Intermountain GIS Conference
April 4-7, 2016
Great Falls, Montana

MAGIP
Montana Association of Geographic Information Professionals

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An interactive, web-based schedule is available for use from your mobile device: http://2016intermountain.sched.org/mobile/

Logo Design by Kelsey McCartney, winner of the 2016 design contest.

Welcome to Great Falls

On behalf of the 2016 Intermountain GIS Conference Planning Committee, we would like to welcome you to the conference and to the city of Great Falls. It has been a pleasure to be the co-chairs for the planning of this conference, we couldn't do it without the members of the committee so we'd like to thank each and every one of them for all their hard work and guidance throughout the planning process. This year's conference theme was focused around the Lewis & Clark expedition, which was a great choice because Great Falls is very proud to have been along the trail as Lewis & Clark made their way to the Pacific Ocean over 200 years ago.

This is the first time the Intermountain GIS Conference has been hosted in Great Falls. We hope you can make time to enjoy the city during your stay. We have great museums and local attractions including the Lewis & Clark Interpretative Center, C.M. Russell Museum, the History Museum, Giant Springs State Park, the River's Edge Trail and so much more!

Thank you for coming to the 2016 Intermountain Conference, we look forward to talking to you and we encourage you to discover and explore new GIS technologies!

Jeff Hedstrom, Co-Chair   Judy Burg, Co-Chair
City of Great Falls   City of Great Falls

Conference Organizers

Planning Committee

Special thanks to committee members who in aggregate contributed many hundreds of hours of effort toward the staging of this year's events. The committee has focused on developing a conference that will benefit our GIS community in multiple areas - training, education, networking, and inspiration.

Jeff Hedstrom - Co-Chair, Track Chair Coordinator, Site Coordination
Judy Burg - Co-Chair, Local Publicity, Banquet/Entertain.Coordinator
Lee Macholz - Conference Administrative
Leslie Zolman - Keynote Coordinator
Meghan Burns - Vendor Chair, Publicity, Webmaster
Brian Andersen - Poster Chair, SWAG Chair
Corey Richardson - Workshops Chair, Awards Chair
Jenny Connelley - Student Scholarships Coordinator
Janelle Luppen - Graphics Coordinator
Karen Coleman - Treasurer
Lorie Palm - Program Design & Publication
Jason Underwood - Planning Advisor
Elaina Graham - Planning Advisor
Candy Hill - Former Co-Chair, Planning Advisor, Minutes
Jennifer Johnson - Planning Advisor
Carrie Shockley - Theme & Logic Coordination

Track Chairs

Track Chairs organize sessions by soliciting speakers to offer presentations. They coordinate with speakers to prepare the sessions and submit materials for the program. The conference committee wishes to recognize these volunteers for their efforts in developing outstanding program content.

Leslie Zolman - Education Track
Jenny Connelley - Emergency Services/N-G-9-1-1
Jessie Fernandes - Health Track
Eric Spanenberg - Local Government Track
Jason Underwood - Military Track
Elaina Graham - Natural Resource/Remote Sensing Track
Andy Rahn - Mobile/Online Technologies Track
Jon Henderson - Public Works Track
Dan Stahly - Survey Track
Wally Gladstone - Survey Track
Matt Lopez - Tribal Track
Maya Daurio - Volunteer GIS Work Track

MAGIP Board of Directors

The mission of the Montana Association of Geographic Information Professionals (MAGIP) is to stimulate, encourage, and provide for the advancement of an interdisciplinary approach to the use of geographic information. The Association sponsors educational workshops, conferences, such as the Intermountain GIS Conference, forums, educational grants, and scholarships. We work collectively with educators, data creators, data users, application developers and software vendors to foster technical cooperation and promote the development of sound policy and practices that will support the efficient and effective use of geographic information systems.

Board Members

Leslie Zolman, President, Elected by the members, 2014-2017
Leslie Zolman has served on the MAGIP Board since 2012. She is the Montana Department of Commerce, Census and Economic Information Center GIS Coordinator. She has been with CEIC for over 4 years and has provided leadership and shared vision for implementing cloud based interactive maps and received the Special Achievement in GIS Award from Esri in 2013. Her past GIS work has included working with non-profit organizations in the US and abroad including working with the World Health Organization on the Ebola outbreak in 2015. Leslie holds a master's of GIS from Penn State and an undergraduate degree in microbiology. She holds a geographic information systems professional (GISP) certification and is a member of the GISP review committee. She currently serves GISCorps as one of their Mission Coordinators.

Brian Andersen, Vice President, Elected by the members, 2015-2018
Brian Andersen has been a GIS Professional at the Montana Department of Transportation since 2000. While at MDT he has served as the GIS Lead and Project Manager. He is currently the Supervisor of the Road Inventory and Mapping section where he has a team of 10 employees that work with GIS and Databases.

Meghan Burns, Past President, Elected by the members, 2013-2016
Meghan Burns has served on the MAGIP Board since 2011. She is currently a GIS Analyst with the Montana State Library (MSL). Formerly she was the GIS Manager for the Montana Department of Military Affairs in the Construction and Facility Management (CMFO). She holds a Master's of Science degree in Geographic Information Science and a B.S. in Biology from Michigan State University. Go State! Previously, she was a co-steward of the MSDI Wetlands layer as a Landscape Ecologist for the Montana Natural Heritage Program.

Karen Coleman, Treasurer, Elected by the members, 2015-2017
Karen Coleman has been employed by the Montana Natural Heritage Program as the Biological Data Systems Coordinator since 2004, designing and maintaining databases to house species and habitat information. She holds an M.S. in Forestry from the University of Minnesota (with an emphasis on GIS and data management), a B.A. in Environmental Studies from Oberlin College, and received her GISP certification in 2013. She has served on the MAGIP Board since 2013.

MAGIP Board of Directors

Curtis DeVault, Technical Committee Chair, Appointed by the Committee, 2015-2017
Curtis DeVault is a GIS Specialist with Pioneer Technical Services out of Pioneer's Bozeman office. His primary duties include making maps for reports, supporting construction activities, managing large amounts of environmental data and developing mobile data collection solutions. He received his B.S. in Earth Sciences from Montana State University in 2014 and is currently pursuing an M.A. in Homeland Security focusing on Geographic Information Technology in Emergency Management.

Tara Chesley-Preston, Operations & Business Committee Chair, Elected by the members, 2014-2016
Tara Preston is a GIS Analyst with the City of Bozeman. She focuses on asset management, data integration, and web map development. Prior to this she worked as a contractor at the USGS Bozeman office. She holds a Master's of Science in Geography from Montana State University and a B.A. in Geology from University of Colorado.

Valentijn Hoff, Member-at-Large, Elected by the members, 2014-2016
Valentijn Hoff is a GIS analyst at the National Center for Landscape Fire Analysis, at the University of Montana. After fighting and lighting a lot of fires in the southeastern United States, he started a career in GIS at the government of Oconee County, in South Carolina. Since 2008 he has been helping wildland fire managers and researchers with data collection, spatial analysis and database development in Missoula. In the summer he works on wildfires across the country, on Incident Management Teams and Wildland Fire Modules as a field observer and as a GIS specialist. He has a BS in Forest Management from Clemson University and a MS in Forestry from The University of Montana.

Henry Hansen, Member-at-Large, Elected by the members, 2015-2017
Henry currently serves as the Park County/City of Livingston GIS technician. Prior to this he worked for a variety of natural resource agencies such as the United States Geological Survey, Minnesota Department of Natural Resources, and United States Fish and Wildlife Service. He holds a Bachelor of Science degree in Environmental Science from the University of Wisconsin-Stout. As a board member he has been actively engaged with promoting meetups, collaborating with professional organizations, and serves as secretary of the board.

MAGIP Board of Directors

Corey Richardson, Professional Development Committee Chair, Appointed by the Committee, 2014-2016
Corey Richardson is a GIS Analyst at the Montana Department of Transportation where he is currently the geodatabase administrator for MDT's SDE spatial data. He also publishes services through ArcGIS for Server and manages GIS projects for MDT's maintenance, Environmental, and Pavement sections. Corey previously worked for a consulting firm where he managed GIS projects for the Forest Service, BLM, and oil/gas companies. He has also worked on numerous state and county hazard mitigation plans where GIS analysis identified vulnerable populations that were at-risk to natural disasters. Corey is a certified Geographic Information Professional (GISP) and is currently working on his capstone for his MGIS online through the University of Central Arkansas.

GIS Mentoring
Peer-to-Peer or Career

The MAGIP GIS Mentoring program enables GIS practitioners to identify and contact colleagues who are willing to answer technical "how to" questions or offer GIS career guidance.

MAGIP GIS Mentoring
Peer-to-Peer or Career
www.magip.org/mentoring
Montana Association of Geographic Information Professionals
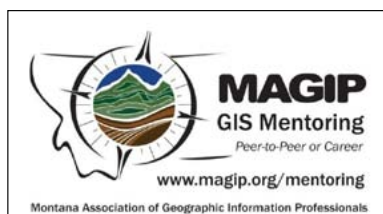
- Components are entirely web-based and self-guiding
- Participation is available to active MAGIP members
- Cost is simply the cost of annual MAGIP membership

magip.mt+mentor@gmail.com

Rob Ahl, Education Committee Chair, Appointed by the Committee, 2014-2016
Not Pictured

Robert Ahl has been honored to serve on the MAGIP board since 2014. Having spent much time in school he appreciates the challenges both students and educators face, and is grateful to work on their behalf as chair of the Education Committee. He has an undergraduate degree in biology, an MS in environmental science, and doctorate in forestry from the University of Montana. Professionally, he is a remote sensing analyst, working with the USFS Northern Region Geospatial Group, creating existing vegetation databases for all the Forests and Grasslands in Montana, and prats of Idaho, Washington, and the Dakotas.

Student Scholarship Recipients

At each Intermountain GIS Conference, MAGIP awards scholarships to student applicants. In return for their awards, students contribute their time to assist the conference committee in a variety of ways – serving at the registration desk, monitoring AV equipment and assisting presenters. Many also present posters and/or papers during during the conference general sessions. This year's recipients are:

Heidi Fleury, *Flathead Valley Community College*, Natural Resource Conserv. (Associate's candidate)
Verena Henners, *University of Montana*, Geography (Master's candidate)
Ahna Miller, *Clark University (Massachusetts)*, Geographic Information Science (Master's candidate)
John Olson, *Montana State University*, Archaeology with a GIS minor (Bachelor's candidate)
Aaron Vaughn, *Carroll College*, Geographic Information Systems Program

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Sponsor contributions enhance the conference and help lower fees for participants.
Please visit the exhibit booths and see what the sponsors have to offer.

Awards Banquet

Wednesday, 5:30 - 8:30 PM

Please join us for our dinner banquet and awards presentation, to be followed by a special presentation "Mapping with Lewis & Clark."

No-host Cocktail Reception……………..........…………………….....5:30-6:00

Banquet Dinner……………………………….........…………....6:00-7:00

MAGIP Awards Presentation……………………........……………..7:00-7:30
    Presentation of MAGIP Distinguished Services and Livability Awards

    Awards Committee Members: Corey Richardson-chair, Janelle Luppen, Kris Larson, Erin Fashoway, Lance Clampitt

Special Presentation "Mapping with Lewis & Clark"................7:30-8:30
    By the Lewis & Clark Honor Guard

The purposes of the Lewis and Clark Honor Guard, an independent not-for-profit group, are to promote the local history of the Lewis and Clark Expedition through living history interpretation and demonstrations to the public, to instill in the community a sense of pride in the accomplishments of the Corps of Discovery, who in the year 1805 conducted a grueling portage of the Great Falls of the Missouri; and during their expedition, contributed immensely to the scientific knowledge of the United States.

Previous Award Recipients

Distinguished Service
2000 - Mike Sweet
2002 - Gerry Daumiller
2004 - Duane Anderson
2006 - Bryant Ralston
2008 - Stu Kirkpatrick
2010 - Duane Lund
2010 - Annette Cabrera
2012 - RJ Zimmer
2014 - Lance Clampitt

Professional Livability Award
2008 - Ken Wall
2012 - Denny Rea
2014 - Clinton "Van" Shelhamer

GIS in Education (2000 - 2006)
2000 - Kris Larson
2002 - Gretchen Baldus
2004 - Margie Lubinski
2006 - Paul Wilson

Monday Schedule

	American Room	Britain Room	Canadian Room
Workshops *8:00 - 12:00*	Cartography Fundamentals		ArcGIS Open Data

Lunch Break on Your Own - *12:00 - 1:00*

	American Room	Britain Room	Canadian Room
Workshops *1:00 - 5:00*		Getting Started with ArcGIS 10.3	Creating Great Web Apps

Social *5:30 - 9:00*	Esri GeoDeveloper Meet Up Lightning Talks Social *Heritage Inn, Lewis & Clark Room*

Cartoragphy Fundamentals
Presented by:
Gerry Daumiller, Montana State Library
Kris Larson, CDM Smith

ArcGIS Open Data: Get Started and Use Best Practices
Presented by: Scott Moore, Esri

Getting Started with ArcGIS 10.3
Presented by:
Keith Weber, Idaho State University

**Creating Great Web Apps:
No Coding Required**
Presented by: Scott Moore, Esri

Esri GeoDeveloper Meet Up

Tuesday Schedule

	American Room	Britain Room	Canadian Room
Workshops *8:00 - 12:00*	Communicating with Maps: ArcGIS Online	Remote Sensing Basics	Telling Your Story with Esri Storymaps

Communicating with Maps: Using ArcGIS Online
Presented by: Brian Andersen,
Montana Department of Transportation

Remote Sensing Basics
Presented by: Catherine Maynard,
USDA-NRCS

Telling Your Story with Esri Storymaps
Presented by: Joseph Kerski, Esri

Lunch Break on Your Own - *12:00 - 1:00*

	American Room	Britain Room	Canadian Room
Workshops *1:00 - 5:00*		Field Data Collection	Spatial Analysis with ArcGIS Online

Collecting High Accuracy GNSS Data Using Esri Collector and Trimble Mapping Products
Presented by: Michael Clancy,
Electronic Data Solutions

Spatial Analysis with ArcGIS Online
Presented by: Joseph Kerski, Esri

Vendor Social *5:30 - 9:00*	Vendor Social Treasure Hunt, Games, Lightning Talks & Poster Displays Open	Vendor Booths Open

Vendor Night Social

Open to the Public

Who should attend? Anyone who wants to learn more about GIS:
school aged children and their parents, the general public,
GIS personnel, local government officials interested in
finding out more about GIS…there's something for everyone.

Tuesday, April 5
5:30 pm to 9:00 pm
Best Western Plus Heritage Inn

Events Include

Vendor Exhibits
Lightning Talks
Treasure Hunt
Games with Prizes
Map Poster Gallery
and More!

No-host Bar &
Hors d'oeuvres Provided

See you there!

Posters

Public Land Ownership and Land Management
Authors: Duane Lund and GeoInfo staff at Montana State Library, (Maya, Meghan, Gerry, Keith, Bob, Troy, Michael, and Diane)

Public land ownership and land management represent a complex mosaic to the landscape in Montana. This map attempts to display a representative cross section of public ownership and land management types in a format useful to the citizen of the state of Montana. It is intended to be easily updated from public sources once a year as ownership and management are a dynamic topic.
Key Words: Public Ownership

Building Resilience: Expanding Pollinator Habitat in Dryland and Irrigated Agriculture
Author: Heidi Fleury, *Flathead Valley Community College*

The project objective was to find the most suitable sites for implementing pollinator plantings in dryland and irrigated agricultural operations in the Mission Valley of Montana. To determine suitable plant species and prime habitat for the plantings, habitat characterizations for several types of flowering plants were completed using soil, aspect and land cover data. An irrigation type layer was created to overlay on the prime habitat sites to better understand irrigation driven vegetative characteristics of the valley as well to help rule out unsuitable sites.

