

## Welcome.....

*To the Tenth Biennial Arkansas GIS Users Forum Symposium ... it is indeed a special gathering, as we celebrate twenty years of GIS in Arkansas! When given the opportunity to convene again in Eureka Springs at one of the most beautiful times of the year for the 2009 symposium, we couldn't resist. Fall in the Ozarks is glorious and Eureka Springs holds special memories for many of us from years past..get ready to make some more "spatial" memories as we mark this twenty-year anniversary!*

*We have assembled some great speakers and sessions for our Tenth Biennial celebration. We are especially pleased to have the American Society for Photogrammetry and Remote Sensing sponsoring a full session of papers dealing with their specialty. The rest of our categories are broad in range, and you are sure to find sessions and posters that will enhance your professional growth over the course of the next three days.*

*Again, we would like to remind you that the papers and posters are but part of the reason that the Forum gathers every couple of years. It is essential for us to network with our colleagues to renew old acquaintances and forge new alliances. The social activities interspersed throughout the symposium are designed with that very goal in mind, so take advantage of all those opportunities - and enjoy yourself!*

*We hope that your experience at "A Spatial Quest: Twenty Years of Mapping the Natural State" is both informative and entertaining. Thanks for joining us - we're glad you're here!*

*Happy Anniversary from your Executive Committee!*

### **Forum Officers**

Chair : Alan Price - Arkansas Department of Environmental Quality

Vice Chair : Bill Sneed - United States Geological Survey

Secretary: Louise Hogan, Little Rock Wastewater

Treasurer : Chris Owen - Pulaski Area GIS (PAgis)\*

### **Executive Committee Members**

Kim Bogart - Entergy

Inderpreet Singh Farmahan "Sunny" - University of Arkansas - Little Rock

Hanna L. Ford - Arkansas Game and Fish Commission

Phyllis Poche - University of Arkansas - Little Rock

Robert Scoggins - Arkansas Highway and Transportation Department

Dr. Bob Weih - University of Arkansas - Monticello

Suzanne Wiley, U of A Cooperative Extension Service, retired

Pam Cooper, USDA Natural Resource

### **Symposium Coordinator**

Dana Venhaus - Arkansas Extended Learning Center

# “A Spatial Quest: Twenty Years of Mapping the Natural State” 2009 SYMPOSIUM SCHEDULE AT A GLANCE

## Monday, October 26th

3:00 - 5:00 p.m.

Workshop Pre-registration

## Tuesday, October 27th

7:00 - 8:00 a.m.

Workshop Registration

8:00 a.m. - 12:00 p.m.

Morning Workshops

12:00 - 1:00 p.m.

Lunch (on your own)

1:00 - 5:00 p.m.

Afternoon Workshops

1:00 p.m.

Golf Tournament

## Wednesday, October 28th

6:45 a.m.

5K Run/Walk

8:30 - 10:00 a.m.

Symposium Registration & Continental Breakfast

8:30 a.m.

Vendor Expo Open

10:00 - 10:15 a.m.

Welcome and Opening Remarks *Alan Price, Chair*

10:15 - 10:45 a.m.

Opening Speaker *Dr. Steven Foster*

10:45 - 11:05 a.m.

Awards Presentation *Bill Sneed, Suzanne Wiley*

11:05 - 11:15 a.m.

The National Perspective *Learon Dalby*

11:15 - 11:45 a.m.

Break/Visit with Vendors

11:45 a.m. - 1:30 p.m.

Luncheon - Keynote Speaker *Dr. Dave Cowen*

1:30 - 2:45 p.m.

Arkansas' Business Planning Process *Michael Turner*

2:45 - 3:00 p.m.

Break/Visit with Vendors

3:00 - 5:00 p.m.

Concurrent Sessions

3:00 - 5:00 p.m.

AR GIS Board Meeting Sycamore Room

6:00 p.m.

Reception/Social

## Thursday, October 29th

7:30 - 8:30 a.m.

Breakfast with Vendors

8:15 - 8:25 a.m.

Conference Announcements - Maple/Walnut Rooms

8:30 - 10:00 a.m.

Concurrent Sessions

10:00 - 10:15 a.m.

Break

10:15 - 11:45 a.m.

Concurrent Sessions

11:45 a.m. - 1:00 p.m.

Lunch with Vendors

11:00 - 2:00 p.m.

Concurrent Sessions

2:00 - 2:30 p.m.

Break

2:30 - 4:00 p.m.

Concurrent Sessions

4:15 p.m.

Geocaching/Poker Run

6:30 p.m.

Dinner and Social

## Friday, October 30th

7:30 - 8:30 a.m.

Continental Breakfast

8:30 - 10:00 a.m.

Concurrent Sessions

10:00 - 10:30 a.m.

Break for Room Check-out

10:30 - 11:30 a.m.

Closing Speaker *Dr. William Baker*

11:30 - 12:00 p.m.

Awards Presentation and Prize Giveaway



# Arkansas State Land Information Board and State Geographic Information Office

The Geographic Information Systems Board, formerly called the State Land Information Board, was originally created in 1997 by Arkansas Code 15-21-501. Governor Mike Huckabee appointed twelve initial board members who first met in 1998. Three each of the twelve appointees represent state entities; city, county and local government; the private sector; and institutions of higher education. The thirteen voting members serve for a term of four years.

The Board supports economic development and an improved quality of life for Arkansas citizens by providing basic spatial data infrastructure, coordinating geographic information activities, and creating short- and long-term strategies that will result in improved decision making, effective asset management, and reduced costs.

ACT 244 of the 87th General Assembly renamed the Board as the Arkansas Geographic Information Systems Board and added the State Chief Technology Officer as the thirteenth voting member of the board. The State GIS Board works closely with the Arkansas Geographic Information Office.

## GIS Board Members

Name	Affiliation	Represents
Judge Clayton Castleman	Little River County	Local Government
Judge Jerry Hunton	Washington County	Local Government
Kasey Summerville	Clark County	Local Government
Dr. Robert Kissell	U of A, Monticello School of Forest Resources	Higher Education
Dr. Jackson Cothren	U of A, Fayetteville Center for Advanced Spatial Technologies	Higher Education
Dr. Margaret McMillan	U of A, Little Rock Department of Earth Sciences	Higher Education
Mr. Glen Dabney	Kingwood Forestry Inc.	Private Sector
Mr. John Ed Isbell	NTB Associates	Private Sector
Mr. Randy Everett	First Electric Cooperative	Private Sector
Ms. Bekki White	Ark Geological Comm	State Government
Mr. Earl Smith, Vice Chair	Ark Soil & Water Conservation Commission	State Government
Ms. Tracy Moy, Chair	Arkansas Game and Fish Commission	State Government

20 Years of Mapping the Natural State

**“A Spatial Quest: Twenty Years of Mapping the Natural State”  
2009 SYMPOSIUM SCHEDULE AT A GLANCE**

**Wednesday, October 28, 2009**

Tracks	<b>Arc GIS Server IA Maple/Walnut</b>	<b>Framework Data IB Hickory</b>	<b>Educational and Volunteer Opportunities IC Oak</b>	<b>Emergency Response ID Willow</b>
3:00p	<b>ArcGIS Server</b> Understanding and Implementing ArcGIS Server with Starter Templates <i>Dan Haag and Russell Gibson</i>	<b>FW</b> NHD: Stewardship Progress in AR <i>Katy Hattenhauer</i>	<b>EVO</b> Developing GIS Community Projects <i>Cassady Bloch, Joey Chatterton, James Reed</i>	<b>ER</b> Ozark-St. Francis NF Geospatial Response to Ice Storm 2009 <i>Tammy Hocut</i>
3:30p		<b>FW</b> Arkansas Centerlines and Physical Address Data, Past -Present-Future <i>Adrian Clark, GISP</i>	<b>EVO</b> Geospatial Endeavors in EAST, GIS/GPS savvy students who provide a wealth of mapping opportunity for their communities <i>Robin Gregory</i>	<b>ER</b> Wildlife Hazard Assessment - Benton County <i>Elizabeth Bowen</i>
4:00p	<b>ArcGIS Server</b> Real Stories of ArcGIS Server Implementation-Stepping Stones to Success from Those Who've Made it!	<b>FW</b> Parcel Maintenance - Accessor's Viewpoint <i>Todd Davis</i>	<b>EVO</b> Educating Geospatial Professionals for a Decade in Arkansas: The SIS Program <i>Dr. Bob Weih</i>	<b>ER</b> Emergency Response through IDIQ: The Rock River Ice Jam <i>Scott Perkins</i>
4:30p		<b>FW</b> The Northwest Arkansas Travel Demand Model - Results and Scenarios <i>John McLarty &amp; Cristina Scarlat</i>	<b>EVO</b> Arkansas New Stream Team Web Portal <i>Brian Culpepper</i>	<b>ER</b> Conducting Environmental Micro-Assessments Using Mobile Computers with Integrated GPS <i>Brady Davis</i>

**Thursday, October 29, 2009**

Tracks	<b>ASPRS 2A Maple/Walnut</b>	<b>Web Solutions Historical &amp; Archaeological 2B Hickory/Oak</b>	<b>Project Mgmt. &amp; Planning Using Tools 2C Willow</b>	<b>ESRI Software Licensing Earth Science 2D Sycamore</b>
8:30a	<b>ASPRS</b> A Comparison of Land Use/Land Cover Classification Methodologies for Hot Springs, Arkansas <i>Dr. Bob Weih</i>	<b>WS</b> Arkansas Wetlands Information System <i>Brian Culpepper</i>	<b>PMP</b> GIS for Farmland Assessment <i>Bill Wetzel</i>	<b>ESRI Software Licensing</b> Updates, Changes, Good Practices <i>Jean Jeannotte with Ed Crane</i>
9:00a	<b>ASPRS</b> Terrestrial Habitat Mapping of the Ozark Mountains and Arkansas River Valley <i>Bruce Gorham</i>	<b>WS</b> Connecting Arkansas with the Web Soil Survey <i>Katie Teague</i>	<b>PMP</b> Creation and Uses of Local Linear Referencing System at the AHTD <i>Christopher Davis &amp; Greg Nation</i>	<b>Earth Science</b> Analysis of landscape feature orientation and geological effects <i>James Kaufmann &amp; Mark Hudson</i>
9:30a	<b>ASPRS</b> An Aerial Perspective on the Satellite Imagery Industry <i>Michael Flynn</i>	<b>WS</b> Using a Web-Based Geographical Information System to Access Geophysical Logs and the Top of Aquifers and Confining Units in the Mississippi Embayment <i>Drew Westerman</i>	<b>PMP</b> Troubleshooting Parcel Data <i>Bill Wetzel</i>	<b>Earth Science</b> Relationship of Nitrate Concentrations to Karst Features in the Buffalo River Watershed <i>Timothy Kresse &amp; Phillip Hays</i>

**Break**

# 10<sup>th</sup> Biennial Symposium

Tracks	<b>ASPRS 2A Maple/Walnut</b>	<b>Web Solutions Historical &amp; Archaeological 2B Hickory/Oak</b>	<b>Project Mgmt. &amp; Planning Using Tools 2C Willow</b>	<b>ESRI Software Licensing Earth Science 2D Sycamore</b>
10:15a	<b>ASPRS</b> A New Generation of US Geological Survey (USGS) Topographic Maps <i>Kari Craun</i>	<b>WS</b> Graphically Monitoring the State Network (near-real time) <i>Learnon Dalby</i>	<b>PMP</b> Analysis of Digital Elevation Models and other Raster Data for Setting Aquatic and Terrestrial Conservation Priorities <i>Ethan Inlander</i>	<b>Earth Science</b> Providing the Public with a High Quality Seamless Soil Survey <i>Leslie Glover</i>
10:45a	<b>ASPRS</b> Developing a Process for Rapid Collection and Processing of Aerial Imagery with the TerraHawk Imaging System: <i>Bruce Gorham &amp; Dr. Jackson Cothren</i>	<b>WS</b> Advanced ArcGIS Server Configurations <i>Glen Rhea</i>	<b>PMP</b> Assessment of Object-Oriented Feature Extraction to Support the USCoE Mitigation and Recovery Land Cover Mapping Series <i>David Shaver</i>	<b>Earth Science</b> Soil Data Viewer Tool for ArcGIS <i>Edgar Mersiovsky</i>
11:15a	<b>ASPRS</b> Satellite Imagery Analysis of the Pisco, Peru Earthquake <i>Adam Barnes &amp; Dr. Jackson Cothren</i>	<b>WS</b> Geospatial Decision Support in the Fayetteville Shale: the LINGO Project <i>Malcolm Williamson &amp; Dr. Jackson Cothren</i>	<b>PMP</b> Aquifer Restoration in AR and LA through Science, Monitoring and Partnerships <i>Patrick Higgins &amp; David Freiwald</i>	<b>Earth Science</b> Example of Soil Data Use in Geospatial Analysis <i>Dwain Daniels</i>

## Lunch with Vendors

1:00p	<b>ASPRS</b> Leveraging LIDAR for a Wetland Assessment Model in the Bayou Meto Watershed <i>Dr. Jason Tullis</i>	<b>HA</b> Boomtowns: Leslie and Cotton Plant, Arkansas <i>Christopher Davis</i>	<b>PMP</b> Using GPS and GIS Technology in "Operation Mongoose" the Northern Snakehead Eradication project conducted by the AGFC <i>Scott Lane</i>	<b>Earth Science</b> - Earth Science Application of Hillshaded DEMs <i>Roger Miller</i>
1:30p	<b>ASPRS</b> The Reconnaissance Level GIS Mapping of Major Quaternary Features on the Arkansas Gulf Coastal Plain <i>W. J. Bennett, Jr.</i>	<b>HA</b> Using GIS to Integrate Landscape, Memory, and Sense of Place: A Case Study from the Arkansas Ozarks <i>Mary Brennan</i>	<b>PMP</b> GIS, Engineering Jobs in Progress & the Executive Board <i>James RainsShaver</i>	<b>Earth Science</b> Data-Driven Lake and Reservoir Monitoring Using Real-Time 3-D Hydrodynamic and Water-Quality Simulations <i>Reed Green</i>

## Break

2:30p	<b>ASPRS</b> Making use of the FREE Landsat Data Archive <i>Michael Starbuck &amp; Keith Landgraf</i>	<b>HA</b> The Virtual Hampson Museum: Complete 3D Artifacts Available for Free Download and Viewing <i>Angelia Payne</i>	<b>UT</b> A Picture Is Worth A Thousand Words-Using GPS/Compass Enabled Camera For GIS Mapping <i>Ashok Wadwani</i>	<b>Earth Science</b> USGS Land Cover Activities <i>Chris Barnes</i>
3:00p		<b>HA</b> Modeling the Pre-Euroamerican Landscape with GIS <i>Dr. Bob Weih</i>	<b>UT</b> Using the Geospatial Interface (GI) to optimize methods for displaying and outputting GIS data and products <i>Tina Rotenbury</i>	<b>Earth Science</b> From Paper Geologic Worksheets to ArcGeology Data Model <i>Susan Horvath</i>
3:30p		<b>HA</b> CORONA Atlas of the Near East <i>Adam Barnes &amp; Dr. Jackson Cothren</i>	<b>UT</b> Using GIS Tools for Rapid Watershed Assessments <i>Edgar Mersiovsky</i>	<b>Earth Science</b> Calculating Morphometric Indices for Landform Analysis Using GIS and DEMs <i>Beth McMillan</i>

**4:15 p.m. Geocaching/Poker Run  
6:30 p.m. Dinner and Social**

## 20 Years of Mapping the Natural State

Friday, October 30, 2009

Tracks	<b>GIS in General 3A Maple/Walnut</b>	<b>GeoStor 3B Hickory/Oak</b>
8:30a	<b>GIS in General</b> 2010 Census: What to Expect <i>Sunny Farmahan</i>	<b>GeoStor</b> Going Where no GIS Platform Has Gone Before <i>Shelby Johnson</i>
9:00a	<b>GIS in General</b> Smart Grid, Electric Utilities and GIS <i>Randy Everett</i>	

**10:00 - 10:30 a.m. Break for Room Checkout**  
**10:30 - 11:30 a.m. Closing Speaker Dr. William Baker**  
**11:30 - 12:00 p.m. Awards Presentation and Prize Giveaway**

# Exhibitors



Name	Company	Phone	Email Address
Kevin Beers	Pictometry	888-771-9714	kevin.beers@pictometry.com
Jeff Breen	Science Applications International Corp.	703-676-9012	breenj@saic.com
Matt Calamito	Science Applications International Corp.	703-676-9012	calamitom@saic.com
Don Cleveland	Midland GIS Solutions	660-562-0050	shepherd@midlandgis.com
Ed Crane	ESRI	909-793-2853	ed_crane@esri.com
Brian Culpepper	CAST	479-575-2622	brian@cast.uark.edu
Glen Dabney	Eagle Forestry Services/EFS GeoTechnologies	870-460-9994	glen.dabney@geotech.com
Michael Flynn	MJ Harden, Inc.	913-981-9600	michael.flynn@geoeye.com
Dave Freiwald	USGS	501-228-3618	freiwald@usgs.gov
Dan Haag	ESRI	909-793-2853	dan_haag@esri.com
James Hartshorn	Eagle Forestry Services/EFS GeoTechnologies	870-460-9994	jhartshorn@geotech.com
Phillip Hays	USGS	479-575-7343	pdhays@usgs.gov
Chad Hicks	Navigation Electronics Inc.	337-237-1413	chad_hicks@neigps.com
Jean Jeanotte	ESRI	909-793-2853	jean_jeanotte@esri.com
Michael Kallas	MJ Harden Associates, Inc.	913-981-9600	kallas.mike@geoeye.com
Bryan Kramer	ITT Visual Information Solutions	303-786-9900	bkramer@ittvs.com
Randy Mayden	Surdex Corporation	314-779-7742	randym@surdex.com
Pete McIntosh	ITT Visual Information Solutions	303-786-9900	pmcintosh@ittvis.com
Mike Mitchell	a.c.t. GeoSpatial, Inc.	501-771-2985	mmitchell@actgeospatial.com
Sam Moffat	Fugro EarthData	301-948-8550	lhunter@earthdata.com
Stacey Priest	ESRI	909-793-2853	stacey_priest@esri.com
Tom Scott	a.c.t. GeoSpatial, Inc.	501-771-2985	tscott@arcamatech.com
Larry Segó	USGS	573-308-3744	lsegó@usgs.gov
Bill Sneed	USGS	501-228-3665	wsneed@usgs.gov
Ashok Wadwani	Applied Field Data Systems, Inc.	281-579-0492	afdcsw@aol.com
Bill Walker	Surdex	314-779-7742	billw@surdex.com
Bill Wetzel	The Sidwell Company	630-549-1000	bwetzel@sidwell.com
Malcolm Williamson	CAST	479-575-2622	malcolm@cast.uark.edu
Bill Wilson	Surdex Corporation	636-532-3427	billw@surdex.com

# Keynote Speakers



**Dr. Steven Foster**

**The Foster Group**

**Eureka Springs, AR**

Author, photographer, and consultant in medicinal and aromatic plants, Steven Foster has traveled the world exploring herbal traditions for 35 years. Foster is the author 16 books, including senior author of three Peterson Field Guides and National Geographic's *A Desk Reference to Nature's Medicine*, a 2007 New York Public Library "Best of Reference." Steven makes his home in Eureka Springs, Arkansas.



