

COLORADO PLATEAU  
DATA  
COORDINATION  
WORKSHOP

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OCTOBER 28-29, 1997

FARMINGTON, NEW MEXICO

Co-sponsored by the Federal Geographic Data Committee and the Arizona, Colorado, New Mexico and Utah geographic coordination councils.



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## WELCOME

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A. J. Martinez convened the workshop, and welcomed the approximately 70 participants. Persons from local, county, state, and federal government agencies, tribes, and nongovernment organizations were among the participants.

### **HONORABLE TOM TAYLOR, MAYOR OF FARMINGTON, NEW MEXICO**

The Colorado Plateau is a special area of remarkable landscapes, and of few residents. Boundaries of governmental jurisdictions are an artificial pattern superimposed on this landscape. Many things that people do are the result of instinct, and not of conscious thought. Regulations and plans, such as those for zoning and subdivisions, often are implemented to serve the regulations themselves and not to serve the more important goals of aesthetics and comfort. In our attempt to control the resources of the Colorado Plateau, we should remember that regulations are to serve our goals; our goal is not to serve the regulations.

### **PHILLIP TUWALETSTIWA, HOPI TRIBE**

Tribes have a unique perspective of the Colorado Plateau that stems from their occupation of the area for generations. Three unique constants of this landscape are the issues of land, water, and religion. To the Hopi people, these issues are linked closely. The location of environmental and cultural features always has been a part of the knowledge of the tribe. The encoding of this and other information into digital forms allows a better understanding of the relationships among these pieces of information. A year ago, the types of data that might be shared, and reasons to share data, would not have been clear. With recent increased interaction of the tribe with other organizations, reasons for data sharing now are better appreciated. There are, however, political and other considerations that must be considered in deciding what data can be shared.

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## OVERVIEW

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Paul Riederer, the workshop facilitator, reviewed the workshop agenda (appendix A).

Dennis Goreham reviewed the purpose of the workshop. There are a number of issues of interest on the Colorado Plateau, and a number of institutions active in these issues. Sharing geographic data can help us.

The purposes of the workshop are:

- To establish relationships and create, expand, or continue connections across public and private sectors, and across institutional barriers.

- Provide a forum to discuss data availability, access, standards, uses, and needs related to the natural, cultural, and socioeconomic aspects of the Colorado Plateau.
- Share information on existing investments in infrastructure and activities.
- Create a strategy to maximize current and future investments.

Draft vision, mission, and goal statements (see box) were offered to the participants for comment.

*Draft Vision, Mission, and Goal Statements*

*Vision: Our vision is to share regional data in support of a sustainable economy and the good stewardship of the natural and cultural resources of the Colorado Plateau region.*

*Mission: Our mission is to provide a forum and framework for interested parties to participate in and make recommendations that encourage the sharing of impartial and credible geographical data for the Colorado Plateau region.*

*Goal: Our goal is to improve our ability to effectively collect, manage, and transfer data across all political boundaries enabling more informed decisions to be made regarding the Colorado Plateau region.*

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**INFORMATION SHARING VIEWPOINTS**

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**LEE AGGERS AND INGRID LANDGRAF, U.S. GEOLOGICAL SURVEY (USGS)**

(See appendix B for presentation materials and handouts.) Barriers to cooperative data development include the costs of geospatial data, and the time required to produce these data. Partnerships provide a means of overcoming these barriers. Partnerships used by the USGS include conventional and innovative partnerships. The State of Utah is notable for its aggressive use of the latter program. The Department of the Interior (DOI) High-Priority Digital Base Data Program also has engendered the creation of data sharing consortia, such as those for the U.S./Mexico border, the Middle Rio Grande Basin Project, and the Greater Yellowstone Project. Persons interested in data for the Colorado Plateau might consider taking advantage of this program. The USGS is willing to provide a liaison to work with such a consortium. The speakers also provided status graphics for data coverage in the four states.

**DENNIS GOREHAM, UTAH GEOGRAPHIC INFORMATION SYSTEM ADVISORY  
COMMITTEE (GISAC)**

(See appendix C for handouts.) The membership of the committee includes state and federal agencies, cities and counties, academia, and the private sector. The committee develops standards, is developing a statewide database, facilitates geographic data sharing, and represents the state in national geographic data discussions. Barriers include a lack of management participation from member agencies. A recently signed data sharing agreement was developed to address this issue. Other barriers include a lack of time and money.

Applications require data that transcend jurisdictional boundaries. For example, the ability to model the routing of emergency services requires information about roads that may cross many jurisdictions.

The committee supports maintaining data close to their source. This 'local' approach includes dependence on local governments, as well as local offices of state and federal agencies.

GISAC has a role in data development and dissemination. Through partnerships, vector data for basic data, in the form of Cartographic Feature Files from the U.S. Forest Service and Digital Line Graphs from the U.S. Geological Survey, are available for Utah's part of the Colorado Plateau, and soon will be available for the entire state. Orthophotos also are being developed. The state leads an effort to integrate cadastral data being collected in the state.

Expectations for the workshop include determining:

- With whom to coordinate? Existing groups, such as the Canyon Country Partnership, provide some solutions to this question.
- Who has what desires and responsibilities?
- What data and standards exist?
- On what can we agree?

**GENE TROBIA, ARIZONA GEOGRAPHIC INFORMATION COUNCIL**

(See appendix D for presentation materials and handouts.) At the state level, Arizona has three main coordination groups. The Arizona Geographic Information Council does strategic planning, and addresses policy issues. The Arizona Land Resource Information System provides training and other services. The State Cartographer's Office encourages communication and coordination. All sectors in the state participate in this structure.

The state has decided to use national standards where possible, and to concentrate on gaps left among these standards. The state has taken advantage of cooperative programs of the Federal Geographic Data Committee to aid its efforts. These projects include developing metadata, establishing a node on the National Geospatial Data Clearinghouse, and organizing cadastral data through a framework approach.

Data are expensive. They need to be joined and timely to be useful. By working together, we can help ensure that data are consistent and timely.

**MIKE WHATLEY, COLORADO GEOGRAPHIC INFORMATION COORDINATING COMMITTEE (GICC)**

(See appendix E for presentation materials and handouts.) The key to success is participation. The GICC is composed of seven state agencies, four of which are active, and representatives of federal and local government agencies and private organizations. The Colorado Counties organization, which is part of the GICC, helps to provide local governments' perspectives.

GICC projects include developing metadata, and providing these metadata through a node on the National Geospatial Data Clearinghouse. The council also developed and updates the Colorado Resource Directory, and provides online access to this information. The directory lists existing data, and organizations that have data. The directory is available at the GICC homepage at <http://www-gis.cudenver.edu/~gicc>

Challenges to data sharing include financial and organizational issues. Organizational issues are the most difficult.

**RICH FRIEDMAN, NEW MEXICO GEOGRAPHIC INFORMATION COUNCIL (NMGIC)**

(See appendix F for presentation materials and handouts.) NMGIC has a nine-person elected board, and a broad membership. Committees include those for geographic names, corporate members, GIS, GPS, local government land records, and mapping advice from the state to the U.S. Geological Survey. The networking opportunity provided by NMGIC is its most valuable service. Other benefits of membership include a newsletter, free admission to biannual meetings, discounts for NMGIC workshops, and mailings about important events.

The Colorado Plateau does not stop at state boundaries. This workshop is important to bring together organizations with common concerns, to open lines of communication, to develop data that will serve the region, to build the National Spatial Data Infrastructure, and to keep participants current with local, regional, and national trends.

**TERRY ARUNDEL, COLORADO PLATEAU FIELD STATION AND COLORADO PLATEAU INFORMATION NETWORK**

The Colorado Plateau Field Station fosters partnerships among federal, state, university, and other communities, and provides biological research and technical services in support of effective resource management. Much of the work is done at national parks and monuments. The field station works with collaborative planning organizations, and provides web access to documents from these organizations.

The Colorado Plateau Information Network disseminates biological data and information, using the approach developed through the National Biological Information Infrastructure

(NBII). Information provided through the network includes the results of field station studies, the GAP program, and the exotics map program.

