



2012 MAGIP Fall Technical Session Abstracts



Denotes Hands-On Lab or Workshop

Agricultural Land Valuation – Workflow and Tools

Presenter(s): *Christian Hinderman (chinderman@mt.gov) & Val Cannon (vcannon@mt.gov) – Montana Dept. of Revenue, Helena, MT*

In Montana, property that is classified as agricultural or forest land is valued by its productive capacity. In 2009 the Department of Revenue started a new GIS-based method of valuing agricultural and forest land. Productive capacity was determined by combining DOR cadastral information with NRCS soil productivity data, a University of Montana School of Forestry productivity model, and a newly built DOR land classification layer. To accomplish this, a variety of Visual Basic, VBA, Modelbuilder, Python scripts, and JAVA tools were developed for ArcGIS. This presentation will give an overview of the GIS workflow and tools used in the land valuation process.

ArcPad 10 Overview and Integration with ArcGIS for Mapping & Data Maintenance

Presenter(s): *Jackson Beighle (Jackson@elecdata.com) – Electronic Data Solutions, Jerome, ID*

This presentation provides a general overview of ArcPad 10 and how to use the software for GPS mapping and data maintenance. Learn more about the current capabilities of ArcPad 10 and how it integrates with ArcGIS. See how the software can be used on Trimble handhelds for a wide range of field applications.

Arcpy Essentials Workshop

Presenter(s): *Dave Highness (Dave.Highness@tetrattech.com), Senior GIS Programmer/Analyst, Tetra Tech Inc., Helena, MT*

Python is a vital skill for any ArcGIS professional interested in furthering their automation and analysis tasks. Python allows users to create custom data management or analysis tools ranging from single functions to complex multi-function processes with validation, which can be easily reused, shared, and even executed with little or no user interaction. This workshop includes a quick introduction to the Python scripting language and shows how it can be used to access ArcPy for automation of GeoProcessing tasks and map production. **Note – registration to attend this workshop is required. Contact Miles Wacker at mwacker@mt.gov, Chris Stump at cstump@mt.gov, or Dave Highness at Dave.Highness@tetrattech.com.**

Combining ArcGIS and ArcGIS Online for Organizations



Presenter(s): Ken Wall (KWall@geodataservicesinc.com), Geodata Services, Inc., Missoula, MT

This session will show practical uses of ArcGIS for Desktop and ArcGIS Online for Organizations (Esri cloud based ArcGIS server model) for GIS operations in rural Montana counties and towns. We will cover citizen mapping, and leveraging framework and authoritative data while incorporating community mapping into GIS operations. This session will draw on two Montana projects, Community Mapping in the Upper Swan, and Vibrant Futures Regional Sustainability Project in North Central Montana. The Swan project is based on the local school as the locus for community GIS and web mapping. Vibrant Futures, encompasses 11 counties and 4 tribal nations in North Central Montana implementing a \$1.5 million HUD sustainability grant. Both are predominately rural areas leveraging ArcGIS for Desktop and ArcGIS for Organizations, and encouraging grassroots involvement in community mapping by citizens and local government representatives with limited GIS training and experience. Both projects are vastly different in their strategies to adopt and deploy these technologies. We will explore examples, best practices, and lessons learned in both projects, and how these tools can be deployed in other rural areas in Montana. Bring along your smartphones, tablets, netbooks, or portable computers for some hands on experience in using ArcGIS Online.

DEQ GIS Field Workflow – Automation, Code, & Database Management

Presenter(s): Chris Stump (cstump@mt.gov), MAGIP Technical Committee Chair & Nat Carter (ncarter@mt.gov) – Montana Dept. of Environmental Quality, Helena, MT

DEQ Spatial Database Engine (SDE) Architecture is based on three Oracle database instances, separated by business workflow and functionality, including Field, for field data collection and QA/QC, Production for DEQ bureau cartography, analysis, and QA/QC, and lastly Publication for data sharing and public viewing. This presentation focuses on tying DEQ Field Workflows using ArcPad into our established SDE workflow & architecture to create a seamless and automated field data collection environment. Detailed discussion and examples of ArcPad checkin/checkout procedures, symbology maintenance in the mobile and desktop environments, use of ArcPad Edit Forms & Controls, ArcPad map document automation, and Python code management concepts will provide attendees with an understanding of how to integrate field workflows into their business workflow.