A Montana Bucket List
Author: Jason Underwood, *CACI*

A cartographic representation of Great Falls Tribune's "A Montana bucket list: 100 things every Montanan should do"
Key Words: Montana; Recreation

A Comparison of Historical and Modern Maps Along the Lewis and Clark Trail
Authors: Jason Underwood - Mike Maldonado, *Malmstrom Air Force Base*

A comparison of maps created by William Clark, United States Geological Survey, Malmstrom Air Force Base, and modern aerial imagery compare relative accuracy and techniques in representing the landscape in the Great Falls area.
Key Words: Great Falls, Lewis&Clark, History, Cartography

Dearborn Rural Fire District
Author: Jeff Hedstrom, *City of Great Falls*

The Dearborn Rural Fire District is located approximately 40 miles southwest of Great Falls. The district is made up of the southwest portion of Cascade County and extends into Lewis & Clark County. It's an area that in very rugged with many hills, curved roads and non-bridged creeks, which presents its' own challenges of accessing the northern half of the Dearborn in the winter and early spring months. Upon demand, the City of Great Falls Mapping & Addressing Division produces several wall maps for the fire district. The division coordinates the rural addressing for the entire Cascade County, so building that relationship between a few of the rural volunteer fire departments has been a critical piece for our growth, as well as our neighboring counties (i.e. Lewis & Clark County).
Key Words: ArcGIS, Volunteer Fire Department

Identifying and Spatially Analyzing Great Falls Crime Incidents
Author: Jeff Hedstrom, *City of Great Falls*

The Great Falls Police Department has been actively seeking to reduce crime in areas where there is a high incident rate. Through the DDACTS (Data-Driven Approaches to Crime & Traffic Safety) Program, GFPD has tried several different methods of identifying these "hot spots" of high incidences, but this year we have finally come up with a solution. Using the spatial analysis tools in ESRI's software and crime data from the past three years, we have identified hot spots of these incidents. GFPD intends to increase patrol in those identified areas in an effort to reduce the number of incidents.
Key Words: Spatial Analysis, ArcGIS

Projected Fire Danger in Flathead National Forest
Author: Kate Ehrenberg, Barrett Gray - Eric Sawtelle, *Whitefish MT High School*

We analyzed the fire danger for the upcoming fire season within the Flathead National Forest based on factors that contribute to fire risk: precipitation, slope, slope aspect, and dominant vegetation.
Key Words: fire risk, modeling, climate, precipitation

Monthly Maps of Montana's Snow and Water Supply Conditions
Authors: Troy Blandford - Meghan Burns, Catherine Maynard, *Montana State Library*

Since 2002 the Montana State Library and the USDA Natural Resources and Conservation Service have collaborated to produce maps illustrating snow and water supply conditions across Montana. In 2016 the maps were revised and new products created, and now seven statewide maps and 42 basin-specific maps are produced the first of each month and made available via the MSL Water Information web environment. This poster will feature the various maps available at: http://mslapps.mt.gov/Geographic_ Information/Maps/watersupply
Key Words: water, snow

A Fire History of the White Cap Creek Watershed in the Selway-Bitterroot Wilderness, 1889 - 2013
Author: Valentijn Hoff, *National Center for Landscape Fire Analysis, The University of Montana*

At more than 1.3 million acres, the Selway-Bitterroot Wilderness is the third largest wilderness in the lower 48. It was established through an act of congress in 1964. The White Cap Creek drainage is a remote area in this wilderness, bordered by the Selway River in the west and the Idaho/Montana border in the east. The elevation ranges from a low of 930m at the confluence of White Cap Creek and the Selway River, up to 2680m at the summit of Vance Mountain. Located just south of the 46th parallel in the Northern Rocky mountains, where the maritime influence of the Pacific starts to give way to a more continental climate, the area contains large gradients of temperature and moisture. This creates a variety of vegetation types, leading to a variety of fuel types, fire return intervals and thus spatial and temporal fire interactions. In the 1960's the White Cap Creek area was chosen for a radical experiment: letting fires burn. In 1972 the lightning caused Bad Luck fire burned for 4 days, the first time a fire was allowed to run its course since aggressive suppression had been implemented in the aftermath of the 1910 fires. Many fires have burned since in this area, creating the burn mosaic of a natural fire regime. This poster provides an interesting visual representation of the fire history in this important area. The mixed use of typography and cartography creates a unique perspective of the interaction between the fires in the area, over the period 1889 – 2013.
Key Words: wildfire, typography, fire policy

Information Usage Section

Montana BLM Grazing Lease Regions and Predominant Vegetation Type
Author: Aaron Vaughn, *Carroll College*

The map will display the largest grazing lease areas in the state – areas allowed through the Bureau of Land Management and the Department of the Interior. The map is large format size and will have separations of vegetation type, forest and number of leases. It will depict relief as well as color-coded areas indicating lease regions, lease numbers and related monetary value. It will basically help answer questions concerning the volume of lands made available through the BLM for ranchers who move their livestock into public lands for grazing, typically during the summer months. It will show, given the largest lease areas, what kind of land is usually available, and whether the portions of land would seem adequate for large herds of livestock.
Key Words: Montana Grazing, BLM Lease Allotments

Impervious Surfaces of Whitefish MT
Authors: Annika Gordon - Eric Sawtelle, *Whitefish MT High School*

Impervious surfaces within the Whitefish MT city limits were delineated and impacts to water quality from those surfaces investigated. Potential sites for installing permeable pavement were examined in areas posing a greater threat to water quality, closer to water bodies and streams.
Key Words: water quality, storm water, impervious surface

Montana Natural Heritage Program Web Applications: Accessing Information On Montana's Animals, Plants, And Biological Communities
Authors: Bryce Maxell, Dave Ratz, Karen Coleman, Linda Vance, Andrea Pipp, *Montana Natural Heritage Program*

The Montana Natural Heritage Program (MTNHP) was established by the Montana State Legislature in 1983 and charged with statutory responsibility for acquisition, storage, and retrieval of information documenting Montana's flora, fauna and biological communities (Montana Code Annotated 90-15). Information managed by MTNHP includes taxonomy, biology, ecology, and conservation status information for nearly 8,000 plant and animal species and nearly 150 terrestrial and aquatic communities, nearly 1.7 million animal observation records, over 182,000 locations where a formal structured animal survey protocol has been followed, predictive distribution models for animal and plant species, species occurrence and wetland and riparian mapping polygons that are used in environmental reviews, land cover mapping, and land management information. We deliver this information via staff facilitated requests and web applications that include the Montana Animal and Plant Species of Concern reports, the Montana Field Guide, the Natural Heritage MapViewer, and the Species Snapshot. In this presentation, we will provide a brief overview of how biologists and natural resource managers can access information via our websites. We will focus on recent updates to our Species Snapshot and Montana Field Guide applications that allow users to create custom species summaries and field guides using spatial, taxonomy, and conservation status filters and our vision for the development of an environmental review tool that can be used by agency resource managers, planners, and consultants to speed environmental reviews.
Key Words: Natural Heritage Program, MapViewer, Field Guide, Species Snapshot

Urban Forestry of Whitefish, MT
Authors: Cassidy Grady, Annika Gordon - Eric Sawtelle, *Whitefish MT High School*

Trees in the downtown Whitefish area were inventoried to identify tree species and health/vigor of each tree. Recommendations for improvements to the City of Whitefish urban forestry program were made based on inventory results.
Key Words: urban forestry, tree health and disease

The Montana Land Information Act and the Importance of Local Data
Author: Diane Papineau, *Montana State Library*

This poster illustrates the role of MLIA in Montana—its annual grants, its Council, and State GIS Coordination. Together, these MLIA elements ensure that Montana's investment in local data, GIS capacity, and statewide geographic databases not only endures but is further expanded, strengthened, and utilized.
Key Words: MSDI, GIS Coordination, MLIA, MLIAC, grants, local government, local data

Montana Spatial Data Infrastructure
Authors: Diane Papineau, Colleen Hamer, *Montana State Library*

The Montana Spatial Data Infrastructure (MSDI) is made up of fifteen "framework" geographic databases vital for making maps of Montana and understanding its geography. Seven of the databases are federally-defined datasets. The other eight were selected as additional, valuable data themes by the Montana Land

Information Advisory Council (MLIAC). This poster illustrates the nature of these datasets, their use with mapping and research, and how to find more information and access the data.
Key Words: MSDI, framework, spatial data infrastructure, MLIAC, base map

Connecting the Dots: Using Geographic Information System (GIS) to Evaluate Health Care Provider Referrals to the Diabetes Prevention Program in Montana
Authors: Dorota Carpenedo, Sarah Brokaw, Paul Campbell, Jacob Doney, *Montana Department of Public Health and Human Services*

BACKGROUND: The NIH demonstrated that the Diabetes Prevention Program (DPP) is an effective way to prevent and reduce Type 2 Diabetes (T2D). The MT DPP is a group-based lifestyle intervention that includes 16 weekly and 6 monthly sessions for adults with prediabetes and other risk factors for T2D and CVD. To participate in the program s/he needs a health care provider's (HCP) clearance. Since 2012, MT Medicaid has reimbursed for the program. There are 18 on-site and 8 telehealth-site DPP locations. To our knowledge no studies have evaluated the referrals from HCP to the DPP. Using Geographic Information System (GIS) we aimed to identify spatial gaps in access to DPP sites, referrals patterns "from" and "to" DPP sites, referral provider caseloads and gaps in identifying potential referring HCPs. METHODS: The MT DPP utilizes the Primary Prevention System (PPS) database to manage participant information and HCP referrals. From the PPS, we selected 2.5 years of DPP referral data from January 2013 through June 2015 and validated the data for HCP's practice address. To determine Medicaid HCPs who referred patients to the DPP, Medicaid administrative data were linked to the PPS data by HCP's first, last and practice location. HCP's addresses were geocoded using ArcGIS online. SAS and Excel were used for data extraction collection, linking and analysis. RESULTS: After excluding approximately 40.0% of records with missing HCP's name and address, we geocoded 613 unique referring HCP to the county level from ZIP code. Of those HCPs, 16.0% referred to ≥1 DPP location. The distance varied greatly from 1 mile to 556 miles to which DPP location the HCP referred. Of those 613 referring HCPs, 62.0% were Medicaid HCP who referred to DPP. During the 2.5 year period, HCPs successfully referred a total of 2,529 (min. 1, max. 39, mean 4) high-risk adults into the DPP. After excluding 20.5% of records from the Medicaid dataset with HCPs who were not considered as valid referral source we identified 4,312 potential referring HCPs. Of those, 91.2% had not referred a patient to the DPP during those years. CONCLUSION: As the diabetes epidemic continues to grow, awareness, referrals, and access to the DPP will be necessary to promote healthy lifestyle strategies. Our findings suggest that more awareness needs to be done among HCPs especially Medicaid, promoting existing DPP sites and potentially expanding DPP on-site or telehealth-site locations to provide high-risk adults with prediabetes with increased access to the DPP.

Whitefish Recycling
Authors: Haley Burger, Barrett Gray - Eric Sawtelle, *Whitefish MT High School*

Examine recycling bin placement in downtown Whitefish based on existing trash and recycling drop sites. Present findings to City of Whitefish for implementation, enhancing the City's sustainability efforts.
Key Words: recycling, downtown Whitefish MT, waste reduction

Solar Potential of the Creekwood Development in Whitefish MT
Authors: Haley Burger, Emma Nixon - Eric Sawtelle, *Whitefish MT High School*

The solar potential of single dwelling homes in a neighborhood development in Whitefish MT is investigated using ArcGIS tools and LiDAR elevation data. Findings can help individual homeowners and the city in future climate smart planning efforts.
Key Words: solar radiation, urban planning, climate action

Historical Aerial Imagery of Malmstrom Air Force Base
Author: Jazmine Brown, *Malmstrom Air Force Base*

A comparison of aerial imagery of Malmstrom Air Force Base, MT between 1942 and 2015.
Key Words: Historical, imagery

2015 Idaho Wild-land Fire Season
Author: Jet Johstone, *Idaho Department of Lands*

Using Idaho Wild-land fire data from the 2015 fire season, I created a time-laps visual that displays the entire fire season into a 30 second video. The time-laps is on a one week interval and aids in visually displaying when where and when the fire season sped up.
Key Words: Fire, Idaho Department of Land (IDL)

Why Are My Property Lines Off? How the CadNSDI Improves the Accuracy of Ownership Parcels
Author: Maya Daurio, Keith Blount, Christian Hinderman, *Montana State Library*

The CadNSDI, commonly known as the PLSS, is the backbone of much of the property and boundary data in Montana. Much of the public and private land in the state at least partially follows the boundaries of the CadNSDI. When adjustments or accuracy improvements are made to the CadNSDI, much of this other data can also be improved. Ownership parcels are one of the more frequently accessed and viewed datasets, and there is a direct correlation between the accuracy of the CadNSDI and the accuracy of ownership parcels.
Key Words: CadNSDI, PLSS, parcels

CO-2 Transportation Emissions in Downtown Whitefish MT
Authors: Rachel Dunlap, Cevana Lawshe, Rose Madison, & Marisa Warnick - Eric Sawtelle, *Whitefsih MT High School*

We quantified CO-2 emissions from idling cars in downtown Whitefish MT and examine possible emission reduction strategies that involve transportation planning and design.
Key Words: carbon dioxide, emissions, transportation

O'Dell Creek Stream and Wetland Restoration
Authors: Selita Ammondt, John Muhlfeld, *River Design Group, Inc.*

Since 2005, River Design Group, Inc. has collaborated with resource agencies and landowners to develop and implement comprehensive stream and wetland restoration strategies in the O'Dell Creek Headwaters Wetland Complex southeast of Ennis, Montana. An important spring creek tributary to the Madison River, historical land management practices resulted in the degradation and loss of wetland habitats and physical changes to O'Dell Creek including channel downcutting and incision, bank erosion, and simplification of instream aquatic habitat. Projects have included reclaiming over 3 miles of irrigation and diversion ditches, reconstructing 10 miles of spring creek, restoring 576 acres of wetlands, and restoring or creating 35 acres of open water wetland features. These actions have resulted in significant improvements to aquatic and wetland habitat, benefiting species such as brown and rainbow trout, and neo-tropical migrant birds who utilize the O'Dell Creek project area for breeding, migration, and stop-over habitat.
Key Words: restoration, habitat, stream, wetland

Web Maps/Apps

Lewis and Clark County Public Health Licensed Establishment Viewer
Author: Jason Danielson, *Lewis and Clark County/City of Helena*

The Licensed Establishment Viewer provides locations and awards for food establishments in Helena and Lewis and Clark County.

Block Boundary Suggestion Project for Census 2020
Author: Leslie Zolman, *Montana Department of Commerce*

Story map detailing the Block Boundary Suggestion Project for Census 2020. Includes background information on why blocks were implemented by the Census Bureau for redistricting, how to get involved in the project and interactive maps that display the 2020 Census prototype blocks along with 2010 Census boundaries. All attachments within the map are also hosted in AGO.

Telling the Story of Refugees Through Esri Storymaps
Author: Verena Henners, *University of Montana*

This Esri Storymap represents spatial information about refugees arriving in Europe, focusing on data for the year 2015. The app combines different Storymap templates. It shows the refugees' main countries of origin, their main routes to Europe, the main countries in which they are seeking asylum, and how the number of refugees has changed from 2008 to 2014. Pop-ups and links are used to provide the user with additional information.

Wednesday Schedule

	American Room	Britain Room	Canadian Room	Montana/Alberta Room	Vendor Area
Session One 8:00 - 9:10	Education	Natural Resources	Local Government	Tribal	Vendor Booths
Break					
Session Two 9:40 - 11:30	Education	Natural Resources	Local Government	Tribal	

Lunch Buffet - *11:30 - 1:30*
Conference Address and Keynote Speaker

	American Room	Britain Room	Canadian Room	Montana/Alberta Room	Vendor Area
Session Three 1:30 - 2:40	Public Works	Natural Resources	Local Government	Tribal	Vendor Booths
Break					
Session Four 3:10 - 5:00	Public Works	Natural Resources	Local Government	Tribal	
Social 5:30 - 8:00	No-Host Cocktails, Banquet Dinner, Awards and Mapping with Lewis & Clark Presentation				

Presentations

Wednesday, Session One, 8:00-9:10 am

Moderator: Leslie Zolman

Sleepwalking into the Future: A World Without Spatial Thinking, Why GIS in Education and Society Matter
Presenter: Joseph Kerski

Abstract: The presentation will explore the significant effect of how a world lacking spatial thinking might address critical contemporary global and local issues such as natural hazards, energy, water, human health, agriculture and biodiversity. Kerski will illustrate how such issues affect our daily lives and demand transdisciplinary approaches and a spatial perspective to resolve.

