The State of Kansas
GIS Policy Board's
Data Access and Support Center (DASC)
FY2007 Annual Report

Outline:

DASC is located at:

University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, Kansas 66047
Tel: 785-864-2000 Fax: 785-864-5317
dasc@kgs.ku.edu
www.KansasGIS.org

This report was prepared by the DASC staff:

Ken Nelson, DASC Manager
Eileen Battles, GIS Specialist
Nick Callaghan, GIS Specialist
Lisa Hallberg, Web Portal Manager
Brent Miller, GIS Specialist

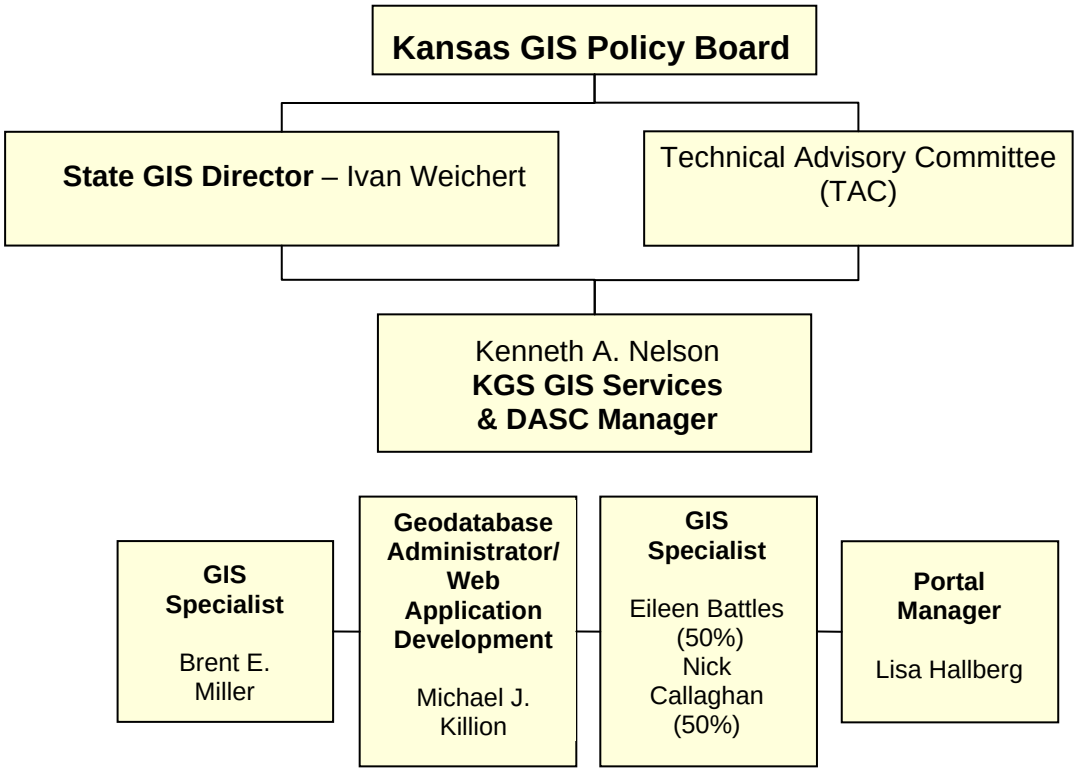
Introduction

The Data Access & Support Center (DASC) serves as the geospatial data clearinghouse for the State of Kansas. DASC was formed by the Kansas GIS Policy Board in 1991, and is located at the Kansas Geological Survey (KGS) at the University of Kansas. DASC operates under the direction of the Kansas GIS Director and Kansas GIS Policy Board, and provides a variety of services to the Kansas GIS community including:

- Database archival and distribution;
- Database quality assurance/quality control (QA/QC);
- Technical assistance;
- Geospatial metadata development assistance;
- Web application development and hosting;
- Database development;
- Cartographic development;
- Promotion of the Kansas GIS Initiative.

This report provides a detailed description of the services provided by DASC during State of Kansas Fiscal Year 2007 (July 1, 2006 - June 30, 2007).

DASC Organizational Chart



University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

Executive Summary

Since its inception in 1991, the Data Access & Support Center (DASC) has served as the State of Kansas GIS Data Clearinghouse. Over the past 16 years, GIS technology has continued to evolve and mature. Hardware and software have become more affordable, GIS software tools have become easier to use, and web-based GIS applications and services have made geospatial data and technologies accessible to an ever-growing user audience. Throughout this time of change, DASC's mission has remained the constant – to provide efficient and effective data archival and distribution services. While the toolkit for providing these services has changed significantly since 1991, DASC's focus on customer service continues to be of utmost importance.

During FY07, demands for DASC services reached all-time highs. DASC provides access to the Kansas Geodatabase in a variety of ways – prepackaged data files available for download in multiple vendor-specific formats, web-based GIS applications, and a series of web mapping services. DASC distributed over 315,000 files, representing 17.5 TB of data. Of these files, over 244,000 were distributed from the DASC web site, representing a significant increase from FY06.

Through the use of GIS server technologies, DASC provided data and geospatial services to a wide variety of users. DASC provided custom web-based application development and hosting services for state agencies, local government, and non-profit organizations. Web-based GIS applications have effectively enhanced access to the Kansas Geodatabase and broadened the reach of the GIS technology. Historically, only those with expensive GIS software, high-end workstations, and technical training could benefit from the state's investment in geospatial technology and data. The availability of web-based GIS software, combined with DASC's Web Services Initiative, has allowed more users to benefit from geospatial technology, resulting in a much larger return on investment. DASC's web-based applications generated over 2.3 million map images displaying content from the Kansas Geodatabase. These applications were accessed from over 75,000 distinct Internet Protocol (IP) addresses.

During FY07, DASC continued to serve the Kansas GIS community and promote the vision and concepts of the Kansas GIS Initiative. DASC staff gave several presentations at GIS-related events and conferences. DASC staff members also served on several GIS planning committees including the Kansas GIS Policy Board's Technical Advisory Committee (TAC), TAC Imagery & Elevation Data Committee, TAC Transportation Data Committee, TAC Land Surface/Geology/Soils Data Committee, TAC Water Resources Data Committee, Kansas GIS Collaborative GIS Breakthrough Team, and the Kansas GIS Strategic Planning Committee. Participating in these activities provides an opportunity for DASC staff members to educate others about DASC services and build relationships with the Kansas GIS community.

