2008 GIS / Data Management Conference
March 31 – April 3, 2008
Fort Collins, Colorado

Hilton Hotel
425 West Prospect Avenue
Fort Collins, CO 80526

Abstracts of numbered sessions are attached

Agenda

Montana Room is available throughout the conference for side meetings

#	Date / Time	Session Title	Location / Room	Moderator / Presenter	Comments
Monday, March 31 – hand-on workshops APHIS building (within walking distance from hotel); NRPC (WASO) 3rd-floor conference room. **Transportation will be provided between NRPC and the hotel.** Maps attached.					
1	8:30 – 11:30	Programming with Python **(van leaves Hilton Lobby at 7:50 am and NRPC at 11:45)**	NRPC – 3rd Floor	B. Frakes, J. Morgan	An introduction to Python programming fundamentals
2	8:30 – 11:30	Raster data and tools available throughout NPS	APHIS IT Lab	R. Johnson, D. Duran	An overview of selected raster tools and data available to NPS employees.
3	8:30 – 11:30	Using the GIS Model Builder	APHIS CEAH Lab	T. Clark (ESRI)	Hands-on introduction to ESRI's Model Builder
4	8:30 – 11:30	Field data collection of geo-tagged photos	APHIS Kit Carson Room	T. Smith	Morning session will be followed by an afternoon computer lab session
5	1:30 – 4:30	Transitioning from Shapefiles to Geodatabases **(van leaves Hilton Lobby at 12:50 pm and NRPC at 4:45)**	NRPC – 3rd Floor	L. Nelson	Pros/cons and case studies of converting shapefiles to geodatabases.
6	1:30 – 4:30	Migrating from Access to SQL Server	APHIS IT Lab	S. Kingston	What to consider when upsizing from Access to SQL Server
4	1:30 – 4:30	Field data collection of geo-tagged photos	APHIS CEAH Lab	T. Smith	Continuation of morning session
	5:00–7:00 pm	**Registration: pick up conference materials and name tag** (in front of Arizona & Texas rooms, Hilton)			
Tuesday, April 1					
	7:30 – 8:00	**Registration: pick up conference materials and name tag** (in front of Arizona & Texas rooms, Hilton)			
	8:00 – 8:30	Plenary: Welcome and opening remarks	Arizona & Texas	G. Dickison, S. Hawkins, L. Curran	George Dickison – Natural Resource Program Center Director; Sue Hawkins – Deputy NPS CIO; Larry Curran – NPS CIO

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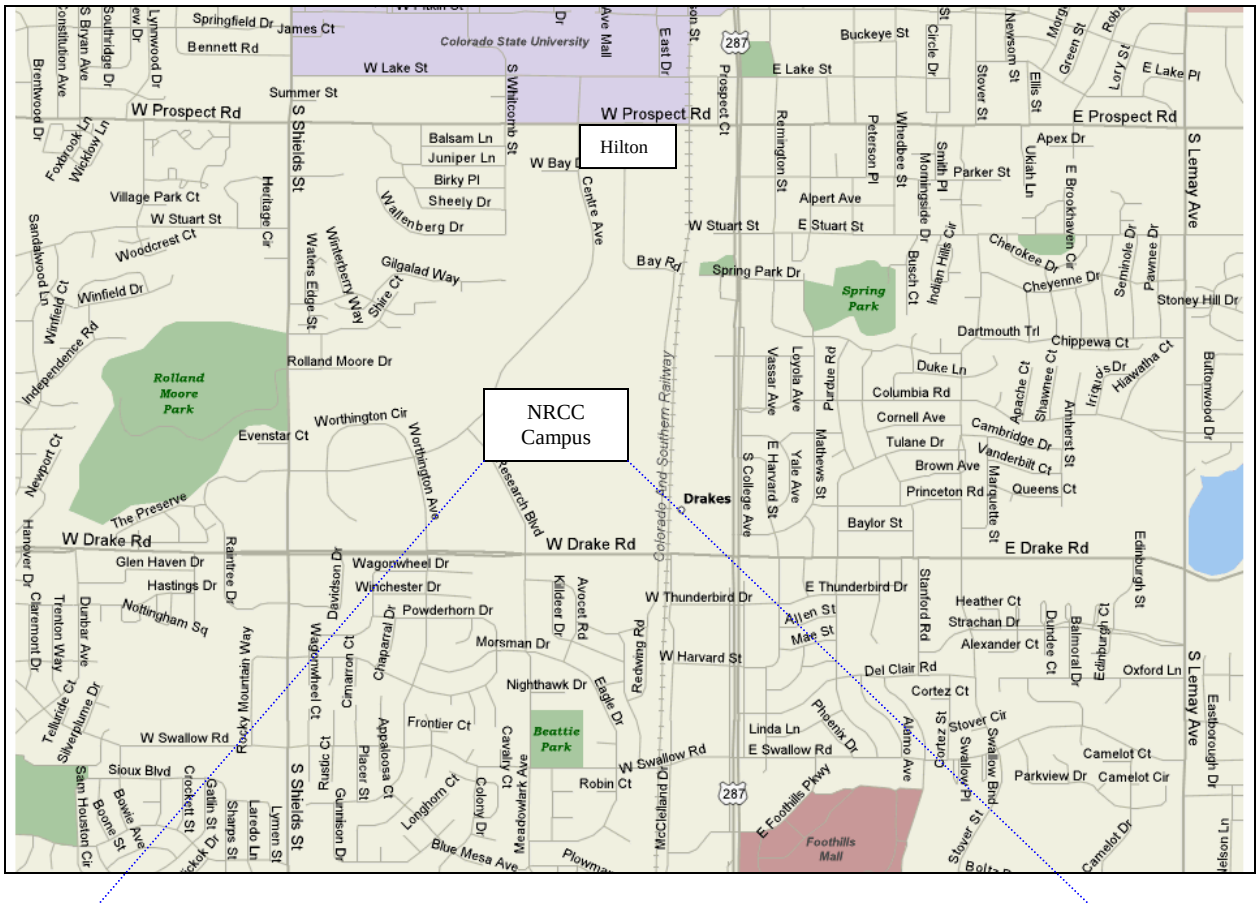
7	8:30 – 9:15	Plenary: GPS and Future Directions in Positioning	Arizona & Texas	D. McCarthy	Dennis McCarthy is the director of the U.S. Naval Observatory's Directorate of Time
	9:15 – 9:40	Plenary: Show 'n' Tell #1	Arizona & Texas	M. Beer - moderator	
	9:40 – 10:00	**Break**			
8	10:00 – 11:30	Cultural Resource Heritage Assets	Arizona	J. Knoerl, moderator	
9	10:00 – 11:30	Collecting and processing multi-year monitoring data	Texas	J. Haack, moderator	
	11:30 – 1:00	**Lunch**			
	11:30 – 1:00	*Side Meeting: VSIMS User Group*	*Montana*	*L. Nelson*	
10	1:00 – 2:30	Tele-monitoring: near- and real-time data acquisition from the field	Arizona	D. Wilder, moderator	
11	1:00 – 2:30	GIS and data management planning	Texas	T. Stidham, moderator	
	2:30 – 3:00	**Break**			
12	3:00 – 4:30	GPS best practices	Arizona	T. Smith, moderator	
13	3:00 – 4:30	Acquiring remotely-sensed data for resource issues	Texas	M. Story, moderator	
	4:30 – 6:00	*Side meeting: NPSpecies User Board*	*Montana*	*M. Beer*	Overview and discussion of progress to date with "Species 2.0"
	4:30 – 6:00	*Side meeting: Virtual Science Learning Centers*	*Arizona*	*A. Rodman*	Open to anyone interested is discussing the Virtual Science Learning Centers
Wednesday, April 2					
	8:00 – 8:15	Announcements	Arizona and Texas	J. Gregson	
14	8:15 – 9:00	Plenary: Connecting science and management – an information value chain	"	M. Klein	Mary Klein is the President and CEO of NatureServe
	9:00 – 9:30	Plenary - show 'n' tell #2	"	M. Beer, moderator	
	9:30 – 10:00	**Break**			
15	10:00 – 11:30	Tools and techniques for digital image management	Arizona	D. Mortenson, C. Dietrich, moderators	

