MINNESOTA GIS/LIS CONSORTIUM
TWENTY-FIFTH ANNUAL CONFERENCES & WORKSHOPS

"Charting Our Future"
46° 46' 52.57" N
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OCTOBER 7-9, 2015
DULUTH ENTERTAINMENT & CONVENTION CENTER
DULUTH, MINNESOTA
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#mngislis15 | #charting our future | @mngislis | Fb.com/mngislis
On behalf of the Minnesota GIS/LIS Consortium Board of Directors, I welcome you to the 25th Annual Minnesota GIS/LIS Conference & Workshops in Duluth, Minnesota. We hope this year’s conference finds you all well and challenges you to think about where GIS is heading in Minnesota. We have compiled an outstanding conference this year, featuring 37 sessions with over 100 presenters and 17 workshops of varying levels taught by Minnesota GIS professionals. This conference would not be possible without the hard work and dedication of our volunteers. I would like to thank each individual and organization on the committee in helping make this year’s conference a great success. If you see them at lunch or any time during the conference, ask them what is involved and how you may be able to help next year. This year’s keynote presenter is Jack Dangermond, President, Esri. Please join us in hearing about the Current and Emerging Trends in GIS. On Friday, sit back, relax and hear a little about the history of Duluth from author Tony Dierckins in his talk, Boom Bust Boom Bust Boom: Duluth’s Development, 1856-1920.

This year we celebrate 25 years of conferences and workshops — and our mission, To develop and support the GIS professional in Minnesota the benefit of our state and its citizens. As we begin “Charting our Future” for the consortium, we should look back at those who have helped to make the Consortium what it is today. We honor the 25 Lifetime Achievement Award winners and 38 Polaris winners (which includes the three winners this year — Sonia Dickerson, Matt Koukol, and David Fawcett). Please join me in congratulating these individuals who have helped make the Consortium and GIS/LIS what it is today. We also welcome the many students who will attend the conference for the first time. This year, we will host more than 100 students. Many of them will take part in the mentor program and the student competitions. Please consider attending the student competition on Thursday; if you see a student, welcome them to the conference. Please consider becoming a mentor next year — stop by the consortium booth to learn how.

During the exhibitor reception, we will announce the winners of the student competitions. Exhibitors continue to support the conference and consortium in many ways. Not only by providing products, services and information. They also support students through the Student Assistants program. This year, WSB & Associates, Inc., and DDMS, Inc., supported 4 students’ conference registration. They also donate a number of items to our scholarship raffles. The Exhibit hall opens at 10 am on Thursday, October 8. Please stop by and thank them for all of their support. The conference would not be as successful as it is without them.

This year, we have invited K-12 educators to our conference to meet with GIS/LIS professionals in an effort to develop Geo-Mentors. On Wednesday, we have over 45 teachers attending workshops presented by the Minnesota Department of Education and GIS/LIS professionals. If you are interested in learning more about this program, stop by the Consortium booth to talk to volunteers and learn to how to become a Geo-Mentor.

Don’t forget to stop by the MN GIS/LIS Consortium booth in the exhibit hall. Meet current board members and learn about Board and Consortium activities and support the MN GIS/LIS scholarship fund. I’d like to thank each of you for attending this year’s conference and workshops. It is the continued strength of the Consortium membership that keeps this organization strong now and into the next 25 years!

Gerry Sjerven
2015 Conference Chair

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We would like to thank the staff at Ewald Consulting who help the Minnesota GIS/LIS Consortium and its Board of Directors in the administration, logistics and management of this conference.

MN GIS/LIS History - Record of Events / Highlights

In 1988, the Minnesota GIS/LIS Consortium got its start as one of the nation’s first forums to communicate and share information among the growing community of environmental and natural resource geographic information system users and data producers in Minnesota. The Department of Natural Resources (DNR), Land Management Information Center (LMIC), the University of Minnesota’s Center for Urban and Regional Affairs (CURA) and Natural Resource Research Institute (NRRI) along with other key participants, organized an "Executive Steering Committee" to get the effort started.

Initially, the group was named “Minnesota Natural Resource Geographic Information Systems (NRGIS) Consortium.” In 1990, the Steering Committee unanimously adopted to change the group’s name to the Minnesota GIS/LIS Consortium and the first statewide conference was held.

In 1992, the Consortium incorporated as a state and federally-recognized non-profit run by a Board of Directors elected by the members, thus creating the basic structure of the Consortium that still exists today.

In the following pages we’ve listed the past Board of Directors, Polaris and Lifetime award winners. Without the leadership and dedication of these individuals, the Minnesota GIS/LIS Consortium would not have survived the first 25 years.

Please take a moment to view the commemorative poster, located in the exhibit hall, remembering those who have influenced the GIS/LIS community over the years, but are sadly not here today to share in this anniversary.
KEYNOTE SPEAKERS

Charlie Fitzpatrick, Esri Schools Program Manager
Learning & Teaching in the Age of GIS

When not working with maps, computers, teachers, or students, he can be found scuba diving on coral reefs. Charlie is currently the education manager at Esri. He has worked here since 1992. Charlie received the NCGE Distinguished Teaching Award in 1991. From 1977 thru 1992, Charlie was a secondary level social studies teacher at St. Paul Academy, St. Paul, Minnesota. Charlie received his Masters of Arts in Geography at the University of Minnesota in 1974.

Jack Dangermond, President, Esri
8:30 AM, Thursday, Oct. 8, 2015
Current and Emerging Trends in GIS

The Thursday morning keynote will feature the renowned Esri founder and president.

Mr. Dangermond has more than 40 years of experience in geographic information system (GIS) software, a technology for managing, analyzing, and sharing location-based information for better decision making. He is the founder and president of Esri, the world’s fourth largest privately held software company. Founded in 1969 and headquartered in Redlands, California, Esri is widely recognized as the technical and market leader in GIS, pioneering innovative solutions for working with spatial data on the desktop, across the enterprise, in the field, and on the Web.

Esri has the largest GIS software installation base in the world with more than one million users in over 300,000 organizations representing government; nongovernmental organizations (NGOs); academia; and industries such as utilities, health care, transportation, telecommunications, homeland security, retail, and agriculture. Mr. Dangermond is recognized not only as a pioneer in spatial analysis methods but also as one of the most influential people in GIS. He actively manages Esri and is closely connected to projects, clients, and company vision. He takes a leadership role in national and global initiatives to facilitate standards for data access and sharing across agencies and organizations. He is personally committed to applying GIS methods for environmental stewardship and sustainable communities.

Tony Dierckins
Noon, Friday, Oct. 9, 2015
Boom Bust Boom Bust Boom: Duluth’s Development, 1856-1920

This presentation explores the development of Duluth, from its 1856 birth upon a “pile of rocks” at the head of the Great Lakes to its zenith as a manufacturing center and the world’s largest inland sea port, surviving a series of financial panics between immigration and construction booms. Learn how eleven townships formed, came together, split apart, joined again, and expanded into a city three miles wide and 27 miles long.

Duluth author Tony Dierckins has written or co-written over two dozen books, from the ridiculous Duct Tape books and calendars to regional histories such as Lost Duluth and Crossing the Canal, a history of Duluth’s Aerial Bridge. He has been twice nominated for the Minnesota Book Award and is the 2012 recipient of the Duluth Depot Foundation’s Historic Preservation and Interpretation Award. His most recent book is Historic Glensheen, 1905-1930. Dierckins is also the publisher of Zenith City Online, an internet publication celebrating historic Duluth, western Lake Superior, and Minnesota’s Arrowhead.
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Polaris is the proper name for the North Star and for centuries has served as a beacon used by navigators as a guide. The Minnesota GIS/LIS Consortium’s Polaris Leadership Award recognizes active, established leaders in the geospatial community who demonstrate a beacon of energy and creativity that inspire and guide the rest of us.

Polaris award recipients are determined by the following criteria: significant contributions that have benefited our state and its citizens for at least five years; demonstrated leadership, energy, and creativity within and beyond one’s normal job environment for the benefit of the greater GIS community; and involvement with the Minnesota GIS/LIS Consortium, such as a conference presenter and/or a committee or board member.

Sonia Dickerson  
MN.IT @ MNDNR

Sonia’s humor, bearing, knowledge, personal conduct, moral character, and leadership are indicative of a true professional. She has made many significant contributions to our geospatial community, including chairing the Consortium’s 2002 Conference, serving on the consortium Board of Directors from 1999 to 2002, and serving on the Governor’s Council on Geographic Information from 2000 to 2005. She was also one of the principal authors of “A Foundation for Coordinated GIS: Minnesota’s Spatial Data Infrastructure”. This study laid the groundwork for what is now the Minnesota Geospatial Commons. Sonia’s high standards, dedication to duty and teamwork have set the example for all GIS professionals. Sonia’s exemplary performance of duty is in keeping with the highest tradition of service and reflect distinct credit upon her, the GIS community, and the State of Minnesota.

David Fawcett  
MN.IT @ Minnesota Pollution Control Agency

Very few GIS professionals have done more to raise Minnesota’s profile in the national geospatial spotlight than David Fawcett. Since joining the MPCA in 1989, he has steadily increased his responsibilities and contributed to the GIS community. Throughout his tenure, he has demonstrated his passion for teaching by introducing GIS folks to scripting and server skills through workshops. He has also participated heavily in traditional IT spaces, introducing geospatial concepts to programmers, web designers, and data reporters. Perhaps most indicative of David’s passion was his work bringing the FOSS4G North America conference to Minneapolis in 2013. This conference was a tremendous success and opened up a lot of new ideas for Minnesota. In 2012, the Minnesota Geospatial Commons Workgroup became an official MnGeo project, and David’s participation on the team has been crucial to its success, leading to a soft launch in 2014 and an official launch in 2015.

Matt Koukol  
Ramsey County

Matt Koukol has been an integral part of the geospatial community for twenty years. At MnDOT, Matt’s knack for integration and coordination, both internally and externally, enabled him to build lasting partnerships and trust above the immediate expectations of his project work. As GIS Manager for Ramsey County, Matt has taken an active role in building relationships with the Ramsey County GIS Users Group and serving as Ramsey County’s representative to the MetroGIS Coordinating Committee. He has been a strong advocate for free and open data helping Ramsey County to be the first metro county to adopt a formal sharing policy. He has also been a key leader in the advancement of the Metro Regional Centerlines Collaborative and its “parent” project: the Statewide Centerline Initiative. Matt’s leadership, steady and calming presence, good humor and demonstrated ability make him a highly respected and valued member of our community.
## Lifetime Achievement Awards
The Minnesota GIS/LIS Board periodically inducts people and organizations to the Minnesota GIS/LIS Lifetime Achievement Award. This award began in 1993 and is ongoing. This award was established to recognize a lifetime of accomplishments in the field of GIS/LIS in Minnesota.

- David Arbeit (2012)
- Marvin E. Bauer (2006)
- John Borchert (1993)
- David D. Claypool (2000)
- Will Craig (1995)
- Jesse Fant (1995)
- Rick Gelbmann (2013)
- Dave Gorg (2002)
- Jeffrey L. Grosso (2003)
- John C. Hoshal (2009)
- Randall Johnson (2012)
- The Legislative Commission on Minnesota Resources (1994)
- Robert W. Marx (2001)
- Ken Pekarek (2005)
- Victoria A. Reinhart (2014)
- Alan Robinette (1993)
- Rod Sando (2000)
- Joseph E. Sizer (1993)
- Gary Stevenson (2013)
- Don Yaeger (2000)

## Polaris Leadership Award
The Polaris Leadership award has been established to recognize mid-career GIS professionals who demonstrate a beacon of energy and creativity that inspires and guides the rest of us.

- Steve Benson (2010)
- David Bitner (2013)
- Rebecca L. Blue (2009)
- David Brandt (2009)
- Chris Cialek (2006)
- Mike Dolbow (2011)
- Rebecca Foster (2010)
- Rick Gelbmann (2005)
- Joella Givens (2006)
- Lisa M. Hanni, L.S. (2011)
- Catherine Hansen (2013)
- Randall (Randy) Johnson (2007)
- Randy Knippel (2005)
- Mark Kotz (2008)
- Banette Kritzky (2008)
- Steve Lime (2006)
- Chad Martini (2014)
- Jane Mueller (2013)
- Nancy K. Rader (2011)
- Nancy Read (2009)
- Dan Ross (2003)
- Sarah Schrader (2012)
- Gerry Sjerven (2012)
- Mark Sloan (2008)
- Annette Theroux (2005)
- Ben Verbick (2007)
- Sally Wakefield (2007)
- Hal Watson (2014)
- Ron Wenc (2012)
- David Windle (2004)
- Tom Zeisler (2010)
Since 1996, the Governor’s Geospatial Commendation Award recognizes organizations that have gone the extra mile to deliver products and services resulting in a more responsive government, promoting public access to information and reflecting the benefits of working in a collaborative environment that encourages similar efforts in the future. For more information and a list of past winners, visit: www.mngeo.state.mn.us/awards/gov_commendations/

2015 Governor’s Geospatial Commendation Award Recipient

Minnesota GIS/LIS Consortium

The Minnesota GIS/LIS Consortium is honored to have been selected for a Governor’s Geospatial Commendation Award for 2015. The awards recognize organizations that have “gone the extra mile” to deliver products and services resulting in a more responsive government, promoting public access to information and reflecting the benefits of working in a collaborative environment that encourages similar efforts in the future.

The Consortium is being recognized for 25 years of dedication to its mission to develop and support the GIS professional in Minnesota for the benefit of our state and its citizens. A collaborative, volunteer-based organization, the Consortium has supported the community through the multiple opportunities it offers related to GIS education and networking events. Most prominently, it organizes an annual conference that brings together geospatial professionals from all sectors. It also provides technical workshops each spring and fall, networking events, scholarships for college students, event grants and lifetime achievement and leadership awards, and sponsors training events for the K-12 system. The award recognizes the efforts of the hundreds of volunteers who have made the Consortium successful as well as all who have realized the great value of the Consortium’s mission during the past 25 years. These awards have been given since 1996.

MN GIS/LIS History – Awards

Governor’s Geospatial Commendation Award

- 2014 – Minnesota Elevation Mapping Project (Minnesota Department of Natural Resources, Minnesota Geospatial Information Office, Minnesota Department of Transportation, University of Minnesota, United States Geological Survey, Clean Water Legacy Council)
- 2013 – GeoMoose (City of St. Paul)
- 2011 – Red River Basin Mapping Initiative (The International Water Institute)
- 2010 – The Emergency Preparedness Committee and Stephen Swazee
- 2009 – Goodhue County-Wide GIS Alliance (Goodhue County GIS Office)
- 2008 – Geospatial Image Server (Land Management Information Center)
- 2008 – McLeod County LiDAR and Orthophotography Partnership (McLeod County GIS Department)
- 2006 – Firewise in the Classroom (Minnesota DNR Firewise Program, GIS4Schools, Macalester College Department of Geography, MN Alliance for Geographic Education)
- 2006 – Preserving GLO Plat Maps (Office of the Minnesota Secretary of State, Minnesota Department of Transportation, Minnesota Association of County Surveyors, Land Management Information Center, Minnesota Historical Society)
- 2005 – MapServer (University of Minnesota - Department of Forest Resources and Steve Lime)
- 2004 – Environmental Data Access System (Minnesota Pollution Control Agency)
- 2004 – Statewide FSA Orthoimagery Cooperative (Minnesota Departments of Administration, Natural Resources, Pollution Control, Transportation and U.S. Department of Agriculture, Farm Service Agency)
- 2003 – Minnesota Environmental Atlas (Macalester College, Minnesota Department of Natural Resources - Forestry Division and Land Management Information Center)
- 2003 – Ramsey County GIS Users Group
- 2001 – Twin Cities Metropolitan Area Groundwater Model (Minnesota Pollution Control Agency)
- 2001 – Minnesota GeoGateway (Land Management Information Center)
- 2000 – DNR Data Deli (Minnesota Department of Natural Resources)
- 1999 – Internet-enabled parcel mapping information program (Dakota County)
- 1999 – Training and education of GIS technology at all levels of government (Alexandria Technical College)
- 1999 – Developing the statewide land use and land cover data layer (Association of Minnesota Counties, George Orning and Minnesota Department of Natural Resources)
- 1999 – Providing data and maps to a variety of users (GIS Print Room, City of Minneapolis)
- 1998 – Carlton County Soil and Water Conservation District
- 1998 – MetroGIS
- 1998 – Base Maps for the 1990s project (Land Management Information Center)
- 1998 – Washington County Surveyor’s Office
- 1996 – National Wetlands Inventory (U.S. Fish & Wildlife Service)
- 1996 – State of Minnesota digital highway BaseMap (Minnesota Department of Transportation)
STUDENTS

“Charting Our Future” 46° 46' 52.57” N 92° 05' 34.97” W
The Consortium’s scholarship program recognizes graduate, undergraduate, and community college students for their excellence in GIS studies. The annual conference provides an opportunity to highlight their achievements and showcase their work through a scholarship competition. Over $4000 is awarded each year in scholarships based on students’ participation in the scholarship competition and excellence in project presentations. To date, 168 students have been recognized as part of the scholarship program and over $37,000 in scholarships has been awarded. This is only possible through the generosity of Consortium members. Scholarship funds are raised through networking events, honorariums donated by workshop instructors, t-shirt sales, direct donations, and the conference’s Thursday night entertainment event and raffle. Thank you for your support of this important program.

Each year the scholarship program invites qualifying schools to name one Student Scholar per degree program (undergraduate / graduate / community college). Student Scholars receive the following:

- 1 free registration to the annual MN GIS/LIS conference
- A certificate recognizing the student as a GIS/LIS Student Scholar
- An invitation to participate in the Student Scholarship Competition

The Student Scholarship Competition consists of three separate events:

- Community College Poster Presentation Competition
- Undergraduate Oral Project Presentation Competition
- Graduate Formal Paper and Oral Presentation Competition

Each student participating in the scholarship competition receives a scholarship award of $200, or a larger scholarship award if their presentation is selected by a panel of judges as a first or second place winner.

The 2015 student scholars are:

**COMMUNITY COLLEGE GIS**

Joe Johnson – Fond du Lac Tribal and Community College
Joe Johnson holds a BA in History, and completed his coursework in Geospatial Technologies in May 2015 from Fond du Lac Tribal and Community College. Joe is currently working with trail maintenance and mapping in the Duluth, MN area. Joe participated in FDLTCC’s EMARE internship, working on integrating climate change predictions from the IPCC A1B scenario into the ArcSWAT model being used for hydrologic modeling of the St. Louis River watershed.

Andrew Kurth – Itasca Community College
Andrew Kurth received a GIS certificate from Itasca Community College in August 2015. Andrew holds a Master’s of Science degree in Cultural Resources Management Archaeology from Saint Cloud State University and a Bachelor of Arts degree in Anthropology from the University of Minnesota Duluth. He has worked in the fields of natural and cultural resources for the past nine years and is currently employed as a Cultural Resources Specialist with HDR, EOC in Minneapolis.

**UNDERGRADUATE GIS**

Jacqueline Brockman – Bemidji State University
Jacque Brockman is pursuing a B.S. in Geography with a GIS emphasis at Bemidji State University. She previously served in the US Army as an Aerial and Satellite Imagery Analyst. She is currently an Emergency Medical Responder and volunteer firefighter and works to implement GIS analysis and mapping to improve rural response times. She has also completed the Forest Technology program at Northwest Technical College and hopes to work in this field after graduation.

Claire Hofius – Macalester College
Claire is a senior Geography major at Macalester College. After returning from a semester in India, she is currently working with Professor Eric Carter and Professor Laura Smith on spatial epidemiological study of immunization in California. After graduating, Claire would like to travel in the US and abroad before attending graduate school.

Tylor Schwarz – Minnesota State University, Mankato
Tylor attended Minnesota State University, Mankato and graduated with a B.A. in Professional Geography and a certificate in GIS in May 2015. Tylor plans to attend MNSU again in the fall to begin a M.S. in Geography and GIS. Tylor worked for Carver County in Cologne, MN as a GIS assistant working on various projects for the county. Some of Tylor’s favorite courses while attending MNSU are the advanced GIS classes where we put the GIS software to practical use in real world situations. I would love to someday work for a global mapping corporation or be an educator at the collegiate level.
Joseph Krenzelok – University of Minnesota
Joseph Krenzelok recently graduated from the University of Minnesota Twin Cities with a B.S. in Geography and minors in GIS and Environmental Geoscience. During his undergraduate, Joseph worked at the University of Minnesota Polar Geospatial Center, which piqued his interests in glaciology and hydrology. This past summer, Joseph served as a Hydrology Intern for the Northwest Forest Plan’s Aquatic and Riparian Effectiveness Monitoring Program in Corvallis, Oregon. Joseph aspires to attend graduate school and pursue a career as a hydrologist to confront issues relating to water resource management.

Adam J. Barthel – St. Cloud State University
I am going into my senior year at St. Cloud State University. I plan on graduating next spring with honors, and I am majoring in Geography and minoring in GIS. I grew up in Elk River, MN and graduated from there in 2012. This summer I have been working with the Minnesota Forest Resources Council as a student worker. This work experience has been great for me because I have been able to make lots of contacts and have been given opportunities to work with some of them.

Caitlin J. Woodard – St. Thomas University
Caitlin Woodard is a senior at the University of Saint Thomas majoring in geography with a concentration in GIS and minoring in environmental studies and history. She enjoys traveling and experiencing different cultures. This passion led her to recently complete an internship with the local study abroad company World Endeavors. Caitlin received the Young Scholars Research Grant for Summer 2015, which permitted her to conduct research with her history professor in Croatia. Caitlin intends to graduate in Spring 2016 and begin her career in the GIS field. She hopes to eventually attend graduate school at the University of Minnesota to obtain her Master’s degree in urban planning.

