKSHOP	Room: Harvest Hall Executive/Board
	Jake Wittenberg and Danielle Bailly, Frontier Precision, Inc. Maple Grove, MN 55369, jake@frontierprecision.com . NEW HARDWARE TECHNOLOGY FOR HIGH ACCURACY DATA COLLECTION	
F2	WORKSHOP	Room: Harvest Hall Director's
	Lisa Schaefer and Kyle Wikstrom, Pro-West & Associates, Walker, Minnesota, 56484, WINNING WITH LAND RECORDS.	
F3	ESRI Hands On Learning Lab	Room: Harvest Hall/Conference Room
4:30 pm	Conference Conclusion	

Concurrent Sessions B3, C4, D3, E3 and F3 9:30 AM – 4:30 PM TUESDAY September 29

The Esri Educational Services Hands On Learning Lab (HOLL) consists of a group of laptops with headphones where students can work through lessons at their own pace. A lesson consists of a recorded presentation followed by a hands-on exercise. Each lesson typically takes about 45 to one hour to complete and students can generally come and go as they please. Esri Educational Services instructors are on hand to assist with questions and to discuss Esri products, other training opportunities and Esri Technical Certification.

2015 HOLL Lesson offerings

1. Getting Started with GIS 1: Understanding the ArcGIS Platform
2. Getting Started with GIS 2: Using ArcMAP to Explore GIS Data
3. Getting to Know ArcGIS Pro
4. Advantages to Storing Your GIS Data in the Geodatabase
5. Creating Presentation Quality Maps in ArcMap
6. Editing GIS Data in ArcMap
7. Multi-user Editing Using Versioning
8. Editing and Maintaining Parcels Stored in a Parcel Fabric
9. Geocoding Street Addresses to Create Map Points
10. Importing and Preparing CAD Data for Use in ArcGIS
11. The Importance of Spatial Reference in Tactical Applications
12. Exploring Health and Epidemic Patterns Using Spatial Statistics Tools
13. Optimizing Transportation Routing Using ArcGIS Network Analyst
14. Modelling Time and Distance Along Networks Using Linear Referencing
15. Working with Geometric Networks to Manage Utilities and Water Runoff
16. Interpolating Sample Points to Create Rasters Using Spatial Analyst Tools
17. Geoprocessing GIS Data Using Python
18. Sharing Maps and GIS Content Using ArcGIS Online
19. Understanding Web Services Using ArcGIS for Server
20. Generating Web Applications for the GIS Novice
21. Getting Started with the Community Maps Data Preparation Tools
22. Mapping Excel Data Using Esri Maps for Office

ABSTRACTS

Listed alphabetically by speakers last name

Jesse Adams, North Point Geographic Solutions, Duluth, MN 55802, jesse@northpointgis.com.
LEVERAGING ARCGIS ONLINE IN YOUR ORGANIZATION.

If you've never used Esri's ArcGIS Online (AGO), you may not even know that you already have an account! This presentation will cover not only the basics, but also a few of the new and exciting features that AGO has to offer. We will show you how to make your subscription work for you, along with tips for how AGO can benefit your workflows and become an integral part of your organization. Attendees will gain basic knowledge of AGO as well as information about customizing an AGO homepage, open data distribution options, enterprise integration, and out of the box apps. Come join us to learn how to get the most out of your AGO Organizational account!

Jesse Adams, North Point Geographic Solutions, Duluth, MN 55802, jesse@northpointgis.com.
MOBILE DATA COLLECTION WITH ARCGIS ONLINE.

This presentation will give attendees a high level overview and provide ideas for how ArcGIS Online (AGO) can be used to make their data collection more efficient and effective. We will cover various workflows and configuration of AGO that will allow you to get started in streamlining your processes and increasing your data accuracy. We will also discuss mobile applications such as ArcGIS for Windows Mobile, ArcPad and the Collector App that are provided by ESRI and integrate with AGO as part of the ArcGIS Online Organizational account subscription.

Brad Anderson, City of Moorhead, Moorhead, MN 56560, brad.anderson@ci.moorhead.mn.us.
Transforming your enterprise GIS. The impact of new City Government database deployment on your enterprise GIS.

One of the primary missions for a Municipal GIS is to tie together all the disparate datasets within the City. Challenges include understanding and fully integrating with different vendors, platforms, and schemas. The real power of Municipal GIS is enabling users to access every piece of information about a property or feature in the City by selecting it on the map. The City of Moorhead recently switched to new CAMA and permitting database systems which required the GIS Department to restructure many of its datasets, including new data extraction and creation processes. A silver lining in this project was that it made a wealth of more comprehensive database information available to the City's GIS. This presentation will demonstrate how Moorhead GIS achieved its goals and integrated the new database information with Esri's Local Government Information Model and the data being extracted from our parcel fabric.

Kay Anderson, Cass County Government, Fargo, ND 58108, andersonk@casscountynd.gov. Data Replication and Sharing: The Cass County experience.

