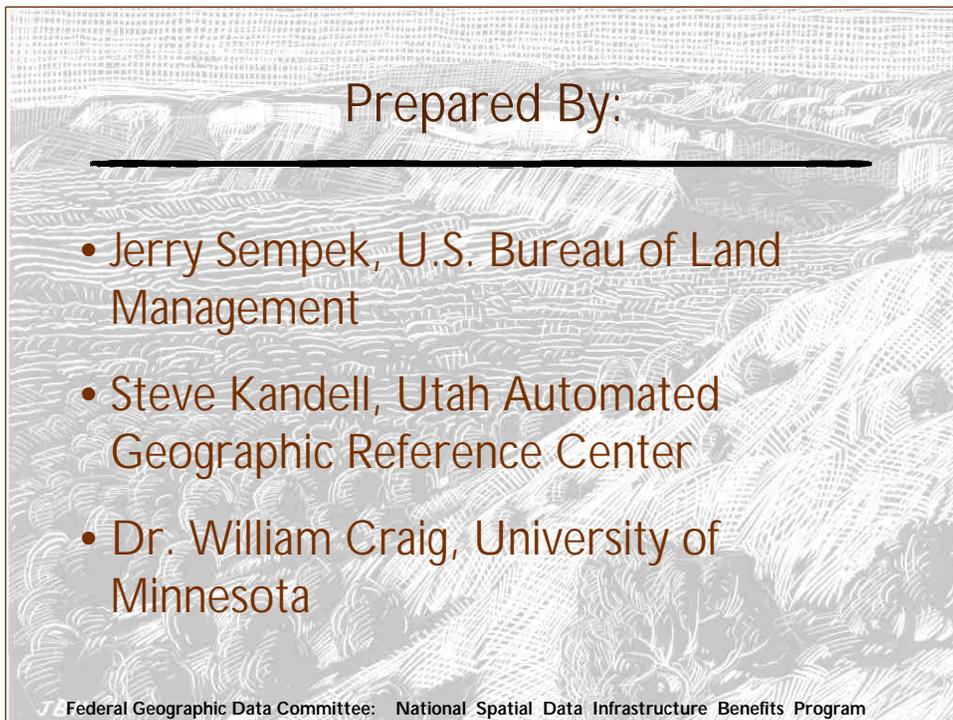




The purpose of this presentation is to provide an overview of the Grand Staircase-Escalante National Monument (GSENM) Geospatial Data Sharing Pilot Project and the benefits that have resulted. The results of this study have been presented at the Utah Geographic Council Conference in Snowbird, Utah and at the Driven By Data Symposium sponsored by the Consortium for Geographic Information in Los Angeles, California. This project is expected to be the subject of the feature article in an upcoming issue of *GeoInfo Systems* to be published in early 2000.

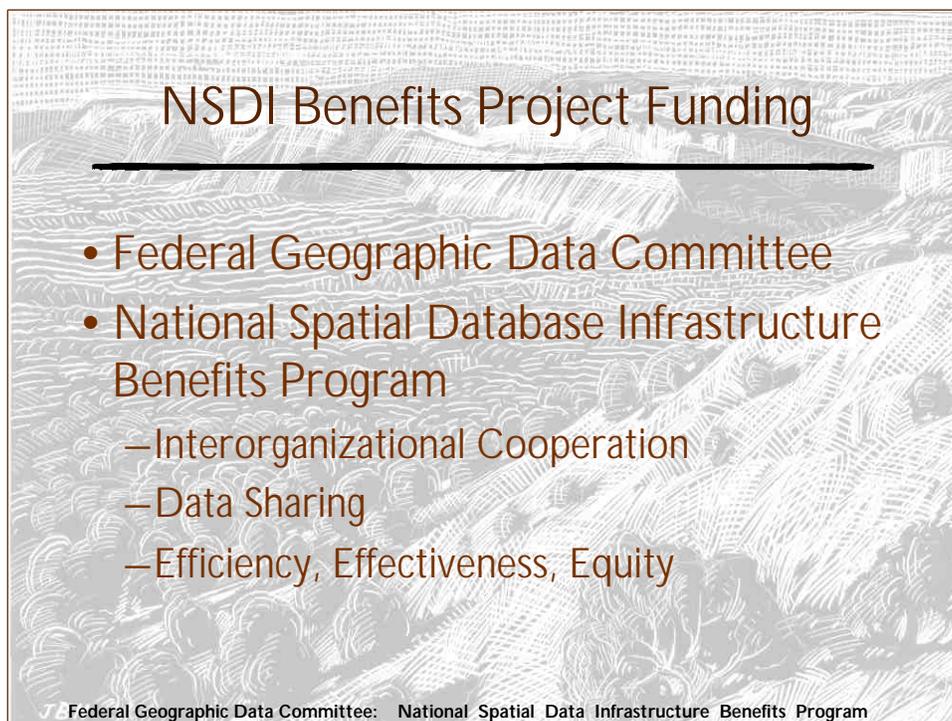


Prepared By:

- Jerry Sempek, U.S. Bureau of Land Management
- Steve Kandell, Utah Automated Geographic Reference Center
- Dr. William Craig, University of Minnesota

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

The Bureau of Land Management's (BLM) Grand Staircase-Escalante National Monument was awarded a matching grant through the NSDI Benefits Program in 1997 to implement the "Grand Staircase-Escalante National Monument Geospatial Data Sharing Pilot Project". The scope of this project included the purchase of computer hardware and software to establish an Internet geospatial data serving site and then to serve geospatial data used in developing the Monument Resource Management Plan to the stakeholders. Jerry Sempek of BLM Grand Staircase-Escalante National Monument was the project manager/coordinator and oversaw the project organization and implementation. A qualitative study to identify benefits accrued by this project was then conducted by Dr. William Craig of the Center for Urban and Regional Affairs at the University of Minnesota and Stephen Kandell, an urban planner with the State of Utah Automated Geographic Reference Center (AGRC).



## NSDI Benefits Project Funding

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- Federal Geographic Data Committee
- National Spatial Database Infrastructure Benefits Program
  - Interorganizational Cooperation
  - Data Sharing
  - Efficiency, Effectiveness, Equity

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

As mentioned previously, this project was partially funded through a matching grant by the Federal Geographic Data Committee (FGDC). FGDC is a compilation of Federal agencies, state agencies, tribal entities, universities, and private sector partners that work to develop policies, standards, and procedures for organizations to cooperatively produce and share geographic data. Furthermore, FGDC coordinates the development of the National Spatial Data Infrastructure (NSDI). The NSDI encompasses policies, standards, and procedures for organizations to cooperatively produce and share geographic data. The federal agencies that constitute the FGDC are developing the NSDI in cooperation with organizations from state, local and tribal governments, the academic community, and the private sector.

The NSDI Benefits program (BEN) funded cooperative projects that assess the impact of interorganizational cooperation and data sharing to address important issues or solve problems over a particular geographic area. Projects may focus on environmental, economic, social, or cultural problems. FGDC recommends focusing on the assessment of three categories of potential benefits (efficiency, effectiveness, and equity) under BEN. In this particular case, the issue is the development of a resource management plan for Grand Staircase-Escalante National Monument that incorporates a wide array of input from stakeholders and the public.

## Introduction/Background

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Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

Prior to discussing the specifics of GSENM Geospatial Data Sharing Pilot Project, background information about the Monument will be presented.

## Introduction/Background

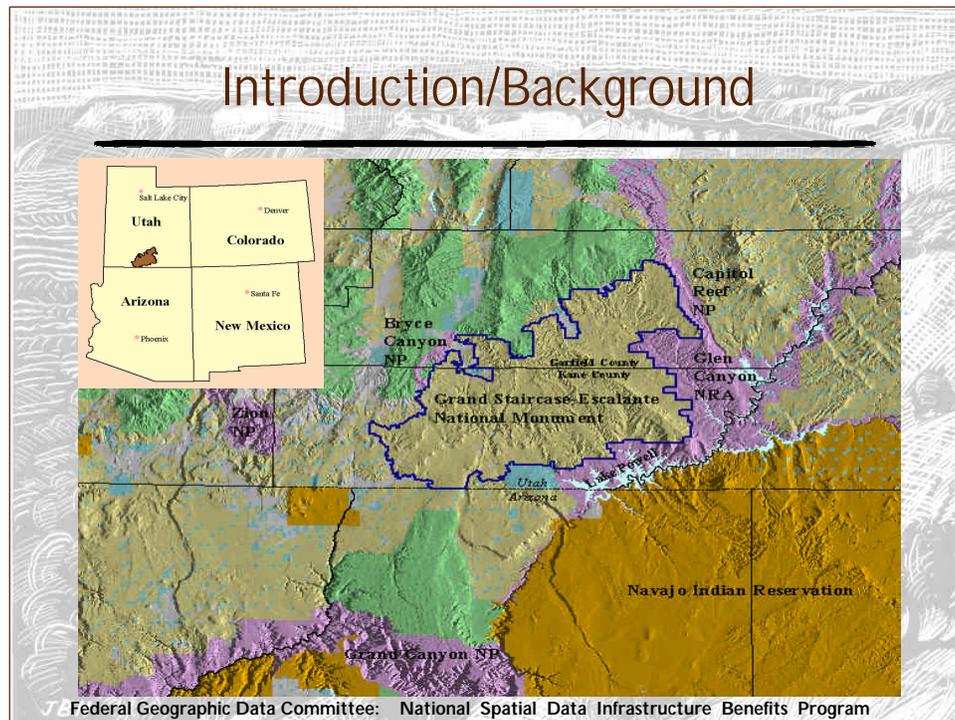
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- September 18, 1996
  - Presidential Proclamation Establishing Grand Staircase-Escalante National Monument



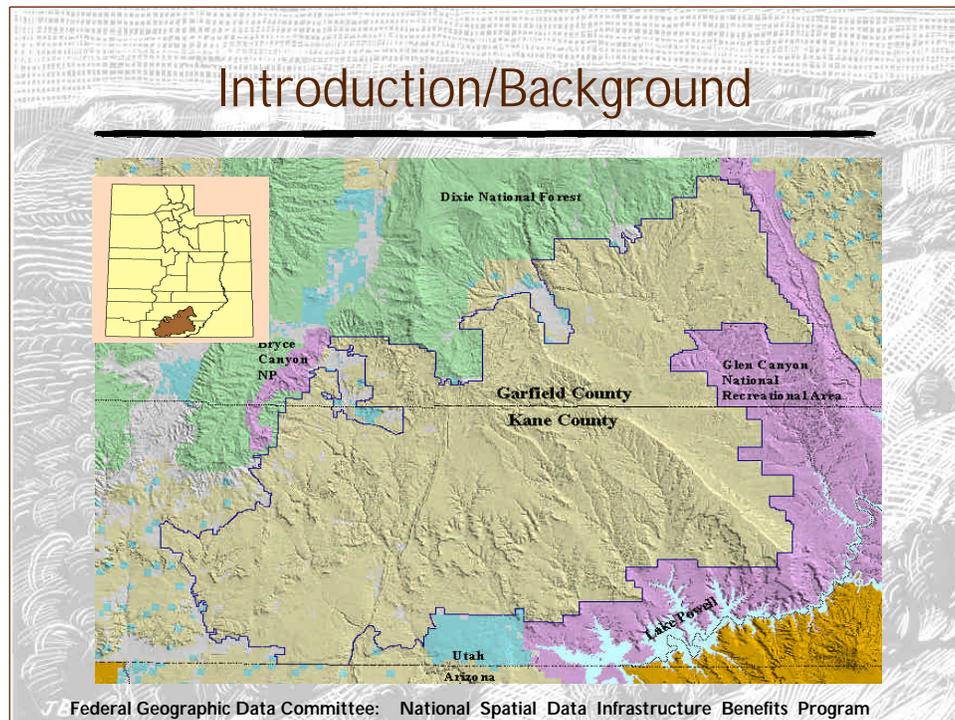
Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

GSENM was established through Presidential Proclamation on September 18, 1996. The legal authority for the Proclamation was the Antiquities Act of 1906. The Monument was created to protect the many scientific, historic, biological, geological, paleontological, and archaeological objects in the area. This is the first National Monument for which the BLM was designated as the management agency. Although a small number of national monuments are managed by the U.S. Forest Service, the National Park Service is the primary monument management agency in the U.S.