Bio: Joseph Kerski serves as Education Manager for Environmental Systems Research Institute (Esri). He served for 21 years as Geographer at the USGS and at the US Census Bureau. He teaches GIS at the University of Denver, other universities, in K-12 schools, and in online courses, including MOOCs. Joseph holds three degrees in Geography. Passionate about spatial learning, Joseph fosters educational partnerships, promotes GIS in education and society through service and scholarship, and conducts courses on geotechnology in education internationally. He creates GIS research in the effectiveness and implementation of GIS in education.

Education Panel
Presenters: Joseph Kerski, Diane Papineau, Gerry Daumiller

Joseph Kerski will discuss trends and highlights in GIS in primary, secondary, university, and informal education around the world and in the USA, addressing the challenges that remain and the success stories that bring great optimism for the future.

Diane Papineau will discuss the MAGIP GIS Mentoring program, fostering peer-to-peer and classic career mentoring for members of MAGIP (GIS professionals, those entering profession, and other specialists who use GIS for their work).

Gerry Daumiller will discuss MAGIP scholarship and grant programs and how MAGIP promotes the exchange of geographic information technology to K-12 schools, colleges, universities and the public.

Wednesday, Session Two, 9:40-11:30 am

Moderator: Leslie Zolman

Treasure Hunt in the Treasure State: GIS Lesson Plan
Presenters: John Hogland, Melissa Reynolds-Hogland, Dalene Norman, Brandon Wood

Abstract: Geographic Information Systems (GIS) are used within a wide variety of professional communities to solve a vast range of spatial questions. While the complexity of these systems has historically limited their use to specialists, today just about everyone uses GIS. Examples ranging from onboard car and cell phone navigation systems to google maps and the daily weather forecast highlight how prevalent the technology has become in our day-to-day lives and demonstrate the ability of the technology to convey information quickly and efficiently. Despite the prevalence of GIS and its ability to answer questions and convey information, few K-12 schools teach or use GIS as a teaching tool.
As a teaching tool, GIS can be used to not only teach basic geography but can aid and enhance skills in reading, writing, math, science, problem solving, public speaking, computers, spatial thinking, data manipulation, and computer programming. At Frenchtown Elementary we have embarked on a project that uses GIS to aid in teaching. Through a detailed lesson plan and multiple exercises that use a GIS to answer spatial questions, students learn problem solving skills and how those skills can be used to find treasure in the treasure state.

Come join us on our treasure hunt as our students show their findings! Over the course of the project they have used GIS to map locations of gold mines in the 9 Mile Watershed, and they have created predictive maps of undiscovered gold using resource layers such as streams, vegetation types, and elevation. Along the way they have learned about the different methods that were historically used to extract gold, discuss whether or not those methods used 150 years ago still have an effect on water quality today, and have designed a spatially explicit science experiment to test this question. Their study design includes sampling water quality upstream and downstream of 3 gold mine sites in the 9 Mile Watershed. To get to those locations they will try out their newly honed orienteering skills using traditional compass and pacing and will learn about GPS technology. While navigating to their sample sites they will learn about map accuracy and determine the accuracy of their "Map of Undiscovered Gold" by panning for gold. Back in the classroom, students will be testing their water samples, evaluating the results, and determining whether or not heavy metals are still present in the 9 Mile Watershed. Through facilitated experiments and discussion, they are "discovering" that the greatest treasures in the Treasure State include not only shiny minerals like gold but also resources like clean water.

Samsung Solve for Tomorrow State Winner Presentation
Presenters: Suzie Flentie, Sam Fulbright, Josie Friesen, Collin Comes

Abstract: Students will present their project for the Samsung Solve for Tomorrow Competition. The project involves using STEM to solve a problem in the community. They are the state winners and have submitted a video for the national competition.

Bio: 8th grade science teacher at Lewistown Junior High School in Lewistown, MT GIS club instructor

Working Partnerships between Government Agencies and High School Students: A good way to get some extra work done and greatly benefit the education of the upcoming generation.
Presenters: Hans Bodenhamer, Gabby Eaton, Maddie Henley, Sierra Curtis, Catherine Roland

Abstract: Bigfork students are not taught GIS by traditional methods in which they develop skills they will later use on a project. They start with a project and then develop the skills they need. Furthermore, most student projects are conducted in partnership with a local agency or organization such as the US Forest Service or National Park Service. Often times the project tackles a task the agency doesn't have budget or staff to undertake. These projects provide the partnering agency with data and analysis that will help them make decisions to better manage natural resources. Students are highly motivated by this approach in which they are actually doing something "real". Students will present a few past and ongoing projects and the wonders, and challenges of the program and its unusual approach will be discussed.

Bio: Hans Bodenhamer teaches science and GIS at Bigfork High School. GIS has been offered at Bigfork for 9 years. Four of Hans' students will co-present. For more information on Bigfork's GIS program Google search "Bigfork High School GIS".

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Natural
Resources

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Wednesday, Session One, 8:00-9:10 am
Moderator: Elaina Graham

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Implementation Of A Field-Specific Spatial Data Monitoring And Analysis Framework To Optimize Input Use, Maximize Profit, And Minimize Environmental Impacts In Montana Cropping Systems
Presenter: Philip Davis

Abstract: Increasing adoption of precision agriculture (PA) technologies by farmers in Montana has led to an abundance of valuable spatial data that can be used to inform management decisions. Seeding, fertilizing, and weed control can be applied at variable rates (VR) across a field using modern farming equipment and data is collected automatically. By using VR technology a producer can increase profits by maximizing yield and reducing input costs. The most commonly varied input is nitrogen, often a farmer's greatest expense. Nitrogen is most often varied based solely on previous years' yield maps and the current year's yield goals. Although useful, yield data is limited, as it often co-varies with other drivers that influence crop yield. Additional information such as soil fertility tests, cropping history, weed density, and weather can and should be used in the decision making process to further optimize input efficiency. This is difficult, however, as significant obstacles exist for farmers and consultants in collecting, organizing, synthesizing, and analyzing these data. For example, agricultural companies force consumers to rely on their non-interoperable file types and proprietary data management software programs that often lack desired features.
In response, we have implemented an on-farm precision experiment (OFPE) to begin to address the lack of a free, non-proprietary data organization, analysis, and management recommendation software infrastructure. We have created a participatory research network (PRN) of interested farmers throughout the state to help us design and test our approach. Cooperators in the PRN will provide us with previous years' yield data, fertility treatments, herbicide treatments, and soil tests, and will manipulate nitrogen levels in two fields on each farm for our experiment. These data, in addition to derived products such as digital elevation models, topographic wetness indices, and climate data will help us to design the database schema, populate the database, parameterize models, and test the eventual graphical user interface through which farmers will be able to access and display their data in the future.
The greater OFPE project involves agricultural scientists, database design specialists, computer scientists

and agricultural economists. This presentation will focus on the challenges associated with first-level data collection and transformation to non-proprietary formats, yield data QA/QC and cleaning, creation of derived products, the various tools used to accomplish each step, and obstacles to overcome to reach the eventual goal of automating data flow from farm equipment to the OFPE user interface.

Bio: Philip works as a Research Associate at Montana State University on a large, interdisciplinary precision agriculture research project funded through a Montana Research and Economic Development Initiative (MREDI) grant. He works with an array of GIS software programs and spatial database management systems to collect, clean, store, analyze, and display the infinite stream of spatial data collected by modern precision agriculture technology. Philip also works intermittently as a GIS Specialist on environmental consulting projects for Intermountain Aquatics, Inc., based in Driggs, ID, where he has been employed since April 2011. Philip holds a M.S. in Land Resources and Environmental Science from Montana State University and post-graduate certificate in GIS for Environmental Management from the University of Toronto School of the Environment. Philip is a member of MAGIP and volunteers on the Membership and Education subcommittees.

Building Resilience: Expanding Pollinator Habitat in Dryland and Irrigated Agriculture
Presenter: Heidi Fleury

Abstract: I will be presenting my research project thats objective was to find the most suitable sites for implementing pollinator plantings in dryland and irrigated agricultural operations in the Mission Valley of Montana. To determine suitable plant species and prime habitat for the plantings, habitat characterizations for several types of flowering plants were completed using soil, aspect and land cover data. An irrigation type layer was created to overlay on the prime habitat sites to better understand irrigation driven vegetative characteristics of the valley as well to help rule out unsuitable sites.

Bio: I am a student at Flathead Valley Community College in the Natural Resources Conservation and Management Program. For the past two summers I have worked for the Natural Resources Conservation Service as a Soil Conservationist Trainee learning the ups and downs of federal conservation planning.

Natural Resources

Wednesday, Session Two, 9:40-11:30 am
Moderator: Selita Ammondt

The USFS Northern Region Existing Vegetation Spatial Database (VMap)
Presenter: Steve Brown

Abstract: Consistent, continuous, and current vegetation data are fundamentally necessary to support the ecosystem and land management assessment and planning process. The US Forest Service's Northern Region Vegetation Mapping Program (VMap) helps to meet this information need by providing the US Forest Service's Northern Region with a geospatial database of existing vegetation condition that is produced following consistent protocols that utilize the most current tools and technology available. VMap is a remote sensing derived product. As such, it uses a combination of satellite imagery and airborne acquired imagery. The image data (i.e., pixels) are put through a process of aggregation to derive spatially cohesive units (i.e., polygons). These polygons better reflect homogenous patches of vegetation rather than single pixels, providing land managers with a better inherent understanding of the spatial nature of the classification. A small proportion of these polygons are then sampled to determine

their composition and are used to develop spatial models that are then applied to the remaining area to derive probability based estimates of vegetation composition An independent accuracy assessment is conducted to provide a validation of the data, giving an indication of reliability of the map products, so that managers are fully informed throughout the decision making process. VMap is used for a variety of applications including vegetation analysis, wildlife habitat mapping, and others to support Land and Resource Management Plans and project planning and analysis. The VMap database is designed to be used for Forest and Landscape level analysis. However, the database is constructed so that it can be used at the project level with minimal additional work done by leveraging the local knowledge of Forest and District specialists. This presentation will illustrate the process that is undertaken to produce the VMap database across the Northern Region including: image selection and preparation, polygon derivation, field data collection, image classification, model verification, and examples of how the data is used to help support analysis and decision making with the Northern Region.

Bio: Regional Remote Sensing Program Lead USDA Forest Service Northern Region

A Comparison of NAIP/DEM and LiDAR Based Modeling of Forest Characteristics in the Rocky Mountains of Montana, USA
Presenters: Robert Ahl, John Hogland

Abstract: In recent years Light Detection And Ranging (LiDAR) has received a great deal of attention in the geospatial and natural resource disciplines. To date, analysts have successfully used LiDAR to measure multiple objects heights and are now learning to relate those heights to forest characteristics such as canopy dimensions, tree basal area, number of trees, and tree diameters. While LiDAR has shown promise in measuring forest characteristics, similar achievements have also been documented using National Agricultural Imagery Program (NAIP) digital aerial imagery in combination with the National Elevation Dataset (NED). Few comparisons, however, have been made between LiDAR based and image and elevation based relationships to estimated forest characteristics. In this study we compare LiDAR, NAIP, and NAIP assisted NED, with respect to their ability to estimate forest characteristic. We use a nested modeling approach, and Akaike's information criterion (AIC) to evaluate the relative strengths of the comparison datasets. Our finding suggest that there is a high degree of similarity in model fit and the ability to estimate forest characteristic when using LiDAR or NAIP and NAIP with NED.

Bio: Robert Ahl, PhD Remote Sensing Analyst RedCastle Resources / USFS Geospatial Group
John Hogland Biological Scientist USFS Rocky Mountain Research Station

Local Government

Wednesday, Session One, 8:00-9:10 am
Moderator: Annette Cabrera

Using ArcGIS Online to Create an Interactive Zoning Map
Presenter: Jeff Hedstrom

Abstract: The power of interactive maps on the web goes beyond points, lines & polygons on a computer monitor; it's an effort to relay data from your own GIS database to the public in varies different ways. One of the benefits of creating this interactive zoning map is nearly all skill levels can quickly know the zoning information and zoning boundary lines in a particular area or on a particular property location. This map is embedded on the City Planning Department's webpage and is frequently used by public.

Bio: Jeff Hedstrom graduated from Montana State University with a Bachelor's of Science degree in Earth Sciences, with a GIS emphasis. Jeff has been a MAGIP member for the past six years and is active involved in the Great Falls GIS community. He currently is the GIS Coordinator for the City of Great Falls (for the past 2 ½ years) and some of his duties within the organization are: maintaining the city's GIS database, creating & analyzing data for other departments & agencies, coordinates with other GIS & Engineering companies to ensure data accuracy and organizes the Great Falls GIS Meetup quarterly.

Utilizing Mobile Applications for Code Enforcement
Presenters: Jason Danielson, Greta Dige

Abstract: In 2014, the Helena Parks and Recreation's Code Enforcement Officer approached GIS Services requesting the development of mobile applications for field work. The Code Enforcement Officer is responsible for documenting and enforcing infractions for a variety of violations. After researching mobile options and capabilities, GIS Services created multiple theme-specific HTML5 applications providing 'live' editing in the field. The presentation will include an overview of the collaborative efforts between GIS Services and City of Helena Parks and Recreation to design the data and applications. The presentation will also include a brief review of Latitude Geographic's Geocortex Essentials application, and how the COTS (commercial off-the-shelf) software has been utilized for mobile applications. Lastly, we will provide a live demonstration of the applications while sharing best practices.

Bio: Jason Danielson is the GIS Database Analyst and Address Coordinator for Lewis and Clark County/ City of Helena GIS Services. His duties include the assignment and/or re-assignment of roads and addresses within Lewis and Clark County, the creation and maintenance of our enterprise geospatial data, providing GIS software/project support for existing clients within our enterprise, and the creation, maintenance, and management of our interactive mapping sites (Geocortex Essentials). He holds a Bachelor of Science degree in geography from the University of North Dakota (2000).

Bio:Greta Dige is the Code Enforcement Officer for the City of Helena Parks and Recreation Department. She holds a Bachelor of Arts degree in sociology from Carroll College (2003). She has been working for the City of Helena since 2007 for Parks and Recreation and Engineering departments. Her duties include enforcement of various city codes, noxious weed management for city properties, mapping (trail and park inventory and updates, fuel reduction projects, etc), webpage, social media, ADA audits, and so much more. She learned ArcMap while on the job and has been expanding her knowledge to become a power user. Over the last two years she has transitioned her complaint tracking from spreadsheets to multiple GIS mobile applications.

Local Government

Wednesday, Session Two, 9:40-11:30 am
Moderator: Eric Spangenberg

Public Comment Options in ArcGIS Online
Presenter: Corey Richardson

Abstract: This presentation will focus on four ArcGIS Online out-of-the-box applications for Public Comment. These applications allow for the general public and other interested parties to comment on proposed projects being heard by their local government. These projects could include upcoming road

construction, identifying problem intersections and areas of congestion, or perhaps a cities land-use proposal or sidewalks or bike lanes that need repair. These applications provide online mapping (hosted by ArcGIS Online or ArcGIS for Server), that enable users to submit comments anonymously, provide configurable pop-ups and forms, and are flexible in a smartphone, tablet, or desktop environment.