Evan Wagner – University of Minnesota Duluth
I am a recent graduate of University of Minnesota Duluth with a BA in Environment and Sustainability and a GIS certificate. I have grown up in Minnesota my entire life, moved to Duluth for college, and have always appreciated nature and the outdoors. Throughout my college career, I have had the opportunity to work at some great Duluth organizations like Hartley Nature Center and the Natural Resources Research Institute. The project I hope to present at the GIS/LIS conference details my GIS and cartographic efforts under the supervision of NRRI ecologist Jennifer Olker and in collaboration with the US Forest Service. I have experimented with and implemented a semi-automated, GIS and remote sensing method for identifying seasonal ponds from high resolution geographic data such as LiDAR and aerial photography. This method can be used to assist in the field identification of these ponds, which has been planned for the summer of 2015. Throughout the process, I have gained a lot of practical GIS software and data management knowledge that should be immensely beneficial for me in the future.

David Brown – Gustavus Adolphus College
David will be a senior at Gustavus Adolphus College in 2015-2016, and is a Geography/GIS major, minoring in Economics and Coaching. David is a member of the men’s Varsity Tennis Team and enjoys skiing, fishing, film, and loves visiting different national parks. His experience exploring these places has been a primary motivation for his decision to study geography and GIS. In his professional life, David hopes to continue using GIS as a tool to enhance our understanding of the natural environment.

Graduate GIS

Kyle Mullen – Minnesota State University, Mankato
Kyle Mullen attended the University of Iowa, where he earned his Bachelor of Geoscience in 2009 and was honored with a Dean’s List recognition for three semesters. Kyle is currently a Master’s student in the Geography and Graduate GIS Certificate programs at Minnesota State University, Mankato (MNSU). While at MNSU, Kyle has held multiple Teaching Assistant positions, maintained a 4.0 G.P.A., and has been selected to present research at the Association of American Geographers 2015 Annual Meeting. Outside of academics, Kyle has been active both on campus and in the community, serving as a science fair judge, held membership in campus and national student organizations, and volunteered as a water quality monitor for the Minnesota Pollution Control Agency. Kyle’s research focuses on developing remote sensing methods to detect, map, and predict forest disturbances caused by insects. Specifically, using hyperspectral and high resolution imagery to model early stages of damage caused by mountain pine beetle infestations in the Black Hills, SD.

Jennifer Reinke – University of Minnesota
Jennifer Reinke is pursuing a Master of Geographic Information Science (MGIS) with a Design Minor at the University of Minnesota-Twin Cities. Jennifer developed GIS skills in various disciplines such as working in the field with the Natural Resources Department for the City of Lakeville, remote sensing projects for the Polar Geospatial Center, and currently metadata curation, web development, and historical aerial photograph manipulation as a graduate assistant for the John R. Borchert Map Library through U-Spatial, the University’s consortium for spatial research. She includes cartography, graphic design, and learning languages in her myriad interests while indulging in drawing, croquet, and wanderlust as a creative outlet. Follow her on LinkedIn: www.linkedin.com/in/jennifertreinke.

Brie Anderson, Saint Mary’s University of Minnesota
Brie recently completed her Master’s Degree in GIS from Saint Mary’s University of Minnesota. She has a wildlife biology background and 8 years of professional experience utilizing GIS to support energy infrastructure development and permitting specific to natural resources. She enjoys building species-specific habitat models, programming, and online mapping.

Gary George and Chitrasen Parbhunath, Minnesota State University, Moorhead
Gary grew up in rural Minnesota on a crop farm. He is the fifth oldest in a family of fifteen. He attended Battle Lake Public School. Gary is now majoring in Sustainability: Emphasis Environmental Science and Geoscience: Emphasis Geographical Science at Minnesota State University Moorhead. He is very excited about the future of GIS and is looking forward to working in this field of science.

Chitrasen Parbhunath is also a student at Minnesota State University Moorhead and was an intern on a prairie restoration project this past summer.
This list contains first and second place winners from 2005 through 2014:

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<td>Jesse Pruette</td>
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SCHEDULE

“Charting Our Future” 46° 46’ 52.57” N
92° 05’ 34,97” W
Workshop check-in begins at 7:30 am Wednesday morning in the Lobby of the DECC where refreshments will be provided. Workshop registration includes lunch and will be provided in the Harbor Side Ballroom at the DECC at 12:15 pm. All data and materials for the workshops will be provided by the instructors.

All hands-on workshops are Bring Your Own Laptop and some hands-on workshops are Bring Your Own Mobile Device. If you would like to attend one of these workshops, you will need to bring a laptop to the workshop.

- **Workshops are Hands-on**
- **Workshops are Lecture Style**

### TUESDAY, OCTOBER 6

- **6:00 p.m.** Special Interest Group: Northern Minnesota GIS User Group social, (Canal Park Brewery) See page 49

### WEDNESDAY, OCTOBER 7

- **7:30 a.m.** Conference registration and materials pickup; refreshments in lobby
- **9:00 a.m. – 4:30 p.m.** Full-Day Workshops
  - WK0019 LiDAR Terrain Analysis Techniques (Horizon Rm 202)
  - HOLL Esri Hands-On Learning Lab (Board Room)
- **9:00 – 10:30 a.m.** Half-Day Morning Workshops
  - WK0002 Getting Started with ArcGIS Pro (Ballroom MN)
  - WK0003 Parcel Fabric Migration Is Done — Now What? (Ballroom O)
  - WK0004 Introduction to Python Using the ArcGIS Field Calculator (French River Rm 1)
  - WK0005 Leveraging ArcGIS Online for Your Organization (French River Rm 2)
  - WK0006 Introduction to Collector for ArcGIS (Split Rock Rm 1)
  - WK0007 Intro Esri Javascript API (Split Rock Rm 2)
  - WK0008 Enterprise SDE: The Whole Nine Yards! (Horizon Rm 203)
  - WK0009 Intermediate Python (Horizon Rm 204)
- **10:30 a.m.** Refreshment break, lobby
- **10:45 a.m. – 12:15 p.m.** Full Day and Half-Day Morning Workshops Continued
- **1:15 – 2:45 p.m.** Half-Day Afternoon Workshops
  - WK0011 Data Driven Pages (Ballroom MN)
  - WK0012 Understanding Geodatabases (Ballroom O)
  - WK0013 Introduction to Python Using the ArcGIS Field Calculator (French River Rm 1)
  - WK0014 Web GIS Security (French River Rm 2)
  - WK0015 Intermediate Collector for ArcGIS (Split Rock Rm 1)
  - WK0016 ArcGIS Server 10.1 & Beyond (Split Rock Rm 2)
  - WK0017 Integrating Sensors with ArcGIS Platform (Horizon Rm 203)
  - WK0018 Using Geoprocessing Services with JavaScript API (Horizon Rm 204)
- **2:45 p.m.** Refreshment break, lobby
- **3:00 – 4:30 p.m.** Full Day and Half-Day Afternoon Workshops Continued
- **4:30 – 5:30 p.m.** Special Interest Group: Networking Opportunity for Young Professionals YPN of MN, (St. Louis River Room) See page 49
- **4:30 – 6:00 p.m.** Wednesday Welcome Reception, Geolounge
- **6:00 – 9:30 p.m.** Wednesday Welcome Reception Continued, Grandma’s Sports Garden
Esri Hands-On Learning Lab
Fact Sheet

What is the Hands-On Learning Lab?
The HOLL (Hands-On Learning Lab) is a training resource provided and developed by Esri Training Services. The lab is an excellent way to introduce ArcGIS® software users to a variety of Esri® solutions and training opportunities while learning to use Esri software.

How does the HOLL work?
The 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 from about 45 minutes to one hour to complete, and students can generally come and go as they please. Training Services instructors are on hand to answer questions and discuss Esri products, other training opportunities, and Esri Technical Certification.

How often is the HOLL updated?
The lesson topic choices are updated on a schedule matching the Esri software release schedule in order to provide new and up-to-date content when it becomes available.

Lessons offered at the HOLL (subject to change)
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
13. Optimizing Transportation Routing Using ArcGIS® Network Analyst
14. Modeling 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®

Interested in having the Hands-On Learning Lab at your next event?
Contact your Esri account manager for more information. To find the Esri office that serves you visit esri.com/offices.
### SESSION 1 Wetlands (Ballroom L)

- **An Improved National Wetland Inventory for Southern Minnesota** – Steve Kloiber, MN DNR; Dave Rokus, MN DNR
- **Identifying and Quantifying Attributes of Drained Wetlands in the Red River Basin Using LiDAR** – Henry Van Offelen, MN DNR; Grit May, International Water Institute

### SESSION 2 Forest Management (Ballroom MN)

- **Streamlining the Red Lake Reservation Forest Inventory Process** – Jesse Adams, North Point Geographic Solutions; Scott Abel, Red Lake DNR
- **Forestry’s Stand Exam Project – How to Make Everyone Happy?** – Kari Geurts, MN DNR
- **Disease Tree Inspections with Mobile GIS Tools** – Tami Maddio and Gregg Hove and Sara Pluta, City of Eagan

### SESSION 3 Emergency Management & 911 Dispatch (Ballroom O)

- **Next Generation 911 for GIS Professionals** – Adam Iten, State of MN
- **GIS for 911 Dispatch FAQ** – Victor Barnett, Ramsey County
- **GIS/GPS Technologies in Wildfire Suppression Management** — Red Lake Reservation – Scott Abel, Red Lake DNR

### SESSION 4 Field Data Collection (Split Rock Room 1)

- **High Accuracy GNSS with Smart Phones and Tablets** – Jake Wittenberg, Frontier Precision, Inc.
- **Data Dictionary Creation Using GPS Pathfinder Office & TerraSync** – Hillary Bjorstrom, STAR Energy Services

### SESSION 5 Lightning Round I — Mapping (Split Rock Room 2)

- **Mapping Places and County Subdivisions from 1790 to Present: The 1 Year Update** – Jason Borah, Minnesota Population Center
- **Mapping Joy & Pain: Connecting Space, Place, and Emotion** – Maureen McFarlane, University of Minnesota
- **Managing ArcGIS Services and AGOL with Python** – Matt McGuire, Metropolitan Council
- **Introducing Web Mapping to Writing Studies and Journalism Classes at the University of Minnesota Duluth** — Micaella Penning, University of Minnesota Duluth
- **Mapping Minnesota’s Infrastructure** – Len Kne, University of Minnesota
- **Pink Turns to Blue: Tools for Making Colorblind-Friendly Maps** – Brad Neuhauser, MN Secretary of State

### SESSION 6 Web Map Design (French River Room 1)

- **Building (and Maintaining) Flexible, Focused GIS Web Apps** – John Nerge, City of Brooklyn Park
- **Web AppBuilder Customizations: A Success Story** – Nate Rose, Stearns County
- **Designing Web Mapping Applications that Appeal to the Non-Technical User** – Kris Johnson, Point Geographic

### SESSION 7 Students & Young Professionals (French River Room 2)

- **Finding, Applying for and Interviewing for Jobs in GIS** – Stacey Stark, University of MN, Duluth; Andy King-Scribbins, Hennepin County; Heather Albrecht, City of Maple Grove; Catherine Hansen, MN.IT; Blaine Hackett, Flat Rock Geographics
### SESSION 8 Centerline Collaboration (Ballroom L)

The Metro Regional Centerlines Collaborative — Geoff Maas, MetroGIS/Metropolitan Council; Ann Houghton, Hennepin County; Matt Koukol, Ramsey County

### SESSION 9 Imagery (Ballroom MN)

What's New in Aerial Imagery — New Data Acquisitions, New Accuracy Standards and New Public Sector Contracting Opportunities — Chris Cialek, MNGeo; Craig Molander, Surdex Corporation; Peter Jenkins, MnDOT; Steve Kloiber, MN.IT Services @ DNR; Jeff Bloomquist, USDA

### SESSION 10 Surveying (Ballroom O)

The Land Surveyor and the Parcel Fabric — Frank Conkling, Panda Consulting

Now Available Online! St. Louis County Survey Records — Preston Dowell, St. Louis County Survey Division

Survey Coordination Using ArcGIS Online and Collector — Dave Kirkpatrick, Houston Engineering, Inc.

### SESSION 11 Transportation (Split Rock Room 1)

Backcasting Implications of Travel Demand Modeling — Mohammad Molla, Upper Great Plains Transportation Institute

How MnDOT Is Utilizing Workflow Manager and Data Reviewer to Improve Our Business — Jesse Pearson and Amelia Rockwood, MnDOT

Generation of Daily Activity-Travel Patterns: An Application of GIS — Mohammad Molla, Upper Great Plains Transportation Institute

### SESSION 12 Open Source (Split Rock Room 2)

Automatic Vehicle Location (AVL): We Know what You Did Last Summer — Bob Basques, City of St. Paul

Giving Away the Code Without Giving Away the Farm: A Business Model for Open Source Entrepreneurs — Blaine Hackett, Flat Rock Geographics


### SESSION 13 ArcGIS Online (French River Room 1)

Leveraging ArcGIS Online in Your Organization — Jesse Adams, North Point Geographic Solutions

Making the Most of ArcGIS Online for Your Organization: A Look at a Regional Example — Stephanie Gibeau, North Point Geographic Solutions

ArcGIS Online in Action — John Nerge, City of Brooklyn Park

### SESSION 14 Undergraduate Competition (French River Room 2)

The Impact of Joint Planning on Land Values and Property Tax Assessments in Bemidji, MN — Jacqueline Brockman, Bemidji State University

Spatial-Statistical Analysis of Childhood Immunization Refusal in California — Claire Hofius, Macalester College

A Look at the Spatial Distribution of PEDv — Taylor Schwarz, Minnesota State University, Mankato

Detecting Terminus Advance and Velocity of Hubbard Glacier, Alaska, Using Image Correlation Techniques — Joseph Krenzelok, University of Minnesota, Twin Cities

### SESSION 15 Product Demonstrations (St. Louis River Room)

Pictometry Product Demo — Brandon Tourtelotte, Pictometry International

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<td>Using GIS to Support Avian Influenza Response – Alison Slats and Karl Hillsrom, MN Department of Agriculture</td>
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<td>GIS Unplugged: No Time for Fancy in an Emergency – Randy Knippel, Dakota County</td>
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<td>10 Years After: New Orleans and Hurricane Katrina – Geoff Maas, MetroGIS/Metropolitan Council</td>
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<td>U.S. National Grid: What Are You Waiting for? – Randy Knippel, Dakota County</td>
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<td>Adapting to the New State Mandated MS4 Permit and Completing an Annual Pond and Storm Utility Infrastructure Inventory Using GIS and ArcCollector in the Field – Leah Sperduto and Aaron Menza, City of Eagan</td>
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<td>From the Field through the Firewall: An Approach to Streamlining Utility GIS Data Access in the Field, Office, and Web – Kim Sundeen, City of Duluth Engineering</td>
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<td>Trial, Error and the Future of Data Collection: Increasing the Speed of Field to Database Update – Michael Thorstad, City of Duluth Engineering; Chauncey Bangs, City of Duluth</td>
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<td>Investigating the Mountain Pine Beetle Infestation of Ponderosa Pine Forest in the Black Hills of South Dakota: Mapping and Early Detection – Kyle Mullen, Minnesota State University, Mankato</td>
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<td>Il était une fois: Mapping Balzac’s Paris – Jennifer Reink, University of Minnesota, Twin Cities</td>
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<tr>
<td>Accuracy and Precision of Using Aerial Photography to Monitor Great Blue Heron Colonies on the Upper Mississippi River National Wildlife and Fish Refuge – Brie Anderson, Saint Mary’s University of Minnesota</td>
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<th>Students — Undergraduate Competition (French River Room 2)</th>
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<tr>
<td>Implementing Private Forest Management Plans on Minnesota Family Resorts – Adam J. Barthel, St. Cloud State University</td>
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<td>Powering Minnesota – Caitlin Woodard, University of St. Thomas</td>
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<td>GIS and Remote Sensing Identification of Vernal Pools – Evan Wagner, University of Minnesota, Duluth</td>
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<td>Remote Sensing of Wildfires: Methods – David Brown, Gustavus Adolphus College</td>
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FRIDAY, 8:30 a.m. – 10:00 a.m.

**SESSION 23**  Product Demonstrations (St. Louis River Room)

- Map 3D Tools for the Civil Workflows: Taking CAD to GIS – Scott Mitzak, CAD Technology Center
- The Agricultural Conservation Planning Framework (ACPF) and its application in the Le Sueur River Watershed in Southern Minnesota – Jessica Nelson, Water Resource Center, MSU - Mankato; Sara Porter, National Laboratory for Agriculture and the Environment

**SESSION 24**  Data Aggregation: Address Points (Ballroom L)

- The MetroGIS Address Point Editor Tool and Data Aggregation Strategies – Tanya Mayer, Metropolitan Council; Ann Houghton, Hennepin County; Todd Lusk, Dakota County; Peter Hensche, Carver County; Jon Hoekenga, Metropolitan Council; Hal Watson, MN DNR

**SESSION 25**  LiDAR & Hydrology (Ballroom MN)

- Watercourse Hydrography Development from LiDAR-derived Products Creating Next Generation Watercourse Hydrography (NXG-Hydro) for Minnesota’s Landscape – Sean Vaughn, Rick Moore, Steve Kloiber and Tyler Kaebisch, MN.IT Services@MN DNR

**SESSION 26**  Utilities (Ballroom O)

- Imagery-Based Asset Verification for Utilities – Brandon Tourtelotte, Pictometry International
- Using Esri Geoforms to Engage Current and Future Minnesota Power Customers – Brandon Keinath, Minnesota Power

**SESSION 27**  A Little Bit of this, a Little Bit of that (Split Rock Room 1)

- Python and the ArcGIS REST API – Caleb Mackey, Bolton & Menk, Inc.
- Space Geography – Rick Gelbmann
- Mapping Alternate Terrains: GeoHumanities and Cartographic Expression – Kevin Dyke and Ryan Mattke, John R. Borchert Map Library, University of Minnesota

**SESSION 28**  Lightning Round III — Environment (Split Rock Room 2)

- Ian McHarg in Minnesota – Will Craig, UofM CURA; Ryan Mattke, Borchert Map Library, University of Minnesota
- Citizen Scientists Help Map Vernal Pools in Northern Minnesota – Jennifer Olker, Natural Resources Research Institute
- An Exploration of the Impact of Governor Dayton’s Proposed Shoreland Buffer Initiative on Agricultural Lands in Minnesota – David Kelley, Geography – University of St. Thomas
- Utility Pole Decay in Relation to Soil Types – Timothy Tabor, Minnesota Power

**SESSION 29**  Web Maps (French River Room 1)

- Cannon Valley Trail Web Mapping App – Leanne Knott and Dale Lempke, Goodhue County
- Minnesota’s Network of Parks & Trails: Creating a Cohesive Geospatial System – Norm Anderson, MNGeo; Elissa Brown, University of Minnesota’s Center for Changing Landscapes

**SESSION 30**  Education (French River Room 2)

- Determining Suitable Locations for Wind Turbines on the Leech Lake Reservation – Mentor: Doug Adams, Baltimore County, Maryland; John Seelye, Grand Rapids; Jacqueline Schneider, Leech Lake Reservation
- Latest News from the Front of GIS Education – Moderator: Laure Charleux, University of Minnesota Duluth; Panel: Ben Richason, St. Cloud State University; Molly Keinath, Barr Engineering; Sam Giebner, North Point Geographic Solutions; Gina Hollinday, Denfeld HS teacher; David Brandt, Washington County
## FRIDAY SESSIONS

### SESSION 31 Hydrology (Ballroom L)

- Statewide Riparian Buffer Inventory of Minnesota’s Rivers and Streams – John Sandberg and Andrew Petersen, MPCA
- Floodplain Models: A Streamlined Review through Data Mining and Visualization – Kyle Volk and Thomas Sayward, Moore Engineering Inc.