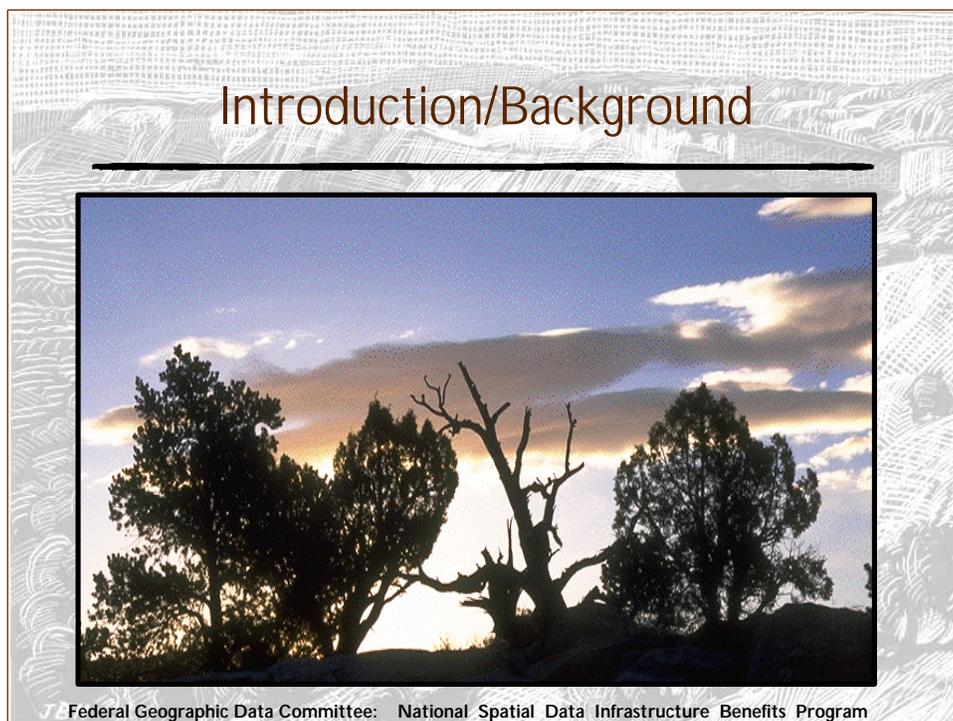


The Monument encompasses roughly 1,870,800 acres of Federal public lands in south-central Utah. Approximately 15,000 acres of lands within the Monument boundary are privately owned.

The Monument is surrounded primarily by other Federal lands which are managed by the U.S. Forest Service and the National Park Service. The Dixie National Forest borders the Monument to the north, Capitol Reef National Park is adjacent to the east, Glen Canyon National Recreation Area is contiguous on the east and southeast, Bryce Canyon National Park is to the northwest, and other BLM administered lands exist on the south and west.

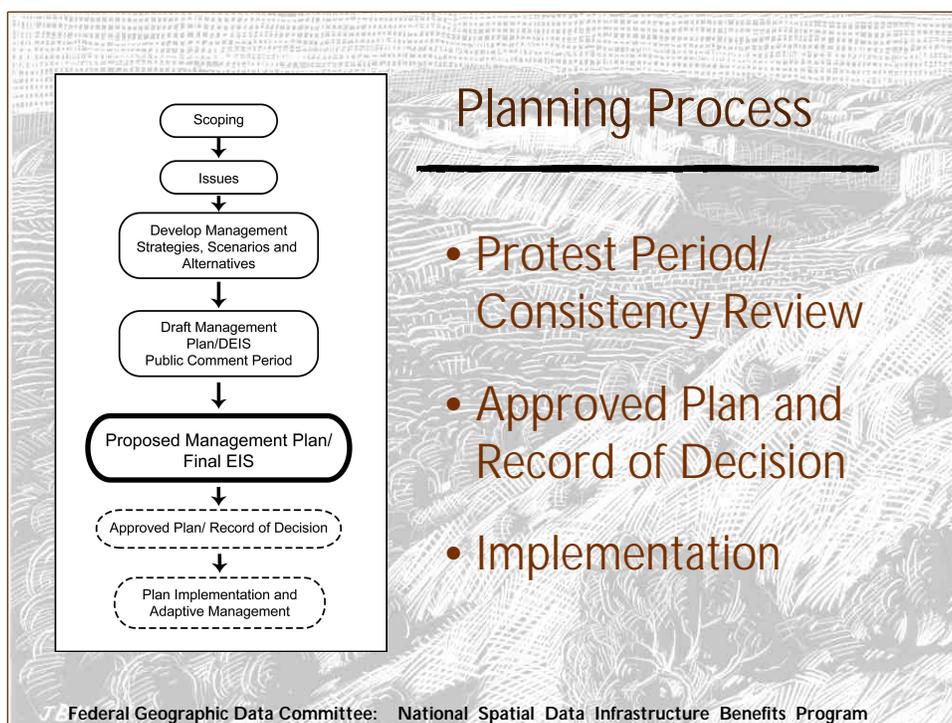


The boundaries of two Utah counties, Kane and Garfield, cross the Monument. Approximately 68% of the Monument is within the Kane County boundary, while the remaining 32% is in Garfield County. About 49% of Kane County and 18% of Garfield County lie within the borders of the Monument. Although each of these counties is roughly the physical size of Connecticut, their population density is comparatively quite low. The combined 1990 population of both counties was less than 10,000 inhabitants.



During the last three years, the BLM has been conducting an intensive collaborative planning process involving state and local governments and other interest groups to develop a natural resource management plan for Monument. In fact, five of the seventeen planning team members were State of Utah employees. This is a very unique situation for a federal land management agency.

The planning team recognized early in the process that one important way of furthering this collaborative approach, was to make geospatial data accessible to the large community of data users and interest groups in a quick, efficient, and effective manner. The hope of the planning team was that the GIS community including Federal, state, and local agency users, private sector users, and the general public would benefit from the creation and availability of geospatial data by being able to more fully participate in the planning process. It was this realization that provided the impetus for the Geospatial Data Sharing Pilot Project.



To provide a better understanding of the collaborative planning process and the opportunity and need for sharing geospatial data, described below is a short over view of the process.

Following the establishment of the Monument, a 17 member planning team was assembled in Cedar City, Utah . Between the Spring of 1997 and the Fall of 1998, the team went through the process of soliciting initial public input (scoping), developing issues, preparing management alternatives, and finally, publishing a Draft Management Plan/Draft Environmental Impact Statement (DEIS). After the release of the Draft Plan in November of 1998, a 90 day public comment period (eventually extended to 120 days) was opened. The planning team invited public input on the Draft Plan from a wide variety of sources including email, the Internet, and thirteen open house meetings held locally and nationally. Nearly seven thousand comments were received and considered in developing the Proposed Plan.

The publication of the Proposed Plan initiated a 30 day protest period and a 60 day Governor's Consistency review. The protest period offered those people who had participated in the planning process, an opportunity to protest decisions to the Director of the BLM. The Governor's consistency review provided a mechanism for the Governor's Office to identify any perceived inconsistencies with state or local plans. After protests or inconsistencies are resolved, a Record of Decision (ROD) and Approved Management Plan is prepared for signature by the Secretary of the Interior. Following the signing of the ROD, the implementation of the plan will begin.

## Primary NSDI Benefits Project Partners

- Federal Geographic Data Committee
- BLM GSENM Planning Office
- AGRC
- Garfield and Kane Counties

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

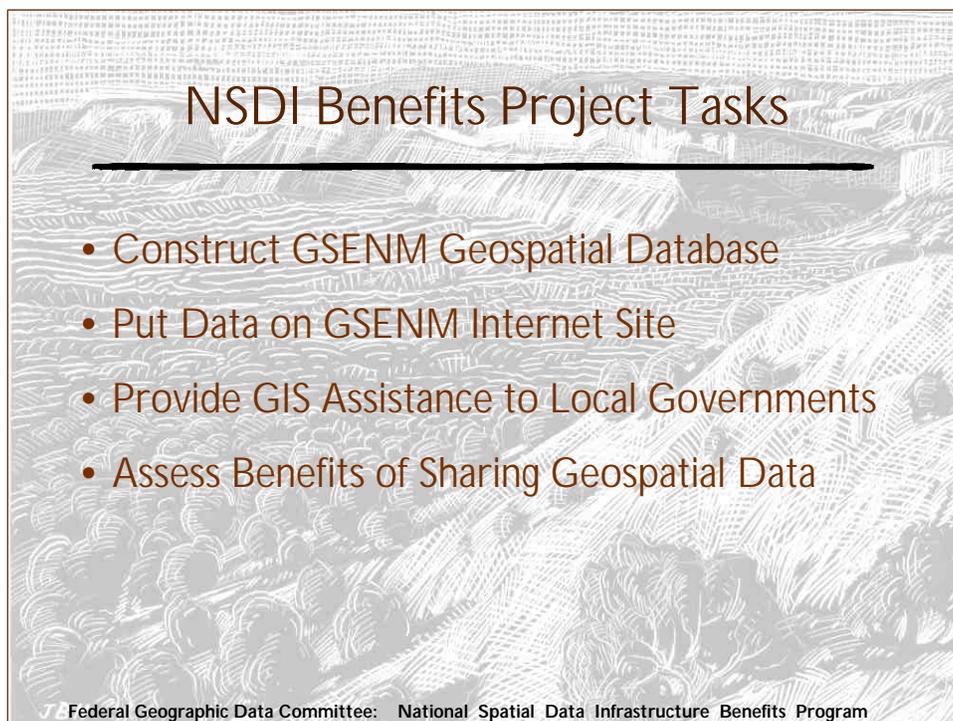
The next portion of this discussion will focus on the Monument Geospatial Data Sharing Project. The primary project partners include the FGDC, the BLM GSENM Planning Office, AGRC and Garfield and Kane Counties. Other Federal and state agencies, educational institutions and private organizations assisted as well.

## NSDI Benefits Project Goals

- Make GSENM Geospatial Data Available to Stakeholders
- Assess Benefits of Sharing Geospatial Data

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

The major goals of this project included making GSENM geospatial data available to a large community of data users and then to assess the benefits of sharing this geospatial data.



## NSDI Benefits Project Tasks

- Construct GSENM Geospatial Database
- Put Data on GSENM Internet Site
- Provide GIS Assistance to Local Governments
- Assess Benefits of Sharing Geospatial Data

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

The primary project tasks include constructing a Monument geospatial database, making this data available to a large community of data users by placing it on the Monument Internet Site, providing GIS assistance to both Kane and Garfield Counties, and finally, to assess the benefits of sharing the Monument geospatial data.

## Construct GSENM Geospatial Database

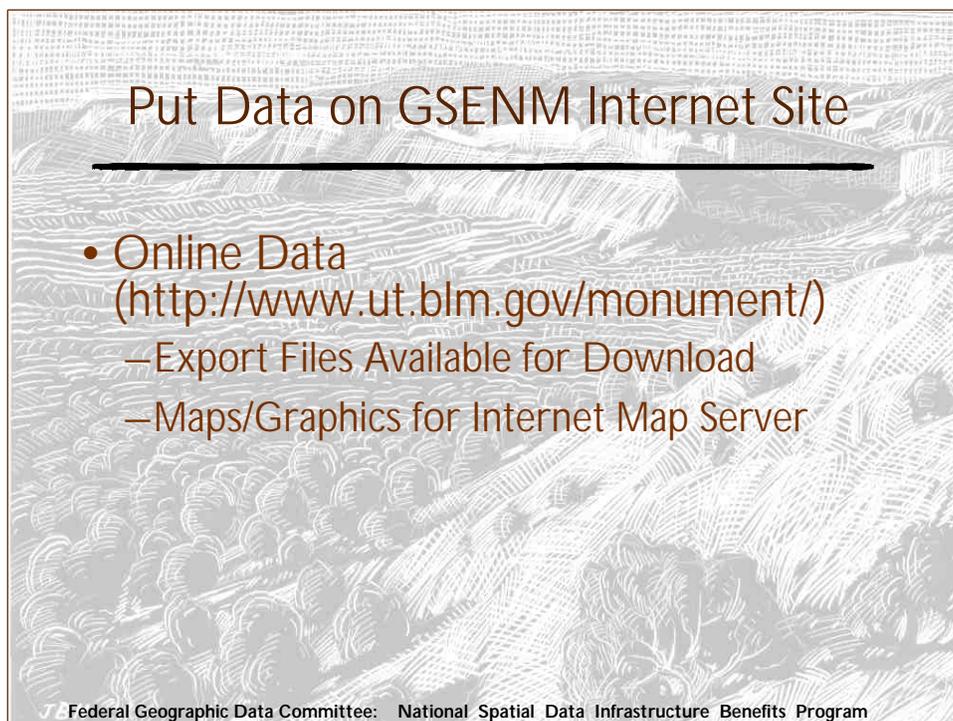
- Partnership With AGRC/USU
  - Data Conversion/Acquisition/Evaluation
  - Data Standards
    - State Geographic Information Database
    - Canyon Country Partnership Efforts
- FGDC Standards for Metadata
- Internal Barriers

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

Construction of the GSENM geospatial database entailed a huge effort that had to be completed in a relatively short period of time. A partnership was established between the BLM GSENM Planning Team and Utah AGRC to accomplish this task.

Construction of the GSENM geospatial database consisted of assembling data from a variety of sources. Some data was converted from the old BLM GIS Maps Overlay and Statistical System (MOSS), other data layers were acquired from Federal and state agencies. Base layers were constructed to be consistent with Utah's State Geographic Information Database (SGID). A primary concern was that geospatial data not be duplicated, especially base or framework layers. Also of concern was that data standards reflect efforts underway in the state and that all metadata meet the FGDC content standard.