Bio: Corey Richardson is a GIS Analyst at the Montana Department of Transportation where he is currently the geodatabase administrator for MDT's SDE spatial data. He also publishes services through ArcGIS for Server and manages GIS projects for MDT's maintenance, Environmental, and Pavement sections. Corey previously worked for a consulting firm where he managed GIS projects for the Forest Service, BLM, and oil/gas companies. He has also worked on numerous state and county hazard mitigation plans where GIS analysis identified vulnerable populations that were at-risk to natural disasters. Corey is a certified Geographic Information Professional and is currently working on his capstone for his MGIS online through the University of Central Arkansas.

Public Involvement and Outreach
Presenter: Scott Randall

Abstract: No longer are PowerPoint presentations and public hearings enough to truly outreach and engage the public. As our audience becomes more technologically savvy, so too must our outreach efforts. This session will include a review and interactive presentation of GIS-based public involvement and outreach tools. The discussion will include online commenting platforms, presentation methods, open houses, and other methods to engage and outreach to the public.

Bio: Scott Randall, PE, is a Senior Transportation Engineer with Robert Peccia and Associates (RPA) in Helena. He has over 12 years of experience in the transportation industry focused on Traffic Engineering, Transportation Planning, and GIS implementation. He has previously served as the GIS Manager for RPA and currently manages transportation engineering projects throughout the northwest.

Leveraging ArcGIS Online to Support Local Governments
Presenter: Kyle Balke

Abstract: This presentation will explore how ArcGIS Online has been used to support several local government and conservation projects throughout the State of Montana including the City of Billings 2014-15 Long Range Growth Policy Update and the Rocky Mountain Elk Foundation land's access prioritization. Mr. Balke will also discuss some of the strengths as well as challenges to implementing real-world projects in ArcGIS Online.

Bio: Kyle Balke (GISP) is a Senior GIS Analyst with Geodata Services, Inc. and has 12 years of applied GIS experience working with local and state governments, engineering firms, conservation groups, and telecommunications companies. He has extensive experience in web mapping, GIS solutions, data maintenance and editing, project development, CAD and GIS integration, geodatabase design, python scripting, model builder, spatial and statistical analysis, cartography, and 3D modeling.

Federal Indian Lands
Presenter: Frank Desmond Rollefson

Abstract: An examination of the basis of land title in the United States via the Doctrine of Discovery, as it relates to Federal Indian Trust Lands and its enactment as Federal Policy via the Supreme Court Case 1823 Johnson v. McIntosh and later supreme court cases. Utilization of the Eighteenth Annual Report of the Bureau of American Ethnology to the Secretary of the Smithsonian Institution, 1896-97, Part 2, to plot with Geographic Information Systems successive Native American land cessions in the Rocky Mountain Region by Treaty and later Acts of Congress. Review of the effects of the General Allotment Act of 1887. Lastly to summarize the current status of Federal Indian Trust Lands and future implications for federally recognized Indian tribes.

Bio: Mr. Frank Desmond Rollefson Cartographic Technician Land Title & Records Office Rocky Mountain Regional Office Bureau of Indian Affairs Department of Interior 2021 4th Ave. North Billings, MT 59101 (406) 247-7993 Education: Bachelors Degree Biology, University of Montana, 1997 Masters Degree Resource Management, Central Washington University, 2003 Enrolled Member of the Northern Cheyenne Tribe, Montana.

Karterra
Presenter: Scott Close

Abstract: Karterra is a lightweight mobile mapping platform for the creation, interaction, and distribution, map content, providing instant innovation on or offline in a world far beyond city limits. In addition to a rich set of drawing and navigation tools, individual users and enterprises alike can distribute spatial content privately, publicly, or make available for sale in a new spatial marketplace. This Bozeman-based startup is creating a rich visual library of the world that surrounds us and seeks to change how the world interacts with 'where'... all in the palm of your hand.

Bio: Scott is a serial explorer. Recently leveraging the power of big data for research and mineral project generation throughout the continent, alongside the creation of a new field mapping platform that doubles as a visual map library in your pocket (Karterra), his work led to the recent acquisition and sale of a major-tier mineral belt in Canada and the discovery of three other 'go big or go home' district-scale gold, copper and zinc projects across north America. Scott holds a B.Sc from Montana State University and an M.Sc from Simon Fraser University in Vancouver, BC and is a professionally registered economic & structural geologist with over 10,000 hours of field experience. A mountaineer, computer coder, and general jack-of-all-trades, Scott recognizes that 'renaissance man' entrepreneurs have unique blends of experience and insights for the development of high-potential companies and technological solutions from the microscope to the world scale. A native Montanan, Scott and his family now live in Bozeman.

Crow Genesis - A Geographic History
Presenter: Jackson Old Horn

Abstract: This presentation will utilize Apsa'alooke(Crow) oral histories to illustrate Crow Geography. The origins of the Crow will be told starting with the Creation Story & mapping the Crow Migration Story. Crow place names & the stories behind them, will further illustrate the Crow connection to a landscape intimately known as the Apsa'alooke homeland.

Bio: Jack Old Horn is an enrolled Crow Tribal Member. He has worked for the Federal Government for 32 years. He served four years as a National Park Service Ranger at the Little Big Horn Monument, two years as a temporary employee in the Bureau of Indian Affairs Land Services and 26 years as a Cartographer for the BIA in Crow Agency, MT. He has been using GIS since 1991. Retired from the BIA in 2014, Jack now works for the Crow Tribe in the Land Management Department as a GIS Specialist. He continues to use ArcGIS as the primary tool to assist the Land Management Department in tracking and managing Tribal Lands, Tribal Range Units, preparing land holding maps for individual tribal members, assisting the Tribal Roads Department with strip maps and plans development. Jack has also been called upon throughout his career for fire control efforts as a hand crew member, Crew Boss, Engine Slug, GISS, & Initial Attack Incident Commander. In addition, he served as a Division Supervisor at Hurricane Andrew, Hurricane Katrina, Hurricane Bonnie and the great Crow Flood of 2011. Also, he has been called on to prepare maps for Search and Rescue efforts, Hazmat incidents, weather events, general planning purposes, and preparing public safety maps for cultural events.

Navigating Land Ownership Mapping on the Reservation
Presenters: Peter Gillard, Martin Zobel

Abstract: The Flathead Reservation recently received federal money towards the Fractionated Interest Buy-back program. CSKT and BIA land ownership records used in part, as justification for the grant. GIS was used as part of that application. CSKT land records, BIA land records, and the State of Montana cadastral layer were all reviewed in GIS as part of the assessment. This presentation will focus on some of the issues of mapping land ownership unique to the Flathead and possibly other Reservations, based on multi-jurisdictional land records.

Bio: Pete has been the GIS Program manager in Natural Resources on the Flathead Indian Reservation for the last 15 years. He has a master's degree in geography from the University of Wyoming and has been working with GIS in natural resources for the last 23 years. Pete has developed GIS training workshops, taught at the Salish Kootenai College in Pablo, MT. He has worked with the BIA, the FGDC and NOAA in developing GIS training throughout Indian Country.

Bio: Martin is a Cartographer at CSKT Natural Resources GIS Program working on a variety of projects in support of Tribal programs and departments. He looks forward to upcoming GIS Portal implementation at CSKT and recently participated in the Tribes' Climate Change Oversight Committee.

Keynote

Wednesday - 12:00 Lunch Program

Why GIS? Five Converging Trends

Presenter: Joseph Kerski, Ph.D., GISP, Esri and the University of Denver

Five converging global trends – geo-awareness, geo-enablement, geotechnologies, citizen science, and storytelling– have the potential to offer GIS a world audience that may be unprecedented in the history of the discipline. Issues central to GIS professionals are now part of the global consciousness. Everyday objects are rapidly becoming locatable, and thus able to be monitored and mapped. Tools and data that were formerly used and examined only by GIS professionals and earth and environmental scientists are now in the hands of the general public. Citizens are becoming involved in contributing data to the scientific community. Multimedia and cloud-based GIS have greatly multiplied the attraction that maps have had for centuries to tell stories. But despite these trends bringing opportunity to the GIS profession, is geoliteracy becoming increasingly valued? How can GIS practitioners seize the opportunity that these trends seem to present to actively promote geospatial content knowledge, skills, and perspectives throughout education and society?

Joseph Kerski serves as Education Manager for Environmental Systems Research Institute (Esri). He served for 21 years as Geographer at the USGS and at the US Census Bureau. He teaches GIS at the University of Denver, other universities, in K-12 schools, and in online courses, including MOOCs. Joseph holds three degrees in Geography. Passionate about spatial learning, Joseph fosters educational partnerships, promotes GIS in education and society through service and scholarship, and conducts courses on geotechnology in education internationally. He creates GIS-based curricula and conducts research in the effectiveness and implementation of GIS in education.

Wednesday, Session Three, 1:30-2:40 pm

Moderator: Jon Henderson

Asset Management Using GIS
Presenters: Jon Henderson, Tara Preston, Jamie Merrill

Abstract: The City of Bozeman employs a wide range of systems and technology to coordinate infrastructure improvements across all asset classes. This presentation will focus on the major components of a citywide asset management program including data collection techniques, work order management, risk modeling, performance analysis, and communication tools. Examples will demonstrate an effective means of extending the lifecycle of assets for both small and large communities alike.

Bio: Jon Henderson (GIS Manager), Tara Preston (GIS Analyst), and Jamie Merrill (GIS Technician) work for the City of Bozeman Public Works Department to support a wide variety of systems used to manage assets across the city. With over 25 years of combined experience, this team brings a wealth of knowledge and technical skills needed to achieve a well balanced approach to maintaining and coordinating infrastructure improvements.

Wednesday, Session Four, 3:10-5:00 pm

Moderator: Jon Henderson

GIS and Map Applications for the River's Edge Trail
Presenter: John Juras, Curt Swets

Abstract: This presentation will include a brief summary of the ongoing and future plans for keeping the River's Edge Trail the most excellent recreational trail system in Montana. Two GIS applications are currently being worked on to improve the trail. First is a tracking system to catalog and better maintain the trail through an active web based application that allows Trail managers real time access to Trail assets. Second is an interactive mapping application that will allow trail users to better navigate the system using hand held navigation devices.

Bio: John Juras, P.E. – John is an old school civil engineer at TD&H Engineering and long time advocate for bicycling and trails. He combines his passion for cycling with his professional engineering connections to help develop, promote, and maintain the River's Edge Trail. As President of the River's Edge Trail Foundation, John is constantly looking for ways to improve the Trail such as exploring ways to develop an interactive map of the Trail for multiple purposes.

Bio: Curt began working for TD&H Engineering as a surveyor in May of 2013. However, his main focus has been on drafting and the integration of GIS data and techniques into existing drafting processes and providing GIS data services throughout our firm and to various clients. He has a degree in GIS and Land Planning from Montana State University and has many years of GIS experience ranging from ecological landscape analysis while employed at Montana State University to GIS consulting and mapping for the telecommunications industry nationwide.

Getting Started with Asset Management for Medium to Micro Sized Localities
Presenter: Skyler Ryser

Abstract: Efficiently managing public infrastructure isn't limited to localities with larger populations and larger budgets. This session provides tools and best business methodology on how to get started with Asset Management at an organization of any size. The session will focus on asset management for streets, traffic signs, street lights, storm water, water and wastewater infrastructure. Topics will include tips on inventory collection, reactive and preventative maintenance, work and resource management, condition analysis and rating of assets and processing citizen service requests. • What is Asset Management and how do organizations benefit from it? • Case Studies • How to get started •   Cost • Questions

Bio: Skyler has been with Azteca Cityworks since 2011 fulfilling roles in documentation, client support, product analysis, and Account Mangement. His primary focus has been helping local governments achieve greater coordination, accountability and efficiency through implementing Cityworks as the Asset Management and Permitting solution. Skyler graduated from the University of Utah with a degree in Russian. And was also a member of the Air Force Reserves.

Mobile Resource Management in Today's Society
Presenter: Ken Winward

Abstract: As proven leaders in Mobile Resource Management solutions we offer both real-time GPS tracking mirrored with robust, enterprise level fleet management functionality. Leveraging a 20+ year Esri partnership to allow your current mapping investment to be a contiguous tool for information based decisions. Adding value to simultaneous operational cost reductions through current tracking of decreased response times, overtime minimizations, route optimization, and engine monitoring. Providing an instant improvement of safety and exposure to liability with managed accountably and increasing overall customer service with snapshot views of Asset Management. Information at your fingertips with an experienced 7th generation software platform for various applications and multiple viewer abilities. Encompassing the knowledge and the ability to track multiple phones, tablets, laptops, various vehicles, and Motorola radios.

Bio: Ken Winward is the Western US Sales Manager at CompassCom, a division of Compass Holdings based in Centennial, Colorado. CompassCom is a proven leader in Mobile Resource Management and GPS Solutions. Along with a gold partner and 20 year plus relationship with Esri, they are also an integrated partner with Azteca Cityworks. He brings with him over 20 years of Business Development and Consulting experience within the Public Sector. Including Public Safety (Police, Fire and EMS), Public Works, Utilities, and Fleet Management. As a frequent speaker he adds industry knowledge, experience, and technology along with a solid sales and marketing background. He is considered by his peers to be data-driven, open-minded, and also problem solving within his vast integrated network of associates. He maintains current membership in the International Association of Emergency Dispatchers, National Sheriff's Association, International Association of Fire Chiefs, International Chief of Police, and most recent, Rocky Mountain Fleet Managers Association. Born and raised in Idaho, he now lives in Castle Pines, Colorado with his wife Deborah, their children and dogs. He enjoys golfing, skiing, biking, and hiking (pretty much anything outdoors).

Wednesday, Session Three, 1:30-2:40 pm
Moderator: Selita Ammondt

The Ultimate Underground Experience: Cave Monitoring and Management with GIS and High School Students
Presenters: Hans Bodenhamer, Catherine Roland, Gabby Eaton, Maddie Henley, Sierra Curtis

Abstract: Members if the Bigfork High School Cave Club will present several examples of their GIS cave monitoring work. The presentation will explain field and related class room activities and demo maps that inventory biological, cultural, and mineralogical resources. They will show how GIS is used to track changes in the resources and suggest management activities to help conserve caves. For more background Google Search "Bigfork High School Cave Club"

Bio: Hans Bodenhamer teaches science and GIS at Bigfork High School and sponsors a Cave Club. The focus of the club is primarily conservation. Student members of the club have developed a GIS based method for monitoring caves that has garnered considerable recognition. In 2010 the club was awarded the President's Environmental Youth Award for their work in the conservation of caves in Glacier National Park. They were also invited to present at the opening ceremony of the International GIS Conference in San Diego. The club has developed GIS monitoring for over 40 caves throughout Montana. In 2012 and 2013 they were invited to establish monitoring for 16 caves in Grand Canyon Nation Park. More recently cub members have been working with the Montana Natural Heritage Program and many other natural resource managing agencies to develop a data base on Montana caves used by bats in the winter.

Modeling the Cost of Pipeline Oil Spills using GIS
Presenter: Scott Raznoff

Abstract: Over 5,500 significant pipeline accidents have occurred in the United States over the last 20 years, costing an estimated seven billion dollars (PHMSA). Pipeline operators actively manage their assets to reduce the likelihood and consequences of accidents. The ability to predict the consequences of pipeline accidents before they occur greatly aids operators in protecting their sensitive sections of pipe as well as the surrounding cultural and environmental resources. The goal of this study provides quantitative damage forecasting by automating and testing one damage estimation model. The Basic Oil Spill Cost Estimation Model (BOSCEM) was created in conjunction with the Environmental Protection Agency to provide a methodology for estimating oil spill costs. It breaks costs down into environmental, sociocultural and response categories and considers a number of factors which influence each. Many of the factors can be estimated using Geographic Information Systems. A workflow using publicly available datasets as well as pipeline rupture simulation outputs as inputs has been established. Python, a programming language, will be used along with ArcGIS to automate this process creating a consistent and repeatable tool. This is important for the pipeline industry because these features require many simulations along their entire lengths to be reliable. Finally, historic spills will be compared with the output of the tool to validate the methodology for forecasting oil spill costs. This project will contribute to pipeline GIS by providing one way to quantitatively model hazards associated with pipeline operation. It will also provide validation of the model by determining if it produces reasonable estimates for incidents of known cost.

