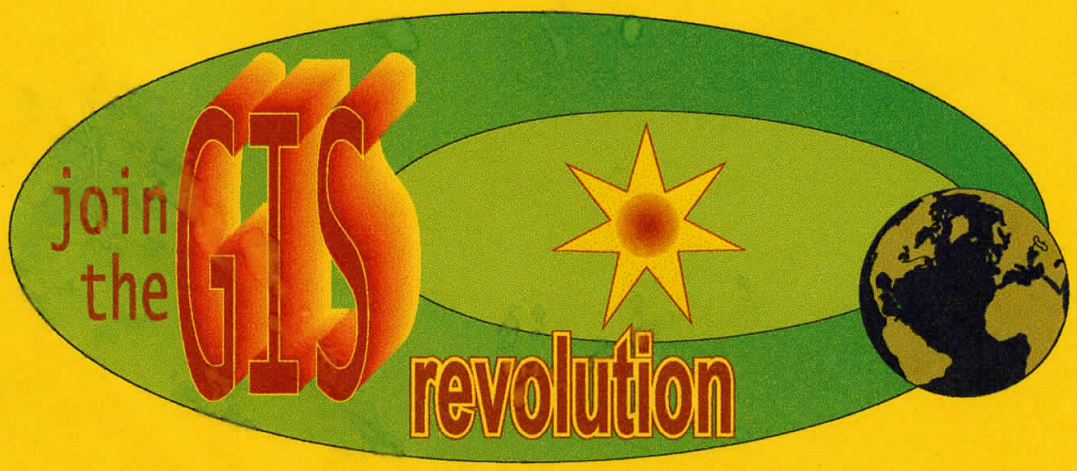
1997 Montana/Idaho GIS Conference Program

April 28–30, Bozeman, Montana



Welcome to Bozeman, and to the 9th annual Montana GIS Users' Group Meeting, the first ever attended jointly by Montana and Idaho. With a wide variety of pre- and post-conference workshops to choose from, and concurrent sessions on Local Government, Natural Resources, New Technology and Native American issues, we're certain that you'll find this year's conference to be especially interesting.

Be sure to attend Public Night (Monday), when posters will be presented and judged, and students from local schools will showcase the GIS projects they have developed in the GIS K-12 Adopt-a-School Program. And you won't want to miss Tuesday evening's no-host social and dance.

If you should need anything, please ask at the registration desk in the Holiday Inn. Look for announcements on the bulletin board in the lobby.

Enjoy!

All Montana GIS conferences are sponsored by the **Montana GIS Users' Group, Inc.**, a state wide consortium of public agencies and private businesses involved with the application and development of GIS technology. Special thanks this year to **Montana State University's Geographic Information and Analysis Center,** the **City of Bozeman**, **Gallatin County**, and the **Natural Resource Information System.**

ACKNOWLEDGEMENTS

1997 Program Committee:

Gretchen Burton, Gallatin County
Annette Cabrera, Yellowstone County
Doug Cayko, Geographic Information & Analysis Center (GIAC), MSU
Jeanette Cherry, GIAC, Montana State University
Steve Custer, Earth Sciences & GIAC, Montana State University
David Delsordo, Confederated Salish and Kootenai
Nickie Duff, Power Engineers, Boise, Idaho
Fred Gifford, Natural Resource Information System, Montana State Library
Stu Kirkpatrick, Department of Revenue
Lisa Landenburger, GIAC, Montana State University
Teresa Larsen, City of Bozeman
Kris Larson, Natural Resource Information System, Montana State Library
Andy Little, Power Engineers, Boise, Idaho
Margie Lubinski, Lolo National Forest
Jackie Magnant, GIAC, Montana State University
Catherine McCoy, GIAC, Montana State University
Jody Olson, City of Bozeman
Loretta Reichert, Department of Environmental Quality
Jackie Reilly, Forest Service
Elizabeth Roberts, Plant, Soil & Environmental Sciences, Montana State University
Michael Sweet,School of Forestry, University of Montana
Connie Williams, Natural Resources Conservation Service

1997 Scholarship Recipients:

Gloria J. Marceau, Renita Tailfeathers:
Blackfeet Community College- Browning

Mark Gerber, Deborah Murphey:
Boise State University-Boise

Sarah Cooper, Chad Johannesen, Chad Minteer:
Idaho State University-Pocatello

Cyndi Crayton, Angela Kociolek, Ute Langner, Mandy Lineback, Linda Phillips, Vicki Steele, Andrea Wright:
Montana State University-Bozeman

Debra Geesling, Lewis Headrick, Paul Roueche:
Montana Tech College of Technology-Butte

Carl Brenner, David R. Grey, Denny Hildreth, Dan Huber:
University of Idaho-Moscow

Ciro Gardi:
Washington State University-Pullman

Montana GIS Users' Group, Inc. Board of Directors

Each year, the GIS Users' Group has elections for new board members at the annual conference. Board members serve a 2-year term, in accordance with the Users' Group's bylaws. The current board members are:

Ken Wall, University of Montana and GeoData Services, President
Hans Zuuring, University of Montana, Vice President
Margie Lubinski, Lolo National Forest, Secretary
Jackie Magnant, Montana State University, Treasurer
Stu Kirkpatrick, Department of Revenue, Past President
David Delsordo, Confederated Salish and Kootenai Tribes
Kris Larson, NRIS, Montana State Library
Loretta Reichert, Department of Environmental Quality

Montana GIS Users' Group Education Subcommittee:

Marcia Beckwith, Educational Consultant
Annette Cabrera, Yellowstone County
Jeanette Cherry, Montana State University
Jeffrey A. Gritzner, Co-director of the Montana Geographic Alliance
Sue Haverfield, Flathead County Clerk and Recorder
Steve Holloway, Oikos Works Arts
Teresa Larsen, City of Bozeman
Kris Larson, Montana State Library
Margie Lubinski, Lolo National Forest
Jackie Magnant, Montana State University
Alex Philp, Public Policy Research Institute
Monte Sealey, Central Montana RDC, Inc.
Cliff Sisko, Bureau of Land Management
Michael Sweet, University of Montana
Ken Wall, University of Montana

The Montana GIS Users' Group *THANKS* the following for their generous donation to the 1997 Scholarship Fund Raffle:

B. Dalton Bookstore
Blue Marble Geographics
Boulton's Office Supply
Cellular One
Chalet Market
ESRI
GIAC - MSU
GIS World Magazine
Hastings Books, Video & Music
MacKenzie River Pizza Co.
Museum of the Rockies
pHD Skis
Rocky Mtn. Roasting Co.
Simkins-Hallin Lumber Co.
Spanish Peaks Brewery
The River's Edge

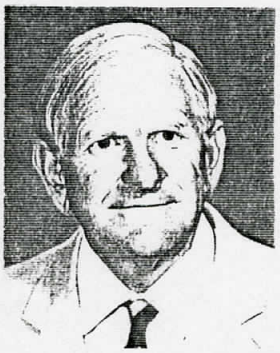
The Montana GIS Users' Group also *THANKS* all of the helpers, speakers, and work-shop presenters who stepped forward to make the 1997 Montana/Idaho GIS Conference a success. We couldn't have done it without you!

SPECIAL GUEST SPEAKERS

Steve Custer, Host. Steve is currently the acting Director for the Geographic Information and Analysis Center and Professor of Geology in the Earth Sciences Department at Montana State University.

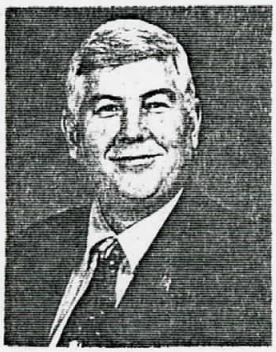
Eric Anderson, 'Environmental and decision-support analysis of Army National Guard training missions with GIS and a national database'. Eric is Chief of Conservation and Environmental Programs for the Army National Guard in Arlington, Virginia.

Richard Aspinall, currently with the Macaulay Land Use Institute in Scotland, will soon be coming on board as Director of the Geographic Information and Analysis Center at Montana State University. Aspinall brings with him a wealth of expertise in GIS and environmental modeling as applied to many aspects of environmental science. We would like to welcome Richard to Montana.



Joe Chapman, 'The Role of the Academic Community in GIS'. Joe is Provost and Vice President for Academic Affairs at Montana State University. He has published a great many papers, monographs and books, and in 1992 described the Appalachian cottontail, a new species.

Steve French, 'Shared Data Resources for State and Local Planning'. Steve is Professor and Director of the City Planning Program at the Georgia Institute of Technology at Georgia Tech in Atlanta, Georgia. He is also a board member of the Urban and Regional Information Systems Association (URISA).



Jay Heavner, "Lincoln County's GIS- A nationally recognized County approach to a comprehensive public access GIS". Jay is the tax administrator for Lincoln County.

Don Stueck, 'New residents are increasingly drawn to the natural beauty of Bozeman and the Yellowstone: GIS can be a powerful planning and management tool'. Don is Mayor of Bozeman.

POSTER EXHIBITS

Development of an Idaho HAZUS Training Program

Guy Adema
Department of Geology and Geological Engineering
University of Idaho
Moscow, ID 83843-1919
Ph: 208-885-5791, email: gadema@iron.mines.uidaho.edu

Local Government Atlas: A GIS Tool for Protecting Water Resources

Stewart Dary, Robert Klein
St. Johns River Water Management District
P.O. Box 1429
Palatka, FL 32178
Email: sjrwmd@district.sjrwmd.state.fl.us

MT Fish, Wildlife & Parks GIS Activities

Janet Decker-Hess
Montana Fish, Wildlife & Parks
Information Services Unit
490 N. Meridan
Kalispell, MT 59901
Ph: 406-751-4570, email: jdeckerhess@mt.gov

Flathead Indian Reservation

Mickey Fisher
Confederated Salish and Kootenai Tribes, Flathead Reservation
P.O. Box 278
Pablo, MT 59855
Ph: 406-675-2700

Riparian Inventory using High Resolution Multi-spectral Imagery

Gretchen Fitzgerald
Flathead National Forest
Hungry Horse RD USFS
P.O. Box 190517
Hungry Horse, MT 59919
Ph: 406-387-5243

Ron Pierce
MT Fish, Wildlife and Parks
3201 Spurgin Road
Missoula, MT 59804
Ph: 406-542-5532

Creating a Map of Land Stewardship for the State of Montana

Melissa Hart
Wildlife Spatial Analysis Lab
University of Montana
Missoula, MT 59812
Ph: 406-243-5208, email: claudine@wru.umt.edu

Food Stamp Mail Loss in Montana - FFY95 and FFY96

Stu Kirkpatrick
Department of Administration
Mitchell Bldg., Rm 225
125 N. Roberts
Helena, MT 59620-0113
Ph: 406-444-9013

The Upper Midwest Aerospace Consortium (UMAC)

Jerry Korol
Remote Sensing / Wildlife Habitat
College of Forestry, Wildlife & Range Sciences
University of Idaho
Moscow, ID 83844-1133
Ph: 208-885-2595, email: jkorol@uidaho.edu

Teton Basin Watershed Management Area Composite Map

Randy Lee
Lockheed Martin Idaho Technologies Co.
P.O. Box 1625
Idaho Falls, ID 83415-2213