This presentation will focus on how data replication and coordination efforts in the Fargo metro area are benefiting multiple agencies. We will look at how replication is set up, what data is being shared and how the big jigsaw fits together.

Kay Anderson and Ben Prather, Cass County Government, Fargo, ND 58108, andersonk@casscountynd.gov. Fighting the bite in Cass County with ArcGIS & SharePoint.

Cass County GIS Department and Vector Control are teaming up to fight the battle of the mighty mosquito in Cass County and the City of Moorhead. This presentation will focus on how ArcGIS Online is being used by seasonal workers in the County to locate treatment areas and record their applicator activities.

Sarah L. Anderson and Devan McGranahan, Department of Range Science, North Dakota State University, Fargo, ND 58108, sarah.anderson.4@ndsu.edu. SPATIAL TRENDS IN AIRBORNE DUST INTENSITY AND EXTENT IN WESTERN NORTH DAKOTA.

A spatial analysis was conducted in the Bakken oil-producing region of western North Dakota to identify spatial patterns in airborne dust intensity as determined by oil well density, well stage, and precipitation. Data from the North Dakota Oil and Gas Commission was used in ArcGIS to illustrate spatial trends in well development and airborne dust. Kernel density and standard distance analysis of current well locations, associated well stage and well traffic levels are used to model trends in well development and airborne dust. Our model predicts that changes in traffic frequency as a result of well stage, along with decreased monthly precipitation and increased oil well density, increases dust extent and intensity. Well stages are defined on a gradient with establishment (fracking + drilling) having the most associated traffic, production having a moderate amount of traffic and maintenance having the least associated traffic. Western expansion of well density is likely influenced by developments in oil technologies and the geology of the Bakken shale formation. The model predicts and identifies gradients of airborne dust as a result of well traffic and illustrates that lower monthly precipitation increases the spatial extent and density of airborne dust particles.

Christopher J. Atkinson and Lisa Pimentel, Department of Geography, University of North Dakota, Grand Forks, ND 58202, christopher.atkinson@email.und.edu. NEW CHILDREN IN MINNESOTA, 2013.

Traditionally, the number of children born in any country is the result of many factors. Three factors include: 1) religious upbringing and teaching; 2) a country's standing regarding demographic transition; and, 3) the ethnic makeup of the population and how those residents view family size as it relates to the number of children desired. Catholics generally accept the teaching of children at conception. Further, once a country develops industry and a healthy infrastructure and health care to offset population losses due to disease (4th stage of the demographic transition), low birth rates and death rates dominate. Additionally, a changing national demographic can affect the overall total fertility rate (average number of children born per woman during childbearing years, generally defined as 15-49). As is true with other measures describing geographic distributions, the variation in total fertility rate is broad. In the United States in 2014, the total fertility rate was 2.01 (CIA World Factbook). In Minnesota during 2013, the total number of women giving birth was 5.8 percent of the total women of childbearing age (U.S. Census Bureau, American Fact Finder). The purpose of this study is to investigate Minnesota children born and aborted during 2013. Data sources include the U.S. Census Bureau and documents from the State of Minnesota. Spatial distributions including total fertility rate density for both married and unmarried women as well as aborted children will be explored. This investigation and the type of maps produced are transferrable to other demographic studies in Minnesota and the nation.

Danielle Bailly and Jake Wittenberg, Frontier Precision, Inc.
Bismarck, ND 58504, djbailly@frontierprecision.com. NEW DATA COLLECTION AND EDITING SOFTWARE SOLUTIONS

Collect, manage and edit all of your geospatial data in one cloud based application. In this workshop we will talk about the practical implementation of a cloud based data management system. How it can cut down on cost, and reduce errors in a user friendly cross platform format. This is becoming increasingly common in the world of BYOD (bring your own device). With one application, users on iOS, Android, or Windows can sync their data to a centralized location that can be accessed by data managers anywhere via the web.

Patrick Bright, MA, Abdimajid Ahmed, BS, Mandi-Leigh Peterson, MA, and Gary Hart, PhD, Center for Rural Health, University of North Dakota, School of Medicine & Health Sciences, Grand Forks, ND 58202, Patrick.bright@med.und.edu. PHYSICIAN WORKFORCE DISTRIBUTION IN NORTH DAKOTA.

As North Dakota continues to see increased population growth and demographic change, this begs the question of its effects upon the physician workforce. With the increased growth, what types of positions are available for physicians in North Dakota? Where are these positions located? While certain areas may have a higher need or more positions open, physicians may not be willing to go to these areas. What areas are North Dakota's physicians currently located in? We utilize GIS to illustrate areas where positions are open and in need, contrasting that to where physicians currently base themselves to study their dispersion patterns.

Morgen W. V. Burke and Bradley C. Rundquist, Department of Geography, University of North Dakota, Grand Forks, ND 58202, morgen.burke@my.und.edu. SHELTERBELT DENSITY DYNAMICS AND THEIR DRIVING FORCES IN GRAND FORKS COUNTY, NORTH DAKOTA, 1962 TO 2014.

