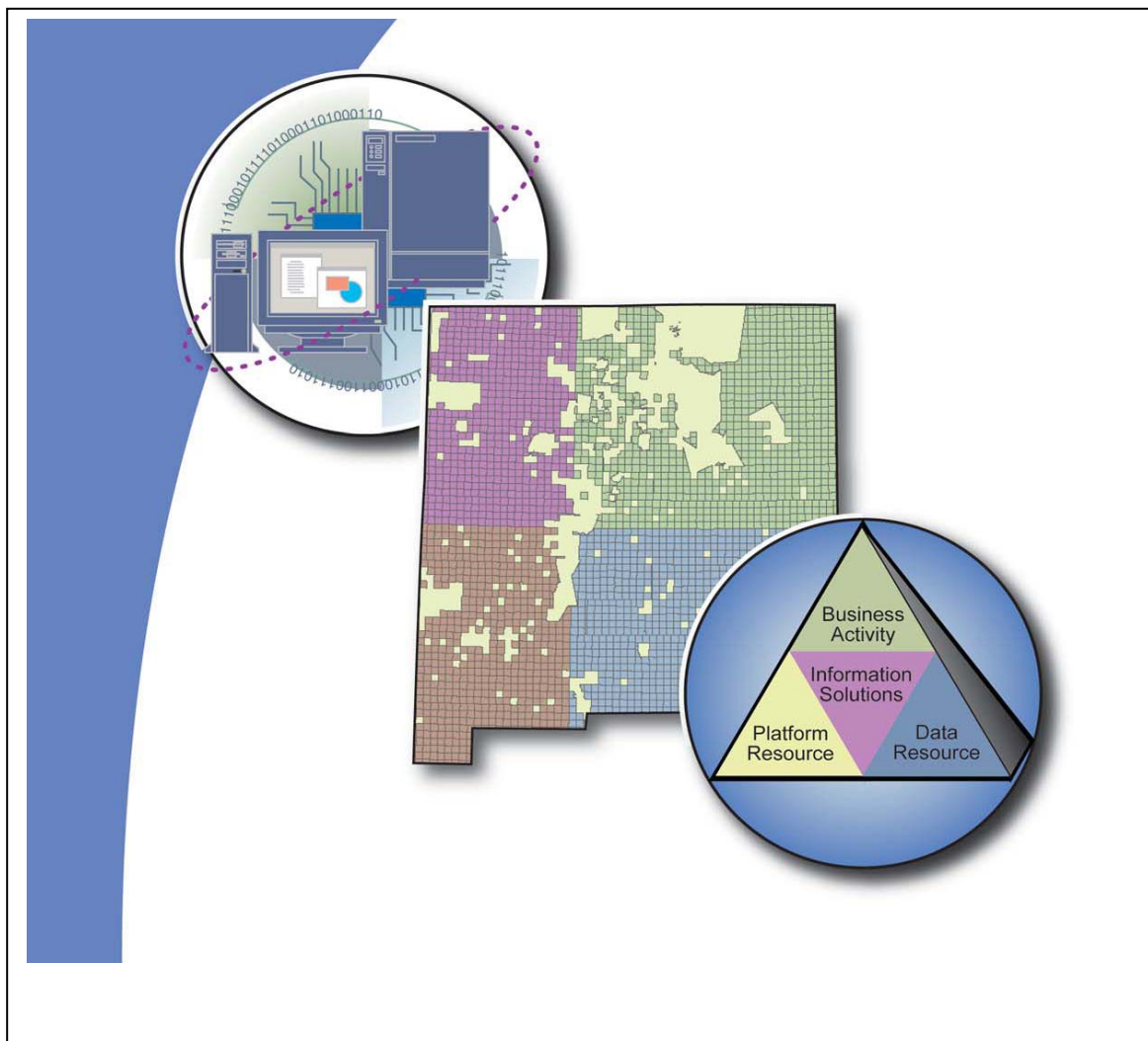


HOUSE JOINT MEMORIAL 81

Geospatial Information and Data Services

Findings and Recommendations
October 1, 2009





Message from Secretary Mackey

The New Mexico Department of Information Technology is pleased to present the Geospatial and Data Analysis Task Force Findings and Recommendations.

The scope of the study was inclusive of as many appropriate stakeholders who could potentially benefit from geospatial information and data analysis. Although the participation in the taskforce was voluntary, participation included over fifty individuals representing public and private interests. Task force participation included representatives from: BBER, DCA, DFA, DHSEM, DGR, DOH, DoIT, DOT, EDAC, EMNRD, HED, JISC/COQ, HPC, HSD, NMAC, NMDGF, NMED, NMGIC, NM Prof. Surveyors, ONGARD, OSE, PED, PSFA, RGIS, RLD, SLO, Santa Fe County SRCA, TRD, and UNM.



I want to congratulate the Task Force members on their hard work and diligence. Additionally I want to thank the many agencies and other organizations that recognize the value of our efforts and were willing to share their time and other resources to complete this endeavor. I would like to express my personal gratitude to Rick Koehler (EMNRD), Mike Inglis (EDAC), Larry Brotman (TRD), Bill Sprick (PSFA), and Gar Clark (OSE) who took on the onerous work of steering committee and work group leadership. Finally, I would like to thank my staff at the Department of Information Technology.

These findings and recommendations represent many hours of cooperative efforts, deliberations, and compromise. The task force recognizes that in these economic times, the recommendations may not be immediately possible to the fullest extent. The recommendations are therefore presented in order of both priority and minimal fiscal impact. To lessen the fiscal impact, the task force recommends implementing recommendations one and two in the next fiscal year, and further recommendations in subsequent fiscal years.

Sincerely,

Marlin Mackey
Cabinet Secretary & State Chief Information Officer
New Mexico Department of Technology

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EXECUTIVE SUMMARY

House Joint Memorial 81 Task Force

INTRODUCTION

House Joint Memorial 81 (HJM81), “*Geospatial Info Sharing Task Force*”, was sponsored by Representative Janice E. Arnold-Jones (R/Albuquerque) during the 2009 Regular Legislative Session (See Appendix A). HJM81 requested that the Secretary of the Department of Information Technology (DoIT), in cooperation with the Office of the Governor and the New Mexico Legislative Council, convene a task force to study geospatial information sharing, data analysis and policy issues; and then develop recommendations to be delivered no later than October 1st, 2009. The Task Force of over 50 individuals representing public and private interests convened in May. An evaluation between HJM81 and the New Mexico Geospatial Strategic Plan (See Appendix B) provided a strong framework to form four Working Groups that resulted in the following four major recommendations.

RECOMMENDATION #1

Establish a New Mexico State Geospatial Information Officer at DoIT.

RECOMMENDATION #2

Establish the New Mexico Geospatial Data Center as the primary node of a decentralized system of distributed data stewards using the existing data repository located at the University of New Mexico.

RECOMMENDATION #3

Establish and fund Geospatial Services that provide support services for geospatial data visualization, development, integration, and analysis.

RECOMMENDATION #4

Establish the New Mexico Geospatial Policy Council to provide policy for statewide geospatial data and services in support of statewide data acquisition, development, and sharing.

Task force participation included representatives from: BBER, DCA, DFA, DHSEM, DGR, DOH, DoIT, DOT, EDAC, EMNRD, HED, JISC/COQ, HPC, HSD, NMAC, NMDGF, NMED, NMGIC, NM Prof. Surveyors, ONGARD, OSE, PED, PSFA, RGIS, RLD, SLO, Santa Fe County SRCA, TRD, UNM.

RECOMMENDATIONS

House Joint Memorial 81 Task Force

RECOMMENDATION #1

Establish a Geospatial Information Officer for the State of New Mexico at the Department of Information Technology (DoIT), as recommended by the State of New Mexico Geospatial Strategic Plan.

The Geospatial Information Officer will:

- Be a permanently-funded position reporting to the Secretary of DoIT to coordinate GIS efforts which will eliminate duplication, save taxpayer dollars, and provide consistency;
- Pursue grants and funding opportunities available through the federal government
- Negotiate geospatial data sharing agreements and software licensing agreements;
- Serve as the point-of-contact for all State of New Mexico geospatial activities that includes local, state, tribal, federal, non government organizations, and private interests.
- Chair the State of New Mexico Geospatial Advisory Committee (GAC)

RECOMMENDATION #2

Establish the New Mexico Geospatial Data Center as the primary node of a decentralized system of distributed data stewards using the existing data repository located at the University of New Mexico.