### SESSION 32 Metadata (Ballroom MN)

- The Next Generation of Metadata in Minnesota: Curating Content for the Geospatial Commons – Mike Dolbow, MNGeo
- Susanne Maeder, and Nancy Rader

### SESSION 33 Emergency Management — Planning & During the Emergency (Ballroom O)

- Visualizing Fire Department Responses with CartoDB – Paul Wickman, Flat Rock Geographics
- GIS and Law Enforcement at Carver County – Chad Riley, Carver County

### SESSION 34 Asset Management (Split Rock Room 1)

- Building an Asset Management System, One Project at a Time – Heather Albrecht, City of Maple Grove
- Tracking Sign Assets and Projecting Future Maintenance with Cityworks – Rebecca Foster, City of Edina

### SESSION 35 Parcel Database Initiative (Split Rock Room 2)

- Statewide Parcel Data Layer: Current Status and Future Plans – Bart Richardson, MN.IT Services@MN DNR; Dan Ross, MnGeo
- Status of the Wisconsin Statewide Parcel Map Initiative – Howard Veregin, State Cartographer’s Office, Peter Herreid, Codie See
- Incorporating Spatial Clustering into Your Analysis: An Assessors Office Case Study – Daniel Fasteen, Dakota County

### SESSION 36 Government GIS (French River Room 1)

- GIS in Corrections at Hennepin County – Andrew King-Scribbins, Hennepin County Department of Community Corrections
- Forecasting the Next 30 Years of Metro Development – Todd Graham, Metropolitan Council

### SESSION 37 Imagery/Remote Sensing (French River Room 2)

- Integrating Landsat Imagery with LiDAR and Object-based Image Analysis for Land Cover Classification of the Lake of the Woods/Rainy River Basin for the ~1990 and ~2010 Time Periods – Leif Olmanson and Marvin Bauer, University of Minnesota
- Using LiDAR Imagery to Identify Bluffs and Potential Erosion Sites on Lake Superior’s North Shore – George Host, Natural Resources Research Institute
GENERAL POSTERS

• A 15-Year Analysis of Arson and Incendiary Wildfires: Karlstad, Minnesota — Kyle Wikstrom, Pro-West & Associates, Inc
• Cost Effective Software Applications for Historical Bluff Erosion Analysis Using LiDAR and Archived Air Photos — Cynthia Miller, Minnesota State University, Mankato
• Ian McHarg in Minnesota — Will Craig, UofM CURA; Ryan Mattke, Borchert Map Library, University of Minnesota
• Inver Grove Heights Community Solar Gardens: Site Potential GIS-based Assessment — Andra Bontrager and Scott O’Donnell, City of Inver Grove Heights
• Land Asset Management: DNR’s Strategic Plan for the Conservation Agenda — Sherry Watson and Katherine Rossman, MN.IT @ Minnesota Department of Natural Resources
• Mining the Past via GIS to Protect the Future — Julie Oreskovich, Natural Resources Research Institute
• Minnesota for the American Community Survey: MACS — Jeff Matson, University of Minnesota
• Planting for Pollinators — Jacqueline Kovarik, MN DNR
• St. Louis County MN: Parcel Fabric LGIM Poster — Jeff Storlie, St. Louis County Planning & Development
• Standardized Maps Using the U.S. National Grid — Randy Knippel, Dakota County
• Sub Aquatic 3D Visualization and Temporal Analysis Utilizing ArcGIS Online, Story Maps and 3D Applications — Tom Hollenhorst, EPA Mid Continent Ecology Division; Jonathon Launspach, SRA International Inc. (a contractor to EPA)
• Upper Cannon River Watershed BMP Targeting and Watershed Database Development — Michelle Trager and Jennifer Mocol-Johnson, Rice County
• Validation of a Forest Canopy Disturbance Map: A Case Study — Jim Garner and Mark Nelson, USDA Forest Service Northern Research Station
• Watershed Health Assessment Framework — A GIS Driven Project to Facilitate Understanding and Collaboration around Clean Water Work — Ben Gosack and Beth Knudsen, MN DNR

STUDENT POSTERS

• Il était une fois: Mapping Balzac’s Paris — Jennifer Reinke, University of Minnesota, Twin Cities
• Mapping Riparian Indicators of Function and Connectivity — Courtney Blouzidis and Keith Pelletier, University of Minnesota
• Mosaicking 2-meter Panchromatic Digital Elevation Models Extracted from Stereo Paired Satellite Imagery — Michael Clementz, University of Minnesota
• Seasonal Ponds Mapping Methods, Issues, and Future Mapping Efforts on the Chippewa National Forest — James (Matt) Frazer
• When Interstate Becomes Main Street and Interchanges Downtown Centers! — Pierre Callies, Saint Cloud State University; Karuna Paudel, Saint Cloud State University

WEB MAPS

• Minnesota GIS/LIS Conference Attendees — Kitty Hurley, MN.IT Services
• USNG Emergency Location Markers: Assisting Emergency Response along Recreational Trails in Cook County, MN — Kyle Oberg, Cook County GIS
• Watershed Health Assessment Framework — A Web Mapping Application to Facilitate Understanding and Collaboration Around Clean Water Work — Ben Gosack, MN DNR
**ENTERTAINMENT**

**TUESDAY, OCT. 6**

**Social Networking**
6:00 p.m.
**Canal Park Brewery**

Once you've arrived in town, join your colleagues for networking and great brews at Canal Park Brewery, conveniently located within walking distance of the DECC and the Canal Park hotels. Canal Park brewery features a unique brew pub menu, along with craft beers brewed on site.

**WEDNESDAY, OCT. 7**

**Welcome Reception**
4:30 – 6:30 p.m.
**Geolounge**
6:00 – 10:00 p.m.
**Grandma's Sports Garden**

After a long day of workshops, stop by the Geolounge for some drinks and food. This event will be open to all, with a special welcome to our educator attendees. After the Geolounge, feel free to wander over to Grandma's Sports Garden for a welcome reception, more food, drinks and games.

**THURSDAY, OCT. 8**

**Exhibitor Reception**
5:00 p.m.
**Edmund Fitzgerald Exhibit Hall**

Visit the exhibition hall to have some appetizers and meet with the exhibitors who make the conference possible. Stop by each booth to view and participate in any special vendor prize drawings, and preview the prizes donated for the Scholarship Raffle. A cash bar will also be available.

**Scholarship Fund Raffle & Door Prizes**
6:45 p.m.
**Edmund Fitzgerald Exhibit Hall**

**Scholarship Fund**
Prizes are donated by many of our exhibitors with proceeds going toward the Minnesota GIS/LIS Consortium’s Scholarship Fund. You may choose which prize drawing(s) to enter. Tickets can be purchased at the MN GIS/LIS booth at $1/ticket. Enter to win a specific prize by dropping tickets in the bin at the donating vendors booth. You do not need to be present at the drawing to win these prizes.

**Thursday Night Craft Brew Fest**
7:00 – 10:00 p.m.
**Holiday Center**

Once the sessions are over, be sure to stop by the vendor reception in the DECC exhibit hall. Afterward, join us for the conference social at the Holiday Inn, located in downtown Duluth. The festivities include a craft beer tasting event, featuring craft brews from across the Northland region!

**Participating Vendors Include:**
- Bent Paddle: bentpaddlebrewing.com
- Canal Brewery: canalparkbrewery.com
- Castle Danger: castledangerbrewery.com
- Blacklist: blacklistbeer.com
- Carmody: carmodyirishbrewpub.com
- Vikre: vikredistillery.com

Homebrew cider, beer, root beer and cream soda will be available.

The MN Wild Hockey home opener will also be on for all the hockey fans to enjoy.

**FRIDAY, OCT. 9**

**5K Fun Walk/Run**
6:05 a.m.
Starting at Canal Park Lodge Parking Lot at 6 a.m.

**Explore Duluth Post Conference**

The conference may be over, but the weekend is just beginning in Duluth! Feel free to explore and visit one of the many scenic sites, enjoy the craft brews, restaurants and entertainment in Canal Park or downtown. Don’t forget your MN GIS/LIS Conference discount card!
The Geolounge, sponsored by Bolton & Menk, is located in the Gooseberry Falls Room.

**Thursday, Oct. 8**

**10:00 a.m. – 5:00 p.m.**

**Recorded Keynote:**

1:30 – 3:00 p.m.

Current and Emerging Trends in GIS – Jack Dangermond, President, Esri

**Recorded Session 5: Lightning Round I — Mapping**

3:30 – 5:00 p.m.

- Mapping Places and County Subdivisions from 1790 to Present: The 1 Year Update – Jason Borah, Minnesota Population Center
- Mapping Joy & Pain: Connecting Space, Place, and Emotion – Maureen McFarlane, University of Minnesota
- Managing ArcGIS Services and AGOL with Python – Matt McGuire, Metropolitan Council
- Introducing Web Mapping to Writing Studies and Journalism Classes at the University of Minnesota Duluth – Micaella Penning, University of Minnesota Duluth
- Mapping Minnesota’s Infrastructure – Len Kne, University of Minnesota
- Pink Turns to Blue: Tools for Making Colorblind-Friendly Maps – Brad Neuhauser, MN Secretary of State

**Friday, Oct. 8**

**8:00 a.m. – Noon**

**Recorded Session 20: Lightning Round II — Miscellaneous**

8:30 – 10:00 a.m.

- Ramsey Enterprise 10.3.1: The Voyage to “The Best of Both Worlds” – Jessica Fendos and Matt Koukol, Ramsey County
- A GIS-Driven Spatial Decision Support System to Select K-12 Schools for Student Teaching Experiences – Aaron Kingsbury, Mayville State University
- March of the Ticks – Nancy Read, Metro Mosquito Control
- Teaching Mobile GIS to Boy Scouts – John Wirries, Kadrmas Lee & Jackson, Inc.
- Don’t Divorce Your Career: Tips for Rekindling a Passion for GIS – Cinde Morris, AE2S
- Telling the American Community Survey Story: Opportunities and Threats – Jeff Matson, University of Minnesota and Joan Naymark, Minnesotans for the ACS

**Recorded Session 28: Lightning Round III**

10:30 a.m. – Noon

- Ian McHarg in Minnesota – Will Craig, UofM CURA; Ryan Mattke, Borchert Map Library, University of Minnesota
- Citizen Scientists Help Map Vernal Pools in Northern Minnesota – Jennifer Olker, Natural Resources Research Institute
- An Exploration of the Impact of Governor Dayton’s Proposed Shoreland Buffer Initiative on Agricultural Lands in Minnesota – David Kelley, Geography – University of St. Thomas
- Utility Pole Decay in Relation to Soil Types – Timothy Tabor, Minnesota Power

Never before has geospatial data been more accessible and had the ability to assume such an essential role in your organization.

Contact Bolton & Menk About:

» GIS Technical Services
» Python Development for ArcGIS Platform
» GIS Needs Analysis and Implementation Planning
» Utility Mapping/Infrastructure Management
» GPS Infrastructure Data Collection
» Asset Management and CMMS Implementation
» Internet and Mobile GIS Solutions

507-625-4171 | www.bolton-menk.com

DESIGNING FOR A BETTER TOMORROW
The Mn GIS/LIS Consortium Conference Mentor Program is in its 6th year! Each year, we match willing GIS professionals with students or early professionals who wish to connect with someone personally at the conference for conference navigation, career advice, resume review and professional stories. This program has been a huge success, growing to 15 mentor/mentee pairs in 2014. Students’ early introductions to local organizations and employers go a long way to making sure our Minnesota graduates are successful and that many are the future GIS professionals of Minnesota.

From a mentor: "I always learn something new from the mentees, and it is a rewarding experience."

From a student: "This was my first MN GIS/LIS conference and having a mentor willing to introduce you to his/her colleagues is a tremendous asset while networking."

The mentor program involves a small commitment of time on Thursday of the conference. You will meet your mentee in the Geolounge at 7:30am on Thursday (prompt!) for 15 minutes. Then we ask that you please invite your mentee to sit with you and your colleagues at the welcome/plenary and again at the Thursday lunch. We provide some optional conversation starters to aid in discussion. What you do beyond this initial networking is up to you both to decide!

---

**MN GIS/LIS History - Mentor Program**

**Mentor Program Summary 2010–2014**

**50 mentor-mentee pairs total**

**Young Professional Mentees**

- 47 different mentees
- (3 repeats)

**Non-School:** 2

**Out of State:** 4

**Mn GIS LIS Mentors**

- 31 different Mn GIS/LIS member mentors

- **MN Programs:** 9
ABSTRACTS, ORAL PRESENTATIONS, POSTERS
PANEL DISCUSSIONS & PRODUCTIONS

“Charting Our Future”
PRE-CONFERENCE WORKSHOPS

Workshop check-in begins at 7:30 am Wednesday morning in the Lobby of the DECC where refreshments will be provided. Workshop registration includes lunch and will be provided at the DECC at 12:15 pm. All data and materials for the workshops will be provided by the instructors.

○ Workshops are Hands-on  ○ Workshops are Lecture Style

FULL-DAY WORKSHOPS

WK0019 — LiDAR Terrain Analysis Techniques ○ ◇
(Horizon Rm 202)
Joel Nelson, University of Minnesota
Audience: Intermediate
Software Required: ArcGIS, Spatial Analyst

Terrain Analysis techniques for soil & water conservation, hydrologic planning, and water quality concerns will be addressed. A number of terrain attributes will be calculated from LiDAR data, with an emphasis placed on interpreting these data for natural, agricultural, or otherwise non-urban landscapes.

WK0002 — Getting Started with ArcGIS Pro ◇
(Ballroom MN)
Audience: Intermediate
Technology: Bring Your Own Laptop, Bring Your Own Mobile Device
Software Required: Participants will need to have ArcGIS Pro installed on their computers.
This workshop is an introduction to one of the most exciting new tools in the geospatial community. This workshop will help you get started using ArcGIS Pro. We’ll start with an overview of the user interface followed by a demonstration of common tasks and tools. Some of those tasks include building projects, editing data, displaying data, and sharing maps. This course is recommended for users already using ArcGIS for Desktop or other desktop GIS products.

WK0003 — Parcel Fabric Migration Is Done — Now What? ◇
(Ballroom O)
Audience: Intermediate
This 1/2 day workshop will focus on what to do after a migration to the LGIM and Parcel Fabric. The lecture and demonstrations will focus on enhancing the geodatabase with some tuning tips, publishing work, utilizing extensions that most organizations don’t even realize they have, and looking to the future possibilities for workflow management. These topics will be focused around the business needs, data needs, and service needs of local government organizations.

WK0004 — Introduction to Python Using the ArcGIS Field Calculator ○
(French River Rm 1)
Presenter: Terese Rowekamp, Rowekamp Associates, Inc.
Audience: Intermediate
Software Required: ArcGIS 10.0 or later
Learn the basics of Python programming while also learning the power of ArcMap’s Field Calculator. This hands-on workshop will introduce a non-programmer to the Python scripting language. The workshop will start with an introduction to Python programming concepts using ArcMap’s Python window and will then move on to creating and executing Python code blocks in the Field Calculator. A working knowledge of ArcGIS and the Field Calculator is expected of attendees in this workshop. Prior programming experience is not required, but is helpful.

WK0005 — Leveraging ArcGIS Online for Your Organization ○ ◇
(French River Rm 1)
Presenters: Jesse Adams and Sam Giebner, North Point Geographic Solutions
Audience: Intermediate
Software Required: Web browser
This workshop will cover many of the new and exciting features that ArcGIS Online has to offer while also helping attendees leverage these features for their organizations. Participants will learn how to set up open data sites which provide a resource for the general public to search, download, filter, and visualize an organization’s data through their web browser or mobile device. We will also cover how to set up Collector for ArcGIS, which allows for data to be collected and updated in the field on mobile devices, whether in a connected or disconnected environment. Participants will also learn how to utilize enterprise login. Enterprise login provides flexibility to your organization by giving members the ability to sign in to ArcGIS Online using the same login credentials used to access an organization’s enterprise information systems, instead of using a separate ArcGIS account.
WK0006 — Introduction to Collector for ArcGIS ○ (Split Rock Rm 1)
Presenter: Jacqueline Kovarik and Chris Pouliot, MN DNR
Audience: Beginner
Software Required: ArcMap and a web browser; see workshop description

Curious about how to configure a mobile Collector app? This course will walk you through the necessary steps, from beginning to end. In 4 hours, you’ll learn how to take a paper data entry form and turn it into a user-friendly mobile data collection app using ArcGIS Online, a File Geodatabase, and a smartphone or tablet. We’ll spend time discussing, developing, and testing our end product: a Collector for ArcGIS application. Familiarity with geodatabase design and global positioning systems will be beneficial.

Please bring your own laptop with ArcGIS 10.2 or later installed. Additionally, please bring a mobile phone or tablet if possible (cellular connectivity is not required) that meets the following requirements:
- Android: Android 4.0 or later, Armv7 processor, OpenGL ES 2.0 support, Precise location (GPS & Network-based support), iOS: iOS 7 or later, iPhone, iPad, iPod touch. Note: Windows devices are not compatible with Collector for ArcGIS.

WK0007 — Intro Esri Javascript API ○ (Split Rock Rm 2)
Audience Level: Beginner

Basic hands-on training on getting started with ArcGIS JavaScript API. You will learn some basic HTML5 and CSS3 web page designing techniques, mainly focusing on map layouts. From there, a step-by-step development process will be performed to design a complete web mapping application using ArcGIS JavaScript API. Users will learn how to incorporate basic tool such as searches and auto-completes, identify and query layers, printing and geoprocessing tasks in a web application. At the end users will learn basic development-cycle of web mapping application.

WK0008 — Enterprise SDE: The Whole Nine Yards! ○ (Horizon Rm 203)
Presenter: Jessica Fendos, Ramsey County
Audience Level: Intermediate

This workshop will prepare you to successfully deploy an enterprise geodatabase to serve multiple users and secure mission-critical geospatial datasets in your organization. You will learn about SDE’s role in an Enterprise ArcGIS Server system, its installation options, as well as how to manage a geodatabase by setting up user accounts and permissions, enabling versioned editing, and performing database maintenance tasks including the automation of data load, compression, rebuilding indexes and recalculating statistics. Instructor will conclude by providing tips and tricks on creating database views, SQL stored procedures and jobs, and locks handling based on real-life scenarios. Course concepts apply to ArcGIS V.10.X settings.

WK0009 — Intermediate Python ○ (Horizon Rm 204)
Presenter: Zeb Thomas
Audience Level: Intermediate

Python programming knowledge is increasingly a vital skill for the GIS professional. As an open source language with broad adoption, Python provides access to a wealth of libraries that make it uniquely positioned to bridge proprietary and open data formats. This workshop will introduce some of the more object-oriented approaches available in Esri’s arcpy module. This will include Cursors, FieldMapping, Describe, and creating Python Toolbox Tools and customizing them using the ToolValidator Class. Along the way, we will also cover some other useful (and free) Python modules. Participants are expected to have some experience using the arcpy module.

WK0011 — Data Driven Pages ○ (Ballroom MN)
Presenter: John Wirries, KLJ
Audience: Beginner

We will start with the basics of creating data driven pages and work up to dynamic text, and other key features.

WK0012 — Understanding Geodatabases ○ (Ballroom O)
Presenter: Rebecca Cooper, Roweankamp Associates, Inc.
Audience: Beginner
Software Required: ArcGIS Desktop 10.0 or later (standard or advanced preferred but not required)

This ½ day workshop will introduce the different types of geodatabases and the advantages of using geodatabases over shapefiles. Learn how to create a file geodatabase, import shapefiles to a geodatabase, build attribute domains and subtypes and use a relationship class (ArcGIS Desktop Standard or Advanced users will also create a relationship class). No prior knowledge of geodatabases required but one should be comfortable working with data in ArcMap and the Catalog window to complete the hands-on exercises.

WK0013 — Introduction to Python Using the ArcGIS Field Calculator ○ (French River Rm 1)
Presenter: Terese Rowekamp, Roweankamp Associates, Inc.
Audience: Intermediate
Software Required: ArcGIS 10.0 or later

Learn the basics of Python programming while also learning the power of ArcMap’s Field Calculator. This hands-on workshop will introduce a non-programmer to the Python scripting language. The workshop will start with an introduction to Python programming concepts using ArcMap’s Python window and will then move on to creating and executing Python code blocks in the Field Calculator. A working knowledge of ArcGIS and the Field Calculator is expected of attendees in this workshop. Prior programming experience is not required, but is helpful.
WK0014 – Web GIS Security
(French River Rm 2)
Presenter: Lucas Scharenbroich, Pro-West & Associates, Inc.
Audience: Advanced
Portal for ArcGIS is now included with Server as of 10.3, and many
organizations are looking closely at the benefits of an on-premise or
hybrid web GIS deployment over a pure cloud-based environment that
only utilizes ArcGIS Online. This workshop will cover some common
deployment scenarios and focus on the security set-up and implications
of each. The interaction among the various software components will
be discussed in detail, including the roles of Active Directory, the Web
Adapter, Federated Servers, SAML and OAuth. Participants are expected
to have experience deploying and configuring ArcGIS Server and should
have a basic understanding of general IT and networking concepts.

WK0015 – Intermediate Collector for ArcGIS
(Split Rock Rm 1)
Presenter: Jacqueline Kovarik, MN DNR and Chris Pouliot, MN DNR
Audience: Intermediate
Format: Hands-On
Software Required: ArcMap and a web browser; see workshop description
Building on foundational Collector for ArcGIS concepts, this course
will teach students custom configuration techniques such as Collector
database best practices, ArcGIS Online tips and tricks, and service, app,
and custom basemap optimization techniques. Familiarity with subjects
covered in Introduction to Collector for ArcGIS course or equivalent
knowledge is suggested.
Please bring your own laptop with ArcGIS 10.2 or later installed.
Additionally, please bring a mobile phone or tablet if possible (cellular
connectivity is not required) that meets the following requirements:
Android: Android 4.0 or later, Armv7 processor, OpenGL ES 2.0 support,
Precise location (GPS & Network-based support). iOS: iOS 7 or later,
iPhone, iPad, iPod touch. Note: Windows devices are not compatible with
Collector for ArcGIS.

WK0016 – ArcGIS Server 10.1 & Beyond
(Split Rock Rm 2)
Presenter: Justin Hansen, WSB & Associates, Inc.
Audience: Advanced
This workshop will serve as an advanced look into ArcGIS Server 10.3
from both the IT and GIS management perspective. Existing users of
ArcGIS Server will find the most benefit from this workshop as topics will
range from installation recommendations, system architecture guidelines,
security best practices, load testing and more. In addition, we will discuss
the advantages and disadvantages of running ArcGIS Server in Amazon's
Cloud. Also, we’ll look at where Esri is going with the ArcGIS Platform and
how ArcGIS Server fits within Esri’s ever-changing ecosystem including
ArcGIS Online. This workshop will benefit both IT professionals and GIS
Managers seeking to understand how to best manage their ArcGIS
Server 10.3 deployment or existing infrastructure. While this workshop is
targeted at advanced users with ArcGIS Server experience, it will provide
a solid introduction to core ArcGIS Server concepts.

WK0017 – Integrating Sensors with ArcGIS Platform
(Horizon Rm 203)
Presenter: Chad Nunemacher, Houston Engineering
Audience: Intermediate
During this workshop we will explain how we captured data with a sensor
and then transmitted that data into a GIS environment for analysis. We will
share what type of sensor was used and why, all the needed components
at the monitoring site (not just the sensor), how the sensor data were
collected and transferred to the GIS environment, how the sensor data
was used in GIS, and more. The use of sensors for data collection is
becoming increasingly popular. Mix this in with ability to visualize sensor
data via GIS and you have a powerful combination. Come join us and open
your mind to the possibilities. Houston Engineering would like to thank
Roman Marjamaa (Marjamaa Engineering, Inc) for his work in configuring
the ultrasonic sensor system. He was responsible for converting analog
and digital signals to digital data and then transporting those data to a
GIS accessible repository.