Grand Forks County is thought to have the highest concentration of shelterbelts in the World. As trees have aged and reached their expected lifespan the quality of these shelterbelts has decreased and many have been removed. Tree removal is thought to be increasing over time with few shelterbelts being replanted. This raises concerns over possible increases in wind caused soil erosion, such as was experienced in the 1930s. Using remotely sensed imagery and GIS, historic and recent shelterbelt densities can be measured and changes over time can be recorded. Geographic object-based image analysis (GEOBIA) can be used to automate shelterbelt density measurements on modern 4-band imagery, while older panchromatic imagery requires manual digitizing. The research presented is preliminary and focused on the methodology. Full results are expected in early 2016.

David Enns, CEO, VisualSpection Inc., Winnipeg, MB, david@visualspection.com
Title: Use Case on switching from tablets to smart glasses

Abstract: We will discuss and demonstrate how an engineering firm increased their efficiency by 34% in the field through a voice driven and transcribed inspection solution with smart glasses. Industries currently using smart glass solutions include energy (oil & gas, utilities), engineering and transportation. Data collection has never been easier with full integration into ArcGIS Online and enterprise Esri software.

Gerry Fisher and Jayden Pascua, Energy Infrastructure and Impact Office, Department of Trust Lands, State of North Dakota, Bismarck, ND 58501, Sam Giebner, North Point Geographic Solutions, Duluth, MN 55802, samg@northpointgis.com. GIS Solutions for Managing and Visualizing Grant Data - A Look at a Regional Example.

The North Dakota Department of Trust Lands' Energy Infrastructure and Impact Office (EIIO) provides assistance to political subdivisions through grant funding to aid oil and gas development impacted cities, counties, school districts, and other taxing districts. During the 2013-2015 biennium, the EIIO has awarded 602 grants totaling over 230 million dollars. The EIIO staff have historically responded to a high volume of grant data information requests from the state legislature and general public. These data requests took EIIO staff a great deal of time to research and provide responses. In an attempt to reduce the manual labor involved with providing this data and increasing transparency, the EIIO teamed up with North Point Geographic Solutions to utilize the ArcGIS Online (AGO) platform through the State of North Dakota's implementation named Visual ND. In this presentation, we will discuss how EIIO was able to use AGO to not only visualize their data and reduce staff time by increasing accessibility, but also were able to communicate a better story about their data by providing a temporal context.

Sam Giebner, North Point Geographic Solutions, Duluth, MN 55802, samg@northpointgis.com.
STORY MAPS: HARNESS THE POWER OF MAPS TO TELL YOUR STORY.

You may have seen or heard talk about story maps lately, but aren't quite sure how to create or utilize their capabilities, or maybe you are familiar with them but just want learn a few tips and tricks. Whether you're new to story mapping, or just looking for ideas, come join us to see how you can harness the power of maps to tell your story! We will show you not only the basics, but provide instructions for how to take your maps to the next level and combine them with rich multimedia content - text, photos, graphics, video, and audio that will enhance the user experience. We will also briefly touch on creating custom thumbnails for your story maps and the best practices for displaying your maps through your ArcGIS Online account.

Damon Grabow, Water Development Division, North Dakota State Water Commission, Bismarck, ND 58505, dmgrabow@nd.gov, Intro to GRASS GIS and Python Scripting.

There are numerous GIS platforms currently available and all of them allow for user-constructed scripts. These scripts not only speed up the processing of large data sets, but also help maintain a clean storage location. This presentation will introduce GRASS, an open source GIS platform, and the use of python scripting by taking working examples from start to finish. Also, the GRASS built-in hydrologic toolset, used to interpret DEM's and surface water transport, will be a secondary point of emphasis.

Megan M. Grove, Energy & Environmental Research Center, University of North Dakota, Stop 9018, Grand Forks, ND 58202-9018, mgrove@undeerc.org. USING SPATIAL STATISTICS TO INVESTIGATE PRODUCTION TRENDS IN THE BAKKEN PETROLEUM SYSTEM.

As efforts are made to improve the recovery factors of unconventional reservoirs, such as the prominent Bakken petroleum system, identifying areas of advancement is necessary. Geostatistical analysis was performed on oil production from the Bakken petroleum system in order to provide insight into potential factors affecting well performance. To conduct this investigation, the first 60–90 days of oil production data for wells producing from the Bakken and Three Forks Formations were analyzed using a hot spot (Getis-Ord G_i^*) analysis to determine a z-score. Multiple geostatistical tools were evaluated to

determine the most accurate way to represent the data. Empirical Bayesian kriging was chosen because it employs a weighted least-squares approach, which does not assume a tendency toward an overall mean and, hence, the likelihood of large deviations to skew the data. Several distinct geographic areas were clearly delineated showing high (fell above the 90th percentile) and low (fell below the 10th percentile) areas of production. In order to provide accessibility to these data interpretations to a broad technical audience beyond GIS professionals, various products were developed to showcase key aspects of the data.