A significant barrier to the ability to share the GSENM geospatial database was that BLM network security policy prohibited access to the geospatial data residing in the planning office for users outside the wide area network (WAN). BLM GIS specialists felt it was important to have physical access to the server housing the geospatial data and therefore could not use a remote BLM server located in Salt Lake City. To overcome the BLM network security policy, a dedicated GIS workstation was installed in the Cedar City office but outside the BLM network, that mirrored the GSENM shared geospatial database and was connected by a dedicated line to the State of Utah WAN and the Internet.

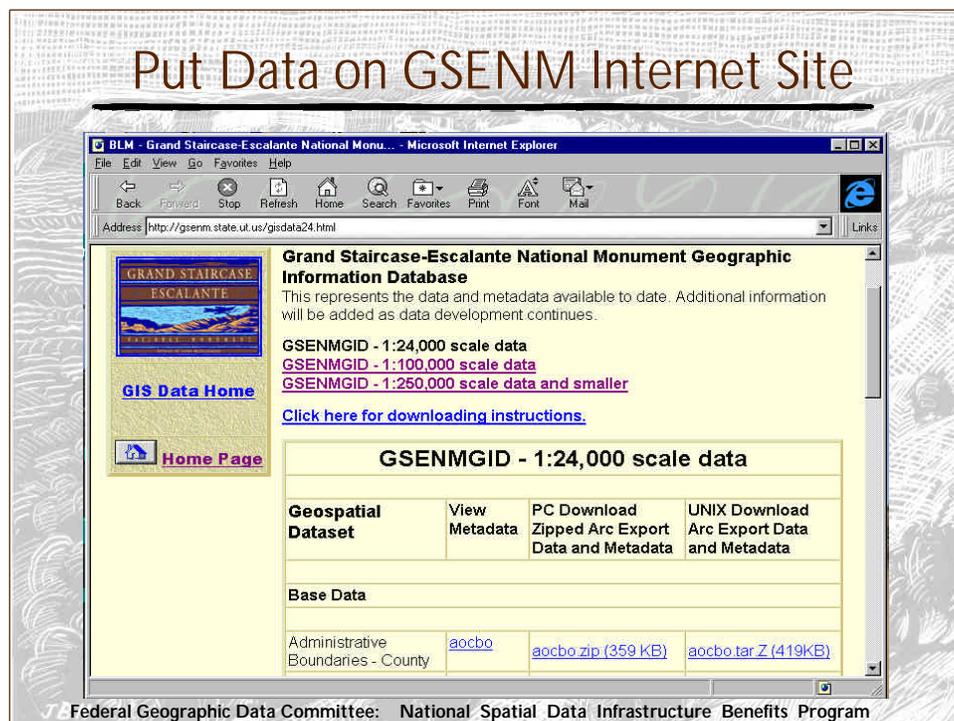


## Put Data on GSENM Internet Site

- Online Data (<http://www.ut.blm.gov/monument/>)
  - Export Files Available for Download
  - Maps/Graphics for Internet Map Server

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

During the development of the Draft Management Plan approximately 30 GIS data layers were available to download online in ARC/INFO export format. By the end of the 120 day public comment period for the Draft Management Plan, over 1500 hits to the Geospatial Data section of the Monument's Internet site were counted.



Currently, there are approximately 40 GIS data layers available online in ARC/INFO export format. Additional layers will be placed on this site as they are available and will have full metadata documentation.

## Put Data on GSENM Internet Site



[GIS Data Home](#)

[Home Page](#)

**Grand Staircase-Escalante National Monument Geographic Information Database**  
 This represents the data and metadata available to date. Additional information will be added as data development continues.

[GSENMGID - 1:24,000 scale data](#)  
[GSENMGID - 1:100,000 scale data](#)  
[GSENMGID - 1:250,000 scale data and smaller](#)  
[GSENMGID - DEIS Maps/Data](#)  
[GSENMGID - FEIS Maps/Data](#)

[Click here for downloading instructions.](#)

| GSENMGID - 1:24,000 scale data     |                          |   |  |
|------------------------------------|--------------------------|---|--|
| Geospatial Dataset                 | View Metadata            | PC Download Zipped Arc Export Data and Metadata | UNIX Download Arc Export Data and Metadata |
| <b>Base Data</b>                   |                          |   |  |
| Administrative Boundaries - County | <a href="#">aocbo</a>    | <a href="#">aocbo.zip (359 KB)</a>              | <a href="#">aocbo.tar.Z (419KB)</a>        |
| BLM Resource Area Boundries        | <a href="#">barbp</a>    | <a href="#">barbp.zip (138KB)</a>               | <a href="#">barbp.tar.Z (171KB)</a>        |
| GSENM Administrative Boundary      | <a href="#">bampb</a>    | <a href="#">bampb.zip (160KB)</a>               | <a href="#">bampb.tar.Z (191KB)</a>        |
| GSENM 24k Study Area Clip Cover    | <a href="#">gdqup1di</a> | <a href="#">gdqup1di.zip (9KB)</a>              | <a href="#">gdqup1di.tar.Z (17KB)</a>      |
| GSENM Priority Quads               | <a href="#">gaqup1rs</a> | <a href="#">gaqup1rs.zip (29KB)</a>             | <a href="#">gaqup1rs.tar.Z (50KB)</a>      |

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

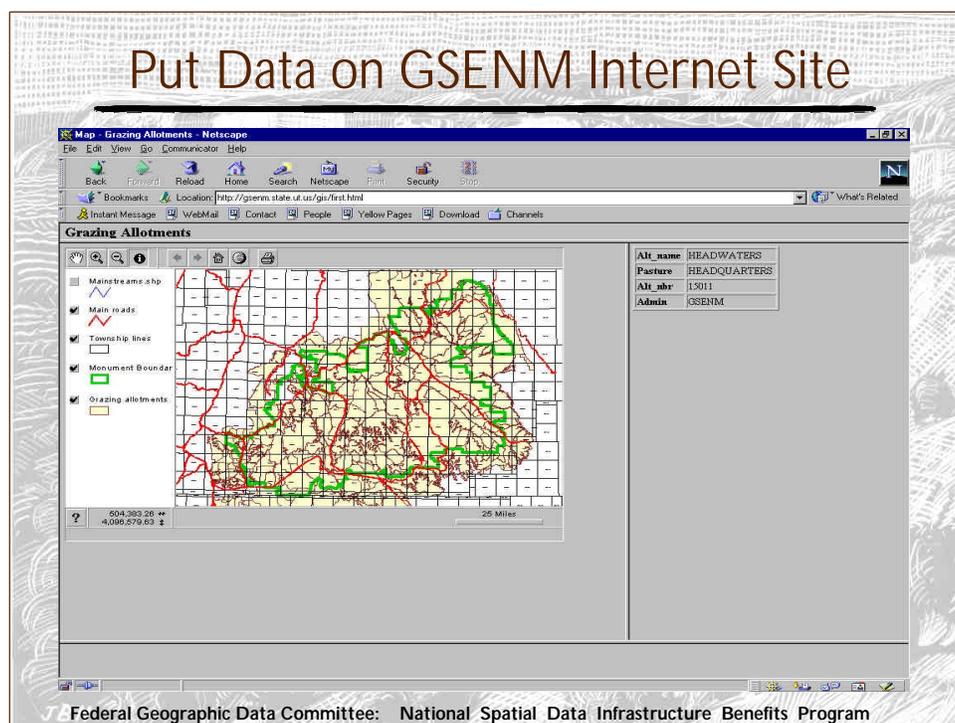
The GSENM Internet site provides GIS base data layers, i.e., hydrography, land status, etc., at three different scales; 1:24,000 scale, 1:100,000 scale, and 1:250,000 scale and smaller. The site also provided data sets used in the GSENM Draft Management Plan/Draft Environmental Impact Statement and the GSENM Proposed Management Plan/Final Environmental Impact Statement.

## Put Data on GSENM Internet Site

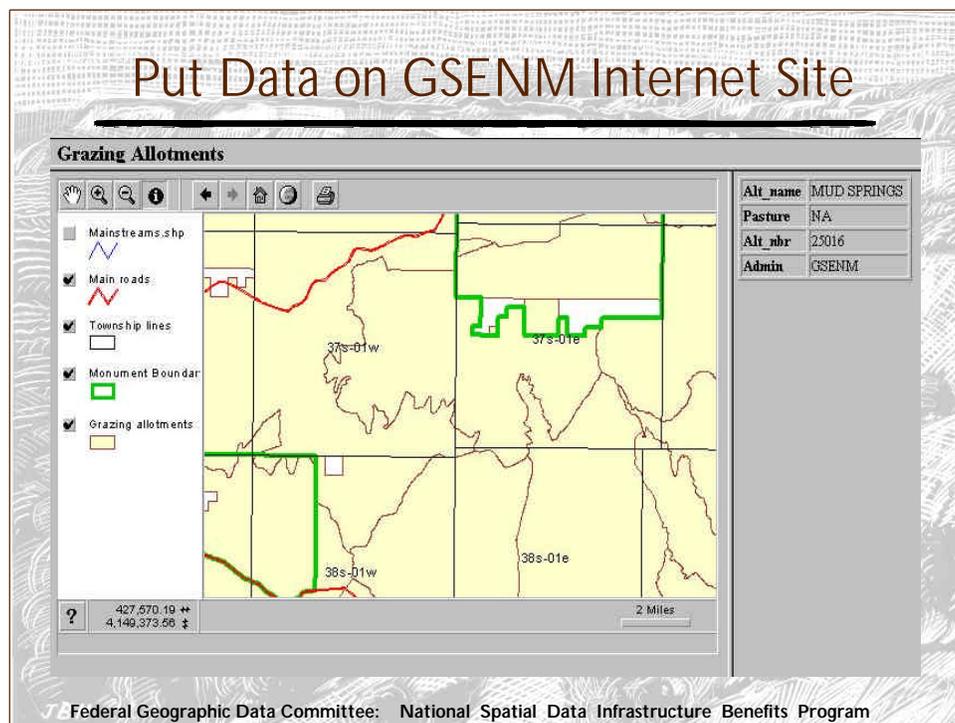
| GSENMGID - DEIS Maps/Data                |                          |   |  |
|--|--------------------------|---|--|
| Geospatial Dataset                       | View Metadata            | PC Download Zipped Arc Export Data and Metadata | UNIX Download Arc Export Data and Metadata |
| <b>Chapter 2 Maps</b>                    |                          |   |  |
| Map 2.1: Alternative B Management Zones  | <a href="#">alt_b</a>    | <a href="#">alt_b.zip (645KB)</a>               | <a href="#">alt_b.tar.Z (682KB)</a>        |
| Map 2.3: Transportation - Alternative B  | <a href="#">rds_altb</a> | <a href="#">rds_altb.zip (670KB)</a>            | <a href="#">rds_altb.tar.Z (744KB)</a>     |
| Map 2.4: Alternative C Management Zones  | <a href="#">alt_c</a>    | <a href="#">alt_c.zip (779KB)</a>               | <a href="#">alt_c.tar.Z (844KB)</a>        |
| Map 2.5: Transportation - Alternative C  | <a href="#">rds_altc</a> | <a href="#">rds_altc.zip (773KB)</a>            | <a href="#">rds_altc.tar.Z (857KB)</a>     |
| Map 2.6: Alternative D Management Zones  | <a href="#">alt_d</a>    | <a href="#">alt_d.zip (401KB)</a>               | <a href="#">alt_d.tar.Z (429KB)</a>        |
| Map 2.8: Transportation - Alternative D  | <a href="#">rds_altd</a> | <a href="#">rds_altd.zip (493KB)</a>            | <a href="#">rds_altd.tar.Z (564KB)</a>     |
| Map 2.9: Alternative E Management Zones  | <a href="#">alt_e</a>    | <a href="#">alt_e.zip (596KB)</a>               | <a href="#">alt_e.tar.Z (630KB)</a>        |
| Map 2.10: Transportation - Alternative E | <a href="#">rds_alte</a> | <a href="#">rds_alte.zip (827KB)</a>            | <a href="#">rds_alte.tar.Z (915KB)</a>     |

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

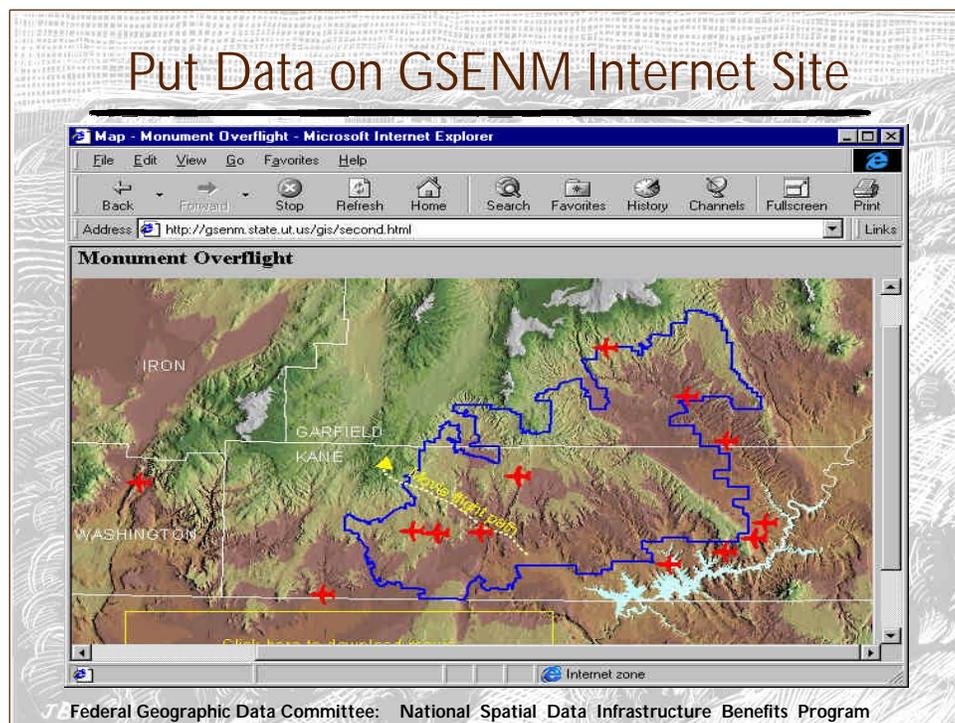
An illustration of some of the GIS layers found under the category of GSENM Draft Management Plan/Draft Environmental Impact Statement, includes data for the various management alternatives and transportation plans. The data was organized by Chapter and referenced by Map number as listed in the GSENM Draft Management Plan/Draft Environmental Impact Statement.