#	Date / Time	Session Title	Location / Room	Moderator / Presenter	Comments
16	10:00 – 11:30	Managing data in an enterprise data management architecture	Texas	A. Sparks, D. Best, moderators	
	11:30 – 1:00	**Lunch**			
17	1:00 – 2:30	Acquisition, analysis, and application of climate data	Arizona	J. Gross, moderator	
18	1:00 – 2:30	3-D Visualization, Modeling and Mapping	Texas	D. Wilder, moderator	
	2:30 – 3:00	**Break**			
19	3:00 – 4:30	Developing and storing information in a SQL Server environment	Arizona	B. Frakes, moderator	
20	3:00 – 4:30	Processes and procedures for spatial and tabular data QA/QC	Texas	R. Johnson, moderator	
	4:30 – 6:00	*Side meeting: Image management user requirements*	Texas	*D. Mortenson, C. Dietrich*	
	5:00 – 6:30	*Side meeting: Northeast Region*	Montana	*K. Callahan*	
	6:30 – 9:30 pm	**Tools and technology swap meet**	Texas		Internet connection available. Share and swap info; ESRI rep will hold an ArcGIS "doctor's office"
Thursday, April 3					
	8:00 – 8:15	Announcements	Arizona and Texas	J. Gregson	
21	8:15 – 9:00	The Geospatial Modernization Blueprint for Transformation (GMBT): What it is, why it's important	"	T. Petty, Lorri Peltz-Lewis	Tim Petty is the DOI Deputy Secretary (acting) for Water and Science; Lorri Peltz-Lewis is the Program Management Officer (BOR/DOI) for the DOI Geospatial Modernization Blueprint
	9:00 – 9:40	Plenary session – Show 'n' Tell #3	"	M. Beer, moderator	
	9:40 - 10:00	**Break**			
22	10:00 – 11:30	Creative cartography – elegant solutions to thorny problems	Arizona	R. Johnson, moderator	
23	10:00 – 11:30	The resource information management challenge: Who's on First?	Texas	J. Gregson, moderator	

	Date / Time	Session Title	Location / Room	Moderator / Presenter	Comments
	11:30 – 1:00	**Lunch**			
	11:30 – 1:00	*Side meeting: Intermountain Region GIS*	Montana	*Nancy Shock*	
	11:30 – 1:00	*Side meeting: Southeast Region staff*	Texas	*Annabeth Rice*	
24	1:00 – 2:30	Innovative use of the web for data access and dissemination	Arizona	N. Irwin, moderator	
25	1:00 – 2:30	The IRMA Project and NPS Apps 2.0 – the migration to Service-oriented Architecture	Texas	M. Beer, moderator	
	2:30 – 3:00	**Break**			
26	3:00 – 3:20	Plenary – "Connect the Dots": integrating park science, planning, and management	Arizona and Texas	S. Fancy	
27	3:20 – 4:30	Plenary – Climate Change and NPS: panel discussion	Arizona and Texas	C. Dalby, moderator	
Friday, April 4					
	8:30 – 11:30	GISC meeting	NRPC – 3rd Floor	Peter Budde	
	7:30 a.m.	Snowshoeing in Rocky Mountain National Park		Marianne Tucker	Meet in hotel lobby
	8:00 a.m.	Rocky Mountain National Park tour		Sara Melena	Meet in hotel lobby
	1:00 p.m.	Fort Collins craft breweries tour		Peter Budde	Meet in hotel lobby

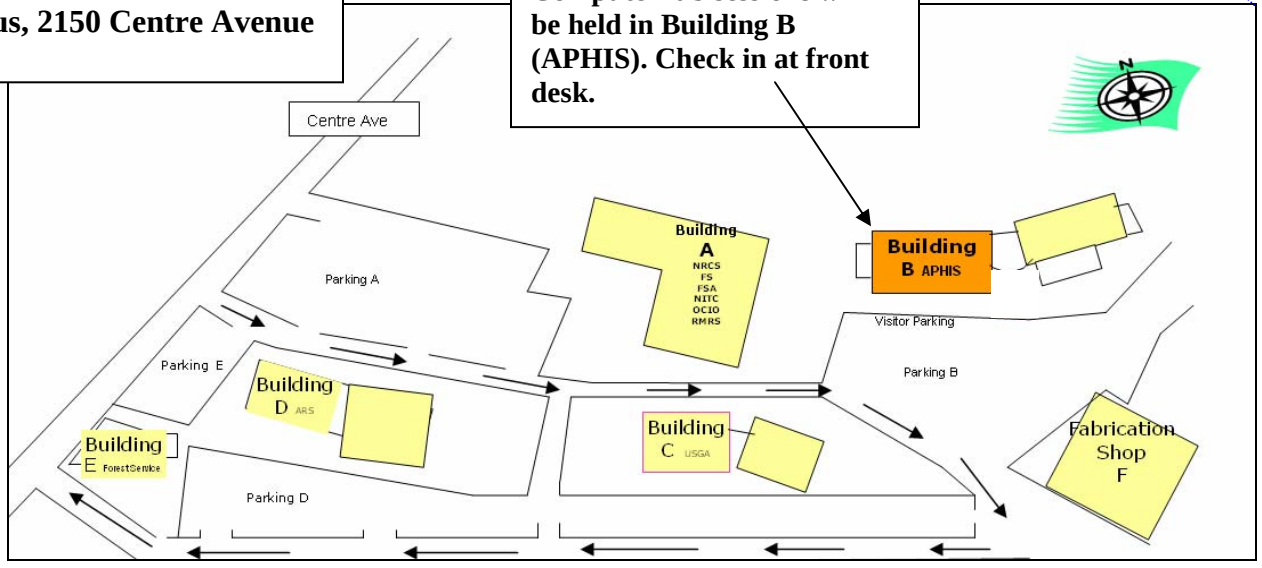
Note: field trips may be subject to change or cancellation due to weather.

Directions to Computer Lab: NRCC Campus, 2150 Centre Avenue, Building "B" (APHIS). Monday workshop sessions 2, 3, 4, and 6 will be held here.



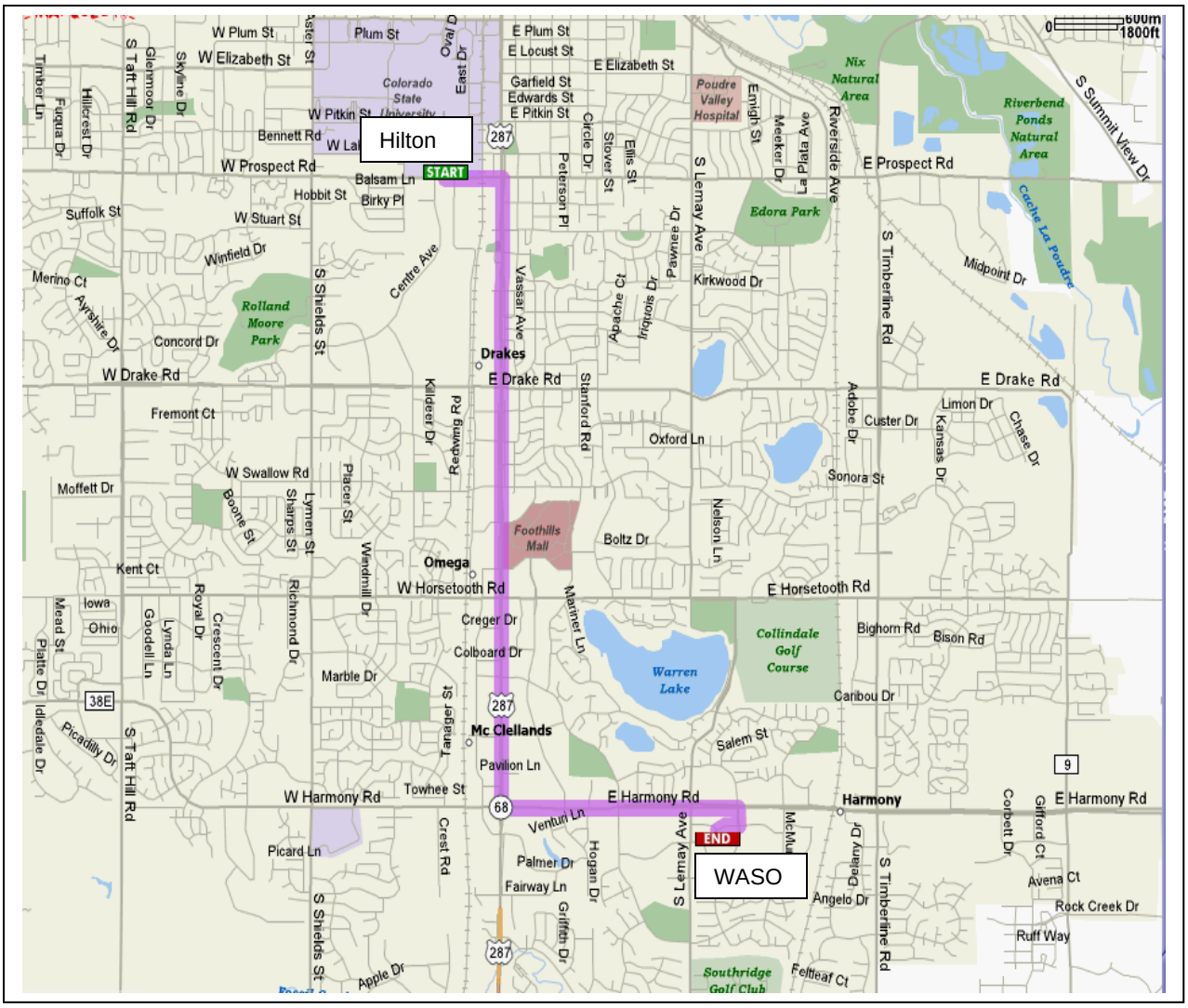
Approx. 15-minute walk from the Hotel to the NRCC Campus, 2150 Centre Avenue

Computer lab sessions will be held in Building B (APHIS). Check in at front desk.



