

**Biennial Report on
Geographic Information Systems Technology**

Digital Texas 2010



**Texas Geographic Information Council
November 1, 2010**

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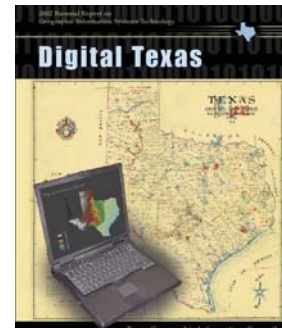
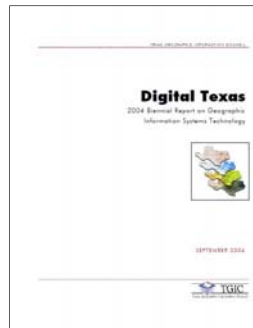
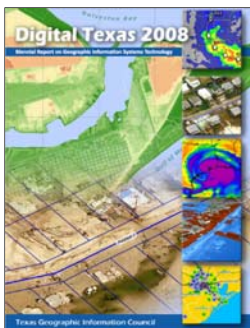
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About this Report

The Texas Geographic Information Council is required by statute to publish a biennial report on the use of geographic information systems technology by state government. *Digital Texas 2010*, TGIC’s fifth biennial report, describes recent GIS initiatives and accomplishments and identifies planned initiatives for the next biennium.





About the Texas Geographic Information Council

In 1997, the 75th Texas Legislature established the Texas Geographic Information Council (TGIC) as the primary coordinating body for geographic information systems (GIS) in Texas state government. TGIC was created to provide cost-effective and useful exchange and retrieval of geospatial information both within and among the various agencies and branches of government, and from agencies and branches of state government to the people of Texas and their elected representatives. TGIC includes 46 members from state, local, and federal agencies and universities. TGIC's governing statute is in [Section 16.021](#) of the Texas Water Code.

TGIC Members

State Agencies

Governor's Office of Economic Development and Tourism
Office of the Attorney General
Office of the Governor of Texas
Public Utility Commission of Texas
Railroad Commission of Texas
Texas Army National Guard
Texas Board of Professional Land Surveying
Texas Commission on Environmental Quality
Texas Commission on State Emergency Communications
Texas Department of Agriculture
Texas Department of Criminal Justice
Texas Department of Family and Protective Services
Texas Department of State Health Services
Texas Department of Information Resources
Texas Department of Insurance
Texas Department of Assistive and Rehabilitative Services
Texas Department of Transportation
Texas Education Agency
Texas Facilities Commission
Texas Forest Service
Texas General Land Office
Texas Health and Human Services Commission
Texas Historical Commission
Texas Legislative Council
Texas Parks and Wildlife Department
Texas State Soil and Water Conservation Board
Texas Water Development Board

State Universities and Research Centers

Houston Advanced Research Center
Stephen F. Austin University – Columbia Center
Texas A&M University – Academy for Advanced
Telecommunications and Learning Technologies
Texas A&M University – Cooperative Extension
Texas A&M University – Department of Forest Science
Texas A&M University – Spatial Reference Center
Texas A&M University – Texas Transportation Institute
Texas State University
Texas Tech University
University of Texas at San Antonio – Office of the State
Demographer
University of Texas – Bureau of Economic Geology
University of Texas – Center for Space Research

State and Regional Associations

County Information Resources Agency
San Antonio River Authority
Texas Association of Counties
Texas Association of Regional Councils
Texas Society of Professional Surveyors

Federal Agencies

United States Geological Survey

TGIC Sponsors

The executive director of the Texas Department of Information Resources (DIR) and the executive administrator of the Texas Water Development Board (TWDB) serve as executive sponsors of TGIC.



The Texas Water Development Board through its Texas Natural Resources Information System (TNRIS) serves as the state clearinghouse for geographic data. TNRIS provides research, distribution, and online access to Texas geographic base data.