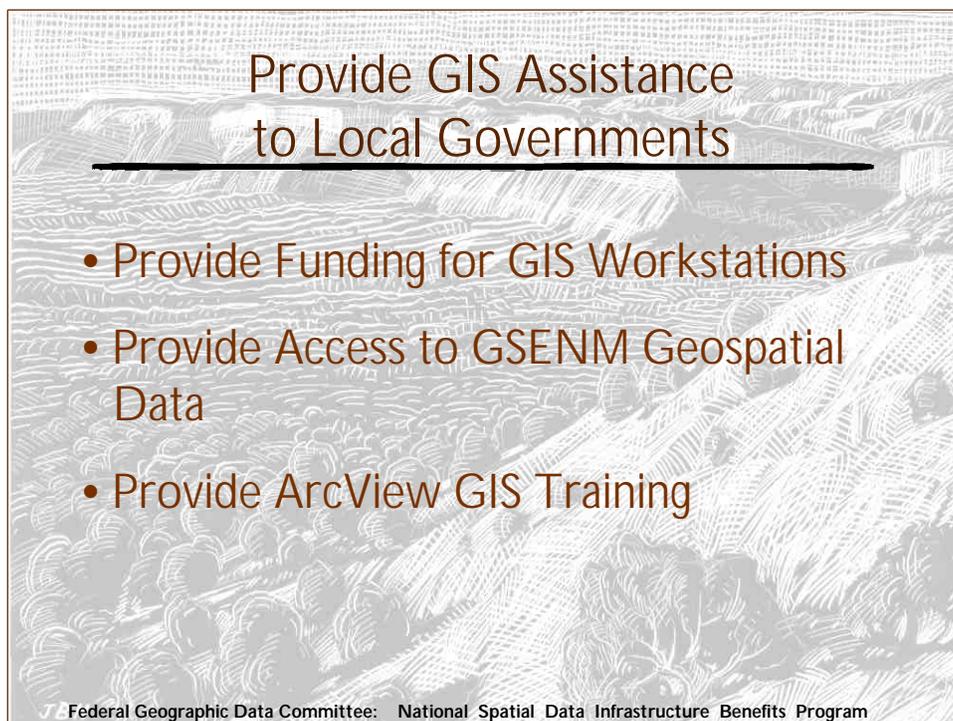
The planning team also prepared an Arcview project which can be viewed online using Arcview Internet Map Server. In response to requests made by a variety of stakeholder groups, this project was developed and served online which allows users to view and query information about grazing allotments within the Monument.



The users can query grazing allotments in the Monument for the allotment name and number. They can also interactively pan and zoom to areas to understand the spatial location and configuration of the allotment boundaries.



Another project that is served on the Monument Internet site allows users to interact with other types of data. In this instance, if you click on one of the airplane symbols which represent photographic view points, a picture of the landscape as seen from that location pops up.



## Provide GIS Assistance to Local Governments

- Provide Funding for GIS Workstations
- Provide Access to GSENM Geospatial Data
- Provide ArcView GIS Training

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

The second primary task involved in this project was to provide GIS assistance to both Kane and Garfield Counties. Neither Kane or Garfield County had the financial resources to purchase equipment or train local staff. Furthermore, because geospatial data is not commonly shared among agencies and governmental entities and each organization maintains its own database, common data standards do not always exist for framework data layers or for common resource layers which may hinder understanding and use of the data. The rationale behind this effort was that if these local communities and government officials had access to GSENM geospatial data they would be able to more fully participate in the planning process.

## Provide GIS Assistance to Local Governments



Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

Using project funds both Kane and Garfield Counties purchased GIS workstations. The BLM provided technical assistance in the purchase of these GIS workstations.

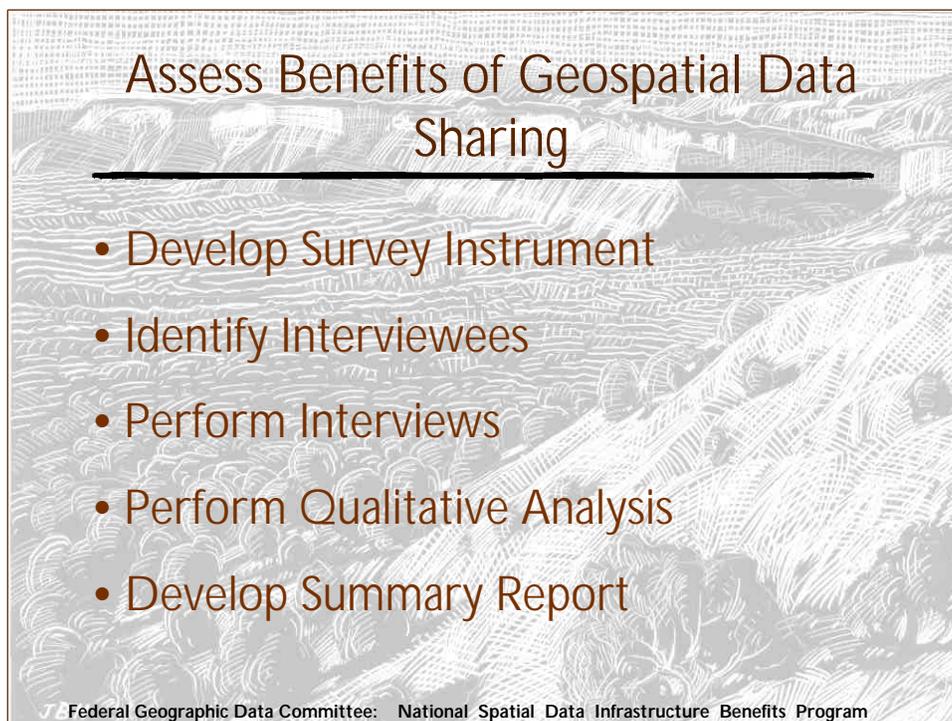
Kane and Garfield Counties placed these GIS workstations in their County Courthouses (Garfield County Courthouse, located in the town of Panguitch is illustrated above). Using these GIS workstations both counties were able to access geospatial data through the Monument Internet Site. Furthermore, both counties were provided geospatial image data on CD-ROM that covered the extent of the Monument.

## Provide GIS Assistance to Local Governments



7 Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

Each county GIS workstation was connected to the State of Utah wide area network. Plotters were also purchased by each county for map production purposes. To assist the local governments in using GIS, one staff member from each county received ArcView training through AGRC.



## Assess Benefits of Geospatial Data Sharing

- Develop Survey Instrument
- Identify Interviewees
- Perform Interviews
- Perform Qualitative Analysis
- Develop Summary Report

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

Five steps were taken to determine the benefits accrued from the sharing of geospatial data. These steps include (1) developing a survey instrument, (2) identify interviewees, (3) performing interviews, (4) performing qualitative analysis, and (5) developing a summary report.

## Develop Survey Instrument

- Target Digital Geospatial Data and Hard Copy Users
- Design Questions
  - Efficiency, Effectiveness, Equity
- Test and Revise Survey Instrument

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

In an effort to determine what benefits data users received, a survey was developed consisting of approximately 10 questions. This survey was designed to solicit responses from both users of digital GIS data and paper GIS maps. Furthermore, the survey was designed to distinguish between digital GIS data users who manipulated the data or simply used it to print out paper maps.

Survey questions were developed to capture three different categories of GIS benefits; efficiency, effectiveness, and equity. These categories of GIS benefits can be defined as follows: efficiency is doing standard things quicker and cheaper, effectiveness is doing old things better (improving quality) or doing new things like improving decision making, and equity is being more fair in dealing with people and organizations.

## Develop Survey Instrument

4. How did you utilize the GIS data that you accessed; manipulation, develop plan comments, justify your position(s), increase your understanding of the plan, other?
- To date, has the GIS data allowed you to perform any of your work tasks more efficiently, less work hours to develop plan comments, other? If so, can you assign a value to this increased efficiency; hours, dollars, other?
  - Do you foresee the GIS data allowing you to perform any of your work tasks more efficiently in the future, automating existing work tasks, other? If so, can you assign a value to this increased efficiency; hours, dollars, other?
  - To date, has the GIS data allowed you to perform any of your work tasks more effectively; develop more detailed and substantive plan comments, communicating better with colleagues or the BLM, other?
  - Do you foresee the GIS data allowing you to perform any of your work tasks more effectively in the future; improving your ability to oversee the plan's implementation, improving the management of resources in the Monument, other?

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

This survey question attempts to determine if benefits under the categories of efficiency and effectiveness were accrued by individuals using digital GIS data. Following the development of the survey a test interview was performed. Based on the results of the test interview, data was analyzed to determine how well the survey questions were functioning and questions were then edited as necessary.

## Identify Interviewees

- Review Draft Plan Comments (6,835)
- Confer with Planning Team Members and Local Governments
- “Add On” Question to Survey Instrument

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

To identify interviewees, a representative sample of data users was developed. These data users included individuals from local, state and Federal Government, the Monument planning team, recreation and environmental groups and individuals. To identify individuals from these groups that used either digital GIS data or paper GIS maps three steps were taken.

First, public comments on the Draft Plan were reviewed. Approximately 6,800 public comments were submitted on the plan. Of these 6,800, 85 to 90 percent were form letters where organizations developed a comment letter for individuals to sign and submit on their behalf to the Monument planning team. The remaining letters were submitted by a variety of individuals and organizations. These comment letters were reviewed to identify if digital GIS data or paper GIS maps were used in their development. The content, length, and use of GIS data in the development of these comments varied greatly.

Second, planning team members and local government officials were questioned to determine if they had come into contact with any individuals or organizations that had used digital GIS data or paper GIS maps in their work (public meetings, presentations, etc.). Third, a question was added to the the survey asking if the interviewee knew of any other data users that should be contacted.

## Perform Interviews

- Personal Interviews (13), Phone Interviews (24)



Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

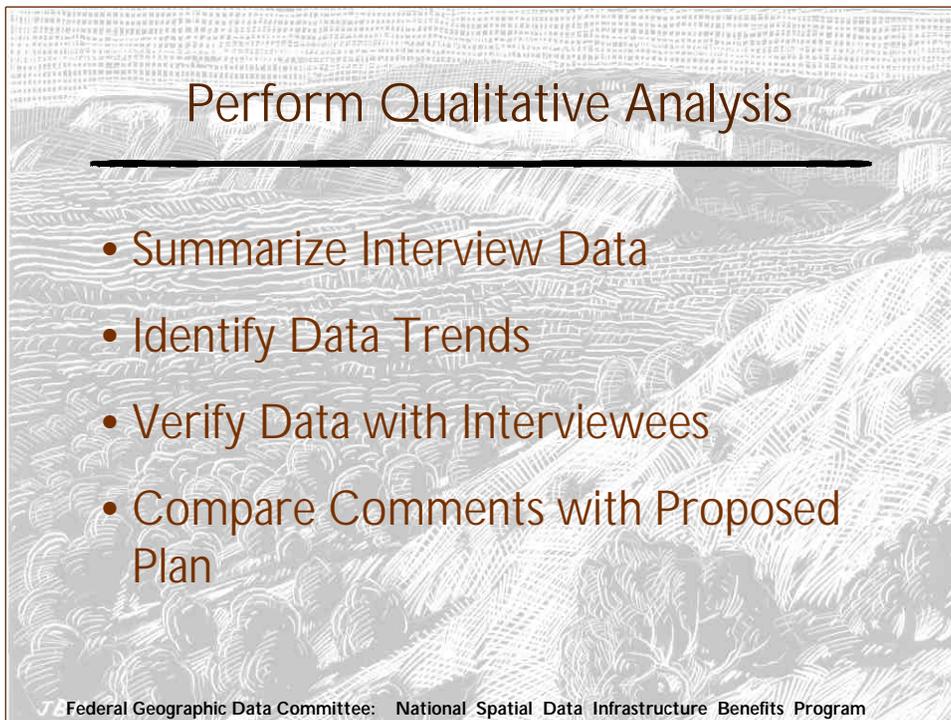
With a pool of approximately 40 interviewees identified, the interview process began. When possible personal or face to face interviews were performed. However, this wasn't always possible because of schedule conflicts or the physical location of the interviewee. A total of 13 interviews were completed in person and 24 interviews were conducted over the phone.