Directions from Hilton Hotel to WASO Office (1201 Oak Ridge Drive)

From the Hilton go EAST on W PROSPECT RD. Turn RIGHT onto US-287 (South College Ave.) Turn LEFT on Harmony Road. Turn RIGHT onto WHEATON Drive, then RIGHT on OAK RIDGE Drive. (Look for a big glassy building)



#	Session Abstracts
1	***Workshop: Programming with Python*** **-** *Brent Frakes and Jacob Morgan.* The course will cover an introduction to some programming fundamentals, and using Python to automate geoprocessing of GIS data. Each topic will provide an opportunity to practice learned concepts with basic exercises.
2	***Workshop: Raster data and tools available throughout NPS*** **-** *Roger Johnson and David Duran* This session will provide an overview of selected raster tools and data available to NPS employees. There will be a introductory discussion of how to install and use LizardTech's GeoExpress software and NGS Topo. Hands-on exercises and demonstrations will be followed by an overview of images created within NPS using these software packages that are available for immediate download and daily use. Finally, there will be demonstrations of the industries leading integrated image and map & globe browsers. This includes Google Earth, NASA's World Wind, Microsoft's Virtual Earth, and ArcGIS Explorer. In addition to a discussion of the functionality of these products users will receive an update on the official authorized uses of this data within NPS.
3	***Workshop: Using the GIS ModelBuilder*** **–** *Tim Clark (ESRI)* In a hands-on session presented by ESRI staff, attendees will explore the capabilities of ModelBuilder. ModelBuilder provides a graphical modeling framework within ArcGIS for designing and implementing geoprocessing models that can include system tools, scripts, models, and data. This session discusses how ModelBuilder can be used to create geoprocessing procedures and workflows.
4	***Workshop: Field data collection of geo-tagged photos*** **–** *Tim Smith* Digital photographs have become an important part of many NPS data collection efforts. Geo-tagging photos at the time they are taken not only increases value of the images, but in many cases may be required to meet data collection protocols. This hands-on workshop will introduce attendees to procedures for collecting geo-tagged photos using digital cameras, hand-held GPS receivers, and GPS-PhotoLink software. We will spend time introducing concepts and equipment, go to the field to collect geo-tagged images, and then return to the computer lab to process and manage the images and data.
5	***Workshop: Transitioning from Shapefiles to Geodatabases*** **–** *Lisa Nelson* In this hands-on session, we will review geodatabase options in ArcGIS and then discuss pros/cons and case studies of converting shapefiles to geodatabases. Possible examples include loading building footprint shapefiles into personal geodatabases and converting shapefiles to personal ArcSDE geodatabases. Participants are encouraged to bring shapefiles they wish to convert.
6	***Workshop: Migrating from Access to SQL Server*** *- Simon Kingston* This session will look at Access and SQL Server differences, exporting data to SQL Express, and using SQL Server Management Studio Express. Participants are encouraged to bring Access databases they wish to convert.

#	Session Abstracts
7	***GPS and future directions in positioning –*** *Dennis McCarthy* Space-based navigation systems such as the Global Positioning System (GPS) promise to provide unprecedented accuracy in positioning within the next ten years. Together with land-based augmentations, they will routinely provide accuracies that will allow users the ability to locate themselves and their assets within centimeters. As these systems develop, users will have the opportunity to make their needs known to developers as well as the opportunity to take advantage of extremely accurate positioning data. Now is the time to consider what we can accomplish with this opportunity.
8	***Cultural Resource Heritage Assets –*** *John Knoerl* The use of GIS in cultural resource management within the National Park Service is beginning to come of age. This is clearly evidenced by the formation of the Heritage Assets Subcommittee of the NPS GIS Council. From the nuts and bolts GIS applications in cultural resource inventory and monitoring to the application of GIS in heritage tourism to the use of GIS as a means to integrate the multitude of cultural resource databases, GIS is transforming how we do business in historic preservation. <u>Archeological Inventory and Monitoring: The Role of GIS</u> Anne M. Wolley Vawser, Archeologist, Midwest Archeological Center The National Park Service, like other Federal land managing agencies, is required to inventory all of their lands for the presence of archeological resources. In addition, these agencies are responsible for preserving and protecting known archeological sites and complying with other laws to determine if sites might be harmed by government undertakings. The use of GIS has played a major role in improving how the NPS and other agencies meet these requirements. This presentation reviews efforts to date in the Midwest Region of the NPS. There are also some new prospects on the horizon for management and research that may enhance archeological site discovery and preservation in the future, and some of these will be reviewed. <u>Mapping the American Civil War: Cultural Heritage on the Web</u> Matthew Stutts and Kati Singel, Cultural Resource GIS Facility Presented by Kati Singel The 150th Anniversary of the American Civil War is expected to generate significant interest in both academic research and cultural heritage tourism related to the event and its legacy. In anticipation of the occasion, partnerships between various programs have been formed, including the National Information Systems Center's Resource Information Management Division and Heritage Documentation Program's Cultural Resource GIS Facility (CRGIS) to create a web-based information system tailored to the needs of tourists and researchers. The intent of this project is to combine GIS, historical research methods, and cultural resource databases to create a method of exploring the cultural heritage of the American Civil War. Using web services, the partners are developing a Civil War web site that will allow the public to access a wide range of historical documentation currently housed by disparate programs. Such access has not been available before in the National Park System. This paper discusses an overview of the roles of the project partners, and discusses the difficulties and successes involved in the project's creation.

#	Session Abstracts
	Creating Cultural Resource Spatial Data Standards Deidre McCarthy, Historian, GISP, Cultural Resource GIS Facility Locational information is a critical factor in understanding cultural resources and how to protect them, plan for them and preserve them. Knowing the location of a resource provides more than an understanding of where the resource is, offering clues about the human and environmental influences on that resource and helping to explain why it exists and how it relates to other important sites. Within the National Park Service there are at least 14 different cultural resource databases that store information about our most important cultural resources, some of them including locational information, but few of them sharing information. Organizationally, cultural resource specialists separate out each cultural resource category and catalog them in individual databases for buildings, archaeological sites, museum objects, etc. These existing databases serve important purposes and maintain specific data that can not be collapsed into a single cultural resource database. Geography however can be used as a means of integrating the databases, where one location is used to reference multiple databases. The Heritage Assets Subcommittee, formed under the umbrella of the National Park Service GIS Council, is composed of GIS and cultural resource specialists and seeks to find innovative ways to encourage more GIS use among the cultural resource community, collaborate among cultural resource specialists and to form cultural resource spatial data standards with the goal of allowing us to better represent cultural resources through GIS. Clearly there is a need for such standards to help cultural resource specialists within the National Park Service bring their databases together, better plan for known resources, protect those resources and find new resources. OMB Circular A-16 designates the National Park Service as the lead agency for the cultural resource spatial data theme, responsible for the stewardship of the dataset and the creation of cultural resource spatial data standards for all Federal agencies. The work undertaken by the Heritage Assets Subcommittee will eventually lead to the creation of these larger standards to help all Federal agencies better communicate and share cultural resource data. Previous attempts to create such standards have come from the collaboration of Western State Historic Preservation Offices with the BLM, focusing on the region and on archaeological resources in particular. The Heritage Assets Subcommittee seeks to go further and address other significant issues, such as the security of this important data, when to gather locational information and the accuracy required for that data. This session will describe the methodology, technical aspects of the implementation involved in the establishment of National Park Service and Federal-wide cultural resource spatial data standards.
9	***Collecting and processing multi-year monitoring data*** *– Jennifer Haack* Collecting Multi-Year Monitoring Data Jennifer Haack, GIS Specialist, HTLN There are multiple aspects to natural resource monitoring, including the collection, processing, analyzing, and delivery of data. One of the most fundamental aspects of monitoring is the proper collection of data. If a project starts with bad or incomplete data, there is no hope of increasing the quality of the project. Therefore, certain issues should be considered when creating a good collection methodology. Some of these issues are protocol/SOPs development, communications, and monitoring changes.