TNRIS manages the StratMap Program, the High Priority Imagery and Data Sets contract, and the Borderlands Information Center, and it provides technical assistance for the Floodplain Mapping Program. TNRIS supports emergency management needs for data and online mapping services.

www.twdb.state.tx.us
www.tnr.is.state.tx.us



The Department of Information Resources is the state's lead information technology office. DIR works to ensure that information technology is deployed within state government in an effective and cost-efficient manner.

DIR guides and supports the appropriate use of GIS by coordinating interagency and inter-governmental efforts, setting state GIS policies and technical standards, integrating GIS planning into the State Strategic Plan for Information Resources Management, and providing administrative support to TGIC.

www2.dir.texas.gov

November 1, 2010

From the Council Chair and Vice-Chair

The Texas Geographic Information Council (TGIC) is involved in not only the collection of geospatial data, but also the systems and services used to distribute and view that information. In partnership with its sponsors, the Texas Water Development Board (TWDB) and the Department of Information Resources (DIR), TGIC is charged with taking an accounting of major geographic information systems (GIS) activities within the state and helping the state, through the Texas Natural Resources Information System (TNRIS), to get the greatest possible value out of each dataset. In 2009, DIR, through input from TGIC membership, was able to compile and publish an inventory of major GIS datasets in Texas, an inventory of GIS web services, and an analysis of state agency GIS environments and platforms. With TNRIS tasked with the implementation of a statewide purchasing contract in 2008, TGIC was asked to reach out to state and local entities and invite them to participate. Within two years the state has realized nearly \$2 million in savings. As local government participation grows, so will the savings to the state for the expansion of current base data, and the purchase and exchange of new datasets.

Geospatial technology serves an essential function in many state government enterprises—including the conservation of Texas' precious natural resources; supporting agriculture and animal health; managing fisheries, wildlife, and the parks system; and the promotion of tourism. GIS continues to be critical in monitoring energy production, determining where infrastructure funds are allocated and why, and analyzing transportation patterns for the most efficient placement of resources and services.

By merging geographic and socioeconomic data, GIS provides local government and the private sector the tools they need for urban planning and economic development. In 2011, the U.S. Census Bureau will release geographic, population, and socioeconomic data gathered during the 2010 decennial census count. The effective analysis of the census data is critical to a fair and consistent redistricting effort and is the core of all redistricting plans and maps.

The onset of Google Maps and Earth, Bing Maps, and other web-based mapping systems will lead to the expansion of the availability, and usability, of TNRIS data. With the growing ability to move data from platform to platform, datasets previously isolated to agency internal use only will be available for release and distribution. TGIC is positioned to provide outreach and education in the use of these new datasets, and to provide member input into the development of technical standards to ensure interoperability of existing and new datasets.

Bruce Barr

TGIC Chair

Texas Association of Counties

Claire DeVaughan

TGIC Vice-Chair

U.S. Geological Survey

Progress on GIS Initiatives 2009–2010

In its *Digital Texas 2008* report, TGIC outlined ten planned initiatives for the next biennium and beyond. Progress on those initiatives can be summarized in four primary areas, described below.

Progress 1: Coordinated procurement of shared base map data



In 2008, the Council on Competitive Government (CCG) completed its review of geographic information systems and data resources and determined that a broad capacity for coordinated acquisition of geographic data could produce savings for the State of Texas.

Working with TNRIS and TGIC, CCG formulated the High Priority Imagery and Data Sets (HPIDS) contract establishing a pool of pre-qualified and contracted commercial data providers. This pool of proven companies offers capabilities to develop a wide range of geographic data resources. The HPIDS contract has realized \$1.8 million in savings to the state allowing increased quality and area of coverage of data serving multiple purposes.

Participants include Texas Forest Service, General Land Office, Bexar Metro911, San Antonio River Authority, City of Tyler, and Smith County, among others. The HPIDS allows for direct and concurrent purchase of data by state and local governments.