Dynamic Segmentation: A useful model for examining issues along the Highway 93 corridor through the Flathead Indian Reservation in Western Montana

Brian Mladenich
Confederated Salish and Hootenai Tribes, Flathead Reservation
P.O. Box 278
Pablo, MT 59855
Ph: 406-675-2700

Blackfoot River Restoration: A Private Lands/Fishery Initiative

Ron Pierce
MT Fish, Wildlife and Parks
Missoula, MT 59804
Ph: 406-542-5532

Enhanced Algorithms for Remote Sensing of Biomass Burning

James Plummer
School of Forestry
University of Montana
Missoula, MT 59812
Ph: 406-243-6255, email: jrp@ntsg.umt.edu

Montana Noxious Weed Survey and Mapping System

Elizabeth Roberts
MT Noxious Weed Survey & Mapping System
Department of Plants & Soils and Environmental Sciences
Montana State University
Bozeman, MT 59717
Ph: 406-994-6211, email:usser@gemini.oscs.montana.edu

Glacial Lake Missoula and the Channeled Scabland: A Digital Portrait of Landforms of the Last Ice Age, Washington, Oregon, and Western Montana

Jeff Silkwood
USDA Forest Service
P.O. Box 766
Missoula, MT 59807
Ph: 406-329-3133, email: silkwood_jeff/r1@fs.fed.us

Fish Out of Water: Struggling Upstream with 100K DLGs

Wendy Williams
Wildlife Spatial Analysis Lab
University of Montana
Missoula, MT 59812
Ph: 406-243-5208, email: wendy@wru.umt.edu

VENDOR EXHIBITS

Electronic Data Solutions - Jerome, ID

Environmental Systems Research Institute (ESRI) - Olympia, WA

Geo Research Inc. - Billings, MT

Horizons, Inc. - Rapid City, SD

Integrated Geoscience, Inc. - Helena, MT

Marshall & Associates - Olympia, WA

Mountain CAD, Inc. - Missoula, MT

NIES Mapping Group, Inc. - Bellevue, WA

PCI Pacific GeoSolutions, Inc., - Victoria, B.C., Canada

Selby's ESSCO - Billings, MT

Silicon Graphic, Inc. (SGI) - Englewood, CO

Terra West Technology, Inc. - Clancy, MT

USGS National Mapping Div. - Denver, CO

Widecom Group - Mississauga, Ontario, Canada

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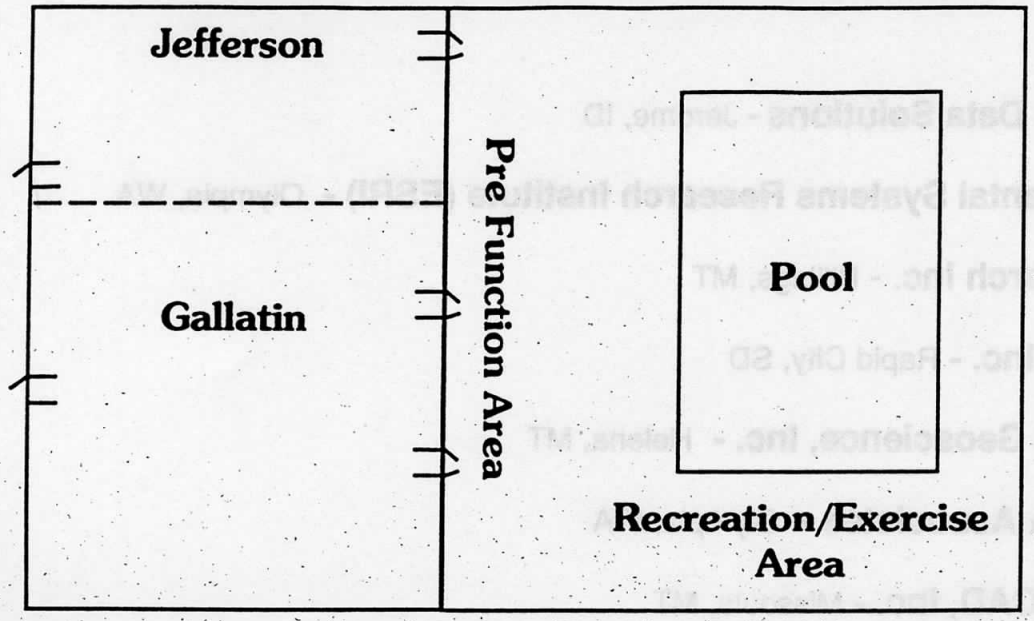
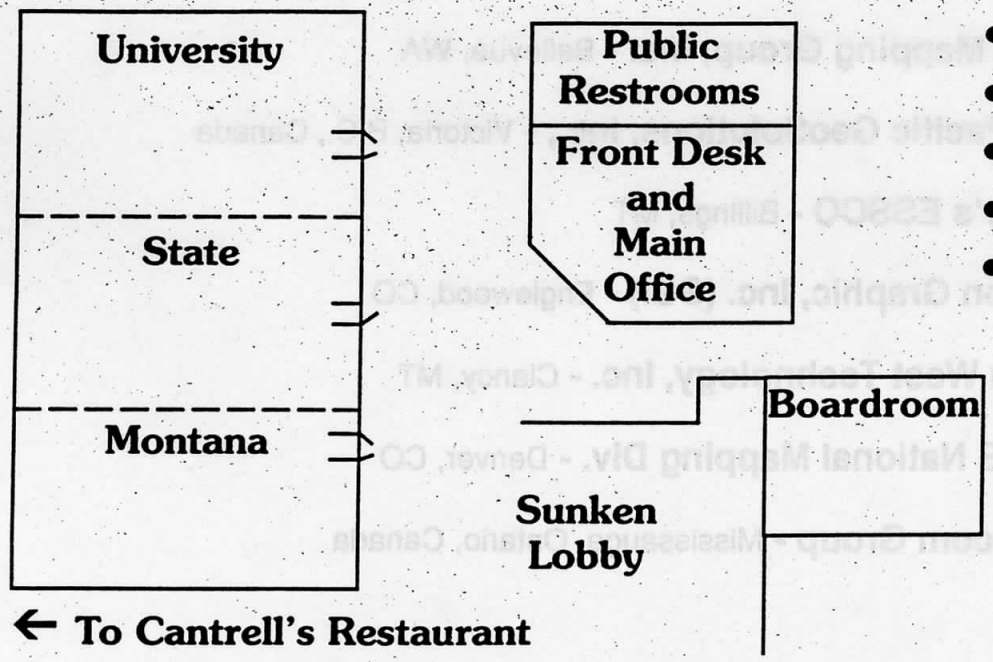


- Conventions
- Conferences
- Seminars
- Weddings
- Receptions
- Banquets



1325 North 7th Avenue
Bozeman, Montana 59715
(406) 587-5261
1-800-624-5865

Banquet & Meeting Facilities

Welcome to the Best Western GranTree Inn
Bozeman's Business and Travel Hotel is proud to provide the finest in convention facilities and services the "Big Sky" state offers. At the GranTree Inn, we realize how important your business is to you . . . and to us. This guide is designed to assist you in planning those special meetings, banquets or room accommodations to insure a successful and pleasant stay with us.

Meeting Rooms
Our flexible meeting facilities can quickly be modified from large group meetings to smaller break out rooms using moveable walls. Meeting rooms can be set per your individual needs and requests. Audio visual equipment is also available. Facility charges based upon groups individual needs.

Banquets
Our banquet menus vary from tastefully prepared single menu entrees and buffets to "themed" meals tailored just for your group. Facility charges based upon groups individual needs.