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	Developing an efficient monitoring data summary tool Alan Williams, Data Manager, Shenandoah National Park Attempting to balance the need for efficient timely data summaries with the need for consistent repeatable results from a live growing database can be challenging. The challenges range from the size and complexity of the database, to adequate documentation of how summary calculations are done. One approach is to standardize how summary metrics are calculated and exported and document the process. Two examples of automated summary metric calculations will be shared and discussed. One effort illustrates a collaborative effort between multiple networks to develop a summary tool for forest vegetation monitoring data. The Use of Long Term Monitoring Data in a Decision Support System Kevin James, Plant Ecologist, HTLN A decision support application is presented that evaluates vegetation management goals and vital signs monitoring. The use of the system is demonstrated with an example from a prairie park in the Heartland I&M Network. In a logic model, the grassland community vital sign is evaluated as a function of prairie ecosystem components monitored at the park. The logic model shows the state of each management unit with respect to species diversity, composition, structure and exotic species. The logic and decision models are run in EMDS (Ecosystem Management Decision Support), an ArcGIS extension.

#	Session Abstracts
10	***Tele-monitoring: near- and real-time data acquisition from the field –*** *Doug Wilder* Development Of A National Network for Acoustical Monitoring in National Park Units Kurt Fristrup, Ph.D., Senior Acoustic Specialist, WASO Natural Sounds Program Center The NPS Natural Sounds Program Center has historically conducted monitoring efforts in park units to support management of specific activities. More systematic monitoring of acoustical resources is planned, to provide more comprehensive documentation of the status and trends of park unit environments. Ongoing monitoring efforts have documented rates of power consumption and data generation for archival recording systems. Future systems will continue these archival recording practices and add real-time computation and transmission of summary statistics to provide assurances of proper system function and timely alerts to changes in local acoustical conditions. Engineering design options will be discussed in relation to cost, power consumption, and data capacity Black Bears, *Ursus americanus*, Alter Their Home Ranges to Utilize Preferred Foods in Sequoia National Park, California Karen Folger, Fire GIS Specialist, Sequoia & Kings Canyon NPs White pine blister rust (*Cronartium ribicola*) and Sudden Oak Death have the potential to reduce or eliminate both sugar pines (*Pinus lambertiana*) and black oaks (*Quercus kelloggii*) from the Sierra Nevada. We studied the importance of these tree species as a source of food for black bears in Sequoia National Park to determine how a reduction in these trees might affect the bears. We used GPS collars to collect location data on ten wild, adult, female bears during summer and fall of 2004-2006. These data on habitat use were compared with the Park's vegetation map of available habitat using GIS. The distribution of seed-bearing sugar pines overlaps with the bears' summer range, whereas acorn-bearing oaks occur south of the bears' summer range. Both sugar pines and oaks are masting species, with unpredictable seed production. Our results indicate that there is a relationship between the inter-annual variability in the availability of high-quality natural foods and the seasonal ranging behavior of black bears in Sequoia National Park. In a year when sugar pine seeds were abundant, bears remained in small, comparatively stable, home ranges, regardless of the amount of acorns available. In a year when sugar pine seeds were not abundant, bears shifted out of their established range to feed on acorns. If these two important food sources are lost, both a short-term increase in human-bear incidents and a long-term decrease in the Sierra's carrying capacity for bears are likely. Peregrine Falcon Monitoring Through Webcams Alan Williams, Data Manager, Shenandoah National Park Shenandoah National Park is home to the only known active nesting pair of peregrine falcons in the Central Appalachians. In March 2006, the Park installed live webcams near this peregrine nest. This was done so biologists can gather peregrine falcon nesting information throughout the breeding season (March through July). The remote webcams provide biologists with specific information such as time of egg laying, hatching success, chick development, species of prey brought to the nest, and the timing of young-fledging. Peregrine nesting information is also provided to the general public and students in the classroom (via website). This project utilizes small weather-proof cameras, solar panels, an image server, and Wi-Fi antennas on the cliff near the nest. This equipment is used to send live-streaming images of nest sites to the internet. The images have been very useful and have shed light on some usually hard to get details about local falcon ecology. Using GPS collars to monitor mountain lions in the Santa Monica Mountains, California Lena Lee, Data Manager, Santa Monica Mountains National Recreation Area Habitat loss and fragmentation due to urbanization can have significant impacts on wildlife movement and survival. Large carnivores, such

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	as mountain lions (*Puma concolor*), are especially vulnerable to the effects of urbanization because of their extensive spatial requirements, low density, and potential for conflicts with humans. Since 2002, we have been using GPS collars to study the behavior, ecology, and conservation of mountain lions in and around Santa Monica Mountains National Recreation Area, a national park west of Los Angeles. Lions were fitted with GPS radio-collars (Televilt Inc.) that obtained GPS positions on a programmed schedule. We have used three GPS collar models since 2002 – Simplex, Tellus Basic with Remote UHF download and Tellus Basic with Remote GSM download. Each model varied in the way GPS data were downloaded. For instance, Tellus Basic with Remote UHF download collars have remotely triggered data downloads so that the data can be retrieved whenever it is convenient and as often as desired, and remotely triggered drop-off mechanisms for retrieving the collar, while Tellus Basic with Remote GSM download collar transmits GPS data over the GSM cell phone net. The data received from the collar allows us to collect detailed information on activity and movement patterns, often in real-time.
11	***GIS and Data Management Planning*** *– Tammy Stidham* An Enterprise Geodatabase for Resource Management and Planning: George Washington Birthplace NM General Management Planning Database Development Bill Slocumb, Research Associate/GIS Specialist, Center for Earth Observation, North Carolina State University Resource management and planning requires the knowledge of a wide range of resources including natural resources, cultural resources and facilities. Typically, these data are in differing formats and resolution that may not be easily integrated. Additionally, these databases may be unavailable to managers or they may be unaware that they exist. This may cause facilities management to use outdated data or fail to include available data to make management decisions, possibly causing damage to culturally significant resources. In an effort to provide managers and planners with databases not normally associated with particular disciplines, disparate databases have been incorporated into an Enterprise geodatabase using geography as the organizing factor. The database structure is designed to maintain the complex relationships inherent in the individual databases that the original developer created. The database is then provided to natural and cultural resource managers and planners. This allows, for example, the facilities managers to understand that a stone pipe contributes to the cultural landscape and that the general appearance and structure must be maintained to convey its historical significance. To ensure all managers have the most current data, the database is delivered to the managers from a central server. A significant advantage of this system is the ability of updates to be viewed in real-time by all managers working with the database. Contractors: Getting the Cleanest Geospatial Data Possible Elena Robisch, GIS Specialist, Zion National Park How many times have you received data from contractors or researchers only to find that, even though you provided them NPS data standards, you need to edit the data to conform to what you need? Here are some tips for working with contractors and researchers *before* they go into the field. Three Perspectives on GIS Roles within NPS Patrick Flaherty, Data Manager, Appalachian Highlands Network: Case studies will be presented highlighting three GIS roles within the National Park Service by contrasting differences and similarities of program planning and data integration. The first study represents the big park perspective in Yellowstone. The second represents a small park GIS program focusing on Pinnacles National Monument. And the third GIS perspective is from the Appalachian Highlands I&M Network, representing the GIS role of the network working with the network parks.

#	Session Abstracts
	From Projects to Policy, the evolution of NPS Program GIS Organizations John Knoerl, Program Manager, CRGIS Facility There are some key differences in the approaches to operating a GIS shop depending if you are a region/park GIS or program GIS. First, program GIS organizations are generally more narrow in scope than regional/park GISs. Second, this scope leads to development of theme specific GIS/GPS tools such as GPS data dictionaries and in the case of cultural resources emphasis on geo-referencing historic maps and viewshed analyses. And third, ultimately after a number of years the evolution of the organization turns to a focus on creating standards. Both NPS National Trails and Cultural Resources have followed this path.
12	***GPS best practices*** *– Tim Smith (with assistance from Joel Cusick)* GPS Project Planning: is that a point, line or polygon in your pocket or are you just happy to see me James Stein, Contractor, NPS Cultural Resources GIS This discussion will cover aspects of planning and executing a successful GPS project. Project planning addresses the use of GPS as an additional tool to collect data to populate a GIS. Topics include assessing the purpose and data needs of the project, data scale and accuracy, feature attributes and data dictionary development. GPS best practices--field Chris Wayne, GIS Coordinator, Crater Lake National Park This session will discuss best practices for field techniques when conducting GPS missions. Topics will include field recon, antenna positioning, pre-field preparation and other techniques for maximizing accuracy and completeness of field-collected data. The presentation will be generally "software generic" in terms of content. However, examples will refer to specific data collection systems, including Garmin and Trimble workflows. Post-processing: How to squeeze the most out of your GPS data collection Ulf Gafvert, GIS Specialist, Great Lakes Network This presentation will provide information on best practices for exporting data from the GPS unit into your GIS. This includes selecting the best CORS stations for differential correction, options for proper datum transformations, and outputting data for GIS implementation. Metadata included. Primarily geared toward mapping grade GPS, (Trimble XT and XH), but will also cover WAAS and recreational hand-held units (Garmins, etc.)
13	***Acquiring remotely-sensed data for resource issues*** *- Mike Story* As the importance of imagery continues to increase for managing and monitoring resources in the National Park Service, questions related to acquisition of satellite and aerial based imagery become more important. There is a tremendous archive of historic and current imagery that is available for our use if we only know where to look. This session will focus on three types of data that are of interest to NPS: LIDAR, Commercial High resolution systems, and "in house" archived imagery. LIDAR data: What can it do and how can you get it?