## Perform Interviews

| Interview Group              | # of Interviews Performed |
|------------------------------|---------------------------|
| Local Government             | 11                        |
| Environmental Groups         | 10                        |
| State and Federal Government | 4                         |
| Individuals                  | 5                         |
| Recreationists               | 3                         |
| Monument Planning Team       | 4                         |
| <b>TOTAL</b>                 | <b>37</b>                 |

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

A break down of the 37 interviews conducted shows that 11 were performed with local government officials, 10 with environmental groups, 4 with State and Federal government officials, 5 with individuals, 3 with recreationists, and 4 with members of the Monument planning team.



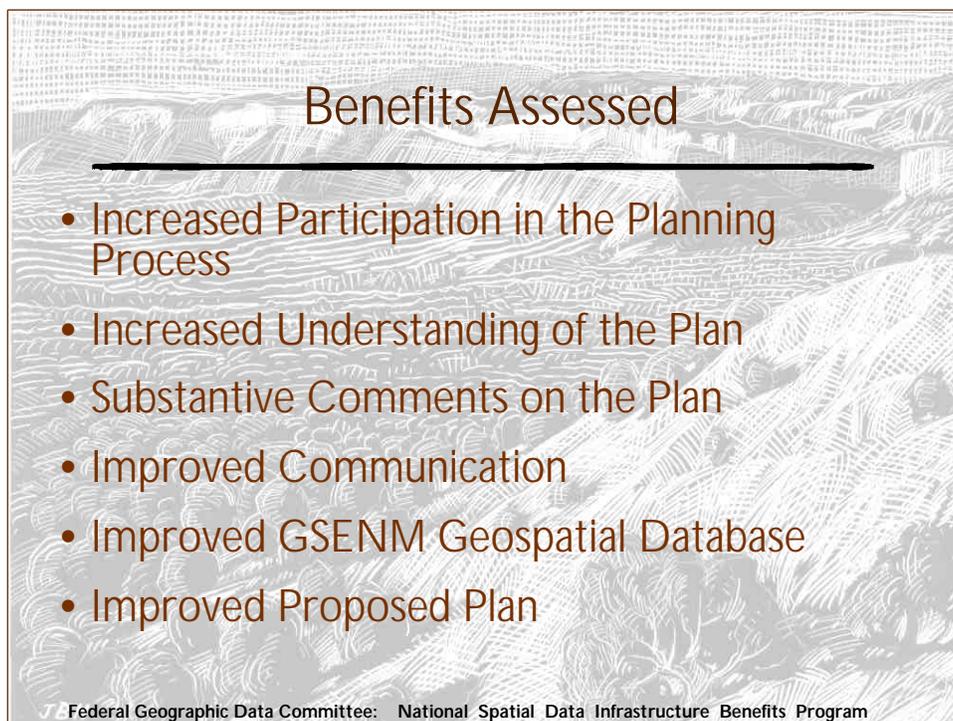
## Perform Qualitative Analysis

- Summarize Interview Data
- Identify Data Trends
- Verify Data with Interviewees
- Compare Comments with Proposed Plan

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

The next step was to perform a qualitative analysis on the interview data. To accomplish this, each of the interviews was summarized and then reviewed to identify data trends. For example, the majority of interviewees responded that using the geospatial data allowed them to increase their level of participation in the planning process.

To assure the accuracy of the data, some of the interviewees were contacted to verify information and quotes they had provided. In addition, comments submitted by interviewees on the Draft Plan and also on the Proposed Plan were compared to determine the impact on the resultant planning document, if any, these comments had. Last, planning team members were interviewed to further identify where comments submitted by data users resulted in changes between the Draft and Proposed versions of the Plan.



## Benefits Assessed

- Increased Participation in the Planning Process
- Increased Understanding of the Plan
- Substantive Comments on the Plan
- Improved Communication
- Improved GSENM Geospatial Database
- Improved Proposed Plan

Federal Geographic Data Committee: National Spatial Data Infrastructure Benefits Program

Based on the qualitative analysis performed, six categories of benefits were identified. They include the following: (1) increased participation in the planning process, (2) increased understanding of the plan, (3) substantive comments, (4) improved communication, (5) improved GSENM geospatial database, and (6) an improved Proposed Plan.

Though these benefits stand alone, they're also supportive of each other. For example, the first benefit of "increased participation in the planning process" builds a foundation on which the next benefit of "increased understanding of the plan" is developed. This process continues until the benefits eventually culminate into an "improved Proposed Plan."

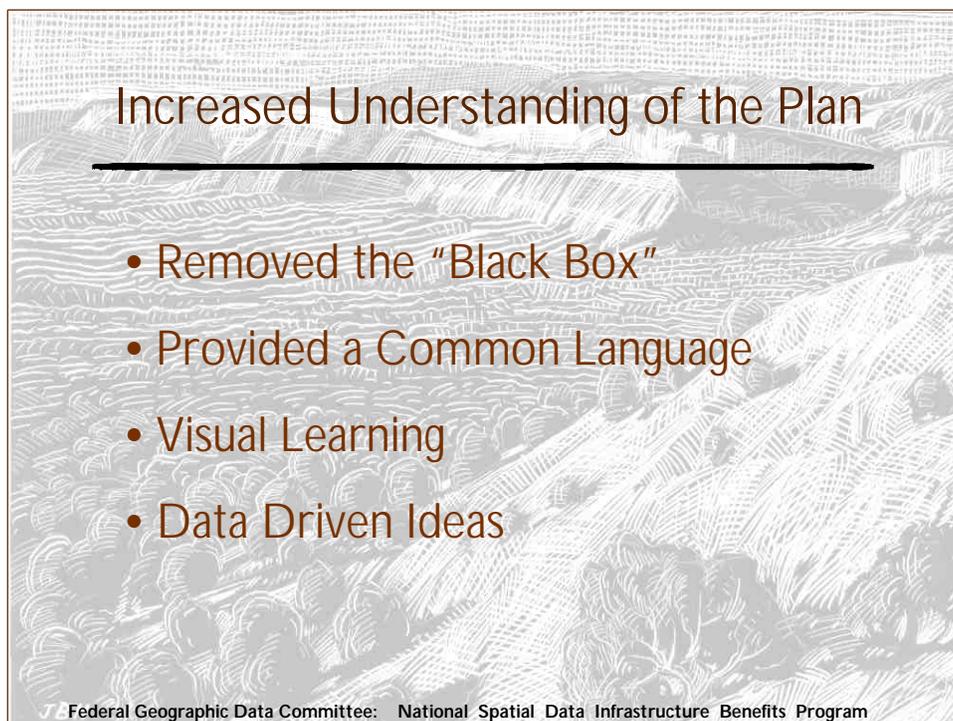


The data supports the finding that both paper GIS maps and digital GIS data increased participation in the planning process. Examples of this include the experiences of the State Community and Economic Development Strategy Committee (CED), local government officials at public meetings, and individuals affected by the Plan.

CED, consisting of representatives from state and local government, was formed by the Governor to bring state expertise to the local level during the planning process. To this end, CED worked to develop formal comments on the Draft Plan for the Governor's signature. Brad Barber, State Planning Coordinator, noted that maps were used extensively by the committee to focus and facilitate their discussions. Another CED member estimated that 80% of the groups discussions centered around maps.

Jim Matson, Kane County Planning Coordinator, noted that using GIS paper maps actually increased the amount of time it took to formulate comments. The maps facilitated the participation of a large number of county residents in the planning process and therefore increased the amount of time it took to formulate a set of unified comments.

Several individuals, including ranchers and private land owners, used maps from the Draft Plan to identify specific roads they needed to remain open in order to access facilities (watering tanks) or land holdings in the Monument.



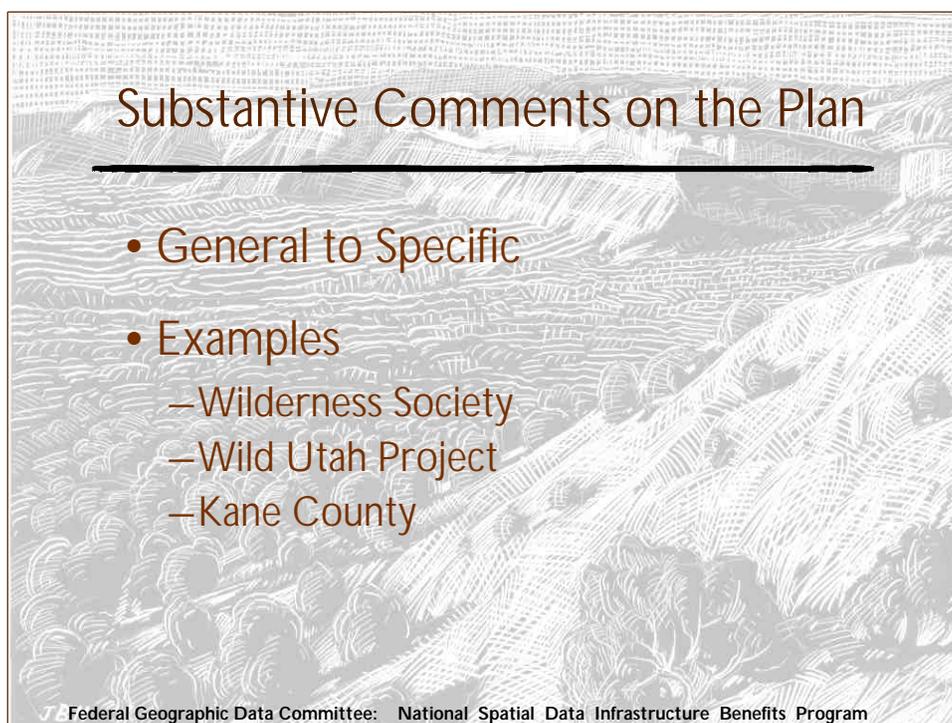
The data supports the finding that both paper GIS maps and digital GIS data increased individual’s understanding of the plan. This increased understanding of the plan was accomplished in four separate ways.

First, it was accomplished by removing the “Black Box” from the planning process. Both paper GIS maps and digital GIS data allowed individuals to get a clear picture of the process that led up to the policy decisions. Though individuals may not have agreed with the decisions made, they could at least develop an understanding of the rationale used.

Second, Brad Barber, State Planning Coordinator, noted that GIS maps improved the planning process by providing stakeholders with a common language. Furthermore, he noted that GIS allowed individuals to discuss the issues rather than dispute the location of features.

Third, all of the interviewees supported the notion that it’s always easier and quicker to understand an issue when you can visualize it, rather than having to read two chapters. Individuals commented that GIS maps were very helpful in efficiently and effectively developing an understanding of the various management zones and transportation alternatives.

Fourth, users of digital GIS data noted their initial ideas about the Draft Plan were clarified by using the digital GIS data and performing analysis resulted in a heightened perspective about the implications of the various alternatives.



The data supports the finding that both paper GIS maps and digital GIS data produced substantive comments. Interviewees noted that by using both paper GIS maps and digital GIS maps they were able to develop general ideas into specific comments.

Three examples of substantive comments submitted during the public comment period include the following: (1) The Wilderness Society commented that a road system should be designed within the Monument that creates and protects remote, roadless areas. To illustrate how this was not being achieved under the Draft Plan's transportation alternatives they performed analyses to determine the percent of the Monument that would be within a mile of a road under each transportation alternative. (2) The Utah Wilderness Coalition's, Wild Utah Project identified conflicts between the Draft Plan's preferred transportation alternative and their proposed wilderness areas. (3) Kane County overlaid Monument management zones with 1:24,000 topographic maps using GIS, to support their comment that the management zone boundaries didn't conform to natural land features, i.e. top of cliff, drainage area, etc.

## Substantive Comments on the Plan

- Geospatial Data Made the Comments
  - "...1000 times better..."
  - "...much more persuasive..."
- "...could only respond to specific comments..."
- "... the red line I have drawn in shows an existing road..."

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This slide lists quotes from some interviewees that further support the finding that both paper GIS maps and digital GIS data produced substantive comments. James Catlin of the Wild Utah Project noted that the digital GIS data made their comments "1000 times better" and "much more persuasive."

Planning team members noted that most of the good comments they received were based on maps. Approximately 600 map driven comments were submitted. Planning team members said "They could only respond to specific comments and not to general ones like the whole area should be open to all terrain vehicle (ATV) use or preserved as wilderness". They also noted that the majority of changes made to the Draft Plan were from map driven public comments.

Last, Roger Pugh, a local rancher, submitted a map with his comments saying, "the red line I have drawn in shows an existing road with access to Highway 89; without this road we would be denied access to three watering tanks that need constant supervision."