The Geospatial Data Center will:

- Be legislatively recognized as the primary geospatial data repository for the State of New Mexico
- Use the existing and long established Resource Geographic Information System (RGIS) located at the University of New Mexico Earth Data Analysis Center (EDAC).
- Maintain a publicly accessible catalogue of geospatial data
- Maintain a publicly accessible catalogue of geospatial data and provide map data in common formats that may include stored, archived, and distributed data.
- Establish agreement mechanisms between the NM Geospatial Data Center and the State Geospatial Information Officer:
 - To assess data dissemination and visualization needs and priorities for the NM RGIS Program (NM Geospatial Data Center); and
 - To assess and coordinate data needs for geospatial analysis and visualization, such as map generation; and
 - To promote the understanding and use of NM RGIS data, metadata, maps, and mapping tools; and
 - To create FGDC-Compliant Metadata

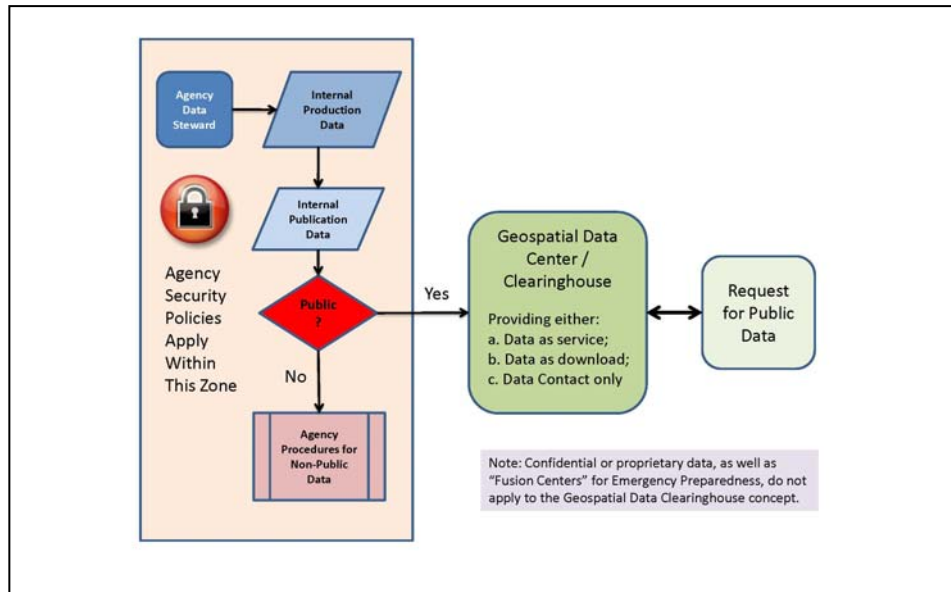


Diagram: Conceptual Geospatial Data Center and Security Issues

RECOMMENDATION #3

Establish and fund Geospatial Services that provide support services for geospatial data visualization, development, integration, and analysis.

Geospatial Services will:

- Be guided by the NM Geospatial Policy Council under advisement from the existing Geospatial Advisory Committee (GAC) in:
 - Defining the scope of operations and resource requirements for any Geospatial Services; and
 - Identifying major and/or long-term projects that demonstrate measurable benefits derived from investment in geospatial initiatives with a Special Projects Program;
- Provide the expertise and technology to develop information products that support client business needs.
- Establish a Geospatial Services Help Desk for GT/GIS consultation, guidance, and referral; and for short-term geospatial Services and support.
- Encourage and support authoritative entities to develop and maintain Framework data layers required for effective statewide geospatial analysis.

RECOMMENDATION #4

Create the New Mexico Geospatial Policy Council (NMGPC) to establish policy for statewide geospatial data and services in support of statewide data acquisition, development, and sharing.

The NM Geospatial Policy Council will:

- Be created and chaired by the DoIT Cabinet Secretary and will include public and private representation.

- Make policy decisions on funding and prioritization of major and/or long-term geospatial projects (conducted by the Geospatial Services, and elsewhere), via recommendations provided by the State GIO and GAC;
- Establish permanent funding to support production, updates to, and maintenance of New Mexico geospatial data;
- Assure that geospatial data and technologies are used statewide in a transparent manner to promote open, honest, and fair decision making;
- Provide high-level guidance to the State GIO and Geospatial Services;
- Enable coordination of data sharing between state executive and legislative departments, agencies, offices and local and tribal governments, through a digital catalog of current data and data products that result from statutory requirements.

INTRODUCTION
House Joint Memorial 81 Task Force
New Mexico State Geospatial Information Officer, Geospatial Data Center,
Geospatial Services, and Geospatial Policy Council

In cooperation with the Office of the Governor and the Legislative Council, the Department of Information Technology (DoIT) convened the Geospatial Information Systems and Data Analysis Task Force during the summer of 2009.

The task force was asked to provide recommendations to the Governor and the Legislature by October 1, 2009 on issues surrounding geospatial development, organization, structure, coordination, data analysis, and public requirements.

The task force kick off meeting was May 20, 2009. The outcome of the first meeting included an overview of GIS in New Mexico, and formation of "Work Groups" that align with the recommendations requested in HJM81. These Work Groups worked somewhat independently through June and July. Work Group focus areas included the following statewide geospatial issues: Coordination and Communication, Policy, Data Analysis Services and Data Center Services.

In September the preliminary findings of the task force were presented to the memorial's sponsor, the Legislative Science, Technology, and Telecommunications Committee (STTC), and the Information Technology Commission (ITC). The efforts of the task force were well received and confirmed that the task force efforts were aligned with the legislative intent and executive direction. The DoIT Secretary, the Bill's sponsor Representative Arnold-Jones, the STTC, and ITC support the task force approach and preliminary findings.

The scope of the study was inclusive of as many appropriate stakeholders who could potentially benefit from geospatial information and data analysis. Although the participation in the taskforce was voluntary, participation included over fifty individuals representing public and private interests.

These findings and recommendations represent many hours of cooperative efforts, deliberations, and compromise. The task force recognizes that in these economic times, the recommendations may not be immediately possible to the fullest extent. The recommendations are therefore presented in order of both priority and minimal fiscal impact. To lessen the fiscal impact, the task force recommends implementing recommendations one and two in the next fiscal year, and further recommendations in subsequent fiscal years.

FINDINGS AND RECOMMENDATIONS

House Joint Memorial 81 Task Force

1. ESTABLISH A NEW MEXICO STATE GEOSPATIAL INFORMATION OFFICER

BACKGROUND

New Mexico has no central geospatial coordinative authority, and thus cannot benefit from the reduction in costs and duplicative efforts, or gains in economies of scale and efficiency that enterprise-level coordination provides. New Mexico lacks the integration of geospatial activities, which affects not just state agencies, yet all levels of government, and our citizens.

- The existence of a State Geospatial Information Officer (GIO) or State GIS Coordinator is foremost among the National States Geographic Information Council's (NSGIC) criteria for assessing a state's geospatial fitness;
- Future availability of federal funds for geospatially-related initiatives will be dependent upon a state having an officially-recognized GIO;
- Geospatial initiatives have far-reaching effects in the daily lives of citizens, as delineated by House Joint Memorial 81;
- New Mexico has no State GIO; there is no single point-of-contact nor is there any one authority to act on behalf of the state for geospatial-related issues;
- The repercussions of having no State GIO extend to policy issues, coordination gaps, limited data sharing, and redundant or disjointed data acquisition efforts, unnecessary cross-jurisdictional barriers, and decreased economic development opportunities;
- Many states (at least 34) have a position of "State GIS Coordinator" or "State Geospatial Information Officer" (GIO); most of those that do not are actively working towards creating the position;

ISSUE

The State of New Mexico needs a Geospatial Information Officer (GIO) to fulfill a coordination, governance, policy, planning, and assessment role regarding statewide Geospatial Information Technology efforts, as noted in the New Mexico Geospatial Strategic Plan.

RECOMMENDATION #1A

Establish a Geospatial Information Officer for the State of New Mexico, as a legislatively-established permanent classified managerial-level position which reports to the DOIT Secretary, as recommended by the State of New Mexico Geospatial Strategic Plan. An important note is that the State Information Technology Secretary will utilize the GIO, to administer some duties as detailed in the Department of Information Technology Act (Section 9-27 NMSA 1978). Recommendations #1A-1J will support the DoIT Act.

RECOMMENDATION #1B

To jump-start the GIO initiative, the State GIO position may be initially funded through a two-year special one-time appropriation. The GIO should be an “office” with a GIO and additional initial staffing to be determined, such as GIS specialists or IT Business Analysts as needed, to effectively provide the services called for in HJM81.

ISSUE

New Mexico has no centralized geospatial coordinative or funding authority, no one to formally represent the State at the regional or national level, and no one to act on behalf of New Mexico in pursuing grant monies and federal funding for geospatial initiatives.

The current State of New Mexico Geospatial Advisory Committee (GAC) Chair, elected by voting members on a year-to-year basis, has no authority over any state agency’s geospatial activities, including acquisitions, purchases, data sharing, data accuracy or data integrity. Nor does GAC itself have this authority: there is no state enterprise-level authority. There are no formal review mechanisms for large geospatial projects specific to the Geospatial Technology (GT) domain.