Jason Horning, ENP, North Dakota Association of Counties, Bismarck, ND 58501, jason.horning@ndaco.org. Next Generation 9-1-1 (NG9-1-1) GIS.

Next Generation 9-1-1 (NG9-1-1) will improve the public's ability to reach 9-1-1 services anytime, anywhere, from any device. GIS data serves a mission critical role in this new system. Hear what ND is doing to support NG9-1-1 and how new workflows are being established to support the future of 9-1-1 in ND. If you build and/or maintain GIS data for use in a public safety answering point (PSAP), this session is for you.

Kevin C. Iverson, Manager, Census Office, North Dakota Dept. of Commerce, Bismarck, ND 58502, kciverson@nd.gov. INTRODUCTION TO USING CENSUS BUREAU'S AMERICAN FACTFINDER WEBSITE

The Census Bureau's American FactFinder (AFF) Website, launched in 2012, hosts a wide range of data on demographic, economic, social, housing information. The site hosts data previously maintained on 50 different websites. Data from censuses, population estimates and surveys such as the American Community Survey are all hosted at this single site. Information on populations by age, sex, race, ancestry, ethnicity, labor force participation, number of children at home, grandparents, food stamp participation, health insurance coverage, place of work and journey to work, tenure of the householder, value of homes, rent, number of bedrooms and source of heating fuel to name a few items is available. More than 7,000 geographic areas nationwide can be selected by the user. Options to map the data online are available or the user can download shapefiles for use in GIS applications.

Gwendolyn R. Jakel, GIS Specialist, Bartlett & West, 3456 E. Century Avenue, Bismarck, ND 58503, gwen.jakel@bartwest.com. AUTOMATING WORK FLOWS USING MODEL BUILDER AND PYTHON SCRIPTING

Creating a tool in Model Builder or developing a Python script requires more than just connecting a series of commands and creating output. I'd like to walk you through my journey with Model Builder and Python Scripting. Topics I'll be discussing include identifying needs within your workplace, researching possible solutions, developing your workflow and making your tools accessible to others. Automated workflows assist your organization by solving problems and increasing efficiency. They can be a crucial part of making GIS an integral part of office workflows instead of sitting on the side lines.

Osama Khan^a and Yong Shin Park, Transportation and Logistics Program, North Dakota University, Fargo, ND 58105, Osama.khan@ndsu.edu, Impact of weekdays, season and population density on Motor Vehicle Fatalities in North Dakota, a Hotspot analysis

Deaths due to motor vehicle crashes have been of great interest to researchers in recent years. This research study performed a hotspot analysis using Geographic Information System (GIS) and Microsoft Excel tool pack to analyze motor vehicle fatalities between 2010 and 2013 in eight judicial districts of North Dakota with respect to season, weekdays, weekends and population density. The result failed to

reject the hypothesis that weekday variable has positive correlation and density has negative correlation on number of motor vehicle fatalities. The results rejected the hypothesis that winter season increases the number of motor vehicle fatalities. This study will provide the decision makers and policy planners for emergency management service and for education, and prevention of fatal crashes.

Dave Kirkpatrick, GIS Specialist, Houston Engineering Inc, Fargo, North Dakota, 58102
dkirkpatrick@houstoneng.com, Survey Coordination Using Arc GIS Online and Collector

Arc GIS Online and Collector allow coordination between HEI office and field staff. Office staff can request survey data by drawing a polygon over the area of interest and adding some basic information about the survey requirements. Field staff use tablets with 4G to take field notes and attach pictures in order to supplement the survey data in real time. Post processed survey data is added the database and posted for viewing in the online environments. The end result is a one stop shop for data and information that is available in a simple format that works across multiple platforms.

Earl L. Klug, Morgen W.V. Burke, Bradley C. Rundquist, Lawrence L. Burkett, Mitchell P. Braget, Department of Geography, and Brett J. Goodwin, Department of Biology, University of North Dakota, Grand Forks, ND 58202, earl.klug@gmail.com. INTEGRATION OF GROUND-LEVEL AND SATELLITE DATA FOR MONITORING VEGETATION PHENOLOGY AT THE OAKVILLE PRAIRIE.

The UND Department of Geography, in cooperation with the UND Department of Biology, has installed a phenology camera (phenocam) and weather station at the UND Oakville Biological Field Station near Grand Forks. The purpose of the phenocam is to collect digital photographs of a small area of the saline prairie canopy every 30 minutes during daylight hours in four spectral bands (blue, green, red, and near-infrared). The camera's purpose is to monitor the timing of various prairie phenological stages, such as onset of greenness, peak greenness, and senescence, and to link those measurements to weather trends, including air temperature, incoming solar radiation, soil temperature, precipitation, and soil moisture content. The goal is to extend the local phenology-weather relationships over larger geographic areas using several satellite sensors. The Oakville phenocam is part of the National Phenology Network comprising 244 core and affiliated cameras.