Enterprise geospatial applications in the USDA Forest Service

Presenter(s): Jim Barber (jbarber@fs.fed.us) & Erin Nock (enock@fs.fed.us) – USDA USFS, Missoula, MT

The USDA Forest Service has recently completed a migration to a centralized geospatial computing environment at the USDA's National Information Technology Center (NITC) in Kansas City, Missouri. Accessing both the ArcGIS software and data located at this data center using Citrix software provides a new kind of GIS service. To facilitate access to geospatial data for resource specialists at the data center, the Forest Service Geospatial Interface (GI) was developed. The GI is an ArcMap extension that provides

an easy way to access data stored in various places on local Forest Service sites, centralized data servers, or other sites. In addition, the GI helps users work efficiently with data by providing tools that simplify loading data and offers various custom products for display, standard analysis and output of data. Because the GI is an ArcMap extension, all the tools in ArcMap are still available. Just like any other feature class, those loaded by the GI can be exported and sent to an external partner, uploaded into ArcPad, or manipulated with ArcToolbox. There are two modules of the GI; the Client and Registration Tool. Work done 'behind the scenes' in the Registration Tool makes the appropriate connections, data displays, and analyses possible in the GI Client.

ESRI Hands On Learning Lab



Presenter(s): *ESRI Staff – Self Paced Content*

Take Esri training at your own pace in the Hands-on Learning Lab. Each lesson includes a prerecorded presentation and exercises and is roughly 45 minutes in length. Esri staff will be on hand to answer your questions. Come in when you can—no advance registration is required.

Learn to build web applications with the ArcGIS Web Mapping APIs or explore topics such as animation and Python scripting. A wide variety of topics are available for both GIS beginners and veterans. [Click here](#) for more information.

- Editing with ArcGIS for Desktop
- What's New at Version 10.0
- Getting Started with Animation
- Introduction to ArcGIS for Server
- Basics of the Geodatabase Model
- Creating a Map in ArcGIS
- Designing Effective Web Applications using ArcGIS for Server
- Geocoding with ArcGIS
- Introduction to ArcGIS for Desktop
- Introduction to Geometric Networks for Utilities
- Introduction to Linear Referencing
- Introduction to Network Analyst
- Introduction to ArcGIS Data Reviewer
- Introduction to Geoprocessing Using Python
- Introduction to Spatial Analyst
- Spatial Statistics for Public Health
- Working with CAD in ArcGIS

Estimating forest characteristics for the Uncompahgre National Forest in Western Colorado using field samples, NAIP imagery, and texture

Presenter(s): John Hogland (jshogland@fs.fed.us), Nate Anderson, and Greg Jones, RMRS – Missoula, MT

Forest characteristics such as basal area per acre, trees per acre, and tons per acre of above ground biomass (AGB) have been estimated across the Uncompahgre National Forest using a two-tiered remote sensing approach. The first stage of our methodology, calculates the probability that a National Agricultural Imagery Program (NAIP) pixel represents a visually identifiable class (e.g., tree canopy, shadow, grass, or water) using polytomous logistic regression (PLR). The second stage then estimates forest characteristics by species using multivariate regression, Forest Inventory Analysis (FIA) plot data, and a combination of stage 1 probabilistic and NAIP textural metrics. The outputs of these models are stored as multiband raster datasets that can be easily used to address numerous management objectives.

Finding Spatial Data

Presenter(s): Diane Papineau (dpapineau@mt.gov), Montana State Library – Helena, MT

Finding appropriate, existing spatial data for a project can be challenging—do you know where to look? In this session, we will also discuss how data is created and how to evaluate it to ensure it is the best available data for your task.

FWP – Update on Lessons Learned in Implementing an Enterprise Level GIS (focus on ArcGIS Server)

Presenter(s): Bob Cochran (bcochran@mt.gov), Bill Daigle (bdaigle@mt.gov), & Lydia Bailey (lbailey@mt.gov), Montana Dept. Fish, Wildlife, & Parks – Helena, MT

This presentation will provide an update on the steps Montana Fish, Wildlife & Parks (FWP) has taken over the past year in implementing our modularized approach for ArcGIS Server hosted mapping applications. Topics will include a brief overview of the concepts we introduced last year to streamline our processes, use of customized tools and widgets, challenges in version 9.3.1 and anticipated challenges in 10.1. We will provide demos of our internal tool based mapping applications to illustrate how FWP has extended our modularized approach. We will also provide an overview of FWP's publicly available mapping related resources.