During FY07, DASC strengthened its role as an area-integrator and a key contributor to the development and maintenance of strategic statewide databases that require state, regional, and local partnerships. DASC developed conflation techniques designed to effectively integrate local road updates into the Kansas Department of Transportation (KDOT) statewide road network. DASC developed a partnership with KDOT and Fort Hays State University (FHSU) and successfully acquired funding from the Kansas GIS Policy Board to implement the conflation techniques and develop a program that will allow for regular updates of the statewide road network. DASC also worked with county clerks to acquire and integrate local tax unit boundaries, which are the building blocks of several different types of local administrative boundaries. Additionally, DASC initiated a pilot project to develop a statewide situs address (address points) database based on information collected from local government and the private sector.

The remainder of this report provides a detailed description of DASC's objectives and accomplishments during FY07, and identifies initiatives and direction for the coming year.

University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

Funding:

DASC relies on three primary funding sources to support the variety of services it offers. These funding sources include the annual baseline funding provided by the State of Kansas Department of Administration (KDA) Division of Information Systems and Communications (DISC), in-kind support provided by the Kansas Geological Survey (KGS), and fee-for-service activities. The FY07 baseline funding provided by DISC was $246,316. The DISC funding provided salary support for the following positions: 2.5 full-time GIS specialists; one full-time web application developer; and a small percentage of the DASC Manager's salary. The baseline funding also helped cover costs of hardware and software acquisition, maintenance fees, and limited in-state and out-of-state travel. KGS provides operational support for DASC in the form of office space, telecommunications, use of KGS vehicles, and access to computer support staff and IT infrastructure.

In addition to the annual funding provided by DISC and the operational support provided by KGS, DASC also generates revenue through fee-for-service activities and grant funding opportunities. The revenue generated by these activities (usually referred to as "additional initiatives" or "secondary services") broadens the scope of the DASC program, increases our capacity to provide service, and helps cover the rising hardware and software costs of providing IT-related services. Because the additional initiatives do not follow set fiscal calendars, the most effective way to quantify the level of activity within any given state fiscal year is to calculate the total salary expenses for the entire DASC staff, not just those funded by the annual contract. The total DASC staff expenses (gross salary+fringe benefits) for FY2007 exceeded $300,000. This total staffing expense fluctuates annually depending on the amount of fee-for-service or grant-related activity. Considering the various funding sources, the total financial commitment required to fund the DASC operation during FY07 exceeded $350,000.

DASC's baseline funding support has remained stagnant for the past four fiscal years. While we have been successful in acquiring additional funding through fee-for-service activities, it is becoming challenging to provide a stable funding base that addresses all aspects of the program. As DASC continues to expand its services portfolio to include coordination activities, local government partnerships, database development and integration activities, and local data backup, in addition to its traditional data archival and distribution services, it will become increasingly important that the baseline funding support for the program increase to allow us to effectively provide service in all areas. DASC continues to work with the State of Kansas GIS Director on strategies for acquiring the necessary budget increase.

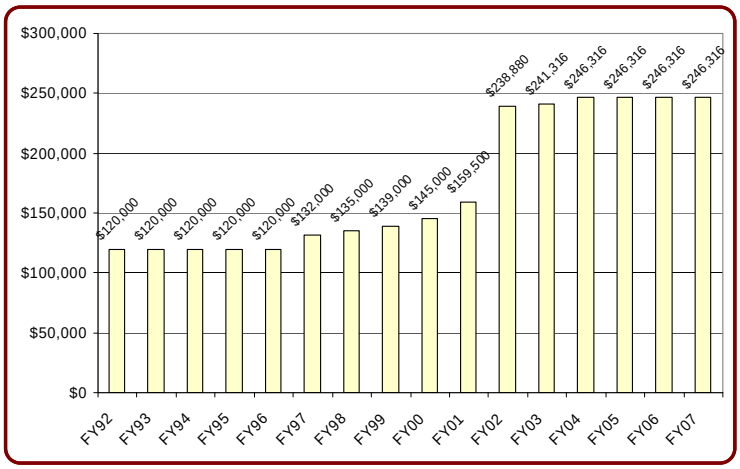


Figure 1 - DASC baseline budget from DISC

University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

FY07 IT Architecture:

Note: As previously noted, DASC is located at KGS and benefits from the KGS IT infrastructure and computer services staff. The resources and practices listed below represent the efforts of both DASC staff and support from KGS computer services staff.

Software environment:

Function	Product	Platform
Web server	Apache HTTP Server	Unix/Windows
Servlet engine	Apache Tomcat	Unix/Windows
Web application server	ColdFusion	Windows
GIS software	ArcGIS	Unix/Windows
Internet Map Server	ArcIMS	Windows
Spatial Database Engine	ArcSDE	Unix
RDBMS	Oracle	Unix

Hardware environment:

Web application server:	Dell PowerEdge, Dual Xeon 3.2 Ghz, 1GB RAM, 1.2 TB
RDBMS server:	SunFire, Quad UltraSparc III, 16GB RAM, 2+TB storage, RAID 5 configuration
Web document server:	Adaptec Snap Server, 1.5TB, RAID 5 configuration

Data Backup policy:

Redundant data backup:
- On-site/off-site;
- Multiple electronic media formats (CD, 8mm tape, DLT tape, DVD);
- Oracle backup & file-based system backup.

Redundant Oracle server:
- Nightly replication;
- Hosted at KU Computer Center;
- Hosted at the Arkansas Geographic Information Office (AGIO).

University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

Description of Primary Services:

- Review core data sets and check work of contracting agencies to assure compliance with contract specifications and Kansas database standards;
- Provide monthly and semi-annual database compliance reports to the Technical Advisory Committee (TAC);
- Respond to requests for basic conversion services from all federal/state/municipal tax-supported agencies/entities for the cost of media and shipping and handling. Basic conversion services shall include the processing of the Kansas Geodatabase in their native projection and tiling;
- scheme into DASC-supported spatial data exchange formats and also include technical support for the loading and importation of the data;
- Respond to requests on a need/priority basis established by the DASC manager and periodically reviewed by the TAC. Maintain an accurate and complete log of all requests, work, and consultation;
- Provide basic conversion services to private sector or non-tax-supported organizations on a fee-for-service basis;
- Provide supplemental conversion services to all organizations on a fee-for-service basis as specified in the DASC fee schedule. Supplemental services shall include the alteration of native projection, tiling scheme, or topological structure. Respond to requests on a need/priority basis established by the TAC;
- Prepare, maintain, and distribute a Kansas Geodatabase catalog. Use various methods including the Kansas Geospatial Community Commons (KGCC) web site and GIS newsletters to distribute information on updates to the catalog;
- Maintain an on-line digital data library of Federal Geographic Data Committee (FGDC) compliant metadata and GIS databases. Maintain a National Spatial Data Infrastructure (NSDI) compliant clearinghouse node on the Internet; as per the agreement with the USGS NSDI program. Archive old databases as revised databases are received from custodial agencies. Publish new databases received from custodial agencies that meet Kansas quality standards;
- Work with the TAC and other appropriate groups on development, refinement and implementation of standards to facilitate data exchange and compatibility;
- Document problems, errors, deficiencies and needs of the core database using established procedures for error reporting and internal error detection. Recommend corrective action;
- Consult with the TAC on a regular basis regarding development and implementation of annual implementation plans, delivery of DASC services, coordination of agencies' database development projects and acquisition of digital data.