**Dr. David J. Cowen**

**Professor Emeritus at the University of South Carolina**

**Columbia, SC**

David J. Cowen is a Distinguished Professor Emeritus at the University of South Carolina. During his career at the University of South Carolina he was chair of the Department of Geography, Director of the Liberal Arts Computing Lab, co director of the Center for GIS and Remote Sensing, and a Carolina Distinguished Professor. He is currently a member of the Department of Interior's new National Geospatial Advisory Committee, a member of the NRC Board on Earth Sciences and Resources, the Vice President of the Geographic Information Systems Certification Institute and a National Associate of the National Academy of Sciences. Between 2000 and 2006 he chaired the Mapping Science Committee of the National Research Council and recently chaired the NRC Study Committee "Land Parcel Databases: A National Vision". He is the 2005 recipient of the ESRI Lifetime Achievement Award in GIS. Since 1967 his research and teaching interests have focused on the development and implementation of geographic information systems in a wide range of settings.



**Dr. Bill Baker**

**USDA Foreign Agriculture Service**

**Washington, DC**

Bill Baker works for the United States Department of Agriculture as a Crop Analyst. His efforts support the Office of Global Analysis with its mission to provide independent information concerning the area and production capacity of the major crop growing regions in the world. He is currently on temporary assignment in Diwaniyah, Iraq serving as an Agriculture Advisor for the US State Department as member of a Provincial Reconstruction Team. GIS and remote sensing have played a large part in his current job, and in previous University research work in the field of precision agriculture.

# Concurrent Session Abstracts



## Track I – Wednesday, October 28, 2009

### Track IA: Arc GIS Server Maple/Walnut Rooms

**3:00 – 4:00 p.m.**

#### **Understanding and Implementing ArcGIS Server With Starter Templates**

Authors and Presenters: Dan Haag, ESRI and Russell Gibson, City of Fort Smith

Publishing your GIS resources to the Web can be a daunting experience the first time it's done, but the technologies are more robust, the tools and templates to help you get started are much better, and many organizations are gaining a lot of benefit from using this convenient way to communicate geospatial information more widely and more effectively. A basic understanding of the underlying technology as well as being comfortable with the terminology and techniques of 'best practices' as you get started is essential. This one-hour session will introduce concepts and get you started on the road to successfully implementing ArcGIS Server, and set up the next hour which will be focused on the on-the-ground recent experiences of several of your colleagues standing up ArcGIS Server web sites.

**4:00 – 5:00 p.m.**

#### **Real Stories of ArcGIS Server Implementation—Stepping Stones to Success from Those Who've Made It!**

Various Presenters:

The session is planned in two parts, the first being showing off a couple of examples of recent AGS sites and brief suggestions of what to do and not do in the process. Following these two examples, there will be a facilitated discussion with several attendees who've been working these and other AGS implementations that will give you real-world answers to questions about what is involved, what kind and how much training is needed, and what to expect along the way to getting a good site up and running.

### Track IB: Framework Data Hickory Room

**3:00 – 3:30 p.m.**

#### **NHD: Stewardship Progress in AR**

Author and Presenter: Katy Hattenhauer, ADEQ

The Arkansas Department of Environmental Quality (ADEQ) officially accepted the role of the NHD Steward for the State of Arkansas on October 15, 2008. Since that time the AR Technical Working Group (TWG) has grown and continues to develop policies and instructions to make the NHD in AR more outstanding. The TWG has developed and attended meetings and trainings. A status map has been made to assist the TWG in their editing processes. With all of these things combined, the TWG is moving forward to develop and maintain higher resolution NHD datasets across the state.

**3:30 – 4:00 p.m.**

#### **Arkansas Centerlines and Physical Address Data, Past-Present-Future**

Author and Presenter: Adrian "Butch" Clark, Sr. GIS Analyst, Arkansas Geographic Information Office (AGIO)

## 10<sup>th</sup> Biennial Symposium

The Arkansas Centerline File Program (ACF) was initiated in 2002 with the goal of developing state-wide road centerline features in a standardized GIS format. Since that time, 72 of the state's 75 counties have completed, and are currently maintaining, ACF features as part of their daily E9-1-1 business activities. Currently, the AGIO is working with Calhoun, Izard, and Newton Counties in cooperative projects that will include complete physical addressing and mapping of these 3 remaining counties; thereby, completing the ACF for the entire state. This is a huge accomplishment and will provide great benefits to our state. The future uses of this data and the logical "next big step", which is state-wide address point features, is the focus of this presentation. The audience will achieve an understanding of how we arrived at this point of development, the importance of ACF maintenance (including address point correlation), and the many applications of a state-wide address point file.

**4:00 – 4:30 p.m.**

### **Parcel Maintenance - Assessor's Viewpoint**

Author and Presenter: Todd Davis, GIS Analyst Benton County Assessor's Office

This presentation includes a detailed look at the process of creating and maintaining parcel data and documents for use by the Assessor Department, as well as a review of different ESRI products and how they are used by the Benton County Assessor's Office. Also discussed are various examples of the data layers created for the Assessor to administer a more accurate, equitable and timely assessment of property. Finally, we will look at how other entities use and benefit from the Assessor's data, as well as the distribution of the data via our public website.

**4:30 – 5:00 p.m.**

### **The Northwest Arkansas Travel Demand Model –Results and Scenarios**

Author and Presenter: John McLarty, Cristina Scarlat, Northwest Arkansas Regional Planning Commission

A Travel Demand Model has been developed for the Northwest Arkansas region (Benton and Washington Counties) by the Northwest Arkansas Regional Planning Commission and the Arkansas Highway and Transportation Department for 2005, 2010, 2015 and 2030. Northwest Arkansas is without doubt one of the most dynamic and economically vibrant areas in the state and also in the country, attracting an increase in population without precedent for the area. The transportation challenges caused by this increase in population are addressed through a comprehensive travel demand model. Geographic Information Systems were extensively used in developing the structure and mechanisms for deploying the model. The various data models and their results and model scenarios will be presented and discussed in this presentation

## **Track I C: Educational and Volunteer Opportunities**

### **Oak Room**

**3:00 – 3:30 p.m.**

### **Developing GIS Community Projects**

Authors and Presenters: Cassidy Bloch, Joey Chatterton, James Reed, of the EAST Program, Eureka Springs HS

High school EAST students in Eureka Springs, Arkansas, use GIS to serve their community through various mapping projects. Students have taken earlier mapping projects and added new analytical dimensions to them. For example, for their fire hydrants project, students started with analyzing one-way streets, narrow streets that fire trucks cannot use, and the city's main water lines. The students are currently including other elements, like elevation data, to further help the emergency personnel. Additional mapping projects include School Bus Routes (Network Analyst), Springs and Storm Drains (ArcGlobe, ArcScene), Hobbs State Park (Spatial Analyst).

**3:30 – 4:00 p.m.**

### **Geospatial Endeavors in EAST, GIS/GPS savvy students who provide a wealth of mapping opportunity for their communities**

Author and Presenter: Robin Gregory, Center for Advanced Spatial Technology (CAST), University of Arkansas

As a partner in the EAST Initiative since 1996, CAST staff (aka EAST Support Team) are growing geospatial endeavors reaching over 215 schools in 8 states. CAST provides geospatial support to nearly 17,000 students a year using ArcGIS, Pathfinder Office, and TerraSync software. This combination of software and support from CAST staff allows EAST students to apply learning cooperatives with multiple agencies developing community projects. EAST students use GIS/GPS to assess impacts, create bus routing improvements, and provide

## 20 Years of Mapping the Natural State

raw critical data for emergency management, cultural and environmental issues. A new generation of geospatially enriched youth are mapping the Mississippi and Arkansas Delta's historical heritage, providing 3D tornado siren buffers, fire hydrants for multiple locations, ecotourism guides and many more. These nationally recognized students are therefore raising-the-bar to enable an upcoming and capable geospatial workforce. One could consider this EAST program presentation an introduction to GIS/GPS community assets across Arkansas and abroad.

**4:00 – 4:30 p.m.**

### **Educating Geospatial Professionals for a Decade in Arkansas: The SIS Program**

Author and Presenter: Dr. Robert C. Weih, Director, Spatial Information Systems (SIS) Program, University of Arkansas at Monticello

The Spatial Information Systems (SIS) program at the University of Arkansas at Monticello (UAM) School of Forest Resources creates a spatial learning environment that allows students to explore, investigate, analyze, question, learn, and make decisions in an interactive holistic manner. The graduates (the drivers) meet the growing demand for a 21st-Century geospatial workforce. The Spatial Information Systems program leads to a Bachelor of Science in SIS or an Associate of Science in Land Surveying Technology. The curriculum incorporates Geographic Information Systems (GIS), Global Positioning Systems (GPS), Surveying, and remote sensing technology as well as critical general education and supportive requirements. The program provides students, with the surveying option, the technical skills and education to take the Arkansas state survey licensure exam and become a land surveyor. The program started to offer classes in 1999.

Learn the history and the political up/downs of getting the SIS Program funded and started. Also, how the faculty balances training and education in a geospatial program, while empathizing good communication skills. We use a problem base learning approach and all students are required to meet certain core competencies to be successful in a course.

**4:30 – 5:00 p.m.**

### **Arkansas New Stream Team Web Portal**

Authors and Presenters: Brian Culpepper (CAST), Andy Taylor and Steve Filipek (AGFC)

Arkansas is blessed with thousands of miles of streams that provide recreation, drinking water and serenity for all Arkansans and our visitors, but they need our help. Arkansas' Stream Team volunteers answer the call and provide much needed assistance with water quality data collection and streamside cleanups in support of this important resource. Arkansas Stream Team members are people with an interest in the health and quality of Arkansas' beautiful streams.

The Arkansas Game and Fish Commission (AGFC) has developed a new Stream Team web portal to facilitate the collection, storage and dissemination of all Stream Team related information and water quality datasets. This session will explore Arkansas' new Stream Team website and demonstrate the strategies employed for organizing thousands of users and managing the valuable 'crowd-sourced' datasets collected by these passionate volunteers.

## Track ID: Emergency Response Willow Room (downstairs)

**3:00 – 3:30 p.m.**

### **Ozark-St. Francis NF Geospatial Response to Ice Storm 2009**

Author and Presenter: Tammy Hocut, GIS Coordinator, U. S. Forest Service, Ozark-St. Francis National Forest

On Tuesday, January 27, 2009, an ice storm began over the northern and central parts of Arkansas and Southeastern Oklahoma, which included freezing rain and sleet. With bitterly cold air temperatures, ice began to form on all vegetation. The storm continued sporadically over the next two days with limbs and trees breaking and loss of power and phone communications to an estimated 200,000 Arkansans and Oklahomans at one point. Roads and highways were impassable. It is estimated that over 500,000 acres on the Ozark-St. Francis has been affected – some areas have received virtually no damage, while other areas have been very hard hit with pines and hardwoods bent over, split, tops broken out, or the entire tree down, especially in upper elevations. Quick response to assess resource damage, tracking or road clearing for emergency access, production of data for quick contracting to clear roads for emergency access, and modeling of damage assessment levels of the resources was produced from a corporate GIS based locally on the forest and from the new centralized corporate data warehouse in Kansas City. This type of process and data is used to produce damage assessment values of "low", "moderate", and "severe" to be able to report numbers and dollars to Regional offices and Washington offices for events like weather (ice storms, hurricanes, etc.) or events like fires.

**3:30 – 4:00 p.m.**

### **Wildfire Hazard Assessment – Benton County**

Authors: Elizabeth Bowen, Chris Angel (GIS) and Marshal Watson (Department of Emergency Management)

Presenter: Elizabeth Bowen, GIS Coordinator Benton County

The Department of Emergency Management and the GIS Department have worked together to use GIS tools for a wildland fire risk assessment by parcel and neighborhood to assist in creating the Benton County Wildfire Mitigation Plan. There are five primary factors that determine the nature and severity of a wildfire hazard to structures in the wildland-urban interface. These factors are means of access, vegetation, topography, building construction and available fire protection. In this presentation you will hear about the need and goals of the project, see models and tools that were used to get the most from available datasets to answer the questions such as defensible space, slope, utility placement, etc that lead to the hazard rating determinations. Hear how GIS saved hundreds of man hours to complete this plan.

**4:00 – 4:30 p.m.**

### **Emergency Response through IDIQ: The Rock River Ice Jam**

Author and Presenter: Scott R. Perkins, Wilson & Company, Inc., Engineers & Architects

The Rock River Ice Jam project showcases the emergency response capabilities possible between service providers and government agencies through QBS selected Indefinite Delivery/Indefinite Quantity (IDIQ) Contracts. In merely six hours Wilson & Company, Inc., Engineers & Architects negotiated to complete an emergency flood imagery project, planned the photo mission, traveled to the project area in Rock Island, Illinois, and captured 90 frames of imagery of ice flows and flooding along the Rock River. Wilson & Company had a multiyear IDIQ with the US Army Corps of Engineers – Rock Island District (CEMVR), and offered same-day response when tasked by CEMVR to capture imagery that would serve as a historic record of the event and aid in future flood planning.

**4:30 – 5:00 p.m.**

### **Conducting Environmental Micro-Assessments Using Mobile Computers with Integrated GPS**

Author and Presenter: Brady Davis, B.S Emergency Administration and Management, Manger, IT Department at Center for Toxicology and Environmental Health

During an environmental catastrophe, rapid assessments conducted by first responders determine the decisions that are made by officials to mitigate the situation. Photos, maps, drawings, and notes are some of the types of media used to portray critical information. We have identified four entities that are crucial during an incident and developed software to collect and report this information in near real-time: Source, Instrument, Event, Receptor Awareness (SIERA) is a software suite consisting of a mobile client for data collection and a web-based application for review and reporting information. SIERA is essentially a digital project log book with the ability to geographically tag photos and events in chronological order.

## **Track 2 – Thursday, October 29, 2009**

### **Track 2A:**

### **American Society for Photogrammetry & Remote Sensing sponsored session Maple/Walnut Rooms**

**8:30 – 9:00 a.m.**

### **A Comparison of Land Use/Land Cover Classification Methodologies for Hot Springs, Arkansas**

Authors and Presenters: Norman D. Riggan, Jr. and Robert C. Weih, Jr.

Land Use/Land Cover (LULC) classification data have proven to be valuable assets for various governmental agencies, park managers, and natural resource managers. Traditional pixel-based classification methods have difficulty with high-resolution imagery, resulting in a “salt and pepper” appearance. Newer object-based methods may prove to be more accurate. This study compared an object-based classification procedure utilizing Feature Analyst© software with a traditional pixel-based methodology (supervised classification) when applied to medium-spatial resolution satellite imagery merged with high-spatial resolution aerial imagery. This study utilized two multi-spectral SPOT-5 satellite images, leaf-on and leaf-off, merged with a color infrared aerial image. Because of correlation between some of

## 20 Years of Mapping the Natural State

the bands of the merged image, Principal Component Analysis (PCA) was used to reduce redundancy in the data. Field data was collected in the study area to serve as a reference for the accuracy assessment. A training set was produced by selecting and identifying specific LULC class-types using 1-foot high-spatial resolution aerial imagery. This training set was used by both of the classification methods (supervised and object-based) to identify the various cover types within the study area. An accuracy assessment was performed on each image utilizing error matrices, the Kappa coefficient, and a two-tailed Z-test. Results indicate that the overall accuracy of the object-based classification was 82.0%, while the pixel-based classification was 66.9%. A Kappa analysis and a two-tailed Z test were calculated. These values indicated a significant difference in the overall accuracies of the classifications.