A State GIO would serve as the point-of-contact for all State of New Mexico geospatial activities. This would include, yet not be limited to the NM Association of Counties, the NM Municipal League, the NM Professional Surveyors Association, and the National Geospatial Program Office at United States Geological Survey, including the USGS National Mapping Division Liaison assigned to New Mexico. The GIO would work with local, state, tribal, and federal agencies, the private sector, and NGOs, to build collaborative relationships & partnerships, and have specific authority over State GIS activities.

New Mexico’s participation in national and regional geospatial organizations (such as the National States Geographic Information Council - NSGIC) has no formal funding: the current NSGIC \$250 membership fee has been contributed by various state agencies, and in one case, as an out-of-pocket expense by the individual.

RECOMMENDATION #1C

The GIO should be the permanent Chair of the State of New Mexico Geospatial Advisory Committee, and the GIO (or a designee thereof) should serve as New Mexico’s representative to NSGIC, and the Western Governors Association Geographic Information Council (WGA GIC). Funding would be provided to allow participation in NSGIC, and other regional/national groups.

RECOMMENDATION #1D

The GIO should convene a working group in conjunction with GAC and NMGIC, and other key stake-holders, to develop suitable and appropriate geospatial standards for New Mexico to facilitate cross-jurisdictional data sharing. The standards would be appropriate to the situation (such as public versus confidential data). Such standards would cover metadata, interoperability, large

and small scale data standards, public availability, accuracy and data integrity issues. These standards would be submitted to the proposed Geospatial Policy Council (GPC) and the State Information Technology Secretary for formal approval. When appropriate, these standards may be promulgated into New Mexico Administrative Code per the DoIT Act.

RECOMMENDATION #1E

The State GIO, in conjunction with appropriate subject matter experts and the State Information Technology Secretary, should be empowered to negotiate geospatial software licensing agreements, and data sharing agreements, to the extent permissible within the constructs of the State Purchasing systems. The State GIO should administer geospatial software license pooling efforts and other centralization initiatives.

RECOMMENDATION #1F

The State GIO should work with the proposed New Mexico Geospatial Policy Committee (NMGPC), in conjunction with GAC, NMGIC, and the Geospatial Services providers, to create and implement plans to meet framework or base mapping (roads, streams, aerial imagery, boundaries, etc.) data needs. These plans should emphasize software and data interoperability, security, and alleviate cross-jurisdictional issues.

RECOMMENDATION #1G

The State GIO should facilitate state data sharing initiatives, state data acquisition initiatives, in conjunction with GAC and NMGIC, guided by the proposed NMGPC, to reduce duplication and gain cost-efficiencies. (DoIT Act - Section 9-27-6 NMSA 1978)

RECOMMENDATION #1H

The State GIO should be required to develop the State GIS Strategic Plan with a three-year horizon, and update the plan annually, in conjunction with GAC. This plan should include details on data management and an inventory of major systems, etc. This plan would be subject to approval by the NMGPC and become part of the State IT Strategic Plan.

ISSUE

The State GIO must ensure that Geospatial Data Center activities and Geospatial Services are aligned with statewide coordination efforts. Consensus-building through GAC and other stake-holders should be built in, but the GIO should have the authority to create compliance mandates in certain situations. Any responsibilities assigned to a GIO must be accompanied by the requisite authority to undertake them, accompanied by the check & balances effectuated by a higher-level policy council.

RECOMMENDATION #1I

The State GIO should have an oversight role in relation to any State Geospatial Data Center or any State Geospatial Services, through the GIO's membership in

the proposed NM Geospatial Policy Council formed as part of this effort (see Major Recommendation #4 concerning the Geospatial Policy Council, an advisory or executive management committee formed for the purpose of providing guidance to the Geospatial Data Center and the Geospatial Services).

ISSUE

The scope and unique demands of a State GIO position call for an individual with extensive technical expertise coupled with managerial & organizational skills, and most importantly, an ability to effectively communicate.

RECOMMENDATION #1J

The GIO should have at least 8 years experience of progressive responsibility in GT, such as a Department-level GIS Coordinator managing an enterprise-type GIS; possessing a detailed knowledge of New Mexico's unique geospatial issues, structures, systems, strengths & weaknesses, and community would be considered advantageous.

2. ESTABLISH A NEW MEXICO STATE GEOSPATIAL DATA CENTER

BACKGROUND

For New Mexico public and private entities to effectively meet the demand for accurate and timely location information (spatial data and associated attributes) to support management and decision-making, a permanent geospatial data center needs to be established and supported.

The permanent geospatial data center is necessary to:

- Identify shared geospatial data needs and pursue data acquisition, including acquisition of and processing for the most current framework data for the entire state (aerial imagery, elevation data, transportation data, etc.);
- Develop data user and data steward partnerships;
- Provide methods and procedures, including formal agreements as necessary, for the sharing of data and for required data confidentiality and security;
- Meet the needs of federal, state, county, city and town, local, and tribal governments, as well as the public, education, and business and industry for mapping data;
- Establish standardized data documentation (metadata) guidelines and requirements.

The New Mexico Resource Geographic Information System Program (NM RGIS) has served the state as a permanent data center since the Legislature established the program in 1991. The University of New Mexico (UNM) Earth Data Analysis Center (EDAC) has successfully managed and administered NM RGIS since it was created.

- UNM EDAC has partnered with UNM Bureau of Business and Economic Research Data Bank to provide and serve U.S. Census Bureau and other socioeconomic data to NM RGIS since the program's creation;
- The NM RGIS Program coordinates with federal, tribal, state, county, and local government agencies, education institutions, and private enterprise to acquire and maintain current framework (base map) data for the entire state.

For government, education, public, and private entities to benefit effectively from the application of geospatial technology, the data need to be readily accessible and in formats easily applied to mapping and analysis. These needs will require the Geospatial Data Center to:

- Provide public Web access for data discovery, visualization and map creation, and download;
- Develop the means of access to public-use geospatial data, some of which are currently fragmented or disconnected;

- Provide metadata-driven search tools, Web mapping, and Web services through a single site;
- Provide secure log-in and user downloads via FTP and direct access to data stewards of distributed data, as necessary;
- Provide data-delivery alternatives to on-line Web data access to support emergency response agencies and programs with geospatial data for mapping and mitigation needs and for response preparedness planning;
- Provide metadata-keyword search tools to (transparently) point to data distributed across state agencies and institutions and to data stored or archived in the NM RGIS Clearinghouse.

The New Mexico Resource Geographic Information System Program (NM RGIS) provides public, Internet access to geospatial data and information. Many in federal, state, local, and tribal governments, public and community organizations, education institutions, and private enterprise are not aware of the NM RGIS data stores and functions.

- Data stewards in state and local government agencies could share geospatial data with the NM RGIS Clearinghouse through Web services and data brokering, using metadata search and query functions for data discovery. Such distributed-data functionality will require that each data set be documented with metadata that comply with Federal Geographic Data Committee (FGDC) metadata content standards;
- Many federal, state, local, and tribal government agencies participate in emergency response. Full participation benefits from or requires federal credentialing for the GIS needs of the planning sections of incident management teams. A central coordinating mechanism for acquiring and credentialing such training has not been established;
- Some smaller state, local, and tribal agencies do not have trained geospatial professionals on staff and so have limited map-creation or analysis abilities. A central coordinating mechanism for rudimentary geospatial training has not been established.

ISSUE

The State of New Mexico needs an established, permanent, and fully-funded Geospatial Data Center to coordinate, serve, and share geospatial data, resources, and services.

RECOMMENDATION #2A

Establish the New Mexico Geospatial Data Center as the primary node of a decentralized system of distributed data stewards using the existing data repository (New Mexico Resource Geographic Information System – NM RGIS); this permanent center at the University of New Mexico Earth Data Analysis Center will

be a system of publicly accessible geospatial data in common formats and will include stored, archived, and distributed data.

RECOMMENDATION #2B

Promote the New Mexico Resource Geographic Information System Program as the state's permanent Geospatial Data Services Center.

- Continue to support The University of New Mexico Earth Data Analysis Center as the administrator and manager of the NM Resource Geographic Information System Program (NM RGIS);
- Continue to support the partnership between the Earth Data Analysis Center and the Bureau of Business and Economic Research in the provision and dissemination of U.S. Census Bureau and other socioeconomic data;
- Establish agreement mechanisms between the NM Geospatial Data Center and the NM Geospatial Information Officer:
 - to perform the functions of NM RGIS, including analysis and training resources and support;
 - to assess NM RGIS data needs and priorities; and
 - to investigate funding mechanisms and policy to provide monetary support for county and local data development and special projects;
- Designate funding of \$450,000 (based upon the NM Geospatial Strategic Plan) for each of the first two years of the multi-phased program for NM RGIS to continue, maintain, and enhance the permanent NM Geospatial Data Center.