For spatial data, the field station hosts a community Global Positioning System base station, and provides this information through its web site. Some GIS data is available, and access to more data is planned soon. Metadata that are compliant with the FGDC and NBII metadata standards also will be available.

#### **PAUL NOTAH, NAVAJO NATION**

There is not much data available for the reservation. The reservation is large and crosses the borders of three states. Resources are not available for cost sharing programs. The tribe has been using GIS since 1984; and its experience ranges from the use of mainframes to minicomputers to workstations and personal computers.

The tribe is willing to cooperate to develop data. It is difficult to determine whom to contact to discover cooperative opportunities. There also is a question of whose priorities will be followed in cooperative efforts. Trust also must be established, and cultural differences must be bridged. The consequences of sharing data, both intended and unintended, must be considered. The tribe participates in informal data sharing arrangements with state agencies in Arizona, and with the Bureau of Indian Affairs.

#### **PHILLIP TUWALETSTIWA, HOPI TRIBE**

(See appendix G for presentation materials.) The tribe has three objectives: map cultural and natural resources, educate its people about their reservation, and make wise decisions about these resources. The tribe started with no data, GIS capability, or preconceptions. The tribe has developed a geodetic control network, employs GPS receivers that have a variety of capabilities, uses and integrates various geospatial data technologies, and is developing 100 data layers.

The tribe must cooperate with other organizations on issues of mutual concern. Barriers to cooperation include politics (distrust, a lack of a track record), legal disputes (proprietary information), and cultural differences (differing views about land and problem solving). As an example of the cultural differences, Hopi view themselves as stewards, and not owners, of land. Some believe that drawing boundaries, conducting surveys, etc., are not compatible with this view, and should not be done. Another example is the time it takes to make a decision. Hopis rely on consensus, which can be a slow process. The 'snap decisions' encouraged by technology is not compatible with the consensus approach. The workshop can explore advantages of data sharing, start to build trust, and encourage an understanding of each other's needs.

**PETE KILBOURNE AND DON GRAY, CANYON COUNTRY PARTNERSHIP (CCP)  
GEOGRAPHIC DATA COMMITTEE**

(See appendix H for presentation materials.) One of two standing committees of the CCP Forum, the committee includes anyone interested in Canyon Country data, and typically include persons from federal, state, and local government agencies, universities, industry, and citizen groups. At meetings, the participants share technical tips and tricks, share information from conferences, encourage data sharing activities, collaborate on data development, and discuss other topics of interest.

To avoid the problem of sharing data among organizations that have different data structures and codes, the group developed a set of additional codes that all members employ. Each organization can thereby retain its own approach but share a common code that facilitates data sharing.

The group focuses on geographic data, and avoids political issues. The group engenders trust, avoids hidden agendas, operates by consensus, and ensures that there is no retribution. Barriers include finding time to administer the partnership (mailings, meeting notes, etc.), finding ways to share the workload, and encouraging acceptance of the partnership's approach, especially from larger organizations.

Expectations for the workshop include learning what works and what doesn't, how the Internet can help, who else is interest, and other groups with which it can coordinate.

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**IDENTIFY ISSUES**

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The workshop participants discussed barriers and issues raised by the presenters, and identified additional ones. Barriers, listed in arbitrary order, include:

- Gaining participation
- Lack of time
- Lack of money
- Lack of standards
- Jurisdictional boundaries: GIS data are not useable across boundaries (those of states, tribes, etc.)
- Expensive of data
- Political, organizational, and cultural issues and differences
- Lack of awareness of data availability
- Data gaps: do not have data from some areas
- Lack of equity: socioeconomic barriers to data access

The participants identified the issues listed in appendix I. Following the listing of the issues, the participants voted to identify those to be discussed at the workshop. Based on the vote, six topics of discussion were organized:

- Public access: How do we effectively provide access to metadata, data, and information, recognizing varying levels of expertise and needs among users? Topics include delivery tools (use of the web, CD-ROMs, and clearinghouses), communications (web, advertising, etc.), assessing who needs what data, protecting confidentiality, and costs and charging for data.
- People and policies: How can we foster cooperation and understanding between political leaders (such as agency managers and elected officials) and technical leaders (such as GIS managers, programmers, and specialists) so that we can foster cooperative efforts and partnerships to help us make wise decisions? An important task is to develop trust.
- Consortium: If a Colorado Plateau Geographic Data Consortium were to be established, how would it be structured and how would it work?
- Directories and clearinghouse: How do we identify or develop spatial data directories or clearinghouses? (These would include directories of data, projects, contacts, and policies and standards.) How do we share data and technical mechanisms (including transfer standards, media, format, and metadata)?
- Data integration: How can we integrate federal, state, local, and private data as a long-term goal referring to the joint collection useful combinations of data? This activity could include jointly setting priorities for technical issues, data needs, operational requirements, and innovative funding opportunities.
- Data standards: How would the development of data standards improve data sharing? Topics include moving toward the NSDI, making data useful to public and private organizations, and encouraging the availability of data.

The participants organized into small groups to develop strategies to deal with these issues.

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#### **DEVELOP AND REFINE VISION, MISSION, GOAL, AND STRATEGY STATEMENTS**

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Small groups considered the issues, and developed strategies to address these concerns. The results of the small groups were posted, and workshop participants individually reviewed the strategies and suggested changes. Following this review by the individual participants, the group convened in a plenary session to review the vision, mission, goal, and strategy

statements, and changes to the statements suggested by individuals; and to identify persons and organizations willing to begin the work of carrying out the strategies. *Note: participants written comments (transcribed as recorded on the flipcharts and on "sticky notes" are shown in italics.*

### **VISION, MISSION, AND GOAL**

Vision: Our vision is to promote the sharing of regional data among all organizations and citizens in support of a sustainable economy and the good stewardship of the natural and cultural resources of the Colorado Plateau region.

Mission: Our mission is to provide a forum and framework for interested parties to participate in and make recommendations that encourage the creation and sharing of impartial and credible geographical data for the Colorado Plateau region.

Goal: Our goal is to improve our ability to effectively collect, manage, and transfer data across all political boundaries enabling more informed decisions to be made regarding the Colorado Plateau region.

### **PUBLIC ACCESS**

Issue: How do we (the Colorado Plateau Consortium) provide access to Colorado Plateau information, data, and metadata, recognizing varying levels of expertise and needs among users?

### *Small group discussion: Public Access*

*Participants: (Note: this list of participants was taken from the breakout assignments sheet.) Terry Arundel, Colorado Plateau Field Station; M.C. Baldwin, Navajo Nation; Lyle Bilberry, LEMAC; Willard Harris, Navajo Nation; Karen Holt, Southwest Data Center; Tony Lee, US Government, Shiprock OEH&E; Ellen McConkey, US Forest Service; Randall Schumann, USGS; Jerry Sempek, BLM; Bob Vlahos, BLM; Melissa Werkmeister, BLM.*

*The following was the initial charge for our group that resulted from issues identification session and planning committee issues compilation.*

#### ***Original Public Access Issue Statement***

How do we effectively provide access to metadata, data, and information, recognizing varying levels of expertise and needs among users?