**9:00 – 9:30 a.m.**

### **Terrestrial Habitat Mapping of the Ozark Mountains and Arkansas River Valley**

Author and Presenter: Bruce Gorham, CAST

The intent of this project was to delineate Terrestrial Habitats (TH) within the Boston Mountains and northern Arkansas River Valley. Two map sets were produced. The first map, based on 30-meter resolution data, encompasses the Boston Mountain and northern Arkansas River Valley ecoregions. The second map, at 5-meter resolution, depicts seven Arkansas Natural Heritage Commission “National Areas” within the overall study area.

Several spatial datasets were employed including aerial photography, satellite imagery, datasets derived from elevation and stream data, sun azimuth and altitude data, etc. Field samples for each habitat type were collected. The methodology included three main tasks: preprocessing, model development, and accuracy assessment/revision.

The final TH map, including unsampled categories, such as urban, water, and cropland, had an overall accuracy of 91%. The average accuracy for sampled TH categories was 76%. With minor ruleset and data input modifications the resulting “rules-based” model can be adapted for other ecoregions.

**9:30 – 10:00 a.m.**

### **An Aerial Perspective on the Satellite Imagery Industry**

Author and Presenter: Michael Flynn, GISP. Operations Manager, MJ Harden

In the 1990's there was much speculation and fear in the aerial imagery business that satellites would dominate image acquisition globally as new high resolution commercial satellites came online. These fears were unfounded. Today, as new even higher resolution satellites come online, the speculation has resurfaced. This presentation will discuss what satellite derived imagery is available commercially, how the imagery is being used, and how you can find it. The presentation will also address our companies' perspective on how complimentary these different approaches are in solving the unique challenges faced by image users.

**10:00 – 10:15 a.m. – Break (Please visit with the vendors)**

**10:15 – 10:45 a.m.**

### **A New Generation of U.S. Geological Survey (USGS) Topographic Maps**

Authors: Michael Cooley, Kari Craun

Presenter: Kari Craun, U.S. Geological Survey

The “Digital Map - Beta” ([nationalmap.gov/digital\\_map](http://nationalmap.gov/digital_map)) is the first step toward a new generation of digital topographic maps delivered by the U.S. Geological Survey. These maps are built from The National Map data, which are integrated from local, State, Federal, and other sources. The initial version of the “Digital Map – Beta” includes orthoimagery plus roads and geographic names in the traditional 7.5 minute quadrangle format. “Digital Maps - Beta” are available free on the Web in the GeoPDF® format.

Tools are available free for download. Users can navigate the map, zoom in and out, select various layers, and print the maps. Use of the term “Beta” signifies that these maps are initial versions that do not yet contain the full content of the traditional USGS topographic quadrangle maps. In 2010, the USGS will add historical versions of the topographic maps and will incorporate other data layers including hydrography and contours.

**10:45 – 11:15 a.m.**

### **Developing a Process for Rapid Collection and Processing of Aerial Imagery with the TerraHawk Imaging System: Lessons from Arkansas' 2008 Flood Event**

Authors and Presenters: Bruce Gorham and Jackson Cothren

In the spring of 2008 much of Arkansas experienced a major flooding event. CAST researchers partnered with the Arkansas Game and Fish Commission (AGFC) to document and measure the extent of this flooding within eight AGFC Wildlife Management Areas (WMAs) located in the Mississippi River Valley. Project investigators utilized a TerraHawk aerial imaging system with a DuncanTech multi-spectral camera to capture color-infrared images of the flooding. Additionally, innovative techniques were developed to automate the rectification and geo-referencing of the aerial images. Though the TerraHawk system was not specifically designed for large-scale data collection, the collected images, after processing, offered valuable insight to AGFC resource planners regarding the flooding patterns within this region. This imaging system, both hardware and software components, provides CAST researchers with the ability to conduct versatile research in precision agriculture, forestry, rapid response techniques for emergency management, and other areas where near-real-time imagery is critical.

**11:15 – 11:45 a.m.**

### **Satellite Imagery Analysis of the Pisco Peru Earthquake**

Authors and Presenters: Adam Barnes and Jackson Cothren

During the August 15, 2007 Pisco, Peru Earthquake (Mw=8.0), a massive liquefaction-induced lateral spread occurred on a marine terrace near Canchamaná, Peru. The Canchamaná lateral spread appears to be one of the largest lateral spreads (if not the largest) ever documented. However, due to the size of the feature it was difficult to spatially quantify the magnitude of the displacements in the field. Therefore, pre- and post-earthquake high-resolution satellite images of the area were acquired by the GEER team and analyzed by personnel from the Center for Advanced Spatial Technology (CAST, at the University of Arkansas) as a means to determine the magnitude and spatial variability of the lateral displacements. The tasks of this research are to determine: (1) if high-resolution satellite image processing can be used to quantify the extent, magnitude, and direction of displacements associated with lateral spreading, and (2) what quality of raw satellite images and level of processing (i.e. cost) is needed to achieve accurate results. This paper details steps that have been taken toward answering these questions.

**11:45 a.m. – 1:00 p.m. - Lunch with the Vendors**

**1:00 – 1:30 p.m.**

### **Leveraging LIDAR for a Wetland Assessment Model in the Bayou Meto Watershed**

Authors: Dr. Jackson Cothren, Malcolm Williamson and Dr. Jason Tullis

Presenter: Dr. Jason Tullis

CAST researchers are working on a pilot project with the Arkansas Natural Resources Commission (ANRC), which will develop a GIS model, using both on-site and off-site variables, to predict wetland condition at a landscape level. The Arkansas Multi-Agency Wetland Planning Team (MAWPT) has previously evaluated the utility of the Landscape Development Intensity (LDI) index as an assessment tool in the Delta Ecoregion, but has deemed it insufficiently correlated with Level 2 and 3 assessments. The primary problem appeared to be that LDI only considered factors outside the wetland.

The project goal was to develop a model that would attempt to right the failings of the LDI. Multi-return LiDAR data was employed to create proxy variables for forest structure. In addition, spectral signatures of digitally collected aerial photography were explored as a proxy for vegetation vigor. This presentation will discuss the results of the GIS model, the challenges and effectiveness of leveraging LIDAR multi-return data within the Analysis and then compare those results with the HGM assessments already completed throughout the project area under previous studies.

**1:30 – 2:00 p.m.**

### **The Reconnaissance Level GIS Mapping of Major Quaternary Features on the Arkansas Gulf Coastal Plain**

Authors: Ed Hajic, William Isenberger, W. J. Bennett, Jr.

Presenter: W. J. Bennett, Jr.

This presentation describes the development of a reconnaissance-level, 1:24,000 scale GIS for the major quaternary geomorphic surfaces of the Arkansas Gulf Coastal Plain. This work was performed by Archeological Assessments, Inc. (AAI) for the Arkansas Multi-Agency Wetland Planning Team (MAWPT) which is comprised of state agency representatives promoting wetland conservation through the implementation of goals and objectives contained in the Arkansas Wetlands Strategy. The presentation discusses how various remotely sensed and previously constructed data sets, including soils information, were combined into a highly useful analytical tool to be used in wetland identification and management.

## 20 Years of Mapping the Natural State

**2:00 – 2:30 p.m. - Break (This will probably be your last opportunity to visit with our Vendors)**

**2:30 – 4:00 p.m.**

### **Making use of the FREE Landsat Data Archive**

Authors and Presenters: Michael Starbuck and Keith Landgraf - U.S. Geological Survey, Mid-Continent Geographic Science Center

The entire Landsat satellite data archive held at the USGS Earth Resources Observation and Science (EROS) facility is being made available free of charge over the Internet. This workshop will show participants how to take advantage of this unparalleled store of earth observation data, including how to search for and download images they need, how to import them into common software packages, and how to perform simple image viewing and analysis. Basic characteristics of the Landsat data will be discussed, and some example applications using Landsat data will be presented.

## Track 2B: Web Solutions/Historical and Archaeological Hickory/Oak Rooms

**8:30 – 9:00 a.m.**

### **Arkansas Wetlands Information System**

Authors: Brian Culpepper and Jack Cothren

Presenter: Brian Culpepper

The Arkansas Wetlands Resources Information Management System (AWRIMS) is an ArcGIS Server powered wetland decision support tool for the Arkansas Natural Resources Commission (ANRC). The AWRIMS project provides quantitative comparative analyses of wetland impacts within Arkansas. An overview of the web mapping and data analysis technologies provided within the data capture and status reporting of the wetland information system will be provided.

**9:00 – 9:30 a.m.**

### **Connecting Arkansans with the Web Soil Survey**

Author and Presenter: Katie Teague

The volume of soil classification maps, interpretive tables, and detailed soil maps contained within the Washington County Soil Survey are in high demand. However, as hard copies of the 1969 publication became scarce and internet access became commonplace, the Arkansas Online Soil Survey has emerged as a marvelous resource. Whether connecting real estate professionals to septic and engineering information, linking soil characteristics to K-12 landuse curricula, or assisting University students in securing specific soil series for their research, the online soil survey has had tremendous utility in supporting University of Arkansas Cooperative Extension Service outreach and education programming.

**9:30 – 10:00 a.m.**

### **Using a Web-Based Geographical Information System to Access Geophysical Logs and the Top of Aquifers and Confining Units in the Mississippi Embayment**

Authors: Rheannon M. Hart and Brian R. Clark, USGS

Presenter: Drew Westerman, USGS

As the demand for groundwater increases, so do the needs of water-resource managers for reliable data for determining the depth to the tops of aquifers and confining units. Depths to the top of aquifers and confining units were interpreted from more than 2,700 geophysical logs in parts of Alabama, Arkansas, Illinois, Kentucky, Louisiana, Mississippi, Missouri, and Tennessee, and stored digitally. These depths were then used to construct digital surfaces for the top of 10 formations within the Mississippi embayment for an area approximately 70,000 square miles.

The digital surfaces were developed as part of the U.S. Geological Survey's Mississippi Embayment Regional Aquifer Study to display a stratigraphic section based upon a user-defined location. A user can select a well location on a map, enter a well depth, and a virtual well and stratigraphic column are created for that location. The locations and images of nearby geophysical logs and previously published structure maps also are available from the web site. The web-based GIS uses open-source software with the spatial interpolation method of inverse distance-weighting used to create each digital surface.

## 10<sup>th</sup> Biennial Symposium

**10:00 – 10:15 a.m. – Break (Please visit with our vendors)**

**10:15 – 10:45 a.m.**

### **Graphically Monitoring the State Network (near-real time)**

Authors: Learnon Dalby, Glen Rhea

Presenter: Learnon Dalby, Arkansas Geographic Information Office (AGIO)

The Arkansas Department of Information Systems maintains the states network. Historically, the network has been monitored with text and tables. This made it difficult to determine if the location of an outage could be attributed to other elements, such as a storm. AGIO and DIS staff worked together to develop a near real time monitoring system that allows users to visually observe where outages are located. This allows the addition of weather and other factors to be included to develop a complete picture. This presentation will demonstrate the product including the software used to accomplish the task and how it proved useful during the 2009 ice storms.

**10:45 – 11:15 a.m.**

### **Advanced ArcGIS Server Configurations**

Author and Presenter: Glen Rhea, GeoStor Administrator, AGIO

Configuring ArcGIS Server for normal operations isn't real difficult but there are scenarios where a more advanced setup is required. Sometimes a load balanced, redundant architecture that is also cost effective is necessary, especially in today's economy. Some of the things that I have implemented to address those requirements is web map cache sharing (create once, share many), web farm architecture, and virtualization technology. The goal is to share these ideas to help others build successful implementations that are easier to manage, have more uptime, and still be cost conscious for the organization.

**11:15 – 11:45 a.m.**

### **Geospatial Decision Support in the Fayetteville Shale: the LINGO Project**

Authors and Presenters: Malcolm Williamson, Jackson Cothren

We describe the development of Geospatial Decision Support System (GDSS) funded through the Department of Energy's Low-Impact Natural Gas and Oil (LINGO) program. When fully deployed, this GDSS will provide regulators and gas producers operating in the Fayetteville Shale a platform to assess potential environmental impacts of proposed well pad, reserve pit, compressor station, gathering line and road placements. The system is web-based and will provide access to current geospatial data layers from a variety of sources. Two primary users are envisioned: 1) regulators at AOGC, ADEQ and ANRC who will have easy access to complex geospatial analysis to inform permitting decisions, and 2) producers who wish to vet infrastructure placement proposals and expedite permitting by efficiently communicating with regulators.

**11:45 a.m. – 1:00 p.m. – Lunch in the Vendor area**

**1:00 – 1:30 p.m.**

### **Boomtowns: Leslie and Cotton Plant, Arkansas**

Author and Presenter: Christopher Davis, Information Systems Analyst, AHTD

The Missouri and North Arkansas Railroad cut across Arkansas from Northwest of Eureka Springs to Helena, Arkansas in the early 20th Century. Along the way, many small towns sprang up overnight and existing towns boomed as a result of rail access to a once remote part of Arkansas. Leslie, in southeast Searcy County and Cotton Plant, in southwest Woodruff County are prime examples of just how areas can boom, and bust just as fast as a catalyst such as a railroad disappears.

**1:30 – 2:00 p.m.**

### **Using GIS to Integrate Landscape, Memory, and Sense of Place: A Case Study from the Arkansas Ozarks**

Author and Presenter: Mary Z. Brennan, Zone Archeologist, U. S. Forest Service, Pleasant Hill, Boston Mountain, Mt. Magazine Ranger Districts, Ozark-St. Francis National Forest

Cultural landscapes are opportunities to study complex interrelationships between people, cultural systems, and the environment. For the 19th and early 20th century settlers of the rural Arkansas Ozarks, kinship was an integral part of their survival strategies, empowering

## 20 Years of Mapping the Natural State

the mobilization of resources necessary to the practices of subsistence farming. This paper discusses the use of GIS to thematically model the landscape in context of kin group affiliations and interactions. Utilizing data from archeological fieldwork, archival sources, and oral histories, GIS modeling enables an understanding of “relatedness” beyond the genealogical definition, but instead as defined by individuals and groups whose daily activities and interactions shaped the landscape.

**2:00 – 2:30 – Break (Please visit with the Vendors...This will probably be your last opportunity)**

**2:30 – 3:00 p.m.**

### **The Virtual Hampson Museum: Complete 3D Artifacts Available for Free Download and Viewing**

Authors: Angelia Payne, Snow Winters, and Fredrick Limp

Presenter: Angelia Payne, CAST

The Virtual Hampson Museum Project is a next generation virtual museum that provides high-resolution, 3-dimensional data of scanned artifacts from the Native American collections at the Hampson Archeological Museum State Park in Wilson, Arkansas. The project uses close range 3D laser scanning to document and digitally archive over 400 artifacts from the collections in Wilson. Visitors to the online museum can view the artifacts in full 3D within their browser window using tools available in Adobe Reader. There is also a 3D Recreation of the Upper Nodena Village where the majority of the original artifacts were found. This paper will present the challenges in compiling, distributing, and presenting 3D datasets in an online environment.

**3:00 – 3:30 p.m.**

### **Modeling the Pre-Euroamerican Landscape with GIS**

Authors: R. Weih, Jr. and A. Dick

Presenter: Dr. Robert Weih, Jr., University of Arkansas at Monticello

Forested areas in the United States have been altered since the time of European settlement. There is increasing interest in comparing present day vegetation with that of the Pre-Euroamerican era to understand what changes have occurred in some of our more outstanding natural areas. Studies have been conducted using General Land Office (GLO) notes to understand historic vegetation surveys, but past studies focused on species present/absent lists. The GLO surveys included information about tree species, tree diameter and other physical features. This study used indicator kriging to interpolate the probability of tree species on the landscape using the GLO data from 62 townships. Once continuous probability models were developed, vegetation spatial patterns were analyzed throughout the sub-basin. This technique provided insight into what the vegetation pattern (spatially) was like prior to Euroamerican settlement within the Buffalo River sub-basin. It provided the base information necessary to quantify vegetation change and the spatial extent of that change. Based on this research it appears that post-Euroamerican fire suppression and agricultural practices with other human activities have been major contributors to change. Eastern Redcedar (*Juniperus virginiana*) and hickory (*Carya* sp.) have increased, while oak species (*Quercus* sp.) have decreased. Additionally 19% of the sub-basin has changed to non-forest.

**3:30 – 4:00 p.m.**

### **CORONA Atlas of the Middle East**

Authors and Presenters: Adam Barnes and Jackson Cothren

Archaeologists have long appreciated the extraordinary power of aerial photography and satellite imagery to aid in the discovery and interpretation of archaeological sites, the recognition of larger cultural landscape features such as roads, canals, and field systems, as well as the mapping and management of cultural resources. However, in the Near East, no imagery of adequate spatial resolution was available to archaeologists until 1995, when a large archive of US intelligence satellite images from the 1960s and 1970s, known as CORONA, were declassified and made publicly available. Because CORONA images are over 30 years old, they preserve a picture of archaeological sites prior to their destruction by recent industrialization and urban expansion, making CORONA imagery an absolutely unique resource that can never be replaced by new technologies. We will show how the web-map enabled atlas will facilitate the discovery of thousands of previously unknown archaeological sites, substantially change our understanding of older regional survey projects, offer new perspectives on known sites, and aid in the documentation and mapping of the cultural landscape features throughout the Near East.