In 2008, Texas Commission on Environmental Quality, Commission on State Emergency Communications, General Land Office, and Texas Water Development Board, in addition to the U.S. Geological Survey, Farm Services Agency, and Natural Resources Conservation Service contributed to development of a statewide aerial imagery project. The products acquired delivered the highest resolution imagery for a statewide collection and included two seasons of coverage for East Texas and the Gulf Coast regions. Products from the effort have contributed to environmental modeling, emergency response networks, floodplain mapping, critical facilities assessments, coastal monitoring, and crop mapping.

Progress 2: Catalog of geospatial datasets

In *Digital Texas 2008*, TGIC identified an initiative to “develop a comprehensive online catalog of geospatial datasets including metadata records and information on the maintenance, custodianship, distribution, restrictions, and limitations of each dataset.”

In 2009, TGIC requested that DIR add a GIS dataset inventory component to the Information Resources Deployment Review (IRDR) process. This process requires each state agency by statute to conduct a biennial inventory of its information resources, based on instructions developed by DIR. TGIC and DIR jointly developed a schema for the inventory, which was included as Part 3.02 of the [2009 IR Deployment Review Instructions](#).

Agencies were asked to describe major, routinely used GIS datasets. They were instructed not to include datasets that are intended solely for internal use or that would have no interest outside the agency. In all, 655 major GIS datasets were reported by 20 agencies. The majority of datasets was reported by the following agencies and universities:

Major GIS Datasets Reported by Top Eight Agencies

Datasets	Agency
360	Texas Department of Transportation
86	Texas General Land Office
56	Stephen F. Austin State University
22	Texas Water Development Board
19	Texas Parks and Wildlife Department
19	The University of Texas at El Paso
16	Texas Commission on Environmental Quality
16	Texas Forest Service

The major dataset inventory, to be published by DIR, contains the following information:

- Dataset name
- Source
- Public availability
- Metadata status
- Additional information

This is the most complete statewide inventory of GIS datasets collected to date in Texas; however, it is very basic and does not fully implement TGIC’s plan for a comprehensive online catalog as described above. TGIC will explore options for utilizing the 2011 IRDR process to collect more detailed information and to publish a searchable catalog.

Progress 3: Catalog of geospatial web services

In *Digital Texas 2008*, TGIC identified an initiative to “conduct an inventory and develop a registry of state government geospatial web services.”

Example

The Texas Parks and Wildlife Department has developed a public web mapping service called the Tarpon Observation Network. The application allows anyone who hooks, lands, or otherwise observes tarpon to document the observation on an interactive Google map with details about the observation such as date, location, size, number, water temperature, and photos, if available. This program encourages the public to participate in developing a greater understanding of the status of the tarpon fishery in Texas. The service is available at www.tpwd.state.tx.us/tarpon.

In 2009, TGIC requested that DIR add a GIS web services component to the Information Resources Deployment Review process. TGIC and DIR jointly developed a schema for the inventory, which was included as Part 3.03 of the *2009 IR Deployment Review Instructions*.

Agencies were asked to identify each planned or current GIS web service they provided. In all, 110 web services were reported by 15 agencies. Of these, 88% are existing and 12% are planned. Most of these services (70%) are or will be available to the public. The majority of web services was reported by the following agencies and universities:

GIS Web Services Reported by Top Eight Agencies

Web Services	Agency
27	Texas Parks and Wildlife Department
18	Stephen F. Austin State University
16	Texas Department of Transportation
11	Texas Water Development Board
8	Texas Commission on Environmental Quality
8	The University of Texas at El Paso
7	Texas General Land Office
5	Railroad Commission of Texas

The web services inventory, which will be published by DIR, contains the following information:

- Web service name
- Purpose
- Status
- Public URL
- Additional information

This is the first inventory of GIS web services in Texas; however, it is very basic and does not fully implement TGIC’s plan for an online registry as described above. TGIC will explore options for utilizing the 2011 IRDR process to collect more detailed information and/or to implement a live registry.