Bio: Scott Raznoff is a GIS Analyst at Integrity Plus, a consulting organization for the Oil and Gas Pipeline Industry. He is based out of Helena, Montana. He is currently pursuing a MGIS degree through Penn State University's World Campus.

Wednesday, Session Four, 3:10-5:00 pm

Moderator: Catherine Maynard

A Federal And State Collaborative Effort To Produce Monthly Statewide And Basin-Specific Maps Of Montana's Snow And Water Supply Conditions
Presenters: Catherine Maynard, Troy Blandford, Meghan Burns

Abstract: For well over a decade (approx. 2002), the Montana State Library and the USDA Natural Resources and Conservation Service have collaborated to produce maps illustrating snow and water supply conditions across Montana. In 2016 maps were revised and new products created, and now seven statewide maps and 42 basin-specific maps are produced the first of each month and made available via the MSL Water Information web environment. This presentation will highlight the new products that are available, the federal and state partnership, the distributed work process, and how so many maps are produced in just a few hours using ArcMap data driven pages and scriptin. Snow and water supply maps are available at: http://mslapps.mt.gov/Geographic_Information/Maps/watersupply

Bio: Catherine Maynard is the State Geospatial Analyst for the USDA-NRCS in Montana. She currently specializes in using satellite imagery and other geospatial data to model and evaluate the extent and distribution of natural resource conditions. She has worked closely with the staff at the Montana State Library for many years to collaborate on GIS data development and data sharing. She is a member of the Montana Land Information Council (MLIAC) and acting steward of the MSDI Soils and Watershed Boundary datasets. Her educational background includes a Ph.D. in Land Resources and Environmental Science, Montana State University; M.S. in Soils and Forest Ecology, University of Montana; and B.S. in Environmental Science and Plant Ecology, Utah State University.

Bio: Troy Blandford is a GIS Analyst and the Water Information System Manager at the Montana State Library. He holds an M.S degree in Geography specializing in GIS and remote sensing and a B.S. in Environmental Science specializing in hydrology. He previously worked for the Montana Department of Natural Resources and Conservation, Water Resources Division. He is currently the MSDI Theme Lead for hydrography and has over 10 years of experience with applications of GIS in water resources.

Bio: Meghan Burns is currently a GIS Analyst with the Montana State Library (MSL). Formerly she was the GIS Manager for the Montana Department of Military Affairs in the Construction and Facility Management (CMFO). She holds a Master's of Science degree in Geographic Information Science and a B.S. in Biology from Michigan State University. Go State! Previously, she was a co-steward of the MSDI Wetlands layer as a Landscape Ecologist for the Montana Natural Heritage Program.

Glacier National Park: A study of Snow Cover Change over a 20 Year Span
Presenters: Ahna Miller, Bryan Buttigieg

Abstract: This study quantified and provided visibility to changes in snow cover in the month of April in Glacier National Park over a 20 year time period from 1995-2015. Satellite imagery of Glacier National Park was obtained from the USGS (EarthExplorer) Landsat TM and Landsat OLI images along path 41 and row 26 for selected dates in the month of April. A false color composite was created using Green, NIR, and SWIR and further analyzed using a snow cover index to distinguish snow coverage from cloud cover. Histogram analysis and cross tabulation of images was used to compare snow coverage between each of the 3 years. Image differencing, standard differencing, as well as standard class classification

were employed using IDRISI/Terrset to analyze the change in snow coverage. Results found that that the snow cover increased by about 3,000 km2 from 1995-2004 and had an overall decrease of about 7,000 km2 over the entire 20 year study. If the snow continues to melt at the rate it did from 1995-2015 without any strong snowfall winters (as seen in April 2004), there is potential that glaciers will be completely melted by the month of April within the next 9 years. There has been change in snow cover over the past 20 years, serving as a base study for future research looking at the effects of the change in snow cover on the local economy and ecology.

Bio: Ahna Miller is currently a student in the Geographic information Science for Development and Environment at Clark University. She has a background in aquatic biology and is applying this interest conducting spatial statistics research examining the distribution of damselfish post removal of a competitively dominant species in conjunction with the work of a PhD candidate for James Cook University. Prior to starting graduate school, she worked as a GIS analyst for an agriculture company in California creating a mobile application for data collection from the field. She also worked for the City of San Jose Public Works as a Geographic Systems Specialist working on data migration to ESRI Local Government Model and maintaining an E911 and city basemap database. After grad school she is interested in applying GIS and programming for web and mobile technology to environmental consulting.

Downloading Weather Station Data Using the MesoWest Application Programming Interface
Presenter: Braden Burkholder

Abstract: MesoWest has been a critical source of North American weather information since 1996. The MesoWest weather database functions as a data aggregator and relies on weather observing networks that are managed by government agencies, private firms, and educational institutions. In 2015, researchers and programmers at Mesowest released an API web service using cloud computing resources to provide greatly improved automated access to real-time and archived weather data. This powerful tool has opened the door to relatively straightforward access to vast quantities of reliable data for researchers, application developers, agency personnel, and commercial users. There are no costs to users to access the open-source data streams available from MesoWest.
This presentation will cover options for accessing Mesowest data, including brief look at legacy web-based data acquisition and an overview of the new API. An example of how the Montana Natural Heritage Program has downloaded and organized statewide weather data in a local spatial database will be shown, along with preliminary results relating those data to current research on bat ecology and management across the state.

Bio: Braden Burkholder is a Biological Data Analyst with the Montana Natural Heritage Program. He started his career chasing wildlife for various research projects across the U.S. and completed a Master's in Fish and Wildlife Management from Montana State University in 2012. Over the last 5 years, he has morphed into a GIS and database guru, with responsibilities ranging from managing millions of bat acoustic records to optimizing spatial data processing in Python. When he's not at his desk, Braden enjoys mountain biking, mountaineering, and exploring the wilds of his native Montana with his wife and daughters.

Wednesday, Session Three, 1:30-2:40 pm

Moderator: Eric Spangenberg

Open Data Strategies Round Table
Presenters: Brian Andersen, Montana Fish Wildlife & Parks, Montana State Library

Abstract: Discuss the main issues and ideas for the open data concept in Montana. Including data organization, data maintenance, metadata, available tools, data downloads, tabular vs. spatial, server loads, ArcGIS Online, State Investments and clearinghouses.

Bio: Brian Andersen has been a GIS Professional at the Montana Department of Transportation since 2000. While at MDT he has served as the GIS Lead and Project Manager. He is currently the Supervisor of the Road Inventory and Mapping section where he has a team of 10 employees that work with GIS and Databases. He is an active member and current vice president of the Montana Association of Geographic Information Professionals. Montana Fish, Wildlife & Parks provides for the stewardship of the fish, wildlife, parks, and recreational resources of Montana, while contributing to the quality of life for present and future generations. Montana State Library staff support State GIS Coordination and Guides the development and maintenance of the Montana Geographic Information Clearinghouse in Montana to ensure that this investment not only endures but is further expanded, strengthened, and utilized. MSL provides leadership and coordination in the conceptualization, development, and implementation of the Montana Spatial Data Infrastructure (MSDI).

Wednesday, Session Four, 3:10-5:00 pm

Moderator: Eric Spangenberg

The Status of the CadNSDI in Montana
Presenter: Maya Daurio

Abstract: Since November 2013, the Montana State Library Geographic Information Program has assumed custodianship of the CadNSDI, and in July 2014, published the first adjusted version of the MT CadNSDI. Since that time, we have published three more iterations. This presentation will cover the latest status of the CadNSDI, future areas of adjustment, and discuss how we're collaborating with various stakeholders to improve the CadNSDI in Montana and surrounding states.

Bio: Maya Daurio is a GIS Analyst with the Montana State Library and works with both cadastral and hydrography data as part of her job. She has done a little volunteering in humanitarian GIS and is interested in how crowdsourcing tehcnologies can benefit humanitarian efforts.

Coordinating Zip Code Boundary Lines Roundtable
Presenters: Jason Danielson, Jeff Hedstrom, Janelle Luppen, Jenny Connelley, Henry Hansen, Alan Serfoss

Abstract: The roundtable discussion will include professionals from multiple local governments to share their experiences with referencing and/or maintaining zip code (postal zone) boundaries. Consistent boundaries are vital in the creation of addresses and reference for mailing addresses. GIS zip code data and/or web services can be found at multiple resources, but each may represent disparate information. Without referencing a definitive source, governments may be utilizing arbitrary boundaries and providing inaccurate address and mailing address information. Presenters will share their own experiences within his/her local government, and discuss potential solutions.

Bio: Jeff Hedstrom is the GIS Coordinator for the City of Great Falls focusing on maintaining the city's GIS database, analyzing data for other departments & agencies, and coordinating with other regional GIS/Engineering companies to ensure data accuracy. He has a B.S in Earth Sciences with a GIS emphasis from Montana State University (2012) and has worked for the City of Great Falls for the past 2 ½ years.

Bio: Janelle Luppen is the Address Coordinator for Yellowstone County and primarily works on public safety-related data and app's. She's a 1999 graduate of Metropolitan State University in Denver and worked with an environmental consulting firm before relocating to Billings. She thrives on "pulling all the strings" to put a project or dataset together, and sharing what she's learned.

Bio: Jenny Connelley has been with Gallatin County GIS for 8 years. Experience with, knowledge of and ability to research public records are the qualities that Jenny brought to the GIS Department. As Program Assistant, Jenny has had the opportunity to use her research skills for everything from rural addressing, to land ownership, to creating zip code, historical fire district and condo layers for Gallatin County. Jenny enjoys challenges and using GIS to provide access to information for others.

Bio: Jason Danielson is the GIS Database Analyst and Address Coordinator for Lewis and Clark County/ City of Helena GIS Services. His duties include the assignment and/or re-assignment of roads and addresses within Lewis and Clark County, the creation and maintenance of our enterprise geospatial data, providing GIS software/project support for existing clients within our enterprise, and the creation, maintenance, and management of our interactive mapping sites (Geocortex Essentials). He holds a Bachelor of Science degree in geography from the University of North Dakota (2000).

Bio: Henry Hansen's technical expertise comes from both the Geographic Information Systems (GIS) and Environmental sectors. Some of his previous positions included working for the United States Geological Survey, Minnesota Department of Natural Resources, United States Fish and Wildlife Service, National Park Service, and the University of Wisconsin-Stout. Currently he serves as the Park County/ City of Livingston GIS technician. This position applies a diverse range of cartographic skills, spatial data management processes, and web based mapping solutions. Henry is dedicated to researching modern GIS workflows and adapting them to local government GIS. He also is a current Board of Director for the Montana Association of Geographic Information Professionals.

Bio: Alan Serfoss works for the U.S. Postal Service, he is the Postmaster for the Great Falls Office.

Wednesday, Session Three, 1:30-2:40 pm

Moderator: Matthew Lopez

Ksanka Fly-through
Presenter: Martin Zobel

Abstract: Preserving place and language. A potential project utilizing native language audio incorporated with reservation/homelands fly-through.

Bio: Cartographer at CSKT Natural Resources GIS Program working on a variety of projects in support of Tribal programs and departments. He looks forward to upcoming GIS Portal implementation at CSKT and recently participated in the Tribes' Climate Change Oversight Committee.

Using GIS Mapping for Montana Water Rights
Presenter: Kevin Bradley

Abstract: The Montana Water Court is tasked with decreeing all water rights for the State of Montana. Prior to 1973, all water was used on a first come, first served basis. With the rising population there was a rise in disputes. Montana passed a law in 1979 to move the state into a permit system. All water users had a deadline to file their historical water rights with the state.
The Montana Water Court was created to review and decree all claims into law. Claimants were instructed to over claim because it was easier to reduce a claim rather than increase. The Bureau of Indian Affairs is tasked to protect the trust interest for the reservations of the federally recognized tribes. The Water Court split the state up by water basin and systematically issues a preliminary decree for each basin one by one. The BIA reviews every single claim that may impact a tribe's reservation or interest. If the BIA objects, it has essentially entered into a court case with the claimant. Evidence has to be gathered to present to the court and disprove the water uses claim. The common items that are disputed are: ownership of the land, acres irrigated, priority dates, feasibility to irrigate, abandonment, etc.
With the use of ArcMap, the BIA can use aerial photos, measure current and historic areas of irrigation, upload Tribal Allotment information, overlay township-range-section data and upload ownership cadastrals to produce maps for the water court. These maps are a key piece of evidence in proving the BIA's case for objections. The Presenter, Kevin Bradley, will go through some examples to illustrate how the BIA uses ArcMap in court cases.

Bio: Water Resource Engineer, Bureau of Indian Affairs, Rocky Mountain Region, Water Resources

Wednesday, Session Four, 3:10-5:00 pm

Moderator: Matthew Lopez

Tribal Access To Information On Montana's Animals, Plants, and Biological Communities Through The Montana Natural Heritage Program's Web Applications
Presenters: Bryce Maxell, Linda Vance, Andrea Pipp, Dave Ratz

Abstract: The Montana Natural Heritage Program (MTNHP) was established by the Montana State Legislature in 1983 and charged with statutory responsibility for acquisition, storage, and retrieval of information documenting Montana's flora, fauna and biological communities (Montana Code Annotated 90-15). Information managed by MTNHP includes taxonomy, biology, ecology, and conservation status information for nearly 8,000 plant and animal species and nearly 150 terrestrial and aquatic communities, nearly 1.7 million animal observation records, over 182,000 locations where a formal structured animal survey protocol has been followed, predictive distribution models for animal and plant species, species occurrence and wetland and riparian mapping polygons that are used in environmental reviews, land cover mapping, and land management information. We deliver this information via staff facilitated requests and web applications that include the Montana Animal and Plant Species of Concern reports, the Montana Field Guide, the Natural Heritage MapViewer, and the Species Snapshot. In this presentation, we will provide a brief overview of how tribal biologists and natural resource managers can access information via our websites. We will also spend some focused time on recent updates to our Species Snapshot and Montana Field Guide applications that allow users to create custom species summaries and field guides using spatial, taxonomy, and conservation status filters.

Bio: Bryce completed his Ph.D. in Fish and Wildlife Biology in the Wildlife Biology Program at the University of Montana in 2009 where he completed a state-wide status assessment of, and constructed predicted habitat suitability models for, Montana's amphibian and reptile species and examined the population demographics of Columbia Spotted Frogs. During his time in Montana he has authored or coauthored three books, a dozen peer reviewed publications, and 35-plus professional reports on amphibians, reptiles, bats, small terrestrial mammals, birds, terrestrial mollusks, and fish. Bryce is passionate about making biological information available to resource managers and the general public so that Montana's plants, animals, and terrestrial and aquatic communities can be appreciated by current and future generations and is excited to lead Heritage Program staff in this endeavor.