**Concurrent Session Abstracts continued on page 25**

**Diamond Sponsor**



**United States Geological Survey**

The USGS serves the nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

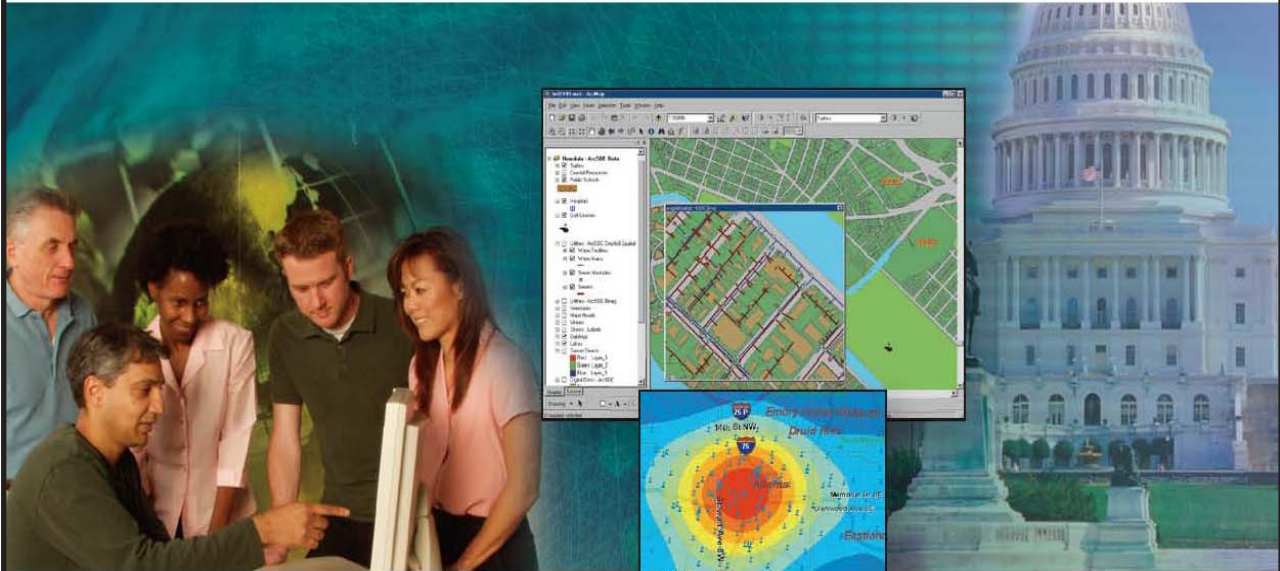
The National Geospatial Program provides leadership for USGS geospatial coordination, production and service activities. The Program engages partners to develop standards and produce consistent and accurate data through its Geospatial Liaison Network. Operational support is provided by the National Geospatial Technical Operations Center. These and other Program activities that are essential to the National Spatial Data Infrastructure (NSDI) are managed as a unified portfolio that benefits geospatial information users throughout the Nation.

The Water Resources Discipline (WRD) mission is to provide reliable, impartial, timely information that is needed to understand the Nation's water resources. WRD actively promotes the use of this information by decision makers to minimize loss of life and property as a result of water-related natural hazards, such as floods, droughts, and land movement; effectively manage ground-water and surface-water resources for domestic, agricultural, commercial, industrial, recreational, and ecological uses; protect and enhance water resources for human health, aquatic health, and environmental quality; and contribute to wise physical and economic development of the Nation's resources for the benefit of present and future generations.

United States Geological Survey  
401 Hardin Road  
Little Rock, AR 72211  
Phone: 501-228-3600  
Fax: 501-228-3601  
Web: [www.usgs.gov](http://www.usgs.gov)

Diamond Sponsor

# GIS—Better Decisions through Modeling and Mapping Our World



## ESRI Philosophy

ESRI believes that better information makes for better decisions. Our reputation is built on contributing our technical knowledge, our special people, and our valuable experience to the collection, analysis, and communication of geographic information. Founded in 1969, ESRI is the leading developer of GIS software with more than 300,000 clients worldwide.

Contact us today to learn how ESRI's GIS is helping to manage and improve government operations around the world.



1-800-447-9778

info@esri.com • www.esri.com

## Gold Sponsors



**a.c.t. GeoSpatial, Inc. (aGI), located in North Little Rock, AR. aGI is in the business of serving the GIS needs of Arkansas and the surrounding states. Our goal is to provide professional, "customer oriented" GIS service and deliver the highest quality GIS/Mapping products available. aGI currently provides its clients with the following services: GIS Consulting, Digital Cadastral Mapping, Land Records Management, E-911 products, GIS/CAMA Integration, GPS Data Collection, Remotely Sensed Imagery, and Assessment/Land Use Classification.**

**a.c.t. GeoSpatial, Inc.  
2900 Percy Machin Drive, Suite 1  
North Little Rock, AR 72114  
Phone: (501) 771-2985  
Fax: (501) 791-1930  
Email: [mmitchell@actgeospatial.com](mailto:mmitchell@actgeospatial.com)  
Web: [www.actgeospatial.com](http://www.actgeospatial.com)**



### **Center for Advanced Spatial Technologies (CAST)**

The Center for Advanced Spatial Technologies (CAST), located at the University of Arkansas, focuses on research, education, outreach, and applications in geomatics, including GIS, geospatial analysis and modeling, high density survey, enterprise spatial databases, remote sensing, digital photogrammetry, geospatial interoperability and other areas. Much of CAST's research efforts involve new approaches to spatial data collection, storage and innovative use in decision support within Arkansas and beyond. Our website: [www.cast.uark.edu](http://www.cast.uark.edu)

### **RGIS Mid-South Office**

While the Center is involved in a broad range of geospatial research and development of new approaches to the acquisition, management and analysis of spatial information, a key focus area is also our public outreach initiatives within Rural America. We are able to accomplish these community and local government "decision support" initiatives through a long-term USDA-CSREES funded effort called "The National Consortium for Rural GeoSpatial Innovations (RGIS)".

The RGIS consortium consists of 8 unique sites distributed around the United States which assist state, tribal, regional and local governments as well as non-profit and private organizations in the implementation and adoption of advanced geospatial technologies. We are regional geospatial resources focused upon supporting geospatial technology adopters with free and vendor-neutral technical advice much like the role of our USDA county extension agents.

The goal of RGIS is to improve the quality of life, environmental health, and economic competitiveness of rural communities. Just as the Rural Electrification Authority brought electricity to much of under-served rural America in the early 20th century, RGIS' goal is to help bring geospatial technologies and the benefits of the information age to rural America. Today, local units of government are building and maintaining key components of our national geospatial information technology infrastructure and we aim to support the source of our GIS infrastructure. Please visit: [www.ruralgis.org](http://www.ruralgis.org) to learn more about RGIS.

## Gold Sponsors



**EFS GeoTechnologies specializes in high resolution digital aerial imagery. We offer a full line of GIS services including custom raster processing, land use/land cover classification and other custom services (digital elevation models, volumetric calculations, feature extraction). We provide innovative solutions to professional resource managers across the United States.**

EFS GeoTechnologies  
Eagle Forestry Services, Inc.  
147 Greenfield Drive  
P.O. Box 90  
Monticello, AR 71657



Phone: 870-460-9994  
Email: eagle@efsgeotech.com  
Web: www.efsgeotech.com

*High Resolution...High Accuracy...High Quality*

GeoRover® geospatial software products are developed by Science Applications International Corporation (SAIC) and are designed and sold as extensions or "plug-ins" to the ArcMap™ component of Environmental Systems Research Institute (ESRI®) ArcGIS Desktop GIS software. GeoRover products are technology enablers that simplify many common processes in ArcGIS Desktop. Our core products include:

Locus Track – Powerful tools for geospatial feature data creation, editing, and geospatial data fusion.

Digital Data Tracker – Field data collection tools and real-time map navigation.

RPF Tools – High-speed indexing, display, and management of large file-based raster product format (RPF) datasets, typically map and imagery data.

Range Tools – Geospatial feature data creation, editing, and ingestion or ring, ellipse, and arc feature data.

Coordinate Viewer – Custom coordinate window with real-time coordinate display.

Zoom Tools – Rapid map zooming and "go-to" capabilities.



Gold Sponsors

# Got FARMS?

*Use GIS to calculate agricultural assessments:*

**Get Sidwell's Parcel Builder-FARMS™!**

Douglas County Soils Calculation Report											
Non-weighted Calculations											
PARCELS	ASSESSED ACRES	LAND USE	SOIL CODE	SOIL NAME	MEASURED ACRES	NET ACRES	PI	ADJ PI	EAV ACRES	ASSESSED	
04-10-100-002	53.33										
		CR									
		149A	Winter		3.85	3.76	125	125.00	249.23	938.05	
		152A	Winter		41.50	40.55	127	127.00	299.90	12,160.11	
		154A	Winter		4.83	4.72	127	127.00	299.90	1,414.72	
		198A	Winter		3.70	3.61	127	127.00	299.90	1,083.15	
					<u>53.87</u>	<u>52.64</u>				<u>15,596.02</u>	
		HS									
		152A	Winter		0.03	0.03	127	127.00	0.00	0.00	
		198A	Winter		0.30	0.30	127	127.00	0.00	0.00	
					<u>0.33</u>	<u>0.32</u>				<u>0.00</u>	
		NA									
		152A	Winter		0.26	0.25	127	127.00	0.00	0.00	
		198A	Winter		0.12	0.11	127	127.00	0.00	0.00	
					<u>0.38</u>	<u>0.37</u>				<u>0.00</u>	
					<b>54.58</b>	<b>53.33</b>				<b>15,596.02</b>	
											<b>\$15,596.02</b>

For a free webcast, contact Bill Wetzel:  
 bwetzel@sidwellco.com | 630-841-9853  
 www.sidwellco.com | 877-SIDWELL

At Surdex Corporation, the science and art of photogrammetry is utilized to provide the fastest, most accurate mapping data for clients. Whether a project requires digital or film orthophotography or LiDAR data, we have the resources to provide high quality images for your mapping needs.

For over 50 years Surdex's talented staff of industry professionals has provided the experience and knowledge to serve our client base that includes Federal, state, and local governments, as well as private

**Surdex Corporation**  
 520 Spirit of St. Louis Blvd.  
 Chesterfield, MO 63005  
 tel: (636) 532-3427  
 fax: (636) 537-9638  
 email: billw@surdex.com  
 www.surdex.com

companies in the engineering, surveying, and exploration industries.

Our full service Photogrammetric production facility allows us to control every phase of the project – from acquisition with our fleet of six—through image creation and delivery, ensuring a quality product is delivered on time. Additionally, Surdex's highly experienced in-house crew of FAA certified aircraft and power-plant mechanics allow us to keep our schedules by increasing aircraft uptime and productivity, which is extremely rare in our industry.



## Gold Sponsor



# ITT

There's More  
to Imagery Than  
Meets the Eye

# ENVI.

Trusted by imagery professionals  
for years, now integrated with ArcGIS®.



To learn more, visit us at the **ITT Booth** or online at [www.ittvis.com](http://www.ittvis.com).

Copyright © 2009 ITT Corporation. ENVI is a trademark of ITT Corporation. All other marks are the property of their respective owners. All rights reserved.

## Silver Sponsors



Navigation Electronics, Inc. (NEI) was formed in 1984 as a division of John Chance & Assoc., performing instrument sales and service to the offshore oil and related industries. In 1988, Charlie Poche acquired NEI and began expanding its services to land, hydrographic and geodetic surveyors, as well as to GIS/Mapping professionals. In 1989, NEI became one of the first Trimble GPS distributors and soon after, became one of the largest distributors of Trimble GPS surveying and mapping equipment in the country. NEI has received the Trimble MGIS \$3 million dollar award for three consecutive years making them one of only two dealers in the nation to have received this honor three years in a row. NEI ranks in the top 5 Trimble Survey distributors in the country. NEI's rental department maintains the complete line of Trimble products available for rent from Trimble GPS survey grade systems, mapping grade systems to total stations, hydrographic equipment and everything you need to fill your temporary equipment needs.

NEI's corporate headquarters are located in Lafayette, LA with satellite offices in AL, AR, FL, MS & TN. NEI maintains a Trimble certified service center in Lafayette, LA and a sales office and training center in Norcross, GA. NEI is a women-owned and operated business.

Navigation Electronics, Inc. is your Official Trimble Distributor and your "Complete Surveying and Mapping Solution Provider" offering mapping, marine, survey and infrastructure solutions. Visit us on the web at [www.neigps.com](http://www.neigps.com).



Pictometry is the world leader in digital, oblique aerial imaging. Our revolutionary, visual information systems are helping homeland security, public safety agencies, and first responders save time and lives. By using our patented image capture process governments improve operational efficiencies, reduce expenses, and better manage community growth.

**See Everywhere , Measure Anything, Plan Everything**

Silver Sponsors



**YOUR SOURCE FOR:**

**GIS SERVICES  
DIGITIZATION,  
APPLICATION DEVELOPMENT,  
CONSULTING / TRAINING  
MAPPING SYSTEMS  
GPS RECIEVERS,  
LASER RANGE FINDERS,  
GSP ENABLED CAMERAS,  
FIELD DATA COLLECTION SOFTWARE,  
RUGGED HANDHELD PDA**



**MJ Harden**  
5700 Broadmoor, Suite 800  
Mission, KS 66202-2402  
P: 913-981-9600  
F: 913-981-9602  
www.mjharden.com

MJ Harden has been in business since 1956 and its main office is located in Mission, KS. We have decades of experience in providing aerial acquisition, photogrammetric mapping, and GIS data management services. Clients include utilities, government agencies, civil and environmental engineering firms, and pipeline operators. To date, MJ Harden has completed over 20,000 mapping and GIS implementation projects, and is known for quality performance and reliability throughout many industries.

**Aerial Imagery**

MJ Harden's two airplanes and two Z/I Digital Mapping Camera (DMC) systems provide tremendous flexibility for acquiring aerial imagery that addresses a wide variety of project requirements. The DMC simultaneously captures panchromatic, color, and color infrared imagery in a single flight. Imagery from the DMC is suitable for engineering-level planimetric and topographic mapping as well as superior orthoimagery. It has been documented that the DMC's accuracy and image quality exceeds other digital imaging systems.

**LiDAR**

MJ Harden operates the Optech Gemini. This system can operate at a pulse rate of 167 kHz and at altitudes ranging from 80 to 4,000 meters. The system has variable pulse rates, swath widths and scan rates which allow the sensor to adapt to varying topography, land cover, and project size and shape.

The MJ Harden team's processing approach is based on using correct LiDAR filtering algorithms combined with manual editing and lidargrammetry to achieve high quality products.

**Satellite Imagery**

As part of the GeoEye, Inc. family, MJ Harden is able to access quality satellite imagery to meet the needs of our clients. GeoEye is the world's largest provider of high-resolution commercial satellite imagery. In 2008, GeoEye will be launching GeoEye-1, the next generation in commercial satellite imagery with the highest resolution and most advanced collection capabilities in the marketplace.

**Orthophotography Experience**

MJ Harden's skilled compilation operators have decades of photo interpretation experience and utilize a variety of specialized hardware and software tools. This experience sets us apart and assures that our services for orthophotography, planimetric mapping and topographic mapping meet the highest standards for accuracy and completeness.

**GIS Services**

MJ Harden provides turnkey GIS solutions that are designed to address the geospatial data management needs of government agencies, utilities and private firms.

As providers of total GIS solutions, we support our consulting services with strong expertise in mapping, data conversion and migration, and end-user applications development. Through our many successes, for a wide range of clients, we have gained a reputation as a market leader in the application of advanced GIS technology.