ISSUE

The permanent State Geospatial Data Center will provide access to current and pertinent New Mexico data, in commonly used formats, to respond to the needs and further the development of programs and opportunities, such as those for private enterprise, resource sustainability, planning and zoning concerns, and others.

RECOMMENDATION #2C

Establish agreement mechanisms between the NM Geospatial Data Center and the NM Geospatial Information Officer:

- **to assess data dissemination and visualization needs and priorities for the NM RGIS Program (NM Geospatial Data Center); and**
 - **to assess and coordinate data needs for geospatial analysis and visualization, such as map generation.**
- Continue to support the NM RGIS Web application and interface;
 - Support the development and implementation of NM RGIS metadata-based search, query, and data delivery tools;

- Support the development and implementation of NM RGIS secure data access and of non-Internet data delivery. Implement metadata search mechanisms for all NM Geospatial Data Center data.

ISSUE

For NM state agencies and local and tribal governments to receive the greatest benefit from geospatial technology, technical personnel need to be well trained and current with GIS data and tools and how to fit geospatial applications into their organizations.

RECOMMENDATION #2D

Develop NM Resource Geographic Information System (NM RGIS) educational modules for understanding and using NM RGIS data, metadata, maps, and mapping tools; and for creating FGDC-Compliant Metadata.

- Develop the means to promote the NM Geospatial Data Center to federal, state, local, and tribal agencies, the public, education institutions, private enterprise, and other New Mexico organizations;
- Establish agreement mechanisms between the NM Geospatial Data Center and the NM Geospatial Information Officer to coordinate, provide, or point to personnel and resources for custom or on-site training and workshops.

3. ESTABLISH NEW MEXICO STATE GEOSPATIAL SERVICES

BACKGROUND

New Mexico departments, agencies, and offices at Executive, Legislative, and Judicial branches and local and tribal governments have limited access to Geographic Information Systems (GIS)/Geospatial Technology (GT) expertise and services that support their missions and business needs. No State entity is currently responsible for or funded to:

- Promote and enable a broader use of geospatial data for visualization, exploration, and modeling;
- Provide access to professional analysts and other experts who understand and employ spatial data analysis techniques;
- Provide geospatial data visualization and analysis support services;
- Provide geospatial data development support services including “framework” data;
- Provide access to domain experts who are able to integrate business and geospatial data to transform the original data into more useful information;
- Enable effective policy and decision support using integrated geospatial data visualization and analysis;
- Provide support services that identify optimal location information for government, public, and private sectors; and
- Identify geospatial educational opportunities and facilitate cross-training in geospatial data application and management.

New Mexico governmental entities have limited access to GIS consultation, project management, and production resources that support their missions and business needs. Access to these resources is challenging because:

- Business and spatial data analysis expertise is highly specialized;
- Business and spatial data analysis expertise is widely dispersed throughout the State among state and local entities, universities, and the national laboratories;
- Facilitation of GIS project assessment, design, and coordination resources is lacking;
- Consultation resources for geographic and Framework data development are limited;
- Consultation resources for initiatives and projects that require integration of business information and geographic data are limited; and
- There are no readily available resources to assist in identifying grant opportunities and to support application processes.

New Mexico governmental entities have limited access to GIS expertise and services that support their diverse business needs. These needs can include:

- Consultation to assess and make use of the data that are available from the New Mexico Geospatial Services;
- Mapping and data visualization with quick turn-around* times;
- Short-term* analysis of existing business information and geospatial data;
- Integration of existing business information and geospatial data;
- Publication of Web maps;
- Guidance to maintain geographic information in conformance with accepted data standards and procedures;
- Guidance to develop and maintain associated geospatial metadata that comply with Federal Geographic Data Committee (FGDC) metadata content standards;
- Project needs assessment and data gap analysis;
- Referral to appropriate resources with relevant data, skills, and expertise;
- GIS technical support;
- Recommendations for GT/GIS training and educational resources; and
- Access to additional Geospatial Data Center resources and support.

**Short-term and quick turn-around refer to a level of effort and limited to 16 person-hours.*

Note: A key component to providing geospatial services is funding. While the task force recognizes that limited funding may be immediately available due to current economic constraints, the memorial specifically requested the task force provided recommendations, and are so provided with the understanding that some services may not be available without funding.

ISSUE

New Mexico executive and legislative departments, agencies, and offices and local and tribal governments require decision and policy-making support that may include geographic components. They have limited access to resources that enable geospatial data visualization, development, integration, and analysis.

RECOMMENDATION #3A

Establish and fund Geospatial Services to provide support services for geospatial data visualization, development, integration, and analysis, and the techniques and expertise required to develop information products that support client business needs.

ISSUE

Framework data layers and associated metadata required to produce effective and reliable statewide analysis are incomplete. These data layers require the active

engagement of the local government entities closest to the information used to develop Framework data. Local jurisdictions often have limited or no access to the technologies and expertise necessary to produce and maintain Framework data layers.

RECOMMENDATION #3B

Establish Geospatial Services to encourage and support authoritative entities to develop and maintain Framework data layers required for effective statewide geospatial analysis.

ISSUE

New Mexico has no formal authoritative body empowered to work with the State's GT/GIS experts on the funding and prioritization of essential Geospatial Services.

RECOMMENDATION #3C

Establish a Geospatial Policy Council (see major Recommendation 4) that collaborates with the NM State GIO, the NM Geospatial Advisory Committee, and the Geospatial Data Center to define the scope of operations and resource requirements for the Geospatial Services provided to NM agencies and citizens. The Geospatial Policy Council will also serve as a bridge between the geospatial technical community and Executive & Legislative branches in recommending funding and in setting priorities.

ISSUE

State, county, and local jurisdictions often have no means of funding small geospatial projects. These projects offer the potential to improve existing business practices, leverage limited resources, reduce duplication, and provide data for making informed and effective decisions.

RECOMMENDATION #3D

Task the State GIO and GAC to work with state agencies and local government to identify geospatial initiatives that provide measurable benefits, and provide recommendations to the proposed Geospatial Policy Council for inclusion in a Special Projects Program.

ISSUE

New Mexico state, local and tribal governments, departments, agencies, and offices require support and services related to geospatial data & technology, and many have limited central resources available for GT consultation, guidance, and referral. Many also have no central resources available for short-term* geospatial production support.

RECOMMENDATION #3E

Establish a Geospatial Services Help Desk for GT consultation, guidance, and referral, and for short-term geospatial services and support.**

** Short-term and quick turn-around refer to a level of effort limited to 16 person-hours.*

*** Scope of Help Desk services is identified in the Appendix for "Scope of Services Provided by the proposed Geospatial Services."*

4. ESTABLISH A NEW MEXICO GEOSPATIAL POLICY COUNCIL.

BACKGROUND

New Mexico needs established policies for the Implementation, Administration, and Ethics of geospatial data coordination and sharing. Establishing policy that addresses data availability and sharing will reduce duplication of efforts and promote cost savings throughout the state.

Geographic Information System (GIS) policy development refers to how government leaders employ and regulate the use of publicly funded geospatial data (spatial data and spatially-enabled tabular data) and GIS and other geospatial technologies to promote efficient program management. The need to develop policy that enhances decision making at all levels in New Mexico requires legislative commitment.

New Mexico currently lacks policy to define or establish:

- A fully-funded Geospatial Data Center to allow sharing of and access to data for state executive and legislative departments, agencies, and offices and local and tribal governments;
- Geospatial Services to support geospatial data development and analysis services for state executive and legislative departments, agencies, and offices and local and tribal governments;
- The means to assess the needs of all sectors and to prioritize those needs;
- Coordination and recommendations for GIS programs and investments to the Geospatial Data Center and Geospatial Services.
- A GIS Policy Council to develop high-level policy and provide oversight for the proposed NM Geospatial Data Center and Geospatial Services, and to coordinate with all government jurisdictions and private sectors.

Currently, New Mexico state and local governmental entities are not required to:

- Operate in a cost-effective manner by sharing data across jurisdictional boundaries;
- Collaborate in the management and documentation of tabular and spatial data that are used in common across jurisdictions;
- Make effective and widespread use of data that state executive and legislative departments, agencies, and offices are already required to collect and process – these data are often isolated and in “silos;”
- Provide a digital catalog of current data and data products that result from statutory requirements.

ISSUE

New Mexico lacks policy to define and establish a Geospatial Data Center and provide needed Geospatial Services, and to support statewide data acquisition, development, and sharing.

RECOMMENDATION #4A

Establish a State of New Mexico Geospatial Policy Council (NMGPC), a high-level authority to provide guidance and set geospatial policy for the state. The NMGPC would be comprised of members representing broad constituencies (legislators, local, state, tribal and federal government, the private sector), and include the State GIO and a NMGIC representative (as technical experts). The NMGPC would also provide an oversight function for the State Geospatial Data Center and Geospatial Services efforts. An important note is that the State Information Technology Secretary may utilize the council to administer some duties as detailed in the Department of Information Technology Act (Section 9-27 NMSA 1978).