Thursday Schedule

	American Room	Britain Room	Canadian Room	Montana/Alberta Room	Vendor Area	Lewis/Clark Rm.
Session One *8:00 - 9:50*	Mobile/ Online Technologies	Survey	Emergency Services/ NG-9-1-1	Tribal	Vendor Booths	
Break						
Session Two *10:20 - 12:10*	Mobile/ Online Technologies	Health	Emergency Services/ NG-9-1-1	Tribal		GISP Dr. Office *10:00 - 12:00*

Lunch Buffet - *12:10 - 1:30*
Poster Awards and 50/50 Winners

	American Room	Britain Room	Canadian Room	Montana/Alberta Room	Vendor Area
Session Three *1:30 - 4:00*	Mobile/ Online Technologies	Natural Resources	Military/ Volunteer	Volunteer	Vendor Booths
Break					
Summit *4:20 - 5:00*	Montana Summit				

Presentations

Thursday, Session One, 8:00-9:50 am
Moderator: Rob Ahl

Routing with Purpose- Bridge Permitting for Oversized Vehicles
Presenters: Miles Wacker, Dave Warner

Abstract: The Montana Department of Transportation permits tens of thousands of commercial motor vehicle each year to travel our roadways. When weights exceed those allowed by the Motor Carrier Department, permits are forwarded to the Bridge Department for review. In 2001, 302 permits needed Bridge approval, while 3,000 permits in 2012 needed bridge approval. The exponential increase over the last decade is mainly due to oil exploration. Much of the time spent in bridge analysis was using manual methods to determine which bridges a truck crosses on a given route. The most recent bridge inspection notes and load ratings all needed documenting prior to actual bridge analysis for capacity under an overweight permit. This was a manual process involving old platted maps, and PDF maps when Dave took over. Road inventory names and mileposts were entered in a 20 year old Oracle query, one road at a time. Miles and Dave collaborated and MDT Engineering and Information Services partnered to develop an application using the AGILE methodology. The resulting tool is as easy to use as the commonly understood google maps direction tool we all know so well. On the back end our tool performs a geospatial query finding all bridge locations within 200 meters of the requested route of travel. Workloads were cut by 10 to 100 times from previous methods. The application automates the routing process, thereby significantly increasing the productivity of the permit Engineers. Using the Google Maps API to generate the routes, MDT coupled ArcGIS Server Geoprocessing Services within a Spring-MVC application to analyze routes, track bridges, permits, query and compare bridge conditions, and help the process run more efficiently. The programs cousin is being developed which will do over height checks for clearances under bridges.

Bio: Miles Wacker is a Geospatial Systems Analyst for the Montana Department of Transportation. Miles has over 10 years of GIS experience and recently renewed his GISP. Miles is primarily responsible for application development and enterprise architecture, with experience in database management, mobile applications, GPS, cartography and Remote Sensing.

Bio: Dave Warner is a Professional Engineer working in the Bridge Bureau of the Montana Department of Transportation. With MDT Dave has 7 years of seismic bridge design. Dave currently has over three years' experience granting overweight permits for vehicles passing through Montana. Dave also is a bridge load rater, served as the AASHTO Bridgeware secretary for 6 years, and earned the Governor's award for Excellence in 2009 for implementing energy saving measures.

DEQ Mobile – A DEQ GIS integrated solution
Presenter: Nat Carter

Abstract: The Montana Department of Environmental Quality (DEQ) charged its GIS Program to provide a solution to implement field inspection workflows and collection forms specific to each DEQ Program

while using a common platform to increase the ease of implementation and knowledge transfer for everyone involved. Based on previous coordinated efforts across the Agency using a variety of field and data management tools, DEQ Mobile was developed to alleviate many pain points of the field staff in data collection as well as data management and synchronization to DEQ's GIS when back in the office. DEQ Mobile is an in-house developed solution with the ability to collect, collaborate, and verify spatially attributed data using a wide variety of mobile devices while synchronizing across all systems, field and office, in a transparent process to the user. It was determined that a combination of Software as a Service (SaaS) offerings integrated with DEQ's GIS at the core would be used to meet the three primary components of DEQ Mobile; the Mobile Data Collector, the Mobile Project Manager, and the Spatial Data Reviewer. The Mobile Data Collector and Mobile Project Manager components were developed within AmigoCloud due to their open API framework, wide variety of supported mobile devices, and easily customizable data collection forms that could synchronize with DEQ's GIS, an ESRI ArcGIS Geodatabase based system. The Spatial Data Reviewer component was developed with ESRI ArcGIS Online managed web mapping applications against DEQ GIS sourced web services to provide field staff and data quality technicians easy web based tools to view and flag spatial data for further review or approval. Once approved, the collected data is promoted to DEQ's Production Geodatabase for use by internal GIS Analysts as well as updates to other business managed and reporting systems. Providing a customizable mobile app and platform that could be effortlessly synchronized with DEQ's GIS has resulted in a very efficient development and deployment solution that can be managed by DEQ's GIS Program limited staff as well as increased acceptance and integration with those that use it in the field and back in the office.

Bio: Nat Carter has been serving Montana DEQ for 8 years as its GIS Coordinator performing needs assessments, consultation, and solution implementation at an Agency and individual Program level. By working closely with staff from the users to upper management he has helped coordinate and expand the use of spatial solutions throughout the Agency meeting a variety of needs. Throughout his tenure, DEQ's GIS has grown into an enterprise wide GIS supporting not only seasoned GIS Analysts but also those who collect the data in the field and the management and policy makers they support.

Integrating ArcGIS Collector into Field Work Workflows: Annual Field Inventory of Roads
Presenter: Erin Fashoway

Abstract: This presentation will highlight the process of integrating new mobile technologies that utilize ArcGIS Online disconnected editing for collection of Montana road data. MDT utilized ArcGIS Collector on tablet/iPad devices to successful complete their annual Field Inventory. The presentation will detail the setup, actual collection, QA/QC, and the integration of data. We will also offer recommendations for usage and the lessons learned through the process.

Bio: For the past 10 years Erin Fashoway has worked for the state of Montana. Currently, she is a GIS Analyst for the Road Inventory and Mapping Section of the Montana Department of Transportation. Her previous roles with the State include the Montana Spatial Data Infrastructure Boundaries Lead/GIS Analyst at the State Information Technology Services Division and the Montana State Library. Prior to venturing to the Big Sky Country, Erin lived and worked in the Buckeye state, Ohio, where she is originally from. There she worked for the Northwestern Water and Sewer district and Esri. Erin holds a bachelors in Geography and masters in City and Regional Planning.

Thursday, Session Two, 10:20 am -12:10 pm

Moderator: Michael Clancy & Jeff Hedstrom

Automating the Export and Organization of Attachments from Collector
Presenter: Curtis DeVault

Abstract: With the rise in use of Esri's Collector for ArcGIS we have been faced with the need to get our attachments out of the geodatabase where non-GIS users can use them. Our client required the staff in the field to take a specific number of photos, organize them, and rename them in a certain manner. The process I developed allows the staff in the field to take those photos in the set order but not have to spend hours in the office manually renaming and and reorganizing them for delivery to the client. I will discuss the process I developed that takes a geodatabase exported from ArcGIS Online and automatically creates the required folder structure, renames and numbers each photo, and places that photo in the correct folder.

Bio: Curtis is a graduate of Montana State University in Bozeman. He received his degree in Earth Science with an emphasis in GIS/Planning in 2014 and is currently a GIS Specialist with Pioneer Technical Services in Bozeman.

Troubleshooting iPads for Geologic Field Mapping Instruction
Presenter: Nicholas Fox

Abstract: Field mapping instruction in geology has traditionally been by hand, but with the advent of powerful applications and ease of portable tablets professors have been experimenting with how to integrate digital mapping with traditional techniques. This presentation aims to provide the steps and troubleshooting involved with the FieldMove (Midland Valley) application in preparing iPads, in-field use, and post processing of data . The application has made in-field use simple, however the pre and post-processing has posed several obstacles. These include preparing multiple iPads, loading geo-referenced maps, and disseminating information from iPads that is beneficial to the student's work and can be reviewed by the professor.

Bio: Nicholas Fox is a Master's of Earth Sciences candidate at Montana State University, Bozeman, where he works as a Teacher's Assistant in the GIS curriculum. Mr. Fox has 5 years experience in unconventional oil and gas and mitigation with Advanced Resources International and graduated with a Bachelor's of Science in Geology from Washington and Lee University in 2009.

MARLS
Presenter: Dan Stahly

Abstract: Montana Association of Registered Land Surveyors (MARLS) is a statewide organization representing the majority of professional land surveyors licensed to practice in Montana. The true merit of a profession is determined by the value of its services to society. The Montana Association of Registered Land Surveyors dedicates itself to the promotion and the betterment of the profession of land surveying as a social and economic element vital to the welfare of society.

Mission Statement -MARLS was founded in 1963 as an organization dedicated to the objectives:
- To promote the common good and welfare of its members and the public in the profession of land surveying.
- To advance the study of land surveying and the education of land surveyors.
- To promote public knowledge, faith, and reliance in licensed professional land surveyors and their work.
- To foster and maintain high standards of professional ethics in the practice of land surveying.
- To foster and support legislation generally beneficial to the profession and to the citizens of the state of Montana.
- To promote closer relations, understanding, and cooperation within the profession.
- To establish better relations between the land surveyor and other professions interested in land surveying.
- To aid and encourage the interest of associate and student members of the association.

Bio: Dan Stahly, PLS, works in Bozeman, Montana, for Stahly Engineering and is the Montana Association of Registered Land Surveyors current 2016 - 2017 president. He is also a Past-President of MARLS and has served on the MARLS Board of Directors for many years in various Board of Director and Committee chair positions. He has presented several land surveying seminars throughout Montana to associations affiliated with professional surveying.

Coordinate Systems: Grid To Ground and Why It Matters
Presenter: Curt Swets

Abstract: As creators and consumers of GIS data, most individuals in the field of GIS recognize the need to understand the basics of coordinate systems and how to transform data among the many available options. This presentation will look into the differences between "grid" coordinates and "ground" coordinates, why they matter, why it is essential to ensure a correct transformation and what can go wrong when done incorrectly.

We will look into the fundamental relationship between the two coordinate systems and how they differ. By understanding the relationship between them and how they differ "in the real world", we can ensure we are producing the best possible product for ourselves and our clients. We will explore some of the methods and tools used to convert one system to the other – and back again for additional data usability. Finally, we will look at potential error that could be introduced into our projects by an improper use or understanding of the two systems.

Understanding the differences between these two coordinate systems is key to minimizing error and lost time on projects that require data to be moved between systems. By understanding the ways they relate to each other for our region and how to manipulate information between the two systems we hope to save time and eliminate potentially costly errors.

Bio: Curt began working for TD&H Engineering as a surveyor in May of 2013. However, his main focus has been on drafting and the integration of GIS data and techniques into existing drafting processes and providing GIS data services throughout our firm and to various clients. He has a degree in GIS and Land Planning from Montana State University and has many years of GIS experience ranging from ecological landscape analysis while employed at Montana State University to GIS consulting and mapping for the telecommunications industry nationwide.

A Brief History of Land Surveying and the Public Land Survey System
Presenter: Matthew D. Morris

Abstract: This session is designed to offer an informative discussion on the practice of land surveying and the history and the development of the Public Land Survey System utilized throughout the Western United States of America. A brief discussion on the history of land boundary surveying will provide the basis for the discussion on the development of the Public Land Survey System, this history will include a discussion on metes and bounds descriptions created prior to the Public Land Survey System. The PLSS (rectangular system) will be discussed including the following principle elements of the system; initial points, guide meridians, standard parallels, quadrangles, fractional townships, and sections. Case examples will be utilized to discuss the subdivision of townships and sections, including discussion on fractional sections, government lots, meander lines, and land grants. The course will focus on defining the elements of the Public Land Survey System with an emphasis on the legal description and subdivision of lands within the public land survey system.

Bio: Matthew D. Morris, a licensed Professional Land Surveyor, has a bachelor's degree in Construction Engineering with both a Business Administration Minor and course work in Land Surveying from Montana State University in Bozeman, Montana. Mr. Morris began his surveying career while studying at Montana State University. After college graduation, Mr. Morris joined Pierson Land Works, LLC in Jackson Wyoming performing multiple tasks associated with surveying. Gaining Licensure as a Professional Land Surveyor in Montana in 2007, Mr. Morris also obtained the credentials to be a Certified Federal Land Surveyor and has obtained Licensure as a Professional Land Surveyor in Idaho and Wyoming. Mr. Morris is active in the Montana Association of Registered Land Surveyors and was elected as the President of the North Central Chapter of the Montana Association of Registered Land Surveyors in 2009, in 2012 was elected to be the President of the Montana Association for the 2013-2014 term, and in 2014 appointed as the Montana Director for the National Society of Professional Surveyors from Montana and elected to the same office in 2015.

GISP Doctor Office
Thursday, 10:00 am -12:00 pm

GISP Dr. Office

GISP Doctor: Leslie Zolman

Are you currently working on your GISP application? Thinking about applying for your GISP? Or do you just want more info about what a GISP is? Then come to the Doctor Office and have a certified GISP answer your questions, help with your application, talk about the new test or review your completed application. Drop by with your questions anytime Thursday between 10:00 and 12:00. Or, make an appointment to review your application or to speak one-on-one about GISP by emailing Leslie Zolman at lzolman@mt.gov. For more information on Leslie, see her bio on page 3.

Thursday, Session Two, 10:20 am -12:10 pm

Moderator: Jessie Fernandes

Geocoding a public health surveillance system: the Montana Central Tumor Registry experience
Presenter: Laura L Williamson

Abstract: Background: Public health has recently discovered the importance of including "place" as a data element in surveillance systems. As of late, central cancer registries throughout North America have begun to geocode patient-level data using a standardized geocoding tool. Montana, a frontier state, has had trepidations about geocoding personal health information for security and utility concerns. The aim of this study was to describe the quality of geocode results and to describe the utility of reporting cancer incidence by Census tract in Montana.
Methods: Montana Central Tumor Registry cases diagnosed in 2008-2013 were geocoded using the North American Association of Central Cancer Registries' geocoder, housed at Texas A&M University, in September 2015 to assign Census tract, county, latitude and longitude. Certainty codes were assigned based on quality of Census tract and GIS coordinate assignments.
Results: Geocode results were produced for 99.9% of cases (39,048/39,094). 79.6% of cases were geocoded based on street address while 15.5% of cases were geocoded based on PO Box ZIP codes. Geocoded county did not match reported county for 342 cases (0.9%). For all analyses, geocoded county derived from street address was used rather than reported county. County reconciliation resulted in a case count percent change that ranged from +22.5% to -5.7%; this did not result in a statistical change for all-site age-adjusted incidence rate for any county. Reporting of 5-year all-site incidence data by Census tract would allow for 95.9% of tracts to report an age-adjusted rate and suppress 1.5% of tracts due to small numbers (<5 cases). Census tract reporting of prostate, breast, lung, or colorectal cancer would require suppression of 11.8% -21.4% of tracts.
Conclusions: Geocoded results show that reported county of residence was misclassified for a small percentage of cancer cases in Montana but this has negligible effects on incidence estimates at the county-level. Sub-county level cancer incidence estimation can be achieved for the most common types of cancer which would be beneficial to state and local public health officials. Other surveillance systems in frontier states should consider geocoding their data.

Bio: Laura Williamson is an epidemiologist and program manager for the Montana Department of Public Health and Human Services. Ms. Williamson has worked on a variety of chronic disease and health behavior issues, including: cancer control, tobacco control, and physical inactivity. Presently, Ms. Williamson manages the Montana Central Tumor Registry and provides program evaluation services to Montana's Cancer Control Programs. Prior to moving to Montana, Ms. Williamson was a researcher with the Centers for Disease Control and Prevention's Division of Nutrition, Physical Activity, and Obesity. Ms. Williamson holds a Master of Public Health degree in Epidemiology from Emory University in Atlanta, Georgia.

Sub-County Assessment of Life Expectancy: Lessons from Montana
Presenter: Cody Custis

Abstract: Life expectancy offers a single, universal, measure of health care. The Sub-County Assessment of Life Expectancy (SCALE) project was designed to look at life expectancy for small areas in large urban counties. Due to Montana's relatively small population, SCALE was used to look at county

level life expectancy in Montana. This presentation discusses the process of creating SCALE estimates for Montana, along with opportunities and challenges in representing life expectancy in Montana.

Bio: Cody L. Custis is the Montana Hospital Discharge Data System Epidemiologist, and previously worked as the natality statistician at the Montana Office of Vital Statistics and an instructor in mathematics at UM-Helena and Carroll College. He received his BA in Mathematics and Economics from the University of Montana, and MS in Statistics from Montana State University. He is a Certified Base Programmer for SAS 9. An avid ultra-runner, he has completed many events, including the Spokane River Run, Trail Rail Run, and the HURL Elkhorn Endurance Run.