WK0018 – Using Geoprocessing Services with the
JavaScript API
(Horizon Rm 204)
Presenter: Caleb Mackey, Bolton & Menk, Inc.
Audience: Intermediate
This workshop will demonstrate how to consume and publish
Geoprocessing services written in Python to perform analysis/tasks in
an HTML5/JavaScript application. It will cover beginner to advanced level
Python scripts to build the GP Services. The workshop will also be focused
on creating simple drop downs and forms to gather user input to pass
the parameters into a Geoprocessing Service within a JavaScript based
application (beginner level JavaScript and HTML5).
An Improved National Wetland Inventory for Southern Minnesota
Steve Kloiber, MN DNR

The National Wetland Inventory (NWI) is an essential tool for wetland management and restoration planning. It is the only spatially comprehensive wetland inventory for Minnesota; however, the original NWI is about 30 years out-of-date. Many changes in wetland extent and type have occurred since the original inventory was completed. Changes in land use have resulted in wetland loss, while changes in wetland policies and programs have resulted in wetland gain. Wetlands have been re-mapped and re-classified for 38 counties in southern Minnesota (23,900 square miles). These data were created using a combination of high-resolution, multi-spectral aerial imagery, various LiDAR-derived datasets, as well as soils and other ancillary data. A rigorous quality control program was implemented including the use of a web-based tool for end-user review of draft data and a random sample of 1887 field sites used to test the accuracy of the final data. The overall accuracy for separating wetland from upland was 94% and the overall accuracy for assigning the specific wetland class was 83%. In addition to the standard set of wetland classification attributes, the new NWI data for southern Minnesota also include hydrogeomorphic classification attributes that enhance the capability of the data to evaluate potential wetland functions. The improvements and enhancements to the data will be presented.

Identifying and Quantifying Attributes of Drained Wetlands in the Red River Basin Using LiDAR
Henry Van Offelen, MN DNR; Grit May, International Water Institute

Light detecting and ranging (LiDAR) provides powerful data to assess hydrologic features of Minnesota’s landscape. Natural resource professionals traditionally have relied on a variety of GIS resources as qualitative planning tools for wetland restoration. More recently, statewide efforts have used LiDAR-derived data to identify existing wetlands. However, the effectiveness of these method is limited in areas with extensive surface drainage. New techniques were developed and tested to remove surface drain and road features to create a modified DEM as a basis to identify drained basins. Applying these techniques in combination with landscape retention analysis results in the development of drained wetland data with quantitative attributes such as volume, depth, and runoff capacity. These new data are being used to prioritize wetland restoration sites at a watershed scale for flood damage reduction, wildlife habitat restoration, and water quality improvement.

Streamlining the Red Lake Reservation Forest Inventory Process
Jesse Adams, North Point Geographic Solutions; Scott Abel, Red Lake DNR

In order to provide the highest level of insight into a managed forest, the forest inventory data and update workflow process need to be as efficient as possible. This presentation will focus on several GIS tools that were implemented for the Red Lake Reservation in order to assist in managing its forest inventory data. These new tools help the Reservation save time, be more efficient with the update processes, and allow for greater insight into the historical forest conditions on the reservation.

Forestry’s Stand Exam Project – How to Make Everyone Happy?
Kari Geurts, MN DNR

A team from the Department of Natural Resource’s Forestry division has been working on the design, development, and deployment of a new application, the Stand Exam Layer (SEL). I had the privilege of being the project manager and the team included representatives from the Timber, Silviculture, and Planning programs. The application was designed to improve state land program integration, increase efficiencies, and decrease redundancies. The goal was to design an application that was simple, relatively easy to use, accessible to all users, and was available from two of Forestry’s existing applications; the Forest Inventory Module (FIM) and the Silviculture and Roads Module (SRM). The Stand Exam application went live in August 2014.

The SEL is used to create annual stand exam lists, enter the onsite visit results, write the silvicultural prescriptions, record timber disposition acres, and record interdisciplinary review comments for Forestry stands. The technical solution included modifying a SDE/Oracle database, making the application accessible from any DNR office using a Citrix client server, creating a customized Esri ArcGIS Add-In that provides access to the menus and screens to enter and edit the attributes of the SEL, and creating the SEL featureclass that is available from either the FIM or SRM applications when ArcMap is launched.

My presentation will cover the project planning process from the perspective of the project manager (me), the choices made for the technical solution, a demonstration of the application, and lessons learned during the project journey.
Disease Tree Inspections with Mobile GIS Tools
Tami Maddio and Gregg Hove and Sara Pluta, City of Eagan

One of the challenges of urban forestry is responding to and tracking diseased trees on public as well as private property. Tree diseases can be spread throughout the community if not properly managed. Tree assets are valuable to residents and municipalities. The City of Eagan has provided disease tree inspections for residents since the mid 1980s. Data were originally collected on paper and eventually moved into an Access database. Recent developments in mobile GIS technology have allowed the Eagan Forestry division to utilize Esri’s Collector application to go paperless and mobile when inspecting trees. The Esri Web Application Builder is also used to visualize this data and as an information tool in the office. These tools have saved the tree inspector time in the field when doing the inspection and in the office when fielding calls and questions from residents. GIS staff can then use the GIS data to create maps, reports and analysis tools. Future enhancements to this system include automated reporting tools and historical data conversion. We want to share our experience throughout the lifecycle of the disease tree inspection program and how the evolution of GIS tools and mobile technology has helped improve our processes.

SESSION 3: EMERGENCY MANAGEMENT & 911 DISPATCH ●

Thursday, October 8 | 10:30 a.m. – Noon | Ballroom 0

Next Generation 911 for GIS Professionals
Adam Iten, State of MN

Modern communication devices with voice, text, and video capabilities now serve as important communication tools that require access to emergency services. The current Enhanced 911 network and infrastructure does not adequately support these types of modern devices. Next Generation 911 depends on current and highly accurate GIS data to precisely identify the location of callers, properly route calls to the appropriate Public Safety Answering Point (PSAP), and dispatch the correct emergency responders. This session will cover NG911’s impact on the role of GIS data in public safety. We will also discuss the Minnesota Geospatial Development for Next Generation 911 Project and how it will affect local GIS agencies throughout the state.

GIS for 911 Dispatch FAQ
Victor Barnett, Ramsey County

GIS for 911: Ramsey County runs the state’s largest 911 call taking and dispatch center. In the past two years, we have revamped all our dispatch related data. This presentation provides a wide-ranging review of the techniques used, lessons learned, and data design for Computer Aided Dispatch, through a review of questions that are frequently asked.

GIS/GPS Technologies in Wildfire Suppression Management — Red Lake Reservation
Scott Abel, Red Lake DNR

The Red Lake Agency Wildfire program implemented GIS/GPS tracking of wildfire suppression resources in conjunction with WildCAD (Computer Aided Dispatch) this past spring. Learn how Red Lake Wildfire Dispatch tracks fire engines, amphibious vehicles, helicopters, planes, etc... with real time GIS/GPS technologies.

SESSION 4: FIELD DATA COLLECTION ●

Thursday, October 8 | 10:30 a.m. – Noon | Split Rock Room 1

High Accuracy GNSS with Smart Phones and Tablets
Jake Wittenberg, Frontier Precision, Inc.

This session will include information about high accuracy GNSS data collection technology that opens the doorway to thinking about how we can collect high accuracy data today and accurately locate that data later. We will discuss the differences between corrected and uncorrected data, and the differences between Real-Time and Post processed GNSS workflows. Lastly, we will explore how you can leverage smart phones and tablets as high accuracy GIS tools through new GNSS receiver types.

Data Dictionary Creation Using GPS Pathfinder Office & TerraSync
Hillary Bjorstrom, STAR Energy Services

A data dictionary is a custom-made database collection tool. It simplifies data collection by using a form to enter the information. Setting up a comprehensive data dictionary is key in a field collection project. This presentation will cover the following: Brief introduction describing a data dictionary and how it is used in field collection; Creating a basic collection data dictionary; Applying repeat functions, visibility, and conditions; Previewing the form in TerraSync software. By the end of this presentation you will be able to create a data dictionary, apply settings, and preview it in TerraSync software.

SESSION 5: LIGHTNING I — MAPPING ●

Thursday, October 8 | 10:30 a.m. – Noon | Split Rock Room 2

Mapping Places and County Subdivisions from 1790 to Present: The 1 Year Update
Jason Borah, Minnesota Population Center

Last year the National Historical GIS (NHGIS) project at the Minnesota Population Center began creating nationwide, historical GIS files for places and county subdivisions 1970 and older. While NHGIS already contains TIGER/Line-derived Place and County Subdivision GIS files for 1980-2013, no such files existed for prior decades until now! Utilizing existing NHGIS data, the published census volumes and maps, and the Geographic Names Information System (GNIS) we created Place level GIS files back to 1900 and County Subdivision files to 1930. Come listen and learn more about this initial data release; find out our plan for linking it to census data, whether or not we still have goals of creating data back to 1790, and the many lessons we have learned along the way!

Mapping Joy & Pain: Connecting Space, Place, and Emotion
Maureen McFarlane, University of Minnesota

Our desire to connect stories and emotions to location has exploded on the web, from social media check-ins to Yelp reviews to Instagram food pictures, with maps providing innovative ways of provoking and exploring these narratives. This project began when a landscape architecture faculty member at the University of Minnesota College of Design created a large wooden map of Minneapolis-St. Paul and brought it to several public places, asking passersby to illustrate where they encountered joy and pain in the cities. The engaged response to the map inspired an interactive web
version of the project. Using the ArcGIS Javascript API as the basis for the application and Mapbox Studio for a custom-styled basemap, visitors use freehand sketching to depict their joy or pain. Allowing people free rein over this anonymous expression enables us to visualize the locations that draw out strong emotions around the Twin Cities and the designs associated with these experiences.

**Managing ArcGIS Services and AGOL with Python**  
*Matt McGuire, Metropolitan Council*

Managing a lot of content through the ArcGIS Server and ArcGIS Online user interface can be time consuming and clunky. Can it be automated? Both ArcGIS Server and ArcGIS Online have web APIs. This session focuses on using Python to automate the creation of 100+ ArcGIS Services and ArcGIS Online Web Maps though a single, end-user maintained map document.

**Introducing Web Mapping to Writing Studies and Journalism Classes at the University of Minnesota Duluth**  
*Micaella Penning, University of Minnesota Duluth*

Mapping and Geographic Information Systems (GIS) are increasingly recognized as a beneficial component of education in the Liberal Arts. The Geospatial Analysis Center at the University of Minnesota Duluth is fostering collaborations with classes across the University, particularly in the fields of writing studies and journalism. Through presentations, demonstrations, and hands-on tutorials, students are learning to harness the power of web mapping using ArcGIS Online. Students with no prior cartographic experience create media-rich story maps, analyze and visualize quantitative and qualitative data, and learn about real-world examples of how GIS and web mapping is being

**Mapping Minnesota’s Infrastructure**  
*Len Kne, University of Minnesota*

Minnesota has a vast amount of infrastructure that is aging. This infrastructure protects public health and provides vital services to residents throughout the State of Minnesota. Maintaining, rehabilitating, and replacing this infrastructure over the next few decades with limited resources will be challenging as many of our communities do not have the population base to spread the costs. Currently there is no one place that identifies location, value, and the condition of infrastructure community by community. Yet the technology exists to integrate existing information and present it in understandable formats (Maps!) to better inform state policymakers and prioritize funding around our most basic public facilities. This presentation will talk about how we are creating a tool for our infrastructure needs in a simple manner using complex data sets, allowing for smarter and more informed decisions. This project is coming out of a University of Minnesota Serendipity Grant, which is bringing together people from the State Auditor’s Office, MN 2050, all levels of government, and the University.

**Pink Turns to Blue: Tools For Making Colorblind-Friendly Maps**  
*Brad Neuhauser, MN Secretary of State*

Around 1 in 20 people have some form of colorblindness, which can significantly affect how they perceive information on maps. While many in the GIS community are aware of this issue, it can be hard to evaluate it in more complex cartography. This talk will demonstrate some free, simple tools such as Color Oracle and Visolve Deflector that can help mapmakers be both cartographically creative and colorblind friendly.

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**SESSION 6: WEB MAP DESIGN ●**

**Thursday, October 8 | 10:30 a.m. – Noon | French River Room 1**

**Building (and Maintaining) Flexible, Focused GIS Web Apps**  
*John Nerge, City of Brooklyn Park*

How can you have a rich suite of GIS apps and still have time to do the rest of your job? The City of Brooklyn Park, MN uses a mix of ArcGIS and Esri Partner software to build apps that are quick to build and easy to use. Integrating with existing city systems reduces the need to create new data. The app designs are reusable, so building new apps is quick and effective. And since the apps focus on a specific group, support is minimal.

**Web AppBuilder Customizations: A Success Story**  
*Nate Rose, Stearns County*

The Web AppBuilder for ArcGIS framework allows for rapid development of responsively designed JavaScript applications. However, have you noticed many Web AppBuilder applications look quite similar and use the same widgets? Break away from the norm and customize. Stearns County hired Houston Engineering to just that. During this presentation, we are going to share with you why Stearns County decided to use the Web AppBuilder Developer Edition for its JavaScript parks application, the approach taken for this project, and a few of the customizations done so the application would have the required functionality determined at the start of the project. So come in and join us as we share this experience with you.

**Designing Web Mapping Applications that Appeal to the Non-Technical User**  
*Kris Johnson, Point Geographic*

The availability of geographic data and aerial imagery has increased in recent years, and has been logically paralleled by an increase with the general public’s exposure to and use of web-based maps. This sort of technological milieu is favorable for introducing map-based tasks into applications that can be made readily available to the general public, while simultaneously improving an organization’s efficiency and workflows. By upgrading existing paper-based application workflows to digital, web-based ones, a number of benefits may be realized; however this digital transition can bring with it a new set of challenges for the non-technical end-user. This presentation will utilize a case study for transitioning a paper zoning permit application to a web application. We will focus on some of the favorable outcomes, as well as highlight a few of the remaining challenges that can occur when trying to meet both business and end-user needs.

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**SESSION 7: STUDENTS & YOUNG PROFESSIONALS ●**

**Thursday, October 8 | 10:30 a.m. – Noon | French River Room 2**

**Finding, Applying for and Interviewing for Jobs in GIS**  
*Stacey Stark, University of MN, Duluth; Andy King-Scribbins, Hennepin County; Heather Albrecht, City of Maple Grove; Catherine Hansen, MN.IT; Blaine Hackett, Flat Rock Geographics*

Back by popular demand! Panel presenters from private and multiple public sectors will discuss their career path stories, what they look for in recent graduates and what entry level positions and internships usually involve. The audience will be able to ask questions about resume building, networking, education, and skillsets.
SESSION 8: CENTERLINE COLLABORATION

Thursday, October 8 | 1:30 p.m. – 3:00 p.m. | Ballroom L

The Metro Regional Centerlines Collaborative (MRCC) is a joint collaborative project involving the technical and managerial GIS staff from the Seven Metropolitan Counties (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington), the Metropolitan Emergency Services Board and the Metropolitan Council to develop a road centerline data model and dataset that meets core business needs of local governments and regional interests including routing, geocoding and use by the emergency services sector. The goal of the MRCC is to facilitate the creation and sustained maintenance of an authoritative local road centerline dataset that can be used to meet the needs of the partner agencies. Over the course of 2014 and 2015, the MRCC has documented the specific business needs of the participating partners, developed a draft data model and collected comments on that draft model. Our presentation will outline the methods employed and progress to date in developing this much-needed data resource.

SESSION 9: IMAGERY

Thursday, October 8 | 1:30 p.m. – 3:00 p.m. | Ballroom MN

What’s New in Aerial Imagery — New Data Acquisitions, New Accuracy Standards and New Public Sector Contracting Opportunities

Chris Cialek, MNGeo; Craig Molander, Surdex Corporation; Peter Jenkins, MnDOT; Steve Kloiber, MN.IT Services @ DNR; Jeff Bloomquist, USDA

This session provides an update on new developments in the area of orthoimagery in Minnesota. Earlier this year, the American Society for Photogrammetry and Remote Sensing (ASPRS) finalized new updated positional accuracy standards for digital orthoimagery, digital planimetric data and digital elevation data. Craig Molander (Surdex Corp) contributed during the standards’ vetting process and will provide a briefing that compares and contrasts this new methodology with those of existing standards for orthoimagery, including examples for common orthophoto resolutions.

In 2008, MnDOT, together with its county partners, collected more than 500 survey quality test points from around the state. Over the past seven years, these survey points have proven extremely valuable to independently test the horizontal accuracy of data for a variety of imagery acquisition projects in order to verify contract compliance. Unfortunately, over time the number of usable points has declined by 50 percent. Peter Jenkins (MnDOT) will describe the value of this innovative program and raise a call to begin cooperatively replacing those lost points. He will discuss proposals to improve the program by collecting more permanent test points that require almost no maintenance.

News about two large statewide data acquisition projects will also be provided in this session. Jeff Bloomquist (USDA Farm Service Agency) will discuss new 2015 summer-leaf on NAIP data for Minnesota. Product examples and an explanation of how the FSA uses them will be provided. Steve Kloiber (MN.IT@DNR) will provide an overview of the recently completed statewide spring-leaf off imagery project. The imagery was collected over a period from 2009 to 2014 with a baseline resolution of 0.5-meter with many areas having 0.3-meter resolution imagery thanks to partner buy-ups. All the imagery was acquired with four spectral bands and is available through the MnGeo imagery service. The Spring Aerial Imagery Program (SAIP) can serve as a successful model for future statewide imagery acquisition programs.

Leveraging the SAIP partner buy-up experience, MnGeo, DNR and the Metropolitan Council are working to develop a multi-year master services contract available to state agencies and local governments to quickly contract for aerial imagery services. Chris Cialek (MN.IT/MnGeo) will describe the details of the program, its current status, and how your organization can get involved.

SESSION 10: SURVEYING

Thursday, October 8 | 1:30 p.m. – 3:00 p.m. | Ballroom O

The Land Surveyor and the Parcel Fabric

Frank Conkling, Panda Consulting

This presentation will discuss the Parcel Fabric, the technology behind the Esri Parcel Editing Solution, and the ways in which it complements and contributes to the integration of survey data into the traditional GIS cadastre. Topics include the way in which the Parcel Fabric accounts for differing boundary values (bearings and distances) for the same boundary line, the concept of measurement versus monuments, integration of survey control into the GIS cadastre and the application of controlled, rule-based adjustments using least squares adjustments.

Now Available Online! St. Louis County Survey Records

Preston Dowell, St. Louis County Survey Division

The St. Louis County Survey Division has been creating, collecting, compiling and indexing survey records since the late 1800s. As these records age, their importance increases, but the condition of the paper deteriorates. The St. Louis County Survey Explorer (SE) is now available to improve access to these precious records.

Survey Coordination Using Arc GIS Online and Collector

Dave Kirkpatrick, Houston Engineering, Inc.

ArcGIS 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.

SESSION 11: TRANSPORTATION

Thursday, October 8 | 1:30 p.m. – 3:00 p.m. | Split Rock Room 1

Backcasting Implications of Travel Demand Modeling

Mohammad Molla, Upper Great Plains Transportation Institute

Travel Demand Models are models used to estimate and forecast travel behavior, travel demand over a future time frame — typically short term (10 years) and long term (30 years). They are used by decision makers to make informed decisions about transportation infrastructure improvement.
The four-step model consisting of trip generations, trip distributions, modal split and traffic assignment is the most widely used model in practice. It is a sequential model and errors in each step can be propagated in later steps. These models are typically updated every five years and are calibrated to ground conditions. Because they are updated every five years, older models are typically not checked to verify how well they performed in predicting traffic. A suitable performance evaluation through backcasting of a given travel demand model would provide a lot more information about the modeling forecasting errors associated with the inputs datasets, parameters, and methodologies. Therefore, the main objective of this research was to identify the implications of geographic information systems (GIS) while backcasting for travel demand modeling and recommend algorithm for suitable backcasting procedures. Results showed that varied type of errors caused by input datasets, parameters, and methodologies could result in significant errors and inaccurate travel demand prediction. The results could be beneficial to the transportation industry for proper transportation planning and decision making.

How MnDOT Is Utilizing Workflow Manager and Data Reviewer to Improve Our Business
Jesse Pearson and Amelia Rockwood, MnDOT

We will show how MnDOT has utilized Workflow Manager to support our Linear Referencing System (LRS) through various workflows. We will discuss how/why the new LRS tools changed the way our office does business and also discuss some of the challenges. The second part will be on the usage of Data Reviewer and how we have utilized the tools to improve our data, quality control and reduce data errors at MnDOT.

Generation of Daily Activity-Travel Patterns: An Application of GIS
Mohammad Molla, Upper Great Plains Transportation Institute

There are several drawbacks in traditional travel demand modeling, which could be overcome through activity-based travel demand modeling. However, activity-based modeling is heavy resources oriented. This is because one of the key input resources for an activity-based model is the availability of travel survey data conducted specifically for activity based models. Small/medium size agencies or Metropolitan Planning Organizations may not have adequate resources to obtain travel survey data and develop an activity-based model. This research aims to provide a new framework to convert existing travel survey data that can be used to develop activity schedules/daily tour patterns that can be used for an activity based model. GIS showed successful applications of this modeling activity generator with an acceptable error range. Results strongly showed that this new algorithm can successfully replicate the actual number of pattern recognition and activity generators. The results could be helpful and recommendable to the transportation planners, especially for small and medium size agencies, for proper transportation planning and decision making.