RECOMMENDATION #4B

Pass legislation to establish permanent funding to support production, updates to, and maintenance of New Mexico geospatial data.

RECOMMENDATION #4C

The NMGPC, in conjunction with DOIT and GAC, would develop policy to ensure the incorporation of sound information system management practices in the use of geospatial data and technologies.

RECOMMENDATION #4D

The NMGPC would develop policy to ensure the Geospatial Data Center complies with data-steward-defined security protocols and role-based access.

RECOMMENDATION #4E

The NMGPC would develop policy to assure that geospatial data and technologies are used statewide in a transparent manner to promote open, honest, and fair decision making.

RECOMMENDATION #4F

The State GIO, working in conjunction with GAC and NMGIC, would establish guidelines and standards for data collection and formatting, documentation, storage and archive, and software across the various governmental agencies and their programs. Standards which might involve compliance issues would be brought before the NMGPC for approval.

ISSUE

New Mexico lacks policy to ensure the systematic coordination of data sharing and access.

RECOMMENDATION #4H

The NMGPC would define policy to eliminate duplication of data collection and development efforts to promote cost savings, and enable the coordination of data sharing between state executive and legislative departments, agencies, and offices and local and tribal governments.

RECOMMENDATION #4I

The NMGPC would recommend legislation to direct data sharing among the various governmental agencies, at no additional cost to those agencies.

ISSUE

State executive and legislative departments, agencies, and offices and local and tribal governments often work independently and are unaware of existing data needs in other jurisdictions.

RECOMMENDATION #4J

The NMGPC, in coordination with State Information Technology Secretary, as relates to duties detailed in the Department of Information Technology Act (Section 9-27 NMSA 1978), would develop and/or otherwise encourage the development of policy for state, local, and other governmental agencies to provide to the Geospatial Data Center a digital catalog of current data and data products that result from statutory requirements.

RECOMMENDATION #4K

The NMGPC, in coordination with State Information Technology Secretary, as relates to duties detailed in the Department of Information Technology Act (Section 9-27 NMSA 1978), would develop and/or otherwise encourage the development of policy to define the means to notify statewide jurisdictions of data acquisition efforts and the means to pool monetary resources to develop data products that benefit the programs and needs of the partners.

APPENDIX A: House Joint Memorial 81

A JOINT MEMORIAL

REQUESTING THE SECRETARY OF INFORMATION TECHNOLOGY, IN COOPERATION WITH THE OFFICE OF THE GOVERNOR AND THE NEW MEXICO LEGISLATIVE COUNCIL, TO CONVENE A TASK FORCE TO STUDY THE SHARING OF GEOSPATIAL INFORMATION AND DATA ANALYSIS CRUCIAL TO ADDRESSING CROSS-JURISDICTIONAL ISSUES, INCLUDING EMERGENCY RESPONSIVENESS; REQUESTING THE TASK FORCE TO STUDY HOW EFFECTIVE PUBLIC POLICY DECISIONS CAN BE MADE AT STATE AND LOCAL LEVELS USING INTEGRATED DATA ANALYSIS AND DATA MANAGEMENT MODELS AND METHODOLOGIES; REQUESTING THE TASK FORCE

TO CONSIDER HOW TO PROVIDE OPTIMAL LOCATION INFORMATION FOR BUSINESSES AND INDUSTRIES, SCHOOLS AND HOSPITALS AND OTHER PUBLIC AND PRIVATE SERVICES; REQUESTING THE TASK FORCE TO EVALUATE THE BROAD SPECTRUM OF MANAGING NATURAL RESOURCES AND ENVIRONMENTAL ISSUES; REQUESTING THE TASK FORCE TO CONSIDER HOW A PERMANENT CENTER OF EXCELLENCE IN DATA ANALYSIS AND DATA MANAGEMENT CAN BE DEVELOPED AND USED, INCLUDING CROSSTRAINING, TO IMPROVE POLICY AND DECISION-MAKING AT ALL LEVELS.

WHEREAS, New Mexico is rich in geospatially related data, information and resources; and

WHEREAS, the secretary of information technology coordinates the state's strategic information technology plan; and

WHEREAS, the New Mexico geospatial strategic plan should be used as a resource and reference for coordination and analysis of data, as well as a starting point for the task force to move the discussion and initiatives forward; and

WHEREAS, an increased demand exists for accurate and timely data management by public and private entities to provide information to support appropriate management and decision-making; and

WHEREAS, the accurate and timely use and analysis of data requires increased interaction among national, federal, regional, state and local programs;

NOW, THEREFORE, BE IT RESOLVED BY THE LEGISLATURE OF THE STATE OF NEW MEXICO that the secretary of information technology, in cooperation with the office of the governor and the New Mexico legislative council, be requested to

convene a task force to study the sharing of geospatial information and data analysis crucial to:

- A. addressing cross-jurisdictional issues, including emergency responsiveness;
- B. making effective public policy decisions at state and local levels using integrated data analysis and data management models and methodologies;
- C. providing optimal location information for businesses and industries, schools and hospitals and other public and private services;
- D. evaluating the broad spectrum of managing natural resources and environmental issues; and
- E. consideration of how a permanent center of excellence in data analysis and data management can be developed and used, including cross-training, to improve policy and decision-making at all levels; and

BE IT FURTHER RESOLVED that the task force include the agency head, lead representative or appropriate designee of the following agencies, organizations or public or private sectors:

- A. department of information technology;
- B. department of environment;
- C. department of finance and administration;
- D. public education department and public school facilities authority;
- E. higher education department;
- F. department of transportation;
- G. office of the state engineer;
- H. state land office;
- I. administrative office of the courts;
- J. New Mexico association of counties;
- K. New Mexico municipal league;
- L. Sandia national laboratories;
- M. Los Alamos national laboratory;
- N. earth data analysis center at the university of New Mexico;
- O. bureau of business and economic research at the university of New Mexico;
- P. private information technology sector; and
- Q. other entities including, but not limited to, the department of public safety; human services department; department of health; energy, minerals and natural resources department; economic development department; aging and long-term services department; tourism department; capitol buildings planning commission; New Mexico finance authority; and colleges and universities as deemed necessary by the secretary of information technology; and

BE IT FURTHER RESOLVED that the task force's work include recommendations on:

- A. geospatial data analysis and coordination;
- B. secured information-sharing among government entities;

- C. the development of excellence and expertise in integrated data analysis and data management across disciplines and jurisdictions;
- D. shared goals that satisfy the operational business needs of all users;
- E. an organized structure best suited to address the geospatial information and data analysis needs of the state; and
- F. the development and organization of a technical and computing infrastructure; and

BE IT FURTHER RESOLVED that the task force be requested to present its findings and recommendations to the governor and the appropriate interim legislative committee no later than October 1, 2009; and

BE IT FURTHER RESOLVED that a copy of this memorial be transmitted to the secretary of information technology.

Digital Copy Available at: <http://legis.state.nm.us/Sessions/09%20Regular/final/HJM081.pdf>

APPENDIX B: New Mexico Geospatial Strategic Plan - Excerpt

[New Mexico Geospatial Strategic Plan: Phase I; August 27, 2007, Revised January 2008]

1. EXECUTIVE SUMMARY

1.1 Overview

New Mexico is rich in data, information, and resources. Some noteworthy milestones have been achieved by voluntary efforts within the geospatial community using geographic information systems (GIS). However, there is an immediate and urgent need for coordination of geospatial information technology (GIT) to:

- Enhance local governance using streamlined business processes among state, federal, local, and tribal agencies.
- Maximize value for committed funding in numerous GIT projects.
- Reduce or eliminate duplication of efforts and resources among existing agencies.
- Provide leadership and instruction regarding the accumulation, dissemination, analysis, and management of geographic information.
- Educate citizens, state agencies, local governments, and policy makers to benefit from GIT.

The GIS Strategic Plan (GSP) meets these needs to achieve both short and long term benefits for the State. The GSP represents the first step toward expanding a statewide enterprise GIT infrastructure into an enterprise decision support technology involving:

- GIS coordination.
- Secured information sharing among government entities.
- Latest data and advanced service delivery by enhancing the existing state clearinghouse.
- Projects built for common application and data requirements.
- Shared GIT goals that satisfy the operational business needs of all users.

The state can achieve the goals and objectives as identified in the GSP by acting as an enterprise; it can strive for and achieve maximum effectiveness by adopting the mindset of a single organization with unified vision and purpose. Per the benchmarking study that was conducted as part of this GSP (see Appendix A), the goals of the GSP are in sync with those currently being pursued by most states. For instance: A significant majority (80%) of the interviewed states that do not have a Geographic Information Officer (GIO) office believe a GIO office is needed and are actively pursuing a GIO office (see Figure 1). About a quarter of the states interviewed currently have a GIO office.