2009 GIS Symposium Vendors



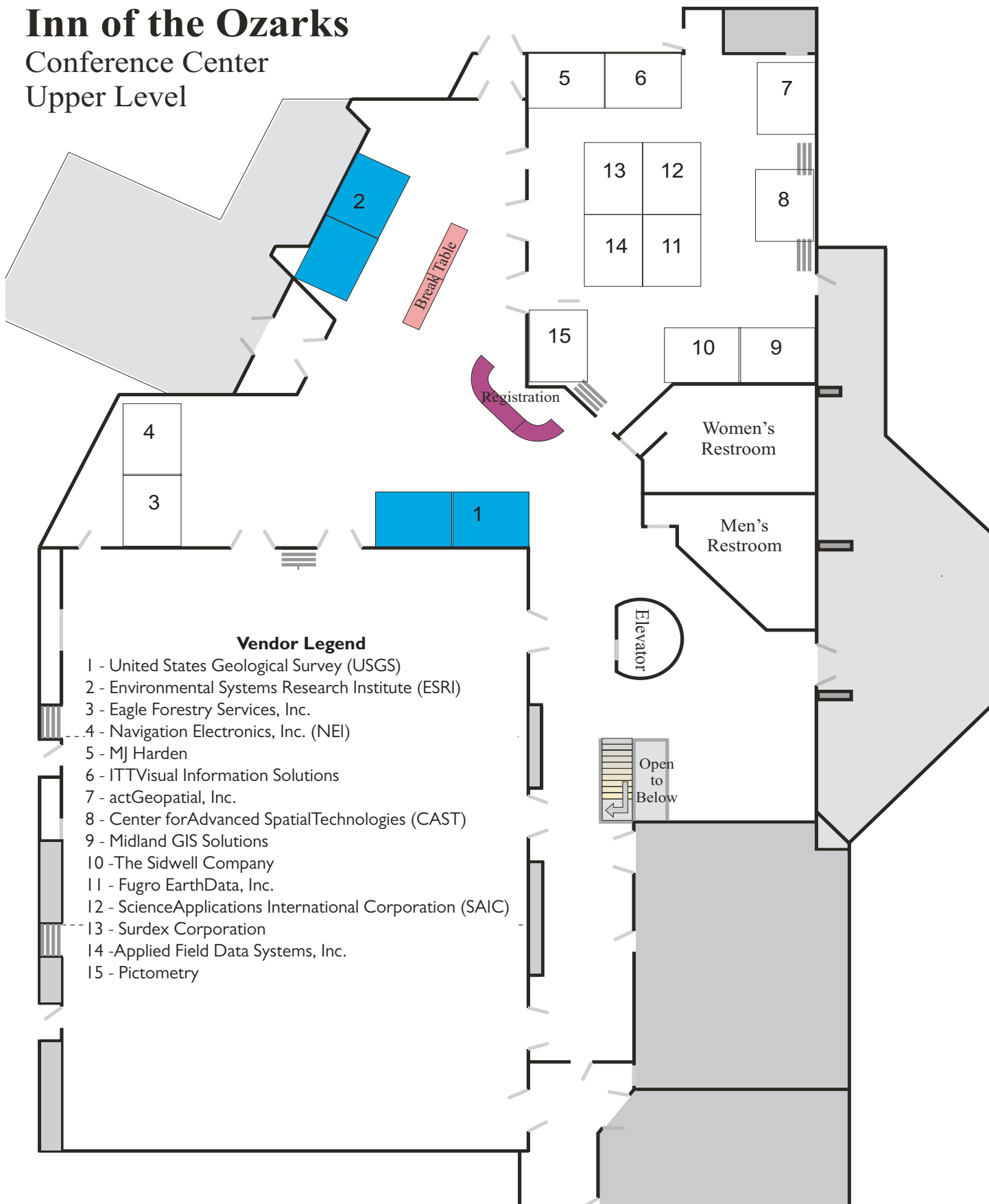
Hospitality Suite Sponsor



**MERRICK<sup>®</sup>  
& COMPANY**

**Best Western  
Inn of the Ozarks  
Conference Center  
Upper Level**

**Vendor Booth Locations**



**Vendor Legend**

- 1 - United States Geological Survey (USGS)
- 2 - Environmental Systems Research Institute (ESRI)
- 3 - Eagle Forestry Services, Inc.
- 4 - Navigation Electronics, Inc. (NEI)
- 5 - MJ Harden
- 6 - ITTVisual Information Solutions
- 7 - actGeopatial, Inc.
- 8 - Center forAdvanced SpatialTechnologies (CAST)
- 9 - Midland GIS Solutions
- 10 -The Sidwell Company
- 11 - Fugro EarthData, Inc.
- 12 - ScienceApplications International Corporation (SAIC)
- 13 - Surdex Corporation
- 14 -Applied Field Data Systems, Inc.
- 15 - Pictometry

### **Concurrent Session Abstracts continued from page 16**

In 2008, the Mid-Century Geographic Science Center (MCGSC) developed a hybrid approach to mapping land-cover classes on U.S. Army Corps of Engineers (USACE) mitigation and recovery sites along the lower Missouri River. The objective of this project was to investigate methods to reduce the cost of producing large-scale land-cover maps for their mitigation and recovery sites. The USACE provided multiple return airborne Light Detection and Ranging (LIDAR) data, hyper-spectral image data, high-resolution true color digital aerial photographs, and the thematic land cover classifications. Several software packages were assessed for ease of learning and use, consistency of application design between versions, ability to create model libraries, processing time, batch capability, and the level of involvement of the human interpreter.

The project resulted in a hybrid mapping approach that includes a combination of automated feature recognition, supervised image classification, and visual interpretation techniques. Although implementing this approach will require the acquisition of new mapping hardware and software and using a wider variety of digital image and elevation data, it was found to reduce the time required to produce the land cover classification maps of the mitigation and recovery sites.

**11:15 – 11:45 a.m.**

### **Aquifer Restoration in Arkansas and Louisiana through Science, Monitoring and Partnerships**

Authors: Patrick J. Higgins and David A. Freiwald

Presenter: David A. Freiwald, U.S. Geological Survey

Until 2004, the Sparta aquifer supplied all water for industrial, municipal, and agricultural uses in Union County, Arkansas and surrounding areas of Louisiana. As a result of withdrawals, ground-water levels in the Sparta aquifer declined more than 360 feet in some areas. Ground-water flow models developed by the U.S. Geological Survey (USGS) indicated that water levels could be maintained by reducing Sparta aquifer withdrawals in Union County by 72 percent.

In 1999, Union County stakeholders united to support legislation authorizing formation of the Union County Water Conservation Board (UCWCB). The resulting Ouachita River Alternative Water Supply Project provides water from the Ouachita River to Union County's three largest industrial users. In 2002, the UCWCB in partnership with the USGS and Burns & McDonnell Engineering Co. embarked on a study to monitor changes within the Sparta aquifer resulting from the project.

USGS provides real-time water-level data available on its website and additional wells are equipped with automated data loggers which form a network of 28 wells strategically placed in five southern Arkansas counties and three northern Louisiana parishes. During the first 4.5 years (October 2004 – April 2009) since surface water was supplied to industry, water levels have risen in observation wells between 5 and 59.3 feet.

### **11:45 a.m. – 1:00 p.m. – Lunch with the Vendors**

**1:00 – 1:30 p.m.**

### **Using GPS and GIS Technology in “Operation Mongoose,” the Northern Snakehead Eradication project conducted by the Arkansas Game and Fish Commission.**

Author and Presenter: Scott Lane, Arkansas Game and Fish Commission

Attempting to eradicate a species from a 50,000 acre watershed containing over 400 miles of creeks, tributaries, ditches and numerous lakes, ponds and flooded fields in an organized manner to ensure proper application and complete coverage, proved to be a task “tailor made” for GIS/GPS. Some of the tasks that were performed using this technology included: identification and mapping of the network of agricultural ditches, assessment of trial runs, planning and mapping of daily crew assignments, creation of custom GPS maps corresponding to daily assignments, and daily retrievals of GPS track logs to document application. Arcmap with a host of third party software combined with Garmin HC Ventures proved invaluable in completing this task within the scheduled seven days.

**1:30 – 2:00 p.m.**

### **GIS, Engineering Jobs in Progress & the Executive Board**

Author and Presenter: James Rains, Conway Corporation

Since 2001, our GIS department has been providing information to our engineers and executive board on the many new and existing jobs we have in progress every month. It started out with just a map to give to our board members and has grown into a database, tracking a job from its planning stages to being stored in our GIS system. This has been a great tool for making sure no jobs are lost in the system and for keeping our GIS as up-to-date as possible.

## Track 2C: Project Management and Planning/Using Tools Willow Room

**8:30 – 9:00 a.m.**

### **GIS for Farmland Assessment**

Author and Presenter: Bill Wetzel, National GIS Account Manager, THE SIDWELL COMPANY

Assessment of agricultural property based on productivity of farmland is a natural fit for GIS. The process involves a spatial overlay of parcels, soils, and land use maps to generate the raw data necessary to calculate values. However, the jump from a GIS overlay to land value can be much more complicated than it initially appears. We'll discuss the steps of data validation, map code verification, normalizing calculated acreages to assessed acreages and the necessity of integration with tax and CAMA software applications.

**9:00 – 9:30 a.m.**

### **Creation and Uses of a Local Linear Referencing System at the Arkansas Highway and Transportation Department**

Authors: Christopher Davis, Greg Nation

Presenter: Christopher Davis, Information Systems Analyst, AHTD and Greg Nation, HPMS Coordinator, AHTD

By Federal mandate, the Highway Performance and Monitoring System (HPMS) will be required to be submitted geospatially to the Federal Highway Administration (FHWA), rather than the traditional relational database format. This geospatial submittal is scheduled to be submitted by June 15, 2010. The mandate above made it necessary to develop and create a geospatial format, or what is called a linear referencing system or "LRS" for local roads at AHTD. Once created, the LRS will be dynamically segmented with the current tabular data that was originally submitted to the FHWA and thus fulfilling the needs of a geospatial submittal.

**9:30 – 10:00 a.m.**

### **Troubleshooting Parcel Data**

Author and Presenter: Bill Wetzel, National GIS Account Manager, THE SIDWELL COMPANY

Sources and methods for creating parcel data vary across all jurisdictions. This presentation will provide several questions to pose about the history of the parcel data you work with, specifically looking at how it was created and maintained. We will reveal several tips and tricks to use for reviewing your own parcel data. Finally, we will look at different methods that can be used to enhance parcel data to provide an accurate and complete parcel dataset for everyone's use.

**10:00 – 10:15 a.m. – Break (Please visit with the vendors)**

**10:15 – 10:45 a.m.**

### **Analysis of Digital Elevation Models and other Raster Data for Setting Aquatic and Terrestrial Conservation Priorities**

Author and Presenter: Ethan Inlander, Ozark Rivers Program Director, TNC Arkansas

Digital elevation models (DEM) are a fundamental and important representation of the Earth's surface. Basic GIS analyses of DEMs can include calculation of slope and aspect, derivation of topographic contours, and generation of hill shade products for cartographic enhancement. Moderately complex GIS analyses of DEMs include hydrologic modeling that can yield stream layers and watershed boundaries. There are many advanced algorithms or analysis procedures that can extract more detailed or meaningful information from DEMs as well. These include complex topographic indices, landscape position, geomorphic riparian zones, and least-cost routing that accounts for topography. All of the above uses, from simple to complex, are useful GIS analyses for setting priorities for aquatic and terrestrial conservation. Come see examples of varying complexity of DEM analysis for parcel prioritization, sediment modeling of unpaved roads, delineation of riparian areas, stratification for vegetation sampling, delineation of nested subwatersheds, identification of groundwater vulnerability, and other useful applications.

**10:45 – 11:15 a.m.**

### **Assessment of Object-Oriented Feature Extraction to Support the U. S. Army Corps of Engineers Mitigation and Recovery Land Cover Mapping Series**

Author and Presenter: David K. Shaver, Mid-Continent Geographic Science Center

## 10<sup>th</sup> Biennial Symposium

**2:00 – 2:30 p.m. Break (Probably your last chance to visit with the vendors...Please do!)**

**2:30 – 3:00 p.m.**

### **A Picture Is Worth A Thousand Words-Using GPS/Compass Enabled Camera For GIS Mapping**

Author and Presenter: Ashok Wadwani, Applied Field Data Systems Inc, Houston, TX

GIS/GPS mapping professionals realize the importance of having a picture associated with the location and attribute information. In fact the use of digital camera in conjunction with GPS data collection is very common. However the process of associating pictures with other attribute data in GIS has been very cumbersome. With the introduction of digital camera with integrated GPS with compass module and associated software, the process of combining photographs with GPS and attribute data in GIS has become very easy. The GPS enabled camera is now being extensively used by various State and private agencies to map location and attribute data for law enforcement, environment, municipalities, disaster management etc. The presentation will cover description and applications of this new hardware and software.

**3:00 – 3:30 p.m.**

### **Using the Geospatial Interface (GI) to optimize methods for displaying and outputting GIS data and products**

Author: Ben Gentry, U.S. Forest Service, Ozark-St. Francis National Forests

Presenter: Tina Rotenbury

The Geospatial Interface (GI) is an ArcMap extension developed by the U.S. Forest Service that provides end users nationwide improved access to spatial and tabular data. The GI can use local data and/or external data such as that located in the Forest Service's nationally centralized Oracle database. The GI allows users to easily join spatial data to associated tabular data for performing attribute queries and creating custom symbologies. The GI can run pre-defined queries and display maps based on pre-defined symbologies. The GI also provides the ability to export maps to MS Word and data to external applications such as Microsoft Excel and Microsoft Access.

**3:30 – 4:00 p.m.**

### **Using GIS Tools for Rapid Watershed Assessments**

Authors: Tim Sweeny, Edgar Mersiovsky

Presenter: Edgar Mersiovsky, USDA-Natural Resources Conservation Service

A strategy of the NRCS is to use a "Watershed Approach" to "provide information and assistance to encourage and enable locally led, watershed scale conservation." Rapid watershed assessments (RWAs) are used to assess and evaluate resource conditions and tailor delivery of NRCS services. RWAs are products of a process which evaluates resource conditions and needs on an 8-digit or smaller hydrologic unit (HUC) basis. A resource profile composed of information such as soils, geology, and land use, and existing treatment within the HUC is developed, which leads to identification of resource concerns by stakeholders and conservation partners. Only limited effort is made to collect new data. The ARS AGWA2 tool is then used to expedite the watershed scale modeling process. The tool utilizes GIS in conjunction with the Soil and Water Assessment Tool (SWAT) and the Kinematic runoff and Erosion model (KINEROS) utilizing the SSURGO or STATSGO digital soils layers.

## **Track 2D: ESRI Software Licensing/Earth Science Sycamore Room**

**8:30 – 9:00 a.m.**

### **ESRI Software Licensing**

Authors: Jean Jeannotte, ESRI and Ed Crane, ESRI

Presenter: Jean Jeannotte

Software licensing for ESRI products can be confusing and there is a lot to understand both in the desktop GIS and the Web GIS world. This session will provide a basic understanding of software licensing terms, recent changes, and where to go on the web if you have questions or want to manage your organizations licensing of ESRI software. Typical questions that ESRI answers will be covered, but come prepared with your own specific questions or issues too.

## 20 Years of Mapping the Natural State

**9:00 – 9:30 a.m.**

### **Analysis Of Landscape Feature Orientation And Geological Effects**

Authors: James E. Kaufmann, United States Geological Survey, Mid-Continent Geographic Science Center and Mark R. Hudson, United States Geological Survey, Earth Surface Process Team

Presenter: James E. Kaufmann

Mapping preferred orientations of landscape features has been recognized as a possible way to locate dense joint networks, fractures, and other linear weaknesses in bedrock. It is well known that water wells located along fracture zones, especially at their junctions, typically produce at a higher rate than wells located away from fracture zones. Mapping such lineaments, however, typically is labor intensive and very subjective. A new geospatial analytical technique based on the statistical distribution of contour line segments has been developed to examine and analyze orientations of landscape features, and to relate these orientations to bedrock features. This analysis has been applied to areas of the Hasty quadrangle along the Buffalo River in northern Arkansas where recent (2004) geologic studies give the spatial distribution of rock types, folds and faults and a representative population of pervasive fractures. Comparison between landscape and geologic data allow an evaluation of the importance of geologic effects on landscape development.

**9:30 – 10:00**

### **Relationship of Nitrate Concentrations to Karst Features in the Buffalo River Watershed**

Authors: Timothy M. Kresse and Phillip D. Hays, U.S. Geological Survey

Presenter: Phillip D. Hays

The Ozarks present a hydrologic system of great complexity with intimate connection of surface-water and groundwater regimes that render the system highly vulnerable to contamination. The very high permeability of solution channels, combined with the frequent connection of these channels with the surface – expressed as karst features (sinkholes, springs, caves, losing streams, etc.) - can lead to rapid transport of surface-derived contaminants into the groundwater environment with little to no attenuation.

USGS is conducting a study to better understand dominant recharge areas in two small watersheds in the Buffalo River. To accurately interpret the relationship between karst landscape features, geology, and land use, and the influence of these components on shallow groundwater quality, a comprehensive field survey of springs, sinkholes, and caves, in addition to cataloging sources of nitrate in groundwater was conducted. A correlation to land use and nitrate-N concentrations in spring water samples was identified, in addition to evidence that nitrate-N concentrations were greater in areas with sinkholes compared to areas devoid of sinkholes.

**10:00 – 10:15 a.m. – Break (Please visit with our vendors)**

**10:15 – 10:45 a.m.**

### **Providing the Public with a High Quality Seamless Soil Survey**

Author and Presenter: Leslie J. Glover II, Soil Scientist, NRCS Arkansas

Soils occurrence across the earth's surface corresponds remarkably with geomorphology and the processes which fashion landforms. By determining the kinds and patterns of soils in an area scientists can create; maps for land use planning, interpretations for soil limitations, and assess impacts of land use on the environment. Congress has charged the Natural Resources Conservation Service (NRCS) to merge individual county soil surveys into one high quality seamless survey for the nation based on physiographic regions. To accomplish this, NRCS Arkansas and its cooperators, have developed a strategy to evaluate, investigate, and synergize over 100 surveys with multiple soil/landscape concepts into one survey. This strategy includes evaluation of soil line placement using ArcGIS methods, field verification of mapping, chemical and physical analysis of typical pedons, matching interpretations for similar soils, bridging data gaps, evaluating soil/landscape models with surface geology, analyzing mapunit composition, and confirmation of taxonomy.

**10:45 – 11:15 a.m.**

### **Soil Data Viewer Tool for ArcGIS**

Authors: Edgar Mersiovsky, Luis Hernandez, Pam Cooper

Presenter: Edgar Mersiovsky

Soil Data Viewer (SDV) is a tool built as an extension to ArcMap that allows a user to create soil-based thematic maps. The application can also be run independent of ArcMap, but output is then limited to a tabular report. The soil survey attribute database associated with the spatial soil map is a database with more than 50 tables. SDV provides users access to soil interpretations and soil properties while shielding them from the complexity of the soil database. Each soil map unit, typically a set of polygons, may contain multiple soil components

that have different use and management. SDV makes it easy to compute a single value for a map unit and display results. SDV contains processing rules to enforce appropriate use of the data. This provides the user with a tool for quick geospatial analysis of soil data for use in resource assessment and management.

**11:15 – 11:45 a.m.**

### **Example Of Soil Data Use In Geospatial Analysis**

Author and Presenter: Dwain Daniels, GIS Specialist, Central National Technology Support Center, Fort Worth, TX 76115

Soil scientists are in the information business; their product entails technical information about our most valuable soil resource that is useful for land use planners and decision makers. Use of SSURGO soils data products for a specific suitability analysis will be discussed. A geoprocessing workflow process has been developed to use products derived from the USDA-NRCS Soil Data Viewer to provide an example of spatial analysis suitability rating.