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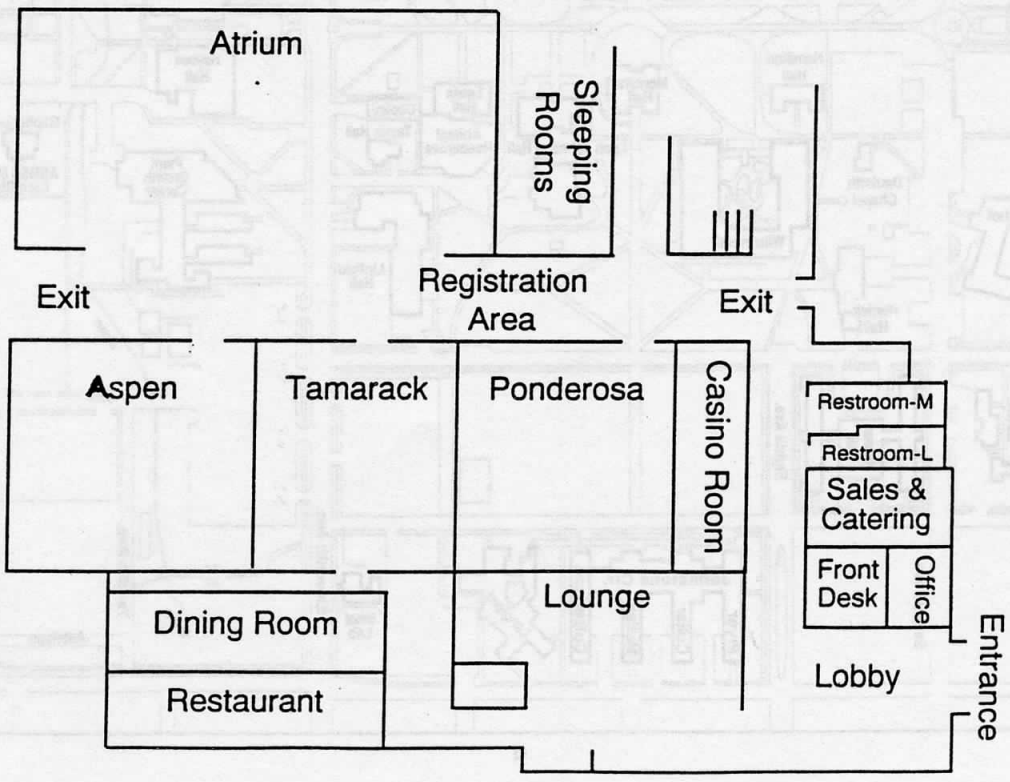
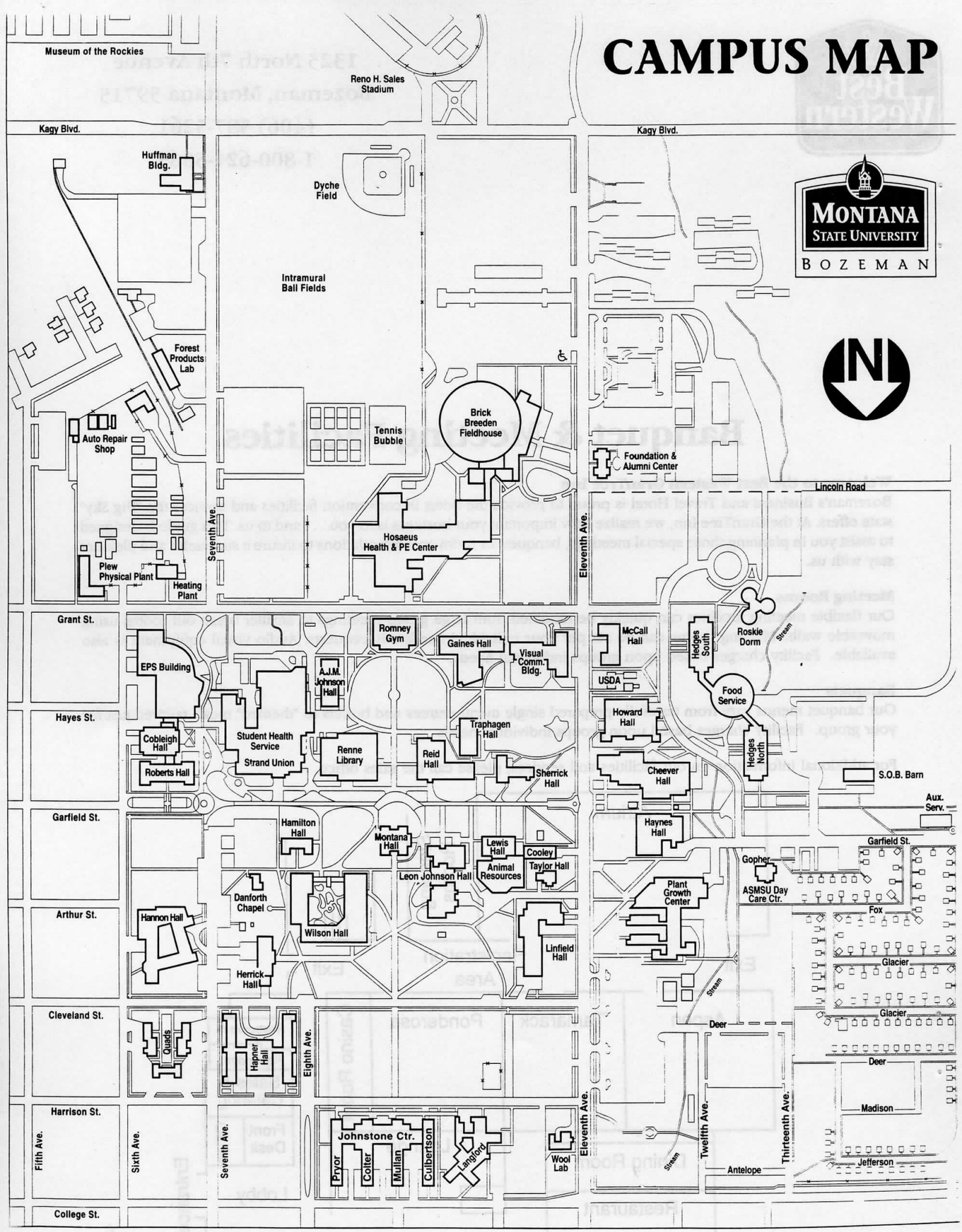
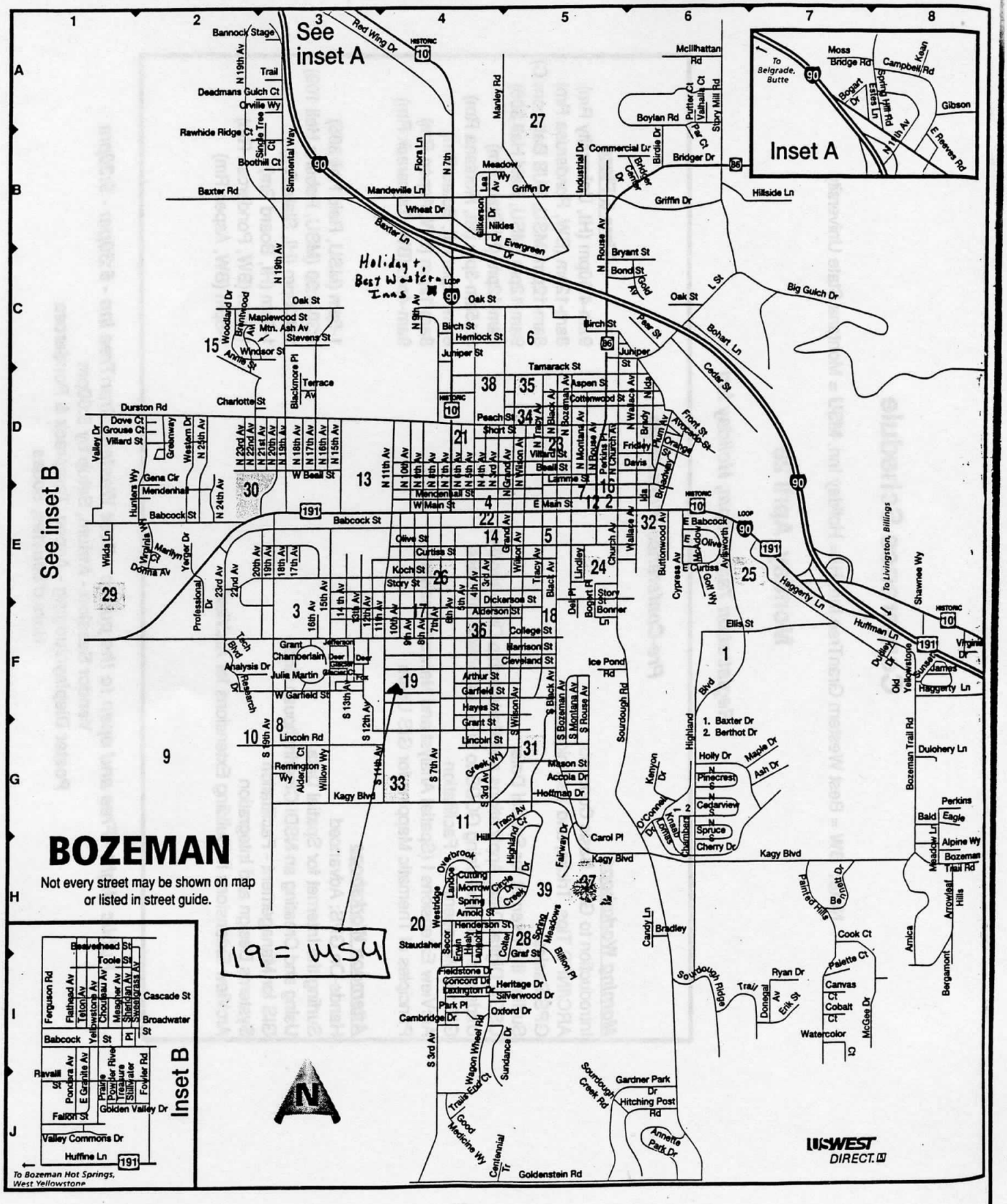


CAMPUS MAP


Museum of the Rockies
Reno H. Sales Stadium
Kagy Blvd.
Kagy Blvd.
Huffman Bldg.
Dyche Field
Intramural Ball Fields
Forest Products Lab
Auto Repair Shop
Tennis Bubble
Brick Breeden Fieldhouse
Foundation & Alumni Center
Lincoln Road
Seventh Ave.
Eleventh Ave.
Hosaeus Health & PE Center
Plew Physical Plant
Heating Plant
Grant St.
Hayes St.
Garfield St.
Arthur St.
Cleveland St.
Harrison St.
College St.
Fifth Ave.
Sixth Ave.
Seventh Ave.
Eighth Ave.
Eleventh Ave.
Twelfth Ave.
Thirteenth Ave.
Romney Gym
Gaines Hall
Visual Comm. Bldg.
EPS Building
A.J.M. Johnson Hall
Cobleigh Hall
Roberts Hall
Student Health Service
Strand Union
Renne Library
Reid Hall
Traphagen Hall
Sherrick Hall
McCall Hall
USDA
Howard Hall
Hedges South
Roskie Dorm
Stream
Food Service
Hedges North
Cheever Hall
S.O.B. Barn
Aux. Serv.
Haynes Hall
Garfield St.
Gopher
ASMSU Day Care Ctr.
Plant Growth Center
Fox
Glacier
Glacier
Deer
Deer
Madison
Jefferson
Antelope
Hamilton Hall
Montana Hall
Lewis Hall
Cooley
Animal Resources
Taylor Hall
Leon Johnson Hall
Danforth Chapel
Hannon Hall
Wilson Hall
Linfield Hall
Herrick Hall
Quads
Hapner Hall
Johnstone Ctr.
Pryor
Colter
Mullan
Culbertson
Langford
Wool Lab
Stream
Stream

Bozeman Street Map



Conference Schedule

Note: BW = Best Western GranTree Inn, **HI** = Holiday Inn, **MSU =** Montana State University

Monday, April 28

Registration 7am to 8pm, Holiday Inn

Pre-Conference Workshops

Morning Workshops	**Time & Place**
Introduction to GIS: Basic Concepts	9am-4:30pm (HI, University Rm)
ARC/INFO Tips, Tricks, and Techniques	8am-12pm (BW, Ponderosa Rm)
GPS Basics	8am-12pm (MSU, SUB Ballroom C)
Surfing the Internet for Spatial Data	9am-12pm (MSU, Reid Hall 305)
USGS Digital Data, Applications and Partnership Opportunities	8am-12pm (HI,State Rm)
Understanding and Using GCDB to Build a Control Database	8:15am-3pm (HI, Montana Rm)
GIS for Management - Facilitation	8am-12pm (HI, Board Rm)
ArcView Extensions I (Spatial Analyst and Network Analyst)	8am-12pm (BW, Aspen Rm)
Principles of Thematic Mapping for GIS Users	9am-4pm (BW, Tamarack Rm)
Afternoon Workshops	
Hands-On GPS; Advanced	1-5pm (MSU, Reid Hall 305)
Surfing the Internet for Spatial Data	1:30-4:30 (MSU, Roberts Hall 109)
Using and Creating an NSDI Clearinghouse Node	1-4:30pm (HI, State Rm)
GIS for Management - Facilitation	1-5pm (HI, Board Rm)
Systems Design and Integration	1-5pm (BW, Ponderosa Rm)
ArcView Extensions II (Building Extensions for ArcView)	1-5pm (BW, Aspen Rm)

Public Night - Free and open to the public - Best Western GranTree Inn - 6:30pm - 9:30pm
Vendor Session - Atrium, Setup by 5:00pm
Poster Display/Judging - Aspen, Tamarack & Ponderosa
Hors d'oeuvres, Sodas