James A. Mertz, Engineering and GIS Specialist, Ward County, Minot, ND 58702,
jim.mertz@wardnd.com. ARCGIS ONLINE: OPEN DATA AND WEBAPP BUILDER.

Using ESRI's free tools, ArcGIS Open Data and WebApp Builder, local governments can expand their public-facing services. These offerings both utilize ArcGIS Online services. ArcGIS Open Data is an easily configurable site that allows members of the public to download ArcGIS Online services in spreadsheet, KML, shapefile, and API formats. This presentation will show the functionality of Open Data, and an overview of the configuration of this site. ArcGIS WebApp Builder is a tool that aids in the creation of unique, single-purpose applications that can be hosted on a web server. These applications can replace existing ArcGIS Online web maps, and can be effortlessly deployed by users of all abilities. This presentation will show examples of the applications, and an overview of configuring applications using WebApp Builder.

Mohammad M. Molla, Department of Civil and Environmental Engineering, North Dakota State University, Fargo, ND 58108, mohammad.molla@ndsu.edu. LOCATION ACCURACY OF TRAFFIC CRASH EVENTS USING LINEAR REFERENCING SYSTEM

Abstract:

Accurate location of traffic crash events with respect to road network is a big concern. Each year state agencies require submission of all public road networks with geospatial data to the highway performance monitoring system of Federal government. This Geospatial road network dataset include useful information about the road network, which can facilitate for an efficient traffic crash event location accuracy analysis using linear referencing system. Therefore, this study aimed to see whether traffic crash events can be accurately overlaid within the linear referencing system. Results indicated the linear referencing system can be useful for the significant portion of the road network in finding the accuracy level of traffic crash events location.

Keywords: Linear Referencing System, LRS, ALRS, Traffic Crash, GIS

Mohammad M. Molla, Department of Civil and Environmental Engineering, North Dakota State University, Fargo, ND 58108, mohammad.molla@ndsu.edu. LEVERAGING ORIGIN-DESTINATION (O-D) TRAVEL TIME DATA COLLECTION TECHNIQUE USING GOOGLE MAPS API

Abstract:

Reliable travel time is an important parameter for transportation planning and operational decision making process especially for corridor, subarea, or any given study area. There are several techniques such as Bluetooth, Cellular Phone, Crowd-Sourcing, Probe Measures, and Spot Measures (Radar, Detector, Image Processing) involving travel time data collection. Literature review suggest that each of these methodologies require mobile, temporary, or permanent equipment installation and maintenance, or paid third party vendors, which will price a substantial amount of cost and time depending on the study goal. Therefore, it was aimed to develop an app so that travel time data can be collected freely in the absence of local data unavailability. The app was successfully developed and validating against the model congested travel time estimated in the travel demand model and field data. It is strongly believe that the proposed app using Google Maps API would leverage for an origin-destination static travel time data collection for free.

Keywords: Travel Time, Origin-Destination Survey, Travel Demand Modeling, Travel Data Collection, Transportation Survey.

Chad R. Nunemacher, GIS Project Manager, Houston Engineering, Maple Grove, MN 55369, cnunemacher@houstoneng.com. The Web AppBuilder for ArcGIS: What is it and how can it help you create web applications?

Roll over Flex and Silverlight and make room for JavaScript. Come join us and learn what makes the Web AppBuilder a desirable application and framework for quickly developing and deploying JavaScript applications. We will go through the components of the application, how it aligns with Esri's platform approach, and how you can create an application using an easy-to-use interface without writing a single line of code. If you are a little more advanced, we will also cover how to use the developer's version extensible framework to custom develop widgets, themes, and more. Just another cool way to add your own flavor and functionality to your Web AppBuilder applications.

Bob Nutsch, Information Technology Department, State of North Dakota, Bismarck, ND 58503, bnutsch@nd.gov, STATE OF NORTH DAKOTA GIS PROGRAM UPDATE

Supported by the North Dakota GIS Technical Committee, the North Dakota GIS Program operates the GIS Hub which supports state agencies in the development of their GIS and the dissemination of common interest data to other levels of government and the public. This presentation will briefly review how to access GIS Hub data, describe current activities with ArcGIS Online, and close with a description of data collection activities.

Bob Nutsch, Information Technology Department, State of North Dakota, Bismarck, ND 58503, bnutsch@nd.gov, STATE OF NORTH DAKOTA VISUAL ND

Visual ND is the GIS Hub's implementation of ArcGIS Online and is used as an additional means of disseminating state GIS data. This presentation will briefly describe Visual ND, who contributes to it, and then in more detail demonstrate how maps, data, applications, and documents can be found using the new, more intuitive search tool.