#### ***Key points:***

*Delivery tools (web; CD; clearinghouse)*

*Communications (web; advertising,)*

*Assess who needs what data*

*Protect confidentiality*

*Costs, charging for info,*

#### ***Public Access Group Meeting Notes (from Flip Chart Notes taken during the Session)***

*The first item of business was introductions. This was followed by the setting of our meeting agenda. The agreed upon agenda was:*

- 1. Define Roles within the Group*
- 2. Define Issues*
- 3. Brainstorm concerns*
- 4. Discuss options and alternatives*
- 5. Develop a plan and action plan*

#### ***1. Group Roles***

*- Facilitator (Paul Riederer)*

*- Note Taker (Paul Riederer via flip chart)*

*- Scribe for formal writeup (Karl Hermann)*

*- Spokespersons (Karen Holt for overall group presentation)*

*(Karen Holt and Karl Hermann for walk about question/answer session)*

## **2. Define Issue**

*We discussed our charged issue question and generally felt that it was acceptable. We simply tried to clarify who the 'we' was and clarified the customer(s).*

*Issue: Public Access*

### *Original version*

*How do we effectively provide access to metadata, data, and information, recognizing varying levels of expertise and needs among users?*

### *Final version*

*How do we (the Colorado Plateau Forum) provide access to information, data, and metadata, recognizing varying levels of expertise and needs among users?*

## **3. Brainstorm Concerns**

*Our brainstorming session covered a number of topic areas. We focused on each topic area and identified specifics within each before moving on to newer areas. The following are the items from our brainstorming discussions:*

### *Define Users*

#### *Types of Users*

*General public*

*Technical users*

*Managers and decision makers*

*Scientific users / scientists*

*Industry*

*Special interest groups*

#### *Level of experience / knowledge*

*GIS experience / or little / or none*

#### *Access to technologies*

*Internet*

*CD-ROM*

### *Confidentiality*

*Security / corrupted data*

*Protecting source data*

*Attributing sources / lineage*

*Need structure / infrastructure*

*Inventory of who is delivering data on the Colorado Plateau*  
*Linkages among users to allow users to connect (e.g. Web site links)*  
*Input engine to collect sources with auto updates*

*Clearinghouse / system options*  
*Centralize data (digital, spatial)? or access to it?*  
*Leave data/information on local machines with linkages*  
*Establish a central data base or card catalogue site(graphical!)*

*How do we assess which users need which data*

*Data versus summary information versus metadata*

*USGS/BRD linked to NBII node*

*Delivery of Information*  
*Web, CD, 8mm tape, Internet (ftp), print, BBS*

*Users focus on different needs (i.e. maps 1:24k versus 1:100k)*

*Communications*  
*This group (CPIN)*  
*Advertise to larger group*  
*Provide search engines*  
*Promote local access (e.g. libraries)*  
*Identify local community networks*

*What types of Information*  
*Reports*  
*Indicators*  
*Digital Graphics*  
*Spatial Data*  
*Summary Data/Information*  
*Maps*

*Costs*  
*If we develop a systems team*  
*Who does it*  
*How to pay for it*  
*.25 FTE to maintain CPIN web page*  
*1.0 FTE on CEP data*  
*Membership costs to support*

*Users manual(s) to promote easier use and technically accurate use*

*How to use these data*

*Metadata*

*Technology transfer*

*Provide additional data to a user who needs to really use the data (e.g. science, techniques, behind the data README files*

*Graphic on the web site*

*GIFs, metadata, definition/project description*

*Recognize different levels of users and provide information to meet their needs*

*Two paths (technical and non-technical)*

*Technical Users (clearinghouse users)*

*Don't need data interpreted*

*Source data*

*Need metadata*

*Detailed analysis*

*ARC/INFO type users*

*Non technical users*

*Need at some analysis performed*

*Use simpler tools (ArcView, Spatially enabled web pages for Browsers)*

*Web-based clients*

*Summary reports*

*Maps*

*Need data interpreted*

#### ***4. Strategies and Options/Alternatives***

*Designate one primary contact point (web site) for Colorado Plateau information and provide linkages to data (CPIN or solicit proposals)*

*Conduct an inventory of data and information*

*Conduct an information needs assessment*

*Community outreach to define information needs*

*Establish a committee for public access and/or look at existing groups to offer these tasks*

*Create a clearinghouse*

*Agree (ask) to follow NSDI model (FGDC standards)*

*Create tools / applications to make it easier for the non-technical general public to get information (or leave this opportunity for later, or private companies)*

*Ask for commitment to share data holdings with the public*

*Evaluate strategies and implement (and facilitate):*

*Define public access as a central point where all users can go for all data/information*

*Identify existing groups that are effective and leverage their resources*

*Agree on standards*

*Identify us as a ring of users, sharing information and sharing links*

*Evaluate options and work with this group and other groups*

*Seek funding (for CPIN or wherever data to establish and maintain)*

*Establish public access coordinating committee which includes at least the State GIS coordinating councils, nongovernment organizations, and other major stakeholders*

*Propose, evaluate, and implement actions to promote public access*

### ***Follow up Meeting Notes***

*The public access group defined what public access means, in both identifying the various types of customers, as well as, in identifying the process of developing a public access system. The group was careful to distinguish between a public access system and what is termed 'a clearinghouse'. It was viewed that the public access system is a primary entry point that provides all necessary links to supporting sites that provide information and/or data on the Colorado Plateau. 'Information' was viewed as a much broader term than 'data'. The term 'clearinghouse' was viewed more specifically as an NSDI clearinghouse node that focuses on metadata and data. In this sense, the 'public access system' has a much broader scope than 'clearinghouse' and in fact includes 'clearinghouse' as one of its components.*

*The group's view of a Colorado Plateau (CP) public access system is one in which there is a Colorado Plateau primary homepage which provides CP information in many forms. It may include an interactive map server capability which a base set of CP spatial data in a common projection/coordinate system. The public access system also links to the appropriate (State) NSDI clearinghouses.*

*Restated issue:* How do we (the Colorado Plateau Consortium) provide access to information, data, and metadata, recognizing varying levels of expertise and needs among users?

Key Points:

- Define types and levels of users (technical to general)
- Communications – who, what, how; web; advertising; other
- Define delivery tools (web; CD; clearinghouse(s))
- Assess information needs (who needs what information)
- Development and maintenance of the public access system (including security and integrity)
- Funding (how to cover costs)
- Inventory (who has what information holdings)
- Define types of information (data, summaries, statistics, maps, reports)

Strategies:

- Conduct an inventory of information and data (taking advantage of the current FGDC/NSGIC Framework Data Survey).
- Conduct a survey or Information Needs Assessment (determine who needs what).
- Develop and implement a public access system that is responsive to all levels of users (technical and non-technical).
- Evaluate existing public access sites.

Actions:

- Establish a public access coordinating committee to:
  - Propose and evaluate alternatives/strategies for public access.
  - Conduct inventory.
  - Conduct information needs assessment.
  - Evaluate existing public access sites.
  - Develop a public access system.
  - Designate one primary contact point for access (web site, organization)
  - Set up linkages to form a ring (network) of Colorado Plateau data/information providers.
  - Seek funding to support the above efforts.

Public Access Volunteers: Terry Arundel, Karl Hermann, Karen Holt, Bill Ferguson

#### **PEOPLE AND POLICIES**

Issue: Political, managerial, and technical leaders have different needs, perspectives, and spheres of influence. A lack of common understanding and direction inhibits the best use of information resources.

*Small group discussion: People and Policies*

*Facilitator and Flipchart recorder: Don Gray, BLM, Background notes: Linda Colville and Kathy Covert.*

**WORK GROUP MEMBERS**

*Linda Colville, BLM; Kathy Covert, FGDC; Bill Disbrow, Colorado Ecosystem Partnership; Lynne Dworak, USGS-BRD; Don Faulconer, Buchanan Consultants, Ltd.; Joel Farrell, BLM; Hanna Gonzales, USGS-BRD; Ivan Joe, DINE Care; Paul Notah, The Navajo Nation; Evert Oldham, Clearwater Resources; Bill Stone, National Geodetic Survey; Mike Whatley, Colorado Department of Natural Resources.*

**ORIGINAL ISSUE STATEMENT**

*How can we foster cooperation and understanding between political leaders (agency heads, mayors, county commissioners etc.) and technical leaders (GIS managers, programmers, GIS specialists) so that we can establish trust, foster cooperative efforts and partnerships to help us make wise decisions?*

**DISCUSSION/COMMENTS**

*The discussion always came back to these two recurring themes: **impediments, obstacles, and challenges** on the one hand, and ideas, recommendations, and possible remedies on the other.*

*Educate managers so they can:*

*ask the right questions*

*understand impacts of their decisions*

*support the work that needs to be done*

*understand the bottom line to them*

*develop their commitment to the technology and support it as a tool*

*Managers need to know to what the technology is and what it can do, as do others who could use it. **Management expects to "push a button and get the answer"**. Need to adjust expectations and also structure GIS so it produces the tool to help managers address land management issues.*