Tuesday, April 29

Registration 7:00am to 7:00pm, Holiday Inn

7:00 - 8:00am	***Buffet Breakfast*** *- Moderators and Speakers only, Best Western, Aspen Room*		
	Plenary Session - Jefferson/Gallatin Rooms, Holiday Inn		
7:00 AM	**Continental Breakfast -** Jefferson/Gallatin Rooms, Holiday Inn		
8:00 - 8:15am	**Host** - Steve Custer, Associate Professor of Geology and Interim Director at Montana State University-GIAC **Welcome** - Joe Chapman, Provost and Vice President, Academic Affairs, MSU		
8:15 - 9:00am	**Keynote** - Steve French, Director of City Planning, Georgia Institute of Technology, Atlanta, Georgia 'Shared Data Resources for State and Local Planning'		
9:00 - 9:30am	**Plenary** - Jay Heavner,Tax Administrator, Lincolnton, NC - "Lincoln County's GIS"		
9:30 - 10:00am	**Break -** Cookies, Coffee, Tea & Sodas		
9:30 - 10:30am	**MT/ID Users' Group Meeting**, Boardroom, Holiday Inn		
	Concurrent Sessions		
	Natural Resources Track Aspen/Tamarack Rm, Best Western Moderator - Tony Rolfes	**Local Government Track** University Rm, Holiday Inn Moderator - Andy Epple	**Special Topics** Ponderosa Rm, Best Western Moderator - Jackson Beighle
10:00 - 10:30am	Building the National Hydrography Dataset - *Keven Roth*	GPS/GIS Technology for Rural Addressing and Enhanced 911 Mapping - *Allen Armstrong*	Spatial Data Warehousing - Fast Access to a Centrally Located "Corporate" Database - *Terry Bartlett*
10:30 - 11:00am	USGS Digital Products - *Jean Parcher & Lance Clampitt*	Assessing Ecosystem Integrity in Rural Communities - *David Knox*	Wow! Now That I've Caught the Grizzly Bear ("GIS"), What Do I Do With It? *Jay Heavner*
11:00 - 11:30am	The Soils of Yellowstone: Creating a Soil Survey with a Shovel and a GIS - *Ann Rodman, Henry Shovic, Eric Compas*	Using GIS in Real Estate - *Nafisseh Heiat*	
12:00 - 1:30pm	**Lunch** (Italian Buffet) & Montana/Idaho Merger Discussion, Jefferson/Gallatin Rms., Holiday Inn (Your Name Tag is Your Meal Pass)		

Tuesday Afternoon - April 29

Concurrent Sessions

	Native American Track Ponderosa Rm, Best Western Moderator - David Delsordo	Natural Resources Track Aspen/Tamarack Rms, Best Western Moderator - Kurt Teuber	Special Topics University Rm, Holiday Inn Moderator - Skip Repetto	Local Government Track State Rm, Holiday Inn Moderator - Steve Hellenthal
1:30 - 2:00pm	American Indian Lands Environmental Support Project - *Al LaTourette*	Using Remote Sensing and GIS to Quality-Control Water Rights - *Tony Morse, Mike Verdun*	Ten Mile Watershed: The Challenge of GPS Data Acquisition in the Field - *Mike Odegard*	*MLGGC GIS/CAMAS Integration Technology Panel Discussion 1:30 - 3:00pm*
2:00 - 2:30pm	Digital Conversion of INEEL Archeological Data - *Julie Brizzee*	GAP: What's in Store for Montana - *Melissa Hart, Roland Redmond*	Ten Mile Watershed: The Challenge of GPS Data Analysis in the Lab - *Cathy Maynard*	
2:30 - 3:00pm	The Pasture: An Old Winter Camp? Using GIS to Assist in the Answer - *Andy Little*	Montana Groundwater Characterization Program and Groundwater Information Center: GIS Applications in Flathead and Lake Counties, Montana - *Larry Smith, Thomas Patton*	Meeting Forestry Resource Data Needs with Digitally Captured Aerial Photo Imagery and GIS - *Bruce Burger*	
3:00 - 3:30pm	**Break** - Cookies, Coffee, Tea & Sodas			
	Native American Track Ponderosa Rm, Best Western Moderator - David Delsordo	**Natural Resources Track** Aspen/Tamarack Rms, Best Western Moderator - Bill Baldus	**New Technology Track** State Rm, Holiday Inn Moderator - Kris Larson	**Local Government Track** University Rm, Holiday Inn Moderator - Karen Hruska
3:30 - 4:00pm	*Native American Round Table Discussion 3:30 - 5:00pm*	GPS and GIS for Stream Channel Assessment - The Ruby River and Careless Creek Projects, Montana - *Doug Harrison, Connie Williams*	VisAg: GIS Driven Ag Management Software - *Dave Schuler*	Automating a Roadway Permitting System Using ArcView and Microsoft Access - *Scot McQueen, Diane Holleran*
4:00 - 4:30pm		Implementation of a Multi-Agency GIS; Greater Yellowstone Winter Visitor Management - *Skip Repetto*	The VisAg Harvest Module - *Mark Little*	Upper Tenmile Watershed: Using Geographic Information Systems to Initiate Watershed Planning - *Pat Hettinger*
4:30 - 5:00pm		GIS and Remote Sensing for Weed Management in the Blackfoot Valley - *Ken Wall*	The VisAg ProScripts Module - *John Huotari*	Creating Accurate Customer Spotting Maps with Personal Check Addresses - *Carl Brenner*

5:30-6:00pm	Advisory Board Meeting for the GIS/GPS Program at Montana Tech College of Technology, Board Room, Holiday Inn
5:30-6:30pm	Technical Working Group (TWG) Meeting - University Rm, Holiday Inn
5:30-6:30pm	Northern Rockies Chapter of URISA Social - Montana Rm, Holiday Inn
6:30-8:00pm	***Conference Banquet Dinner, Jefferson/Gallatin Rooms, Holiday Inn*** *(Your Name Tag is Your Dinner Pass)* *Two Entree Buffet - Bacon Wrapped 8 oz Tenderloin, Poached Pacific Salmon Filet w/Blackberry Butter Sauce*
7:30pm -	Musical Entertainment by Little Elmo and the Mambo Kings

Wednesday, April 30

7:00 - 8:00am	***Buffet Breakfast -*** *Moderators, Speakers, and Students, Best Western, Aspen Room.*
	Plenary Session - Jefferson/Gallatin Rooms - Holiday Inn
7:00 AM	**Continental Breakfast -** Jefferson/Gallatin Rooms, Holiday Inn
8:00 - 8:30am	**Host** - Steve Custer, Associate Professor of Geology and Interim Director at Montana State University-GIAC **Welcome** - Don Stueck, Mayor, Bozeman - 'New Residents are Increasingly Drawn to the Natural Beauty of Bozeman and Yellowstone: GIS Can Be a Powerful Planning and Management Tool'
8:30 - 9:15am	**Guest Speaker** - Eric Anderson, Chief of Conservation and Environmental Programs for the Army National Guard, Arlington, Virginia - 'Environmental and Decision-Support Analysis of Army National Guard Training Missions with GIS and a National Database'
9:15 - 9:30am	**Guest Speaker** - Richard Aspinall, Head of Spatial Data Handling at the Macaulay Land Use Research Institute, Aberdeen, Scotland; Director, Geographic Information & Analysis Center, Montana State University (effective July 1, 1997)
9:30 - 10:00am	**Break -** Cookies, Coffee, Tea & Sodas

Concurrent Sessions

	Natural Resources Track Ponderosa Rm, Best Western Moderator - Jim Devitt	**Local Government Track** University Rm, Holiday Inn Moderator - Gretchen Burton	**New Technology Track** State Rm, Holiday Inn Moderator - Andy Little	**Special Topics** Montana Rm, Holiday Inn Moderator - Stuart Kirkpatrick
10:00 - 10:30am	Modeling Best Habitat Linkages Across Landscapes: The Bridger - Big Belt Potential Wildlife Corridor - *Richard Walker, Lance Craighead*	Local Government Atlas: A GIS-Based Tool for Protecting Water Resources - *Stewart Dary*	A Comparison of On-Line Implementations of GIS/AM/FM - *Mark Duenas*	**Panel Discussion:** *Review of the Executive Order Creating the Montana Geographic Information Council 10:00 - 11:00am*
10:30 - 11:00am	What's New (Digitally) at the NRCS - *Tom Potter*	Putting the "Geographic" into a GIS - *Rick Breckenridge*	Populating the GIS: Equipment and Techniques for Field Data Collection - *Ryan Pierson*	
11:00 - 11:30am	Analysis of Road Network Accessibility - *Dale Hamilton, Ray Ford*		Using GIS for Precision Farming - *Ryan Pierson*	*USFS - Meeting 11:00 - 12:00pm*

12:00 - 1:30pm	**Sandwich Buffet & Raffle Ticket Prizes** Other Luncheon activities include: MT GIS Business Meeting, Ken Wall, Moderator * Users' Group Annual Report, Ken Wall * Technical Working Group (TWG) Report, Tom Ring * K-12 GIS Toolbox, Tom Gallagher & Russ Hendrickson * Education Subcommittee Report, Kris Larson * Local Government GIS Coalition (MLGGC) Report, Steve Hellenthal

Wednesday, April 30

Concurrent Sessions

	Natural Resources Track Ponderosa Rm, Best Western Moderator - Tony Thatcher	**Special Topics** University Rm, Holiday Inn Moderator - Margie Lubinski	**Meetings**
1:30 - 2:00pm	Development of the Greater Yellowstone Area Data Clearinghouse (GYADC) - *Patricia Scarrah, Eric Guss, Anthony Barnosky*	Use of GIS in Landscape Assessments on the Lewis & Clark National Forest - *Kurt Teuber*	*Montana Local Government GIS Coalition (MLGGC)* *1:30 - 3:00PM* **State Rm, Holiday Inn**
2:00 - 2:30pm	Use of Historic Vegetation Cover for Biodiversity Compliance in the Swan River State Forest - *Donna Leeper, Scott McLeod*		
2:30 - 3:00pm	Estimation of Forest Stand Structure Attributes from Aerial Photographs: An Accuracy Assessment - *Charles Schrader-Patton, Robert Pfizer, Lloyd Queen*		*Northern Rockies Chapter of URISA Board Meeting* *2:00 - 3:00PM* **Montana Rm, Holiday Inn**

Thank you for attending the 1997 Montana/Idaho GIS Conference - see you in 1998!

Thursday, May 1

Post-Conference Workshops

Map Objects and Delphi (Part I) - 8am-12pm, Tamarack Room, Best Western
Introduction to Avenue - 8am-4:30pm, Ponderosa Room, Best Western
Internet Map /Server (Part II) - 1-5pm, Tamarack Room, Best Western

PRE-CONFERENCE WORKSHOPS - Monday, April 28

Introduction to GIS: Basic Concepts **- Holiday Inn, University Room, 9am-4:30pm.** Geographic Information Systems: Basic Concepts is a six-hour workshop designed for new or novice GIS users, those who want an introduction to the basic concepts. The workshop is NOT a software specific course. The day-long class provides an overview and introduction to GIS as well as specifics related to cartography and cartographic data, database creation, and principles of spatial analysis and GIS functions. Instructors: Allan Cox and Fred Gifford, Natural Resource Information System.

ARC/INFO Tips, Tricks, and Techniques **- Best Western, Ponderosa Room, 8am-12pm.** Jack Horton is back with his latest and greatest "Tips and Tricks" for the discerning ARC/INFO user who longs for new and better ways!

GPS Basics **- Montana State University, SUB Ballroom C, 8am-12pm.** Global Positioning System (GPS) technology has revolutionized the way we locate features on the face of the earth. If you plan to use the GPS approach to solve mapping or navigation problems, GPS Basics will increase your understanding and provide a solid basis for effective use of this new technology. The workshop covers design, development, characteristics and potential evolution of the system. Mapping issues including datums, projections, coordinate systems, methods and efficiency are also discussed. Specific interests of the participants will be addressed if time permits. Instructors: Diana Cooksey and Dave Tyler, Montana State University.