#	Session Abstracts
	Jason Stoker, USGS EDC This presentation will provide a brief introduction to light detection and ranging (lidar) remote sensing, and how this technology can be used to acquire three dimensional information for bare earth, vegetation and structures. We will also highlight the USGS Center for Lidar Information Coordination and Knowledge (CLICK), and how this virtual center is helping users take advantage of existing lidar data and information across the country. We will also discuss how the USGS is spearheading a National Lidar Dataset effort. <u>Communicating remote sensing requirements and working together to satisfy project needs</u> Thomas Cecere, Land Remote Sensing Requirements Coordinator, U.S. Geological Survey, Land Remote Sensing Program, Reston, VA Historically, government users of remotely sensed data have not been effective in communicating their requirements and data holdings to others within the government and often have difficulty finding suitable data to meet their needs. Under the President's 2003 U.S. Commercial Remote Sensing Space Policy (CRSSP), Federal interagency Requirements and Shared Execution policy implementation teams are partnering to make requirements known (to government and industry), to leverage established infrastructures (for data archiving and distribution), and to utilize existing contract mechanisms and consortiums to help get data into the hands of those who need it. The goals of the presentation are to; a) introduce a tool that was developed by the CRSSP Requirements team called CIDR (which stands for CRSSP Imagery-Derived Requirements), designed to capture the specifics of agency remote sensing needs so that they can easily be analyzed and shared throughout the appropriate communities of interest; b) show the analysis process, which incorporates knowledge of multiple agency holdings as well as vendor archives; and c) introduce a cross section of technologies that this effort supports (electro-optical sensors, LIDAR, SAR) and some of the tools currently available to explore and acquire data. <u>NPS Remote Sensing Image Catalogue (RSIC): What is available and how can I get it?</u> Mike Story, NPS NRPC For the last year or so, the I&M Program has been developing a Remote Sensing Image Catalog (and archive) in order to provide the Parks, Networks and Regions with this base imagery for their particular applications. Specifically, we have collected over 4200 Landsat Thematic Mapper scenes that cover park units over a timeframe of approximately 30 years. In addition, Digital Orthophoto Quarter Quads (DOQQs) are being collected from the National Aerial Imagery Program (NAIP) for park units and "quads of interest". To date, we have over 8 TB of "new" DOQQs for parks in a variety of locations with more to come.

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14	***Connecting science and management –an information value chain -*** *Mary Klein* The profession of developing information that successfully guides on-the-ground management of biological resources is characterized by complexity. It can be challenging to summarize that complexity into a process made up of discreet and recognizable steps. But information professionals increase their chances of both mission and financial success if they can describe their work as a series of concepts that build on each other (a value chain) to deliver ongoing services and products that benefit a diverse set of audiences—from field staff to decision makers at regional and national levels. The President of NatureServe, a non-profit organization that specializes in scientific data to guide conservation action, will talk about how her organization tackles this problem, and uses it to communicate the importance of NatureServe's work.
15	***Tools and Techniques for Digital Image Management -*** *Chris Dietrich* Throughout the Park Service, digital photos are increasingly being used as a regular part of resource management and daily work activity. The large number of digital image files being created by parks and programs can quickly become difficult to manage using a simple directory structure and file naming convention. Presentations in this session will explore image functional categories, things to consider when creating and managing digital photos, and approaches and tools for digital image management. <u>The NCPN Photo Database: A Custom Image Management Application</u> Russ DenBleyker, IT Specialist, NCPN, and Helen Thomas, Data Manager, NCPN The NCPN Photo Management Database is a custom-developed (Microsoft Access) application for organizing, storing, naming, and retrieving digital images associated with the NCPN I&M Program. This presentation will describe the Photo Database, including the requirements motivating its development, usage scenarios (e.g., managing project data photos, searching for general-purpose photos), and the underlying technical details. A demonstration of the application will also be provided. <u>Embedding Digital Images in a File Geodatabase: A Case Study from Cedar Breaks National Monument, Utah</u> Cynthia Wanschura, ZION and Elena Robisch, GIS Specialist, ZION Advances in ESRI ArcGIS software and the development of more robust geodatabases provide new options for integrating digital photographs with geospatial data. A project request from the maintenance division at Cedar Breaks National Monument provided the opportunity to explore using this technology to link digital images with geospatial features using a raster field in the attribute table, in this case linking condition assessment photographs with locations along the boundary fence. In addition to a functional file geodatabase as the end-product, the process illustrated benefits and drawbacks of using geodatabases to link digital images with geospatial data. <u>Management of Photos for Ecological Monitoring</u> Dorothy Mortenson. Data Manager, SWAN Deciding how to manage photos depends on how the photos will be used and by whom. This presentation will cover several examples of SWAN projects using photographs. These include repeat photography, glacier extent monitoring, and aerial photographs.

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	Using NPS Focus for Image Management Chris Dietrich, Resource Information Management Division The NPS Focus Digital Library and Research Station (NPS Focus) is an NPS enterprise image and document management system supported by the Resource Information Management Division. This presentation will discuss the system's history, image management features, partnerships and integration efforts, and future plans.
16	***Managing Data in an Enterprise Data Management Architecture*** *– Allen Sparks* Effective management of enterprise data within the NPS must be a team effort, accomplished through the coordinated contributions of many users in all parks and regions. While the choice of technology is one key factor, success will largely depend on two critical ingredients: support and acceptance by the larger park-based user community, and efficient processes that result in repeatable outcomes. This session will present data management practices for two different enterprise data sets: Administrative Boundaries, and Buildings. Enterprise Management of Lands Tract, Boundary, and Ownership Data Roger Johnson, Chief Cartographer, Land Resource Division The National Park Service (NPS) is guided by the Organic Act of 1916, to protect and preserve resources within units of the National Park System. A number of NPS units contain nonfederal lands. Depending on the use of these lands, it is often necessary for the NPS to seek to acquire them, or interests in them, or conduct land exchanges in order to protect resources and visitor use and enjoyment. The Land Resource Division (LRD) coordinates the exchange and acquisition of lands for the National Park Service. As a result of this activity LRD is the official repository of all NPS land record data and continually maintains dynamic land ownership, parcel, and boundary datasets in support of the NPS mission. This session will provide an overview of the policies, processes, and procedures LRD employs in the creation and management of these foundation data sets. Questions like where do the official acreages come from, why are LRD boundaries the official NPS boundaries, what resources does LRD have available for use by NPS employees today, and what are the future plans for maintaining and publishing these core data layers at an enterprise level will be addressed during this session. Building Footprint Data Collection and Processing Allen Sparks, Enterprise GIS Program Manager, Resource Information Management Division One of the key prerequisites to an effective Enterprise GIS involves park participation in the development of national GIS datasets. Because limited network bandwidth prevents effective use of remotely-stored data, the most efficient approach is for Parks to develop and work with locally-stored data. These data must then be aggregated centrally for service-wide use. This session will present the processes currently used development, collection and display of building footprint. Using Geodatabase Replication for Distributed Data Management David Best, GIS Specialist, Redwood National Park An effective EGIS strategy must consider the distributed nature of parks, staff, and projects within the NPS. To be successful, EGIS must focus on implementing an effective data distribution system that synchronizes and integrates park-based datasets into service-wide versions. ArcGIS geodatabase replication technology provides a promising solution that will allow park GIS specialists to develop data locally and publish to centrally-stored national data layers. This session will present the results of a pilot project to evaluate and implement two-way replication in the Pacific West region.