**11:45 a.m. – 1:00 p.m. – Lunch with the Vendors**

**1:00 – 1:30 p.m.**

### **Earth Science Applications of Hillshaded DEMs**

Author and Presenter: Roger Miller, P.G., AR Dept. of Environmental Quality

Because subsurface geologic variations can affect a range of natural processes, many human activities can benefit from improved knowledge of subsurface structural conditions. For example, water well siting and construction can be optimized, or problems related to geologic instability can be averted or minimized by applying knowledge of the spatial variations of geologic factors that affect groundwater flow, rock weathering, and cave/sinkhole development in soluble rocks.

Hillshaded images derived from Digital Elevation Models (DEMs) are a contemporary extension of the practice of terrain analysis using topographic maps and aerial photographs to infer geologic features. Hillshaded DEMs are particularly useful for identification of fracture zones in the subsurface, evidenced by subtle topographic depressions that often develop above a plane of weakness in the subsurface. Due to accelerated weathering and erosion in the fractured strata relative to adjacent unfractured areas, the intersection of the fracture plane with the surface is sometimes discernible. The same principle can be used to augment geologic interpretations and identify other structural features and lithologic variations where available geologic maps are not sufficiently detailed.

Basic techniques for creating hillshades from DEMs using ArcGIS and the 5-m dataset available on Geostor will be reviewed, with some discussion of new developments and advanced techniques for identifying structure and depicting the results. Examples and case histories, sources of data and public domain hillshading applications will also be reviewed. Finally, hillshading of other spatially variable earth science data (bedrock elevations, groundwater contours, geochemical data, etc.) will also be explored.

**1:30 – 2:00 p.m.**

### **Data-Driven Lake and Reservoir Monitoring Using Real-Time 3-D Hydrodynamic and Water-Quality Simulations**

Author and Presenter: W. Reed Green, U.S. Geological Survey

Recent advances in sensor technology and data telemetry allow a range of surface meteorological and vertical water-column data to be collected simultaneously, in real time, for lakes and reservoirs. With recent advancements in computer technology, three-dimensional lake and reservoir models can be run in much shorter time frames, allowing for real-time simulations of hydrodynamics and water quality. Together, these advances allow for the development of quasi-real-time decision-support systems for water-quality management of individual lakes and reservoir systems. Using real-time instrumentation, the models can “learn” from the data and continuously check their predictive capabilities. Real-time model simulations will provide necessary information for “data-driven” monitoring schemes designed to examine current physical, chemical, and biological conditions that impair the water quality of a lake or reservoir, like algal blooms. For example, real-time model simulations and resultant animations of algal patch development (functional groups like nitrogen-fixing cyanobacteria or even species like *Microcystis aeruginosa*), which may be responsible for taste and odor or toxin problems in drinking water, will provide up-to-date information that can be used by monitoring teams to cost-effectively target data-collection to specific locations in the lake or reservoir and collect data throughout the growth phase and subsequent crash of the algal population. Until recently, recognition of an algal bloom in a lake or reservoir did not happen until after the bloom peaked or crashed, and then too late to collect information about the conditions that propagated the bloom. Understanding the processes that lead to an algal bloom and water-quality impairment will aid in the design of in-lake or landscape engineering or management solutions to reduce or eliminate future impairments. Example applications of the recent technology (using idealized conditions) include two reservoir systems and one lake:

## 20 Years of Mapping the Natural State

Beaver Lake, an impounded mountain valley reservoir in the Ozarks of northwestern Arkansas, Lake Houston, an impounded flood-plain reservoir near the Gulf Coast of Texas, and the south arm of the Great Salt Lake.

**2:00 – 2:30 p.m. – Break (This will be your last shot to visit and bend the ear of a vendor...Take advantage of it).**

**2:30 – 3:00 p.m.**

### **USGS Land Cover Institute**

Author and Presenter: Chris Barnes, USGS

The U.S. Geological Survey (USGS) houses the Land Cover Institute (LCI) at the Earth Resources Observation and Science (EROS) Center, Sioux Falls, South Dakota. The Institute addresses land cover topics from local to global scales, and in both domestic and international settings. The USGS, through the LCI, serves as an impartial advocate for land science research and acts as a forum to coordinate and communicate research opportunities for national and global land cover applications. It also provides extension and outreach services, such as, a data clearinghouse, technical support of land cover data sets and information exchange between existing and future national and international partners and customers.

The USGS Land Cover Institute home page is <http://landcover.usgs.gov>.

**3:00 – 3:30 p.m.**

### **From Paper Geologic Worksheets to ArcGeology Data Model**

Presenter: Susan Horvath, Arkansas Geological Survey

In 1995, the Arkansas Geological Survey completed the COGEO MAP program, a cooperative venture with USGS. The result was 177 paper 1:24,000 scale geologic maps of the Ouachita Mountain region. In recent years, AGS has made a more determined effort to digitize this data and store it in geologic map databases (GMDB). ArcGeology Version 1, proposed by USGS Nevada staff, was chosen as a geodatabase model. The design outlines a set of feature datasets, classes, attributes, subtypes and domains suitable for a variety of geologic maps and adaptable to the preference of AGS staff. The model is also an excellent demonstration of fundamental GIS design principles.

A greater goal has been the effort to provide high quality geological data for the geospatial community. A vector data layer of 1:24,000 scale geology encompassing the Ouachita Mountain region and portions of the West Gulf Coastal Plain and the Arkansas River Valley will be available later this year or early 2010. Plans are underway to include Ozark and Eastern Arkansas geology at later dates.

**3:30 – 4:00 p.m.**

### **Calculating Morphometric Indices for Landform Analysis Using GIS and DEMs**

Author and Presenter: M. E. McMillan, Ph.D., Department of Earth Sciences, UALR

Observations of deep incision into elevated landforms have inspired debate over the roles of climate versus tectonics in the evolution of erosional landscapes. The effects of climate and tectonism are hard to untangle as oftentimes age control and absolute elevation markers are missing. Isolating the effects from each process is further complicated by interrelated feedback mechanisms. A powerful new approach for investigating erosional landscapes is provided by the availability of high-resolution DEMs and user-friendly GIS packages. Morphometric indices such as long profiles, swath profiles, and hypsometric curves can be calculated with ease at the individual catchment scale or at a regional scale. These indices are helping geomorphologists to develop fingerprints for interpreting process acting to shape Earth's surface. Basic morphometric techniques using ArcGIS and Excel will be presented using comparisons from the Ouachita Mountains-Ozarks Plateau and the Rocky Mountains-Colorado Plateau.

**Track 3 – Friday, October 30, 2009**

**Track 3A: GIS in General  
Maple/Walnut Rooms**

**8:30 – 9:00 a.m.**

**2010 Census: What to Expect**

Author and Presenter: Sunny Farmahan, UALR

Census is taken every 10 year, it has two forms short form which will count all residents living in the United States as well ask for name, sex, age, date of birth, race, ethnicity, relationship and housing tenure. Long form which used to detail socioeconomic information has been replaced by American Community Survey. The Survey provides current data about your community every year, rather than once every 10 years. Since it is a survey it is filled by only a small percentage of the total population and there are some disadvantages concerning the sample size which will be discusses during the presentation along with advantages it has to offer.

**9:00 – 10:00 a.m.**

**Smart Grid, Electric Utilities, and GIS**

Author and Presenter: Randy Everett, First Electric Cooperative

If you have watched TV or read the news over the past year, then I'm quite certain that you have encountered the term "Smart Grid". If so, have you figured out what a smart grid actually is? A brief explanation could be summed up as: "A Smart Grid consists of several different utility specific applications (hardware\software) that can gather, receive, and share data in order to pass intelligence across the entire grid." In this presentation I will attempt to explain how GIS plays a very large role in the whole "Smart Grid" initiative.

Smart Grid initiatives are being promoted very heavily around the country in an attempt to increase the efficiency for the power grid, and ultimately, for the consumer. Some of the major pieces include SCADA (Supervisory Control and Data Acquisition), GIS, OMS (Outage Management Systems), AVL (Automatic Vehicle Location), MFF (Mobile Field Force), CIS (Customer Information Systems), AMI (Advanced Metering Infrastructure), and Communication systems. First Electric Cooperative is leveraging today's technology to make a better tomorrow for our members.

**Track 3B: GeoStor...  
Going Where no GIS Platform Has Gone Before  
Hickory/Oak Room**

**8:30 – 10:00 a.m.**

**This will feature a how-to and then an open question and answer session to help you get to know how to use GeoStor 6.0.**

Author and Presenter: Shelby Johnson, AGIO

# Poster Abstracts



Title	Author	Affiliation
1. GIS Assist Energy Efficiency staff with Energy Audit Selection Process	Chris Boudreaux	Conway Corp.
2. Mena, AR before the EF-3 Tornado	Laura D Wilson	USFS
3. Mena, AR two days after the EF-3 Tornado	Laura D Wilson	USFS
4. GIS, GPS, and Remote Sensing: Tools of the Trade for Wildlife Management in the 21st Century	Robert Kissell, Jr. & Michael Kennedy	UAM
5. GeoStor 6.0 Decoded	Glen Rhea	AGIO
6. The Many Faces of Soils Interpretations	Pam Cooper	NRCS
7. 125 Years of USGS Topographic Mapping	Mark Newell	USGS
8. New Arkansas General Soils Map	Luis Hernandez, Edgar Mersiovsky & Pam Cooper	NRCS
9. Analysis of Land Cover Change in the Boston Mountains Ecoregion between 1973 and 2000	Leslie Lansbery, Krista Karstensen & Dave Shaver	USGS
10. USGS NSDI Partnership Community and USGS NHD Stewardship Team	Bill Sneed	USGS
11. Applied Silvicultural Assessment of Upland Oak-Hickory Forests and the Red Oak Borer in the Ozark and Ouachita Mountains of Arkansas	Dr. Fred Stephen, Dr. Jason Tullis, et al.	UA
12. GeoStor!..Geospatial Data at your Fingertips!	Maria Owen	AGIO
13. Forest Service Going Spatial at Kansas City	Tina Rotenbury	USFS
14. Using GIS to Track and Update Land Survey Records on the Ozark-St. Francis National Forests	Jeremy Evans	USFS
15. Using Historic Imagery and Databases to Document the Past for our Future	David Journey, PhD	USFS
16. Arkansas Statewide Heritage Trail System Preliminary Map	John McLarty & Haunani Verzon	NWARPC & UA
17. Recreational and Mapping Grade GPS Receivers Accuracy	R.C. Weih, Jr., M. Gilbert, J. Cross, D. Freeman	UAM, SAL, Eagle Forestry Services
18. Mapping the Buffalo National River Sub-Basin in Arkansas	Robert C. Weih, Jr.	UAM, SAL
19. Examining the Potential Economic Impact of Interstate 69 Through Access to Multi-Lane Highways	Gary Zekis	AHTD
20. Geo Hazards in Arkansas	Jerry Clark	AGS
21. Aquifer Restoration In AR and LA through Science, Monitoring and Partnership	Patrick J. Higgins David Freiwald	Burns & McDonnell USGS
22. Observations on Passionflowers in Arkansas)	Manuela Koinig	UALR

### **GIS Assist Energy Efficiency staff with Energy Audit Selection Process**

Author: Chris Boudreaux, Conway Corporation

A home energy audit is the first step to assess how much energy your home consumes and to evaluate what measures you can take to make your home more energy efficient. An audit will show you problems that may, when corrected, save you significant amounts of money over time. During the audit, you can pinpoint where your house is losing energy. Audits also determine the efficiency of your home's heating and cooling systems. An audit may also show you ways to conserve hot water and electricity. You can perform a simple energy audit yourself or have a professional energy auditor carry out a more thorough audit.

Conway Corporation is working with our customers to encourage voluntary energy audits through our new Energy Efficiency office. We are using GIS technology to target customers who are eligible for our program through integration of base mapping and billing information.

This map shows single family residents with moderate and high annual energy usage.

### **Poster 1: Map Of Mena, Arkansas With Aerial Photos Taken Before The April 9 EF-3 Tornado**

#### **Poster 2: Aerial Photos Taken Two Days After The Tornado**

Authors: Laura D. Wilson, Ouachita National Forest, Ouachita River Ranger District

On Saturday April 11th I came to my office, the Mena Oden Ranger Districts of the Ouachita National Forest, and made large street maps and large maps with aerial photos. I took the first maps to the Mena Police Department. Saturday afternoon my coworkers provided a shapefile of the tornado path that they had gpsed from a helicopter. I overlaid the tornado path on my maps and brought more maps to the emergency management command center. For the next week, I printed and provided maps of the tornado path to volunteer coordinators, Red Cross, Polk County Emergency Management, Arkansas Department of Emergency Management, Polk County Sheriff's Department, Southwest Electric Power Company, Arkansas Highway Patrol, Mena Fire Department, insurance companies, Mena City Hall, Polk County Judge, Arkansas National Guard, US Motors, and local businesses. On Saturday April 18th I received the April 11th aerial imagery from the Polk County Assessor's office. I made and distributed more maps with the aerial photos showing the damage. One month after the tornado, I provided maps to FEMA.

### **GIS, GPS, and Remote Sensing: Tools of the trade for Wildlife Management in the 21st Century**

Authors: Robert E. Kissell, Jr., University of Arkansas at Monticello and Michael L. Kennedy, University of Memphis

Estimating population size of wildlife species is a basic goal for wildlife biologists and managers. Additionally, the most frequently asked question by sportsmen is "How many are there?" We used GIS and remote sensing data to provide a sampling frame for selecting transects to estimate deer density on the President's Island Wildlife Management Area in Memphis, Tennessee, during 12-15 February 2009. From an aerial platform we collected GIS, GPS, and remote sensing (i.e., thermal infrared imagery) data in an on-board computer and video. Data from the video were reviewed and the number of deer and locations of deer were entered into a GIS. The area surveyed was calculated using the GPS data and lens specifications. The deer density was found to be 0.34 deer per ha (or 1 deer per 7.3 acres), and a high level of precision was obtained (CV = 6.2%). Data for wildlife biologists and managers would not be possible without these technologies.

### **GeoStor 6.0 Decoded**

Author: Glen Rhea, AGIO

Presenting a simple interface doesn't necessarily mean that the technology behind that interface isn't complex. In fact, the less the user has to do or learn makes more work on the developer. This poster will have all the code developed for GeoStor 6.0. It will include code for the website and all the background processes to make everything run smoothly and automatically. The purpose of this illustration is to help users understand the challenges with developing and maintaining GeoStor. Sometimes when an application component fails; finding and fixing the code can be like looking for a needle in a haystack.

### **The Many Faces of Soil Interpretations**

Author: Pamela A. Cooper, USDA/NRCS

Soil Science is constantly evolving. Today soil surveys are being evaluated by Major Land Resource Areas (MLRA), which are geographically associated land resource units instead of political units. Better understanding of how soils are distributed within these large resource areas is important to statewide agricultural planning and has value in interstate, regional, and national planning. As county level soil surveys (SSURGO) are joined and map units evaluated based on the MLRA concept, clues can be gained from using soil interpretations to aide the process by examining the landscape of basic soil properties for each map unit.

### **125 Years of USGS Topographic Mapping**

Authors: Mark Newell, Keith Brady, and Dave Perdue, USGS

"In 1884, the U. S. Geologic Survey, USGS, embarked upon the challenge to map the entire Nation. For more than 125 years, this ambitious goal has pushed Survey cartographers to invent new instruments, devise new methods and apply new technologies in mapping. Innovations by the USGS in topographic mapping, geographic information systems (GIS) and the public provision of maps, images and digital geographic data has helped advance the United States as the leader in today's geographic information industry."

This poster was developed to highlight the USGS contributions to the Nation's mapping history, from field surveyors to modern digital mapping. The poster's intent is to spark interest in the dramatic progression of mapping through period photographs and prompt the viewing public to access the featured web site ([nationalmap.gov](http://nationalmap.gov)) for more information. The culmination of the celebration will take place in early December, 2009.

### **New Arkansas General Soils Map**

Authors: Luis Hernandez, Edgar Mersiovsky, and Pam Cooper, USDA/NRCS

Arkansas has a new general soil map based on SSURGO data. The last map was published in 1982. The Arkansas General Soil Map shows broad areas that have a distinctive pattern of soils, relief and drainage. These broad areas are called associations. The General Soil Map is useful for understanding broad patterns of soils in Arkansas, and for comparing large, multi-county areas for general land uses.

### **Analysis of Land Cover Change in the Boston Mountains Ecoregion between 1973 and 2000**

Authors: Leslie Lansbery, Krista Karstensen and Dave Shaver, USGS

The Boston Mountains ecoregion covers an area approximately 112,059 square kilometers (km<sup>2</sup>) including portions of northwest Arkansas and northeast Oklahoma. Statistical analysis of the sample blocks show that total change of the ecoregion ranged from 2.0 percent in the 1973-1980 time period to 2.7 percent in the 1992-2000 time period. The overall spatial change in the ecoregion was 5.5 percent (+/- 0.9 percent). Of this, 2.7 percent (+/- 0.6 percent) of land cover within the ecoregion changed once during the study period, 2.3 percent (+/- 0.4 percent) changed twice and 0.5 percent (+/- 0.1 percent) changed three times. Overall, the three largest land cover conversions in the ecoregion were from forest to mechanically disturbed, grassland/shrubland to forest and mechanically disturbed to grassland, respectively. The loss of forest in the ecoregion can be attributed primarily to the timber industry as well as agricultural practices.