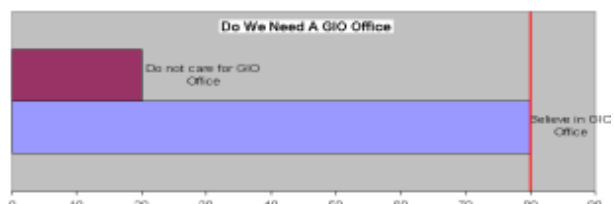


Figure 1: GIO Office Need Response (percentage)

- Significantly over half (68%) of the interviewed states receive some amount of base funding to sustain the operations of a State GIS Coordinator (see Figure 2).

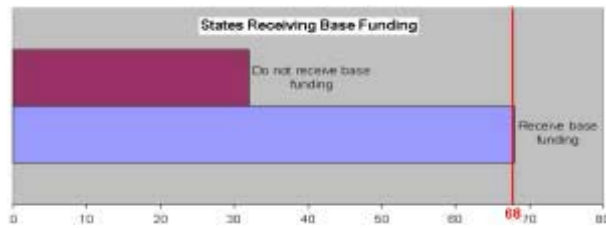


Figure 2: Base Funding Recipients (percentage)

1.2 New Mexico's GIT Vision

The statewide GIT vision recommended for New Mexico and developed within this GSP include:

- Promoting governance through GIT partnerships and focused coordination among various agencies – federal, tribal, state, and local government, the private sectors and educational entities – by encouraging and supporting the contributions of all individuals in the GIS community.
- Reducing redundancy and cost for GIT endeavors and utilizing funds more effectively through coordinated and shared projects.
- Defining GIS technology as a core component of mainstream information technology in support of important decision making in areas such as homeland security, local governance, E911 efforts, and others.
- Developing an organized, well-managed, and secured framework through a statewide GIS clearinghouse to enable data integration and sharing of both spatial and non-spatial data, applications, services, and information.
- Increasing awareness and knowledge of all citizens and businesses in the state regarding the uses and benefits of all geospatial technologies.
- Leveraging resources to accomplish measurable goals and objectives by solving real-world problems.
- Spreading the benefits of geographic information and geospatial technology broadly and equitably to improve quality of life as well as benefit the environment.

1.3 Issues

A series of workshops were conducted in Santa Fe and Albuquerque to understand the requirements of the GSP and actions necessary to achieve its goals and objectives.

Major issues identified and in need of correction:

- Lack of both funding support and a unified approach for statewide GIT efforts.
- Inadequate data, data models, applications, and services to aid GIT efforts within the state to support decision making systems.
- Limited support for a state GIS clearinghouse, State Spatial Data Infrastructure (SSDI), National Spatial Data Infrastructure (NSDI), and Geospatial-One-Stop (GOS).
- Lack of a political champion for GIS, limited sponsorship from legislative engagements, and inadequate political outreach.

- Extremely low scores for New Mexico on a nationwide survey of statewide GIS coordination conducted by the National States Geographic Information Council (NSGIC); the state achieved only two out of nine criteria (per the NSGIC survey), but only one of these was achieved effectively. The details are presented in Section 4.3.1, Table 4-1A and 4-1B.



Figure 3: Statewide Nine Coordination Criteria

- Absence of business plans for each strategic recommendation (see Section 7).

1.4 Recommendations

The following strategic recommendations are presented in this GSP to align with the identified issues and satisfy the state's vision:

- Establish immediately the Geographic Information Officer (GIO) position reporting to the Office of the Chief Information Officer (OCIO) / Department of Information Technology Office (DOIT) to fulfill coordination, governance, policy, planning, and assessment role regarding statewide GIT efforts. The results of the benchmarking study (see Appendix A) also support the need to create a formal GIO office.
- Provide \$850,000 annually towards funding the GIO position, State GIS clearinghouse, web-based data distribution, and specialized GIS services.
- Involve the highest levels of management, political, and legislative bodies within the state in GIS councils and committees.
- Establish a Spatial Data Infrastructure (SDI) subcommittee that includes representative membership from existing GIS councils and committees, data stewards, and data consumers.
- Designate and fund Earth Data Analysis Center (EDAC) to host the state GIS clearinghouse and provide GIS services throughout the state.
- Develop business plans for each strategic recommendation (see Section 7).
- Establish recurring funding to support geospatial coordination, GIT efforts, GIS services, and clearinghouse activities within the state.

1.5 Benefits

The following benefits will result from the strategic recommendations:

- Significant return on GIT investment.
- Better local governance through enhanced inter-agency communication, coordination, and planning.
- Higher levels of information security, emergency preparedness, and regional homeland security.
- Contributions to SSDI, NSDI, and GOS efforts through an enhanced state GIS clearinghouse.
- More effective planning towards potential funding sources for state GIT efforts.
- Increased visibility and demonstrated effectiveness of GIT to achieve legislative sponsorship.
- Leveraging of limited resources to their full potential.

- Decreased redundancy and duplication of efforts.
- Enhanced GIT awareness among agencies, policy makers, and citizens; thus allowing all to benefit from GIT technology, as well as improving the environment and overall quality of life.

1.6 Costs

The annual estimated costs are provided in Table 1-1.

Table 1-1 – Estimated Annual Costs to Implement Recommendations

Recommendations	Estimated First Year Budget
Establish and Maintain Geographic Information Office	GIO Office Budget: \$150,000
Acquire Management Support and Sponsorship	
Establish and Maintain GIS Councils and Committees	GIS Services Budget: \$300,000
Develop and Update Business Plans	
Establish and Maintain State GIS Clearinghouse	GIS Clearinghouse Budget: \$400,000
Distribute Information via Web-based Media	
TOTAL	Budget (Annual) \$850,000

Digital Copy of Entire Document Available at:

- http://www.gac.state.nm.us/docs/NMGSP_finaldraft_0108.pdf



New Mexico Geospatial Strategic Plan

APPENDIX C: Business Cases for Geospatial Data and Services

Case Study 1. Local Jurisdiction Map Development and Publication

Background

Many New Mexico local government jurisdictions (counties, municipalities, towns, villages, school districts, irrigation districts, conservation districts, flood control district, etc.) have:

- Outdated or no maps representing respective district boundaries;
- Limited access to geospatial data to create maps showing district boundaries and relevant infrastructure location data;
- Limited access to geospatial data to publish maps showing district boundaries and relevant infrastructure location data;
- Limited access to geospatial data to analyze district boundaries in relation to coincident or adjacent boundaries; and
- Limited access to geospatial data to analyze district boundaries in relation to coincident or adjacent infrastructure assets (highways, roads, bridges, information/telecommunication/ power transmission and distribution assets, wells, reservoirs, State facilities, etc.).

Case Study #1 Issue:

Mosquero Municipal Schools Transportation Coordinator needs a Public Education Department (PED) approved map of Mosquero school district (and adjacent districts of Las Vegas City, West Las Vegas, Roy, Wagon Mound) to analyze school attendance relative to student residence, county roads and highways, respective school district, and respective DFA/TRD tax districts.

HJM81 Geospatial Services Center Recommendations relevant to this need:

RECOMMENDATION #3A

Establish and fund Geospatial Services to provide support services for geospatial data visualization, development, integration, and analysis, and the techniques and expertise required to develop information products that support client business needs.

RECOMMENDATION #3E

Establish a Geospatial Services Help Desk for GT consultation, guidance, and referral, and for short-term geospatial services and support.**

* Short-term and quick turn-around refer to a level of effort limited to 16 person-hours.

**Scope of Help Desk services is identified in the Appendix for “Scope of Services Provided by the proposed Geospatial Services.”

Case Study 2. State Office Needs Demographic Data and Maps

Background

New Mexico departments, agencies, and offices at Executive, Legislative, and Judicial branches and local and tribal governments have:

- Limited or no access to demographic data that may be supportive of their missions and business needs;
- Limited or no access to resources that would allow them to view demographic data in a geographic context;
- Limited or no access to resources that would allow them to publish maps representing demographic data in a geographic context; and
- Limited or no access to tabular and spatial data analysis resources to generate valuable decision support information supportive of their missions and business needs.

Case Study #2 Issue:

The State of New Mexico Office of Recovery and Reinvestment needs to identify ten of the State's counties that may be described as "persistent poverty counties" as defined in SEC. 1115 of the American Recovery and Reinvestment Act of 2009 (ARRA). This data will support NMORR compliance with the criteria as stated below in the ARRA SEC. 1115:

(a) Allocation Requirement- Of the amount appropriated in this Act for at least 10 percent shall be allocated for assistance in persistent poverty counties.

HJM81 Geospatial Services Center Recommendations relevant to this need:

RECOMMENDATION #3A

Establish and fund Geospatial Services to provide support services for geospatial data visualization, development, integration, and analysis, and the techniques and expertise required to develop information products that support client business needs.

RECOMMENDATION #3E

Establish a Geospatial Services Help Desk for GT consultation, guidance, and referral, and for short-term geospatial services and support.**

* Short-term and quick turn-around refer to a level of effort limited to 16 person-hours.