***Difficult for a technically oriented-bottom up initiative like this to impose itself on management.** Need to overcome that difficulty.*

*Issue-Volunteerism-**no time, no resources.***

*Can learn from case studies like Phillip's (Tuwaletstiwa) example yesterday with using the "toys" to produce results.*

*How to develop managers as advocates? We can help by identifying tangible, graspable benefits bit-by-bit rather than selling the whole grand scheme, or undertaking a generalized education campaign.*

*Issue-**GIS technical folks need a better understanding of management processes and perspectives.** Need to know who the players are and what the culture is in order to know what to do to be effective. Bottom line for managers is money--how to get the most for available money--. How can information technology meet this managerial need?*

*Another bottom line for managers/politicians is power...the ability to control/influence. Need to be able to produce: products, ideas, and solutions when needed.*

***GIS can also be perceived as a threat to managers.** GIS coordinators can help. Role is expectation manager and liaison between managers and techies. Translator.*

*Does everyone recognize the need for cooperation? **Must define objectives of group--define the problem then the solutions and then possible to move forward together. Must define what everyone really wants.** Reasons to foster cooperation will be different for each type.*

***Qualifications differ for jobs in different sectors (Federal, State, local, Tribal, etc.) Need classification of positions--there is a trend toward fewer job classes over time.** It's whom you know not what you know.*

***There is a disconnect between local (tribal) and Federal.** More communication needed. Coordination has improved Feds used to be arrogant and talked down to tribes (but it is better now).*

***Need training appropriate to manager.***

*The Managers View*

*I like things I can sell at budget time*

*What do I get and what does it cost?*

*I want projects that foster partnerships*

*I want projects/proposals that meet employees needs*

**How to get technical/political to recognize IT as important as natural resources.** A lot of frustration around this point. As a consequence the GIS tools is underused and under capitalized. **The management scenario is that the technology is great until it does not work.** So there is a mismatch of expectations. **One problem is the calculation of benefits is over a much longer time period than the calculation of costs.**

GIS is too difficult for some users--need management commitment, but you "can't push a rope". Some problems are too big, need to focus on small projects to be effective.

Need to engage in "individual personality leadership", *money is the grease that makes the wheels turn--need advocacy.*

We need to get beyond understanding to cooperation and advocacy. Need to reconcile different points of view. We need to "establish trust based relationships", but "respect should be given trust should be earned." If we want to build trust we must get a quick return within a long-term structure and strategy.

Strategies:

- Education
- Public Relations
- Cost/Benefit analysis - case studies - sound bites
- Identify quick successes
- Define mutual benefits case study as public relations tool
- Literature review (of cost/benefit lit)
- Speakers bureau (put Mike on video)
- Develop support mechanism

*There are base costs (ie everyone has a desk) for other expense categories. IT should be supported in the same way.*

We must look for windows of opportunity and then make a business case for support. The solutions must be in sync with things that are happening in the external environment. Win/win solutions work best. *In order to do this. we must know the players. Managers sometimes have "buyers remorse" if the project does not yield benefit soon enough.*

*"Let's go out of here with a commitment to form a steering committee to implement action plan." Volunteers: Evert Oldham, Paul Notah, Mike Whatley and Don Gray*

*Note: participants written comments (transcribed as recorded on the flipcharts and on "sticky notes") are shown in italics.*

People and Policies Strategies:

- Develop sufficient resources and support.
- Establish trust-based, mutually acceptable relationships.
- Make best use of our tools for on-the-ground successes.
- Address long range technical issues.
- Educate:
  - Define mutual benefits.
  - Advertise success stories.
  - Address cost and benefits (identify what you get for your money).
  - Facilitate understanding among technical, managerial, and political persons.
  - Cooperate to identify opportunities.
- Facilitate solutions in the short and long term.

People and Policies Actions:

- Identify key people and develop a profile (affiliation, resources, application interests, etc.) on each. *Great work. What are you going to do with results action item#1?*
- Develop a game plan that incorporates our input.
- Plan to tie to consortium efforts; identify links to the consortium.

People and Policies volunteers: Evert Oldham , Paul Notah , Mike Whatley , Bill Disbrow, and Don Gray ; start within three months.

**CONSORTIUM**

Issue: Shall we establish a Colorado Plateau Geographic Data Forum?

*Small group discussion: Consortium*

*Participants: Nica Westerling, City of Farmington, NM; Jennifer Sieverling, USGS, WRD; Brad Cheff, Coconino County, AZ; Bruce Willet, Dine CARE; Michele Francis, Navajo Nation Land Department; Lee Aggers, USGS, NMD; Hormuzd Rassavi, City of Farmington, NM; Anthony Trujillo, New Mexico State Highway and Transportation Department; Berwyn Jones, USGS (facilitator); Bill Baillargeon, Information Systems Division, New Mexico General Services Department (scribe)*

*An initial comment recommended taking an affirmative tone (i.e., when (rather than if) a Colorado Plateau...), and others agreed. It was, however, asked whether, given the existence of state councils, such an organization was required. In response, it was noted that the Colorado Plateau, having a common geographic basis, might therefore also have a common set of problems, needs, data requirements, etc., and that an organization functionally separate from the state councils might better serve those demands. It was further suggested that an organization such as that proposed should build upon existing infrastructure rather than imposing further new infrastructure. The consensus at this point was unanimously an affirmative view. Some sort of consortium, however it is conceived, is required. The proposed name, selected to emphasize the inclusiveness of the organization, is the Colorado Plateau Data Coordination Forum.*

*The forum should provide a means and mechanism for participants to learn “who is doing what, where, how it was done, and how to get it.” It should also provide a means to facilitate coordination among organizations. Other missions and purposes of the organization could include:*

- *Provide a source of finding out who is doing what in terms of data collection, etc., and in so doing helping to reduce duplication of effort.*
- *Provide a source of information for what information already exists.*
- *Provide a mechanism to identify data gaps. It was, however, suggested that such an undertaking is a substantial one and probably beyond that scope of this organization.*
- *Provide input to USGS for establishing base mapping priorities.*
- *Promote inclusiveness.*
- *Provide a mechanism for on-going communications.*
- *Provide a means for planning data updates.*
- *Provide a forum for groups/individuals with an interest in a common set of processes.*
- *Provide a means to leverage funding.*
- *Provide a means to leverage training resources.*
- *Provide a set of contacts regarding whom to call for expertise.*

*Such an organization should operate within the context of an existing infrastructure. State councils should be participants but should not take a lead role. A new organization should not create another bureaucracy. It should also be an organization of organizations that have made a commitment, rather than an organization of individuals. The composition of this organization should include state councils, federal agencies, local government, non-governmental organizations, tribes, libraries, and private sector organizations. The problem of funding to participate was raised. Another meeting is needed to formalize the proposed organization.*

*Given the consensus that another meeting should follow this meeting in the near term, a timeline for the meeting was discussed. Issues associated with this include (1) identifying leaders and responsible parties who could plan meeting; (2) selecting a location for the meeting (Durango and Farmington were mentioned as possible attractive locations; (3) the timing for the meeting (early March 1998 was suggested). Because a formal structure for the Colorado Plateau Data Coordination Forum does not yet exist, state council representatives should take the lead in planning this near-term meeting. This meeting should include workshops on metadata and framework data, data sessions (with people sharing data, metadata, data catalogs, or data dictionaries), and sessions on forum organization and getting management on-board. Participation from local governments and academia should be promoted.*

*In sum, there was broad consensus that a Colorado Plateau Data Coordination Forum should be formally established, that it should seek the broadest possible participation, and that it should be an organization of committed organizations rather than of individuals. There was also broad consensus that the proposed organization should seek to integrate with existing infrastructure or organizations in order to preclude the establishment of another bureaucracy. The Colorado Plateau Data Coordination Forum should operate via in-person meetings and through the effective use of electronic communications.*