Jennifer Olson, Tetra Tech, Saint Paul, MN; Doug Norton, US EPA, Washington DC; Ann Fritz, Division of Water Quality, North Dakota Department of Health, Bismarck, ND; and Peter Cada, Tetra Tech, Research Triangle Park, NC, jennifer.olson@teteratech.com, WATERSHED RECOVERY POTENTIAL IN NORTH DAKOTA: USING GIS-BASED TOOLS TO TARGET AND PRIORITIZE WATERSHEDS FOR NUTRIENT MANAGEMENT

The US Environmental Protection Agency has been supporting states through the Recovery Potential Screening (RPS) approach and GIS-based tools over the past 10 years. RPS is a systematic, comparative method for identifying differences among watersheds at landscape-scales that may influence their relative likelihood to be successfully restored or protected. The RPS approach involves identifying a group of watersheds to be compared with a specific purpose for comparison, selecting appropriate indicators in three categories (Ecological, Stressor, and Social), calculating index values for the watersheds, and applying the results in strategic planning and prioritization. Indicators are developed using geospatial datasets; examples include percent natural area in a watershed, population increase, and percent of watershed with conservation activities.

The RPS Tool is a custom-coded Excel-based tool that performs all RPS calculations and generates RPS outputs (rank-ordered index tables, graphs and maps). It was developed to help compare up to thousands of watersheds in a desktop environment using GIS-based indicators developed from local, state, and national datasets, but without the user needing direct use of a GIS. This presentation will introduce the Tool, discuss development of indicators and data needs, and review available GIS-based datasets currently being used in North Dakota's Tool to evaluate watersheds at two scales and compare options for watershed-based nutrients management. Examples of RPS Tool indicators and outputs will be provided from the state of North Dakota's ongoing RPS project.

Yong Shin Park and Osama Khan, Transportation and Logistics Program, North Dakota State University, Fargo, ND 58105, Yong.park@ndsu.edu, GIS TRANSPORTATION COMPETITION Spatiotemporal analysis of oil spill in case of transportation accidents in North Dakota, USA

Abstract

With oil boom in North Dakota comes concern over spills, this study explore temporal, spatial, and spatiotemporal pattern of oil spill accidents by truck, pipeline, and rail in North Dakota, United States

from 2004 to 2014. Comap was built in order to analyze spatial and temporal relationship of accident patterns considering time of day, day of week, month, and season. This analysis can be used as a baseline to prevent oil spill during accidents and improve response activities at the state level. Results indicate that there were spatial and time variations in the distribution of the oil spill. The results of the study can help planners and decision makers in formulating policy to mitigate the risks associated with hazardous material release, improve safety, and allocate resources.

Lucas R. Rengstorf, GIS Coordinator, GISP, Advanced Engineering and Environmental Services (AE2S), Grand Forks, ND 58201, Jonathan Braski, City of Fargo, GIS Technician II, Fargo, ND 58102, Lucas.Rengstorf@ae2s.com, USING RELATIONSHIP CLASSES WITH ASSET MANAGEMENT
Using Relationship Classes with Asset Management

Depending on the software selected, geodatabases design can be essential to an Asset Management program. The ultimate goal of our team's project was to create a long-term preventative and condition-based maintenance program for equipment and infrastructure assets within a Municipality's Public Works and Engineering Departments. The Asset Management software selected for this project was Cityworks, which is a GIS-centric program. We will discuss the geodatabase schema development and implementation for ArcServer with specific details associated to the use of relationship classes for vertical assets. Along with the discussion, we will provide examples to show how the GIS data is now being used.

Bradley C. Rundquist, Department of Geography, University of North Dakota, Grand Forks, ND 58202. bradley.rundquist@und.edu. FUNDAMENTALS OF REMOTE SENSING.

This workshop serves as an introduction to remote sensing. Participants will use hand-held spectrometers to gain a better understanding of light interaction with surface materials, and how the measured interactions form images from which maps can be produced. Other topics introduced include a survey of existing and emerging remote sensing platforms and sensors (e.g., aircraft including UAS, satellite systems including constellations, LiDAR) as well as applications of remote sensing for land cover mapping and environmental change monitoring.

Bradley C. Rundquist, Michael A. Niedzielski, Megan R. Quinlan, Dillion J. Skogen, Morgen W.V. Burke, Mitchell P. Braget, Austin R. Braget, Department of Geography, Benjamin C. York, Department of Geology and Geological Engineering, University of North Dakota, Grand Forks, ND 58202, and Sebastian F. Braun, Department of Anthropology and American Indian Studies, Iowa State University, Ames, IA 50010. WEB-ENABLED GIS FOR BAKKEN OIL BOOM DATA WITH A FOCUS ON THE FORT BERTHOLD RESERVATION.

The objective of this project is to provide easy access to geospatial data about landscapes and landscape changes associated with the development of the Bakken oil shale play, with a focus on the Three Affiliated Tribes (Mandan, Hidatsa, and Arikara Nations) on the Fort Berthold Indian Reservation. We developed NDViewer, a web-enabled GIS built around USGS Landsat Thematic Mapper (TM) images. Included are a wide variety of raster and vector spatial layers gathered from many different sources. These data sets represent physical, administrative, socio-demographic, economic, industrial and other aspects of life on the reservation and in the region in general. Users of NDViewer can manipulate data displays, make measurements, and extract data for use in desktop GIS. Because landscape changes have occurred quickly in the area of Fort Berthold over the past decade, tools like NDViewer are highly useful for a variety of stakeholders. The inclusion of historical data and imagery allows users to keep track of changes and visualize the larger impacts. It also allows for future analyses of landscape resilience and recovery.