Montana Tobacco Retailer Mapper
Presenter: Lisa Schmidt

Abstract: Big tobacco can't advertise on T.V. Or billboards. Or newspapers. Or magazines. Instead, tobacco companies spend $7.8 billion in the retail environment. The Tobacco Use and Prevention Program of the Montana Department of Public Health developed the Montana Tobacco Retail Mapper story map to show what's in store for the state's youth. This interactive map explores retail point-of-sale issues relating to youth, demonstrates the relationship between tobacco retailers and K-12 schools, and exposes the density of tobacco sales in political jurisdictions. The map series story map includes a custom selector to choose and display any of the administrative units and a link to access customized PDF reports. A journal story map is embedded in the master tabbed story map and included additional spatial analysis to assist in understanding data attributes related to tobacco use.

Bio: Lisa Schmidt is the epidemiologist/evaluator for the Montana Department of Public Health, Healthy Lifestyles Section. She monitors and analyzes data from multiple surveillance systems to help develop program goals and outcomes. Lisa has lived in Montana for four years and is originally from the Great State of Iowa.

Emergency Services/ NG-9-1-1

Thursday, Session One, 8:00-9:50 am
Moderator: Jenny Connelley

SituationAnalyst from a GIS perspective
Presenter: Tom Kohley

Abstract: SituationAnalyst (SA) is a web-based, spatial decision support tool that provides a common operating picture of active all-hazard incidents in Montana. The system is designed to support Incident Command System (ICS) functions including operations, plans and public information. This presentation will provide an overview of SA with emphasis on the "back end" GIS components of the system. A demonstration of how map layers from ArcGIS Online can be brought into SA to support incident management will be provided. Also demonstrated will be SA specific field data collection tools to assist fire operations and home risk and damage assessments.

Bio: Tom Kohley is the Disaster & Emergency Services Coordinator, Fire Warden and GIS Coordinator for Carbon County. He is a lieutenant with Red Lodge Fire Rescue and is a member of the County Assist and

Southern Montana Incident management teams. Tom likes wildland fires.

Preparing GIS Data for Next Generation 9-1-1
Presenter: Michael Fashoway

Abstract: Next Generation 9-1-1 will fundamentally change how GIS data are used in 9-1-1 communications. While much remains to be decided about how Next Generation 9-1-1 (NG9-1-1) will be implemented in Montana, that doesn't mean local governments and those responsible for maintaining 9-1-1 GIS data can't start to prepare for NG9-1-1 today. This talk will focus on the GIS datasets needed for NG9-1-1 and recommendations for steps that can be taken now to get local government GIS data ready for NG9-1-1.

Bio: Michael is a GIS Analyst and the Land Information Lead at the Montana State Library. Since 2007, Michael has been building and maintaining a statewide database of structure and address points based on local, state, and federal government datasets.

Identifying Errors in Dispatch-Dependent Datasets, and Other Tricks to Help with Accurate Geo-location Processes
Presenter: Janelle Luppen

Abstract: Tips and tricks will be presented to help identify errors in addresses, address ranges, zipcode and emergency service zone data that can stymie efficient dispatch operations. This information can benefit users regardless of where they are in their data development cycle, and is especially useful for counties who do not have the luxury of assigning addresses via the frontage-interval method. There will be particular focus on MSAG and phone customer database reviews, and how to get corrections to phone service providers and into your MSAG.

Bio: Janelle Luppen, GIS Project Coordinator and Address Coordinator for Yellowstone County GIS and primarily works on public safety-related data and app's. She's a 1999 graduate of Metropolitan State University in Denver and worked with an environmental consulting firm before relocating to Billings. She thrives on "pulling all the strings" to put a project or dataset together, and sharing what she's learned.

Emergency Services/ NG-9-1-1

Thursday, Session Two, 10:20 am -12:10 pm

Moderator: Jenny Connelley

GIS data readiness for NG9-1-1
Presenter: John Joseph

Abstract: In the future GIS data will play a critical role in the deployment NG9-1-1 systems. By geospatially routing calls to the PSAP (Public Safety Answering Points), Police, Fire, and EMS can save valuable seconds and countless lives. This is why the requirements for GIS data quality are so extremely high. Today is the day to begin preparing GIS data for its key role in a successful NG9-1-1 system. This session will cover how to approach the NG9-1-1 transition in three steps: Assess, Improve, and Maintain. Attendees will learn why consistent GIS data across a jurisdiction, region, or state will be the key to a successful NG9-1-1 system, and the steps to take to assess NG9-1-1 GIS readiness. Once an initial assessment is complete, the session will cover how jurisdictions will begin to improve the GIS

data for its mission critical role in an NG9-1-1 system. Finally, attendees will discuss maintenance plan implementation, a necessary step to ensuring the ongoing, quality, consistency, and integrity of local, regional, and statewide GIS datasets. There are many steps to consider and plan for and this session's objectives will focus on what is needed to begin on the NG9-1-1 GIS data readiness path.

Bio: John Joseph is the Regional Sales Consultant for GeoComm based in Seattle, WA. John has worked in the GIS industry for 18 years, supporting the needs of GIS Professional in the Public and Private Sector. Over the last 4 years John has been supporting the needs of the western region, serving communities from Arizona to Alaska and all points in between. John is passionate about Public Safety and brings a unique mix of experience to the industry. Throughout his career, John has worked to find new and innovative ways for GIS to make a positive impact on the world around us. As an advocate for GIS in Public Safety he works closely with industry leaders, helping agencies embrace the challenges of NG9-1-1. His goal is to help agencies answer the question: Are we ready for NG9-1-1, and what will it take to get us there?

NWS Role in Wildland Fire Operations
Presenter: Bob Hoenisch

Abstract: National Weather Service (NWS) support to fire crews dates back over 60 years with support composed of spot forecast for prescribed burns and fire incidents, annual pre-season briefings to fire crews, fire weather watches and Red Flag warnings. In addition, most NWS offices have specially trained forecasters called Incident Meteorologists (IMETs) that can be deployed to Incident Command Posts. A close working relationship between NWS staff, deployed IMETs and fire crews allow for detailed and site-specific weather support that expands NWS support capabilities.
 A Type 1 IMET deploys with robust forecast support capabilities, which include but are not limited to a portable weather station and radiosonde equipment, satellite data link and laptop computers. While dispatched, IMETs work side-by-side with fire behavior analysts to predict weather and fire behavior effects on small spatial and temporal scales. High-resolution fire behavior models require detailed weather data to maximize accuracy as well as aid in decision-making for fire line operations and asset allocation.
 Because complex terrain and weather affects wildfire behavior, IMETs must have a solid understanding of GIS components such as topography, maps and high resolution hydrologic, wind and precipitation data. Shapefiles and KML files are used to measure and track burn areas, provide current fire status/location info and also to predict flash flood or debris flows. This presentation will discuss the role of IMETs and GIS utilization in wildland fire operations.

Bio: As an Incident Meteorologist, Bob has traveled across the western U.S. to provide on-site support to fire Incident Command Posts. Bob's passion for weather began as he was growing up in eastern Pennsylvania where he was exposed to various weather extremes from severe summer thunderstorms to winter blizzards. He followed his passion and earned a Bachelor of Science in Meteorology from Millersville University. After working in the private sector, Bob began his NWS career in Elko, Nevada arriving in Great Falls in 2006. Outside of the office, Bob enjoys hunting and camping in the mountains across central Montana.

Web application development: A closer look into geoprocessing widgets
Presenter: Giovan Alcala

Abstract: Taking a look at Feature Sets and how users can use geoprocessing tools to predict an event. Journeying through the "Fiber to the Home" project as an example. From model creation, incorporating a feature set, to publishing a geoprocessing service. The examination of Web AppBuilder, Developer, and a little bit on JavaScript. All to help GIS professionals use predictive models on web applications by demonstrating a step-by-step process.

Bio: My name is Giovan Alcala, I'm the GIS Analyst for the Coeur d'Alene Tribe. I working on various GIS projects from creation of maps to geoprocessing and web development. I have a Bachelor's degree from the California State University of San Bernardino in Anthropology with a minor in GIS. A Master's degree from the University of Redlands in GIS. I have also presented at the 2015 ESRI conference regarding my thesis: "Redlands University Emergency Response, Indoor Navigation Prototype".

Portal for ArcGIS: A Tribal Perspective
Presenter: Berne Jackson

Abstract: Cloud computing seems to be the wave of the future, but for many Tribal governments, giving up physical control of their data is difficult or impossible due to Tribal policy constraints. ESRI's ArcGIS Online is a great way to create, organize and host an organization's web maps, but it is a cloud based system and, therefore, may not be suitable for all organizations. ESRI's Portal for ArcGIS is a way to have all of the advantages of ArcGIS Online and retain that "physical" hosting of both data and web applications. Berne Jackson, Senior GIS Analyst and GIS System Manager for the Coeur d'Alene Tribe will discuss the Coeur d'Alene Tribe's experience of installing, setting up and using Portal for ArcGIS.

Bio: Berne Jackson is the Senior GIS Analyst/GIS System manager for the Coeur d'Alene Tribe in North Idaho. Mr. Jackson has over 20 years' experience with GIS, most of which was spent working for the Coeur d'Alene Tribe. He has extensive experience in geographic analysis and cartographic production. His early work for the Coeur d'Alene Tribe focused on data collection and analysis for the Coeur d'Alene Basin NRDA (Natural Resource Damage Assessment) and worked extensively with the other members of that NRDA, including U.S. Fish and Wildlife Service, U.S. Geologic Survey, U.S. Bureau of Land Management, U.S. Forest Service and the Environmental Protection Agency. In recent years, he has been focusing on the creation and maintenance of a large, enterprise SQL Server based GIS, and web-based GIS and mapping using ESRI's Server and Portal for ArcGIS for the Coeur d'Alene Tribe. He has also taught occasional classes for the University of Idaho in GIS analysis and web-based GIS.

Creating an Atlas using Data Driven Pages
Presenter: Sabine Krier

Abstract: Tribal police or the fire crew is dispatched to resolve an issue in a certain area of the reservation that is not very familiar to them. Plus, they need to communicate with dispatch. A handy reference atlas can help a lot. Instead of producing every individual map separately, which can take

forever, ArcMap's Data-Driven Pages allow you to quickly and easily create a series of layout pages from a single map document. This significantly improves the efficiency of such a task. Using examples, we will discuss the different types of map books and how to set up the index layer and basic elements for a simple atlas. We will demonstrate additional useful tools and settings to improve the map, like a locator map insert, labeling adjacent pages, and adding dynamic text.

Bio: Sabine has been a GIS Technician for the Coeur d'Alene Tribe in Northern Idaho since 2010. In addition to creating a great variety of maps and managing GIS data, she assists other Tribal departments with their geo-spatial analysis and presentation projects. She also helps other software users with any challenges.

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Thursday, Session Two, 10:20 am -12:10 pm

Moderator: Matthew Lopez

GIS, Remote Sensing and Respecting Indigenous Participatory Spatial Sovereignty
Presenter: Lisa Lone Flight

Abstract: Geospatial sciences and technologies have the potential to empower Tribal Nations. At the same time they can also be used to aid in the "extraction" of precious resources including intellectual property and physical resources. This presentation will offer a theoretical framework and real world examples of how Indigenizing geospatial sciences maximizes benefit to indigenous communities and allows them to be full participants in the world of GIS and Remote Sensing.

Bio: Lisa Lone Fight (enrolled citizen of the Mandan, Hidatsa and Arikara [MHA] Nation, Dripping Dirt Clan) serves as the Senior Science Advisor for the MHA Nation (Fort Berthold Reservation). She is an Indigenous and Geospatial scientist and her recent publications include, Keeping Native American Communities Connected to the Land: Women as Change Agents. Rangelands 35(6):63-67. 2013 and " A View from the Sky" in the book Tribal GIS (ESRI Press 2012). Lisa lectures and presents widely on indigenous and environmental science and has been an invited presenter at the United Nations speaking on Indigenous Women's intellectual property. She is currently a Doctoral Student in Earth Sciences at Montana State University where her research focuses on energy development, Indigenous People and human induced seismicity within the MHA Nation and other Indigenous populations. She uses remote sensing, field work based participatory research methodologies and has developed an indigenous land cover classification system. Lisa has organized the Native Science Fellows Symposium for three years,was selected to be one of 35 national participants in the "Radical Innovation Summit to Advance STEM Education" and has served on the boards of organizations the American Indian Science and Engineering Society(current), Museum of the Rockies, the Indigenous Women in Science Network and the Society of STEM Women of Color (current) Research Review Board. Her work can be found on her website www.earthlodge.net. Lisa also shares her personal, professional, cultural and academic journey on Facebook (search: Lisa H. Lone Fight).

Spatial analysis methods and data collection to support Tribal natural resource field inventories
Presenter: Catherine Maynard

Abstract: This presentation will provide examples of using raster and vector geospatial data such as the NED, SSURGO soils, climate data, hydrography, satellite imagery and landcover to conduct pre-mapping of natural resources on Tribal lands, and assist with designing efficient field data collection surveys. The importance of field inventory database design and consistent data collection methods will be discussed, with a focus on collecting, organizing and analyzing information critical for Tribal natural resource managers. The presentation will provide examples of how properly designed field inventory data can be combined with geospatial analysis and mapping outputs to answer a wide range of natural resource questions. A discussion period will follow the presentation to allow audience participants to share information and examples of Tribal field data collection needs, strategies, obstacles and recommendations.

Bio: Catherine Maynard is the State Geospatial Analyst for the USDA-NRCS in Montana. She currently specializes in using satellite imagery and other geospatial data to model and evaluate the extent and distribution of natural resource conditions. She has worked closely with the staff at the Montana State Library for many years to collaborate on GIS data development and data sharing. She is a member of the Montana Land Information Council (MLIAC) and acting steward of the MSDI Soils and Watershed Boundary datasets. Her educational background includes a Ph.D. in Land Resources and Environmental Science, Montana State University; M.S. in Soils and Forest Ecology, University of Montana; and B.S. in Environmental Science and Plant Ecology, Utah State University.

Thursday, 12:20-1:30 pm, Lunch Buffet

Enjoy the luncheon buffet and hear from MAGIP and MLIAC leadership.
Poster prizes will be awarded and raffle winners will be drawn.

Mobile/
Online
Technologies

Thursday, Session Three, 1:30-4:00 pm

Moderator: Brian Andersen

Automated data management using python and custom metadata tags
Presenters: Adam Messer, Lydia Bailey

Abstract: Ensuring that spatial data flows seamlessly from source to end users can be a challenging task. This is especially true for large organizations with hundreds of data layers and many ways for users to access those data. We will show how Montana Fish, Wildlife & Parks staff use python tools to generate accurate, standardized metadata with custom tags that direct the automation of various data management needs. This approach allows us to control layer specific workflow requirements, including downstream dependencies and intended migration destinations, ranging from regional network drives to our ArcGIS Online Open Data portal. In addition to reducing workload, internal staff and public users are getting quick access to well-documented and up-to-date data layers in a timely fashion.

Bio: Adam Messer is a GIS Analyst and Lydia Bailey is the GIS Manager with Montana Fish, Wildlife and Parks.

Using Adobe products to enhance GIS
Presenter: Rebecca Goodman

Abstract: An introduction to using graphics programs and formats in your GIS needs. Products include thumbnail creation and how to create and use images.

Bio: Currently a cartographer with the Montana Department of Transportation. But has been working in the field of GIS since 1992. Has a diverse GIS background including a variety of graphics based programs and CAD.

ArcGIS Online Implementation Strategies Round Table
Presenter: Brian Andersen, Gerry Daumiller, Diane Papineau

Abstract: Round Table discussion on the main issues and implementation strategies for ArcGIS Online in Montana. Including basic concepts, Credits and costs, sharing information (Internally and Externally), User accounts, Managing Security, change management, field and public workflows, Web maps, Story Maps, App Builder, Embedding in webpages.

Bio: Brian Andersen has been a GIS Professional at the Montana Department of Transportation since 2000. While at MDT he has served as the GIS Lead and Project Manager. He is currently the Supervisor of the Road Inventory and Mapping section where he has a team of 10 employees that work with GIS and Databases. He is an active member and current vice president of the Montana Association of Geographic Information Professionals.