SESSION 12: OPEN SOURCE ●
Thursday, October 8 | 1:30 p.m. – 3:00 p.m. | Split Rock Room 2
Automatic Vehicle Location (AVL): We Know what You Did Last Summer
Bob Basques, City of St. Paul

Using the new and improved GeoMOOSE web client, MapServer, Bootstrap and the PostgreSQL/PostGIS database packages, we’ve improved the City of Saint Paul’s online Automated Vehicle Location online information lookup interface. The newest version of the software has been rewritten with a modular approach to the coding. The system is now from top to bottom. We’ve also integrated our new AVL system into the GIS data catalog. We’ll be presenting information on the extensive set of services we’ve included in the new AVL interface. Follow along as we describe this new system and how it was developed and presented to our end users. In the session we’ll delve into the Postgres data structures used, and the client (Bootstrap), server (CGI) components used to implement the latest version of the software. This latest version includes separate modules for Fleet View, Historic Trail analysis, and a new administrative interface.

SESSION ABSTRACTS

SESSION 13: ARCGIS ONLINE ●
Thursday, October 8 | 1:30 p.m. – 3:00 p.m. | French River Room 1
Leveraging ArcGIS Online in Your Organization
Jesse Adams, North Point Geographic Solutions

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!

Making the Most of ArcGIS Online for Your Organization: A Look at a Regional Example

Stephanie Gibeau, North Point Geographic Solutions

As GIS technologies are rapidly changing, counties and other governmental agencies are beginning to move forward with assessing their GIS infrastructure in order to better align with these advancements, particularly surrounding ArcGIS Online. This presentation will provide an overview of what you can do as an organization to utilize ArcGIS Online for enhancing your GIS workflows for both private and public purposes. We will discuss how these advancements can be applied by taking a look at Clay County (MN) which pursued the implementation of these new technologies, including customizing an ArcGIS Online Organization, setting up Enterprise log-ins, and creating custom apps utilizing ArcGIS Online templates.

ArcGIS Online in Action

John Nerge, City of Brooklyn Park

At the City of Brooklyn Park, we use ArcGIS Online to engage our community through focused maps and apps. We also integrate our local data with regional and state data. In our presentation, we’ll demo some of our most popular apps, discuss best practices for configuring layers and pop ups, and show how we track content usage. By delivering a clean, consistent user experience, we’re able to get over 200 app views a week and use ArcGIS Online as an extension of our city website.

Spatial-Statistical Analysis of Childhood Immunization Refusal in California

Claire Hofius, Macalester College

In the past decade, rates of childhood immunization refusal have risen across the U.S. Some rationales for vaccination refusal (e.g., a reputed association between certain vaccines and childhood autism) have been widely discredited by public health officials. Nevertheless, rates of non-immunization have reached high enough levels to produce sporadic outbreaks of infectious diseases such as measles and whooping cough. Medical and public health researchers have addressed reasons for parental refusal to vaccinate their children, yet the role of place or neighborhood effects has largely been ignored, even though community-level social norms likely influence family decision-making. Several studies have found that PBE incidence tends to cluster in space, with high levels of spatial heterogeneity in PBE rates, varying greatly at different scales. Our research seeks to answer two questions: Where are the clusters of unusually high and low rates of childhood vaccination refusal in California? And, what are the demographic, socioeconomic, and political characteristics of those places? This study makes use of data from over 6000 schools with kindergartens in the state of California from 2012-2014 to determine the social, demographic and political conditions of places with high and low rates of non-vaccination.

A Look at the Spatial Distribution of PEDv

Taylor Schwarz, Minnesota State University, Mankato

Since May 2009, PEDv or, Porcine Epidemic Diarrhea virus, has hit the U.S. swine market with millions of piglet and sow deaths. This project takes a look at the locations and the dates of the disease in Minnesota as well as some of the variables that both enhance the spread and inhibit the spread, ultimately, to see why the disease was spreading where it did. It also tries to determine what factors may or may not even have an influence on it. I began by receiving PEDv information for the counties in Minnesota to begin analyzing where it began and where it moved. From that information, I researched different factors that could have made a difference and compared it with the location information that I started with. Without more classified information about hog sites and further research and analysis of the information, it is difficult to determine an exact reason for the spatial spread of PEDv. While some suggestions can be made, it does not explain the spread entirely.

The Impact of Joint Planning on Land Values and Property Tax Assessments in Bemidji, MN

Jacqueline Brockman, Bemidji State University

The Greater Bemidji Area Joint Planning Board (GBAJPB) is a collaboration between three government offices (Bemidji Township, Northern Township, and the City of Bemidji) to provide unified zoning and planning services. The GBAJPB’s annexations and the application of new zoning ordinances has been a controversial subject since its inception in 2007. This has resulted in numerous political and legal battles contesting the value of this collaboration and its resulting policies. This research project analyzes the spatial and temporal changes that have occurred in the Bemidji area since the implementation of the GBAJPB. The research focuses on determining any significant changes in land uses, land values and property tax assessments between 2004 and 2016. This project utilizes parcel level data provided by Beltrami County and the City of Bemidji. This study is important in determining what effect the GBAJPB has had on the Greater Bemidji area since its inception.

Joseph Krenzelo, University of Minnesota, Twin Cities

Hubbard Glacier, located in Yakutat Bay, Alaska, is the largest tidewater glacier in North America. Unlike most Alaskan glaciers, Hubbard Glacier is in an advancement phase, and recent surges in advancement have caused the closure of Russell Fjord, creating a lake and resulting in glacial outburst flooding. However, future closures could lead to Russell Fjord overflowing into the Situk River, creating possible flooding of the Yakutat people’s infrastructure. To study Hubbard Glacier’s advancement, glacier velocity, terminus advance, and calving rate data were collected from Landsat imagery of the 2002 closure and was compared with recent years. Analysis shows Hubbard Glacier exhibiting a general trend of surging in the spring, with the largest movement at a velocity of 12.63 m per day in 2010. The general increase in velocity from year to year seems to be analogous with the advance of the terminus. While a prolonged surge in 2002 was able to close off Russell Fjord, three bigger surges with shorter durations in the years 2008, 2010, and 2012 were not able to close off the fjord. In summary, the results show steady advance of the Hubbard Glacier terminus, which has the potential to cause additional closures of Russell Fjord and could lead to flooding events in the future.

Detecting Terminus Advance and Velocity of Hubbard Glacier, Alaska, Using Image Correlation Techniques

Joseph Krenzelok, University of Minnesota, Twin Cities

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Pictometry invented the technology behind aerial oblique image capture. Our integrations give GIS professionals the ability to apply highly accurate, real-world visual context to property-centric, land-based features within programs such as the Esri® ArcGIS solutions suite, AutoDesk® and Intrado®. Activities traditionally requiring field visits can be performed directly from a tablet, desktop or handheld device, utilizing the power of Pictometry images and solutions. Enjoy a seamless blend of GIS and real-world visualization in a single, productive workflow.

Autodesk Infraworks 2016: Using Model Builder for Quick 3D Models
Erik Nelson, Houston Engineering, Inc.

The presentation revolves around using Autodesk’s newest addition to Infraworks, Model builder. Model builder is a new add on that allows a user to specify the region you are working in and it will pull down base data for the area in question and create a 3D model. I will perform a live demo from the ground up and show how you can supplement the base model with your own data.

THURSDAY, 3:30 p.m. – 5:00 p.m.

SESSION 16: WILDLIFE HEALTH MANAGEMENT ●

Thursday, October 8 | 3:30 p.m. – 5:00 p.m. | Ballroom L

Thirteen Years of GIS Lessons Learned; Responding to Disease Outbreaks in Wildlife
Steve Benson, MN DNR

Since 2002, GIS staff in MN DNR Wildlife (now MN.IT @ DNR) have been responding to significant disease outbreaks that affect Minnesota’s economy, wildlife, domestic animals and potentially people. These incidents include multiple outbreaks of Chronic Wasting Disease in deer and elk, Bovine Tuberculosis in cattle and deer, and Avian Influenza in domestic birds. This presentation will focus on GIS/IT actions taken to support the multi-agency responses to the outbreaks, technology used, staffing requirements, project management needs, lessons learned, and interagency cooperation. The general thread will be: what did it take to manage each outbreak, and what did we learn to help with the next outbreaks?

Using GIS to Support Avian Influenza Response
Alison Slaats and Karl Hillsrom, MN Department of Agriculture

In Spring 2015, Avian Influenza infected over 85 turkey and chicken farms in Minnesota. An Incident Command Center was set up by the United States Department of Agriculture (USDA), the Minnesota Board of Animal Health (BAH) and the Minnesota Department of Agriculture (MDA). GIS and mapping was a key component of the response to Avian Influenza. This session will review the use of GIS and mapping to support the Avian Influenza response. We will discuss the challenges of producing maps and products in a fast changing environment, integrating State and Federal datasets and dealing with data privacy issues. We will share some of the GIS work we did and the lessons learned that will help us prepare for the next emergency situation. Erich Borchardt, MN.IT @ Minnesota Department of Agriculture and Board of Animal Health, and Lucinda Dahlberg, UM-VDL @ Minnesota Poultry Testing Laboratory/MN Board of Animal Health, were essential staff in the Avian Influenza Response and will contribute to and may participate in this presentation.
that GIS exists, but that is changing. New developments may have them knocking on your door soon. Are you ready? Recent developments are causing emergency personnel to become more aware of the USNG and begin implementing it on their own. This presentation will focus on practical examples of how it is being used locally and nationally.

SESSION 19: FIELD DATA COLLECTION & ASSET MANAGEMENT ●

Thursday, October 8 | 3:30 p.m. – 5:00 p.m. | Split Rock Room 1

Adapting to the New State Mandated MS4 Permit and Completing an Annual Pond and Storm Utility Infrastructure Inventory Using GIS and ArcCollector in the Field
Leah Sperduto and Aaron Menza, City of Eagan

This presentation will focus on the steps the City of Eagan took to turn a paper data entry form into a user-friendly mobile data collection application. It will highlight the process of improving the GIS content using SDE, ArcGIS Online and the ArcCollector field application. These changes were necessary to streamline data collection, improve data accuracy, eliminate transcription error, and most importantly, meet the newest MS4 permit guidelines. The City of Eagan has collected considerable amounts of information in GIS for waterbodies and storm water infrastructure within the city boundary including size, classification, and location. To ensure accurate reporting for state guidelines, new procedures were needed for data collection and analysis. Much research was performed to determine new MS4 guideline interpretation and meaning, waterbody ownership classification, waterbody maintenance classification, and a more refined field inspection process. Because the City has completed an annual storm utility infrastructure and waterbody inspection program for 10+ years, it made sense to adapt this inventory to meet the new reporting needs of the MS4 requirements.

From the Field through the Firewall: an Approach to Streamlining Utility GIS Data Access in the Field, Office, and Web
Kim Sundeen, City of Duluth Engineering

In the early ’90s the City of Duluth’s Public Works and Utilities Dept. and IT Dept. led the way by digitizing all existing and new underground water, storm, steam, and gas utilities; they brought a GIS utility network to life for the first GIS editors and users. Now, having grown to nearly 15 GIS advanced editors, over 100 GIS users in the Public Works and Utilities Dept. alone and over 200 GIS users city-wide, GIS staff now manage all aspects of the “GIS Data Life Cycle” (i.e., collection/transfer/updating from field-collected GPS units, update into GIS databases, and visualization in webmapping applications). However, over the last decade, inefficiencies and miscommunication of GIS standards plagued all phases of the Life Cycle. As a result, a new wave of management sparked a review of the Engineering and IT GIS system to promote long-term planning. With the 2015 GIS system review, new projects emerged that reinvigorated, refocused, and infused innovation into the geospatial technology. This talk highlights the process and results of streamlining projects that helped the Engineering Division meet three goals: (1) Improve GPS and GIS data accuracy; (2) Standardize GIS data editing and training; and (3) Create new webmapping and database applications that simplify GIS data access. Finally, we end with how to approach every GIS manager’s unspoken goal to build a sustainable GIS program by communicating and increasing awareness of creative geospatial solutions and market real-world cost-savings through the use of GIS.

SESSION 20: LIGHTNING II-MISCELLANEOUS ●

Thursday, October 8 | 3:30 p.m. – 5:00 p.m. | Split Rock Room 2

 Ramsey Enterprise 10.3.1: The Voyage to "The Best of Both Worlds"
Jessica Fendos and Matt Koukol, Ramsey County

After a four-year adventurous voyage engaging in numerous first contacts, integration engagements and in-the-cloud missions, in this episode, Ramsey Enterprise encounters system anomalies and transporter malfunctions caused by alien bugs in the Esri software. Responding to distress calls from colonies, captain and commanding officer react quickly to recover the system and adapt to a new and improved platform to ensure warp performance of Ramsey Enterprise and continued outreach to colonies in Ramsey federation. The Voyage to “The Best of Both Worlds” will unfold in two parts:

• Part I: Migration chronology recording the transformation of Ramsey Enterprise GIS system from a V10.2.2 multi-machines site to a sliced architecture in V10.3.1. We will discuss the symptoms of systems affected by these bugs, the workarounds and solutions/fixes. This is followed by a walk-through of the enhanced Ramsey Enterprise 10.3.1 equipped with a load balancer for redundancy support.

• Part II: Captain’s log on how this integrated and robust system fulfills the prime directive within Ramsey Enterprise. We will demonstrate use cases and success stories with highlights on delivered GIS solutions through ArcGIS Online, HTML5 and mobile applications, and Operation dashboards.

Trial, Error and the Future of Data Collection: Increasing the Speed of Field to Database update
Michael Thorstad, City of Duluth Engineering; Chauncey Bangs, City of Duluth

They say Duluth has two seasons: winter and construction. Construction season has posed many problems for us concerning the flow of data from utility construction in the field to GIS database. For Duluth, the results have come through a trial and error process. Capturing the locations with GPS improved the speed to process the information we sought. However, what we captured and the type of data collected became two new obstacles. In the first attempt, Esri’s ArcPad (version 7.0) running on a Trimble GEO-XH Series 2007 handheld unit was used. Although this accuracy was adequate for manholes and fire hydrants, it was inadequate for buried pipes and did not provide usable elevation data, thus proving unsuccessful. The next attempt used Trimble RTK units, which provided all of the accuracy, but lacked the additional attribute data that we required. This presentation will discuss the process Duluth used to resolve this problem. Ultimately, through experimentation trial and error, and a lot of work, we have now streamlined timely and standardized data updates throughout the construction season. Staff who locate and mark out underground utilities in the field now follow standard work flows to view these updated GIS data in maps on field laptops. Not too far into the future, we anticipate the ability to use this survey-grade GPS data to view and locate gas underground mains in areas where the locating wire has failed.
A GIS-Driven Spatial Decision Support System to Select K-12 Schools for Student Teaching Experiences
Aaron Kingsbury, Mayville State University

With less than 500 full-time students, Mayville State University (MSU) is the smallest university in the North Dakota University System. Established in 1889, it has long focused on certifying K-12 teachers, typically those originating in the rural communities of eastern North Dakota and western Minnesota and then intending to work in schools there after graduation. As part of their certification requirements, each teacher education candidate must complete a number of student teaching sessions in K-12 schools. Last year, MSU faced crucial challenges with re-accreditation centered on an inability to meet educator preparation standards linked to a lack of candidate exposure to diverse students during these sessions. As local demographics are largely homogeneous, K-12 schools with the highest percentages of students with diverse backgrounds must now be specifically targeted as places where MSU teacher education candidates learn their profession. This project produced a GIS-driven spatial decision support system (SDSS) to assist in this process. Operationally, rasters of North Dakota and Minnesota roads and K-12 schools by both location and grade level were downloaded and clipped. Next, distances between MSU and target schools were calculated with Network Analyst. Data for K-12 students across North Dakota and Minnesota on ethnicity, exceptionality, primary home language, and socio-economic status were obtained. Each of the above data sets were converted and added to Esri ArcGIS 10.3 and then ModelBuilder for reclassification to identify ideal student teaching locations for MSU candidates. Results showed that no K-12 schools outside of the two metropolitan areas of Grand Forks/Crookston and Fargo/Moorhead proved optimal locations for candidates. As MSU students must now look to these more distant urban centers to interact with diversity, they face the prospect of longer commutes and considerable competition from teacher education candidates of larger universities for a limited number of student teaching positions.

March of the Ticks
Nancy Read, Metro Mosquito Control

Deer ticks (Ixodes scapularis — official common name is the black legged tick) are the primary vector of Lyme disease and several other serious disease organisms. For the last 20 years, this tick species has become increasingly prevalent throughout the Twin Cities metro area, according to data collected annually by the Metropolitan Mosquito Control District (yes, we care about more than mosquitoes!). From a limited distribution in the northeastern portion of the metro, this tick species has now spread south and west and is found in all 7 counties of the metro area. This presentation describes analysis of the spatial and temporal trends in tick populations, and implications for human health.

Teaching Mobile GIS to Boy Scouts
John Wirries, Kadrmas Lee & Jackson, Inc.

Teaching GIS to younger students in an outdoor environment can be challenging. Tips and lessons learned from a Boy Scout service project involving mapping in a city park.

Don't Divorce Your Career: Tips for Rekindling a Passion for GIS
Cinde Morris, AE2S

We've all been there — one day we're happily working on a cool map and the next we're stuck in a month-long funk where the idea of fixing all those parcel errors or facing an uphill battle of entering a vast amount of data manually makes us want to cry — or relive that printer scene from Office Space. Those of us in technology-driven jobs often face the struggle of finding passion in what we do, especially where mundane daily tasks reign supreme. In many places of employment, Geospatial departments are a one-person show. How do we motivate ourselves when no one speaks our spatial language? To be successful in your job, and in GIS, finding your passion and developing the ability to self-motivate are critical to your success and overall happiness. I will talk about rekindling that passion and finding a purpose in GIS so you can love what you do, no matter what you are doing.

Telling the American Community Survey Story: Opportunities and Threats
Jeff Matson, University of Minnesota and Joan Naymark, Minnesotans for the ACS

Minnesotans for the American Community Survey (MACS) is a coalition of Minnesota leaders, policy and decision makers, business and development planners, forecasters, housing and social service providers, educators, and engaged citizens. Our mission is to educate Minnesota’s members of Congress and the public about the critical importance of census data to drive a strong economy and improve the well-being of all Minnesotans. This Lightning Round presentation will highlight the current issues facing the American Community Survey in Washington, remind attendees of the impact the ACS has on important decisions in our state, and describe how you can get involved or show your support for high quality ACS & Census data.

Investigating the Mountain Pine Beetle Infestation of Ponderosa Pine Forest in the Black Hills of South Dakota: Mapping and Early Detection
Kyle Mullen, Minnesota State University, Mankato

The mountain pine beetle (Dendroctonus ponderosae) is the leading cause for mortality in the pine forests of western North America, having impacted nearly 500,000 acres of ponderosa pine (Pinus ponderosa) forest in the Black Hills of South Dakota since 1996. Effective mitigation can potentially reduce the extent of infested forests and save valuable stands of timber, but only if highly accurate detection methods exist. Visible damage (red attack stage) can be mapped with various multi-spectral remotely sensed images. However, visual damage becomes manifest after beetle brood emergence and flight. Methods aimed at earlier detection prior to visual manifestation during the green attack stage have not been successful because of the overlap and variability of spectral response between green-attacked and non-attacked tree crowns. In situ hyperspectral measurements at the needle level can provide insight into links between the attack status of a tree and differences in spectral response. These links can potentially direct the use of lower resolution space-born platforms to better detect and predict green-attack areas at the canopy level.

Il était une fois: Mapping Balzac’s Paris
Jennifer Reinke, University of Minnesota, Twin Cities

Paris was the cultural capital of the 19th century. French novelist Honoré de Balzac wrote a compilation of literary works entitled The Human Comedy, using realism and ethically ambivalent characters to depict the complexities and capricious state of Parisian society during the Bourbon Restoration period of 1814-1830. Balzac’s characters often shared a romantic notion of the capital and yearned to join high society, the ultimate signifier of becoming Parisian. To be part of the elite, one must permeate the city in order to understand and manipulate his surroundings, enabling him to relocate from impoverished to exuberant quarters to conform to aristocratic
norms and flaunt newly obtained statuses. The objective of this project was
to map, using a semi-automated data extraction process, the movements of
Balzac’s transient main characters in three novels. The map reflects the rise
to the modern city through the eyes of Eugène Rastignac in Father Goriot,
Lucien de Rubempré in Lost Illusions: A Distinguished Provincial at Paris,
and Raphaël de Valentin in The Magic Skin, as the characters struggle with
shifting paradigms and ideologies in an evolving Paris.

**SESSION 22: STUDENTS — UNDERGRADUATE COMPETITION ●**

**Implementing Private Forest Management Plans on Minnesota Family Resorts**
Adam J. Barthel, St. Cloud State University

Over the past few decades, the number of family resorts in Minnesota has
steadily been decreasing while the average size of the remaining resorts
has been increasing. The resorts that are left are seeing families stay for
shorter periods of time and less often. To help keep these resorts, which
often own large parcels of wooded land, from shutting down the MFRG
is going to aid these resorts in enrolling their forests into some level of
management, such as Forest Stewardship Plans, Property Tax Programs, or
Conservation Easements. My project will look at resort owners’ parcel data
to gauge where the resorts are, which lakes they are on, how many acres
they are on, and how much of their land is forested.

**Powering Minnesota**
Caitlin Woodard, University of St. Thomas

The island of St. Clement (Sv. Klement) in central Dalmatia, Croatia, has
been inhabited since prehistoric times. Since 2007 Dr. Schrunk has been
everifying a Roman villa in Soline Bay, located near the present village of
Vlaka. Several UST geography students collected valuable geographic and
ecological data about the island, but investigations about the relationship
between humans and the environment have only been preliminary. My
interdisciplinary academic program in geography, history and environmental
studies made me interested in addressing the questions about how
inhabitants utilized this specific island environment during the Roman Empire
in comparison to present times. If there are differences, what environmental,
geographical, and historical factors contributed to such developments? How
and why?