**Scope of Help Desk services is identified in the Appendix for "Scope of Services Provided by the proposed Geospatial Services."

Case Study 3. Local Jurisdiction Framework Data Development

Background

Many of New Mexico's local government entities responsible for producing and maintaining Framework data layers (counties, municipalities, towns, villages, school districts, irrigation districts, conservation districts, flood control district, etc.) have common problems relating to their data:

- Non-digital, outdated, or no maps representing current status/ownership within their respective jurisdictions;
- Limited or no access to current technologies such as the hardware, software, and broadband internet services required to produce and maintain Framework data layers;
- No or insufficient staff resources required for producing and maintaining Framework data layers; and
- No or insufficient funding required to produce and maintain Framework data layers.

HJM81 Geospatial Services Center Recommendations relevant to this need:

Case Study #3 Issue:

Framework data is geospatial information commonly needed by all entities, but typically produced by specific organizations, some of which are local or county governments which lack the resources to obtain the data, and/or make the transition from legacy maps to the necessary digital formats. New Mexico also has no mechanisms for compiling the local datasets into a comprehensive statewide assemblage, optimized for data sharing, etc.

RECOMMENDATION #3D

Task the State GIO and GAC to work with state agencies and local government to identify geospatial initiatives that provide measurable benefits, and provide recommendations to the proposed Geospatial Policy Council for inclusion in a Special Projects Program.

RECOMMENDATION #3B

Establish Geospatial Services to encourage and support authoritative entities to develop and maintain Framework data layers required for effective statewide geospatial analysis.

RECOMMENDATION #3A

Establish and fund Geospatial Services to provide support services for geospatial data visualization, development, integration, and analysis, and the techniques and expertise required to develop information products that support client business needs.

RECOMMENDATION #3E

Establish a Geospatial Services Help Desk for GT consultation, guidance, and referral, and for short-term geospatial services and support.**

** Scope of Help Desk services is identified in the Appendix for “Scope of Services Provided by the proposed Geospatial Services.”

Case Study 4. County Base Map Development and Web Publication

Background

Many New Mexico local government jurisdictions (counties, municipalities, towns, villages, school districts, irrigation districts, conservation districts, flood control district, etc.) have:

- Limited digital data such as geo-referenced digital aerial photography and topographic maps, and GIS layers that represent elevation, hydrographic features (surface water), soil and vegetation types, transportation features, structures, land ownership or jurisdiction (local, state, federal, private), and administrative boundaries (county, municipal, school, political, emergency response, and special districts);
- Limited access to current technologies such as the hardware, software, and broadband internet services required to produce and maintain geospatial data and applications;
- Limited staff resources required for developing and maintaining geospatial data and applications, coupled with limited access to GIS technical support;
- Limited access to consultation enabling the use of relevant data currently available from RGIS or the Geospatial Data Center;
- Limited access to geospatial data development support services, and geospatial data visualization and analysis support services;
- Limited access to support services that identify optimal location information for government, public, and private sectors;
- Limited access to support services that help develop, publish, and serve web maps; and
- Limited access to, and funding for, GIS training and educational resources.

Issue: De Baca County has a part-time GIS mapper in the Assessor’s office that has been able to develop a preliminary GIS project used for real property parcel mapping. To support economic development initiatives, the County would like to build and publish a geospatial web application that would allow potential commercial, industrial, and agricultural interests the ability to research properties that may fit their business needs.

HJM81 Geospatial Services Center Recommendations relevant to this need:

RECOMMENDATION #3D

Task the State GIO and GAC to work with state agencies and local government to identify geospatial initiatives that provide measurable benefits, and provide recommendations to the proposed Geospatial Policy Council for inclusion in a Special Projects Program.

RECOMMENDATION #3A

Establish and fund Geospatial Services to provide support services for geospatial data visualization, development, integration, and analysis, and the techniques and expertise required to develop information products that support client business needs.

RECOMMENDATION #3E

Establish a Geospatial Services Help Desk for GT consultation, guidance, and referral, and for short-term* geospatial services and support.**

** Short-term refers to a level of effort limited to 16 person-hours.*

Scope of Help Desk services is identified in the Appendix for “Scope of Services Provided by Geospatial Services.”

APPENDIX D: Scope of Services Provided by Geospatial Services

Recommended organizational structure and workflow:

Appropriate resources will be required to provide the following services from the proposed Geospatial Services Help Desk:

Using readily available geospatial data, services include:

- support for understanding and using maps and mapping
- support for understanding and using geospatial data and metadata
- support for understanding and using NM RGIS
- support for identifying and acquiring relevant data from Geospatial Data Services Center
- support for understanding and using UNM BBER data
- support for understanding and using UNM DGR data
- geospatial data visualization and map publication
- geospatial data integration
- web map publication
- supplemental data acquisition and or development
- support with metadata generation
- tech support

Limited consultation services include:

- Spatial data inventory and gap analysis (what data may be useful but is not readily available)
- Project needs assessment
- Resource identification and research
- Referral services (connecting needs with appropriate information or service providers)

Appropriate resources will be required to provide the following Tier 2* services from the Geospatial Services:

- support for “Framework” data development
- support for business case development
- support for GIT project design
- support for analysis project assessment and scoping
- support for forecasting project design
- support for modeling project design
- support for designing and presenting training, seminars, and workshops

* Tier 2 services: potential projects referred by the Help Desk to the Geospatial Policy Council. These are services that are more sophisticated in nature and may require formal project scoping, management, and resource allocation.

APPENDIX E: Abbreviations, Acronyms, and Glossary

Appendix E: Abbreviations and Acronyms

BBER	[UNM] Bureau of Business and Economic Research
CIO	[NM] Chief Information Officer
CSV	comma-separated values [file format, filename extension]
DBF	database file [file format, filename extension]
DEM	Digital Elevation Model
DGR	[UNM] Division of Government Research
DoIT	[NM] Department of Information Technology
DOQ	Digital Orthophoto Quadrangle
DOQQ	Digital Orthophoto Quarter Quadrangle
ECW	enhanced compressed wavelet image format [file format, filename extension]
EDAC	[UNM] Earth Data Analysis Center
EMNR	[NM] Energy Minerals and Natural Resources Department
EPSCoR	[National Science Foundation] Experimental Program to Stimulate Competitive Research
FGDC	Federal Geographic Data Committee
FIPS	Federal Information Processing Standards
FTP	File Transfer Protocol
GAC	[New Mexico] Geospatial Advisory Committee
Gb	Gigabit
GDACC	[NM] Geospatial Data Acquisition Coordination Committee
GIO	Geographic/Geospatial Information Officer
GIS	Geographic Information System
GT	Geospatial Technology(ies)
GML	Geographic Markup Language [file format, filename extension]
GOS	Geospatial-One-Stop [a federal program]
GSP	[New Mexico] GIS/Geospatial Strategic Plan
HJM81	House Joint Memorial 81
ICS	Incident Command System
IIS	[Microsoft] Internet Information Services
IT	Information Technology
ITC	[NM] Information Technology Commission
KML	Keyhole Markup Language [file format, filename extension]
LIDAR	Light Detection and Ranging
QA/QC	Quality Assurance/Quality Control
NGO	Non-Governmental Organization
NHD	National Hydrography Data Sets
NIMS	National Incident Management System
NM	New Mexico
NMGIC	New Mexico Geographic Information Council
NSDI	National Spatial Data Infrastructure
NSGIC	National States Geographic Information Council

OCIO	Office of the Chief Information Officer
OSE	[NM] Office of the State Engineer
pg, pp	page, pages
PSFA	[NM] Public School Facility Authority
RFP	Request for Proposal
RGIS	[New Mexico] Resource Geographic Information System
SDI	Spatial Data Infrastructure
SID, MrSID	multi-resolution seamless image database [file format, filename extension]
SSDI	State Spatial Data Infrastructure
TRD	[NM] Taxation and Revenue Department
TXT	text [file format, filename extension]
UNM	University of New Mexico
V&V	Validation and Verification
WG	Work Group
WGA GIC	Western Governors' Association Geographic Information Council
XML	Extensible Markup Language [file format, filename extension]
ZIP	zipped/compressed [file format, filename extension]

Appendix E Cont.: Glossary of Geospatial Terms and Concepts

Accuracy

The degree to which a measured value conforms to true or accepted values. Accuracy is a measure of correctness. It is distinguished from precision, which measures exactness. Accuracy is an issue pertaining to the quality of data and the number of errors contained in a dataset or map.

Attribute

Non-spatial information about a geographic feature in a GIS, usually stored in a table and linked to the feature by a unique identifier. For example, attributes of a river might include its name, length, and sediment load at a gauging station. In raster datasets, information associated with each unique value of a raster cell.