University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

Database Archival and Distribution: A primary service DASC provides is the collection, testing, archival, and distribution of geospatial databases. DASC maintains records to track database deliveries (provider, description, metadata, number of files, file size, delivery date, update status), database testing and publication records, and database distribution statistics (number of files, file size by database, total file size, customer, delivery method). The following figures summarize database delivery, testing, and distribution activities for the past fiscal year. There was a significant increase in the number of files delivered to and tested by DASC in FY07. This increase is primarily due to three large databases that were delivered during FY07 – Kansas River Corridor LIDAR study, 2006 NAIP in GeoTIFF format, and 2006 Color Infrared (CIR) in GeoTIFF format. Theses databases contain several thousand files and are terabytes in size. Because these databases were in such high demand, they also account for the large increase in the number of files and terabytes delivered by DASC in FY07.

Figure 2: Database Deliveries to DASC – Number of Data Files Tested:

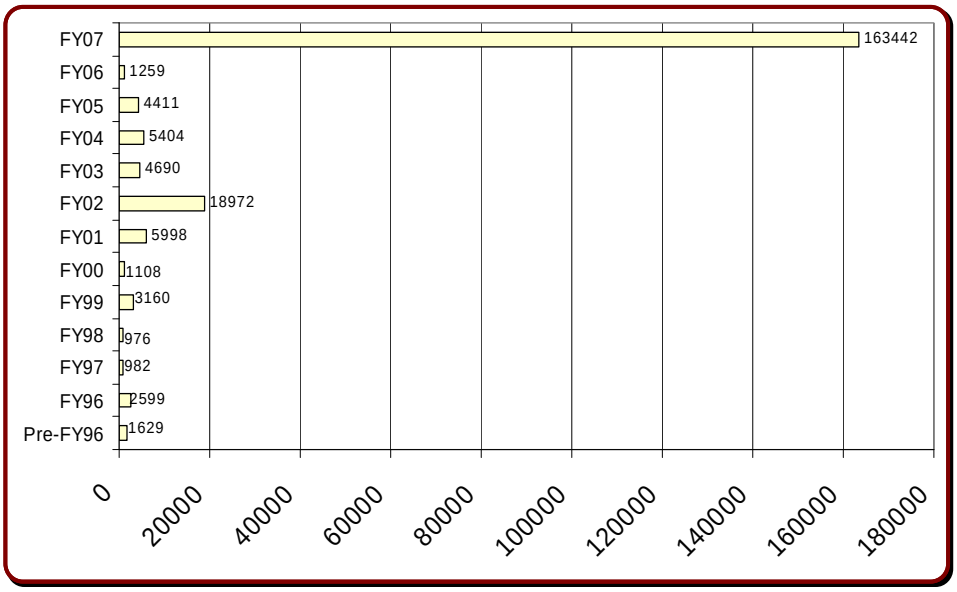
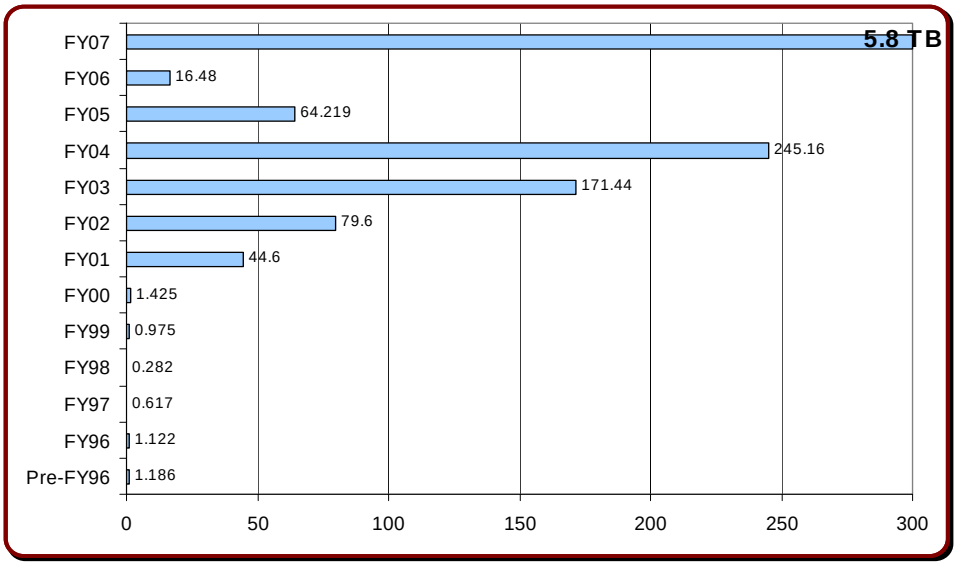


Figure 3 - Database Deliveries to DASC – Total file size delivered:

Note: FY96-FY06 in GB, FY07 in TB



University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

Figure 4 - Staff-assisted Database Requests:

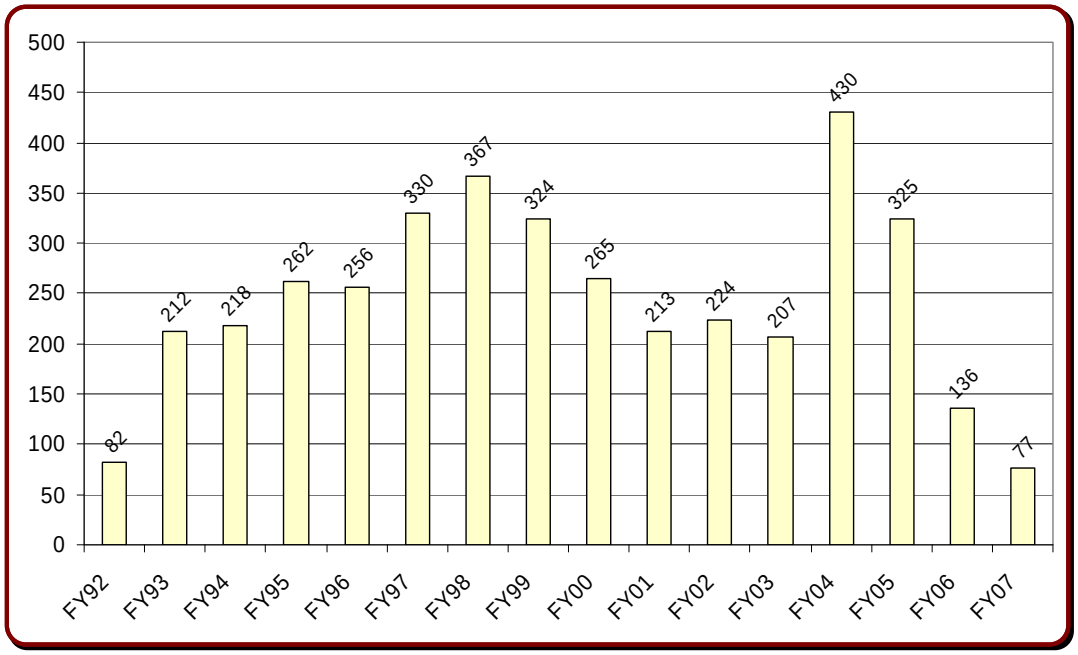
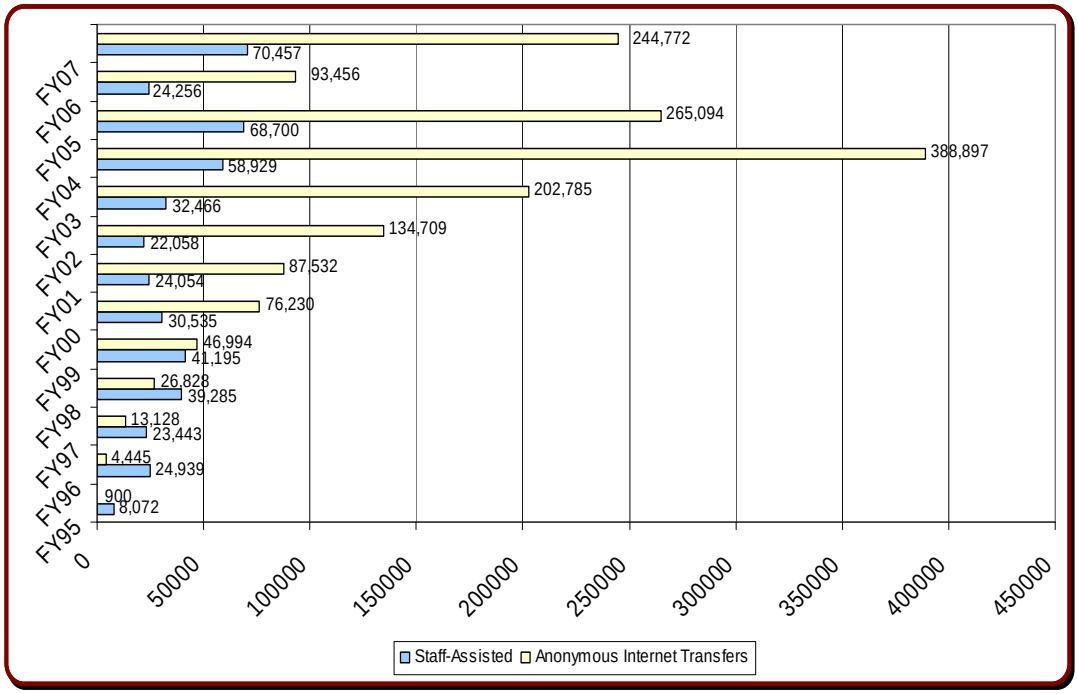


Figure 5 - Total Files Distributed: FY95 – FY07



University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

Figure 6 – Total Number of Gigabytes Distributed: FY97 – FY07

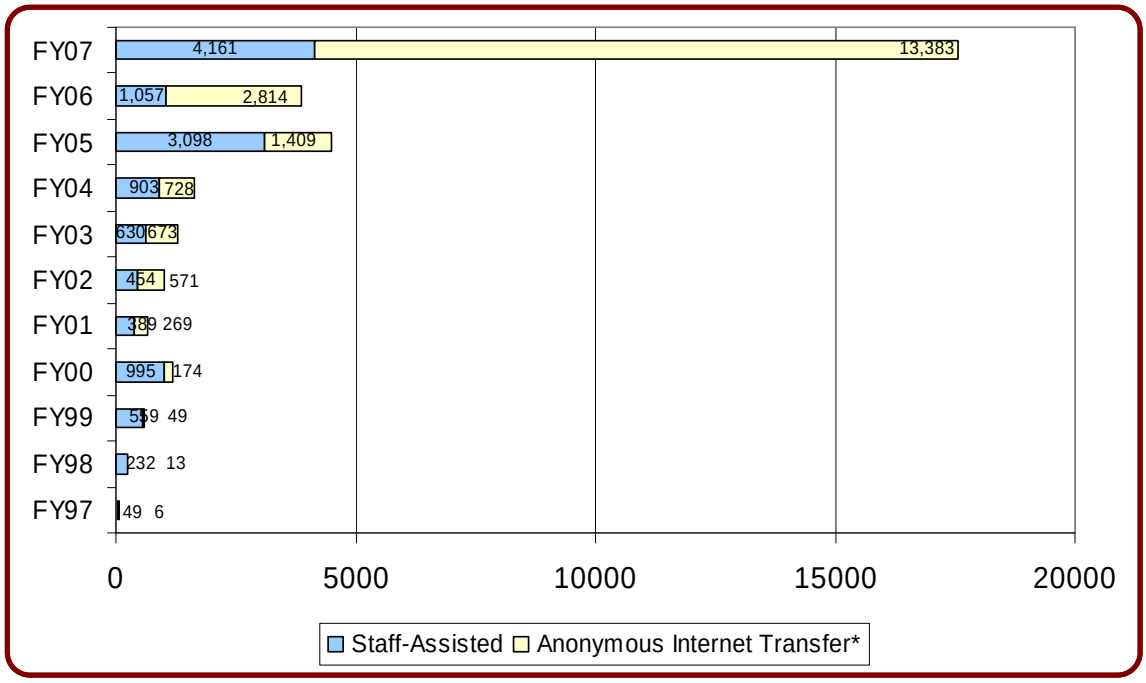
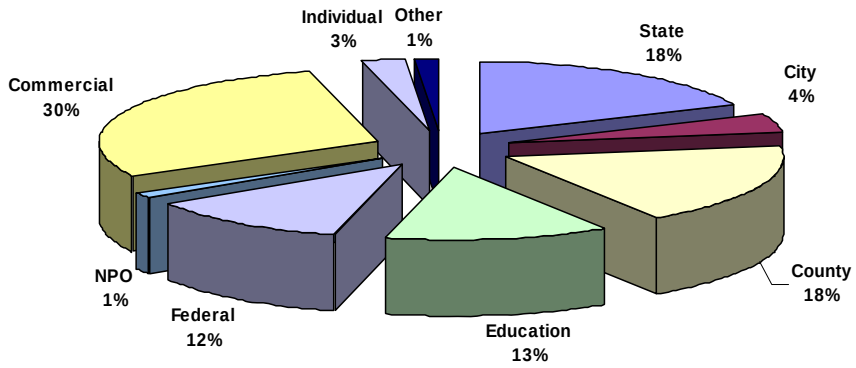