*Note: participants written comments (transcribed as recorded on the flipcharts and on "sticky notes") are shown in italics.*

#### Consortium Analysis and actions:

- Recommendation: Yes! *Is this in place of a clearinghouse? Why should representatives bring data? Is the Forum's purpose to facilitate data sharing or to actually do data sharing?*
- Mission and purpose:
  - Know who is doing what, where and how it was done, and how to get it.
  - Facilitate coordination among organizations. *The Colorado Plateau Forum is set up in this configuration-can we utilize this existing structure? These purposes avoid any involvement in management outside the purely technical environment. Does that mean it's disconnected from the leadership/advocacy issue?*
- Structure:

- An organization of organizations. *How about "a meeting" of organization?*
- The states' councils should take a lead role. *Integrate the Colorado Plateau Forum into the state GISAC's. These councils have established ties to national efforts, ie. FGDC, Framework, NSDI. The National Strategy has been laid out- now the CP should implement it.*
- Include representatives from federal agencies, state governments, local governments, tribes, counties, leagues of municipalities, universities, libraries, nongovernment organizations, and private companies.
- How will it work?
  - In-person meetings.
  - Electronic communications.
- Timeline:
  - Organize an early March meeting in Farmington or Durango.
  - Identify leaders to organize the next meeting today.
- Proposed agenda for the next meeting: *The purpose of the meeting should be to organize/formalize the structure, establish agreements/relationships with other organizations.*
  - Bring data to share.
  - Bring catalogs and data dictionaries.
  - Hold a workshop on metadata.
  - Hold a workshop on framework.
  - Morning/afternoon: Data sessions (such as cadastral)/Organization sessions for getting management on board.

Consortium volunteers: State councils' representatives, Richard Johnson, Everett Oldham, Public Access Committee representative (see Public Access elsewhere), A. J. Martinez, Doug Johnson, Ken Osborn

#### **DIRECTORIES AND CLEARINGHOUSE**

Issue: How do we identify or develop spatial data directories or clearinghouses? (These would include directories of data, projects, contacts, and policies and standards.) How do we share data and technical mechanisms (including transfer standards, media, format, and metadata)?

##### *Small group discussion: Directories and Clearinghouses*

*Participants: Doug Wight, Utah State University and BLM; Phadrea Ponds, USGS, Fort Collins, CO; Donica Sharpe, San Juan County, NM and NM Association of Counties; Kathy Wilke, USGS; Janie Benfield, San Juan County, NM; Marty Ott, NPS; Jonah Begay, Navajo Nation; Bill Ferguson, Southwestern Colorado Data Center, Inc.; Jonathan Taylor, USGS, Fort Collins, CO (scribe); Pete Kilbourne, Manti LaSalle National Forest (facilitator); Dennis Goreham, Utah Automated Geographic Reference Center (recorder and co-facilitator)*

*As an introductory comment, one participant emphasized the need for integrated and compatible data before we can share them through clearinghouse and directories.*

*The group defined the terms "directory," "data dictionary," and "clearinghouse." The group defined a directory as a searchable index to information that is accessible through the clearinghouse. Directories can be established for policies and standards, data and metadata, projects, research (a library of research for a specified area), contacts, and archives. Directories may be created locally to solve locally specific problem.*

*By definition, a directory is a place to start a search, and can be very open ended in terms of kinds of directories and content. They can be tabular lists of maps, data sets with descriptions, policies, laws, and standards. Some state directories of data include information for which access is restricted.*

*A search can go to several levels of detail or depth, with the information required to answer the question "what's there" at the top level of a directory. From this list of data, deeper searches include access to metadata (documentation or description of data), graphic portrayals of data (maps), and the actual data. We may have parallel directory structures rather than pyramidal structures. There are multiple pathways (like the Internet) to get to various data. Directories also can be organized by thematic layers.*

*A data dictionary provides definitions of data elements and codes to identify what information has been encoded.*

*The group defined a clearinghouse as a mechanism for accessing data. It links nodes (such as those on the Colorado Plateau, and elsewhere). Nodes are stores of data and information within the clearinghouse structure that have a function similar to a library, a repository, or a warehouse.*

*The large size and volume of GIS data sets - often gigabytes of data - make it difficult to work with data sets that are available only through the Internet. Multiple access paths to information (through the web, CD-ROMs, hard copy) are needed. The clearinghouse has to be geared for operation by the most novice of users.*

*Technical mechanisms for sharing this information include the use of HTML (Hypertext Markup Language), for which standards are developing. The group discussed the Spatial Data Transfer Standards (SDTS), which essentially is a non-proprietary file format for data transfer. Even though the Federal Government developed the SDTS, and the Open GIS Consortium is interoperability standards, software vendors have not implemented these standards and most of the GIS community has not started using them.*

*The group concluded that two levels of effort are needed. The first deals with the GIS professionals. The second deals with reaching out to a broader community. For the latter effort, the rule is to use "every way you can", including hardcopy, the Internet, tapes, disks, etc. An educational component is essential for end users, and for people who have to provide information to the end users.*

*In order to share data, coordination is needed across state boundaries. Such integrated data are needed to work on regional concerns. One approach would be a CD-ROM of common core data. This could be coordinated through the states' councils and tribal clearinghouses. Federal agencies, major landowners on the Colorado Plateau, also must participate. An effort such as this would require larger scale funding interest; the Environmental Protection Agency might be a source. This approach might help to make "the political boundaries transparent" needed to work on ecoregion concerns*

*The Colorado Plateau has a mosaic of organizations that produce and use data. These groups work in geographic areas of different sizes. Enhancing and linking these efforts would provide a collaborative model for both local and broad-scale coordination. The emphasis should be on enhancing existing institutional and physical infrastructures, instead of building new infrastructures. The result of this effort would be mosaics of infrastructures that interact across various scales.*

*Existing subregional and local data coordination groups, such as the Canyon Country Partnership and the SUPAC groups, form an incomplete mosaic. Completion of the mosaic and establishment of linkages among neighboring groups would improve data sharing and reduce data gaps.*

*Institutional infrastructures are those that form agreements and set policy and standards. Examples include state coordinating councils, headquarter units of local, state, tribal, and federal agencies, and subregional and local data coordination groups, such as the Canyon Country Partnership and similar groups in the region, and the Navajo Nation user groups. Physical infrastructures are those that house data, hardware, software, and networks. Examples include the Colorado Plateau Research Station, the Southwestern Colorado Data Center, tribal GIS departments, Utah's Automated Geographic Reference Center, universities, and field offices of local, state, and federal agencies, and utilities.*

*Note: participants written comments (transcribed as recorded on the flipcharts and on "sticky notes") are shown in italics.*

#### Directories and Clearinghouses Agreements

- Data sharing is the most important aspect being addressed by this group. Clearinghouses & Directories are the mechanisms for doing that sharing

- Provide many ways to share data products and structure collaboration to meet varying needs. *Preserve and accommodate many ways to structure collaboration and share data.*
- Data compatibility and integration is essential for meaningful data sharing.
- Education is a key component effective data sharing.