Hands-On GPS (Advanced) **- Montana State University, Reid Hall Room 303, 1-5pm.** The emphasis of this workshop will be on the application of GPS for field mapping. You will become familiar with a variety of GPS receivers through hands-on experience. Field exercises will introduce you to GPS positioning, navigation and attribute data collection, using both real-time and post-processed differential correction methods. After data are collected in the field, workshop participants will have the opportunity to perform GPS data processing and analysis in a computer lab. Instructors: Diana Cooksey, Dave Tyler, and Elizabeth Roberts, Montana State University.

Surfing the Internet for Spatial Data **- Offered twice: 1) Montana State University, Reid Hall Room 305, 9am-12pm; 2) Montana State University, Roberts Hall Room 109, 1:30-4:30pm.** The Internet continues to change the way people use geographic data. For the beginner, this class will show you the basic tools to access geodata on the net, where to go on the net and how to get the data downloaded to your computer. For the more experienced internet user, we will explore the latest search techniques for geodata using WAIS searches, map object servers and Shockwave technology. Class includes hands-on learning, on-line demonstrations, a course manual and a floppy disk of internet bookmarks. Instructor: Ed Madej, Great Divide Graphics.

USGS Digital Data, Applications and Partnership Opportunities **- Holiday Inn, State Room, 8am-12pm.** This workshop will focus on USGS Digital products including Digital Line Graphs, Digital Elevation Models, Digital Orthophoto Quadrangles, and Digital Raster Graphics. The presentation is designed for all data users or potential data users regardless of digital data knowledge. We will discuss production methods, formats, data applications, availability and how to acquire data sets. Specific questions pertaining to the digital data discussion will be addressed if time permits. Instructors: Lance Clampitt and other representatives from USGS Rocky Mountain Mapping Center.

Using and Creating an NSDI Clearinghouse Node **- Holiday Inn, State Room, 1-4:30pm.** This workshop will provide an overview of the rationale and operational details of setting up and using a Clearinghouse Node in the National Spatial Data Infrastructure. A graphical overview of the HTML and Java interfaces to the Clearinghouse will be presented to introduce participants to using Clearinghouse for discovering on-line digital geospatial data. The second portion of the workshop focuses on the details of preparing FGDC metadata, procedures to validate the metadata, indexing, and service. Participants are expected to have a basic understanding of FGDC metadata elements. Instructor: Angela Jennings, FGDC.

Understanding and Using GCDB to Build a Control Database **- Holiday Inn, Montana Room, 8:15am-3pm.** The Federal Bureau of Land Management's Geographic Coordinate Data Base (GCDB) is under development with the expressed purpose of rendering the most dependable coordinates available for the US Public Land Survey System (PLSS) corners. The GCDB, along with accompanying Geographic Measurement Management (GMM) software, has been utilized to compute the geographic coordinates of PLSS corners using official Cadastral survey record data and to provide an estimate of the approximate relative position coordinate dependability. This system has been used to successfully develop a ground control layer in Flathead County and several counties in Idaho. The GCDB is presently being evaluated as a state standard for ground control and PLSS layers. Workshop presenters will give a general overview of GCDB, its present availability and coordination and development plans for the future. Examples of how the GCDB has been used to create the foundation for GIS and desktop mapping in Idaho and Montana will be presented. Technical details relevant to the case studies will be introduced in ways appropriate for an audience without a surveying-based background. This workshop is intended for all city, county or regional officials interested in developing a parcel database, or other database with its foundation based on a standardized Public Land Survey System. Instructors: Dan Mates and Mark Dixon-BLM, Rick Breckenridge-Flathead County, MT, Joe Bucher-Idaho Tax Commission. Moderator - Stu Kirkpatrick, Department of Revenue in Helena, MT.

GIS for Management - Facilitation **- Offered twice: 1) Holiday Inn, Board Room, 8am-12pm; 2) 1-5pm.** The advantages of employing a team approach in developing and implementing projects have long been documented. The challenge, however, is to harness the talent and interests of diverse groups of individuals, including professionals and, possibly, interested citizens, to reach an effective consensus on issues and solutions. This four-hour workshop demonstrates group facilitation techniques. The workshop can be useful to GIS managers and analysts responsible for working in a team setting involving a diverse group of individuals. It will demonstrate group facilitation methods by conducting an actual workshop, one based on GIS issues that currently exist in Montana and Idaho. Instructors: Stewart Dary and Jackie Magnant.

Systems Design and Integration **- Best Western, Tamarack Room, 1-5pm.** This workshop will explore the secrets to "The Enterprise Environment". Both software and hardware issues with regards to systems design and integration will be covered. System design and implementation planning can establish a solid foundation for future GIS growth. System architecture design provides a distributed computer environment that supports performance and communication needs of application users within the organization. Applications supported by the distributed computer environment establish primary requirements for the system design. Instructor: Jack Horton.

ArcView Extensions I (Spatial Analyst and Network Analyst) **- Best Western, Aspen Room, 8am-12pm.** This workshop will explore the basic functionality of these ArcView GIS software extensions. The ArcView Spatial Analyst lets users create, query, map and analyze cell-based raster data and perform integrated vector-raster analysis using feature-based and grid-based themes. The ArcView Network Analyst extension enables you to solve a variety of problems involving geographic networks, such as finding the most efficient route or closest facility, and defining service areas based on travel time. Instructor: Chuck Lewis.

ArcView Extensions II (Building Extensions for ArcView - Creating and Customizing) - **Best Western, Aspen Room, 1-5pm.** This workshop will explore the sample extensions delivered with ArcView GIS 3.0 and how you too can build and add your own ArcView extensions. The concept of adding objects to a project interactively is not new and was supported by ArcView prior to the development of extensions. What extensions really bring are a means of managing the delivery of these objects. Prior to extensions, to add these additional objects to a project, the objects had to be imported into the project and became permanently incorporated into it. With extensions these objects never become a physical part of the project and are not written to the project file. The objects are owned by the extension and incorporated into the project only when the user turns the extension on; they are removed from the project when the user turns the extension off. Instructor: Chuck Lewis.

Principles of Thematic Mapping for GIS Users - **Best Western, Tamarack Room, 9am- 4pm.** It is easy to make nice looking maps with a GIS, but do you know if they are technically correct? This workshop is concerned with thematic mapping principles for generating correct maps including: choropleth maps, dot maps, proportional figure maps, flow maps, daisymetric maps and others. Production methods and design principles involving graphic limits, layout, lettering, legends, and other marginal information will be covered. Included will be exercises involving hands-on work with computer mapping software. Instructors: Dr. Paul Wilson, Robert Batchelder, and Kurt Knowles, University of Montana.

POST-CONFERENCE WORKSHOPS - Thursday, May 1

MapObjects and Delphi (Part I), Internet Map Server (Part II) - **Holiday Inn, University Room, 8am-12pm (I) and 1-5pm (II).** MapObjects and Delphi are the hottest new tools available to the GIS programmer. MapObjects is an OCX developed by ESRI to be accessed from object oriented programming languages such as Delphi, Visual Basic and Visual C++. Delphi is as easy to implement as Visual Basic but runs nearly as fast as C++, making it an ideal development environment for GIS. Part I of the workshop exposes the developer to the features of MapObjects and how to access them via Delphi. Part II will provide basic technical information needed to set up a MapObjects Internet Map Server as well as demonstrate live Internet Map Server applications. ESRI recently announced the MapObjects Internet Map Server which extends MapObjects GIS and mapping software components and lets developers create spatially enabled World Wide Web sites for a variety of needs. The Web is a compelling and cost-effective way to share information within an organization (i.e., an Internet) or provide public access to information on the Internet. Attendance at both parts of the workshop is highly recommended. Instructors: Mark Little and Chuck Lewis.

Introduction to Avenue - **Holiday Inn, State Room, 8am-4:30pm.** This one-day Introduction to Avenue workshop will provide information and knowledge needed to use Avenue software to create a customized graphical user interface (GUI) to ArcView. This workshop is ideal for participants who are new to GIS, who have little or no programming background. Instructor: Jack Horton.

ABSTRACTS FOR THE 1997 MONTANA/IDAHO GIS CONFERENCE PROGRAM

Tuesday Morning Concurrent Sessions (10:00 - 11:30)

Natural Resources Track

Building the National Hydrography Dataset

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The National Hydrography Dataset is the culmination of recent cooperative efforts of the U.S. Geological survey (USGS). It combines the best of the USEPA Reach File (RF3) and USGS Digital Line Graph (DLG) hydrography files: hydrologic ordering, hydrologic navigation for modeling applications, and a unique identifier (reach code) for surface water features from RF3; and the spatial accuracy and comprehensiveness of DLG hydrography. The National Hydrography Dataset is designed to provide comprehensive coverage of hydrologic data for the U.S. While based on 1:100,00-scale data, the National Hydrography Dataset is designed to incorporate--and encourage the development of--higher-resolution data required by many users. An integral feature of the National Hydrography Dataset is that it incorporates a two-way exchange of data between the National level and the State and local level. States, localities, and other users are expected to benefit from the National Hydrography Dataset and to contribute to the dataset as well. The National hydrography Dataset supersedes RF3 and DLG by incorporating them, not by replacing them. Users of RF3 or DLG will find the same data in a new, more flexible format. They will find the National hydrography Dataset both familiar and greatly expanded and refined.

USGS Digital Products

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This presentation will provide a good overview of USGS's Digital Mapping products. These mapping products provide an inexpensive foundation for creating base data layers for Geographic Information systems. The presentation will focus on Digital Line Graphs, Digital Elevation Models,

Digital Orthophoto Quadrangles, and Digital Raster Graphics. Production methodology, applications, user hints, and availability will be discussed for each of the four products.

The Soils of Yellowstone: Creating a soil survey with a shovel and a GIS

by Ann Rodman, Henry Shovic, and Eric Compas
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This purpose of the study is to provide information about the nature and distribution of the soil resource in Yellowstone National Park. The soil survey process requires a predictive system based on limited observations of a resource that is largely invisible and continuously variable. The traditional methods are expensive and require physically visiting most of the study area. Because our backcountry access is limited and we have a strong GIS program, we chose to replace the traditional process with electronic methods of spatial analysis.

A point coverage of 1500 field sample sites was quantitatively correlated with accepted theories of soil formation to develop predictive concepts applicable to the Yellowstone survey area. We translated these concepts into a set of 300 rules in ARC/INFO. We applied these rules to polygon and raster coverages of landform, vegetation, climate, and soil parent material to create a polygon soils theme directly on a topographic base. We used ARC/INFO to produce the final camera ready maps, meeting all cartographic standards. Our experiment in using automated spatial analysis resulted in a product that meets all agency standards, but at a much lower cost than normal.

Local Government Track

GPS/GIS Technology for Rural Addressing and Enhanced 911 Mapping

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Many counties today face the challenge of collecting information in large rural areas where people and facilities are widely dispersed and perhaps not officially addressed. In the establishment of an Enhanced 911 Dispatch Management System, data remains the key component for efficient public safety planning. Emergency planners, who need to have quick access and knowledge of what's out there and where, are discovering that Global Positioning System (GPS)/Geographic Information System (GIS) technology makes it entirely feasible to collect, manage, and query public safety information rapidly and simply.