Figure 7 - Requests by Organization:



University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

Description of Secondary Services:

- Provide GIS products and services other than those related to the GIS Core Database (e.g. maps and technical support for the use or application of the data) to all organizations on a fee-for service basis;
- Provide professional development opportunities for DASC staff through attendance at various meetings, conferences and workshops related to GIS technology and DASC services;
- Accept and make available other GIS and thematic data layers or metadata documentation that meet minimum standards established by the TAC and that have been approved for acceptance by the Board. Encourage database requesters to share end products derived from the core database;
- Promote GIS technology and use of the Kansas Geodatabase;
- Improve various databases acquired by the Board to produce a more usable GIS product. Convert and transform these databases as directed by the TAC;
- Seek out additional funding sources to extend DASC's mission and services.

NOTE: Provided as resources are available. Any fees derived from DASC activities shall be accounted for separately and shall be applied to the DASC operation as specified by the Board.

Coordination & Promotion Activities:

DASC staff members served on the following committees:

- Kansas GIS Policy Board's Technical Advisory Committee (TAC);
- TAC Imagery & Elevation Data Committee;
- TAC Land Surface/Geology/Soils Data Committee;
- TAC Transportation Data Committee;
- TAC Water Resources Data Committee;
- MidAmerica GIS Consortium (MAGIC);
- Kansas Association of Mappers (KAM);
- Kansas Collaborative GIS Breakthrough Team;
- GIS Strategic Planning Committee

DASC hosted and maintained the web sites and email list servers for KAM, MAGIC, TAC, and the TAC data committees. DASC's involvement in these activities has helped to build and maintain solid working relationships with GIS and IT professionals within the Kansas GIS community and the MAGIC region.

University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

Coordination & Promotion Activities:

The following table (figure 8) represents the schedule of events (i.e. conferences, workshops, training courses, and symposiums) that DASC participated in during FY07.

Date	Event	Location	Activity
August 6-11, 2006	Annual ESRI User Conference	San Diego, CA	Attended Conference
August 21-22, 2006	MAGIC States Clearinghouse meeting	Little Rock, AR	Attended Meeting
August 31-Sept 1, 2006	NHD Maintenance Workshop	Manhattan, KS	Attended Workshop
September 20-21, 2006	Kansas County Officials Association (KCOA) Annual Conference	Wichita, KS	Booth Display
October 1-4, 2006	National States Geographic Information Council (NSGIC) Conference	Little Rock, AR	Attended Conference
October 2-4, 2006	Kansas Association of Mappers (KAM)	Wichita, KS	DASC Presentations/Booth Display
October 10, 2006	KU Geography Seminar Course	Lawrence, KS	DASC Presentation
October 16, 2006	Association of Public Communications Officers (APCO) – KS Chapter Annual Conference	Mayetta, KS	Kansas GIS Initiative Presentation
November 8, 2006	KSU GIS Class Presentation	Manhattan, KS	DASC Presentation
November 15, 2006	GIS Day - Fort Hays State University	Hays, KS	DASC Presentation
November 19-21, 2006	Kansas Association of Counties Conference	Topeka, KS	Booth Display
December 5, 2006	Joint Committee on Information Technology (JCIT) meeting	Topeka, KS	DASC Presentation
December 14, 2006	Kansas Association Wetlands & Streams (KAWS)	Hutchinson, KS	KAWS Mapper Training
January 3-4, 2007	ArcGIS Server Studio	St. Louis, MO	DASC Training
January 4, 2007	Kansas Association Wetlands & Streams (KAWS)	Lawrence, KS	KAWS Mapper Training
January 16, 2007	LIDAR Workshop	Kansas City, MO	DASC Training
January 17, 2007	Watershed Restoration & Protection Strategy (WRAPS) Conference	Wichita, KS	KAWS Mapper Presentation
January 30, 2007	KDA Workshop	Pittsburg, KS	DASC Presentation
February 1, 2007	KDA Workshop	Salina, KS	DASC Presentation
February 9, 2007	Geological Survey Advisory Council (GSAC) meeting	Lawrence, KS	DASC Presentation
March 20, 2007	Osage/Lyon/Coffey County Tax Units project	Emporia, Lyndon, & Burlington, KS	Presentations/Meetings
March 27-29, 2007	Kansas Rural Water Association (KRWA) Annual Conference	Wichita, KS	DASC Presentation/Booth Display
May 2-4, 2007	Kansas County Clerks Conference	Manhattan, KS	Booth Display
June 12, 2007	Nebraska GIS Steering Committee	Lincoln, NE	Kansas GIS Initiatives/DASC services presentation
June 18-22, 2007	Annual ESRI User Conference	San Diego, CA	Attended conference
June 20, 2007	Kansas Association of Local Health Departments (KALHD)	Wichita, KS	IMS presentation

University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

Additional Initiatives: Database Development & Integration

During FY07, DASC worked to expand its role as a database area integrator. Providing this geodatabase service is a growing trend among state GIS data clearinghouses. Many of the databases required by GIS users originate at the local level and local government is commonly the source of the most current and accurate data. Rather than duplicating this effort at the state level, a better approach is to leverage the investment of producing the data at the local level, and integrating the data into seamless statewide layers. A key related issue related is coordination, as data integration relies on the willingness of other organizations to share their data. Due to DASC's involvement in the local government outreach activities led by the Kansas GIS Policy Board and the Kansas Collaborative, we have built many of the relationships required to support this activity. During FY07, DASC focused its database development and integration efforts on the following projects:

Tax Units/Administrative Boundaries: DASC began a collaborative effort with county clerks across the state to create and verify a statewide tax unit boundary map. Tax units form the building blocks of over 30 different types of local administrative boundaries. Building and maintaining a statewide view of this data is of benefit to state, local, and regional organizations and could be particularly useful in emergency management situations. In an effort to generate interest and support in the project, DASC attended two statewide county clerks' conferences and followed up with phone calls and emails as necessary. As a result of this concerted effort, many counties support the project and have shared data with DASC that will be used to update the current version of the database.