Progress 4: Snapshot of GIS use in state agencies

Also at TGIC’s request, DIR included general questions about agencies’ use of geospatial technology in the 2009 IRDR process. The following summary statistics provide a snapshot of the extent of GIS use in the agencies:

- 42 agencies (32%) use GIS technology
- Of these agencies:
 - 35 (83%) use ESRI’s ArcGIS as their primary GIS software
 - 31 (74%) use or plan to use server-based GIS application software

- 25 (60%) use or plan to use a server-based spatial database
- 21 (50%) host or plan to host one or more GIS web services
- Over 4,500 agency staff use GIS software to perform some of their work
- Of these, 370 perform GIS duties full time

With assistance from DIR, TGIC will further analyze GIS content in the 2009 IRDR and will publish the results on TGIC's website in the spring of 2011.

Planned Initiatives 2011–2012



TGIC's primary goals are to promote geospatial data sharing, reduce duplication of effort among agencies, improve geospatial data quality, and make geospatial data created in the public domain easily accessible to everyone. In support of these goals, TGIC has defined a Texas Spatial Data Infrastructure (TSDI) as a component of the National Spatial Data Infrastructure (NSDI). The TSDI consists of eight components: geo data, coordination, partnership programs, clearinghouse network, web services, standards, metadata, and training and education. Together, these eight components provide the foundation for a shared services environment for geospatial technology in Texas that supports both the public and private sectors.

For the time period 2011–2012, TGIC has identified five primary initiatives that could further development of the TSDI. These initiatives were recommended by TGIC membership based upon priority needs coupled with staff resources that are realistically expected to be available within this time frame.

Initiative 1: Expand availability and usability of shared base map data



Through the ongoing efforts of many state agencies, partnerships with local and federal government agencies, and the stewardship of TNRIS, Texas has made great progress in building a shared digital base map containing those datasets that are most frequently needed to support a broad range of government activities. While development and maintenance of these datasets remains an ongoing priority, the state has increased its focus on improving the availability and usability of its existing shared base map data. This goes far beyond posting the raw datasets on the Internet. Currently, shared data projects in development include:

- **National Hydrography Dataset.** The Texas Water Development Board has authorized TNRIS to pursue a Memorandum of Understanding with the U.S. Geological Survey for stewardship of the National Hydrography Dataset. This federally coordinated effort will transfer to Texas primary responsibility for updating and editing the hydrography base map. TNRIS is in early stages of outreach and stakeholder development to seek qualified partnerships for sharing the maintenance of this common base map. Prospective partners include Harris County Flood Control District and the San Antonio River Authority.
The USGS logo consists of a green square with a white wave pattern, followed by the letters "USGS" in a bold, green, sans-serif font, and the tagline "science for a changing world" in a smaller, green, sans-serif font below it.
- **Enhanced Transportation Dataset.** A second project in pilot is development of a shared transportation dataset suitable for emergency and next generation (e911) call response. Led by the Commission on State Emergency Communications, the project is designed to tie together local and statewide transportation data into a seamless and matched database. The effort has fostered trans-
The CSEC logo features a stylized map of Texas with a white star on a blue background, and the letters "CSEC" in a bold, blue, sans-serif font to the right.

boundary cooperation and unified core data features to allow for more effective response to wireless emergency calls and is also designed to increase the quality and accuracy of routing emergency and public safety response vehicles.

- **Aerial Imagery.** The statewide aerial imagery project conducted in 2008–2009 has also been shared with commercial online mapping programs including Google and Microsoft. These companies have made the images available as part of their online base maps, which can be used freely by accessing their respective sites.

In October 2010, TNRIS deployed these data as a web service, allowing direct access by GIS applications across the Internet. This means of dissemination will lead to greater use and will avoid costs for users by eliminating the need to store the data on their own systems for work that only requires a screen image backdrop.