#### Directories and Clearinghouses Definitions

- Clearinghouse is the mechanism that links nodes on the Colorado Plateau and other nodes of the National Spatial Data Infrastructure with each other.
- Nodes are specific sites with data within the clearinghouse structure.
- Directories - Searchable index to information. *Variety of ways to reference/search. Concerns about quality assurance/control. Completeness data provided living up to expectations. Search by scale. Match with data integration issue item: "develop standard list of search key words".* Types of directories include:
  - Policy and standards of State GIS Coordinating Council and Tribes.
  - Data availability (could include both data and metadata).
  - Project (issue based)
  - Contact (who's who)
  - Research / non-spatial data
  - Archives
  - *Calendar of events*

#### Directories and Clearinghouses Strategies: Opportunities for Linkages

- Educate people on how to use the clearinghouse and other data sharing mechanisms both from the viewpoint of the end user and data provider.
- Learn what data people want and how it needs to be delivered. *Use products shown below, use of mechanisms of clearinghouse, educate people under pressure to provide data/info (people new to GIS).* Provide the data in a variety of ways that are useful. The following is a partial list of common useful media: hard copy, Internet, CD-ROM, and tapes.
- Enhance existing institutional and physical infrastructures at various scales and link them rather than build new infrastructures. The result of linking would be mosaics of infrastructures that interact across various scales.
  - Types of infrastructures.
    - Institutional infrastructures are those that form agreements and set policy and standards. Examples include state coordinating councils, sub-regional and local data coordination groups such as the Canyon Country Partnership, and Navajo Nation user groups. *CCP. Coordination by State Coord councils & tribes. Find interested party with \$. Needs of partners too diverse to choose data. Where does funding come from.*

- Physical infrastructures are those that actually house data, hardware, software, and networks. Examples include state, local, and federal government field offices, tribal departments, private companies, colleges and universities, and non-governmental organizations.
- The state coordinating councils would coordinate the links and foster reduction in gaps in the mosaics to improve data sharing and reduce data gaps.
- The initial action would be to build maps showing existing infrastructures and gaps. Organizational contacts would also be identified.
- Integrate base data for Plateau on single CD-ROM or other media. This effort would require that the data be compatible across political boundaries.

Directories and Clearinghouses Action to: States' councils.

#### **DATA INTEGRATION**

Issue: How can we (1) identify what data (federal, tribal, state, local, and private) we want to or should integrate, and then (2) actually integrate them?

*Small group discussion: Data Integration*

*Participants: Note as listed on breakout assignments sheet. Todd Black, LEMAC, Fran King Brown, Southern Ute Tribe; Rich Friedman, McKinley County GIS; Dan Greene, US Forest Service; Steve Grey, Department of Energy; Marc Hitchcox, Southwest Colorado Data Center; Jeff Russell, BLM; Michael Soulen, Grand Canyon Monitoring and Research Center; Ted Talmon, GeoWest; Phillip Tuwaletstiwa, Hopi Tribe; Melinda Walker, BLM.*

*The group focused on two topics: (1) determining what data might be integrated, and (2) considering how to integrate data, and what information is needed about data that are to be integrated. There was much interest in how to integrate others' data for a particular use, and how to make one's data compliant with those of others. Participants also noted that there were much data that should not be integrated, or were inappropriate for integration. Other views expressed in the group are recorded below.*

*Note: participants written comments (transcribed as recorded on the flipcharts and on "sticky notes") are shown in italics.*

Data Integration Analysis:

- These data have two parts:

- 1) Spatial data, with issues of scale, resolution, precision, accuracy, formats, and structures.
  - 2) Attribute data, with issues of purpose, content, rules (classification, etc.), format, and structures.
- Multiple levels:
    - 1) Framework data
      - Should we all agree?
      - Who would be the "keeper"?
      - Metadata are critical.
    - 2) Local (project) level *What is required and what is optional?*
      - Buyer beware.
      - Concentrate on data sharing rules.
      - Metadata are "supercritical"; more detail is needed.
      - Know why you want to integrate.
  - At all levels:
    - 1) Identify incentives to play.
    - 2) Emphasize knowledgeable users.
    - 3) Standards and metadata are important.

Data Integration Strategies and actions:

- 1) Identify incentives to play:
  - Cost savings.
  - Grants.
  - Cooperative projects (promote multi-participation).
  - Early coordination and follow-through.
  - Enhance employee efficiency (i.e. spread the work around).
  - Improve skill base - combine areas of expertise.
  - Look for local and regional involvement to improve decision making (i.e. issues versus administrative areas; issues versus data)
  - Identify benefits to other users. *Who, and through who? Consortium?*
  - Shame other groups into cooperating ("all the others are cooperating")
  - Promote concept of "more defensible" data (i.e. higher quality data and better products). *Peer review?*
  - Train users.
  - Free software.
  - Conduct public relations on GIS benefits. *Same as a proposed action for the executives/managers/tech leadership item.*
  - Identify what software or data are available and can be used.
  - Interact with the private sector and nongovernment organizations.
  - Let everybody "into the sand box."

#### Data Integration Actions:

- Publicize Plateau success stories and highlight benefits; add them to existing sites and link the sites. Stories could cover:
    - Agency integration.
    - Products.
    - CD-ROMs.
    - Databases.
    - Web sites.
    - Conduct a survey that includes web sites and data inventories.
    - Action to states' councils.
    - Southwestern Colorado Data Center willing to host stories (Bill Ferguson; billf@landuse.com).
  - Develop and document key words for searching WWW and search tools.
    - Needs a committee. *Identify who has received FGDC grants for integration activities - use them as models. Data integrators can be interested (sic) as certifiers. Certification should be a process not a person.*
    - Conduct research.
  - Identify interested data integrators.
- 2) Adopt NSDI framework data layers and standards as a minimum.
- Identify major data stewards and keepers.
  - Comply with minimum metadata standards.
  - Actions:
    - Contact states' clearinghouses for standard (minimum) on framework data. (action to states' councils; all)
    - Personally contact and engage other data holders who did not attend the workshop. (action to all persons on an ongoing basis; share the workshop minutes and summary)
      - FGDC to complete and distribute workshop report as soon as possible.
    - Develop a list server for the Colorado Plateau. Add the persons about which we know already.
      - Check with the Colorado Plateau Information Network and others (including universities) to develop a list server for Plateau. (action to states' coordinators)
    - Link the states' council homepages. (action to states' coordinators)

## DATA STANDARDS

Issue: The small group decided that it is more important to encourage the development of metadata than it is to promote a particular data standard, and modified the assigned issue to read: How do we encourage use of metadata standards to improve data sharing? *How do we encourage the use of metadata standards to aide (sic) in understanding our data.*

### *Small group discussion: Data Standards*

*Participants: Patricia Oldham, City of Farmington, Farmington, NM; Tom Wenk, USDA Forest Service, Taos, NM; Glenn Condon, NMSHTD, Santa Fe, NM; Ingrid Landgraf, US Geological Survey- NMD, Denver CO; Alberta Velarde, Jicarilla Apache Tribe, Dulce, NM; Jiri Doskocil, Jicarilla Apache Tribe, Dulce, NM; Jim Duncan, USDA Forest Service, Salt Lake City, UT; John Varner, USDA Forest Service, Denver, CO; Sharolyn Anderson, Small Business, Farmington, NM (facilitator); Doug Johnson, EPA Region 8, Denver, CO (scribe)*

*The group discussed issues related to standards, including: (1) the number of topics for which standards could be developed (including those for collecting, generating, and scanning data, and ways to verify compliance with standards); (2) the need to understand what drives the use of common standards, and the need for a framework for using standards; (3) the fact that agencies develop their own standards if existing standards cannot be adapted to their operations; (4) the question of establishing standards for items in common versus topics of differences; (5) concerns related to issues of scale; and (6) the need to be able to overcome the problem of standards not being usable. Data exchange standards are important, but the group was uncomfortable about discussing this topic. The group recognized that there are different platforms, and that people are not expected to standardize everything. Other comments in the group included concerns that the states' councils are not taken seriously, the need to break down internal and external barriers, and the need for better education in basic principles of cartography for GIS professionals, possibly through a web site.*

*The main question was that of how common standards could improve data sharing. Metadata, which document how data were produced, are the key starting point for data sharing. Instead of trying to get everyone do things the same way, try to get everyone to document how their data were generated. The FGDC metadata standard, rooted in the NSDI, exists and just needs to be discovered. A profile containing a subset of the standard might be helpful.*

*Thus, the key common standard to improve data sharing is metadata. Encouraging people to support and use metadata could be the main effort in the Colorado Plateau.*

*Note: participants written comments (transcribed as recorded on the flipcharts and on "sticky notes") are shown in italics.*

#### Data Standards Analysis and Actions:

- Promote *standard* metadata documentation rather than a particular data standard. *Define what is optional and what is required.*
- Why? *Protect your own investment for internal use- if your GIS "guru" who created everything leaves, and data is not documente (sic), who in organization will have knowledge about the data.*
  - To support clearinghouse.
  - To improve data sharing.
  - To attain long term benefits (avoid data duplication; obtain cost and time savings).
  - To build relationships.
  - To improve understanding of the Colorado Plateau.
  - To support resource management.
- How?
  - Make metadata easy through:
    - Training workshops, through such groups as the Earth Data Analysis Center in New Mexico. *Distribute Metadata satellite downlink video.*
    - Metadata tools, such as those identified at the FGDC web site ([www.fgdc.gov](http://www.fgdc.gov)).
    - Metadata support group.