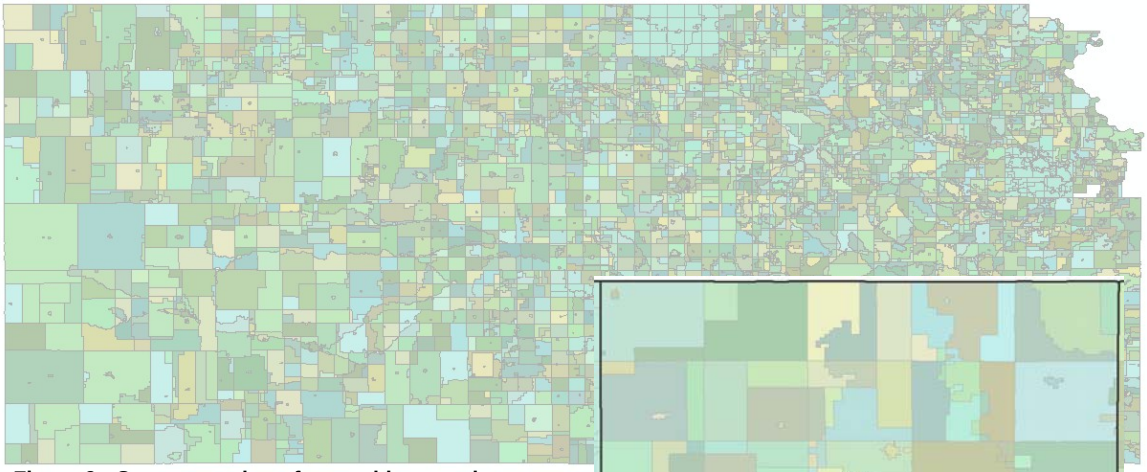


Figure 9 - Current version of statewide tax unit map

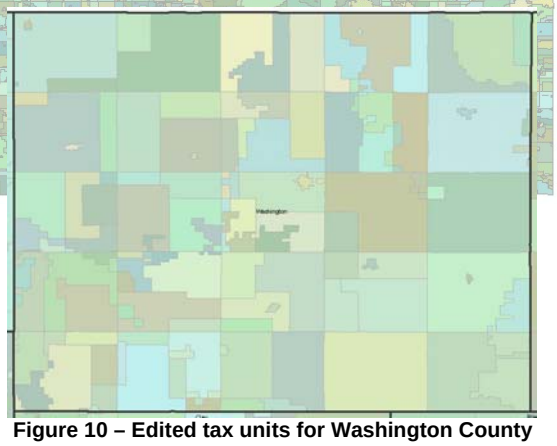
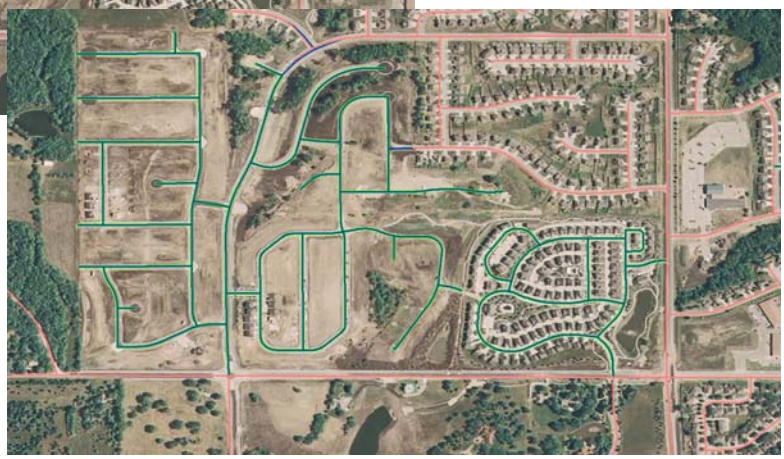


Figure 10 – Edited tax units for Washington County

University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

All-Roads Update & Local Data Conflation: During FY07, DASC began working on a process to efficiently integrate local road centerline data into KDOT's non-state system database. Road centerlines are one of the most common data layers built and maintained by local government. Additionally, local road data often contains a high level of attribution (e.g., address ranges, road type, road surface, speed limit, maintenance) that is difficult to maintain at the state level. DASC has worked to develop a partnership with KDOT and FHSU to implement these new conflation and update techniques during FY08 in order to leverage the investment in KDOT's non-state system database.