GISCI Update

Presenter(s): *Kris Larson (larsonka@cdm.com), CDM Smith – Helena, MT*

Want to learn more about GIS Certification Institute and the ideas behind professional certification? This 20 minute presentation will cover the history of the organization, discuss the requirements for becoming a certified GISP (the GIS Professional process is changing!), and the process for renewal. Did you know that Montana was one of six states that endorsed the certification model? As such, you have some support and resources here that other states are not always so fortunate to have. There are many opportunities for Montanans to be more involved and to have an influence both at the local level and at the national level. We'll have 10 minutes for your questions and comments at the end of the presentation. Whether you are considering applying, renewing, or just want more information about certification, this session will have something for you. Please come and join the conversation!

Image Analysis 101: Is it as simple as it looks?

Presenter(s): *Claudine Tobalske (Claudine.tobalske@umontana.edu) & Linda Vance (livance@mt.gov), Spatial Analysis Lab/Montana Natural Heritage Program – Missoula, MT & Helena, MT*

In this presentation we will cover the basics of image analysis, including a quick overview of remote sensing theory; reasons for using automated image analysis and the questions it can (and can't) address; a comparison of available imagery and image analysis software; and examples based on our work classifying land cover and land use. The goal of the presentation is to help would-be image analysts assess the potential pitfalls they may encounter in project planning, image acquisition and preparation, software and program selection, and interpretation of results. Experienced image analysts who would like to share their own experience are more than welcome to attend.

Leveraging GIS Technology for Utilities: A unique look at two local utilities use of GIS

Presenter(s): *Carrie Shockley (cshockley@bozeman.net), City of Bozeman – Bozeman, MT & Lee Macholz (leemacholz@gmail.com), Mountain Water – Missoula, MT*

Mountain Water of Missoula and the City of Bozeman Water/Sewer Division are teaming up to discuss how they have leveraged the use of GPS and GIS technologies in their utilities. The two companies will discuss their initial mapping efforts, the field components they use, how they utilize GIS to help track the maintenance of their assets, the GIS projects they have done, and their goals and ideas as they move forward.

Lewis & Clark County Web Mapping/Services

Presenter(s): Jason Danielson (jdanielson@co.lewis-clark.mt.us) & Eric Spangenberg (espangenberg@co.lewis-clark.mt.us), Lewis & Clark County/City of Helena GIS Services

This presentation will focus on the opportunities and struggles of creating and implementing web mapping applications within our local government. Lewis and Clark County/City of Helena awarded an RFP to Latitude Geographics in 2007, and its Geocortex Essentials' 'Commercial Off-The-Shelf' (COTS) software is utilized by staff for both internal and external web mapping applications. We will provide examples of various choices of mapping applications available, and share our experiences with exploring alternative web mapping applications.

Local Government Roundtable Discussion on the Future Involvement of Former MLGGC Activities in MAGIP

Presenter(s): Allen Armstrong (allen.armstrong@gallatin.mt.gov), MAGIP Vice President, Former MLGGC Member & Annette Cabrera (acabrera@co.yellowstone.mt.gov), Yellowstone County GIS Manager, Former MLGGC Member

The Montana Local Government GIS Coalition (MLGGC) was formed by a group of interested local government GIS practitioners in July 1995. Membership was open to all city and county government entities in Montana. At one time, active membership reached 33 participants who paid annual dues. Members were charged an annual fee based on taxable value (counties) and population (cities). This organization encouraged six goals: (1) to promote a bottom up approach for data acquisition which begins at the local level, (2) to provide for an exchange of ideas among local government GIS users, (3) to provide information through workshops, seminars, and meetings, (4) to provide a forum to identify common problems and unified solutions to benefit both county and state entities, (5) to establish a vehicle to provide non-computer users with information and technical assistance, and (6) to provide representation and advisement on state and regional technology issues and encourage participation by other interested parties.