Data Standards volunteers: Rich Friedman, Bill Disbrow, and M. C. Baldwin





2:15-2:30 pm	Break
2:30-4:30 pm	Consensus Building: Mission, Vision, and Strategies
4:30-5:00 pm	Wrap-up
5:00 pm	Adjourn

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**APPENDIX B: LEE AGGERS AND INGRID LANDGRAF: PRESENTATION  
MATERIALS AND HANDOUTS**

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(Not included in on-line version of report).

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**APPENDIX C: DENNIS GOREHAM: HANDOUTS**

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(Not included in on-line version of report).

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**APPENDIX D: GENE TROBIA: PRESENTATION MATERIALS AND HANDOUTS**

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(Not included in on-line version of report).



## Federal Agencies

### Department of Agriculture

Farm Service Agency. Colorado State  
FSA Office  
655 Parfet St.  
Suite E-301  
Lakewood CO 80215-5517

Mr. Dave Schneider  
Program Specialist  
Tel: 303-236-2866 Fax: 303-236-2879  
E-mail:  
URL:

Aerial Code: D L S  
Photography at various scales flown since  
1949. Photography prior to 1988 covers only  
agricultural land. Listing and order forms  
available. 59 counties.

Civil Engineer  
Tel: 303-275-5206 Fax: 303-275-5170  
E-mail:  
fswa/s=d.wolf/ou1=r02a@mhs.attmail.com  
URL:

Maps Code: D R S  
National Forest & Grassland visitor maps  
(1:126,720) paper and plastic: Primary Base  
Series (1:24000 quads) paper, mylar of maps  
covering National Forests & Grasslands in  
Region 2 for CO, WY, SD, NB, KS.

### Department of Commerce

Bureau of the Census. Geography Section  
6900 West Jefferson Ave.  
Suite 100  
Lakewood CO 80235

Mr. Jim Castagneri  
Geographer  
Tel: 303-969-7760 Fax: 303-969-6777  
E-mail:

Aerial Code: S  
1:10,000 to 1:40,000 of coast areas and 920  
major airports in the U.S.

Control Code: R S  
Primary statewide high accuracy reference  
network (GPS). CDOT densification projects  
(GPS). All existing vertical control done by  
USC & GS/NGS. All existing horizontal  
control done by USC & GS/NGS.  
purifications, software and other geodetic  
information is available.

Digital Code:  
Geodetic data is available in several  
formats. Geodetic PC programs also  
available.

Other Code:  
A collection of historic geodetic surveying  
info is available for Colorado. Assistance  
with problems with geodetic points.

### Department of Interior

Bureau of Indian Affairs. Geographic

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## APPENDIX E: MIKE WHATLEY: PRESENTATION MATERIALS AND HANDOUTS

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(Not included in on-line version of report).

Figure 1. Cover of the Colorado GICC Resource Directory

Figure 2. Excerpt from the directory. The directory is available at  
[www-gis.cudenver.edu/~gicc/res\\_dir.html](http://www-gis.cudenver.edu/~gicc/res_dir.html)

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**APPENDIX F: RICH FRIEDMAN: PRESENTATION MATERIALS AND HANDOUTS**

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(Not included in on-line version of report).

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**APPENDIX G: PHILLIP TUWALETSTIWA: PRESENTATION MATERIALS**

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(Not included in on-line version of report).

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**APPENDIX H: PETE KILBOURNE AND DON GRAY: PRESENTATION MATERIALS**

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(Not included in on-line version of report).

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## APPENDIX I: ISSUES RAISED BY PARTICIPANTS

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Issues raised by participants are identified with a circle ("•"). Issues are listed in arbitrary order:

- Data standards, for example:
  - "share codes"
  - coordinate systems and datums
  - determine which data are available
  - need to agree on standards
- What is certification to you?
- Help agendas move to the NSDI
- How to simplify data standards, make them useful to the public (metadata standards)
  - Executive summaries
  - Profiles
- Recognize users differing levels and needs
- Access to data: how do you make data available (moving beyond the Freedom of Information Act)
- Establish communications (Internet solutions)
- Agree to disseminate data via web sites, etc (including base data, metadata, views of data, biological data in tabular and GIS forms)
- Involve private industry
  - Partnerships with public agencies
  - Resources to run operations
  - Services to private customers
  - Advertising and assistance
- Confidentiality
- How do socioeconomic issues (equity) relate to metadata and data sharing
- Communicating in lay terms
- How to integrate federal, state, local data?
  - Coordinate reference systems (NAD 27 versus WGS 84)
  - Data must carry specifications of reference systems
- How do we identify common, high-priority data needs
- Identify ways to share costs and data: "GSA discounts", etc
- How to identify common, high priority data needs
- Establish a consortium
  - To identify data needs
  - Do survey
  - Agree on priorities
- Links between political and technical leadership (commitment from management)
- Why data?
  - What is our purpose?
  - Wise decision making
- Make wise decisions, educate our people

- Foster partnerships and cooperative efforts on research projects, pilots, etc.
- Establish trust among partners, sharing data and costs
- Consortium for setting priorities
- How to find out whether and where data exist (eg published directories)
- Identify who's doing what, has what info, and is focused on which issues, has what contacts
- Exchange of information among state councils, and with tribes (mechanisms for communication)
- How (technologically) should we share information effectively
- How to protect users from "garbage" data?
- Do we have a defined boundary for the Colorado Plateau?
- Seek experts for help in weak areas
- Need improved skills for staff
  - Scale
  - Using spatial data
  - Training
  - Helping people deal with data to resolve issues and to use data



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**APPENDIX J: LUNCH PRESENTATION: MICHAEL PRESTON, FORT LEWIS COLLEGE, AND RICHARD JOHNSON, U.S. GEOLOGICAL SURVEY**

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To be effective, data collection and research efforts must connect to the needs and values of the community. These communities include both "communities of place", and geographically broader "communities of interest". Membership in these communities includes elected officials, agency managers, and, increasingly, citizens.

The key to ecosystem management is knowledge of relationships among different factors. Ecological research must link to economic and community research. Spatial data are an important means to provide this linkage. Understanding how things change through time also is important; a useful framework consists of reference conditions, current conditions, and desired futures. The Ponderosa Pine Partnership employed a matrix of relationships among ecology, economy, and community, and reference conditions, current conditions, and desired future in its activities.

The ability to work with the many organizations and individuals interested in an area is important. Spatial data can be a great equalizer by providing a readily recognized way of presenting information. There also is much interest in understanding collaborative decision making processes.

Work is underway to understand how people know what information about issues of concern on the Colorado Plateau. Even the best information does not lead to unequivocal decisions. People have preferences about information and processes. Work also is underway to understand what information is needed for ecosystem management.