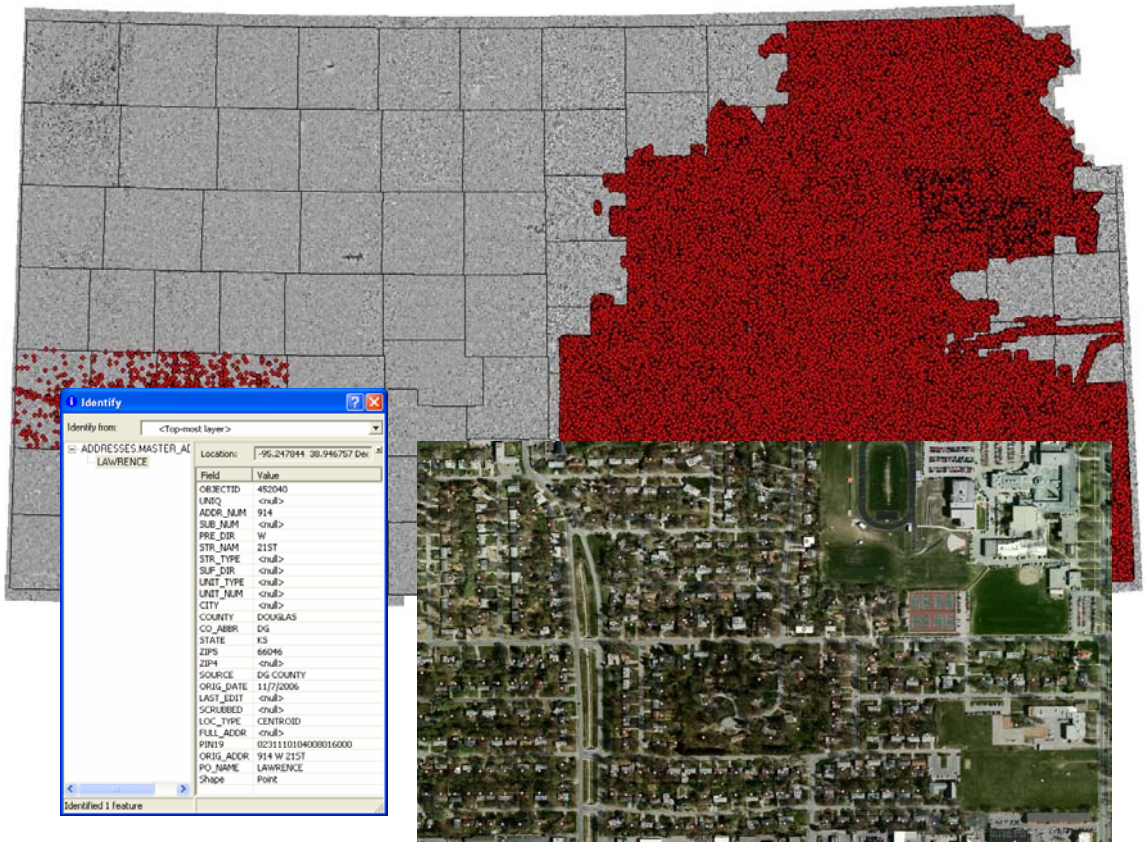
Aerial photo showing new local roads not contained in the statewide road database



Aerial photo and local government road centerline data (green lines on image)

University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

Address Points Pilot Project: A growing trend in the GIS industry is to develop situs address (address point) databases to more effectively model and manage address data. Traditionally, address data in a GIS has been in the form of address ranges tied to a road centerline network. While this type of database model is still useful, there is tremendous value in knowing the precise location of an addressable structure, rather than an interpolated point along a road segment. During FY07, DASC worked with local governments and the private sector to acquire address point data and integrate it into a common database structure. While this work was done as a test, the results were very encouraging and have generated a great deal of interest in the project.



University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

Web Services:

During FY07, DASC continued to promote its web services initiative. The goal of this initiative is to provide cost-effective geospatial web services to state and local government. Application development and hosting services are provided on a fee-for service basis. The fees charged for these services are used to cover personnel expenses and to support hardware and software infrastructure.

Applications hosted during FY07:

- Statewide Comprehensive Outdoor Recreation Plan (SCORP) - Kansas Department of Wildlife & Parks (KDWP);
- Archeological Spatial Data Server - Kansas State Historical Society (KSHS);
- Find My Elected Officials - Kansas Legislative Research Division (KLRD);
- Equus Beds Information Resource - Kansas Department of Health & Environment (KDHE);
- Kansas Green Report - Kansas Applied Remote Sensing (KARS) Program;
- Kansas Registered Offenders - Kansas Bureau of Investigation (KBI);
- Douglas County Property Valuation Viewer - Douglas County, KS;
- City of Lawrence Map Viewer - City of Lawrence, KS;
- Shawnee County Public Access GIS Viewer - Shawnee County, Kansas;
- Watershed Project Management System v2.0 – Kansas Water Office (KWO);
- NEKES Map Viewer - Northeast Kansas Environmental Services;
- Cost Share Management System Map Viewer - State Conservation Commission (SCC);
- Pharmfinder - Kansas Dept. of Health & Environment (KDHE);
- KAWS Map Viewer Kansas Alliance for Wetlands & Streams;
- CommunityRx Network - Division of Health Policy & Finance;
- Kansas MapMaker - Kansas Geolocator, Kansas MapServer, Kansas ImageViewer, Kansas Land Cover, Kansas Aquifers, and Kansas Basemap - general purpose data viewing applications developed and hosted by DASC.

Applications under development/enhancement during FY07:

- Water Use Filing Reporting System - Kansas Department of Agriculture/Division of Water Resources (KDA/DWR);
- Historic Property Inventory - Kansas State Historical Society (KSHS);
- RecFinder – Kansas Department of Wildlife & Parks;
- KALHD Mapper - Kansas Association of Local Health Departments (KALHD);
- Floodplain Mapping Interactive Mapping System, Kansas Department of Agriculture (KDA);

Applications scheduled for development or enhancement during FY08:

- New web mapping application framework for all applications;
- Water Use Filing Reporting System - Kansas Dept. of Agriculture/Div. of Water Resources;
- Archeological Sites Database & Map Viewer v2.0 - KSHS;
- Douglas County Property Valuation Viewer enhancements - Douglas County, KS;
- Geolocator enhancements - DASC;
- RecFinder enhancements - DASC/KDWP.

University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

Figure 14 - FY07 Top 20 Map Services by Number of Images:

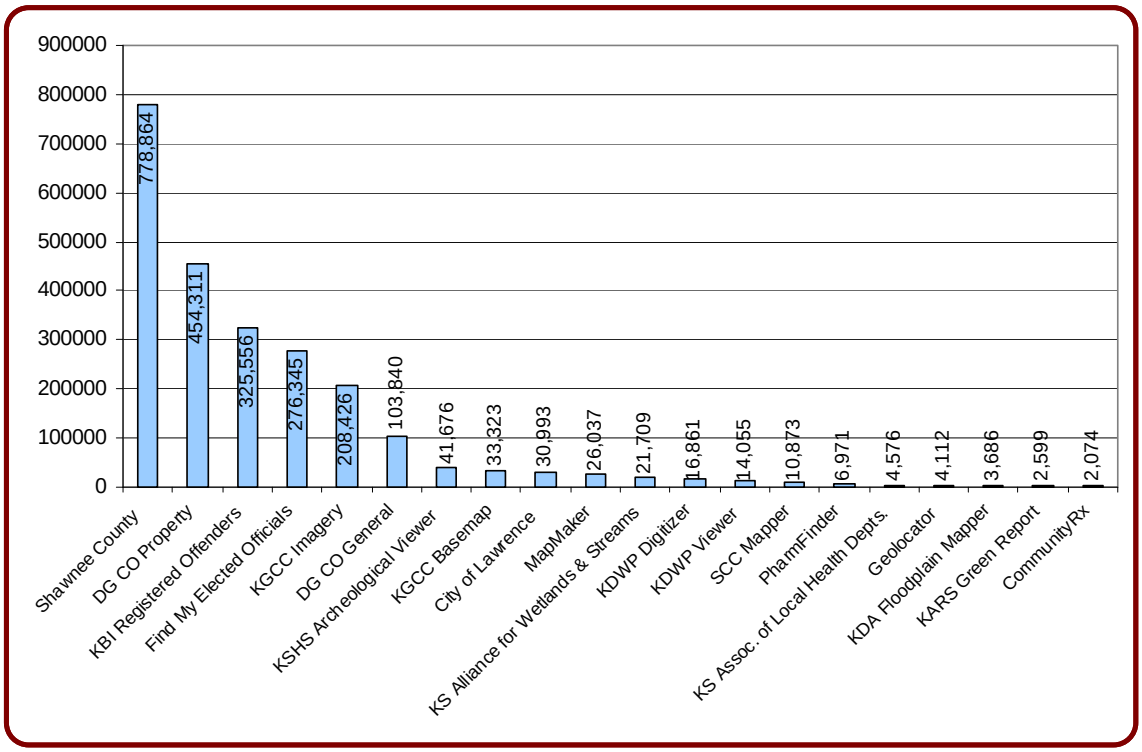
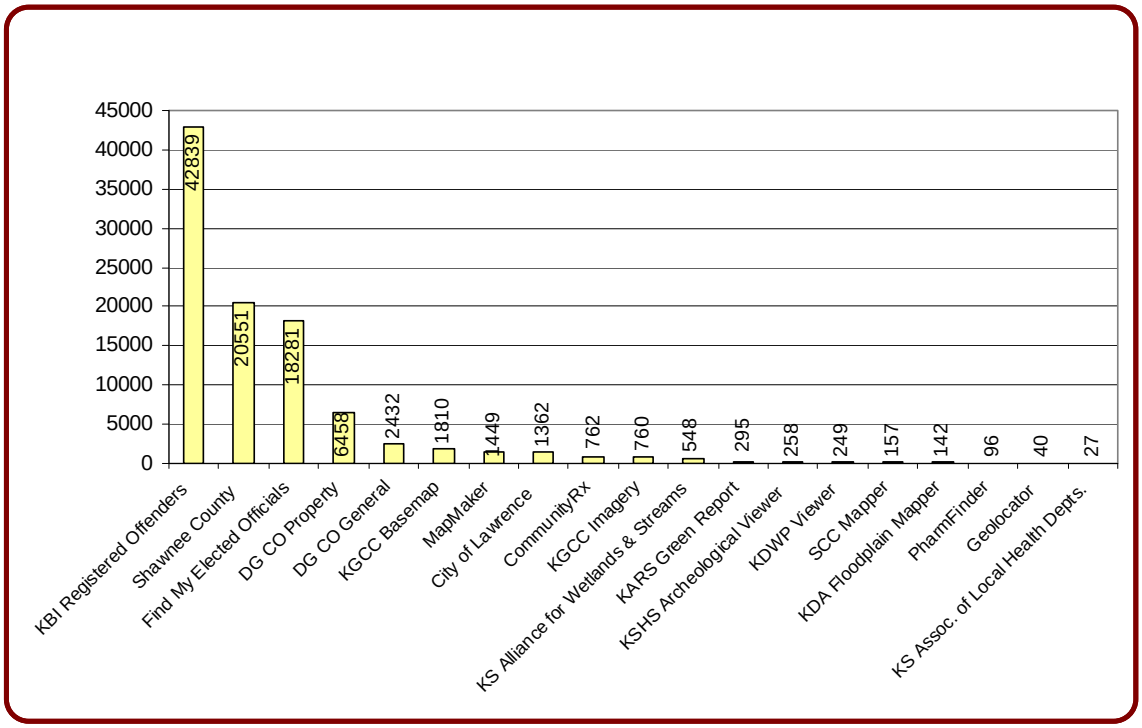


Figure 15 - FY07 Top 20 Map Services by Distinct IP addresses:



University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

Future: During FY08, DASC will focus its efforts in three primary areas – portal design and web services infrastructure, database development and integration, and promotion and coordination.

Portal Design and Web Services Infrastructure: Web-based GIS technologies have continued to evolve over the past several years. Once viewed as high-tech "eye-candy," web-based GIS services are now part of the standard business practice for many organizations. With the recent development of new and improved server technologies from ESRI like ArcGIS Server and ArcGIS Image Server, DASC is planning a major overhaul of its web services infrastructure. In addition to implementing the latest technology from ESRI, DASC is also planning to upgrade many components of its underlying IT infrastructure to add storage capacity, increase speed, and to improve uptime. This new web services infrastructure will allow DASC to effectively serve a much larger user audience and will result in a web service platform that is dependable and scaleable.

Along with the improved services infrastructure will come a new design for the KGCC portal. While we have received many compliments regarding our web site, there is always room for improvement. Historically, the KGCC portal has been designed with a technical audience in mind. A main focus of the redesign effort will be to make it easier for novice and intermediate users to navigate through the site and find the data and services they need. DASC plans to conduct a customer survey in order to collect information that will be used to help guide development of the new web site.

Database Development and Integration: During FY08, DASC will continue to expand its role as an area-integrator to support the development and maintenance of strategic statewide databases. DASC will focus this effort on four primary databases – statewide road centerline database, tax units/administrative boundaries, situs address database (address points), and voting districts update. The goal of these projects is to develop the partnerships and processes necessary to continually maintain the databases. In some cases the approach will be to simply send out hardcopy maps and ask our partners to annotate the necessary database updates. In other cases, we will implement cutting-edge data replication services to support the collection and integration of database updates. While the goal is to develop processes that are efficient and sustainable, it is important to recognize that our partner organizations are at different levels of technical capability and a one-size-fits-all solution is not necessarily the best approach. One important element of all of these projects is that they rely on local government support and participation. DASC will continue to work with the Kansas GIS Policy Board and the Kansas Collaborative's GIS Breakthrough Team in order to develop and maintain the relationships necessary to support this activity.

Coordination & Promotion: DASC will continue to actively participate in promotion and coordination activities. Staff members will continue to serve on the TAC and TAC database committees, the Kansas Collaborative's GIS Breakthrough Team, and the Kansas GIS Strategic Planning committee. DASC's involvement with these activities enables effective communication with our partners and customers and helps to ensure continual alignment of DASC services with the needs of the Kansas GIS community. Because many of the data development and integration activities mentioned above rely on the free and open sharing of local government data, DASC will continue to explore service and partnership opportunities in order to develop mutually beneficial relationships.

University of Kansas
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047