The data supports the finding that both paper GIS maps and digital GIS data helped improve communication. The Wilderness Society noted that “there has been an evolution in the last five years amongst environmental groups in their use of GIS data.” GIS was used extensively during the planning process to facilitate communication among environment groups. Several groups including The Wilderness Society, Southern Utah Wilderness Alliance, Sierra Club, Utah Wilderness Coalition, and others used GIS products to facilitate discussions and develop unified comments. Improved communication among these groups also led to less redundancy and more accurate data layers.

Several interviewees commented that GIS maps allowed them to trust the planning process more. Garfield County Planning Consultant, Robert Hugie noted that local communities have a strong bias or distrust of the Federal Government. As a result, they often won’t listen to verbal explanations provided by the BLM, however they will respect to content of maps.

Interviewees noted that digital GIS data and paper GIS maps helped them understand the process that led up to decisions presented in the Draft Plan. This benefit relates to the idea of removing the “Black Box.” One interviewee commented that “maps made the plan more clear to me, but didn’t make what the BLM was doing any better.”



## Improved Communication

- Within Stakeholder Groups
- Bridging the Trust Gap
- Understanding the Process
- No Second Guessing
- Interagency Cooperation

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Interviewees noted that both paper GIS maps and digital GIS data allowed them to know exactly what the planning team was proposing, thus avoiding having to second guess and interpret text descriptions of proposed actions.

Paper GIS maps allowed the planning team to better communicate with other surrounding Federal Land Management Agencies. For example, by reviewing the preferred transportation alternative in the Draft Plan, the National Park Service identified roads crossing over from the Monument to their jurisdiction that had conflicting use policies concerning ATV's.

## Improved GSENM Geospatial Database

- Transportation Coverage
  - Identifying Duplicate Arcs
  - Correcting Total Road Miles
  - Adding and Removing Roads

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The data supports the finding that both paper GIS maps and digital GIS data helped improve the GSENM geospatial database. Performing GIS analyses on the BLM's preferred transportation alternative coverage, The Wilderness Society determined that duplicate arcs existed. The BLM had not cleaned this coverage due to concerns over coordinate drift.

The Wilderness Society also found that total road mileage for the preferred transportation alternative had been undercounted; 1,134 miles not 1,047 miles as listed in the plan. This was determined to be the result of the road coverage containing null records. It should be noted that the planning team identified this error soon after publication of the Draft Plan, subsequently placing a corrected version of the coverage on the Monument Internet site.

The planning team also added and removed several roads from the Preferred Transportation Alternative coverage based on map driven comments submitted during the public comment period.

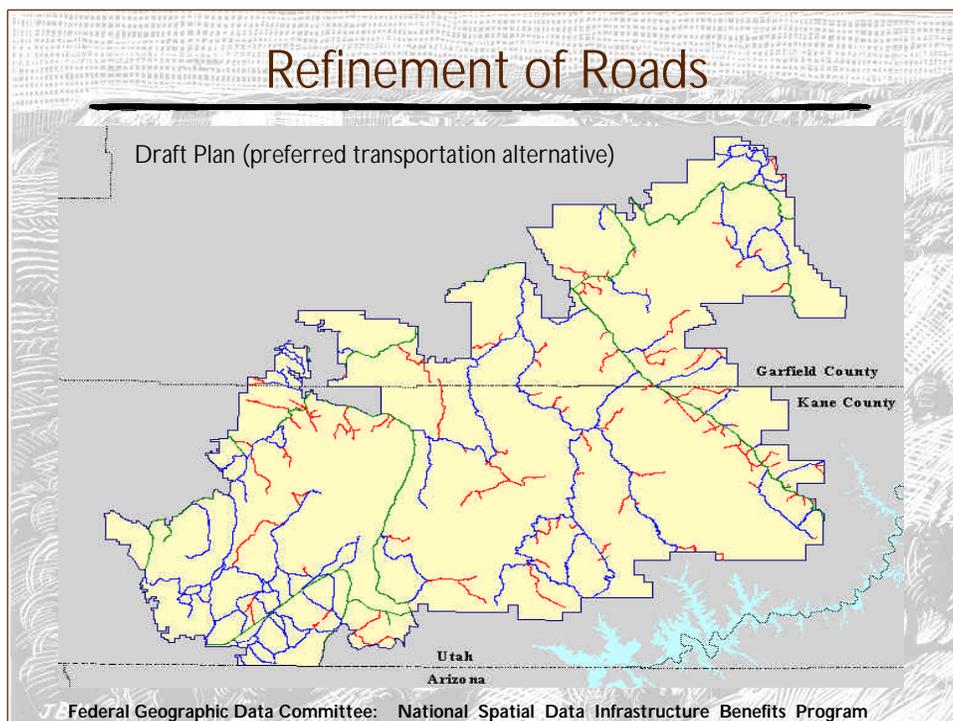
## Improved Proposed Plan

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- Refinement of Roads
  - Administrative Roads
  - Public Roads
- Changes to Monument Management Zones
- Changes to Monument Management Zone Boundaries

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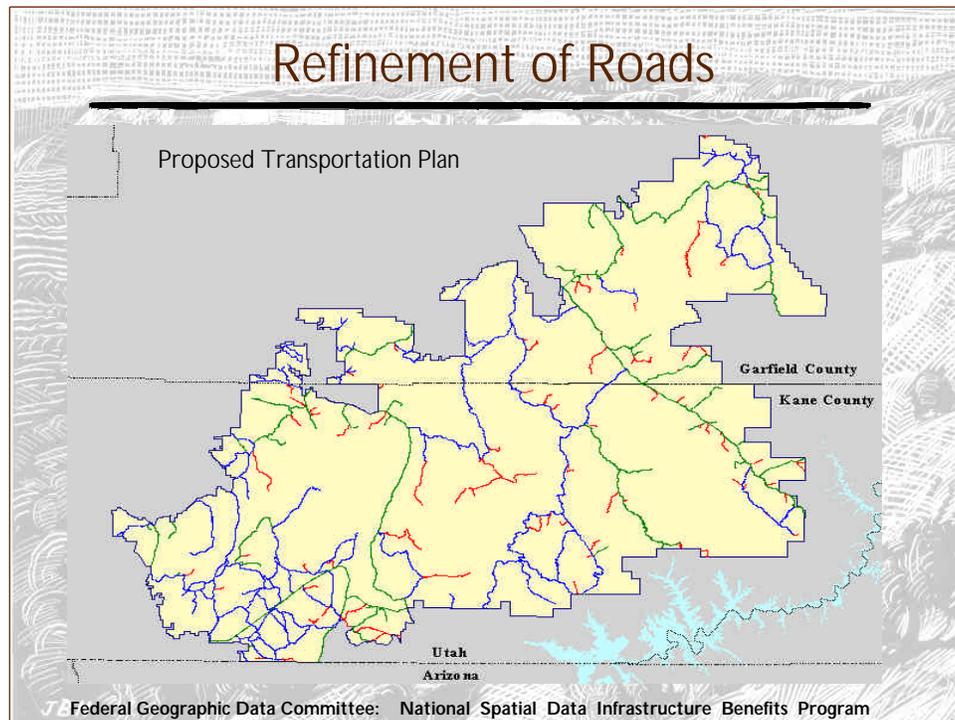
The culmination of all the benefits discussed to this point is an improved Proposed Plan. Some of these improvements include the refinement of roads and changes to the Monument management zones and boundaries.



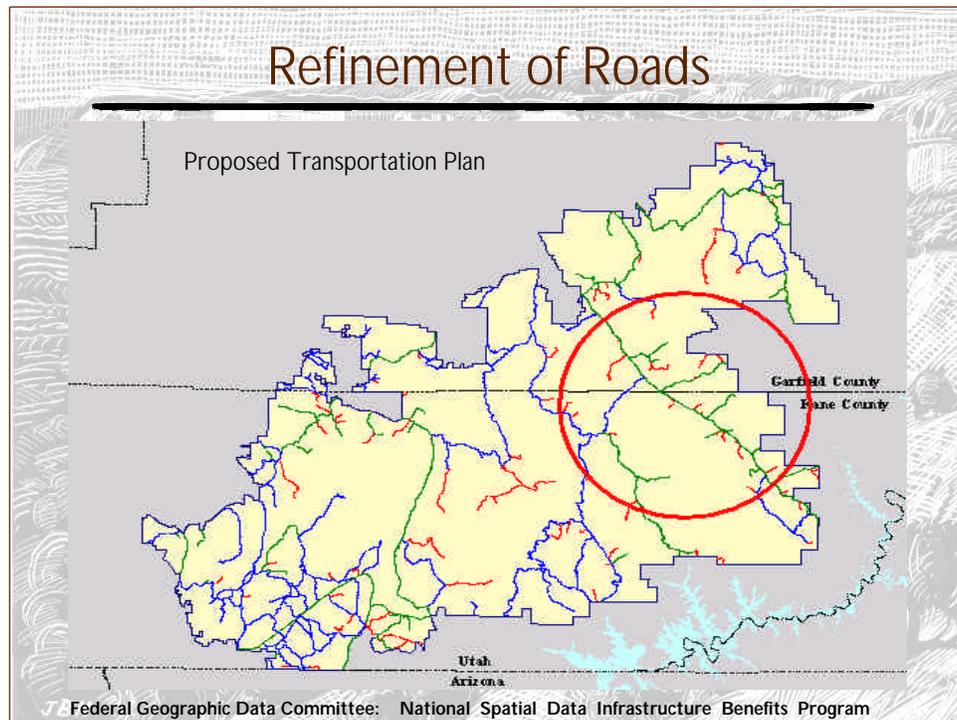
As represented in the Draft Preferred Transportation Alternative (illustrated above) there are three road classifications; administrative roads (red), open roads (green) and open/ATV roads (blue).

Administrative roads are open only to the BLM or permitted users. These roads usually go to some type of structure like a water storage tank or communication site that needs to be maintained. Open roads may be used by street legal vehicles only, and open/ATV roads are open to both street and non street legal vehicles, i.e. ATV's.

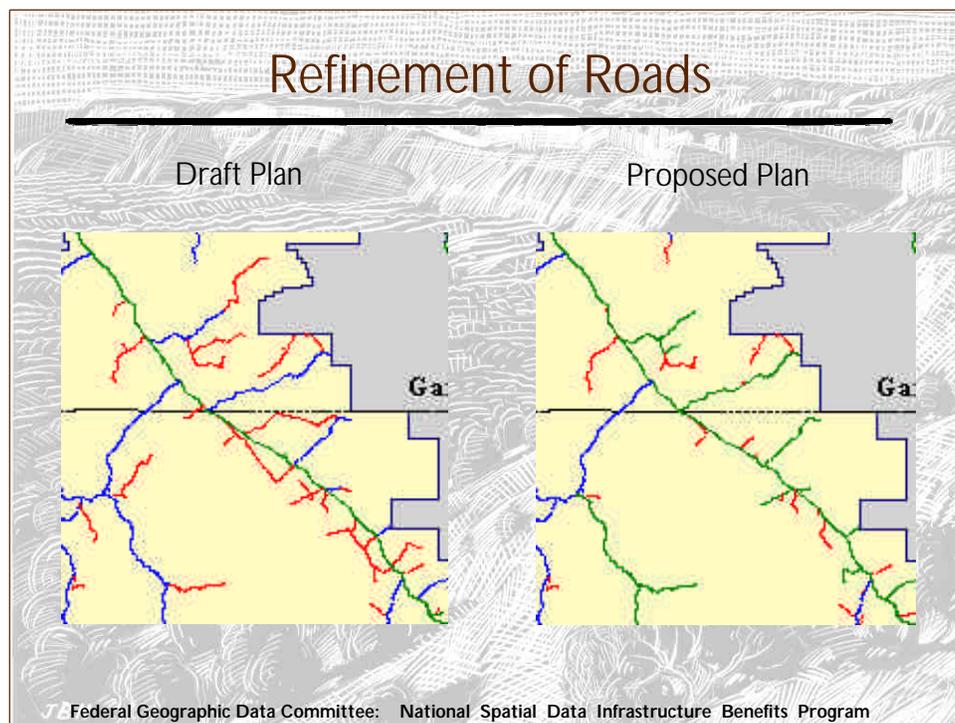
Based on map driven comments from a variety of sources, administrative roads in this alternative were reduced from 310 miles in the Draft Plan to 192 miles in the Proposed Plan. Individuals and organizations identified specific administrative roads that didn't lead to any structures and therefore didn't meet the criteria for being classified as such.