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17	***Acquisition, analysis, and application of climate data*** *– John Gross* Climate data is critical to many analyses and operations in NPS, but it remains difficult to obtain, process, and evaluate. Goals of the NPClime Project include providing methods and techniques to ease the burden of these tasks for NPS, with a focus on I&M needs. This session will serve to illustrate the specific capabilities of NPClime, and it will discuss and illustrate the developments that can be exported and used elsewhere. Introduction to NPClime John Gross, Ecologist, I&M Monitoring Program NPClime involves a sustained collaboration with the Western Region Climate Center to obtain, develop, and enhance a direct connection to their data sources. This introduction will provide a very short overview of the goals, status, architecture, and plans for NPClime. Back-end Services for the NPClime Project Greg Hill, Contractor, Colorado State University NPClime back-end services include the XML/rpc connection and queries to the Applied Climate Information System (ACIS) metadata and observation databases, intermediate file processing and reformatting, data summarization, communication and delivery of information to the user interface, and control and communications with the R statistical engine for further analysis and to produce summary graphics. This talk will provide an overview of key back-end services, with a focus on lessons learned and on elements that can be more broadly applied to other applications with similar needs. Developing the NPClime User Interface Lisa Nelson, Contractor, Colorado State University Results produced by the back-end services are exported to and rendered by a completely independent UI that is consistent with IRMA technology. The overall architecture is 3-tiered, with separate development teams that support the underlying data, the business layer (back-end services), and the user interface. Many lessons learned in the development process should be useful to Networks as they seek to automate acquisition, processing, and reporting of data managed by other agencies. Integrating Climate data into Monitoring Protocols Brent Frakes, Data Manager, Rocky Mountain Network Most I&M Networks have similar needs for developing a climate monitoring protocol. This talk will discuss the overall design of the ROMN climate protocol, which emphasizes the use of existing data and analyses where they are available. I will discuss SOPs that ROMN has developed to meet climate data needs.
18	***3-D Visualization, Modeling and Mapping –*** *Doug Wilder* Modeling and Mapping Underwater Monitoring Sites Judd Patterson, GIS Technician, Southeast Regional Office Dry Tortugas National Park lies approximately 70 miles to the west of Key West, FL. While the park contains seven small islands, the vast majority of the 64,701 acres hold one of the most well-preserved marine areas in the Florida Keys. The South Florida/Caribbean Network (SFCN) recently expanded coral monitoring efforts within the park. SFCN now uses a Geodatabase with ties to multimedia photographs and

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HD video to aid both scientists and visitors in interpreting monitoring results. The future will incorporate 3D animations to truly immerse the visitor in this unique national park.

Evaluating the Effectiveness of 2D vs. 3D Trailhead Maps: **A** map user study conducted at Zion National Park

Tom Patterson, Cartographer, Harpers Ferry
David Schobesberger, University of Vienna, Universitätstr. 7, A-1010 Vienna, Austria

The National Park Service uses two varieties of maps on trailhead signs that hikers see before setting off on a hike: conventional 2D planimetric maps, and 3D maps that depict the landscape from an oblique angle and in perspective. Regardless of whether a map is of the 2D or 3D variety, at a trailhead its goal is to give hikers relevant information without burdening them with unnecessary detail that could detract from their understanding of the trail that lies ahead.

Both 2D and 3D maps have their advantages for trailhead mapping. Many cartographers assume that inexperienced map users can more easily understand 3D maps because they present the landscape in a realistic manner and mimic what people see while on a trail. One of the undisputed advantages of 2D maps is that they require less time and money to produce than 3D maps. These factors call up the central question: are 3D maps really more understandable and are they worth the extra expense to make? Seeking to answer this, in September 2006 we conducted a user study at Zion National Park, Utah, to evaluate the effectiveness of 2D hiking maps compared to 3D trailhead maps for communicating of trail information to park visitors. Collection of data occurred on two popular hiking trails from a large sample of park visitors who had gone on a hike.

The user study aimed to answer these questions

- Which map type communicates geographic information faster and more effectively?
- Which map type imprints itself better as a mental map in the mind of park visitors?
- Which map type attracts more visitors to read trailhead exhibits, holds their attention, and motivates them to go hiking?
- Which map type do national park visitors prefer?

The session will give an overview of the design and implementation of the user study and will introduce the key findings.

Using 3D Models to Visualize Planning Alternatives

Ann Rodman, GIS Specialist, Yellowstone National Park
Greg Comer, Cartographic Technician, Yellowstone National Park

Accurate and realistic 3D visualizations are an effective communication tool in the planning process. Using SiteBuilder 3D and CommunityViz software, linked to ArcGIS, we've created realistic three-dimensional models of Yellowstone National Park's developed areas. These models are directly linked to resource and infrastructure data in the park's GIS. It is possible to show the effects of tree thinning, prescribed burns, adding buildings, removing buildings, changing trails, and realigning roads before the changes show up in the real world. The decision-makers and stakeholders can walk or fly through the scene, viewing the changes from any perspective. Because of the complexity of the natural and built environment, creating these 3D scenes is time intensive. Once they are completed though, it is relatively easy to modify them for any number of "what if" scenarios.

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	Practical Applications of 3D Visualization Joel Brumm, Data Manager, Northern Great Plains Network A powerful tool for landscape visualization is 3D Nature's Visual Nature Studio. This product takes GIS input in the form of shapefiles and DEM data and allows for the creation of photorealistic 3D images and animations. The true utility of this technology comes from the ability to model potential future conditions, whether as a result of development, ecological change, or disturbance (natural or artificial). An overview of the software will be provided, along with some examples of applications.
19	***Developing and storing information in a SQL Server Environment*** *– Brent Frakes* Using SQL Server as a Data Integration Platform Allen Sparks, Enterprise GIS Program Manager, Resource Information Management Division The National Park Service contains many 'islands' of information with value to data managers and GIS specialists. Microsoft's SQL Server provides opportunities to integrate such data and provide a convenient central point of access. This session will demonstrate the use of SQL Server Integration Services to replicate data from systems such as FMSS and LCS into SQL Server databases and geodatabases accessible from desktop tools such as Internet Explorer, Access, Excel, and ArcGIS Desktop. Moving the Legacy GRE Tracking Database (GRE DB) to SQL Server Michael J. Cox and Tim Connors, Geologic Resources Division The Legacy Database for the Geologic Resources Inventory, maintained at the NPS Geologic Resources Division, contains clusters of tables agglomerated over several years' time. As such, the database contains several data rich and largely unnormalized tables. GRD's team responsible for assembling park digital geologic maps is widely geographically dispersed, and each member needs to be able to access the most up-to-date, dynamic version of current geologic map information to incorporate in the Geologic Inventories mapping data. SQL Server is much better suited to the size and distribution needs for the GRE DB than MS Access is, and as such, an effort is underway to convert the existing database to a more normalized SQL Server version. Due to the accretionary nature of the legacy GRE DB, we have chosen to re-design the database to conform to contemporary standards as part of the conversion process. Because of this, we are not able to simply use an upsizing application, but have instead chosen to write a collection of Python scripts to reorganize the data into the new tables that are then imported into SQL Server. This session will cover design issues encountered in converting our legacy database to normalized SQL Server tables and how we addressed those issues, as well as future plans for distribution via a web-based system.
20	***Processes and Procedures for Spatial and Tabular QA and QC*** *– Roger Johnson* QA/QC and DO#11: How Good is Good Enough? Kathy Dratch, IT Specialist, Colorado State University NatureBib, the Natural Resource Challenge bibliographic inventory, now contains about 300,000 records. Data entry for NatureBib has been performed at the park or office level. While constraints on the data have been refined over time, specific procedures to ensure quality have been suggested rather than mandated and record quality can vary from park to park. In order to comply with Director's Order #11B, further QA/QC processes will be necessary before making records more widely available, an important next step for the utility of NatureBib. This session will look at decentralized vs. centralized QA/QC, and some of the decisions that must precede widespread release of the records.