**GIS and Remote Sensing Identification of Vernal Pools**
Evan Wagner, University of Minnesota, Duluth

Vernal pools are unique in that they only hold water for a few months out
of the year. In this short time, however, these seasonal wetlands provide a
wide variety of ecosystem services by holding spring flood waters, providing
obligate habitat for a variety of amphibian and aquatic invertebrate species,
and more. Due to their relatively small size and brevity, they have been
historically difficult to map and thus often overlooked in conservation efforts.
This project is an attempt to map potential vernal pools within the Pike
Bay Experimental Forest area of the Chippewa National Forest in Northern
Minnesota. This is made possible by utilizing increasingly-available high-
resolution geographic data. Remote sensing of water in multispectral aerial
imagery and a statistical depression analysis of a LiDAR-derived Digital
Elevation Model can accurately identify potential vernal pool locations within
a landscape. These data can then be used to assist in the field identification
and certification of vernal pools, drastically cutting down field time, cost, and
effort, while providing resources and methods for future efforts in the study of
seasonal wetlands.

**Remote Sensing of Wildfires: Methods**
David Brown, Gustavus Adolphus College

Comparison of California’s Rim Fire of 2013-2014 Wildfire remote sensing
is tremendously practical for quantitative and qualitative burn assessment.
Resources for precision imagery analysis are free and readily available with
numerous options for spatial, temporal and spectral resolutions. This study
both gathers data from multiple sensors and utilizes various remote sensing and
GIS analysis techniques in attempts to recreate the California Rim Fire burn
area of 257,314 acres, as reported by the U.S. Forest Service.

**SESSION 23: PRODUCT DEMONSTRATIONS ●**

**Map 3D Tools for the Civil Workflows: Taking CAD to GIS**
Scott Mizzak, CAD Technology Center

Civil 3D comes with the full suite of Map 3D tools, and it’s high time you
learn how to use them! Many of the Map 3D tools are not just for GIS
professionals, but for Civil Designers and Surveyors too. Map 3D is the
bridge between the GIS world and the CAD/BIM world, and the gap is getting
smaller every day. We’ll cover some of the core Map 3D tools, including
Object Data Tables and how to export out CAD objects as GIS Shapefiles or
Autodesk SDF files.

**The Agricultural Conservation Planning Framework (ACPF) and its Application in the Le Sueur River Watershed in Southern Minnesota**
Jessica Nelson, Water Resource Center, MSU - Mankato; Sara Porter,
National Laboratory for Agriculture and the Environment

The Agricultural Conservation Planning Framework (ACPF) was developed
by Mark Tomer and his team at the National Lab for Agriculture and the
Environment in Ames, IA and was developed to leverage the LiDAR
data available in many states, along with high resolution soils and land
use data. The ACPF toolset and databases work with ArcGIS software to
generate detailed maps for siting conservation practices in agricultural
landscapes. The ACPF is a conceptual framework, database, and a suite of
semi-automated tools that work within ArcGIS software. Users can
generate detailed maps showing where conservation practices are suitable
and effective. The ACPF begins with terrain analysis — a LiDAR elevation-
based approach for identifying critical source areas which contribute
disproportionate amounts of nutrients, sediment, or runoff. The hydro-
modification of a LiDAR DEM is required to accurately model the flow of
water across the landscape and is a major input into these tools. The
framework tools are then used to identify specific practices appropriate
at three scales; within agricultural fields, at field edges, and in the riparian
zone. An application of the ACPF tool was initiated in the Le Sueur River
Watershed (LRW). The LRW is one of the largest contributors of sediment.
In order to address these water quality concerns, the ACPF was applied to
subwatersheds of the LRW, as identified by local and state agency priorities
and under advisement from the citizen-led watershed group, Le Sueur River
Watershed Network. ACPF’s process for conservation planning provides an
opportunity to engage many landowners in a discussion at a watershed
scale. By targeting conservation efforts in these subsheds, a balance of
practices can be implemented that keeps soil in place, temporarily stores
water and addresses near channel sources, in order to achieve reduction
goals identified. The ACPF toolset is planned for public release in October
2015.
SESSION 24: DATA AGGREGATION: ADDRESS POINTS
Friday, October 9 | 8:30 a.m. – 10:00 a.m. | Ballroom L

The MetroGIS Address Point Editor Tool and Data Aggregation Strategies
Tanya Mayer, Dakota County; Ann Houghton, Hennepin County; Todd Lusk, Dakota County; Jon Hoekenga, Metropolitan Council; Pete Herschel, Carver County and Hal Watson, MN DNR

This panel is a presentation of experiences by 3 counties that have tested and deployed the MetroGIS Address Point Editor tool; followed by an update of developing data aggregation strategies. The creation and sustainable maintenance of an authoritative address point resource was identified as a desirable goal by the MetroGIS stakeholder community. MetroGIS has developed a web editing tool for address point data. The tool is intended to be hosted by counties and other organizations that want to facilitate the creation and maintenance of an authoritative dataset for address points. This ArcGIS Server based tool was developed by North Point Geographic Solutions under contract with the Metropolitan Council. The tool is available for free to be installed and hosted by government entities in Minnesota that wish to aggregate address points data for inclusion in a regional or state wide dataset. All government agencies in Minnesota may freely access this tool. 3 host organizations, Carver, Dakota, and Hennepin Counties, will share their experiences with their need for such a tool as well as their involvement and experience with the development, installation and use of this tool to acquire and maintain an address points dataset. North Point Geographic Solutions will also be available to help answer questions. An update will also be given on an aggregation strategy being developed to bring address points together from multiple data producers to support cross jurisdictional addressing needs. Ideally, the aggregation strategy will support aggregation beyond address points so data producers can use similar methods to submit their data regardless of the dataset theme (e.g. address points, street centerlines, parks, parcels, etc.) or host aggregating agency.

SESSION 25: LIDAR & HYDROLOGY
Friday, October 9 | 8:30 a.m. – 10:00 a.m. | Ballroom MN

Watercourse Hydrography Development from LiDAR-derived Products Creating Next Generation Watercourse Hydrography (NXG-Hydro) for Minnesota’s Landscape
Sean Vaughn, Rick Moore, Steve Kloiber and Tyler Kaebisch, MN.IT Services@MN DNR

LiDAR-derived digital elevation models (DEMs) have become a commonly-applied and valuable data product used by resource managers to represent the landscape and surface water movement. As DNR GIS Water Resources Team members, we are working to create Minnesota’s next generation of hydrography (NXG-Hydro) watercourses from LiDAR. NXG-Hydro will occur on a project-by-project basis across the state. This session will discuss hydro-terrain analysis procedures being implemented across Minnesota’s DEM landscape to generate hydrography for water quantity and quality analysis and deployed the MetroGIS Address Point Editor tool; followed by an update of developing data aggregation strategies. The creation and sustainable maintenance of an authoritative address point resource was identified as a desirable goal by the MetroGIS stakeholder community. MetroGIS has developed a web editing tool for address point data. The tool is intended to be hosted by counties and other organizations that want to facilitate the creation and maintenance of an authoritative dataset for address points. This ArcGIS Server based tool was developed by North Point Geographic Solutions under contract with the Metropolitan Council. The tool is available for free to be installed and hosted by government entities in Minnesota that wish to aggregate address points data for inclusion in a regional or state wide dataset. All government agencies in Minnesota may freely access this tool. 3 host organizations, Carver, Dakota, and Hennepin Counties, will share their experiences with their need for such a tool as well as their involvement and experience with the development, installation and use of this tool to acquire and maintain an address points dataset. North Point Geographic Solutions will also be available to help answer questions. An update will also be given on an aggregation strategy being developed to bring address points together from multiple data producers to support cross jurisdictional addressing needs. Ideally, the aggregation strategy will support aggregation beyond address points so data producers can use similar methods to submit their data regardless of the dataset theme (e.g. address points, street centerlines, parks, parcels, etc.) or host aggregating agency.

SESSION 26: UTILITIES
Friday, October 9 | 8:30 a.m. – 10:00 a.m. | Ballroom O

Imagery-Based Asset Verification for Utilities
Brandon Tourtellotte, Pictometry International

An image is a record of fact, and can be a very powerful tool for verifying assets, particularly when compared to traditional methods of collecting field data. Advancements in imagery technology now provide 6 key pieces of information on every asset you can see; distance, area, bearing, location, elevation, and height. This sort of analysis can be performed in nearly any Geospatial platform.

Using Esri Geoforms to Engage Current and Future Minnesota Power Customers
Brandon Keinath, Minnesota Power

Minnesota Power is an investor-owned electric utility serving nearly 140,000 customers. We are always looking for new ways to engage with our customers, especially related to renewable energy. Using Esri geoforms, we are able to collect information from our customers and quickly bring that data into our organization. Two geoforms will be discussed with steps to create them and lessons learned.

SESSION 27: A LITTLE BIT OF THIS, A LITTLE BIT OF THAT
Friday, October 9 | 8:30 a.m. – 10:00 a.m. | Split Rock Room 1

Python and the ArcGIS REST API
Caleb Mackey, Bolton & Menk, Inc.

The ArcGIS REST API is the framework that drives Esri Web Services. It includes powerful functionality to query data and perform simple tasks all through a web browser. Because all requests are made via HTTP, Python and/or any other language that can make web requests can be used to talk to the REST API. This presentation will show how Python can be used to make requests against REST Endpoints to gain information about its capabilities and properties as well as query and extract data into common GIS formats. Other topics will include using Geocoding Services and working with JSON data.
Space Geography
Rick Gelbmann

As GIS professionals and geographers we use space-based technology such as satellite imagery, GPS, telecommunication services and weather information on a daily basis. Yet, do we really think about space in geographic terms and as part of our human environment? How far up is the Hubble telescope or the Direct TV satellite fleet? Is distance the best measure? Why are satellites where they are? What does this topography look like? What features are important to this new human environment? These are all geographic questions that can in part be answered through mapping and visualization techniques. One challenge in charting the future of GIS technology is to describe near-earth human space clearly in order to support human activities.

This session will focus on near-earth space, where earth’s gravity is the primary influence and human activity in space is the greatest. It will explore the characteristics of near-earth space, survey human activities in space and explore existing ways of describing that environment. Examples and ideas will be illustrated using off-earth and flat-earth cartographic visualization tools and methodologies.

The session is meant to spur a discussion of the use of Geographic and GIS technology and techniques to describe, explore and use near-earth space.

Mapping Alternate Terrains: GeoHumanities and Cartographic Expression
Kevin Dyke and Ryan Mattke, John R. Borchert Map Library, University of Minnesota

Across the University of Minnesota Libraries system, several groups are working on projects that touch on different aspects of the GeoHumanities. The projects demonstrate the value of blending domain and technological expertise with the unique strengths of library staff. This blend facilitates deeper collaboration between the Libraries and faculty, students, and researchers and allows for alternate forms of cartographic expression. Examples include mapping scraped hip hop lyrics as a case study of utilizing a customized geoparser, working to create an online version of a map representing geographic areas associated with joy/pain, geocoding addresses for YMCA locations in New York City from the 1880s to the present in order to visualize patterns in branch openings and closings over time, and working with faculty to enrich the learning experience in the classroom for students creating online exhibits using georeferenced maps as a backdrop for historical site locations.

SESSION 28: LIGHTNING III- ENVIRONMENT

Friday, October 9 | 8:30 a.m. – 10:00 a.m. | Split Rock Room 2

Ian McHarg in Minnesota
Will Craig, UofM CURA; Ryan Mattke, Borchert Map Library, University of Minnesota

Ian McHarg’s 1969 Design with Nature introduced the world to map-overlay as a critical tool for environmental design. That approach is fundamental to today’s GIS work, esp. GeoDesign. A Minnesota project reinforced his commitment to that idea; the Metropolitan Planning Commission, the predecessor of the today’s Metropolitan Council, commissioned McHarg in the late 1960s to conduct an environmental assessment of the Twin Cities. That work was done manually, using acetate overlays. Minnesota GIS leader Al Robinette was a student of McHarg at the time and worked on those maps. The maps have been in the Council archives, but are being moved to the University’s Borchert Map Library for public viewing. Samples will be displayed during this presentation.

WaterSMART and Water Use Guide USGS Science Goals and Priorities
Christopher Sanocki, U.S. Geological Survey

The U.S. Geological Survey (USGS) collects water-use estimates for each state in the nation every five years as part of a National Water Census. This effort, part of WaterSMART (Sustain and Manage America’s Resources for Tomorrow), highlights water resource challenges facing the nation by putting every state in context to each other, and helps to form USGS Science Goals and Priorities. Water-use estimates are divided into eight categories including public supply, domestic, irrigation, livestock, aquaculture, industrial, mining, and thermoelectric power. USGS research as part of WaterSMART includes characterizing long-term trends in streamflow, assessing groundwater availability, quantifying water losses, improving information on human water withdrawals and return flows, and developing tools to understand the ecological effects of hydrologic alteration on aquatic ecosystems.

Citizen Scientists Help Map Vernal Pools in Northern Minnesota
Jennifer Olker, Natural Resources Research Institute

Vernal pools are small seasonally flooded wetlands that provide vital habitat for many native amphibians and aquatic insects that require fish-free wetlands to survive. Despite the importance of vernal pools as vital breeding habitat for a large segment of the food base in forested ecosystems, many vernal pools are unmapped and overlooked. We remotely identified over 900 potential vernal pools in target areas of the Minnesota Lake Superior Coastal Zone with leaf-off aerial photography and elevation data. Volunteers were recruited and trained to conduct field verifications of potential vernal pools through in-person workshops and a printed citizen science guide. This guide includes key characteristics, common biota, and instructions/datasheets for verification and monitoring of vernal pools in Minnesota. Field verifications were conducted by volunteers and student interns in spring/summer of 2014 and 2015, with confirmed vernal pools creating the start of a vernal pool location database for northern Minnesota. Accuracy ranged from 50-80% of points confirmed as vernal pools. Confirmed vernal pools were typically small (90% were estimated to be less than 1/2 acre) and not included in the current National Wetland Inventory (more than 80% did not overlap NWI polygons). Through these efforts to locate, document, and raise awareness, we hope to preserve vernal pools and the ecological biodiversity and ecosystem services they provide.

An Exploration of the Impact of Governor Dayton’s Proposed Shoreland Buffer Initiative on Agricultural Lands in Minnesota
David Kelley, Geography – University of St. Thomas

Current Minnesota state laws mandate vegetative buffers around many waterways, some in agricultural areas. Fifty foot buffer strips can be required around some waters of the Public Waters Inventory (PWI), while Chapter 103E Drainage law sometimes requires a minimum of one rod (16.5 foot) buffer strip width. These laws aren’t uniformly applied or enforced in agricultural areas and many waters are exempt. As a result, crops are often planted up to the edge of waterways and runoff containing excess nutrients and sediments can enter surface waters, eventually reaching the Mississippi River. Several recent surveys have been done to determine compliance with current shoreland rules. In one study by the Environmental Working Group (EWG) of 37 southern Minnesota counties, 8,649 acres of 50 feet wide buffers were required and 6,364 acres were present (74% of what is required). In 2014, BWSR conducted an Agricultural/Rural Riparian Buffer Analysis and found that approximately 64% of riparian areas of watercourses that were analyzed are not...
Utility Pole Decay in Relation to Soil Types
Timothy Tabor, Minnesota Power

Analytic Question: Is there a spatial relationship between utility poles failing groundline inspections and soil hydrology in the Minnesota Power Service Territory? Summary: Utility poles are used to carry high voltage electricity from power plants to customers. This high voltage can be dangerous if the proper physical clearances are not met. If a pole falls on the ground, it could introduce a hazard to the public. Minnesota Power is a power company in Northern and Central Minnesota. It conducts groundline inspections on a 10 year cycle (10%/year). This inspection consists of drilling into the pole to measure shell thickness and, if needed, treating to slow decay. Using the Soil Survey Geographic (SSURGO) Database and Minnesota Power’s Groundline Inspection Database will determine which soil types have a greater failure rate. Other considerations that will be taken into account are the pole age, wood type, and treatment of the pole.

The Advancement of Urban Stormwater Modeling Using GIS
Sean O’Brien, Houston Engineering Inc.

Many projects from the federal level all the way down to the local level require a type of stormwater analysis. Stormwater modeling and GIS have become very tightly integrated in recent years. Many interior drainage studies are conducted using Storm Water Management Models (SWMM) that rely heavily on GIS input data. Fortunately, applicable GIS data have become much more readily available, and the tools to format the data have become much more efficient. Data collection has taken a step forward with the addition of applications such as ArcGIS Online and Collector for ArcGIS. With this culmination of better data, more efficient data collection, and advancement in GIS tools, stormwater modeling has become much more streamlined and accurate. This presentation will take a look at some examples of how stormwater modeling has progressed, and what lies ahead for the future.

Minnesota’s Network of Parks & Trails: Creating a Cohesive Geospatial System
Norm Anderson, MNGeo; Elissa Brown, University of Minnesota’s Center for Changing Landscapes

What: A Partnership of the University of Minnesota’s Center for Changing Landscapes and MnGeo. Purpose: Multiple organizations produce and maintain Minnesota’s parks and trails data, each with its own data models and mapping services. What’s missing is a system to map and understand the entire network as a whole. This project builds on existing data resources and the principles of the Geospatial Commons to create an approach that will synthesize information, methods, and opportunities for analysis, leading to a more complete inventory, a better understanding of where investments have been and should be made to improve the network, and the ability to interpret changes over time.

Outcomes: A common place to host and share parks and trails data, a common data model that aligns and standardizes definitions and methods, a more complete dataset of parks and trails at the local and regional levels, a platform to display information and analysis interactively for exploration by decision-makers and public users, a system that is compatible with a standardized survey tool (in development) to continue to develop robust datasets across the network.
SESSION ABSTRACTS

SESSION 31: HYDROLOGY ●
Friday, October 9 | 10:30 a.m. – Noon | Ballroom L

Statewide Riparian Buffer Inventory of Minnesota’s Rivers and Streams
John Sandberg and Andrew Petersen, MPCA

Riparian buffers provide known benefits to water quality and aquatic habitat, and the current condition of buffers along Minnesota’s waterways has gained recent attention from policymakers. To date, no accurate and precise statewide inventory of riparian buffer conditions exists for Minnesota’s rivers and streams. Obstacles to such an evaluation include: a) the spatial resolution and accuracy of algorithmically-classified land cover data, and b) the time required to complete detailed, comprehensive land cover classification using “improved” methods such as visual interpretation of high-resolution aerial photography. The MPCA’s Environmental Monitoring and Assessment Protocol (EMAP) design offers an opportunity to estimate the condition of riparian buffers at a statewide scale by carrying out detailed GIS air photo interpretation at a limited number of stream locations. The stratified random design of the EMAP program allows extrapolation of these results to the full population of Minnesota’s rivers and streams. While this method cannot be used to evaluate riparian buffer conditions at specific locations outside of the EMAP design, it can provide accurate condition estimates at statewide and ecoregional scales. Buffer condition has been evaluated at different spatial scales, ranging from 15 meters (~50 feet) to 100 meters.

Floodplain Models: A Streamlined Review through Data Mining and Visualization
Kyle Volk and Thomas Sayward, Moore Engineering Inc.

Water resource engineers are often called upon by local agencies to review floodplain models for technical accuracy and completeness. Over the past ten years, these hydraulic models have grown significantly in size and complexity with software advances. The U.S. Army Corps of Engineers Hydrologic Engineering Center produces the software HEC-RAS which is widely used in the United States for river and floodplain modeling. Although the companion software HEC-GeoRAS allows for mapping of floodplains through GIS, it does not provide a means to easily review other aspects of the models. Of particular concern are models with unsteady, or variable, flows which are increasingly needed to analyze the floodplain. Moore Engineering has developed a data mining script to extract spatial and flow data from the HEC-RAS model and plot it in GIS. Manually obtaining this data used to take several days to complete; now a more elaborate process can be accomplished in a fraction of the time through Python and GIS visualization.

SESSION 32: METADATA ●
Friday, October 9 | 10:30 a.m. – Noon | Ballroom MN

The Next Generation of Metadata in Minnesota:
Curating Content for the Geospatial Commons
Mike Dolbow, MnGeo

The Minnesota Geospatial Commons is officially here: a program supported by MnGeo and several state agencies, where over a dozen publishers are opening up their data. But what makes the Commons different than many of the other “data portals” you’ve seen out there? The answer is found with our old friend, metadata. In order to create a portal full of useful, authoritative data, publishers on the Commons must commit to documenting their data. This required complementing the Minnesota Geographic Metadata Guidelines (MGMG) with a new set of “best practice” recommendations that help users effectively evaluate data while clarifying the expectations for publishers. It also required creating new tools, updating existing tools, and providing training on metadata creation in order to empower current and future publishers.

In this 90-minute technical session, presenters will demonstrate how the Commons differentiates itself as an authoritative data source. Attendees will learn more about the metadata recommendations that are guiding current and future publishers on the Commons. They will also learn about new and updated tools available for creating metadata, their strengths and weaknesses, and how they work together to create the resources exposed on the Commons. We will wrap up the session with a discussion and debate on what this means for the future of open GIS data in Minnesota.

SESSION 33: EMERGENCY MANAGEMENT – PLANNING & DURING THE EMERGENCY ●
Friday, October 9 | 10:30 a.m. – Noon | Ballroom O

Visualizing Fire Department Responses with CartoDB
Paul Wickman, Flat Rock Geographics

Local government fire departments need to demonstrate their performance and efficiency. In this session we will show how CartoDB and Torque are being used to visualize fire department responses to emergency events throughout the city, allowing city officials to better understand how they are performing. We will also briefly discuss why routing based on Open Street Maps is not yet sufficient enough to be used for this analysis. Effective Response Force (ERF) is one method that fire departments use to measure their level of success. An ERF is a set of specific resources required to perform a particular task within a set amount of time. For example, the Effective Response Force for a residential building fire, which is less than 200 square meters in size, needs to be four fire engines, one ambulance and a fire chief. These resources may be coming from different fire stations; they may be coming directly from other emergency events. They may even come from neighboring cities.
**SESSION 34: ASSET MANAGEMENT ●**

**Friday, October 9 | 10:30 a.m. – Noon | Split Rock Room 1**

**Building an Asset Management System, One Project at a Time**  
*Heather Albrecht, City of Maple Grove*

For better or worse, the Public works department at the City of Maple Grove became an early adopter of Cartegraph’s Operations Management System, a web-based computerized work and asset management system. As with many new products and technologies the path to success was steep and winding. Heck, we even turned back once! But, through lessons learned we developed a systematic approach for deployment. We took it one step at a time, and with each new project, more staff got exposed to the software and confidence in the system grew. Today, I even overheard, “I love Cartegraph.” A year ago I thought I’d never hear those words. This presentation will focus on how Maple Grove has approached developing a useful asset management system.