Aziz Şatana, Department of Field Crops, Seyrani Faculty of Agriculture, Erciyes University, 38030, Kayseri, Turkey, azizsatana@erciyes.edu.tr. GEOGRAPHICAL DISTRIBUTION OF SOME MEDICINAL AND AROMATIC PLANTS ON MOUNT IŞIKLAR (GANOS), TEKİRDAĞ, TURKEY.

The city of Tekirdağ is located at northeast part of Turkey, north of Sea of Marmara, and in Thrace Region. It is located between 40° 36' and 41° 31' Northern latitudes, and 26° 43' and 28° 08' Eastern longitudes. The highest point of Tekirdağ is located at Mount Işıklar (Ganos) which is a part of Tekir Mountain range. Because of the microclimate that is specific to the location, the region has a particular flora. In order to obtain medicinal and aromatic plants, the field trip was organized in 2013. The field trip consists of collecting specimens in each region and in total, it spans a period of 12 days. This activity was conducted during period of flowering and growing. Specimens of herbarium were collected for the identification by mapping the location of each plant using GPS technology. During the data collection phase, name of plant, total number of the plant by stem count, coordinates, altitude, locality, habitat, species' name, and date of the study were recorded. Using this data, it was possible to draft a geographical map that provides detailed information on the location of coordinates of the plant. Based on further analysis of data, it is concluded that, the plants were spotted at 8 locations, particularly in the east-west and north-south regions of Mount Işıklar. The plants were found in Uçmakedere-Ayvasıl region having an altitude of 4 m and in the Bakacak Tepe, which is a highest point of Mount Işıklar, having an altitude of 932 m.

Thomas Sayward, GIS Department, Moore Engineering, West Fargo, ND 58078
Tyler Maasjo, Water Resources Department, Moore Engineering, West Fargo, ND 58078
tsayward@mooreengineeringinc.com, Mapping Water Inundation Using Hydraulic Models, GIS and Python

Given how flat the Red River Valley is, it is exceptionally difficult to model the flow of water. We were all taught water flows downhill, but what happens to the water when there are no obvious hills? Using ESRI's Arcpy and a water resource modeling program HEC-RAS, Moore Engineering developed a stand-alone python script to help answer these questions. . This script is capable of performing three different analyses; first at what point water will begin to overflow the ditches, second how many days a field will be under water, and third how long a structure point will be flooded.

In this presentation we will give a brief overview of the hydraulic modeling software HEC-RAS, and how this script analyzes model output using raster DEM's to determine inundation duration. By understanding how the water behaves on 'flat' ground, it is possible to better protect those who live within its boundaries.

Lisa Schaefer and Kyle Wikstrom, Pro-West & Associates, Walker, Minnesota, 56484,
lschaefer@prowestgis.com, kwikstrom@prowestgis.com. WINNING WITH LAND RECORDS.

Do you want to take advantage of the huge array of land records solutions available, but don't know where to start? Are you struggling to connect the right data with the right app? Is the idea of standardizing your data overwhelming?

We will show you how to get from where you are now to where you want to be, using the data you already have, in less time than you might expect. We'll provide a flavor of the opportunities available to your organization by looking at a "before and after" case study and demonstrating existing and soon-to-be-released apps for sharing land records data in meaningful ways. By the end of the presentation,

you'll know the steps you'll need to take to start taking advantage of these apps, managing and editing data more efficiently, and doing so on any device, in any location.

Isaac J. Simon, Department of Earth System Science and Policy, Bradley C. Rundquist, Department of Geography, and Ty M. Reese, Department of History, University of North Dakota, Grand Forks, ND 58202, ijsimon@sbcglobal.net. A WEB-ENABLED GIS OF NORTH DAKOTA'S FUR TRADE-ERA MISSOURI RIVER CORRIDOR.

This poster presents the results of a research project that seeks to better understand how human activity has affected the landscape of North Dakota since Euro-American settlement. The web-enabled GIS described establishes a base-line understanding of Missouri River corridor land cover before major human activity transformed the landscape through implementation of European agricultural practices and landscape engineering. Data sources include early survey and topographic maps as well as the correspondence and journal entries of French and American explorers, fur traders, and military officers from the late 18th and early 19th centuries. The Missouri River corridor provides the best opportunity in North Dakota to develop a base-line land cover data set because of the relative wealth of historical, anthropological, archaeological, ethnohistorical, linguistic, and geographic information available.