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	National Perspective on NPSpecies QA/QC Alison Loar, IT Specialist, Colorado State University The National NPSpecies Team is challenged with ensuring NPSpecies data submitted by I&M data managers are synchronized with the master online dataset. This session will demonstrate the QA and QC methods that are used, common types of errors to look for, and standardized ways of fixing errors. How Accurate is your boundary? Ask Lands Jeannie Whitler, Sr. Technical Advisory Cartographer Richard Easterbrook, Cartographer, Land Resources Division Jean Olson, Cartographer, Land Resources Division The Land Resource Division (LRD) coordinates the exchange and acquisition of lands to protect natural and cultural resources for the National Park Service. In addition to orchestrating all the tasks involved in this process, LRD provides technical support relative to lands management and is the official repository for NPS land records. Land exchanges and acquisitions continue to be the primary focus of the program, and as a consequence, LRD continually maintains dynamic land ownership, parcel, and boundary datasets to support the NPS mission. This session highlights the complex issues that are encountered in the development of this data and examines the LRD's use of Quality Assurance and Quality Control (QA/QC) to provide accurate boundary data. As data stewards, LRD will explore such components as: legislative history, spatial integrity, official acreage, legal land records, and explain how these resources are integrated into the QA/QC process. Several case studies will be presented to illustrate how these procedures are used to create and maintain one of the most essential base datasets within the NPS.
21	***Geospatial Modernization BluePrint for Transformation (GMBT) -*** *Tim Petty and Lorri Peltz-Lewis* The purpose of the GMBT is to define how geospatial data and technology will be used to enhance DOI business activities and the achievement of our mission and goals. This is part of the DOI Enterprise Architecture process that is developing a take-action approach. The talk will include why are we doing this, what is being done, and why it's important.
22	***Creative Cartography: Elegant Solutions to Thorny Problems*** *– Roger Johnson* Creating an Atlas for the Yellowstone Area Ann Rodman, GIS Specialist, Yellowstone National Park A few years ago, personnel from the University of Oregon approached Yellowstone NP with a unique partnering opportunity to produce a state-of-the art, data-rich Atlas of Yellowstone. The visual format of an atlas makes it the ideal medium for translating the tremendous wealth of Yellowstone research and management history into a form that is accessible to the general public, while still being a valuable reference tool for scholars, managers, educators, and interpreters. The geographic focus of the atlas is on Yellowstone and Grand Teton National Parks, but maps and graphics will cover the entire region, emphasizing variations across space, connections between places, the dynamic nature of the landscape, and human interactions with the natural environment. The complete Atlas will include 100 topics presented through "page pairs," each of which tells a particular story (e.g., wolf reintroduction) through maps and graphics on a pair of facing pages.

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	This talk will focus on the creation of these “page-pairs”: the process of extracting the most important stories, deciding which data best supports the stories, turning the data into graphs and maps, then arranging the information on the “page-pair” to create an impressive cartographic display that is interesting and visually appealing . Satellite Image Maps (The Union of Annotation, Art and Science) Jeff Bennett, GIS Specialist, Alaska Regional Office In 2004 an initiative was launched to create park wide, annotated, satellite image maps for all Alaska National Park units. The project is a collaborative effort between the NPS Alaska Region I&M Landcover Mapping Program and GIS Team. Maps have been completed for seven of the sixteen Alaska NPS units. The vision of the map series is to create information packed, striking wall art products that have a broad range of application. After map publication the image mosaic, annotation geodatabase and an Adobe PDF of the map are added to the GIS Permanent Data Set for use in other projects. To create these maps we use a suite of software that includes ERDAS Imagine, ArcMap and Photoshop. The session will cover the work flow and tools used in each of these software packages to create the final mosaic and annotation geodatabase. An emphasis will be put on the methods used to deal with imagery issues like scene edges, clouds, shadows, sediment plumes in water, areas of bad data and seasonal variation. The session will also cover the schema for the annotation geodatabase and the normalization process used to create the base GDB for general cartographic use. Map layout and finishing touches will also be discussed. From Legacy Data to Dynamic Map Making Jeannie Whitler, Sr. Technical Advisory Cartographer Richard Easterbrook, Cartographer, Land Resources Division Jean Olson, Cartographer, Land Resources Division The Land Resources Division (LRD) has been aggressively converting their analog segment maps to fully attributed, topologically clean georeferenced digital data sets. This digital data has allowed LRD to create a suite of dynamic new cartographic products including enhanced segment maps that can easily incorporate imagery and other critical data from a multitude of source providers. It has also lead to the creation of an interactive mapping application. This session will highlight several of these products including an intranet mapping service that is currently available to all NPS employees called TractsNet. This online cartographic application puts the ability to create, share, and markup maps at your fingertips. Users can spatially query LRD's ownership databases as well as connect to over 100,000 current and historic maps and legal documents. This session will show how this powerful tool can assist park staff in their day to day tasks, as well as offer a peek at some of LRD's next generation cartographic products. Creating a National Geographic-style Physical Map of the World Tom Patterson, Cartographer, Harpers Ferry Center The physical world maps published by National Geographic Society during the 1960s and 70s, as the manual era drew to a spectacular close, are some of the most refined maps ever made. Painted by artists Heinrich Berann, Tibor Tóth, and John Bonner, innovations included three-dimensional sea-floor topography and terrestrial environments depicted with natural colors that readers could easily understand. Attempts to emulate these classic maps with digital techniques have proven less than fully successful—until now. This presentation will introduce a new physical map of the world designed in the National Geographic-style and with improved digital accuracy.

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23	***The Resource Information Management Challenge – Who's on First?*** *- Joe Gregson* Resource Information Management (RIM) is not a new challenge for NPS data managers and GIS specialists. Though most-deeply rooted in the natural and cultural resource communities, programs across the NPS are beginning to embrace a more comprehensive approach for managing their resource data and digital information. Evolving technologies and approaches, such as SOA (services oriented architecture), are providing new opportunities for more effectively developing, managing, and sharing geospatial and non-spatial data and information across the NPS enterprise. These opportunities are enhanced by more effective communication and collaboration across program areas – especially in areas of overlapping requirements and the reuse of existing data and information resources. This session will examine the evolving approaches for managing NPS resource information and provide attendees with insight into the program areas, information systems, technologies, and opportunities that contribute to the resource information management challenge within the NPS. <u>A Collaborative Services Culture for Managing Resource Information</u> Joe D. Gregson, Chief, Resource Information Management Division Although information management has been a new focus in the Federal and DOI IT communities in recent years, many of the concepts are not new. NPS GIS and data managers have been wrestling with data management issues and best practices for more than a decade. Much good work has been accomplished in a highly distributed environment but generally has resulted in fragmented and/or stove-piped products. The goal of NPS Resource Information Management (RIM) is to take a more comprehensive and integrated approach to the challenges of managing and utilizing this important information. Conceptually, RIM consists of two main program areas: GIS and Digital Information Services (DIS). GIS is a well established program in the NPS and provides a good example of effective NPS-wide coordination over a very broad user community. DIS is a relatively new program area intended to provide a forum and organizational context for coordinating among several existing but mostly disparate information management efforts. The program focuses on digital information management of library resources, digital images, documents, and other media, as well as a variety of related metadata. With this approach, RIM provides new opportunities for collaboration among the GIS and DIS program areas to provide quality products and services to support the NPS mission. <u>New Technologies and Old Challenges in the GIS Program</u> Allen R. Sparks, Enterprise GIS Program Manager, Resource Information Management Division The GIS Program has been active in the NPS for almost two decades. The Program is managed by the GIS Council whose membership includes broad representation from across the NPS and includes a Park GIS Coordinators workgroup that meets monthly to discuss NPS GIS activities and resources. To assist with planning and management of important geospatial program areas, the GISC has chartered four subcommittees: Enterprise GIS (EGIS), GPS and Mobile Mapping, Heritage Assets, and Remote Sensing. Each of the subcommittees meets regularly to discuss issues and plan activities in their area of emphasis. Several exciting and challenging activities are ongoing in the area of EGIS with active collaboration on standards development, enterprise data management, integration of partner systems, and deployment of web mapping and other web services. Active interest in EGIS is also occurring at higher levels in the DOI and E-GOV management as reflected in the maturing Geospatial Modernization Blueprint and Geospatial Line of Business, respectively. In the NPS, several programs are partnering with the GIS community to standardize their geospatial data and evolve their GIS capabilities to enhance their program management. The new and expanded partnerships provide excellent opportunities to utilize advances in technology and services for current and future GIS activities.