**Tracking Sign Assets and Projecting Future Maintenance with Cityworks**  
*Rebecca Foster, City of Edina*

Proposed retro reflectivity sign standards prompted the City of Edina, MN to invest in understanding its street sign asset. Edina used a Trimble GeoExplorerXH 6000 Handheld to locate and photograph signs over a two-year period, creating a sign asset database including all signs within city right-of-way. The Asset Management System is now being used to assess total asset value, budget for future replacement, create a maintenance schedule for sign replacement, and organizes workflow by using service requests or work orders within Cityworks. ArcMap is used to graphically display, analyze, and manage the data for the street sign asset.

**SESSION 35: PARCEL DATABASE INITIATIVE ●**

**Friday, October 9 | 10:30 a.m. – Noon | Split Rock Room 2**

**Statewide Parcel Data Layer: Current Status and Future Plans**  
*Bart Richardson, MN.IT Services@MN DNR; Dan Ross, MnGeo*

MnGeo is actively collecting county parcel data with the goal of “collect once, use many times.” Under the 2014 Government Data Practices Law, MnGeo is able to distribute the parcel data to all state government agencies, as well as state colleges and universities.

**Status of the Wisconsin Statewide Parcel Map Initiative**  
*Howard Veregin, State Cartographer’s Office*

As reported at the 2014 Minnesota GIS/LIS Conference, Wisconsin has embarked on an initiative to provide online public access to a seamless statewide digital parcel map. The Wisconsin Department of Administration (DOA) was assigned responsibility for coordinating the development of this map under the state’s 2013-15 budget, which also created a funding mechanism and made counties responsible for posting parcel information online. The first version of the online map has been assembled by a team within the Wisconsin State Cartographer’s Office (SCO) and will be available online by the time of the 2015 Minnesota GIS/LIS Conference. This presentation will detail some of the features of the online map, discuss challenges faced in its development, and highlight next steps in the Parcel Map Initiative.

**SESSION 36: GOVERNMENT GIS ●**

**Friday, October 9 | 10:30 a.m. – Noon | French River Room 1**

**GIS in Corrections at Hennepin County**  
*Andrew King-Scribbins, Hennepin County Department of Community Corrections*

This session will give a brief overview of the various ways Hennepin County’s Department of Community Corrections and Rehabilitation is utilizing GIS. Topics covered may include, but will not be limited to staff and offender location analytics, site visit routing optimization, GIS and corrections database integration, and mobile device and vehicle tracking. These topics are in various stages of use at the county. Some have been ongoing for years, some are just starting, and some future conceptual uses will also be discussed.

**USGS Geospatial Data Program Highlights**  
*Ronald Wenc, U.S. Geological Survey*

The USGS National Geospatial Program continues to improve and deliver topographic information through a variety of products and services. The National Map (nationalmap.gov) supports data viewing and download, digital and print versions of topographic maps, and geospatial data services. U.S. Topo, the “new generation” of digital topographic maps from the USGS arranged in the traditional 7.5-minute quadrangle format, is currently in production for Minnesota and will be available soon. These maps are georeferenced and delivered through The National Map Viewer and USGS Web services. Additionally, older historical topographic map versions are available in multiple data formats through a new application called “TopoView.” The
3D Elevation Program (3DEP) is being implemented nationally and will result in a transition to update and replace the National Elevation Dataset (NED). 3DEP will provide new bare earth data products and point cloud data at improved quality levels based on new LiDAR data specifications. Information about the FY16 3DEP Broad Agency Announcement (BAA) for project proposals will be reviewed. This presentation will also highlight results from a recent Hydrography Requirements and Benefits Study conducted by USGS. Study goals include 1) identifying mission critical activities; 2) understanding data user requirements; and 3) documenting benefits from improved data. References and resources will be provided on these topics along with additional information on other USGS program highlights.

**Forecasting the Next 30 Years of Metro Development**

*Todd Graham, Metropolitan Council*

Planners are aware of emerging demographic trends. But long-term planning demands greater detail about the timing, location and nature of future growth. To answer questions of what growth will happen, when and where, Metropolitan Council operates a real estate market and land use model for location decisions. The land use model estimates demand for various real estate types and location characteristics, and forecasts development over time as market segments value places, and developers provide local real estate. The Council uses the resulting local forecasts to coordinate local planning and to plan the deployment of regional systems and services. This presentation will cover how the Council’s model was developed, model assumptions, the several spatial datasets informing the model, and modeling results.

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**SESSION 37: IMAGERY/REMOTE SENSING**

Friday, October 9 | 10:30 a.m. – Noon | French River Room 2

**An Overview of Great Lakes Remote Sensing Programs**

*Brain Huberty, U.S. Fish and Wildlife Service, Ecological Services; Brandon Krumwiede, The Baldwin Group at NOAA Office for Coastal Management*

The Great Lakes region contains two countries, eight states and two provinces (an area covering ~759,725 km2), overseeing the world’s largest source of available surface fresh water. How do we as a geospatial community with local to international roles address the remote sensing needs to protect this global resource? The size and the scale of the Great Lakes region necessitate the use of remote sensing geomatics technologies to support scientific research, management, planning, operations, and policy throughout the region. This presentation will deliver a current synopsis on a few significant remote sensing initiatives around the Great Lakes region. The authors will highlight the Office of Science and Technology Policy’s National Plan for Civil Earth Observations (focusing on the Agriculture and Forestry Societal Benefit Area) and the recent recommendations for remote sensing of species and habitats as related to Great Lakes Water Quality Agreement. The outcome is a desire for a collaborative, unified approach across all levels of governments, industry and universities to aid in the creation of a Great Lakes Remote Sensing framework.

**Integrating Landsat Imagery with LiDAR and Object-based Image Analysis for Land Cover Classification of the Lake of the Woods/Rainy River Basin for the ~1990 and ~2010 Time Periods**

*Leif Olmanson and Marvin Bauer, University of Minnesota*

The recent availability of LiDAR data throughout Minnesota has opened up many opportunities for improved land cover classification and mapping. To utilize information such as multispectral data from Landsat™ imagery and LiDAR point cloud and topographic metrics, we utilized an object-based image analysis (OBIA) implemented in eCognition software with random forest classification. By using objects instead of pixels we were able to utilize multispectral data along with spatial and contextual information of objects such as shape, size, texture and LiDAR-derived metrics to distinguish different land cover types. While OBIA has become the standard procedure for classification of high resolution imagery, we found that it works equally well with 30-meter Landsat imagery. Since LiDAR data is not available for the Canadian portion of the basin, we also had an opportunity to quantify the classification accuracy with and without the LiDAR derivatives. To classify the land cover in the Lake of the Woods/Rainy River Basin, we utilized spring and summer Landsat imagery from four paths for the ~1990 and ~2010 time periods. The LiDAR DEMs were used to derive slope, compound topographic index (CTI) and dissection while the point cloud data were used to create mean and maximum vegetation height layers. We used eCognition to segment the imagery and extract the spectral and derived spatial and contextual characteristics of each object. Decision tree classification using random forest enabled taking advantage of the unique differences in these data and determination of the most significant data features for distinguishing among cover types. The presentation will describe the methods and results of this project, including the features found to be most significant for land cover classification and accuracy of the classification with and without LiDAR.

**Using LiDAR Imagery to Identify Bluffs and Potential Erosion Sites on Lake Superior’s North Shore**

*George Host, Natural Resources Research Institute*

The striking character of Lake Superior’s North Shore comes from its rugged bedrock-controlled topography, which produces beautiful scenic vistas, abundant waterfalls, and fast-flowing streams. This same topography provides significant challenges, however, to natural resource management and land use planning. The overlying soils are often erosive, and while erosion is a natural process, it can be accelerated by human activity, resulting in impairments to streams and ultimately coastal waters of Lake Superior. The recent acquisition of statewide high resolution aerial LiDAR data provides an opportunity to quantify the presence, extent and character of bluffs and other steep landscape features in this complex terrain. Bluff characterizations coupled with watershed-scale assessments of stream flow networks and stream power allow the identification of sites potentially susceptible to erosion. While airborne LiDAR presents a broad-scale view of the landscape, terrestrial laser scanners can provide detailed characterizations of individual bluffs at fine spatial resolutions. We will describe the methodology and results from the aerial and terrestrial LiDAR analyses of North Shore watersheds and their application to identifying areas for conservation and restoration activities.
NORTHERN MINNESOTA GIS USER GROUP
Tuesday, October 6 | 6:00 p.m. (at social) | Canal Park Brewery
Brandon Keinath, Minnesota Power

A chance for an informal Northern Minnesota GIS User Group meet-up. If you work in this region and are interested in learning more about our very active user group — please say hello!

NETWORKING OPPORTUNITY FOR YOUNG PROFESSIONALS YPN OF MN
Wednesday, October 7 | 4:30 – 5:30 p.m. | St. Louis River Room
Steph Gibeau, North Point Geographic Solutions; Jack Westman, Army Corps of Engineers - St. Paul District; Kyle Wikstrom, Pro-West & Associates, Inc.

Are you new to the world of GIS? Are you looking to expand your GIS network and build connections across the state? Then don’t miss out on this great opportunity to join the The Young Professionals Network of Minnesota (YPN of MN)! The YPN of MN is an organization aimed toward bringing together people of all ages, across every industry, who are just getting started with GIS and want to learn from other professionals. As a member of the YPN, you will have the opportunity to develop a network with industry experts and other young professionals that will allow you to go further with your GIS career and grow as a GIS professional. Come and join the inaugural meeting of the YPN of MN so you can learn, connect, and grow in the world of GIS. All ages and levels of experience are welcome.

NEXT GENERATION 911
Thursday, October 8 | 1:30 – 3:00 p.m. | Horizon Room 202
Adam Iten, Dept of Public Safety, Emergency communication Networks MN.IT Services

We will meet to discuss the latest status of the NG911 GIS project, which will include a review of the NG911 GIS data requirements.

UTILITIES
Thursday, October 8 | 1:30 – 2:30 p.m. | Horizon Room 203
Brian Udell, Xcel Energy; Brandon Tourtelotte, Pictometry Int’l.

This session will be an informal discussion of new and innovative uses of Geospatial technology in any Utility setting. Come and hear what your colleagues have been up to in GIS.

PICTOMETRY USERS GROUPS
Thursday, October 8 | 3:30 – 4:30 p.m. | Horizon Room 203
Brandon Tourtelotte, Pictometry Int’l.; Dean Larson, Pictometry Int’l.

Please join us for an informative session on the latest offerings and innovations from Pictometry, including several Geospatial solutions that are new since last year’s Conference. Customers and non-customers alike are welcome at this event.

HIGHER EDUCATION
Friday, October 9 | 10:30 a.m. – Noon | St. Louis River Room
Stacey Stark, University of Minnesota Duluth

Join us to discuss all things spatial related to Higher Education: curriculum, AGOL organizational accounting, financial support — and what you want to discuss!
A 15-Year Analysis of Arson and Incendiary Wildfires: Karlstad, Minnesota — Kyle Wikstrom, Pro-West & Associates, Inc

The rural community of Karlstad in northwestern Minnesota experienced an increase in the frequency of arson and incendiary wildfires from 1999 to 2014. Analysis of event origins has revealed spatial and temporal trends that indicate at-risk locations and time frames. The results of average nearest neighbor spatial statistics observed events clustering more frequently in recent years, and density analysis shows these clusters near major roadways outside of city limits. The objective of identifying the predictability of these events serves to aid local officials in apprehending responsible parties, prevent incidents, reduce local response costs, and prevent property loss.

Cost Effective Software Applications for Historical Bluff Erosion Analysis Using LiDAR and Archived Air Photos — Cynthia Miller, Minnesota State University, Mankato

This project examines three complementary, low-cost strategies for analyzing the progression of riverine bluff erosion in the Le Sueur River basin in Blue Earth County, Minnesota. Case studies of severe erosion sites along the Le Sueur River are used to evaluate the comparative results obtained from the three methods. The first is based on traditional overlay methodologies using digital historical air photos in using StereoPhoto Maker v.5.10, a freeware stereo viewing application. Multiple time-sequence stereo pairs make it possible to identify the type and extent of bluff erosion in context with changing land-use/land cover patterns since the 1930s. The second method evaluates uses of Agisoft PhotoScan v.1.1.6, a moderately priced photogrammetric software package, to generate point clouds and 3D models from the same historic photo pairs. The third technique generates terrain models based on two sets of LiDAR data collected in 2005 and 2012 using LAS Tools in ArcGIS v.10.2. These modern-era DEMs of heavy erosion sites along the river can then be compared to the historical stereo models of the same features to estimate rates of bluff retreat. These strategies are appropriate for budget-constrained users in higher education and workplace settings who are unable to utilize more expensive photogrammetric software such as Imagine LPS, AutoCAD Map 3D or SOCET SET. While the results are not quantitatively comparable to analyses based on more precise terrestrial LiDAR methods, they do indicate that these strategies can be valuable as a means of efficiently characterizing general patterns and rates of bluff change. Intermediate-level GIS practitioners in civil engineering, environmental assessment, resource management, archaeology and geomorphology may find these methods useful when basic assessment and visualization of topographic land use change is required.

Ian McHarg in Minnesota — Will Craig, UoM CURA; Ryan Mattke, Borchert Map Library, University of Minnesota

Ian McHarg’s 1969 Design with Nature introduced the world to map-overlay as a critical tool for environmental design. That approach is fundamental to today’s GIS work, esp. GeoDesign. A Minnesota project reinforced his commitment to that idea; the Metropolitan Planning Commission, the predecessor of the today’s Metropolitan Council, commissioned McHarg in the late 1960s to conduct an environmental assessment of the Twin Cities. That work was done manually, using acetate overlays. Minnesota GIS leader Al Robinette was a student of McHarg at the time and worked on those maps. The maps have been in the Council archives, but are being moved to the University’s Borchert Map Library for public viewing. Samples will be displayed during this presentation.

Inver Grove Heights Community Solar Gardens: Site Potential GIS-based Assessment — Andra Bontrager and Scott O’Donnell, City of Inver Grove Heights

The City of Inver Grove Heights is exploring the potential for solar garden power generation sites in the community. A solar garden is a solar electric array that generates power from the sun and distributes it to the utility grid. The subscribers to the solar garden may purchase a portion of the power produced by the array and receive an average electric bill credit of 8 to 10 percent by supporting sun-based energy production. A solar garden provides many benefits to communities with local, environmentally sustainable, and renewable affordable energy.

Solar garden site potential is dependent upon several landscape factors, including land use and physiognomy. In order to identify the most promising sites in the City for solar garden installations, the land use and landscape factors were assessed and rated using GIS. The GIS database for city-owned properties was assessed for solar garden potential using data reclassifications and spatial overlays.

There are several criteria to consider regarding a site’s potential for hosting a solar garden. First, the property land use and parcel size have thresholds and classifications necessary for solar garden development. Second, the solar aspect (direction of slope towards the sun) and elevation characteristics of a site greatly influence the potential productivity of solar arrays. Finally, land cover is an important consideration, wherein open spaces are preferred for productivity and development. Each of these feature characteristics was evaluated within the City’s public properties to identify potential locations for solar garden sites.

The city-owned properties (n=364) were attributed into suitable and non-suitable categories for each variable. The suitable city-owned property locations (n=40) were scored using binary values (-1, 0, 1) and were summed per parcel in order to prioritize parcels for solar garden potential. The GIS analysis identified the city-owned properties with greatest potential for on-the-ground community solar garden establishment.

Land Asset Management: DNRs Strategic Plan for the Conservation Agenda — Sherry Watson and Katherine Rossman, MN.IT @ Minnesota Department of Natural Resources

The Department’s Strategic Land Asset Management (SLAM) program upgrades the state’s public land portfolio through an interdisciplinary and strategic process for acquiring, selling, and exchanging land. The Department is highly motivated to work with all levels of government and non-government stakeholders to gain mutual land management benefits. To help move the department forward with these goals, the SLAM Integration Team developed a ”Decision-making Framework” to proactively plan for and implement SLAM activities in a consistent and timely manner. The DNR GIS Support Team provides software support, maps, data analysis, Python geoprocessing tools, and web applications for staff across the state to help implement the Framework and advance SLAM goals. This poster represents those efforts to showcase the facilitation of the SLAM process.
Mining the Past via GIS to Protect the Future — Julie Oreskovich, Natural Resources Research Institute
Iron ore has been mined in Minnesota for over 130 years. Across the Cuyuna, Mesabi, and Vermilion ranges, mining has scoured pits, sculpted stockpiles, and carved caverns beneath the earth. With time, these features have become ponds, lakes, and slopes that are valued for recreational purposes. But could they play an even larger role as we look to the future? Can Minnesota’s legacy mining features be repurposed to serve the alternative energy sector of today to help promote a cleaner environment for tomorrow? UMD’s Natural Resources Research Institute (NRRI) has been using GIS to investigate potential sites among Minnesota’s mining features for hosting Pumped Hydro Energy Storage (PHES) and Compressed Air Energy Storage (CAES). The PHES study looked specifically at the Mesabi Range, identifying sites that fit various scenarios, such as pit to pit, stockpile to pit, pit to underground workings and stockpile to underground workings. The delimiting criterion was 350 feet of head, the drop from a potential upper reservoir to a potential lower reservoir. The CAES study was expanded to look at the underground workings of all three ranges. This entailed mapping of the Cuyuna underground workings. Both studies were part of a team approach to investigating energy storage. Participants included NRRI and UMD Civil Engineering (Geotechnical and Environmental Teams), UMTC St. Anthony Falls Laboratory (Facilities Team), Humphrey School of Public Affairs (Policy Team), Great River Energy, Minnesota Power and Barr Engineering. GIS aspects of the two projects are presented here.

Minnesotans for the American Community Survey: MACS — Jeff Matson, University of Minnesota
This poster will illustrate how Census data is used by government agencies and the business community, why certain questions are asked on the American Community Survey, and a list of ways you can become involved in local efforts to educate politicians and the general public about the importance of supporting and full-funding this critical source of information.

Planting for Pollinators — Jacqueline Kovarik, MN DNR
Approximately one-third of bee colonies have been dying each year for the past six years. The media attention on this topic has focused primarily on the loss of honey bees, which affect our agricultural production across the U.S. While we can directly correlate the significance of the honey bee to food production, the importance of the 100+ other bee species in Minnesota has not been measured due to a lack of scientific data. Local research is being conducted by University of Minnesota’s Bee Lab, as well as staff from the Minnesota Department of Natural Resources, to identify habitat, geographic range, host plants and behavioral characteristics for all native bee species. Derived from an evolving dataset, this map shows generalized ranges of known host plants to the lesser-known bee species in our state. The intent of this map is to provide oligolectic bee-friendly planting ideas so that you can do your part in helping sustain our native bee population before it’s too late.

St. Louis County, MN: Parcel Fabric LGIM Poster — Jeff Storlie, St. Louis County Planning & Development
This poster will help explain the complex nature of a Parcel Fabric LGIM Data schema.

Standardized Maps Using the U.S. National Grid — Randy Knippel, Dakota County
In disaster situations, when resources are limited, a printed map may be all that is available. In extreme situations, the easiest, quickest, and most reliable GIS solution is copies of existing maps. Maps are the foundation of a comprehensive GIS solution for disaster preparedness. When these maps are standardized across multiple jurisdictions, they provide opportunities to quickly assemble the maps that are needed to cover an area of operation that crosses those jurisdictions, creating a simple but very effective common operating picture with wall maps and maps for distribution. Printed maps, coupled with GPS and basic map reading and land navigation skills, are the most universally useful geospatial solution. When the maps are based on geospatial PDFs, they also provide low cost, mobile GIS functionality when used with appropriate apps or server software. This poster presentation will show U.S. National Grid maps from multiple Twin Cities metro counties, with examples of how they can be easily assembled into wall maps, as well as used as geospatial PDFs on smartphones and other mobile devices.

Sub Aquatic 3D Visualization and Temporal Analysis Utilizing ArcGIS Online, Story Maps and 3D Applications — Tom Hollenhorst, EPA Mid Continent Ecology Division; Jonathon Launspach, SRA International Inc. (a contractor to EPA)
We used 3D Visualization tools to illustrate some complex water quality data we’ve been collecting in the Great Lakes. These data include continuous tow data collected from our research vessel the Lake Explorer II, and continuous water quality data collected from an autonomous underwater robot or Slocum Glider. Both sensors move up and down through the water column so the data need to be represented both vertically and horizontally through time. The data metrics include conductivity, temperature, depth, fluorescence, nitrate, and plankton abundance. Working with story maps and 3D visualization tools allow us to present complex spatial/temporal data sets to the public via an easy to-use intuitive interface. As we automate this process we’ll be able process and present these types of data almost as soon as the are collected. This abstract does not necessarily reflect USEPA policy.