### **USGS NSDI Partnership Community and USGS NHD Stewardship Team**

Contact: Bill Sneed, USGS

The National Hydrography Dataset (NHD) is the surface water component of The National Map. The NHD is a comprehensive set of digital spatial data representing the surface water of the United States using common features such as lakes, ponds, streams, rivers, canals, and oceans. The NHD often is used by scientists, specifically in surface-water analysis using geographic information systems (GIS) technology.

The NHD partnership is now turning its attention to a program of data stewardship to improve upon the existing NHD and keep it continuously updated. It is based on the input of organizations knowledgeable about the hydrography in their local area and will assure the NHD is accurate, current, and meets the objectives of the user community. The opportunity to contribute to the upkeep of the NHD is attracting many new members to the NHD partnership.

### **Applied Silvicultural Assessment of Upland Oak-Hickory Forests and the Red Oak Borer in the Ozark and Ouachita Mountains of Arkansas**

Authors: Dr. Fred Stephen and Dr. Jason Tullis, et al., CAST

The goal of the Applied Silvicultural Assessment (ASA) was to develop and implement an online spatial decision support system that addresses future red oak borer outbreaks. In 2008-2009, preliminary spatially distributed field observations as well as the results from a red oak borer hazard GIS model were organized online using Google application programmer interfaces (APIs) including Google Earth API. Spatially-tagged terrestrial photographs and GIS datasets depicting red oak borer activity and hazards were communicated using the hazard map interface. The web interface resulted in a simplified and high speed delivery of hazard predictions as well as a wealth of supporting data that assists land owners in making decisions about silvicultural prescriptions to mitigate the effects of potentially high red oak borer populations.

### **GeoStor!..Geospatial Data at Your Fingertips!**

Author: Maria Owen, Arkansas Geographic Information Office

GeoStor is one of the first statewide geospatial data warehouses in the country. It's interface provides spatial datasets from a wide variety of sources and for many purposes. The poster shows various cartographic representations of the data found on GeoStor . It was created using ArcView and represents various applications in both the public and private sector. Many people may not realize the wealth of quality data available to them on GeoStor for no fee!

### **Forest Service Going Spatial at Kansas City**

Author: Tina Rotenbury, U.S. Forest Service, Ozark-St. Francis National Forests

For years Kansas City, MO has been the data clearinghouse, called USDA's National Information Technology Center (NITC) for the Forest Service's tabular data. Several years ago NITC moved to a web-enabled application called I-Web. Using I-Web applications, users are able to enter data into National Applications, such as Forest Service Activity Tracking System (FACTS), Timber Information Manager (TIM), INFRA (Roads, Trails, Range, Property, Heritage, etc) or the National Resources Information System (NRIS). The time has come for NITC to become the Enterprise File System operating in a CITRIX Farm environment, serving up tabular and spatial data. This environment will allow users to take advantage of large storage capacity and high performance servers and network closeness to provide better performance, while working in ArcMap and other applications. It will also give Forest Service users the ability to review, download and use other forests data when responding to national disasters, such as wildfires or hurricanes.

### **Using GIS to track and update land survey records on the Ozark-St. Francis National Forests**

Authors: Jeremy Evans, U.S. Forest Service, Ozark-St. Francis National Forests and Ben Gentry

The Ozark-St. Francis National Forest contains over 3,000 miles of property line that separates National Forest System land parcels from those owned by other public and private entities. These property lines and their associated corner monuments receive periodical maintenance in order to preserve a clear distinction on the ground between properties. The Ozark-St. Francis National Forests' GIS team is currently migrating hard-copy property line and corner monument maintenance records into a GIS database. This will provide the capability to map property boundary maintenance needs, and provide project planners with improved knowledge of where to focus maintenance funds and efforts.

### **Using Historic Imagery and Databases to Document the Past for our Future**

Author: David H. Jurney, PhD, U. S. Forest Service, Ozark-St. Francis NFs

The Ozark-St. Francis National Forests have just completed digitization of 1936-1937 aerial photographs, repeat panoramic views from lookout towers; and over 2000 scene photographs illustrating conditions following federal acquisition in 1908. The General Land Office (1815-1840) survey records, original land grants, USDA Forest Service and US Resettlement Administration tract acquisition files are also integrated into GIS. This form of remote sensing increases archeological survey efficiency; cost-effectiveness; evaluation of scientific and historical importance; and landscape coverage inventories.

### **Arkansas Statewide Heritage Trail System Preliminary Map**

Authors: John McLarty, Northwest Arkansas Regional Planning Commission and Haunani Verzon, University of Arkansas

On March 31, Arkansas Governor Mike Beebe signed into law Act 728 of 2009 creating the Arkansas Heritage Trails System. This statewide system will be administered by the Arkansas Department of Parks and Tourism and will mark Indian Removal Routes, the Butterfield Stagecoach Route, the Southwest Trail, and Civil War campaign roads.

The Northwest Arkansas Regional Planning Commission partnered with the Heritage Trail Partners and the Arkansas chapter of the Trail of Tears Association to create statewide maps depicting the primary routes of a statewide system. This project is a work in progress and the current map is based on research by the Heritage Trail Partners, the Arkansas Chapter of the Trail of Tears Association, the Sequoyah National Research Center, the Department of Arkansas Heritage, and the National Park Service.

### **Recreational and Mapping Grade GPS Receivers Accuracy**

Authors: R.C. Weih, Jr., UAM, M. Gilbert, Eagle Forestry Services, Inc., J. Cross, UAM, and D. Freeman, UAM

Since its development in the early 1970s, Global Positioning System (GPS) technology has become more accessible and affordable for consumers. GPS applications have become ubiquitous in society. From the navigation of airplanes and ships to vehicles and cell phones, GPS is being used for determining locations. With the increase use of GPS, the question of accuracy is of concern. This study assesses the accuracy of four Garmin recreational GPS receivers, eTrex®, eTrex Legend®, eTrex Vista®, GPSMAP® 76CS, and three Trimble

## 20 Years of Mapping the Natural State

mapping GPS receivers Juno, GeoExplorer3 and GeoXH. Thirty-three ground control points (GCPs) were established in three different landscapes using survey grade GPS (Trimble's 4700) that were corrected using NOAA's Online Positioning User Service (OPUS). Eleven GCPs were established in a forest landscape, eleven near buildings to simulate an urban landscape, and eleven in the open. The GPS receivers were tested with the Wide Angle Augmentation System (WAAS) on and off. In addition, results from averaging GPS positions were evaluated. This study examined the accuracy of the receivers for different landscapes.

### **Mapping the Buffalo River Sub-Basin in Arkansas**

Author: Robert C. Weih, Jr., Spatial Analysis Laboratory (SAL), University of Arkansas at Monticello (UAM)

Sensors for remote sensing have improved enormously over the past few years and now deliver high resolution multispectral data on an operational basis. Most land-cover classifications of high spatial resolution data, however, still rely on basic image processing concepts (i.e., image classification using single pixel-based classifiers) developed in the 1970s. This study developed the methodology using an object-based classifier to characterize the land-cover for the Buffalo River sub-basin with a 0.8094-hectare (2-acre) minimum mapping unit (MMU). Base imagery for the 11-county classification was orthorectified color-infrared aerial photographs taken from 2000 to 2002 with a one-meter spatial resolution. The object-based classification was conducted using Feature Analyst®, Imagine®, and ArcGIS® software. Feature Analyst® employs hierarchical machine-learning techniques to extract the feature class information from the imagery using both spectral and inherent spatial relationships of objects. The methodology developed for the 7-class classification involves both automated and manual interpretation of objects. The overall accuracy of this Land-Cover classification method, which identified more than 146,000 features, was 87.8% for the Buffalo River sub-basin.

### **Examining The Potential Economic Impact of Interstate 69 Through Access To Multi-Lane Highways**

Author: Gary Zekis, Arkansas State Highway and Transportation Department

The proposed alignment of I-69 in Arkansas goes through several counties in Southern Arkansas currently without interstate access, therefore AHTD wanted to determine the economic benefit of interstate access to those areas along the proposed I-69 corridor from Michigan to Texas. The criteria used for the study involved county areas divided by direct interstate access, access to the interstate by connected multi-lane highways and those without highway access. The tools used include GIS software, centerline files from various state agencies and supporting materials such as maps and Google Earth. The economic data used from 2007 and 2008 came from the Bureau of Labor Statistics and Economic Analysis. Final results show that interstate access can be a substantial factor in improving unemployment and personal income. The economic statistics of the proposed I-69 route are higher than current interstate traffic, because of the alignment connects underserved areas to key transportation hubs such as Houston, Memphis and Indianapolis.

### **Geo Hazards in Arkansas**

Author: Jerry Clark, Arkansas Geological Survey

The New Madrid Seismic Zone (NMSZ) represents one of the most seismically active and hazardous zones in the eastern United States (Johnston and Schweig, 1996). Continued population growth and development in the area over the past century has exposed an ever increasing number of people, buildings, bridges and support infrastructure to significant seismic hazards. The Arkansas Geological Survey has developed several earthquake-related products to provide the public and private sector with usable information to make informed decisions pertaining to local development and hazard mitigation. Products include: Three Centuries of Earthquakes – Arkansas, NEHRP - Soil Classification Map of Arkansas, Liquefaction Susceptibility Map of Arkansas, New Madrid Seismic Zone of Northeast Arkansas, and Depth to Ground Water Map of Northeast Arkansas.

### **Aquifer Restoration in Arkansas and Louisiana through Science, Monitoring and Partnerships**

Authors: Patrick J. Higgins, Burns & McDonnell Engineering Co. and David A. Freiwald, USGS

Until 2004, the Sparta aquifer supplied all water for industrial, municipal, and agricultural uses in Union County, Arkansas and surrounding areas of Louisiana. As a result of withdrawals, ground-water levels in the Sparta aquifer declined more than 360 feet in some areas. Ground-water flow models developed by the U.S. Geological Survey (USGS) indicated that water levels could be maintained by reducing Sparta aquifer withdrawals in Union County by 72 percent.

In 1999, Union County stakeholders united to support legislation authorizing formation of the Union County Water Conservation Board (UCWCB). The resulting Ouachita River Alternative Water Supply Project provides water from the Ouachita River to Union County's three largest industrial users. In 2002, the UCWCB in partnership with the USGS and Burns & McDonnell Engineering Co. embarked on a study to monitor changes within the Sparta aquifer resulting from the project.

USGS provides real-time water-level data available on its website <sup>3</sup> and additional wells are equipped with automated data loggers which form a network of 28 wells strategically placed in five southern Arkansas counties and three northern Louisiana parishes. During the first

4.5 years (October 2004 – April 2009) since surface water was supplied to industry, water levels have risen in observation wells between 5 and 59.3 feet.

## Observations on Passionflowers in Arkansas

Author: Manuela Koinig, UALR

The observations presented in this poster form the basis for potential future research on plant-animal interactions in the study system of two passionflower species and their arthropod visitors. In Arkansas (study area around Little Rock), the natives *Passiflora incarnata* and *P. lutea* are visited by a certain array of associated insects which use the vines as foragers (e.g. herbivores, scavengers), pollinators, or parasites. Owing to presentation of extrafloral nectaries *P. incarnata* attracts ants which exploit this sugar-sources, potentially in a mutualistic relationship. A number of abiotic factors and plant characteristics such as habitat type, reproductive organs, and arthropod visitors were recorded and identified. Data analysis followed in Microsoft Excel and ArcView9.3. Results reveal greater success in condition and reproduction of both *P.* species in or close by man-made habitat such as parking lots or highways in contrast to natural habitat. Visiting arthropods differed between the species while *Crematogaster* and *Monomorium* ants seemed to tend EFNs. Other correlations or significant negative effects of imported fire ants on insect associations or plant reproduction were not detected in this study.

# Participants



Name	Company	Phone	E-mail
Roger Alabach	Green Bay Packaging	501-354-2461	ralabach@gbp.com
Patsy Alexander	Taney County	417-546-7210	patsy@co.taney.mo.us
Darrell Allen	City of Hope	870-722-2512	gis@hopearkansas.net
Scott Alsbrook	Military Dept. of Arkansas	501-212-5886	scott.alsbrook@us.army.mil
Ben Alstadt	Arkansas State Police	501-618-8546	benjamin.alstadt@asp.arkansas.gov
Diana Angelo	USDA - NRCS	870-356-4170	diana_angelo@yahoo.com
Jonathan Ayres	a.c.t. GeoSpatial, Inc.	501-771-2985	jayres@actgeospatial.com
Sharon Baker	AR Highway Dept	501-569-2205	sharon.baker@arkansashighways.com
Brad Baldwin	City of Van Buren, Arkansas	479-471-5025	bbaldwin@vanburencity.org
John Michael Ball	University of Arkansas at Monticello	870-224-5623	jmb_pmfor@hotmail.com
Boyd Ballew	Conway Corporation	501-450-6000	Boyd.Ballew@conwaycorp.com
Adam Barnes	C,A,S,T.	479-575-6141	abarnes@cast.uark.edu
James Barnett	APAC	870-500-4286	james.k.barnett@gmail.com
Joyce Baxter	Baxter County	870-424-2880	baxtercounty911_joyce@centurytel.net
Deena Beaty	Faulkner County Assessor's Office	501-450-4905	faucogis@conwaycorp.net
Amy Beck	USGS	501-228-3605	albeck@usgs.gov
Jack Bennett	Archeological Assessments	870-845-4348	aaajack@att.net
Lee Beshoner	FTN Associates, Ltd.	479-571-3334	ljb@ftn-assoc.com
Jim Besley	U.S. Fish & Wildlife Service	501-513-4476	jim_besley@fws.gov
Kimberly Bogart	Entergy Arkansas, Inc.	501-844-2116	kbogart1@entergy.com
Dale Booker	Nevada County 9-1-1	870-887-4911	dalebooker@ioccc.com
Richard Booth	Benton County	479-271-1749	rbooth@co.benton.ar.us
Kassie Bornds	AR Highway Dept	501-569-2465	kassie.bornds@arkansashighways.com
Chris Boudreaux	Conway Corporation	501-450-6080	chris.boudreaux@conwaycorp.com
Elizabeth Bowen	Benton County	479-271-5788	ebowen@co.benton.ar.us
Julia Bradley	Mack-Reynolds Appraisal Co. Inc.	479-967-0874	cookiebaker1955@hotmail.com
Ken Brazil	Arkansas Natural Resources Commission	501-650-5584	ken.brazil@arkansas.gov
Mary Brennan	Ozark St. Francis National Forest Service	870-964-7217	mzbrennan@fs.fed.us
Laura Brothers	Washington County Assessor's Office	479-444-1892	dcpert@co.washington.ar.us
Jeffrey Brown	AR Highway Dept	501-569-2195	jeffrey.brown@arkansashighways.com
Darla Bryant	Arkansas Game and Fish Commission	501-223-6400	dabryant@agfc.state.ar.us
Mike Burnett	Eagle Forestry Services EFS GeoTechnologies	870-460-9994	mburnett@efsgeotech.com
Ricky Carney	U of A	479-575-6645	ricky.carney@gmail.com
Matthew Charton	Arkansas Game & Fish Commission	501-269-7681	mdcharton@agfc.state.ar.us