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	Digital Information Services – A Fresh Start from a Complex Legacy Chris Dietrich, Digital Information Manager, Colorado State University The Digital Information Services Program (DISP) is a collaborative endeavor involving several NPS programs and coordinated by the Resource Information Management Division (RIMD). The DISP is a newly conceived program area focusing on the management of digital information (i.e., 'gray' or published information products stored in digital format and described by metadata). In its broadest context, DISP includes NPS Libraries and several digital information management (DIM) systems and services. One goal of the Program is to charter a Digital Information Services Council with representation from NPS programs, regions, and parks that meets regularly to determine requirements, collaborate on projects, and guide the evolution of the DISP. Management of digital information NPS-wide is an especially challenging prospect due to the distribution and evolution of the existing DIM systems that were developed with narrow scopes to serve program-specific requirements. However, programs are beginning to evaluate their systems and develop plans to upgrade into a more interoperable architecture utilizing web services. Critical DIM systems include the NPS Voyager Library Catalog and the NPS Focus Information System as well as systems included in the Integrated Resource Management Applications (IRMA) project (e.g., the NPS Data Store) that are highlighted in Session 24.
24	***Innovative Uses of the Web for Data Dissemination*** **-** *Nate Irwin* Recent advances in web technologies and IT infrastructure have made it possible for NPS programs to develop extensible, innovative systems that meet the varied needs of NPS users. Several programs have embraced these new technologies and are building highly-dynamic applications that allow data that are being created and maintained in the NPS to reach a wider audience than ever before. A Thin-Client Geographic Information System for Resource Managers Bill Slocumb, Research Associate / GIS Specialist – North Carolina State University Spatial data are becoming increasingly popular for visualizing the current conditions of areas ranging from neighborhoods to undisturbed wilderness. Google Earth is one of the most popular applications for this type of discovery. Beyond a viewing environment, however, resource managers need analytical capabilities that viewers such as Google Earth do not provide. Geographic Information Systems (GIS) software provides a broad array of analytical functions, but the complexity of installing and using GIS software are serious obstacles to its use. Thin-client or web based GIS applications (e.g., ArcIMS and ArcGIS Server) are being developed to overcome those obstacles, but are not yet mature platforms and do not offer many standard analytical tools. In response, NC State University has developed a thin-client capable of hosting customized ArcGIS applications and a database to allow NPS regional and park managers to operate ArcGIS with little to no formal training. This Virtual Computing Laboratory (VCL) allows users to connect to a high-end computing environment using a remote desktop connection. The VCL is capable of providing customized versions of ArcGIS and access to a regional database that includes both commonly used data such as detailed roads and county boundaries as well as specialized data such as National Natural Landmarks and Land and Water Conservation Fund projects. Recently, Northeast Region Resource Planning and Compliance specialists used the VCL to determine the impact of National Interest Electric Transmission Corridors on NPS and other federal lands in 11 states. A similar environment using the VCL is being developed to assist with Resource Stewardship Strategies, Natural Resource Condition Assessments, and General Management Plans. The VSIMS Atlas Project Bill Thorp, Internet Mapping Applications Developer – Colorado State University The Vital Signs IMS Atlas project is designed to distribute web-based GIS maps while tolerating a high number of users. The VSIMS Atlas

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	uses unique technologies such as tiled imagery, data snapshots, Adobe Flex, and compressed XML data to accomplish this task. The difficulties of standard web mapping technologies such as ArcIMS and ArcGIS Server will be discussed, and how the Atlas's alternative technologies allow for higher-volume data access and dissemination. Use of the Web to Fill Gaps in the Data Lifecycle Nate Irwin, GIS Developer – Colorado State University Over the last year, the Resource Information Management Division (RIMD) has formulated an approach to developing web applications that allows for the integration of multiple disparate datasets into a single interface and allows for non-technical users to steward their own data. This approach helps fill in several pieces of the "data lifecycle equation" that – in the past – have been a real barrier to data dissemination. In this presentation, the RIMD will discuss the thought process and technologies that are being used to drive this approach and will demo some applications that demonstrate the extensibility of this new approach, including the NPS' new Civil War web site and a Facilities Management Mapping application.
25	***The IRMA Project and NPS Applications 2.0 – the Migration to Service-oriented Architecture*** **-** *Randy Leonard* IRMA – the Integration of Resource Management Applications, is the umbrella project that is migrating NPS natural resource-related applications to Service-oriented Architecture (SOA). This means breaking down the existing "silo" architecture of applications such as NPSpecies, the NPS Data Store, and NatureBib, and replacing them with a series of multi-purpose, function-based "services." Laying the Foundation for SOA transformation Randy Leonard, IRMA Project Architect Essential changes have occurred in order to prepare the Natural Resource Program Center (NRPC) to move to SOA. This includes a reorganization of staff, software, hardware, and software development life cycle so they are more aligned with current industry standards. This session will give an overview of the transitions, and will also describe the process of deconstructing silo applications and reconstructing them into resusable services. The New NPSpecies: A Preview of What's Coming Alison Loar, IT Specialist, Colorado State University Simon Kingston, IT Specialist, Colorado State University NPSpecies 2.0 is taking basic NPSpecies functions and converting them to compact and reusable services. One large application is now an assemblage of interactive services, e.g., a taxonomy service, observation service, or "match list" service, all of which can be used by multiple applications for multiple purposes. This session will provide an explanation of these component services and a preview of NPSpecies 2.0. The Future of the NPS Data Store and NatureBib Brent Frakes, Data Manager, Rocky Mountain Network This session will show the "deconstruction" process currently underway for the NPS Data Store and NatureBib, the basic services that are emerging as a result, and the role of user input in determining what will be built.

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26	***Connect the Dots: integrating park science, planning, and management*** *– Steve Fancy* "Connect the Dots" is a strategic, long-term framework for coordinating the efforts of the I&M networks, Watershed Condition Assessment Program, park planning (e.g., Foundation Statements, General Management Plans, Resource Stewardship Strategies), park-funded monitoring and research relevant to assessing natural resource condition, and research and monitoring efforts related to natural resource condition that are conducted by NRPC divisions and other agencies. • The central theme is improved coordination and integration between NPS science and planning programs, to help parks effectively implement "condition-based" natural resource management and performance reporting. • Coordination and integration between science and planning is facilitated through use of a newly proposed "Natural Resource Summary Table" at all parks. • Provides summarized scientific data and information to park planners and managers, in a readily useful form for park resource management action and decision making; the summarized information also supports performance reporting by the park. • Secondary applications (in partnership with others) are to develop "compelling stories" and various interpretive materials for communication with the public. • The proposal helps coordinate the efforts of multiple programs, agencies, and funding sources over a time frame of years to decades.
27	***Climate Change and NPS –*** *Craig Dalby* Global Climate Change presents the National Park Service with unprecedented challenges for managing protected landscapes. In some cases, such as at Joshua Tree National Park, species which parks were specifically created to preserve may not be well suited to future climates in their present habitats. In other instances, long-standing monuments like the Statue of Liberty may be threatened by sea level rise. And infrastructure everywhere is at risk from increased severe weather events. Data management and GIS will play critical roles in the analysis of these threats to park resources and other assets, and the National Park Service must become a leader in developing protocols for dealing with these issues from a spatial data perspective. <u>Managing Resources in an Era of Uncertainty</u> Leigh Welling, Climate Change Coordinator, NPS Natural Resource Stewardship and Science Rapid climate change presents significant threats to park resources and resource values. While resource management decisions must be based on future expectations, the future under climate change cannot be predicted with as much accuracy and precision as we would like. Climate change scenario planning offers a tool for developing a science-based decision-making framework in the face of an uncertain future. Scenario planning does not require precise future predictions, but explores a range of predictions to allow us to begin thinking through what appropriate responses might be. By helping to envision alternative futures, scenarios can be used as a tool to identify policies and actions that will lead to various outcomes. Major benefits of this approach are (1) increased understanding of key uncertainties, (2) incorporation of alternative perspectives into conservation planning, and (3) improved capacity for adaptive management. An overview of scenario planning will be presented along with a case study results from Joshua Tree National Park.

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	Addressing Climate Change in General Management Plans Patrick Gregerson, Chief, Park Planning and Special Studies, Washington, D.C. We are just now appreciating the need to address climate change in our General Management Plans, the framework for the broadest level of decision-making for a park. We are developing an awareness of the tools and data that can inform the planning process to make this possible. Ideally the GMP would identity the aspects of climate change that impact NPS resources and visitor experience, and try to plan for the resource impacts (change in species, etc), visitor impacts (traveling less due to carbon awareness, etc), and their carbon footprint. But, we need modeling tools and guidance to help figure out what kinds of things will be impacted by climate change. Effective spatial data is one of the elements necessary to clearly define what resource conditions and visitor experiences should be achieved and maintained over time. (The types of information gained by using GIS can provide the planning team a foundation in determining desired conditions and a sound understanding of the existing resources and facilities that are the basis in developing management alternatives.) The GMP is the place for substantive but broad goals like these, and its emphasis on fundamental resources and values helps parks determine what they most want to protect. We may also need to think differently about truly dynamic places like barrier islands, glaciers, and rivers, for the very existence of the park and its resources are in question. In these cases, the location of facilities and the schedule for rebuilding areas affected by the environment are the critical questions that a GMP should address. Climate Data Analysis John Gross, Ecologist, I&M Program National Office This presentation will provide an overview and introduction to a very select set of tools, methods, and activities that are broadly useful for evaluating and reporting climate data. Examples include template reports, web sites that provide data summaries and related 'derived products', and ongoing projects specifically targeted to meet NPS needs.