- **Emergency Management Support.** Situational Awareness has become a common phrase among emergency managers to describe a requirement for coordinated response and recovery during disaster events. In the aftermath of Hurricane Rita, TNRIS was awarded a grant by the Federal Emergency Management Agency (FEMA) to develop a statewide hurricane data repository. Known as the Geospatial Emergency Management Support System (GEMSS), the project's primary goal was to establish a geospatial data repository for emergency management in the State of Texas.

Initiative 2: Promote interoperability of agency-specific geospatial data

GIS technology is routinely employed by 42 state agencies and hundreds of city and county governments as well as other public sector entities in Texas. Each of these maintains unique geospatial datasets containing information that serves the specific purposes of the owning agency or jurisdiction.

Making these data interoperable promotes widespread exchange and collaboration among agencies and their programs. Interoperable data promotes more responsive and effective use of data investments and avoids significant costs of processing tasks and storage inefficiencies. Interoperability supports citizen-responsive government.

Promoting interoperability for ease of exchange and use involves addressing a wide range of data types—from technically robust base map data to spreadsheets and databases capturing detailed program information. The potential for associating program information that has already been tied to addresses or geographic coordinates opens up a vast opportunity to relate this information to a map and perform operations that can analyze these data in the context of other geographic data.

Example

The Texas Commission on Environmental Quality has developed several GIS viewer applications that seamlessly interoperate with a variety of other agency applications. For instance, an air quality monitoring station viewer communicates with the Texas Air Monitoring Information System to receive near real-time updates of air monitoring station locations. Users can select a station on a map to view more detailed site information and photos.

Areas of focus to further this initiative include:

- Broaden awareness of the opportunity to geo-reference data by combining raw data and report formats that currently include real-world coordinates and/or addresses.
- Migrate data already based on geographic coordinates to systems that publish these data as web services. This allows the data to be accessed from anywhere with an Internet connection and used as a continuously maintained source of information.
- Encourage development of minimum metadata documentation for sources and versions of systems and software.
- Perform outreach with IT managers to designate base level requirements for producing geographically enabled data.

Initiative 3: Propose updates to existing state GIS standards

State agencies deploy information technology in various ways to support their missions. Texas has adopted certain standards through administrative rule to ensure that agencies use IT in a cost-effective manner from an enterprise perspective, while allowing agencies to innovate to best meet the needs of their specific missions.

The Department of Information Resources is the agency responsible for adopting state IT rules. One of the basic purposes of TGIC is to advise DIR on appropriate statewide geospatial standards. The current GIS administrative rule, [1 TAC 201.6](#), is largely based on recommendations submitted to DIR by TGIC. The rule contains five standards areas, each referencing one or more policies or standards:

1. Geospatial data acquisition and development
2. Geospatial data exchange
3. Geospatial data documentation
4. Mapping datum
5. Statewide mapping system

The GIS rule has remained unchanged since 2001. DIR intends to review and revise the rule in 2011 using standard rulemaking procedures. Through its member organizations, many of

which are state agencies that are subject to the GIS rule, TGIC is in an excellent position to identify and consider possible updates and changes to the rule. Recommendations passed by TGIC and forwarded to DIR in 2011 will be the starting point for the formal rule revision process.

Initiative 4: Encourage cost-efficient and shared geospatial data procurement

The High Priority Imagery and Data Sets (HPIDS) procurement contract developed by the Council on Competitive Government has established a unique capability for Texas to efficiently establish data acquisition partnerships for all levels of government. To date the contract has realized \$1.8 million in savings to the State of Texas based on final negotiated pricing compared with average market responses from the pool of vendors.

The establishment of a standard set of terms and conditions aligned with state purchasing guidelines has resulted in a much more responsive mechanism to engage across levels of government and work within different budget and approval cycles.

The contract has been successfully used by over a dozen local jurisdictions to combine requirements for updated geographic data. The process also allows the state to coordinate the requirements within program priority areas (such as floodplain mapping).

The process allows local governments to access the state contract for their use separate from state program involvement. Most of the projects conducted so far have involved state funding participation and additional assistance with quality assurance and project management.

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