Upper Cannon River Watershed BMP Targeting and Watershed Database Development — Michelle Trager and Jennifer Mocol-Johnson, Rice County
The Cannon River, a designated Wild and Scenic River, originates in Shields Lake in Rice County, and joins the Mississippi River 120 miles downstream near Red Wing. Utilizing an Accelerated Implementation Grant, funded through the state of Minnesota, Clean Water Legacy, Rice County with technical assistance from Houston Engineering utilized LiDAR topographic data to determine areas of highest importance for BMP Implementation within the Upper Cannon (a sub watershed of the Cannon River Watershed). Utilizing GIS analysis of LiDAR data, as well as soils and land-use data, the Upper Cannon Watershed study assessed the propensity of erosion on the landscape through the Stream Power Index and RUSLE. In addition to analyzing erosive potential, the project determined ideal locations to store runoff on the landscape (through Compound Topographic Index, or Wetness Index). In the future, Rice SWCD will utilize the BMP prioritization locations attained from this assessment to target landowners for relevant quantifiable water quality improvements. In addition to the Terrain Analysis, Rice County (with technical assistance from Houston Engineering) created/implemented a web-based tool used within Steele, Waseca, Rice and Le Sueur Counties to effectively and efficiently manage drainage systems. Le
Sueur County manages 85 public drainage systems, Waseca 40, Steele 30, and Rice 23. The software tracks activities associated with public drainage systems, including history, digital archives, determinations, repair orders, improvements, inspections, and maintenance. The database allows the county Drainage Authority (DA) to assess the needs and condition, prioritize, and make water quality improvements.

**Validation of a Forest Canopy Disturbance Map: A Case Study** — Jim Garner and Mark Nelson, USDA Forest Service Northern Research Station

A robust validation is necessary to the development of any remote sensing derived geospatial dataset, though the path through such an analysis is rarely well defined. Considerations of both spatial and thematic scale and resolution can quickly confound the process with unanticipated obstacles. In an attempt to outline a clear path of analysis we present a synthesis of the workflow, techniques, and tools used in the validation of our early successional forest habitat map (ESH) in the Western Great Lakes region. In addition to an area-wide assessment, we segmented and assessed the study area at 5 spatial scales; state (MN, WI, MI), Bird Conservation Region (BCR), state/BCR intersection, and 200 (approximately 216,000 ha each) space filling polygons (SFPs). Our reference dataset was comprised of 27,219 Forest Inventory and Analysis (FIA) plots located within the study area. These data were measured in the field and used to assess the map based on three thematic groups; general landuse (forest, non-forest, water), forest type (deciduous, coniferous, mixed), and year of disturbance (5 year intervals from 1990 to 2009). Confusion (error) matrices were developed for each spatial scale and thematic group, and map categories were used to stratafly plot-based estimates for each reference/map category combination. The resulting matrices were used to estimate overall, users, and producers accuracy as well as partition overall estimated error into allocation and quantity disagreement. Within the SFPs agreement coefficients were calculated between the reference and map area estimates to differentiate random error from bias, and choropleth maps were generated in order to identify potential spatial patterns of disagreement. A variety of charts were also created to best present multiple views of the resulting dataset comparison and validation statistics.

**Watershed Health Assessment Framework — A GIS Driven Project to Facilitate Understanding and Collaboration Around Clean Water Work** — Ben Gosack and Beth Knudsen, MN DNR

The Watershed Health Assessment Framework seeks to raise the bar on systems-based understanding in natural resource management. Through an interactive web mapping application, the project delivers a collection of watershed health scores that cross disciplinary and agency boundaries, providing a platform for collaboration on clean water work. The application assists the user in a process of exploring a watershed, investigating watershed health, and evaluating impairments to health.

**Mosaicking 2-meter Panchromatic Digital Elevation Models Extracted from Stereo Paired Satellite Imagery** — Michael Clementz, University of Minnesota

Digital Elevation Models (DEMs) are a valuable tool that can be used in geospatial analysis. They are developed through a variety of avenues, one being through the collection and merging of high-resolution stereo paired satellite images. This poster was developed to display the process that goes into mosaicking a collection of DEMs derived through stereo pairs collected by the constellation of DigitalGlobe’s high-resolution commercial satellites into a large-scale and high resolution DEM. The mosaicking process was meant to benefit employees at the Polar Geospatial Center (PGC) at the University of Minnesota and other individuals that have the necessary resources. To show the potential of this technology, portions of the Aleutian Islands in Alaska were used as a test site. Although incomplete, the DEM is beneficial for the scientific community since the Aleutians are a remote location with little elevation data. In the future, a completed DEM will be derived using new stereo paired images that are collected and will later be mosaicked using the above process.

**Il était une fois: Mapping Balzac’s Paris** — Jennifer Reinke, University of Minnesota, Twin Cities

Paris was the cultural capital of the 19th century. French novelist Honoré de Balzac wrote a compilation of literary works entitled *The Human Comedy*, using realism and ethically ambivalent characters to depict the complexities and capricious state of Parisian society during the Bourbon Restoration period of 1814-1830. Balzac’s characters often shared a romantic notion of the capital and yearned to join high society, the ultimate signifier of becoming Parisian. To be part of the elite, one must permeate the city in order to understand and manipulate his surroundings, enabling him to relocate from impoverished to exuberant quarters to conform to aristocratic norms and flaunt newly obtained statuses. The objective of this project was to map, using a semi-automated data extraction process, the movements of Balzac’s transient main characters in three novels. The map reflects the rise to the modern city through the eyes of Eugene Rastignac in *Father Goriot*, Lucien de Rubempré in *Lost Illusions: A Distinguished Provincial at Paris*, and Raphaël de Valentin in *The Magic Skin*, as the characters struggle with shifting paradigms and ideologies in an evolving Paris.

**Mapping Riparian Indicators of Function and Connectivity** — Courtney Blouzdis and Keith Pelletier, University of Minnesota

Riparian areas serve an essential role on the landscape by creating ecological corridors, reducing nutrient loading, and stabilizing banks. Conflicting riparian definitions can present a challenge, as different riparian delineations can be based on potentially contradictory criteria: geomorphic, vegetative, or hydrologic. A functional definition of a riparian area has been proposed rather than a fixed buffer around hydrologic features, as it incorporates important ecological functions that strongly interact with the aquatic system. We used an object-based approach to understand what landforms compose riparian areas and how these landforms define and affect stream system function. Two study areas with different surrounding landcover types were examined to test different functional riparian area delineations. First, a primarily forested area in Duluth, Minnesota, focused on Sargent Creek was analyzed using the floodplains as a base hydrologic marker for riparian delineation with curvature, erosive areas, and canopy cover within the valley walls for determining functional riparian area. Second, a study location on Seven Mile Creek in western Minnesota primarily surrounded by agricultural land with ephemeral tributaries used the floodprone area as a hydrologic descriptor to determine the riparian zone. The Duluth riparian zone’s preliminary results produced a more comprehensive and inclusive delineation of the riparian area in comparison to the method applied to the Seven Mile study area, which was more targeted toward hydrologic function. Therefore, decision managers delineating a riparian area should consider the unique ecological benefits of a functional riparian buffer compared to the fixed width buffer.
Seasonal Ponds Mapping Methods, Issues, and Future Mapping Efforts on the Chippewa National Forest — James (Matt) Frazer, University of Minnesota

Seasonal ponds are important ecological features in northern Minnesota’s forests. Mapping and collecting data from these wetlands will help many different agencies with further research and land management. For this study we mapped the Guthrie till plain and the Marcell area of the Chippewa National Forest. We mapped pond locations derived from photo interpretation and field verification data. The photos that were used were 1989 Color Infrared (CIR) images. The photos were georeferenced using 1991 black and white aerial imagery. After the photos were georeferenced a point was placed on each spot that had been marked on the photos resulting in 2700+ potential ponds. Issues we encountered during the mapping process were: National Wetland Inventory (NWI) polygons used at a larger scale were found to be spatially inconsistent with LiDAR and multiple points were found from the different mapping and field verification methods used, potentially representing the same pond. Some of these issues were resolved by consulting with investigators that provided data points to eliminate possible duplicate points of the same pond. Other errors could have resulted from differences in methodology, limitations in available technology (GPS units), or where the coordinates of the field verified point were taken in relation to the pond. Future mapping efforts will include field verifying the photo interpreted sites and collecting data on each, and possibly using Esri’s collector mobile application. LiDAR technology may be another way to help locate ponds that were missed in the photo interpretation.

When Interstate Becomes Main Street and Interchanges
Downtown Centers! — Pierre Callies, Normandale Community College; Karuna Paudel, Saint Cloud State University

Shall the city of Rogers, Minnesota, request the opening of a second interchange along I-94? If so, the return on investment, or property tax revenues, should exceed its construction costs by increasing property value demand around the interchange and the related properties, estimated market values, thus property tax increases. Research is about measuring the cross sectional evolution of property estimated value based on the commute duration from a property to the interchange using the interchange as “Downtown Center”. MnDot and MetroGIS data analysis completed through ESRI business Analyst desktop, supports traditional land estimated value distance decay from the interchange when regressing the estimated property value of 1,000 square foot of land against commute duration. Yet, the same analysis produces different results and market segmentation, when regressing the estimated market value of 1,000 square foot of building against the same commute duration. Applying the regression equations from the existing interchange to the proposed on shows that the taxpayer retrieves his/her investment in opening a new interchange, reduce energy waste, and increase commuters’ and residents’ quality of life. The poster reviews the data, findings and the methodology associated with it.

WEB MAPS

Minnesota GIS/LIS Conference Attendees — Kitty Hurley, MN.IT Services

The interactive map showcases Minnesota GIS/LIS Consortium attendee numbers from 2007 to 2014, by year, including a compiled dataset. Data were compiled for all attendees, even if attendees did not attend the conference, but attended a pre-conference workshop. If attendees attended both a pre-conference workshop and the conference they were counted as one attendee. Due to database constraints, 2012 data is omitted but may be added at a later time. No private information is stored in the datasets and it was determined no person could be individually identified in showcasing attendees by city. The interactive map showing attendees by city can be viewed at: http://geospatialem.github.io/mngisls-attendees

USNG Emergency Location Markers: Assisting Emergency Response along Recreational Trails in Cook County, MN — Kyle Oberg, Cook County GIS

Following the success of trail marker projects utilizing U.S. National Grid (USNG) in surrounding communities, Cook County applied for and was awarded a Federal Recreational Trails Grant to install USNG Location Marker Signs along select trails in Cook County. This is a pilot project aimed at assisting emergency response efforts along the many well used remote and rugged wilderness trails in Cook County. These trails are well-used by numerous and varied users of all ages and abilities during all seasons of the year. While accidents do happen, there appears to be a rise in trail use by less experienced recreationalists or those less familiar with wilderness travel and the necessary planning and preparation that goes with it. When Cook County dispatch receives a 911 call reporting a missing or injured party along a recreation trail, too often where help is needed is not well known. Poor location information increases the difficulty of emergency response, adding unnecessary risk to emergency responders and can result in delayed patient care when time matters most. To improve the chance of communicating accurate location information critical to emergency response, Cook County government is working with other government agencies, local trail clubs, SharedGeo, and other project partners to install USNG Location Marker Signs at strategic locations along various recreational trails. Other project goals include furthering local implementation of USNG and improving the working knowledge of the standard through community outreach and education.

Watershed Health Assessment Framework – A Web Mapping Application to Facilitate Understanding and Collaboration around Clean Water Work — Ben Gosack, MN DNR

The Watershed Health Assessment Framework mapping application delivers a wide variety of map layers that tell a comprehensive story about a watershed’s health. Health index scores provide a consistent means of comparing watershed health across Minnesota. The interactive web map helps users escape scale bias through the use of watershed navigation features that allow a user to quickly zoom between hydrologic scales.
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Presented by Tom Sayward and Kyle Volk

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Our primary service is water — meaning water, wastewater, and water resources system consulting, which represents over 70 percent of our annual revenues. Within these primary services, we offer a total solution by providing master planning, capital improvement planning, study and report, design, bidding administration, and construction administration/observation. Surveying, mapping, geographic information systems (GIS), instrumentation and controls, general civil engineering, structural engineering, electrical engineering, and site development are also provided as stand-alone services or in support of our primary services.

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Booth 24
The Geospatial Analysis Center (GAC) at the University of Minnesota Duluth is a GIS services organization with a decade-long record of external contract work with state agencies, counties, and regional organizations. The Center’s staff also provide assistance in classrooms and research projects across campus. GAC supports the UMD GIS program by raising its visibility and demonstrating high-quality consulting services as well as supporting the development of a workforce that is well-prepared for graduate school and the GIS industry. The UMD GIS Program offers a certificate, a minor, and a major in Geographic Information Science.
www.d.umn.edu/gac

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hexagongeospatial.com

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www.latitudegeo.com

MN DNR DIVISION OF FORESTRY RESOURCE ASSESSMENT

Booth 17

The Resource Assessment Unit within the MN DNR provides natural resource stewards with the expertise, information and analysis needed to properly manage, conserve, and sustain Minnesota’s forests, wetlands, soils, plants, water, and wildlife. This is a statewide office providing services to resource professionals using techniques in remote sensing, geospatial analysis, and field inventory of the resources.

www.dnr.state.mn.us

MN GIS/LIS CONSORTIUM

Booth 29 and 30

Our mission is to develop and support the GIS professional in Minnesota for the benefit of our state and its citizens. Members include GIS/LIS professionals from local, state, and federal government agencies; business and industry; educational institutions; and nonprofits. Anyone can become a member for free by signing up at our website.

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Booth 2

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Booth 19

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www.northpointgis.com

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Booth 22

Panda Consulting (Panda), a GIS consulting firm located in Palm Beach Gardens, Florida, created in 1998 to provide its clients with new and creative ways to apply GIS technology in ways that empower organizations and the individuals within those organizations. Panda is an Esri Business Partner, developer, reseller, consultant, beta testers and was recognized as the Esri New Business Partner of the Year award for 2000.

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Booth 4

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Booth 25

Pro-West is one of the Midwest’s longest-established firms dedicated to helping public and private entities integrate location technology into their business processes. As an employee-owned business, we set the bar high for performance. We care deeply about helping our clients succeed.

We deliver GIS services that align with business needs and bring value to our clients. We are committed to providing unrivaled service, clarifying clients’ visions, and ensuring the results they receive are well understood and offer long term solutions. Pro-West clients know that their applications will continue to evolve and remain fit for purpose as technology advances.

Our staff has a reputation for providing the right technology, exceptional project management, and the development of cost-effective data and applications. Pro-West clients benefit from our strong ties to Esri through our 25-year partnership, ArcGIS Online Specialty designation and multiple Esri awards. We help our clients make better decisions using GIS technology.

www.prowestgis.com

QUANTUM SPATIAL, INC.

Booth 23

Quantum Spatial is a full-service geospatial firm specializing in spatial data generation, integration, and analysis for clients worldwide. Quantum Spatial brings decades of collective experience in providing quality geospatial solutions throughout North America. Quantum Spatial delivers solutions for clients across all industry verticals with specialized expertise in energy, transportation, utilities, environmental, mining, national security, federal agencies, state and local government, and commercial applications. Quantum Spatial has made significant investments to create new solutions that address the evolving challenges faced by each end market.

www.quantumspatial.com

SHAREDGEO

Booth 7

SharedGeo is a Minnesota nonprofit which helps, government, nonprofit, education, and corporate entities use mapping technologies and share geographic data for the public good. Open source software experts and developers. Home to the USNG Information Center. Federal, state, local, tribal and corporate clients. Low cost solutions for diverse needs.

www.sharedgeo.org
THE SIDWELL COMPANY

Booth 3
Sidwell is an industry-leading geospatial solutions provider specializing in GIS products and services for state and local government. We offer cadastral mapping and land records management software and solutions, photogrammetric products and services, GIS asset management solutions, GIS website development and hosting, civic engagement solutions, and GIS consultation.
www.sidwellco.com

SURDEX

Booth 21
Surdex Corporation has provided geospatial services to federal, state and local governments and private industries under the same leadership since 1954. We specialize in aerial photography, photogrammetry, digital orthophotography, topographic and planimetric mapping and LiDAR services. We meet client expectations by providing accurate imagery and data on time and within budget.
www.surdex.com

WISCONSIN LAND INFORMATION ASSOCIATION

Booth 6

WSB & ASSOCIATES, INC.

Booth 8
WSB is more than an engineering firm. We are a culture of relationship building, forward thinking, and collaboration that enables technically advanced, thoughtful, and creative engineering and design solutions that build a legacy — your legacy.

Founded in 1995, WSB has grown into a full service firm disciplined in the planning, design, and implementation for government, commercial, and energy clients. With a diverse staff of engineers and planners, as well as environmental and construction specialists, we have the expertise on hand to support our client’s current needs, while keeping an eye toward the future.
www.wsbeng.com

VENDOR DEMO SCHEDULE

THURSDAY, OCT. 8

Pro-West & Associates, Inc.
10:00 - 10:30 a.m.

Latitude Geographics
3:00 - 3:30 p.m.

Frontier Precision, Inc
5:00 - 5:30 p.m.

North Point Geographic Solutions
5:30 - 6:00 p.m.

Pictometry International
6:00 - 6:30 p.m.
2015 GIS/LIS CONFERENCE AT-A-GLANCE

THURSDAY, OCTOBER 8

7:30 a.m.  Conference registration and materials pickup; refreshments in lobby; Conference mentor program meeting (please be prompt!)
8:00 a.m.  Conference Welcome — Gerry Sjerven, Conference Chair
8:15 a.m.  State of the State — Dan Ross, Minnesota GIO
8:30 a.m.  Opening Keynote Session: Current and Emerging Trends in GIS — Jack Dangermond, President, Esri
10:00 a.m.  Morning Break (Lobby), Exhibit Hall Open, Geolounge Open and Web Map & Poster Gallery Open, People’s Choice Vote
10:30 a.m. – Noon  Concurrent sessions:

| SESSION 1 | Wetlands (Ballroom L) |
| SESSION 2 | Forest Management (Ballroom MN) |
| SESSION 3 | Emergency Management & 911 Dispatch (Ballroom O) |
| SESSION 4 | Field Data Collection (Split Rock Rm 1) |
| SESSION 5 | Lightning Round I – Mapping (Split Rock Rm 2) |
| SESSION 6 | Web Map Design (French River Rm 1) |
| SESSION 7 | Students & Young Professionals (French River Rm 2) |

Noon  Awards Luncheon
1:30 – 3:00 p.m.  Concurrent sessions:

| SESSION 8 | Centerline Collaboration (Ballroom L) |
| SESSION 9 | Imagery (Ballroom MN) |
| SESSION 10 | Surveying (Ballroom O) |
| SESSION 11 | Transportation (Split Rock Rm 1) |
| SESSION 12 | Open Source (Split Rock Rm 2) |
| SESSION 13 | ArcGIS Online (French River Rm 1) |
| SESSION 14 | Undergraduate Competition (French River Rm 2) |

3:00 p.m.  Afternoon break; refreshments in lobby
3:30 – 5:00 p.m.  Last Call: Poster Gallery; People’s Choice Vote,

| SESSION 15 | Product Demonstration (St. Louis River Rm) |
| SESSION 16 | Wildlife Health Management (Ballroom L) |
| SESSION 17 | Parcel Fabric (Ballroom MN) |
| SESSION 18 | Emergency Management: Planning & Aftermath (Ballroom O) |
| SESSION 19 | Field Data Collection & Asset Management (Split Rock Rm 1) |
| SESSION 20 | Lightning Round II - Miscellaneous (Split Rock Rm 2) |
| SESSION 21 | Students- Graduate Competition (French River Rm 1) |
| SESSION 22 | Students- Undergraduate Competition (French River Rm 2) |

5:00 – 7:00 p.m.  Exhibitor Reception, Exhibition Hall
6:45 – 7:00 p.m.  Exhibitor and GIS/LIS Raffle (must be present to win), Exhibition Hall
7:15 p.m.  Thursday Night Social Event, Holiday Center

FRIDAY, OCTOBER 9

6:30 a.m.  5K Fun Run/Walk
7:30 a.m.  Conference registration and materials pickup; refreshments in lobby
8:00 a.m.  Exhibit Hall, Geolounge* Open and Refreshments in Lobby
8:30 – 10:00 a.m.  Concurrent sessions:

| SESSION 23 | Product Demonstration (St. Louis River Rm) |
| SESSION 24 | Data Aggregation- Address Points (Ballroom L) |
| SESSION 25 | LiDAR & Hydrology (Ballroom MN) |
| SESSION 26 | Utilities (Ballroom O) |
| SESSION 27 | A Little Bit of this, a Little Bit of that (Split Rock Rm 1) |
| SESSION 28 | Lightning Round III- Environment (Split Rock Rm 2) |
| SESSION 29 | Web Maps (French River Rm 1) |
| SESSION 30 | Education (French River Rm 2) |

10:00 a.m.  Morning Break; exhibit hall closes at 10:30 a.m.
10:30 a.m. – Noon  Concurrent sessions:

| SESSION 31 | Hydrology (Ballroom L) |
| SESSION 32 | Metadata (Ballroom MN) |
| SESSION 33 | Emergency Management- Planning & During the Emergency (Ballroom O) |
| SESSION 34 | Asset Management (Split Rock Rm 1) |
| SESSION 35 | Parcel Database Initiative (Split Rock Rm 2) |
| SESSION 36 | Government GIS (French River Rm 1) |
| SESSION 37 | Imagery/Remote Sensing (French River Rm 2) |

Noon  Boom Bust Boom Bust Boom: Duluth’s Development, 1856-1920 — Tony Dierckins
2:00 p.m.  MN GIS/LIS Annual Business Meeting — Heather Albrecht, Board Chair

Special Interest Groups

| 1:30-3:00 p.m. | Next Generation 911 (Horizon Room 202) |
| 1:30-2:30 p.m. | Utilities (Horizon Room 203) |
| 3:30-4:30 p.m. | Pictometry Users Groups (Horizon Room 202) |

Special Interest Groups

| 10:30 a.m. – Noon | Higher Education (St. Louis River Room) |

2015 GIS/LIS CONFERENCE AT-A-GLANCE

THURSDAY, OCT. 8

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