Bio: Gerry Daumiller has been a geographic information specialist at the Montana State Library since 1988. He has a bachelor's degree in Geography from the University of Montana and studied cartography in graduate school at the University of Wisconsin-Madison for three years. He has served as a board member and president of the Montana Association of Geographic Information Professionals and is a lecturer at Carroll College for their Geographic Information System courses. He enjoys running, telemark and cross-country skiing, kayaking, travel, and recording all these activities with his GPS

Bio: Diane holds a BS degree in Communications (Ithaca College) and an MS degree in Earth Sciences (Montana State University-Bozeman) emphasizing GIS, remote sensing, historical and cultural geography, and GIS education. She currently works at the Montana State Library as a GIS Programmer/Analyst. A native of New Hampshire, Diane has worked in local, state, and federal government as well as the private sector in the Rocky Mountain West since 1988.

Natural
Resources

Thursday, Session Three, 1:30-4:00 pm
Moderator: Evan Hammer

The Role of GIS in Long-Term Monitoring of the Clark Fork River at Milltown Dam Restoration Project
Presenter: Jesse Wallace

Abstract: The Clark Fork River at Milltown Dam Restoration Project is located at the confluence of the Clark Fork and Blackfoot Rivers, east of Missoula, Montana. In 1908 a flood of record occurred on the

Clark Fork River that deposited tailings from upstream mining and smelting operations along 150 miles of river and resulted in the accumulation of six million cubic yards of contaminated sediments behind Milltown Dam. Between 2008 and 2012, the site underwent extensive remediation and restoration, including removal of the dam, excavation of contaminated sediments, and reconstruction of over three miles of river channel and 250 acres of floodplain. Spatial data and GIS analyses have been used extensively over the course of the project, from restoration design, through implementation, and in post-project monitoring and evaluation. This presentation will focus on the ways in which these data are currently being used to provide information on the condition of the restored site as long-term monitoring of the project continues. GIS data and analytical tools supplement field-based monitoring efforts, providing quantitative and qualitative assessments of site conditions. These data are used to identify ongoing site maintenance needs, and help determine whether geomorphological and revegetation restoration treatments are trending toward the project goal of restoring a natural, functioning riparian ecosystem at the site.

Bio: Jesse Wallace is a GIS Analyst with Geum Environmental Consulting, Inc. in Hamilton, MT. He has eight years of professional experience, specializing in ecological applications of spatial data analysis. His work includes habitat restoration suitability and feasibility analyses, channel and floodplain conceptual designs, and cartographic materials to support field data collection, project reporting, and public outreach. Jesse has an M.S. in Geography with a GIS specialization from the University of Montana in Missoula.

Value-Added Attributes for Montana's Wetland Mapping
Presenters: Linda Vance, Jamul Hahn, Claudine Tobalske, Melissa Hart

Abstract: National Wetlands Inventory mapping was designed to provide biologists and managers with the information they needed to conserve the nation's wetlands. Since the 1970s, when the NWI began, information needs have multiplied. Recognizing that many biologists and managers have neither the time nor expertise to run complex GIS analyses on wetlands, the Montana Natural Heritage Program has been developing a geodatabase that assigns a suite of extra value-added attributes to our NWI mapping. In addition to multiple locator attributes and management status, each wetland location has been intersected with our statewide conservation easement databases. We have also made an attempt to characterize the potential ecological significance of each wetland, focusing on rarity, complexity, known habitat value, connectedness, and integrity of the surrounding landscape, feeding these characterizations back into the geodatabase. Similarly, we have calculated a suite of threats that may affect wetlands, including oil and gas development, urban development, cropland conversion, and climate change. In this presentation, we will discuss the various features of the database, issues we encountered and address during its development, and how we see it being used in a variety of wetland management contexts.

Bio: Linda Vance is Senior Ecologist and Director of the Spatial Analysis Lab at the Montana Natural Heritage Program. She holds a Ph.D in Conservation Ecology from the University of California at Davis. She and her team of GIS Specialists produce and steward the Wetlands and Land Cover/Land Use themes in the Montana Spatial Data Infrastructure. Other work includes using GIS for conservation and restoration planning, particularly for wetlands and whitebark pine.

NASA RECOVER: Getting the most out of GIS for Wildfire Decision Support
Presenter: Keith Weber

Abstract: RECOVER (Rehabilitation Capability Convergence for Ecosystem Recovery) is a site-specific decision support system (DSS) that automatically brings together in a single analysis environment the

information necessary for wildfire decision-making. RECOVER is the result of a close collaboration between NASA's Applied Sciences Program, Idaho State University's GIS Research and Training Center, the Bureau of Land Management (BLM), and Idaho Department of Lands (IDL). RECOVER uses rapid resource allocation capabilities to automatically collect Earth observation data, derived decision products, and historic biophysical data so wildfire management agencies will have at hand a complete and ready-to-use dataset and GIS analysis environment customized for the target wildfire. RECOVER is transforming this information-intensive process by reducing from days to a matter of minutes the time required to assemble and deliver crucial wildfire-related data. This presentation describes numerous techniques developed to automate this process using ArcGIS for Server along with Python and Java.

Bio: Mr. Weber is the GIS Director at Idaho State University (ISU) and has held this position since founding the GIS Training and Research Center (GIS TReC) in 1998. He has been involved in the Geospatial technologies industry since 1989, is a Certified GIS Professional (GISP) and recipient of Esri's Special Achievements in GIS award in 2000 and again in 2013 as well as the URISA Exemplary Systems in Government award in 2014. He is past-President of the Northern Rockies Chapter of URISA, former Vice-President of the Intermountain Chapter of ASPRS, and chairs Idaho's Geodetic Control Technical Working Group. Mr. Weber is the principal investigator for NASA's RECOVER wildfire decision support system, and the Science Advisor for the NASA DEVELOP node at ISU.

National Geospatial Program Products and Services
Presenter: Steve Shivers

Abstract: The National Geospatial Program provides leadership for USGS geospatial coordination, production, and service activities. The Program engages partners to develop standards and produce consistent and accurate data. This presentation will focus on the base map products and services available online through The National Map, highlighting the many varied uses of the data as well as plans for future enhancements.

Bio: USGS Steve Shivers is a USGS National Map Liaison. Liaisons engage and support State, local, Tribal, regional, Federal and other partners in improving timeliness, quality and accessibility of geospatial data for the community. After graduating with a BS in Physical Geography from Oregon State University in 1981, Steve worked briefly as a well log analyst in the North Dakota oil patch before joining USGS in Alaska at the National Cartographic Information Center (NCIC). In 1991 Steve moved to Washington DC as Chief of the Earth Science Information Center (ESIC) in the Main Interior Building. By 1994 Steve was working for Data and Information Delivery as their National Training Coordinator at the USGS National Center. He served in long details as Chief of Headquarters ESIC and USGS Research Coordinator for Geography. He finished his time in Reston as National Coordinator for Information Delivery and Knowledge Management. In 2007 he fled the National Center for the uncrowded hinterlands, taking on the responsibilities of Liaison for Montana, the Dakotas, and Wyoming. He resides high in the Black Hills in the gold camp of Lead.

Thursday, Session Three, 1:30-4:00 pm

Moderator: Jason Underwood

Using GIS to Plan and Monitor Snow Removal at Malmstrom Air Force Base
Presenter: Jason Underwood

Abstract: An interactive web mapping application has been developed at Malmstrom Air Force Base, Montana, to assist the 341st Civil Engineer Squadron's snow removal prioritization and status. Placing GIS editing capabilities in the hands of Pavements/Maintenance allows greater flexibility in planning snow removal priority zones by the Snow and Ice Control Committee, and offers a real-time status update of plowed/unplowed areas available via a web map to the base at large during winter snow events.

Bio: Jason Underwood has over 20 years experience with CACI - National Security Solutions as a GIS Analyst and has spent much of the last three years working as the GeoBase Analyst at Malmstrom Air Force Base, Montana, providing services and consultation in GIS, Surveying, and Drafting.

Environmental Analyses and Project Implementation in Conflict Zones – A Unique GIS/Military Solution from Afghanistan
Presenter: Henry Shovic

Abstract: Military conflicts often occur against a backdrop of existing, and often worsening, environmental conditions. During Operation Enduring Freedom (OEF) in Afghanistan, military leaders and Afghan partners saw opportunities to pursue environmental improvement projects to positively engage local communities as a means of securing cooperation and fostering long term stability and environmental sustainability. Given the importance of agriculture and the prevalence of erosion, water resources were a primary concern. In order to positively engage communities, local military units, using the Commander's Emergency Response Program (CERP) and other funds attempted to address local leader requests for infrastructure improvements, with a military agenda for stability, building trust as a strategy for short term cooperation, and improving acceptance of central government. Eastern Afghanistan's isolation has traditionally been attributed to poor roads, hostilities between rival groups, and banditry. Water availability and flood damage are high priorities among local populations, particularly during the peak years of this work due to drought and an historic flood in 2010. The central Afghan government, when it was functioning anywhere, never enjoyed a positive perception in most quarters in this region that has always been dominated by tribal communities and as a result, many federal efforts were insufficient to counteract a pervasive environmental degradation. Hence our local military units attempted to fill this gap. Environmental assessment (EA) protocols and project designs normally call for extensive on-site visits, field surveys, frequent community engagement, and competent contractors, and a time line sufficient to conduct this process. All of these are often an impossibility in military operations and the inherent difficulties of safe travel in the region. Though embedded civilians were able to provide some perspective, many other areas remained inaccessible and repeat visits were often impossible. Also inherent are highly compressed timeframes, few opportunities for secure community engagement, and limited local capacity to implement projects. Accordingly, early efforts to engage communities through water provision and erosion protection projects produced mixed results and failures, which often could be attributed to inadequate environmental planning and project designs. Limited opportunities for interactions among OEF personnel and communities, short military unit deployments, and a lack of design expertise germane to the Afghan environment also contributed to failure and consequently an erosion of trust among Afghan communities. These conditions led to the development and implementation of a streamlined

environmental assessment process using GIS, remote sensing, and highly-leveraged ground information in close coordination with military leaders. It resulted in rapid implementation of meaningful projects compatible with the highly constrained timeframes and limited community interactions necessitated by ongoing military combat operations. My objective here is to summarize this novel GIS application. I will demonstrate how the EA and Project Design process worked in Afghanistan from 2008 – 2012, making an efficient use of remote sensing, spatial analysis, GIS, and limited ground truth. It was closely coordinated with military units on the ground, and resulted in significant success at a low cost.

Bio: Henry Shovic, PhD is a resource geographer. He has 37 years experience in many applications, including environmental planning, project design, landscape modeling, GIS, wildland fire, and soil survey. He has worked in three countries, including Afghanistan. He has worked for the U. S. Forest Service, the National Park Service, the Army, and many fire departments.

The Future of the Past: Use of GIS/GPS in Cemetery Mapping
Presenter: John W. Olson

Abstract: In Archaeology, GIS is transforming how archaeological surveys are performed as well as the types, quantities and quality of data obtained. One primary aspect in studying the past and present is the concept of kinship; people considered family, which are not always blood relations. In the United States, one method that expresses kinship is the creation, maintenance and use of cemeteries. This presentation details the continuing evolution of the Nevada City Montana Cemetery Mapping Project that began in August 2014 and is led by the Extreme History Project. The Extreme History Project is a non-profit committed to educating the public in how the past has shaped our present and continues to mold our future by pursuing a balanced and honest discussion of the past. Beginning with traditional data acquisition, this volunteer project has developed into a combination of detailed GPS data, written and sketched information, and digital media resulting in an evolving data model as well as an ArcGIS Story Map. Archaeologists can use the information to track the spatial placement of graves resulting from familial segregation, ethnicity, sex, epidemics and more. Subsequent spatial analysis could determine previously unseen trends stemming from changes in human culture and traditions over time.

Bio: John W. Olson is a senior at Montana State University – Bozeman and is graduating this Spring with a Bachelor of Science in Anthropology with a focus on Archaeology and a minor in GIS. He has volunteered for several years with the Extreme History Project in Bozeman and in currently the Project Lead for their Nevada City Montana Cemetery Mapping Project.

Volunteer

Thursday, Session Three, 1:30-4:00 pm
Moderator: Maya Daurio

Humanitarian GIS and Crowdsourcing Technology - A Case Study
Presenter: Maya Daurio

Abstract: Geospatial technologies, data management platforms, and social media are increasingly being used in combination with each other in disaster response efforts around the world. Volunteers, people on the ground, humanitarian organizations, and savvy tech folks can provide needed time, manpower, local knowledge, and skills to efficiently create, aggregate, and distribute relevant data to aid agencies

to organize relief efforts where they are most critical. This highly organized and collaborative process is well illustrated by the coordinated response to the Nepal earthquake, which occurred in April, 2015. This presentation will talk about the innovative uses of crowdsourcing, social media, GIS, and volunteer efforts in humanitarian responses through the lens of the Nepal earthquake disaster response as well as provide information and resources regarding how people can contribute their skills when crises around the world arise. Through highlighting these processes and resources, it is hoped that energy, participation, and interest will be generated in applying lessons from global examples to local disaster response preparedness.

Bio: Maya Daurio is a GIS Analyst with the Montana State Library and works with both cadastral and hydrography data as part of her job. She has done a little volunteering in humanitarian GIS and is interested in how crowdsourcing tehcnologies can benefit humanitarian efforts.

Humanitarian OpenStreetMap and Global Disaster Aid
Presenter: Michael Krueger

Abstract: On October 26, 2015 a 7.5 magnitude earthquake struck northern Afghanistan. The Humanitarian OpenStreetMap Team (HOT) activated a day after the event to coordinate mapping projects throughout the impacted area. The region is incredibly remote, mountainous, and impacts of the quake were widespread making identification of key mapping projects vital to government agencies and disaster relief teams. This presentation will illustrate how HOT and its volunteers created various road networks and identified populated places in the region to support the response effort.

Bio: GIS Specialist HDR Engineering, Inc. Billings, MT

Happening upon data in the Philippines - a volunteer experience
Presenter: Kristy Fortman

Abstract: This presentation covers the successes and challenges of gathering and analyzing spatial data as a Peace Corps Response Volunteer for a source water feasibility study in San Miguel, Leyte, Philippines.

Bio: Kristy Fortman recently started as the GIS Coordinator for the Sage Grouse Habitat Conservation Program at the DNRC. For the last 7 and a half years she worked at the Montana DEQ as a senior water quality planner. She recently took a sabbatical to serve as a Peace Corps Response Volunteer, working on a source water study with a municipality in Leyte, Philippines. Kristy also served as a Peace Corps volunteer for 2 years in Ecuador. She received her graduate degree in Geography from Miami University and her undergraduate degree in Environmental Science and Geography from the University of Colorado.

Using GIS for a Greater Good
Presenter: Leslie Zolman

Abstract: Highlight some of the past projects I have worked on and provide information on GIS volunteer opportunities anyone can be a part of.

Bio: Leslie is the 2016 Preseident of the MAGIP Association. View her biography on page 3.

Montana Summit

Thursday, 4:20-5:00 pm

Join a facilitated discussion with your fellow Montana GIS professionals and the MAGIP Board of Directors and help us set some future goals and direction. Topics of discussion will include:

- Intermountain Conference Schedule
- MAGIP Membership Benefits
- Non-Profit Status
- Legislative Initiative
- Website Changes

Facilitator: Lee Macholz, *GIS Coordinator, Mountain Water Company*
Bio: Lee is the GIS Coordinator for Mountain Water Company in Missoula, MT. She is also the Administrator for the Montana Association of GIS Professionals. Lee has 15 years experience in GIS. The first part of her career was spent in the realm of Wildland Fire and she now helps douse fires in the Water Utility industry. She specializes in data management, geodatabase design and development, and the collection and management of field data.

Mark Your Calendar

2017 Intermountain GIS Conference
Holiday Inn, West Yellowstone, Montana
April 11-14, 2017

Northern Rockies Chapter
URISA

Innovating in a Mobile World

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