Upon the formation of MAGIP in 2004 as an overall organization of Montana GIS professionals, membership in MLGGC, as well as the Montana GIS Users' Group (MTGIS) and the Montana Interagency GIS Technical Working Group (ITWG), became combined into this new overall organization.

This group discussion will explore ideas for any future special interest needs of the Montana local governments. Is there a need for a return of local government meetings at regular intervals to support the work of MAGIP in the future?

Accumulated funds from MLGGC dues were merged into the MAGIP budget with the promise that these funds would be set aside to provide assistance to MLGGC members in the future as the prior organization determined. MAGIP has proven to be a solid and stable organization of Montana GIS professionals; however, it is important to have an established plan for any funds being managed by MAGIP should the local governments wish to use those for relevant meetings, trainings or special interests.

The Montana State Library Geographic Information's New Data List

Presenter(s): Erin Fashoway (efashoway@mt.gov), Montana State Library - Helena, MT

Montana State Library's Geographic Information web redesign of the Data List. This presentation will focus on the new data list and how it uses the latest available technologies and extracts information from the Montana GIS Portal. We will introduce a new, more cohesive way, to find MSDI, natural resource, and other GIS data. We will also give a brief update of metadata and ArcGIS 10.1.

Notification to Landowners Regarding Road Closures and Land Effected During Irrigation Canal Repair



Presenter(s): Van Shelhamer (vhamer@aol.com), GeoEssentials, Inc . -- Bozeman, MT

The situation exists where a local irrigation canal has to do major cleanup and repair to a canal which parallels a public road. Numerous different small acreage landowners will need to be notified of the closure and the part of their land that maybe affected by the irrigation right of way. The task is to create notification addresses for the affected landowners and provide each owner with a map of their property and road that will be affected by the contractor. Participants will create a map document, use queries, buffers, search functions, location and attribute selection, dynamic text and data driven pages to prepare PDF documents that will be included with notification mailings.

Open Source Data Analysis & Mapping with R & Google Earth



Presenter(s): Alison Mynsberge (Alison.mynsberge@cfc.umt.edu) & Alan Swanson (allen.swanson@umontana.edu), College of Forestry & Conservation, University of Montana – Missoula, MT

While ArcGIS is the standard for processing and displaying geographic information, it is cost-prohibitive for many users. A range of open-source tools have been developed in recent years, and now offer a viable alternative. R is a programming language quickly becoming the standard for statistical analysis, and libraries are available for the ingestion, processing, and export of geographic information. In this presentation we will lead participants through an example of importing spatial data, performing a simple analysis, and displaying the results in Google Earth. **Participants are encouraged to bring their own laptops with R (<http://cran.r-project.org>) and Google Earth (earth.google.com/download-earth.html) installed. Several add-on R libraries (rgdal, raster and plotKML) will be needed, but can be installed during the session. Sample data is available via the MAGIP website [here](#).**

Open Source GIS



Presenter(s): Miles Wacker (mwacker@mt.gov), MAGIP President, Montana Dept. of Transportation - Helena, MT

Open Source GIS software provides many advantages to proprietary alternatives in terms of software licenses, restrictions in use, interoperability, extensibility, ease-of-use, and performance. The goal of this presentation is to introduce several major Open Source GIS projects and provide more in-depth, and hands-on view of two projects that can be leverage in building web-based GIS solutions: PostGIS and GeoServer. PostGIS provides spatial functionality to the popular open source database Postgresql. GeoServer is an OGC compliant web server that provides standardized geospatial web services for a multitude of data sources. **The session will follow the OpenGeo Suite Workshop, you are encouraged to Bring Your Own Device (BYOD) with the Suite installed. There will be a limited number of laptops available.**

Preprocessing a SWAT watershed model in ArcGIS

Presenter(s): Erik Makus (emakus@mt.gov), Montana Dept. of Environmental Quality Hydrologist - Helena, MT

The Water Quality Planning Bureau of the Montana Department of Environmental Quality is tasked with developing Total Maximum Daily Loads (TMDLs) for pollutants impairing state waters. As part of this task, watershed models are used to determine streamflow and pollutant loadings associated with various land management practices, point sources, and other anthropogenic influences. One model used extensively throughout the United States for this purpose is the Soil and Water Assessment Tool (SWAT), a physically-based, watershed-scale model. An early step in model development is preprocessing with GIS to define spatial attributes for model parameterization. This includes (1) use of a digital elevation model and stream hydrography to create a flow direction and accumulation grid, (2) defining sub-watersheds and the routing network based on this grid and other user needs (point sources, impaired waters, gages, etc.), (3) overlaying land use, soils, and slopes to create unique hydrologic response units within each sub-watershed, and finally (4) assigning spatial climate data to each sub-watershed. This presentation will take you through a typical GIS-based TMDL model preprocessing effort on a watershed, using the Little Blackfoot River watershed located in western Montana as a case study.