This presentation will highlight several successful GPS/GIS Rural Addressing E-911 projects covering thousands of miles of rural terrain. Field techniques, mission planning for GPS, processing steps and management/planning issues will be discussed along with presentation of actual final products. GPS/GIS technology will be presented as a valuable technology for collecting, managing, and displaying multiple descriptive attributes and GIS feature locations over large, and previously un-mapped areas.

GPS/GIS technology is fast becoming a collection technique that could essentially replace present workflows involving notepaper collection routines, and outdated paper mapping and filing systems. Emergency Services planners, and county GIS developers can collect data with GPS and immediately integrate the geographically-referenced data into their GIS database. GPS/GIS field collection equipment can be combined with fast, efficient data collecting and recording aids into a compact system easily usable by one person, on foot or in a vehicle. Progressive county management agencies, with concerns and

responsibilities for public safety planning, are implementing GPS/GIS technology for effective intelligent emergency management.

Assessing Ecosystem Integrity in Rural Communities

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An ecosystem integrity index was developed for agricultural communities in the rural Rocky Mountains. The goal of study was to assign a value of ecosystem integrity to all the different land uses surrounding the community of Three Forks, Montana. Ecosystem integrity values were then extrapolated to a GIS map of the study area and an overall ecosystem integrity of the area was calculated. Aerial photos from 1965, 1979, 1984, and 1990 allowed us to determine historic land use patterns, and assess ecosystem integrity of the study area through time. Grazed native rangelands had the highest ecosystem integrity rating, industrial and commercial sites ranked lowest. The greatest changes in land use and in ecosystem integrity corresponded to federal government policy changes, such as the institution of the Conservation Reserve Program. Growth of residential areas has had minimal effect on the overall ecosystem integrity of the area. Plans for this GIS are to use it to predict the impact of future policy and development scenarios on the ecosystem integrity.

Using GIS in Real Estate

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Geographic Information Systems (GIS) help analyze data and provide insight for decision makers. Real estate analysts evaluate supply-and-demand factors within markets, principally using U.S. census with U.S. employment data and housing data. A preliminary real estate market analysis is critical and followed by real estate statistical analysis and comparison to identify current and future demand and supply. For each of these tasks, incorporating business geographics into the analysis can make the process easier and the results more compelling.

This study describes the application of a PC-based GIS developed for real estate analysis in Billings, Montana. Using MapInfo from MapInfo Corporation the MLS data was converted to a geographical database by integrating the statistical tables with the state, city and county maps. An MLS system stores data about available residential property and typically is used by realtors to access information for buyers. The geographical database was then queried and analyzed to provide a wide range of information about a specific property and its neighborhood. In addition, by integrating the census data, the GIS model was utilized to do comparative market analysis, direct-marketing mailings to potential property buyers, etc. This paper describes the methodology used and its results.

Special Topics

Spatial Data Warehousing - Fast Access to a Centrally Located "Corporate" Database

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A data warehouse is a subject-oriented, integrated, time variant, nonvolatile collection of data that support an organization's decision making process. In essence, a data warehouse is a large database organizing operational data in a repository for easy query and analysis. It is a well conceived and well designed environment containing data that are key to an organization's decision making process. By definition, a data warehouse is a large database designed to support the decision making needs of an organization.

Data warehousing applications are based on high-performance databases that use a client/server architecture to integrate diverse data types in near real time. While data warehouses typically look at many types and dimensions of data, many are currently lacking in the spatial, or location, context of the data. That will soon change!

ESRI as well as many other database companies, including ORACLE, INFORMIX, IBM and others, are actively developing technology that will allow organizations to input manage and query/serve spatial information (GIS datasets) from within traditional RDMS's.

This new technology will allow your "organization" to have fast access to a central database, add spatial constraints to your SQL queries, manage both your traditional attribute data and your GIS spatial data in the same database management system. Listed above are a few benefits to organizations.

What does this new technology mean to you, the traditional GIS shop? This presentation will discuss the conceptual data warehousing model and what this means to the GIS world today and in the future.

"Wow! Now that I've caught the Grizzly Bear ("GIS"), what do I do with it?"

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This session demonstrates (with a "Live" GIS database) the capabilities of a "comprehensive" GIS and what it would do for you after you have "caught the grizzly bear". Lincoln County's GIS database includes such layers as zoning, structures, 100 year floodplain, contours, soil boundaries, woods, water and sewer lines, fire hydrants, survey control monumentation, watersheds, farm lands use parcels, city and fire district boundaries, E-911 addressing, digital orthophotography, etc. The county's software programs used for comparable sales analysis and displaying of structure images for comparison will be included in this demonstration, along with it's appraisal programs.

Tuesday Afternoon Concurrent Sessions I (1:30-3:00)

Native American Track

American Indian Lands Environmental Support Project

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The American Indian Lands Environmental Support Project (AILESP) is a staff-initiated project created to integrate and evaluate current environmental data on and near indian lands, develop tools to easily access and analyze this data, and to increase coordination between federal, state, and tribal government data systems. The AILESP database contains current information on multi-media releases of contaminants, potential environmental and human health risks from these releases, recent compliance and enforcement histories for facilities located on and near Indian lands, and environmental impact data, such as contaminated fish, which may have resulted from nearby point source discharges. Six regions and three tribes are currently involved in AILESP. Phase One of the project involves compilation and distribution of the data. In Phase Two, we will use this data, along with other data, to develop and implement strategies to reduce the impacts of toxic chemicals on and near tribal lands.

Digital Conversion of INEEL Archeological Data

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For thousands of years, the sagebrush steppe of the northeastern Snake River Plain provided important resources along its seasonal migration routes to the aboriginal hunter-gatherer populations. The Idaho National Engineering and Environmental Laboratory (INEEL) manages a very large portion of this region and is responsible for stewardship of many archeological sites, or cultural resources, that can provide clues as to the nature of aboriginal prehistoric utilization. Ongoing efforts to inventory all cultural resources on the INEEL have resulted in the recording of more than 1500 resources in the past decade. In the past, information gathered from these resources has been archived and managed in hard-copy paper format. Recently these data have been converted to digital format to isolate spatial distribution patterning of different resource types for purposes of predictive modeling and to provide a more consolidated approach to overall management.

This paper explains the process used to enter the data into the system, the data quality procedures used to verify the data entry, and details the engineered interface between ARC/INFO and Oracle that was designed and implemented at the INEEL.

The Pasture: An old Winter Camp? Using GIS to Assist in the Answer

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Using GIS as "the tool", a site along the Snake River carrying the geographic name of the "The Pasture" is researched. The research was driven by the desire of an amateur archeologist to try to put the pieces together in an organized fashion. A look at the Indian history of this area that borders the Snake River in South Central Idaho and is considered a desert climate area. Using GIS technology and ArcView software the information was collected, assembled, stored, manipulated, scanned, digitized, analyzed and keyed in. An attempt was made to take a look back in history and try and determine the effects of sifting sand, erosion, fire and other phenomenon may have had an effect on the site. The approach is to look at this project in both a GIS and archeological point of view. This presentation will be a show and tell using the tools that a laptop computer has in its bag.

Natural Resources Track

Using Remote Sensing and GIS to Quality-Control Water Rights

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The Idaho Department of Water Resources is ten years into the largest right adjudication ever attempted. The department is evaluating 170,000 water-right claims throughout the Snake River Basin in Idaho . Recent experience has clearly demonstrated that the use of remote sensing GIS is a necessary part of the process. Using GIS will accomplish three things : 1) water rights will be converted into a relational data-base; 2) water will be graphically linked to the land on which the water is applied; and) quality control of water rights will become much more powerful and efficient. The issue of quality control is the most potent argument in favor of using remote sensing and GIS. By overlaying water rights on scanned and map-registered aerial photography , significant errors that were previously unrecognized become obvious. Adding tax parcels and the associated data increase the utility of the GIS application. When all of these data are organized in an ArcView project, the case for using remote sensing and GIS becomes compelling.

GAP: What's in Store for Montana

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Montana Gap Analysis (MT-GAP) is part of a national effort to map elements of biodiversity in order to evaluate conservation options at regional scales. Gap Analysis is a proactive approach which examines statewide protection status for all land cover types and native terrestrial vertebrates simultaneously, rather than a single species at a time. Steps include : 1) Mapping statewide land cover; 2) predicting wildlife distributions using land cover characteristics and other variables like elevation, soils, and proximity to water; and 3) overlaying the results with a map of land stewardship to identify current gaps in protection.

MT-GAP will be completed in December 1997, at which point several GIS outputs will become available. We will outline our progress to date, describing methodologies, discussing challenges inherent in constructing statewide outputs, and presenting preliminary results for western Montana. Emphasis will be placed on techniques for mapping land cover, building wildlife models, and identifying conservation priorities. Finally, we will suggest potential applications for future users.

Montana Groundwater Characterization Program and Ground water Information Center: GIS Applications in Flathead and Lake Counties, MT

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The Montana Groundwater Characterization Program uses ARC/INFO to map aquifers, non-aquifer sedimentary units, and depth-to-bedrock in Flathead and Lake counties. Coverages include point data, geologic-unit thickness information from ~14,500 water well logs, and geologic polygon data. The well logs are from MBMG's Groundwater Information Center (GWIC) database. We produce maps showing the size, area extent, and shape of aquifers, confining units, and surficial-deposits. Preliminary maps are made by contouring TIN's or by digitizing hand-contoured point coverages of hydrogeologic units. Machine contours are smoothed by hand and re-digitized. Because of the large numbers of data points and data values attached to each point, GIS tools help to quickly re-make draft maps.

Map control of point data is provided by a spatially distributed set of field-plotted, office-digitized well locations. Data from these wells are used to evaluate location and data quality from unvisited wells. Locations for the ~143,000 wells in GWIC can be translated to latitude/longitude at a scale of 1:250,000. Locations for the ~14,500 wells within the Kalispell Valley and the Flathead Reservation can be converted at a scale of 1:24,000. GWIC is being transferred to Sybase so that it can be accessible directly from Arc as Arc/Sybase.

Special Topics

Ten Mile Watershed: The Challenge of GPS Data Acquisition in the Field

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The Natural Resources Conservation Service, formally the Soil Conservation Service, has been conducting inventories of natural resources for over fifty years. Over the past several years the agency has begun using GPS (Global Positioning System) to gather data to complete these inventories.

This presentation discusses the use of GPS to inventory Ten Mile Creek, located in the Helena valley. Rockwell GPS PLGR's were used to gather both location data and attribute information for use in a GIS database.

Ten Mile Watershed: The Challenge of GPS Data Analysis in the Lab

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In the fall of 1996 a field inventory of conditions along the main channel of Tenmile Creek (in the Upper Missouri basin) was conducted. A variety of observations regarding land use and the types and degree of disturbance to the stream banks and channel were recorded using GPS equipment.

The GPS point data collected was then imported into ARC/INFO and developed into a variety of interpretive coverages and plots for use in public meetings and planning sessions. This presentation explains the methods used to import and manipulate the data and translate it into coverages with additional attributes required for interpretation of the information observed and collected. The discussion will include problems encountered, and suggestions for future GPS field data collection projects intended for similar applications.

Meeting Forestry Resource Data Needs with Digitally Captured Aerial Photo Imagery and GIS.