## 20 Years of Mapping the Natural State

Name	Company	Phone	E-mail
Danny Chidester	AR Highway Dept	501-569-2559	danny.chidester@arkansashighways.com
Johnny Chism	USDA-NRCS	870-741-8600	johnny.chism@ar.usda.gov
Celeste Chmura	Garland County Assessor's Office	501-622-3730	cchmura@garlandcounty.org
Tammy Christy	Sebastian County Assessor's Office	479-784-1516	tchristy@sebastian.ar.us
Adrian Clark	AGIO	501-683-2943	adrian.clark@arkansas.gov
Jerry Clark	AR Geological Survey	501-682-5897	jerry.clark@arkansas.gov
Wesley Thomas Cleland	City of Van Buren	479-471-5025	wcleland@vanburencity.org
Susan Clem	Sebastian County Assessor's Office	479-996-7045	sclem@co.sebastian.ar.us
Tina M. Cole	Baxter County	870-481-6252	safety@baxtercounty.org
Fred Collier	Eagle Forestry Services EFS GeoTechnologies	870-460-9994	fcollier@efsgeotech.com
Pam Cooper	USDA/NRCS	501-301-3146	pam.cooper@ar.usda.gov
Curtis Copeland	VillaGIS, Inc.	417-334-1366	curtiscopeand@villagis.com
Kari Craun	USGS	573-308-3802	kcraun@usgs.gov
Chris Cretini	USGS	337-266-8621	cretinic@usgs.gov
Jessica Crossley	Washington County Assessor's Office	479-444-1508	jcrossley@co.washington.ar.us
Dan Cypert	Washington County Assessor's Office	479-444-1521	lbrosthers@co.washington.ar.us
Learnon Dalby	AGIO	501-682-2929	learnon.dalby@arkansas.gov
Dwain Daniels	USDA - NRCSS	817-3358	dwain.daniels@ftw.usda.gov
Andrew Dartez	a.c.t. GeoSpatial, Inc.	501-771-2985	adartez@actgeospatial.com
Christopher Davis	AR Highway Dept	501-569-2435	christopher.davis@arkansashighways.com
Mary Donaldson	City of Hot Springs	501-321-6998	mdonaldson@cityhs.net
Ron Dornblaser	City of Little Rock	501-888-7061	rdornblaser@littlerock.org
Mark Drew	Little Rock Wastewater	501-376-2903	mark.drew@lrwu.com
Casey Dunigan	WA Co Conservation District	479-442-416-	casey.dunigan@ar.nacdn.net
Maggie Durlley	USDA - NRCS	870-356-4170	maggie.durlley@ar.usda.gov
Hal Edwards	PAGIS	501-377-1260	Hal.Edwards@pagis.pulaski.ar.us
Ted English	AR Highway Dept	501-569-2167	ted.english@arkansashighways.com
Mark Evans	AR Highway Dept	501-569-2234	mark.evans@arkansashighways.com
Jeremy Evans	Ozark St. Francis National Forest Service	870-964-7217	jevans@fs.fed.us
Randy Everett	First Electric Cooperative	501-985-4534	randy.everett@firstelectric.coop
Inderpreet Singh Farmahan	UALR GIS Laboratory	501-569-8721	ilfarmahan@ualr.edu
Jeff Fears	City of Fort Smith	479-788-8919	jfears@fortsmithar.gov
Tiffany R. Felton	Izard County Assessor	870-368-5594	diamond3358@hotmail.com
Jennifer M. Fendley	City of Arkadelphia	870-246-5863	cfendley@cityofarkadelphia.com
Brian Fiehler	USGS	573-308-3867	bfiehler@usgs.gov
Jim Files	ADH	501-280-4436	james.files@arkansas.gov
Hanna Ford	AG&FC	501-223-6366	hlford@agfc.state.ar.us
Ray Fox	USGS	573-308-3744	rfox@usgs.gov
Mick Frus	NWARPC	479-751-7125	mick@nwarpc.com
Tracy Fuller	USGS	303.202.4172	tfuller@usgs.gov
Cory Grant Gallipeau	The Nature Conservancy	479-973-9110	cgallipeau@tnc.org
Amber Garrison	Newton County Assessor's Office	870-446-2937	assessor2@ritternet.com
Russell Gibson	City of Fort Smith	479-788-8919	rgibson@fortsmithar.gov
Michael Gilbert	Eagle Forestry Services EFS GeoTechnologies	870-460-9994	mgilbert@efsgeotech.com
Leslie Glover II	USDA - NRCS	870-413-1467	leslie.glover@ar.usda.gov
Bruce Gorham	C.A.S.T.	479 575-8454	bruce@cast.uark.edu
Leslie Goshien	AR Highway Dept	501-569-2648	leslie.goshien@arkansashighways.com
Dannielle Gray	Arkansas Natural Resources Commission	501-682-3915	dannielle.gray@arkansas.gov
William Reed Green	USGS	501-228-3607	wrgreen@usgs.gov
Robin Gregory	C.A.S.T.	479-575-2622	rgregory@cast.uark.edu
Vince Guillet	Central Arkansas Water/PAGIS	501-377--1246	vince.guillet@carkw.com
Mike Hamby	Crawford County Assessor's Office	479-471-3203	mhamby@crawford-county.org
Logan Hancock	Eagle Forestry Services EFS GeoTechnologies	870-460-9994	lhancock@efsgeotech.com
Lawrence Handley	USGS	573-308-3593	handley@usgs.gov
Rachel Hanley	AR Highway Dept	501-569-2206	rachel.hanley@arkansashighways.com
Doug Hanson	AR Geological	501-683-0115	tish.zarvos@arkansas.gov
Alex Harper	Central Arkansas Water/PAGIS	501-377-1253	alex.harper@carkw.com
Danny Harris	AR Game and Fish Commission	501-223-6400	dlharris@agfc.state.ar.us
Cara Hastings	University of AR at Monticello	870-545-4064	hastings@uamont.edu
David Hathcock	City of Little Rock	501-371-4808	dhathcock@littlerock.org
Katy Hattenhauer	ADEQ	501-682-0945	hattenhauer@adeq.state.ar.us
Carrie Hawkins	USDA - NRCS	870-356-4170	carrie.hawkins@ar.usda.gov
George Heleine	USGS	703-648-4159	gheleine@usgs.gov
Michael Henry	AR Highway Dept	501-569-2403	michael.henry@arkansashighways.com
Pat Henry	NRCS	870-777-8800	pat.henry@ar.usda.gov
Clay Herrmann	Herrmann Realty	501-623-0107	clay@herrmannrealty.com
Angela Hill	Faulkner County Assessor's Office	501-450-4905	faucoabs@conwaycorp.net
Tammy Hocut	Ozark - St. Francis National Forests	479-964-7217	thocut@fs.fed.us

# 10<sup>th</sup> Biennial Symposium

Name	Company	Phone	E-mail
James Holley	PAGis	501-377-1270	James.Holley@pagis.pulaski.ar.us
Susan Horvath	AR Geological Survey	501-683-0115	susan.horvath@arkansas.gov
Milton Hughes	AR Highway Dept	501-569-2282	milton.hughes@arkansashighways.com
David Hughes	Mack-Reynolds Appraisal Co. Inc.	479-967-0874	winrockdave1@yahoo.com
Ethan Inlander	The Nature Conservancy	479-973-9110	einlander@tnc.org
John Ed Isbell	NTB Associates	870-425-5353	johned1@suddenlink.net
Jack Jackson	UALR GIS Lab/AIEA	501-569-3175	jjackson1@ualr.edu
Shawn Lynnette Jackson	Arkansas.Natural Resources Commission	501 682-3907	shawn.jackson@arkansas.gov
Melissa Jenks	The Nature Conservancy	501-614-5085	mjenks@tnc.org
Cindy Jester	a.c.t. GeoSpatial, Inc.	501-771-2985	cjester@actgeospatial.com
Michael Jezierski	AGFC	501-223-6451	mjezierski@agfc.state.ar.us
Shelby D Johnson	AGIO	501-683-2719	shelby.johnson@arkansas.gov
Joshua H. Johnson	FTN Associates, Ltd.	501-225-7779	jhj@ftn-assoc.com
Josh Johnston	Johnson County D.E.M./Floodplain	479-754-6383	jjohnston@cdem.org
Brenda Joyner	Jackson County Assessor	870-523-7409	bjoyner72112@yahoo.com
Jim Kauffman	AR Highway Dept	501-569-2639	jim.kauffman@arkansashighways.com
James Kaufmann	USGS	573-308-3882	jkaufmann@usgs.gov
Kristie Keene	AR Highway Dept	501-569-2179	kristie.keene@arkansashighways.com
Chris Kelley	AR Natural Resources Commission	501-682-3976	chris.kelley@arkansas.gov
James Kingsbury	Arkansas State Police	501-618-8538	james.kingsbury@asp.arkansas.gov
Robert E. Kissell	University of Arkansas at Monticello	870-460-1192	kissell@uamont.edu
Chris Kleinhofs	UALR GIS Laboratory	501-569-8946	cxkleinhofs@ualr.edu
Jack Koba	AR Highway Dept	501-569-2621	jack.koba@arkansashighways.com
Manuela Koinig	UALR	501-658-3352	mxkoinig@ualr.edu
Kevin Koonce	UALR GIS Laboratory	501-569-8288	kwkoonce@ualr.edu
Keith Landgraf	USGS	785-832-3551	kflandgraf@usgs.gov
Scott Lane	Arkansas Game and Fish Commission	870 367 3553	slane@agfc.state.ar.us
Leslie Lansbery	USGS	573-308-3538	llansbery@usgs.gov
David Latham	Texarkana Water Utilities	903-791-1769	dlatham@txkusa.org
Teresa Lee	AR Highway Dept	501-569-2071	teresa.lee@arkansashighways.com
Bob Lemen	USGS	573-308-3736	rlemen@usgs.gov
Jason Lyon	City of Conway Planning & Development	501-450-6105	jason.lyon@cityofconway.org
Tim Mahan	AR Highway Dept	501-569-2066	tim.mahan@arkansashighways.com
Larry Mann	Pulaski County Assessor's Office	501-340-6170	lmann@pulaskicountyassessor.net
Lori Massey	Pope County 9-1-1	479-968-1800	loriamassey@hotmail.com
Scott Masterson	FTN Associates, Ltd.	479-571-3334	sem@ftn-assoc.com
Elizabeth Mayfield-Hart	AR Highway Dept	501-569-2111	elizabeth.mayfieldhart@arkansashighways.com
Rusty McAllister	City of Jonesboro	870-932-2438	rmcallister@jonesboro.org
Tommy McClain	Crawford County Assessor	479-471-3245	tmcclain@crawford-county.org
Sheila McCutcheon	Newton County Assessor's Office	870-446-2937	assessor@ritternet.com
John McLarty	NWARPC	479-751-7125	john@nwarpc.com
Tim McLeod	First Electric Cooperative	501-985-4534	tim.mcleod@firstelectric.coop
Margaret Elizabeth McMillan	University of Arkansas at Little Rock	501-569-3024	memcmillan@ualr.edu
Courtney McNair	Washington County	479-444-1724	cmcnair@co.washington.ar.us
Edgar Meriosky	USDA - NRCS	501-301-3172	edgar.meriosky@ar.usda.gov
Bradley Merrick	a.c.t. GeoSpatial, Inc.	501-771-2985	bmerrick@actgeospatial.com
James Meyer	Pulaski County Assessor	501-340-6170	jmeyer@pulaskicountyassessor.net
Tom Meyer	Fayetteville Public Schools	479 444 3004	tom.meyer@fayar.net
Rusty Meyers	Western AR Planning & Development District	479-785-2651	rmeyers@wapdd.org
Kristen Michaels	AR Natural Resources Commission	479-871-6136	kristen.michaels@arkansas.gov
Roger Miller	ADEQ	501-682-0665	millerr@adeq.state.ar.us
Michelle Mizell	Western AR Planning & Development District	479-785-2651	mmizell@wapdd.org
Drew Moffitt	FTN Associates, Ltd.	501-225-7779	dmm@ftn-assoc.com
Jackie Morgan	Arkansas Natural Resources Commission	501-682-3959	jacqueline.morgan@arkansas.gov
Tracy Jenee' Moy	Arkansas Game & Fish Commission	501-223-6338	tjmoy@agfc.state.ar.us
Fred T. Mullens, Jr.	North Arkansas College	870-391-3000	fmullens@northark.edu
Greg Nation	AR Highway Dept	501-569-2406	greg.nation@arkansashighways.com
Mark Newell	USGS	573-308-3850	mnewell@usgs.gov
David Nicpan	Pulaski County Assessor	501-340-6170	dnicpan@pulaskicountyassessor.net
Gregg Noland	Ptarmigan Software	785.633.3808	gregg@ptarmigansoftware.com
Toni Oden	Craighead County	870-933-4572	toden@cra.countyservice.net
Sara Overton	WA Co Conservation District	479-442-416-	sara.overton@ar.nacdnet.net
Maria Owen	AGIO	501-683-2937	maria.owen@arkansas.gov
Chris Owen	PAGis	501-377-1273	chris.owen@pagis.pulaski.ar.us
Richard Parks	Little Rock Public Works	501-888-2208	rlparks@littlerock.org
Rodger Payne	ADEQ	501-682-0777	payne@adeq.state.ar.us
Linda Pearson	AR Highway Dept	501-569-2282	linda.pearson@arkansashighways.com
Daryl Pemberton	Washington County	479-444-1721	dpemberton@co.washington.ar.us

## 20 Years of Mapping the Natural State

Name	Company	Phone	E-mail
Scott R. Perkins	Wilson Company	816-701-3109	erik.berg@wilsonco.com
Richie Pierce	a.c.t. GeoSpatial, Inc.	501-771-2985	rpierce@actgeospatial.com
Susan Katsuyo Pierce	City of Fayetteville	479-575-8391	spierce@ci.fayetteville.ar.us
Phyllis Poche	UALR GIS Laboratory	501-569-8530	pnpoche@ualr.edu
Russell Presley	Baxter Assessor's Office	870-404-2002	russellp315@suddenlink.net
Alan Price	ADEQ	501-682-0956	alan@alandprice.me
Kevin Pruett	City of Little Rock	501-371-4434	kpruett@littlerock.org
Randy Puckett	ADEQ	501-682-0956	puckett@adeq.state.ar.us
James Rains	Conway Corporation	501-450-6000	James.Rains@conwaycorp.com
Jeremy A. Ramsey	Arkansas Oil and Gas Commission	501-683-5814	jeremy.ramsey@aogc.state.ar.us
Mike Raney	Conway Corporation	501-450-6000	Mike.Raney@conwaycorp.com
Glen Raney	Pulaski County Assessor's Office	501-340-6170	graney@pulaskicountyassessor.net
Rhonda Rawlings	USDA NRCS NWMC	501-210-8908	rhonda.rawlings@ar.usda.gov
Robert Reed	AR Highway Department	501-569-2282	robert.reed@arkansashighways.com
Glen Rhea	AGIO	501-683-2719	glen.rhea@arkansas.gov
Robert Rhyne	Pulaski County Planning and Development	501-340-8269	rrhyne@co.pulaski.ar.us
Juliet Richey	Washington County	479-444-1724	jrichey@co.washington.ar.us
Lis Robinson	Polk County Assessor	479-394-8157	polkcountygis@yahoo.com
Elijah Robison	VillaGIS, Inc	417-334-1366	elijah@villagis.com
Kimberly Romano	AR Highway Dept	501-569-2603	kimberly.romano@arkansashighways.com
Audrey Marie Ross	USDA - NRCS	870-356-4170	marie.ross@ar.usda.gov
David Ross	Arkansas Game & Fish Commission	501-978-7339	dbross@agfc.state.ar.us
Tina Rotenbury	Ozark - St. Francis National Forests	479-964-7217	trotenbury@fs.fed.us
Lisa Sanders	Baxter County 911	870-424-2880	baxtercounty911_lisa@centurytel.net
Cristina Scarlat	NWARPC	479-751-7125	cscarlat@nwarpc.org
Ronald Schonegg	Continental Mapping Inc.	317-244-1800	rschonegg@continentalmapping.com
Robert Scoggin	AR Highway Department	501.569.2282	robert.scoggin@arkansashighways.com
Phillip Scott	a.c.t. GeoSpatial, Inc.	501-771-2985	prscott@arcamatech.com
Clayton Sedberry	City of Springdale	479-750-8550	csedberry@springdalear.gov
David Shaver	USGS	573-308-3866	dshaver@usgs.gov
Brenda Short	Garland County Assessor	501-622-3730	bshort@garlandcounty.org
David Siskowski	AR Highway Dept	501-569-2064	david.siskowski@arkansashighways.com
Keith Smith	Pulaski County Assessor	501-340-6170	ksmith@pulaskicountyassessor.net
Michael Starbuck	USGS	573-308-3687	mstarbuck@usgs.gov
Pam Starks	Arkansas Game and Fish Commission	501-223-6326	ptstarks@agfc.state.ar.us
Jeff Stephens	Faulkner County Assessor	501-450-4905	faucoasr@conwaycorp.net
William Stephenson	Washington County Assessor's Office	479-444-1524	wstephenson@co.washington.ar.us
Chip Stokes	U.S. Forest Service	870-446-5122	cstokes@fs.fed.us
Matt Strawn	AR Highway Dept	501-569-2282	matt.strawn@arkansashighways.com
Kevin Tarkington	UALR	501-837-8552	ktarkington@ualr.edu
Johnna Thomas	AR Highway Dept	501-569-2650	johnna.thomas@arkansashighways.com
Tina Thompson	Western AR Planning & Development District	479-785-2651	tthompson@wapdd.org
Deano Traywick	University of Arkansas Division of Agriculture	501-671-2243	dtraywick@uaex.edu
Melanie K Treat	AR Dept. of Environmental Quality	501-682-0040	treat@adeq.state.ar.us
Jason Tullis	CAST	479 575-8784	jatullis@cast.uark.edu
John Turner	Arkansas Natural Resources Commission	501-682-1608	john.turner@arkansas.gov
Richard Vaught	USDA - NRCS	870-356-4170	richard.vaught@ar.usda.gov
Tony Vestal	PAGis	501-377-1278	Tony.Vestal@pagis.pulaski.ar.us
Jared Vickers	Carroll Electric Cooperative	870.423.2161	fvickers@carrollecc.com
Todd Walker	Carroll Electric Cooperative	870.423.2161	twalker@carrollecc.com
Stephen Allen Walker	USDA-Farm Service Agency	501-301-3007	stephen.walker@ar.usda.gov
Janet Ward	Pulaski County Assessor	501-340-8312	jward@pulaskicountyassessor.net
Scott Webster	Deltic Timber Corporation	870-881-6483	scott_webster@deltic.com
Robert Weih	University of Arkansas at Monticello	870-460-1248	weih@uamont.edu
Drew Westerman	USGS	501-228-3643	dawester@usgs.gov
Bekki White	AR Geological Survey	501-682-5897	bekki.white@arkansas.gov
Minnie Beth White	AR Highway Dept	501-569-2598	minnie.beth.white@arkansashighways.com
Jesse White	AR Highway Dept	501-569-2576	jesse.white@arkansashighways.com
Carey Wilcoxson	Arkansas Game & Fish Commission	877-297-4331	wcwilcoxson@agfc.state.ar.us
June Wiles	Polk County Assessor	479-394-8157	polkcountyassessor@yahoo.com
Suzanne Wiley	U of A Cooperative Extension (Emeritus)	870-367-7176	suzanwiley@earthlink.net
Jared Wiley	AR Highway Dept	501-569-2110	jared.wiley@arkansashighways.com
Darryl Williams	USGS	405-810-4403	dwilliams@usgs.gov
Ricky Wilmoth	Garver	501-537-3238	rwwilmoth@garverusa.com
Ross Wiseman	City of Fayetteville	479-444-3410	rosswiseman@gmail.com
Greg Woodard	City of Morrilton	510-354-8020	gwoodard@suddenlinkmail.com
Taylor Wynn	Carroll Electric Cooperative	870.423.2161	twynn@carrollecc.com
Gary Zekis	AR Highway Dept	501-569-2206	gary.zekis@arkansashighways.com