Attribute data

Tabular or textual data describing the geographic characteristics of features. A numeric and/or text description of a spatial entity. Descriptive information about features or elements of a database. Attribute data is typically stored in tabular format.

Base layer

A data layer in a GIS to which all other layers are geometrically referenced, containing a variety of features often used for locational reference (e.g., state or county boundaries).

Base map

A map depicting background reference information such as landforms, roads, landmarks, and political boundaries, onto which other thematic information is placed. A base map is used for locational reference and often includes a geodetic control network as part of its structure. A map to which GIS data layers are registered and rescaled. Contrast with thematic map.

Conversion

The process of transferring data derived from existing records and maps to a digital database. Conversion is a major input problem and can consume the greatest share of time in a GIS project.

Data

Facts about real-world entities, organized for analysis. Includes results of observations or measurements of such entities.

Data Steward

A person or organization that is responsible for maintaining a dataset, or for maintaining a data element in a metadata registry. Can be a Point-Of-Contact or someone who takes responsibility for a dataset or series of datasets. Data stewardship roles are common when organizations are attempting to exchange data precisely and consistently between computer systems.

Data Dictionary

A catalog or table containing information about the datasets stored in a database. In a GIS, a data dictionary might contain the full names of attributes, meanings of codes, scale of source data, accuracy of locations, and map projections used. A directory of all data items, giving the name and structure of each. It does not contain the actual data. The contents of a data dictionary are sometimes called metadata.

Data Integrity

The degree to which the data in a database is accurate and consistent according to data model and data type.

Data Model

A description of the rules by which data is defined, organized, queried, and updated within an information system (usually a database management system). The conceptual organization of a database.

Database

One or more structured sets of persistent data, managed and stored as a unit and generally associated with software to update and query the data.

Database Management System (DBMS)

A set of software applications used to create and maintain databases according to a schema. Database management systems provide tools for adding, storing, changing, deleting, and retrieving data. A systematic approach to maintaining, accessing, reporting, and analyzing attribute data.

DEM

Digital elevation model, a data file of a topographic surface. Specifically, a data exchange format developed by the United States Geological Survey for geographical and topographical data. More broadly, the digital equivalent of the elevation data portrayed on a topographic base map, which can be provided in a variety of formats.

Feature

A geographic component of the earth's surface that has both spatial and attribute data associated with it (e.g., well, road, lake).

Framework Data

Geospatial data that is necessary for base maps. These "layers" are federally established as a standard by the Federal Geographic Data Committee (FGCD) and include transportation, hydrology, administrative boundaries, topography, aerial imagery, and survey ground control.

Geographic Data/Geospatial Data/Spatial Data

Data that convey the locations and descriptions of geographic features.

Geographic Information System (GIS)

An integrated collection of computer software and data used to view and manage information about geographic places, analyze spatial relationships, and model spatial processes. A GIS provides a framework for gathering and organizing spatial data and related information so that it can be displayed and analyzed.

Geospatial / Geospatial Technologies (GT)

A term used to define a grouping of several related fields: GIS, GPS, Remote Sensing, Image processing, Location-Based Services. The use of the term Geospatial or Geospatial Technologies is preferred as the inter-relatedness of the constituent disciplines increases.

Global Positioning System (GPS)

A system of radio-emitting and -receiving satellites used for determining positions on the earth. The orbiting satellites transmit signals that allow a GPS receiver anywhere on earth to calculate its own location. Developed and operated by the U.S. Department of Defense, the system is used in navigation, mapping, surveying, and other applications in which precise positioning is necessary. Other similar systems are now in operation or planned.

Image Processing

Computerized routines for interpreting imagery (information acquired by remote sensing), and/or for information extraction (e.g., pattern recognition, classification) from remotely sensed images to obtain categories of information about specific features.

Infrastructure

The system of human-made physical structures, such as roads, bridges, canals, cables, wires, communications towers, hospitals, pipes, reservoirs, and sewers, that provide communication, transportation, public services, utilities, or all of the above to a populace. Infrastructure development and management are important at the local, state, regional, national, or international levels, for both urban and rural areas.

Layer

A subdivision of a GIS database containing related data. Layers can be visualized as "transparencies" which allow the user to view and analyze information selectively by theme. Some GIS build their databases as a series of layers covering a single area. Layers are fundamental to overlay analysis.

layer. A logical separation of mapped information representing a theme (e.g., roads, soils, vegetative cover). Layers are registered to each other by control points and the common coordinate system of the database.

Map

A two-dimensional abstract graphic representation of the earth's surface that displays spatial relationships among features, generalizes their appearance to simplify them for the purpose of communication, and applies symbols to aid in interpretation.

Metadata

Information that describes the content, quality, condition, origin, and other characteristics of data or other pieces of information. Metadata for spatial data may describe and document its subject matter; how, when, where, and by whom the data was collected; availability and distribution information; its projection, scale, resolution, and accuracy; and its reliability with regard to some standard. Metadata consists of properties and documentation.

Parcel

A fundamental cadastral unit: a piece of land which can be owned, sold, and developed. Parcels have legal descriptions which not only describe their boundaries but also contain information concerning rights and interests.

Polygon

A two-dimensional figure with three or more sides intersecting at a like number of points. It is defined or bounded by a closed line or arc and has attributes that describe its geographic features.

Quadrangle maps (quads)

A rectangular, or nearly rectangular, area covered by a map. The outline is generally defined by latitude and longitude.

Raster

A spatial data model that defines space as an array of equally sized cells arranged in rows and columns, and composed of single or multiple bands. Each cell contains an attribute value and location coordinates. Unlike a vector structure, which stores coordinates explicitly, raster coordinates are contained in the ordering of the matrix. Groups of cells that share the same value represent the same type of geographic feature.

Record

An element of a database: databases organized are into tables, which contain records. Each record supplies information gathered for an individual example. Records contain one or more fields related to the topic of the table in which they are found.

Remote Sensing

Collecting information about the environment and the surface of the earth from a distance, primarily by sensing radiation that is naturally emitted or reflected by the earth's surface or from the atmosphere, or by sensing signals transmitted from a device and reflected back to it. Examples of remote-sensing methods include aerial photography, radar, and satellite imaging. Often results in the generation of image data. See also image processing.

Resolution

Is the smallest detectable distance between features or entities, and is the detail with which a map depicts the location and shape of geographic features. Resolution can also refer to the dimensions represented by each cell or pixel in a raster, or the smallest

spacing between two display elements, expressed as dots per inch, pixels per line, or lines per millimeter.

Satellite Image

A picture of the earth taken from an earth orbital satellite. Satellite images may be produced photographically or by on-board scanner (e.g. MSS)

Spatial

An adjective applied to objects that vary in space in two or three dimensions. Refers to phenomena distributed in space and therefore having physical dimensions and geography.

Spatial data

Any data that can be mapped. Information about the locations and shapes of geographic features and the relationships between them. The term encompasses both vector and raster-based data; examples of spatial data include aerial & satellite photos, well locations, highway and river networks, etc.

Spatial Database

A structured collection of spatial data and its related attribute data, organized for efficient storage and retrieval.

Spatial Data Infrastructure (SDI)

A framework of technologies, policies, standards, and human resources necessary to acquire, process, store, distribute, and improve the use of geospatial data across multiple public and private organizations.

Tabular data

Data that is organized into tables employing a typical row and column structure. Tabular data often serves as a source of the various attributes of a spatial entity, and can be in a variety of formats.

Thematic Map

A map related to a topic, theme, or subject of discourse. Also called topical, geographic, special purpose, distribution, parametric, or planimetric maps.

Thematic maps emphasize a single topic such as vegetation, geology, or land ownership. Contrast with base map. A map designed to convey information about a single topic or theme, such as population density or geology.

Theme

The overall topic of a map layer in which the spatial variation of a single phenomenon is illustrated (e.g., a vegetation theme map might illustrate vegetative areas such as hardwoods, conifers, and sage brush). A set of related geographic features such as streets, parcels, or rivers, along with their attributes. All features in a theme share the same coordinate system, are located within a common geographic extent, and have the same attributes. Themes are similar to layers.

Vector

A coordinate-based data model that represents geographic features as points, lines, and polygons. Each point feature is represented as a single coordinate pair, while line and polygon features are represented as ordered lists of vertices. Attributes are associated with each vector feature, as opposed to a raster data model, which associates attributes with grid cells.

Web Application

A software program that communicates via the World Wide Web and delivers Web-based information to the user in HTML format. Web applications are typically used to add customization and interactivity to Web pages. Web applications may also be called Web-based applications. A Web-based program that uses a Web site as the front end of a software application. Web applications allow end users to modify and pass data between a server and a client. Web applications are typically used to provide Web site search capabilities, retrieve and display user information from a database, and provide the ability to purchase items from a Web site.

Web Services

A software component accessible over the World Wide Web for use in other applications. Web services are built using industry standards, and thus are not dependent on any particular operating system or programming language, allowing access to them through a wide range of applications.