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The BIA-Southern Ute Agency's Branch of Forestry, in conjunction with the Southern Ute Indian Tribe, worked together with the BIA-GDSC and Positive Systems to evaluate commercially available digital aerial photo imaging technology for updating the Tribe's ten year old resource aerial photography. The goal was to cost-effectively meet a broad set of information needs that require current aerial photography both in traditional hard-copy prints for field use, and as digital imagery for use in a changing and evolving GIS environment.

The entire Southern Ute Indian Reservation was flown with a commercial digital aerial photography camera system to capture true color images with stereo overlap at 2 meter per pixel ground sample distance. Each digital scene was printed at 1:24000 scale for use with stereoscopes in the field in analyzing terrain and vegetative cover. The 615 digital scenes captured over the Reservation's approximately 1150 square miles were also mosaicked through an automated, software driven process that registers them to a georeferenced Landsat TM satellite coverage.

This presentation will highlight the ways in which digitally-based aerial photography system technology was used to address the application, the challenges encountered in completing the project, and the planned uses of the image data within ArcView to meet timber management needs on the Southern Ute Indian Reservation.

Local Government Track

Montana Local Government GIS Coalition (MLGGC) Technical Panel Discussion on GIS/CAMAS Integration

MLGGC Members
Steve Hellenthal, Moderator

This panel will discuss some of the issues and techniques involved in the development and maintenance of a Cadastral layer and its integration with the Department of Revenue Tax Assessment CAMAS database. This panel is open to all conference attendees and open participation is encouraged.

Tuesday Afternoon Concurrent Sessions II (3:30-5:00)

Native American Track

First Nations Round Table Discussion - Mapping Indian Country, 1997

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This session will be a facilitated, open discussion to share the experience and interests of our region's Native American Community on issues of GIS, GPS, geography, and mapping. We will also discuss topics such as managing Tribal Resources, Ceded land issues, Water Rights, Water Management, Geology and Mineral Exploration, Mapping Native American Culture, setting up a GIS shop in tribal government. This will provide us with an opportunity to find common interests and build a network of GIS Users working on issues relevant to the Native American community.

Natural Resources Track

GPS and GIS for Stream Channel Assessment- The Ruby River and Careless Creek Projects, Montana

W. Doug Harrison, Resource Inventory Specialist
Connie M. Williams, GIS Analyst
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A Global Positioning System (GPS) receiver, when linked to a capable data collection device, provided resource inventory specialists with a valuable tool for assessing stream channel damage in Montana. Furthermore, the judicious use of a Geographic Information System (GIS) provided land managers with a new and innovative way to analyze, visualize and display GPS-gathered stream channel data for planning and decision-making.

A 52-mile section of the Ruby River in southwest Montana and a 14-mile section of Careless Creek in central Montana were assessed using a GPS receiver linked to a portable computer. These devices were mounted in a drift boat and carried in a field back pack, respectively. For the Ruby River project, channel alteration information "tagged" to the field-digitized flow-line (thalweg) served as a basis for assessing channel change over a 35-year period and as a current information base for 1995 flood damage assessment and follow-up restoration work. For the Careless Creek project, a

stream channel "baseline" was field-digitized, to which right and left bank erosion features were tagged. This served as a basis for assessing the distribution of stream bank erosion by land owner and for planning irrigation water management strategy and bank stabilization measures.

Both projects engaged GIS analysis to determine individual channel feature length and the proportion of feature length to total channel distance. GIS output products were designed to help land managers visualize the magnitude and distribution of damage and evaluate their treatment options.

Implementation of a Multi-Agency GIS: Greater Yellowstone Winter Visitor Management

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This paper looks at the problems associated with the creation of a spatial database by several different GIS shops. The database created by this team is one of the first that spans the entire Greater Yellowstone Area (GYA). During 1995, the Yellowstone National Park Spatial Analysis Center was directed to head up the GIS portion of Winter Visitor Use Management (WVUM) for the Greater Yellowstone Coordinating Committee (GYCC). This paper explores the implementation of a GIS database where individual parks and forests were given direction and definition on how to create the base data layers. The project required the individual units to assemble base layers and ship them to Yellowstone GIS which would aggregate this data into coverages for the entire GYA at a scale of 1:250,000. The lessons learned during this effort make apparent the need to precisely define how each data layer is created. In this case, each contributing GIS shop interpreted the definitions for the required points, lines and polygons differently. In order to obtain a final product that was usable by the GYCC for management decisions we were required to go through several extra iterations of editing. It is also necessary to know exactly what end products are desired so it is possible to know where to concentrate database development efforts so that goals can be met in a timely fashion.

GIS and Remote Sensing for Weed Management in the Blackfoot Valley

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In 1996 Land and Water Consulting, Geodata Services, Inc. and the Wildlife Spatial Lab at the University of Montana conducted a pilot project for the Blackfoot Challenge to develop GIS and remote sensing techniques to assist in managing several noxious weeds in a 30,000 acre area in the Ovando area of the Blackfoot Valley. This presentation will discuss GIS as a tactical planning tool for weed mapping and a monitoring and communication tool working with local landowners. We will also cover GPS use in weed mapping and applications of satellite imagery for mapping knapweed and leafy spurge.

New Technology Track

VisAg: GIS Driven Ag Management Software

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With VisAg GIS Driven Ag Management Software, a farmer can visually analyze the physical factors that contribute to crop yields, and utilize that information to attain consistently high level results in future years. GIS provides an ideal graphical user interface for record keeping needs in today's agriculture. The map display with point and click farm field selection techniques makes the old "remember the unique record id" methods obsolete. GIS technology is driving American agriculture to new levels of precision in recording and retrieving information for management decision making. VisAg was the first Ag Management Software released on the market fully utilizing GIS technology.

The VisAg Harvest Module

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With VisAg GIS Driven Ag Management Software and its Harvest Module, a farmer can visually analyze the physical factors that contribute to crop yields, and utilize that information to attain consistently high level results in future years.

The VisAg Harvest Module is an enhancement application for VisAg GIS Driven Ag Management Software. It interfaces directly with the GIS driven features of VisAg, and can use the farmer's field data if they are already in VisAg. The farmer can also build field boundaries according to unique requirements. The VisAg Harvest Module is a powerful visualization tool, enabling the farmer to easily view factors affecting his Harvest and, thus, his livelihood.

The Harvest Module provides considerable flexibility. The farmer can choose to work with information from one or more crops, fields or harvests. The farmer can decide which fields or crops are included in the harvest analysis. The harvest parameters can be edited, yield data can be calibrated to match bin measurements, and results can be displayed on the screen or printed. The user has the option of processing a single field, or setting up a Batch process, whereby the entire harvest is processed according to his instructions.

The VisAg ProScripts Module

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A variable rate applicator gives the flexibility to dispense products to a field at variable and specified rates. Through the use of a GPS receiver the variable rate applicator knows its location within a field.

With VisAg GIS Driven Ag Management Software and its ProScripts Module, a farmer can visually prepare instructions for the application of chemical products to a field via a variable rate applicator. It interfaces directly with the GIS-driven features of VisAg, and uses the farmer's field maps already in VisAg or allow the farmer to import the field boundary from a file of points collected with a GPS receiver such as the Ashtech AgNavigator. It allows the farmer to easily view the application plan, and build the necessary instructions for taking that plan to the field.

Easy to use tools enable the farmer to customize maps to the degree of detail required. Editing is simple, and can be done at any time. Maps can be custom colored or shaded as the user chooses. Each product dispensed by the variable rate applicator has its own reference map. Finally, the maps can be printed for reference, and an instruction script compatible with the farmer's variable rate applicator can be produced.

Local Government Track

Automating a Roadway Permitting System using ArcView and Microsoft Access

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Marshall and Associates, Inc., has contracted with Ada County Highway District of Boise, Idaho to implement an automated roadway permitting system to track past and present roadway construction. The system was designed using Microsoft's ACCESS database software, ESRI's ARC/INFO, Dynamic Segmentation and ArcView3. Challenges to this implementation included: 1) assembling past road history from disparate digital information; 2) developing a menu-driven user friendly PC database powerful enough to track over 5,000 permits annually as well as upwards of 16,000 historic permits; 3) linking the resultant database and ArcView3 to graphically display current and past road history; and 4) maintaining simplicity in design to allow users with minimal training to use the system.

Upper Tenmile Watershed: Using Geographic Information Systems to Initiate Watershed Planning

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Information and maps produced using a Geographic Information system (GIS) can be a valuable tool for initiating watershed planning as demonstrated by the formation of the Upper Tenmile Watershed Steering Group. Incorporating a GIS component into watershed resource assessment assisted in the evaluation of threats to drinking water quality and supply in the municipal watershed outside of Helena, Montana. An opinion survey of watershed residents introduced the watershed characterization project to local people and agencies, and helped to generate interest and prioritize key watershed issues. Existing ARC/INFO coverages were clipped to the upper Tenmile Creek watershed boundary. Pertinent data and information were mapped using ARC/INFO to portray a "picture" of the watershed. Useful coverages have included land ownership patterns, hydrography and roads, location of abandoned mines, domestic wells and septic systems, erosion potential ratings, geology and vegetation. The watershed characterization generated interest among watershed residents, local, state and federal agencies who formed the Upper Tenmile Watershed Steering Group in March, 1996. Additionally, appropriate formatting and proper metadata documentation of GIS data layers will assure that additional agencies such as the State Natural Resource Information System (NRIS) and local county government will find further uses for GIS data long beyond the formation of the watershed planning group.

Creating Accurate Customer Spotting Maps with Personal Check Addresses

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Businesses are always interested in locating their customers. Customer spotting maps are often constructed for business analysis. Historically, businesses have made these maps by conducting a survey; this process is time consuming and not efficient.

Perhaps a better method exists. Customers who use personal checks for their payment, provide their address on their check. Clearly, using these addresses introduces a bias in the sampling technique, but with address geocoding and GIS, the customer spotting map can be made quickly and efficiently.

This paper compares the two customer spotting map techniques to see if the personal check address map is as accurate as the survey map. The study is based on data collected from Albertson's grocery stores.

Wednesday Morning Concurrent Sessions (10:00 - 11:30)

Natural Resources Track

Modeling best habitat linkages across landscapes: The Bridger - Big Belt Potential Wildlife Corridor

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To help save the grizzly bear from inbreeding depression associated with genetically isolated populations, we need to examine possible routes that grizzlies can use to move between their core populations in the northern Rockies. Using GIS data, we have begun to look at potential regional scale corridors which could provide the bears with adequate forage, cover and isolation from humans to facilitate the movements of individuals between the Greater Yellowstone Ecosystem and the Northern Continental Divide ecosystem.

One promising route is along the Bridger and Big Belt mountain ranges. However, two areas in particular pose significant impediments to bear movements-- the Bozeman Pass/Bridger Canyon area in the south, and to the west of the Gates of the Mountains Wilderness area in the north. In both of these areas the potential corridor is bisected by interstate highways. The Bozeman Pass/Bridger Canyon area is also being heavily developed for housing.

We assessed the best potential routes which grizzlies might take if they were to use the corridor, using indices of habitat quality and habitat effectiveness derived from Montana Gap Analysis data. These parameters are similar to those used in the Cumulative Effect Model (CEM) developed for the Interagency Grizzly Bear Committee.

What's new (Digitally) at the NRCS?