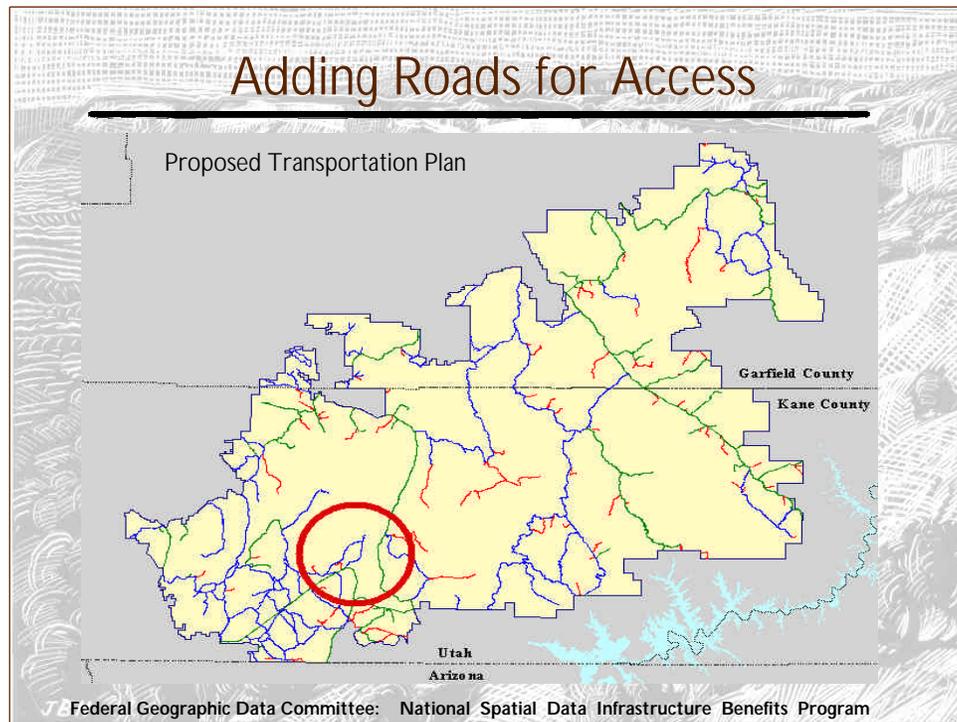
As noted above, a significant reduction in administrative roads can be seen when comparing the Proposed Transportation Plan with the Preferred Transportation Alternative depicted in the Draft Plan and shown on the previous slide.



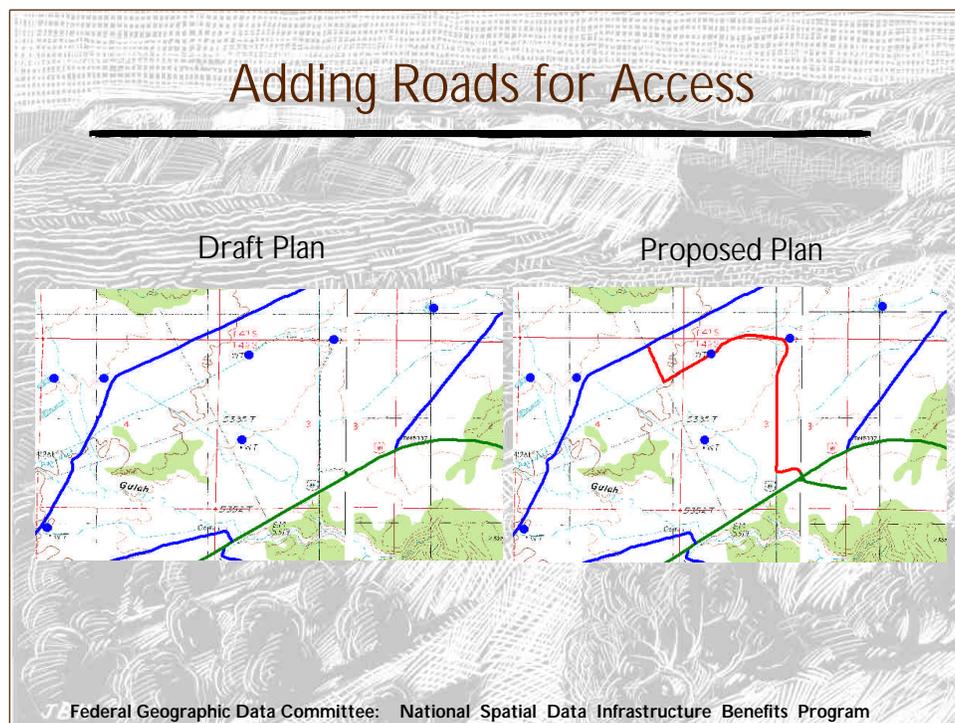
To provide a more detailed illustration of the impact map driven comments had in refining administrative roads between the Draft and Proposed Plans, the next slides will focus on the circled area as illustrated above.



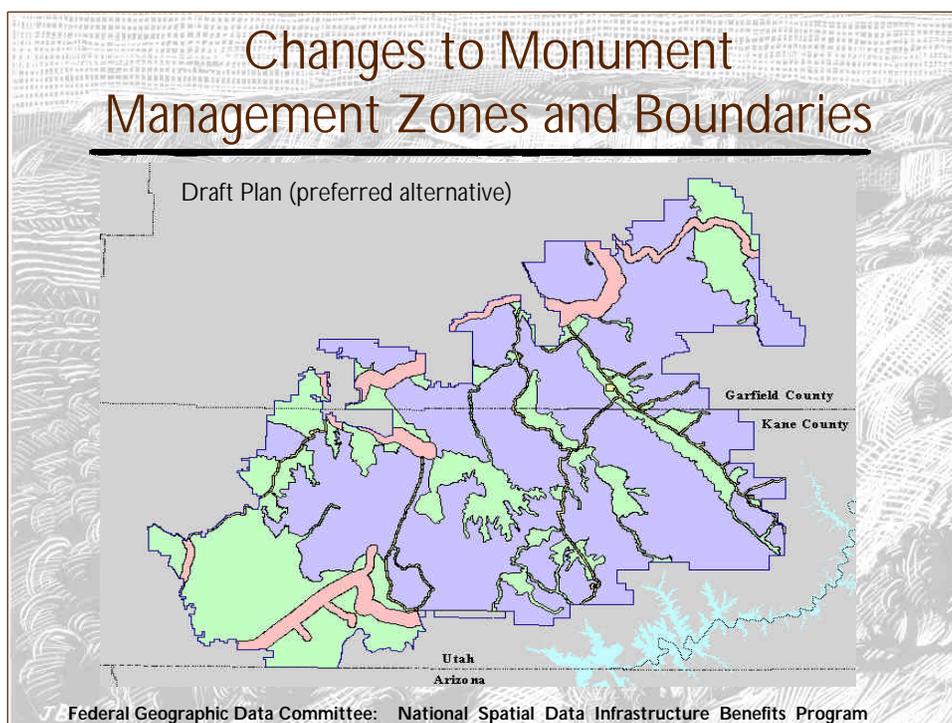
This slide illustrates a significant reduction in administrative roads between the Draft and Proposed Plans. It also illustrates some changes to road classifications between the two plans, i.e. open/ATV (blue) to open and closed to ATVs (green).



Another change made to the Proposed Plan based on map driven comments was adding roads for access. This can be illustrated by focusing on the circled area shown above.



Using paper GIS maps a cattle rancher commented that a road he uses to access and maintain three watering tanks which are essential to his ranching operations (watering tanks are illustrated as blue dots) was excluded from the Draft Plan. As a result, the planning team added this administrative road to the Proposed Transportation Plan.



Two other improvements made to the Proposed Plan, as a result of map driven comments, were changes to Monument management zones and boundaries. In brief, management zones are tools that guide decision making on permitting visitor uses and other activities within the Monument. Illustrated above is the Preferred Management Zone Alternative from the Draft Plan. Four management zones are illustrated. They include a front country zone (red), passage zone (yellow), outback zone (green), and primitive (purple).

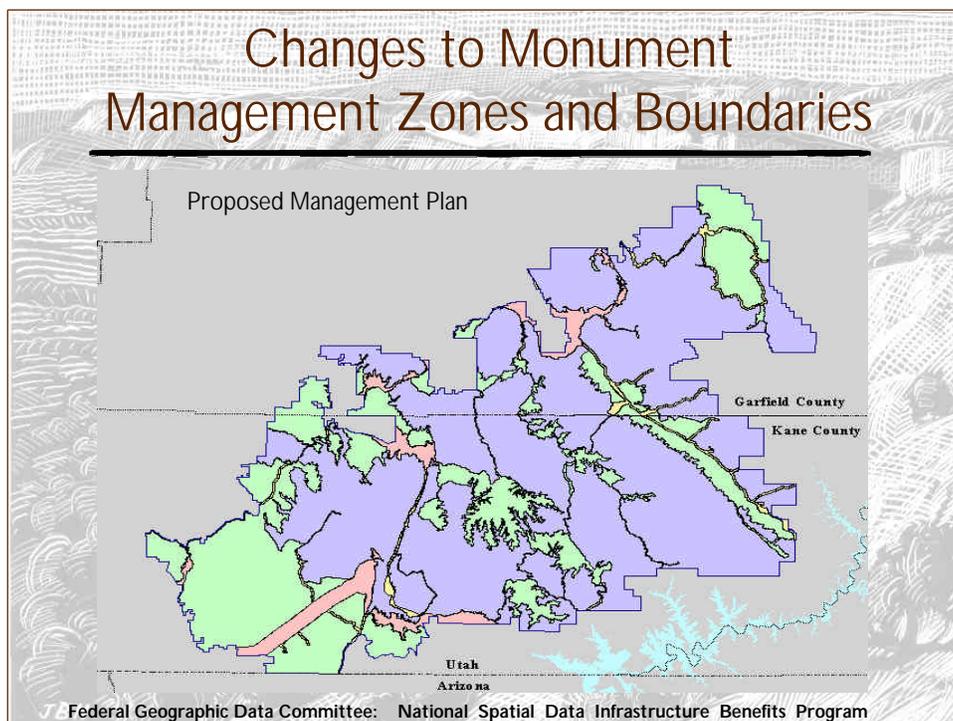
These management zones are defined as follows:

**front country** - focal point for visitation by providing day use opportunities,

**passage** - includes secondary travel routes which receive considerable use,

**outback** - provides an undeveloped, primitive and self directed visitor experience while accommodating motorized and mechanized access,

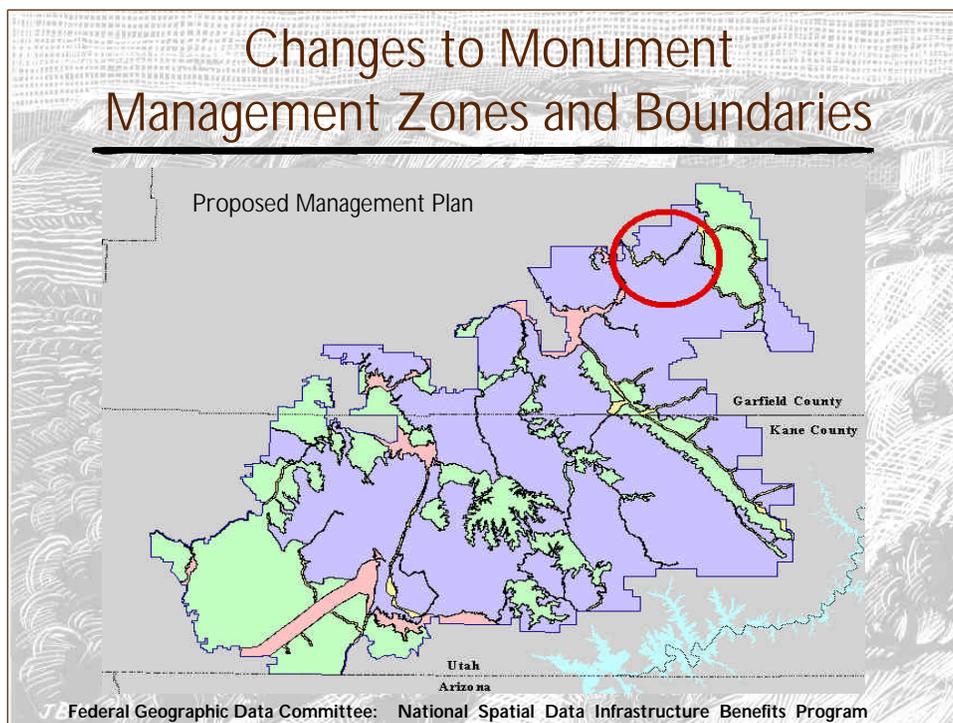
**primitive** - provides an undeveloped, primitive experience without motorized or mechanized means.



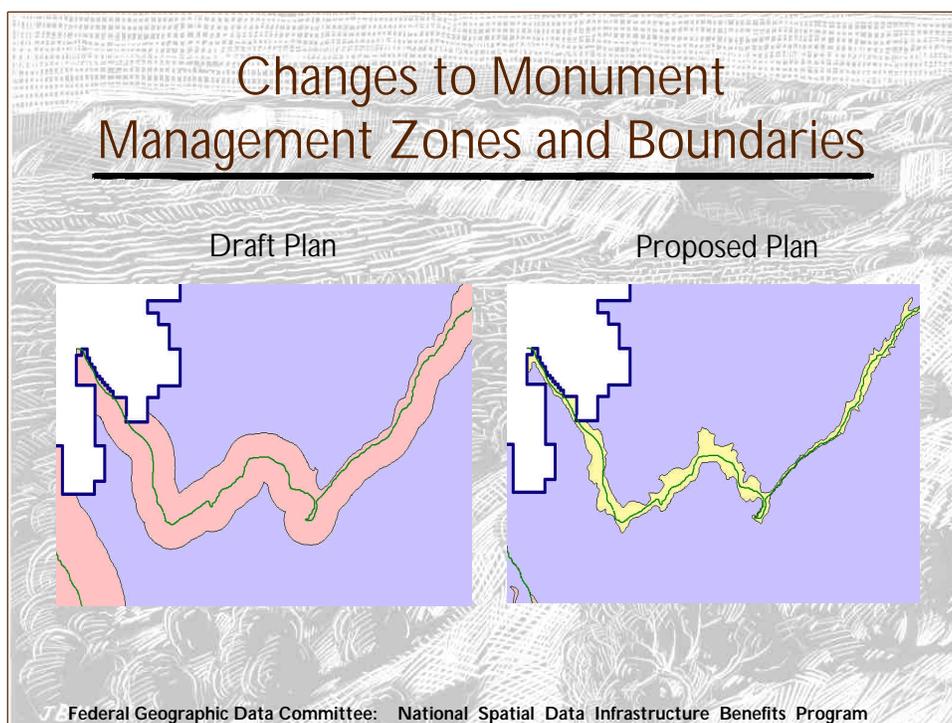
This slide illustrates management zones in the Proposed Plan. If compared to the Preferred Management Zone Alternative in the Draft Plan, notable differences can be seen in both the management zones and their boundaries.