Navin Thapa, Mary Mortensen, and Enrique Delgado, Beaver Creek Archaeology, Bismarck, ND 58501, nthapa@bcarch.org. MAPPING PRE-HISTORIC BURIAL MOUNDS USING LIDAR

Pre-historic burial mounds are artificial heaped piles of earth raised over multiple graves. In North America, they were built primarily during the middle of the Woodland period, dating from 100 BC to 600 AD. These mounds are protected by law as they are considered sacred religious sites to American Indians, and can contain human burials. This study aims to locate such burial mound features in known areas using data provided by State Historical Society of North Dakota. The objective of this study is to check for inaccuracy in previously mapped burial sites and redraw boundaries by analyzing LiDAR elevation models and ground truthing.

In this study we demonstrate the use of LiDAR imagery for the detection and mapping of prehistoric burial mound sites. The study uses LiDAR point-cloud data to produce an elevation model for burial mound sites and improve their mapping accuracy. Techniques such as principle component analysis of shaded relief models, local relief modeling, and feature mapping are used in a GIS environment to extract feature information. These help to extract small-scale topographic features relative to the landscape and visually interpret them. In order to confirm the accuracy of LiDAR analysis over these features, ground observation is conducted to confirm nature of these mounds and avoid anomalies.

Brandon Tourtelotte, Regional Technical Manager, Pictometry, brandon.tourtelotte@pictometry.com. LATEST GIS INNOVATIONS FROM PICTOMETRY

Abstract:

Are you aware of the industry-leading solutions Pictometry now offers the GIS Professional? You may know us for our oblique and ortho imagery products. At Pictometry we've been busy, releasing a new set of solutions that ensure you'll be able to use your Pictometry imagery inside your application of choice; whether that be GIS or CAD software, CAMA, Public Safety, and other applications. Web applications of all kinds, whether 3rd party or custom, are all supported as well. Finally we'll touch on web services. Join us for this informative presentation on what has been keeping us so busy!

Brandon Tourtelotte, Regional Technical Manager, Pictometry, brandon.tourtelotte@pictometry.com.
INNOVATIONS IN AERIAL IMAGERY

Abstract:

Aerial imagery has become an increasingly valuable tool for the GIS and mapping community in recent years. This presentation will provide a brief historical overview of aerial imagery, explore the significant evolution of the technology over the years, as well as highlight some typical as well as more unique use cases for aerial imagery. Lastly, we'll examine some of the latest GIS technology offerings that Pictometry has released in the past year or so.

Dasuni Ranapathi Arachchige and Gregory S. Vandeberg, Department of Geography and Geographic Information Science, University of North Dakota, Grand Forks, ND 58202, gregory.vandeberg@und.edu. MAPPING FLASH FLOOD POTENTIAL IN THE TURTLE AND FOREST RIVER BASINS, NORTH DAKOTA USING GIS.

Flash flooding is a rapid onset natural hazard and can cause extensive property and crop damages as well as deaths. The National Oceanic and Atmospheric Administration storm database reports 464 flash flood events from 1996 to 2013 in North Dakota causing two deaths, more than \$145 million in property damage and \$14 million in crop damage. The main purpose of this study is to identify the critical areas of flash flooding within two selected watersheds in eastern North Dakota. The research method relies on the use of a GIS-based model, the Flash Flood Potential Index that incorporates physiographic characteristics from the watershed. This Flash Flood Potential Index has been used for predictions at various geographic locations from Colorado to Iowa. The index has not been used, to our knowledge, in a flat-lying region such as the Red River Valley of North Dakota and Minnesota. In this study, digital elevation models at 30 m and 3 m resolutions were used to evaluate the sensitivity of the index. Three different scenarios were used with changes for the original FFPI equation. The preliminary results include maps showing areas susceptible for flash flooding in the watersheds. Notably, the highest values of the index for this study correspond to urbanized areas and impervious surfaces such as roads and built spaces, and high slopes reflecting an increased vulnerability to floods and inundation of the watersheds. The correlation between historical events and index results was also tested. Some modifications of the index for flat-lying landscapes might have to be considered in future studies.

Mitch Weier, Water Development Division, North Dakota State Water Commission, Bismarck, ND 58505, mweier@nd.gov, An Overview of QGIS.

Recently, QGIS has developed from a promising desktop GIS platform, to a fairly robust GIS viewing and analysis tool. The North Dakota State Water Commission (SWC) has found that in addition to offering performance and financial advantages, QGIS also provides a flexible database interface. This presentation will summarize the basics of QGIS, advantages and disadvantages of the program, how the program is used at the SWC, and touch on the customizable possibilities of QGIS through Python plugin development.

Jake Wittenberg and Danielle Bailly, Frontier Precision, Inc.
Maple Grove, MN 55369 jake@frontierprecision.com. NEW HARDWARE TECHNOLOGY FOR HIGH ACCURACY DATA COLLECTION

There have been many improvements in GNSS technology and hardware. In this workshop we will discuss what's new, including: multi-constellation receivers, VRS, improvements to GNSS infrastructure, etc.

NOTES

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