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**APPENDIX K: RELATED WEB SITES IDENTIFIED BY WORKSHOP PARTICIPANTS**

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Arizona Geographic Information Council: [www.state.az.us/gis3/agic/agichome.html](http://www.state.az.us/gis3/agic/agichome.html)  
Arizona Land Resource Information System: [www.state.az.us/gis3/alris/alrishome.html](http://www.state.az.us/gis3/alris/alrishome.html)  
Colorado Geographic Information Coordinating Committee: [www-gis.cudenver.edu/~gicc](http://www-gis.cudenver.edu/~gicc)  
Dine' CARE: [www.cnetco.com/~dinecare](http://www.cnetco.com/~dinecare)  
Federal Geographic Data Committee: [www.fgdc.gov](http://www.fgdc.gov)  
Interagency Natural Resources Analysis and Synthesis Center and the Bureau of Land Management's Landscape Ecology: Modeling and Analysis Center (LEMAC)  
[www.nr.usu.edu/~duckhab/lemac.html](http://www.nr.usu.edu/~duckhab/lemac.html)  
National Geodetic Survey: [www.ngs.noaa.gov](http://www.ngs.noaa.gov)  
New Mexico Geographic Information Council: [www.state.nm.us/nmgic](http://www.state.nm.us/nmgic)  
New Mexico GIS Advisory Council: [www.state.nm.us/gisac](http://www.state.nm.us/gisac)  
New Mexico Resource GIS (RGIS) Program: [rgis.unm.edu](http://rgis.unm.edu)  
Southwestern Colorado Data Center, Inc.: [www.landuse.com](http://www.landuse.com)  
U.S. Geological Survey:  
[www.usgs.gov](http://www.usgs.gov) (main homepage)  
[geochange.er.usgs.gov](http://geochange.er.usgs.gov) (USGS Global Change Research Program)  
[greenwood.cr.usgs.gov](http://greenwood.cr.usgs.gov) (downloadable geologic, or geologically-related, spatial data sets)  
[webservice.cr.usgs.gov](http://webservice.cr.usgs.gov) (Colorado water information)  
[www.nbs.nau.edu](http://www.nbs.nau.edu) (Colorado Plateau Research Station)  
Utah State GIS Advisory Committee: [www.agr.state.ut.us](http://www.agr.state.ut.us)

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**APPENDIX L: A MAP OF THE "COLORADO PLATEAU"**

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A participant offered this map as a definition of the "Colorado Plateau". (Note: Not included in on-line version of report).



There is considerable argument about "what is the Colorado Plateau." Various physiographic, social, or ecologic opinions exist. Some include all of the major eco-regions of the Colorado River basin and some exclude everything but the red rock country around the four corners. The BLM's Landscape Ecology; Modeling and Analysis (LEMA) center at Utah State University developed the present map, which represents the core of the Plateau. The dynamic interaction in and out of this flexible boundary will provide critical information to the formulation of both BLM's internal initiative and the "greater" plateau strategy.

**Colorado Plateau Data Coordination Workshop  
October 28 and 29, 1997  
Farmington, New Mexico**

Complete transcribed text of the 25 written workshop evaluations received (24 evaluations on-site and 1 evaluation mailed to the FGDC).

**1. Were your expectations met? If not, tell us what you expected to happen that did not happen?**

yes- and perhaps a little more; mostly; pretty good for a start; yes; [no comment]; yes-exceeded; yes, this was a good opportunity for meeting & communication; would have enjoyed a short field trip; It was a good start. Would like to have a bigger cross-section of players; yes; yes, however, I was disappointed there was not more private industry represented. Perhaps they did not get notified; Yes, I would have like to develop (sic) a list or directory of who has what information; Yes and more; They were exceeded; Hoped for a better organizational structure to come out of the meeting; Yes; Yes, very happy with the workshop; I expected to share information about what data development and research was being conducted; Yes & much more - high energy level of the group & the willingness to proceed/volunteer was very good. The hard preparatory work paid many dividends for the mtg and hopefully for the future of the CP; Yes, Good contacts and action items for the group to work on; Basically yes, however, actions to define parties & responsibilities to march forward were missing. Whos in charge-who responsible, who provides support?; yes; yes; yes; yes, enjoyed it.

**2. Do you have a specific issue or concern or other item that you believe was not adequately addressed? If so, tell us what it is.**

No; Simplified approach to implementing metadata stds; actual access & local involvement in consortium board. (written before presentation; No; [no comment]; [no comment]; these same issues continue to come up time after time. I'd like to think that each time we discuss them, we learn just a bit more. We will eventually need to address standard formats for data attributes (encoding schemes) and other standardization recommendations; No; [no comment]; Touched on a little bit...But, someone needs to determine which agencies are statutorialy (sic) responsible for which data-re BLM - ownership NRCS- soils etc. etc. And this data should be the standard for

that particular theme; [no comment]; This was addressed; No; No; [no comment];  
None, good cross section of organizations interested in data & sharing of data;  
technology transfer, training, workshops; Is this going to be a independantly (sic)  
funded group doing work or a point of conduct (sic) for coordination; I hope we can  
somehow capture the need to “share data with a purpose” I’d even suggest this as a  
motto; More effort shoud be put on cooping (sic) inventory and work; [no comment];  
No; mechanism to document activities & data; [no comment]; People to have respect  
for traditional/ cultural values when they obtain those kinds of data from Tribes.

**3. Given limited resources order the issues as to what you believe are most important to your organization? Please rank the issue by order of importance to you, where 1= most important, 6= least important.**

Public Access			1	1	5	3	2	6	1	5	4	6	6	5	3	4	2	2		5	5	4	4	5	3
Directories and Clearinghouses			5	2	4	1	1	2	2	3	3	2	4	2	5	4	3			4	2	3	2	6	5
Consortium	2		4	3	1	4	6	1	5	6	1	1	1	6	6	3	1	1	3	3	1	1	6	4	6
Data Integration	1		3	4	6	2	2	4	3	2	5	4	5	1	1	2	6		6	2	6	6	1	3	1
Standards			6	6	2	5	4	3	4	1	6	3	3	3	2	2	4		5	1	4	5	3	2	2
People and Policies			2	5	3	6	5	5	6	4	2	5	2	4	4	1	5			6	3	2	5	1	4

Comments on question #3.

Data Integration to make Consortium happen; Don't feel comfortable rating these; I think we need the consortium to address the others; Consortium (coordination).

**4. What did you like best about this workshop?**

Break-out sessions to discuss focus questions; Breakout groups. Presentations. Networking; Putting faces with names (great sticking with time & moving forward); Structure that encouraged participant input and the majority actually participating; fastpaced, goal oriented; Meeting other people who work with GIS; This is the first fully facilitated workshop I have attended. I think it was productive and successful in large part because of this; Excellent speakers; Opportunity for detailed discussion; [no comment]; interaction between participants with time for networking; the contacts I made; Great interaction; Meeting other involved in data/database issues and developing a network; The number of participants and their different perspectives; Everyone was at ease and willing to partipate- Input from the group was well received by the workshop organizers; People/agenda; networking; meeting the people that make up the steering group & the others. The willingness to develop a future for the group & tackle issues; Well arranged - short and sweet; It defined a multitude of issues & some good ideas; Diversity & enthusiasm of participants & facilitators; meeting people; meeting the other people involved (and the BBQ); Interaction among GIS professionals.

## **5. What did you like least?**

Should have been two full days-Monday was a travel day; why the empty space Tuesday morning?; Trying to prematurely push for “concrete actions” in the final plenary session. Not enough groundwork laid in the break-out sessions for this. Either have longer breakouts (more time to work through strategies) or don’t push for artificial conclusions; not enough local level participation (maybe not the time); The food. The mission-goal statement creation and presentation. The lack of real end user participants such as NGO’s and local gov’t representatives as opposed (sic) to high-end data creators, manipulators, and administrators; Physical location; Breakfast; no complaints; Consensus: Mission/Vision/Goals --Needed overheads, --Should have had a better plan for handling proposed changes; Sound system difficult to hear; Where the hell did everyone go? Is the attendance on the second day an indication of the commitment management will have toward this effort???. n/a; Lunch was horrible; Nothing; the drive. Lack of FGDC funded meals & limo service; the length of dialogues on processes and semantics; [no comment]; sound quality in main meeting room; getting caught up on the process of how to make recommendations instead of making recommendations; the cold room at the Anasazi Inn and the acoustics (sic) in the mtg room-other than that, this was a very successful mtg even if it was ambitious; the echo in the room; failure to define clear cut initial actions; [no comment]; lack of facilitation, Paul does not listen; the poor acoustics in the conference room; \$20 requirement for lunch, buffet.

### **Other comments written on form:**

I REALLY ENJOYED THIS.

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**APPENDIX N: WORKSHOP REGISTRANTS**

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(Not included in on-line version of report).