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The NRCS in Montana has always been a leader in GIS within the federal government and the past year has seen several more steps forward.

The first big development began in early 1996 when the soils digitizing staff participated in a pilot project to test a new software developed in cooperation with Rutgers University. ALPS - Automatic Label Placement Software, was used to place multiple soil labels on a digital soils map, ready for publications. Lake County, Montana will be the first digitally published soil survey.

In November 1996, Montana was named as 1 of 4 regional digitizing centers for the NRCS and will play a major role in providing 1:24000 digital soils data to our partners and customers. This will mean stepped up production of digital soils data for Montana and surrounding areas. A fringe benefit of this should be an increase of Digital Ortho Quads (DOQs) for this area, as DOQs will be used both for soil survey certification and publication.

Analysis of Road Network Accessibility

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Many problems in natural resource management involve identifying the ability of vehicle traffic to move across a road network. Identifying vehicle accessibility includes determining which segments of the network are accessible to vehicle traffic, when they are accessible, and which vehicle classes they are accessible to. This can be accomplished with a derivative of a classical "connected components" algorithm, taking as inputs the road network and an associated set of "barriers". The algorithm groups together "connected arcs" which are accessible to each other without passing through any barriers. The algorithm next determines the effects of the restrictions imposed by the barriers on each set of connected arcs. Algorithm output is road network with arcs attributed with the restrictions imposed by the set barriers.

The presentation will focus on the algorithm, and explain how it complements the analysis available using only the facilities embedded in a typical commercial GIS. Examples will be provided to show how the algorithm can be used to record the arc restriction attributes for use with other types of analysis. The examples will also show how the algorithm can be utilized to display which portions of the road network are restricted for a given set of dates.

Local Government Track

Local Government Atlas: A GIS-based Tool for Protecting Water Resources

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Defining Issue: Florida's St. Johns River Water Management District (SJRWMD) is responsible for protecting water-related resources in an area that covers over a fifth of the state. To accomplish this task, the agency must integrate a wide range of data and work in partnership with a variety of agencies. Key data used by the agency include floodplains, wetlands, contaminated wells, conservation areas, ground water recharge areas, and surface water quality. Local governments are particularly important partners since they control land use patterns and activities on the land. In essence, local governments represent the first line of defense for protecting sensitive environmental areas. SJRWMD, like other regional agencies, shares data on critical water resources and issues with local governments in order to coordinate on environmental projects and to maximize scarce resources. However, many local governments, particularly elected officials, do not have easy and rapid access to GIS-based information for decision-making purposes.

GIS Solution: SJRWMD created a hard copy atlas for seventeen of the nineteen counties in its jurisdiction. The remaining two counties represent a small portion of the District. Each county atlas contains a variety of maps and text highlighting St. Johns River Water Management District's four areas of responsibility: Water Supply, Flood Protection, Water Quality, and Natural Systems. Each map is supported by text that explains the map and discusses how it was produced. Some maps also have text that identify key issues within the county, current initiatives being undertaken by various agencies, and strategies developed jointly by SJRWMD and local governments. All maps contained in the atlases are available as EPS and GRA files in the District's Internet web page and

through an AML-based, user-friendly interface running on a SUN workstation at the agency's on-site outreach center.

Application or Methodology: The maps were assembled by employing ESRI ARC/INFO software running on SUN workstations. They were plotted using Hewlett-Packard Designjet 650 and 755 plotters and subsequently color photocopied. The project occupies approximately three gigabytes of disk storage.

Putting the "Geographic" into a GIS

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Implementing the geographic control phase of a GIS program is the most expensive line item investment of the project yet yields the greatest return. This necessary financial commitment is a contributing factor why many GIS programs never get from a visionary's concept to actual implementation. Flathead County, Montana, took advantage of an information exchange memorandum with the Bureau of Land Management in Billings, Montana. That gave this project a control grid covering all 5,300 square smiles of Flathead County derived from USGS 7 ½ minute quadrangle maps, the public land survey system, and then a least squares analysis of that data, for a fraction of the anticipated geographic control cost.

New Technology Track

A Comparison of On-Line Implementations of GIS/AM/FM

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The internet is loaded with information, tools and other useless garbage. Many have learned to filter out the garbage and find the internet a useful tool for every day business. An example of internet usefulness is as simple as using the on-line phone book to find an address in any city across the United States. Not only can one find the address of a company, their phone number, and nearby businesses but one can also find directions to the location by bringing up custom map of the address and surrounding area at the desired scale of the user. This feature of the internet is not very new but very useful nonetheless. But how do these mapping sites work? They contain a GIS component and respond quickly to on the fly user requests. How will this affect GIS/AM/FM as we know it today and what are the tools available now for creating these type of web sites?

The intent of this discussion is to research methods of implementing on-line GIS by comparing the available products, prices, and their ease of use. Focusing on tools which provide cross platform support for popular operating systems such as UNIX, Windows NT, and Windows 95. A comparison of the available browsers will also be necessary to provide a basis for supported functionality and plug-ins, and add-ons for specific browsers will be taken into account. Due to the fact that internet technology is constantly changing and evolving at an incredible rate, the browsers evaluated will only include the two most popular browsers Netscape and MS Internet Explorer each of which have unique features and capabilities which need to be explored and compared along with other GIS internet products.

Populating the GIS: Equipment and Techniques for Field Data Collection

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In a technology driven industry, changes and improvements are continually being made in data collection equipment and software. The purpose of this presentation is to introduce new and evolving technology that directly aids GIS data capture. The focus will be upon types of field data capture equipment and software available, the techniques employed for field data capture, and system compatibility. GPS, Laser Rangefinders, Rugged Hand-held computers, and other equipment will be discussed along with the associated software options. Specific uses of the field data collection equipment will be described along with the potential for integrating these systems to provide complete field data collection solutions. The advantages of such systems will be outlined in detail. Case studies will be used to illustrate the advantages of these field data collection systems.

Using GIS for Precision Farming

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The agricultural market is taking advantage of many existing and emerging technologies to reduce costs and increase yields per acre providing a more profitable and less labor intensive industry. One of the many tools these 'High Tech' farmers utilize is the Global Positioning System (GPS). The GPS serves as a tool for mapping existing resources, collecting field data, and providing precise location information necessary for today's yield monitors and spray controllers. The GPS used in the agricultural market, when combined with other emerging technologies, is reducing costs, increasing yields, helping to protect the environment, and aiding in better resource management. This presentation will discuss how GPS and GIS is being implemented by today's farmers as a management and production tool. Many existing and future applications will be discussed. Field mapping and sampling, yield monitors and spray controllers, irrigation controllers, and precision vehicles will be introduced as the future of today's farmer.

Special Topics

Panel Discussion - Review of the Executive Order Creating the Montana Geographic Information Council

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At their July 11, 1995 meeting, the State of Montana's Information Technology Advisory Council approved formation of a GIS Task Force comprised of members from federal, state and local GIS practitioners. The group met approximately once every three weeks from September 1995 through February 1996. In their final report published in June, 1996 the consensus opinion of the task force was that the State of Montana should develop a cooperative GIS coordinating effort that includes all of the major sectors of GIS interest and activity in Montana. The draft Executive Order creating the Montana Geographic Information Council is the first step in accomplishing the recommendation of the GIS Task Force.

The executive order was drafted by the Information Services Division of the Montana Department of Administration in cooperation with staff from the Natural Resource Information System (NRSI). It has been presented to both the Montana TWG and the Montana Local Government GIS Coalition although their official responses have not been received at time of this writing.

This presentation will give GIS users across the state the opportunity to question the primary drafters of this document on specific items, as well as make suggestions as to how it could be improved. For those attending this session, prior examination of the Executive Order (contained in your conference packet) would be helpful.

Wednesday Afternoon Concurrent Sessions (1:30 - 3:00)

Natural Resources Track

Development of the Greater Yellowstone Area Data Clearinghouse (GYADC)

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Creation of the GYADC is funded by the FGDC/NSDI (initiative entitled Proposal for a National Spatial Data Infrastructure Information Center and Sharing of Geographic information systems Technology among Local, State, and Federal Governments within the Greater Yellowstone Area. The objective of the GYADC is to initiate the communications mechanisms that will lead to developing consistent biological, geological, and socioeconomic data layers across the GYA, for use by researchers, government agencies, and the general public. Participating partners include Montana State University, University of Wyoming; (representing academic researchers); U.S. Geological Survey, National Park Service, and U.S. Forest Service (representing Federal Government); Montana and Wyoming (representing State Government – plans are underway to add Idaho); and six counties within the GYA (representing local government). Goals include: 1) Use internet based software to point users to the Greater Yellowstone spatial data sets of use to managers and stakeholders within the GYA, scientists and the general public; 2) Acquire and post a set of metadata information about each referenced data set; 3) Provide the hardware, software, training and communications pathways required to help selected county governments in their efforts to plan for the future growth in the GYA, and to interact effectively with federal agencies.

Use of Historic Vegetation Cover for Biodiversity Compliance in the Swan River State Forest

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The recently approved State Forest Land Management Plan mandates that an appropriate mix of stand structures and compositions are maintained on State Forest land. In large blocked ownership, management direction is for forest types and structures historically present on the landscape. Ideally this will result in a plan for developing and maintaining a variety of forest structures and compositions instead of focusing on habitat needs for individual, selected species. Historic forest cover and class data was used to determine target cover type and proportion of age classes including old forests for the Swan River State Forest.

Estimation of Forest Stand Structure Attributes from Aerial Photographs: An Accuracy Assessment

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Spatial data are often derived from satellite imagery or from aerial photographs; awareness of potential inaccuracies in these data is important in landscape level analyses. If accuracy data are not provided with these spatial data, then managers need methods to conduct their own accuracy assessments. We estimated several forest stand structure attributes from aerial photographs and conducted accuracy assessments using error matrices by comparing the estimates to objective field plot data. Over 500 stands were photo-interpreted (1:15,840 nominal scale, normal color) for seven forest structure attributes. Accuracy adjusted for chance agreement ranged from 0.63 to 0.29. Land managers continue to look to remote sensing technology as a cost effective way to obtain spatial data. Future research should focus on how inaccuracies in spatial data can affect many landscape-level models.

Special Topics

Use of GIS in Landscape Assessments on the Lewis and Clark National Forest

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The Lewis and Clark National Forest is currently undertaking a process for assessing forest resources over distinct landscapes, or mountain ranges, ranging in size from 50,000 to 900,000 acres. The intent of the landscape assessment process is to establish a framework for project implementation, as well as to prepare for revision of the forest's Land Management Plan, due in 2001. An interdisciplinary team of resource specialists is compiling basic data to describe existing conditions and natural ranges of variability, and to develop an integrated desired condition for the landscape.

GIS technology plays a major role in the landscape assessment process, from producing maps and descriptive data of the basic resource layers, to more advanced modeling techniques. Vegetation Response Units (VRUs), the basic biophysical units of the landscape, are derived from rule-based overlays of potential vegetation, soils/geology, and disturbance or successional regimes. Of particular interest is the use of the Satellite Image Land Classification (SILC) data set, which recently became available to forests in the Northern Region, for describing existing vegetation and land cover.

The forest recently began a landscape assessment for the Little Belt Mountains. Preliminary results will be presented.