Rocky Mountain Research Station (RMRS) Raster Utility



Presenter(s): John Hogland (jshogland@fs.fed.us), USDA USFS RMRS – Missoula, MT

RMRS Raster Utility is an object oriented .NET library packaged as an ESRI add-in toolbar that simplifies data acquisition, raster sampling, and statistical and spatial modeling while reducing the processing time and storage space associated with raster analysis. This session will be split into two parts. The first is an overview of the project, toolbar functionality, and new raster processing techniques, while the second is hands on analysis that demonstrates the utility of the tools within the toolbar. To find out more about

the RMRS Raster Utility project and download the ESRI add-in, source code, tutorials, and demonstrations please visit our website at <http://www.fs.fed.us/rm/raster-utility/>.

Transforming your Organization with ArcGIS

Presenter(s): *Nathalie Smith (nsmith@esri.com) & Scott Moore (smoore@esri.com), ESRI*

ArcGIS continues to evolve and offer new ways for you to meet the needs of your organization. In this free seminar, you will learn how the ArcGIS system at 10.1 helps you make the most of your GIS investment.

You will:

- See examples of collaboration involving departments within city and state government as well as between government, citizen groups, NGOs, and private business
- Discover how to use the ArcGIS system, especially ArcGIS Online, to spread the use of GIS in your organization and beyond
- Learn how to support better decision making by providing management with accurate, up-to-date information
- Network with your peers and connect with Esri staff

The ArcGIS 10.1: Transform Your Organization seminar is a part of the [Success with GIS Series](#) which offers best practices on how to be more successful using your existing ArcGIS software.

Update on the MAGIP Best Practices for Spatial Data Distribution

Presenter(s): *Meghan Burns (meghan.burns@gmail.com) - TREC, Inc. & MAGIP Technical Committee Member, Helena, MT*

The Spatial Data Distribution Best Practices came about through the necessity to have a consistent methodology for obtaining GIS data. Any organization or professional that provides spatial data has many decisions to make regarding how to provide their information to potential users. By providing guidelines MAGIP can help eliminate the inconsistencies between data providers and thus improve efficiency and productivity for data users. Spatial data should become easier to access and use.

Best practices provide guidelines for professionals to complete common tasks in an efficient manner. These best practices in particular outline an effective means to distribute spatial data. Specifically, they are designed to streamline and make consistent GIS data acquisition, use, and enhance communication between data users and data stewards. These spatial data distribution best practices will provide guidelines that will help standardize the process for providing spatial data so that the process is more transparent and consistent.

The Spatial Data Distribution Best Practices are a list of six guidelines to help direct GIS professionals towards providing consistent spatial data for data users through improved data

acquisition, use, and communication. The guidelines cover metadata, download location, update schedules, spatial extent, software versions, layer symbology, and web services.

This session will present the evolution of the spatial data distribution best practice. The intent is also to provide a forum for discussion. If there is little discussion the session will finish early allowing time to join the other session or participate in the ESRI Hands-on Learning Lab.

What You Need to Know About Map Projections

Presenter(s): *Gerry Daumiller (gdaumiller@mt.gov) – Montana State Library, Helena, MT*

This presentation will explain the basic concepts of map projections and focus on what GIS practitioners should know about them in order to avoid inadvertently giving out poor information.

Every map projection produces data where the map scale changes as you move around on your map. This results in inaccurate measurements that GIS software mostly does not compensate for. The Web Mercator projection is especially inaccurate. Most web applications that use this projection compensate somewhat for this, but desktop GIS software does not.

This presentation will show how much error is inherent in commonly used coordinate systems and introduce strategies for compensating for them.