Several map driven comments highlighted the fact that the management boundaries seemed to be arbitrarily defined and didn't follow natural features such as ridge lines or drainages. To address this comment, the planning team printed out 1:24000 topographical maps for the entire Monument. These maps included several GIS coverages including locations of rare and endangered plants and animals, wilderness study areas, and archaeological and cultural sites. Using these data, along with the natural features of the land represented on the 1:24000 topographical maps the boundaries were redrawn and refined.

It should be noted that when these management zones were developed for the Draft Plan, several of these GIS coverages were used, i.e. locations of rare and endangered plants and animals and wilderness study areas. However, the planning team didn't document this methodology in the Draft Plan.



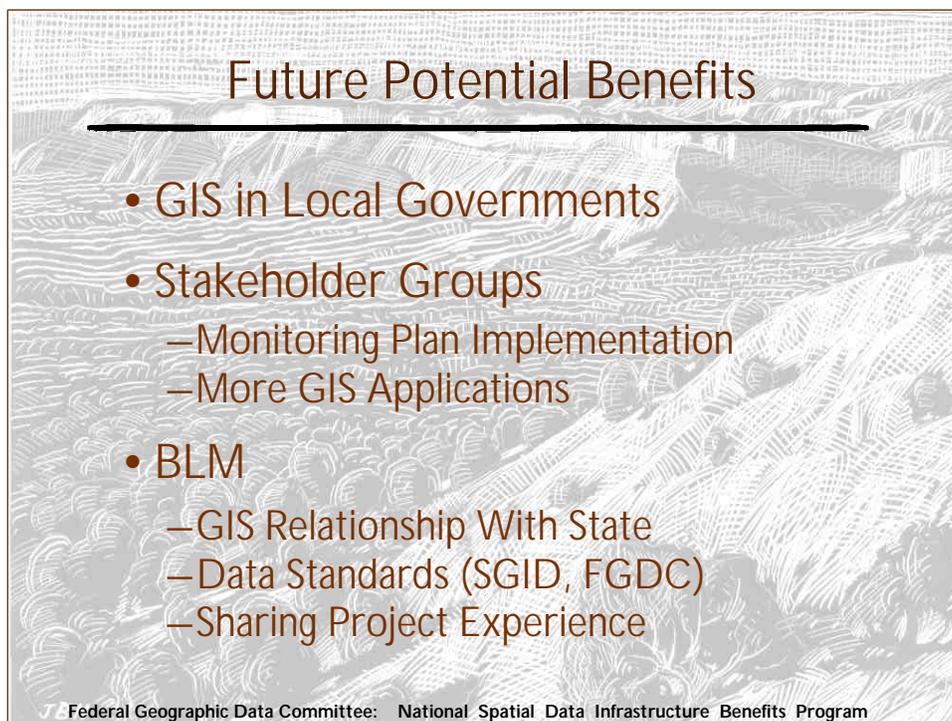
One specific map driven comment that resulted in both a change to the management zone and boundary along the Burr Trail in the Monument (circled above in red), stated that the beauty and sensitivity of the area would be compromised if it was managed under front country.



As illustrated above, the area along the Burr Trail was placed in the front country management zone in the Draft Plan. In addition, a portion of the management zone boundary didn't follow the area's natural feature (bottom of cliff). Instead, a standard buffer distance was established from the road. In the Proposed Plan the management zone along the Burr Trail was changed to passage. Furthermore, the management zone boundary was revised to follow natural feature (bottom of cliff).

Changing both the management zone and boundary addressed the comment that the beauty and sensitivity of the area would be compromised if it was managed under front country. As noted before, front country is characterized as a focal point for visitation, providing trails and interpretive sites, while passage is a secondary visitor area offering fewer facilities and less resource impact.

This revision prompted the planning team to change the defining criteria of the passage zone, from allowing unrestricted camping to requiring the use of designated camping sites. As a result of this change, the planning team reclassified an area along the Smokey Mountain Road from passage to outback since they thought it was not appropriate to restrict camping to designated sites along this remote and rugged road. Outback was felt to be more appropriate since it provides for unrestricted camping and doesn't allow any infrastructure (signs, interpretive sites etc.).



Both Kane and Garfield Counties used GIS in a limited fashion during the planning process. Though they developed some maps in house, i.e., roads and management zones, they primarily relied on the planning team for GIS products. On the other hand, both counties appear headed towards the use of GIS for operational purposes. The road engineers in both counties appear intrigued with the use of GPS to map roads and digital photography for documenting road conditions. Both were introduced to these ideas through work with the Monument. The Garfield County Recorder's office is leading an effort to create a parcel based land information system, but that effort is independent of the Monument planning process.

Stakeholder groups, especially the environmental community, noted that the GIS effort they put forth in developing their comments will serve as a building block for continued work in the area. Some of this work includes monitoring plan implementation and performing additional analyses, e.g. The Wilderness Society is planning to use GIS to identify wildlife habitat corridors in the Monument, while the Utah Wilderness Coalition is planning to use GIS to perform riparian and ecosystem assessments.

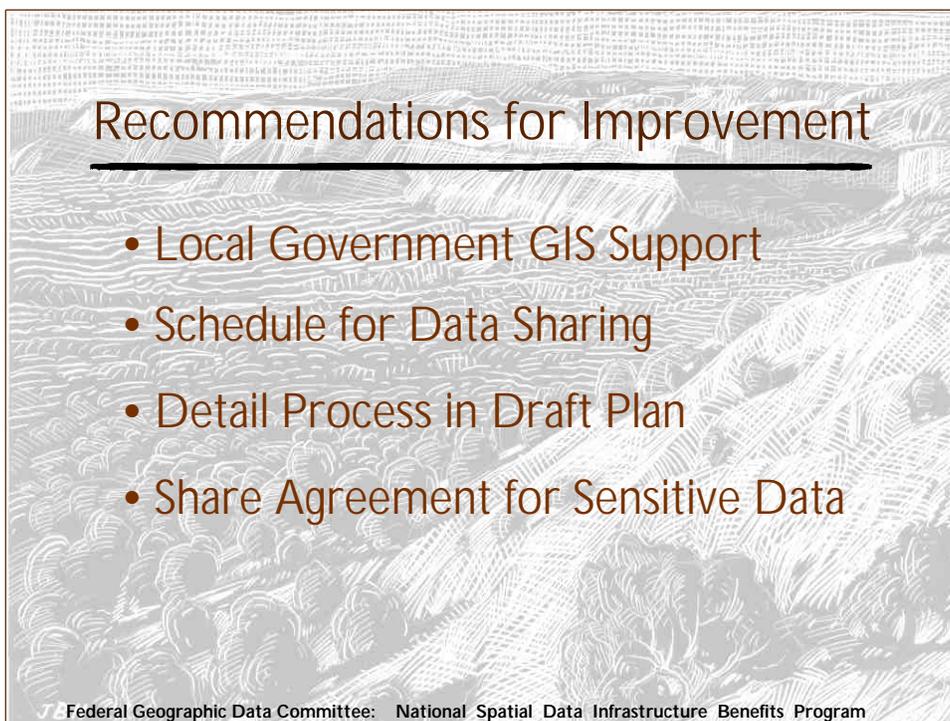
These future benefits or applications of GIS are not limited to the environmental community. Local governments and other interest groups will have the same opportunity to accrue these benefits as their use and knowledge of GIS progresses.

## Future Potential Benefits

- GIS in Local Governments
- Environmental Community
  - Monitoring Plan Implementation
  - More GIS Applications
- BLM
  - GIS Relationship With State
  - Data Standards (SGID, FGDC)
  - Sharing Project Experience

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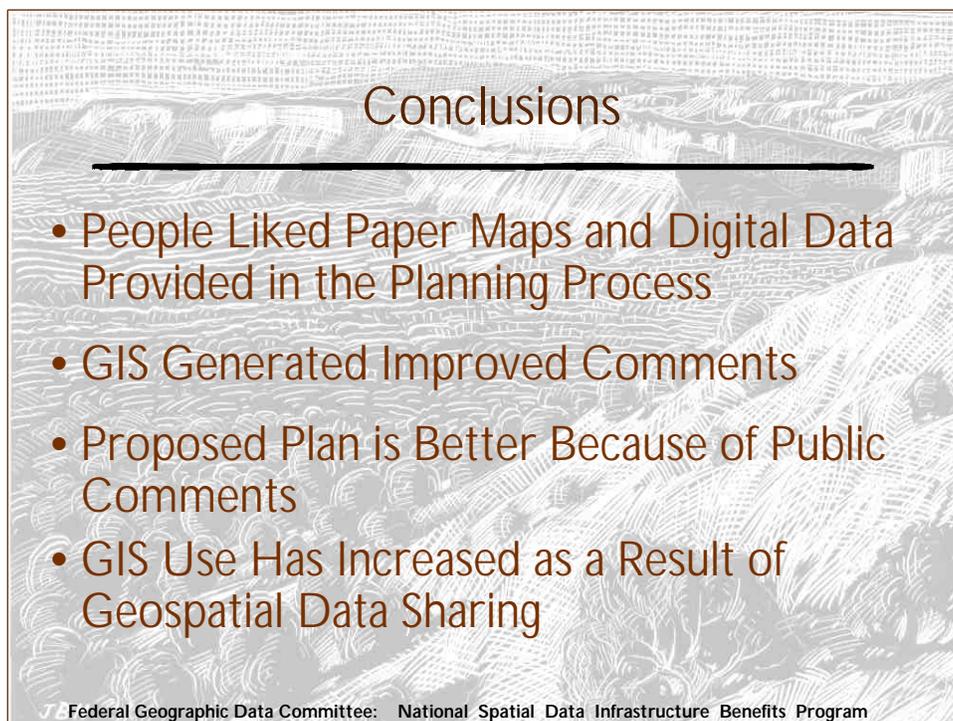
Future benefits to the BLM include an long-term GIS relationship with the State of Utah. This relationship will facilitate more data sharing, less redundancy in data development and overall increased efficiency in the use of geospatial data. In addition, the BLM will continue building a geospatial database that will comply with the SGID data standards for framework data layers, i.e., cadastral and transportation, and will furnish metadata that meets FGDC standards. Last, the Monument planning team will be able share their experiences with other BLM offices throughout the state and U.S. and also assist others in adopting FGDC data standards.



Though the authors of this portion of the report definitely support the BLM's GIS-based open planning process for the Monument, they offer a few recommendations on how to improve the process. First, both Kane and Garfield Counties were not ready to use the GIS resources that were provided by the BLM. Additional training and some hands-on support may have provided them more opportunity. Second, the planning team didn't provide data layers on their Internet site until April of 1998, following the scoping phase of the planning process, meanwhile they had to ftp data layers to stakeholder groups. It would have been better if a schedule could have been set and followed to reduce duplicate work in this data distribution effort.

Third, the Draft Plan was criticized for ignoring details of the landscape and not being scientific in its approach. Actually the Draft Plan was better than this, however the planning team chose to illustrate the plan with general maps and to lessen verbiage in an effort to reduce the size of the document. A better approach would have been to include those details so critics could bypass any surface flaws and deal with the substance of the plan.

Last, some groups wanted BLM to share sensitive data, such as the location of rare and endangered species, so the groups could use that data in their own analyses. When they were denied, the groups used the best data they could find, but BLM was forced to ignore findings based on that alternative data because it was not up-to-standard. This seems unreasonable and it is recommended that ways be found to share such data under non-disclosure agreements.



## Conclusions

- People Liked Paper Maps and Digital Data Provided in the Planning Process
- GIS Generated Improved Comments
- Proposed Plan is Better Because of Public Comments
- GIS Use Has Increased as a Result of Geospatial Data Sharing

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Conclusions drawn from this geospatial data sharing project include:

- people liked the paper maps and digital data provided in the planning process,
- GIS generated better or improved comments,
- the Proposed Plan is better because of these comments,
- GIS use has increased among stakeholder groups as a result of this data sharing effort.

## Grand Staircase-Escalante National Monument



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