

Homeland Security San Juan Basin Demonstration Project

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Abstract

The Homeland Security San Juan Basin Demonstration Project (SJBDP or “Project”), in simple terms, is a survey-based geographic information system (GIS) utilizing the Public Land Survey System (PLSS) as its base layer. However, upon closer inspection one will find more than boundary surveys and “traditional” GIS coverages referenced to the PLSS. The SJBDP is a unique combination of public, private, and corporate data sets, all referenced in one system designed to meet the business needs of the Project’s partners. This paper will describe the origins of the Project, the current status of the Project, and will describe what the partners foresee for the Project’s future.

Introduction

In February 2003, shortly after Congress created the Department of Homeland Security (DHS), representatives from the Federal Geographic Data Committee’s (FGDC) Subcommittee on Cadastral Data, comprised of members from the Bureau of Land Management (BLM) Cadastral Survey Program, the States of Montana, North Carolina, and Utah, and Oakland County, Michigan, conferred with representatives from DHS and the Federal Emergency Management Agency. The objective of the meeting was two-fold. First, the subcommittee members wanted to demonstrate how the Federal government, States, and counties were utilizing survey-based GIS’s to meet everyday business needs of their respective organizations. The second objective was to demonstrate how the BLM and its subcommittee partners could assist DHS in fulfilling a portion of its responsibilities in protecting the nation from future terrorist attacks.

The presentation was successful and the BLM was asked to detail a person to DHS to assist in creating a survey-based GIS for the entire United States. Unfortunately, the cost of creating this system proved to be beyond what DHS leadership had expected and what could be supported in Fiscal Year 2004 (FY2004), and therefore removed this project from the list of funded projects for FY2004.

Despite the lack of support from DHS, the BLM and its subcommittee members still believed in the vision of this survey-based GIS, and decided to go forth with the original proposal, but on a limited basis. The BLM’s leadership approved a proposal in June 2003, to create a demonstration project in the San Juan Basin, with initial funding provided by the Cadastral Survey Program.

The Vision

The vision of a survey-based GIS is not a unique. States, counties, and local governments in various parts of the United States have created similar systems. For example: The State of Montana has created its “Montana Cadastral Mapping Project,” and hosts the information via the Internet. The homepage of the Montana Cadastral Mapping Project describes the project as follows:

The Project is public-private sector partnership to create, maintain, and disseminate a digital GIS land ownership (cadastral) map database of the entire state. Parcels and real property are mapped and maintained by state and county cartographers. Interactive maps and descriptive data are available on this site for each parcel. Descriptive data are derived from the Montana Department of Revenue CAMA (Computer Assisted Mass Appraisal) database. Project status and techniques can also be found here as well as an FTP site to download raw data files.¹

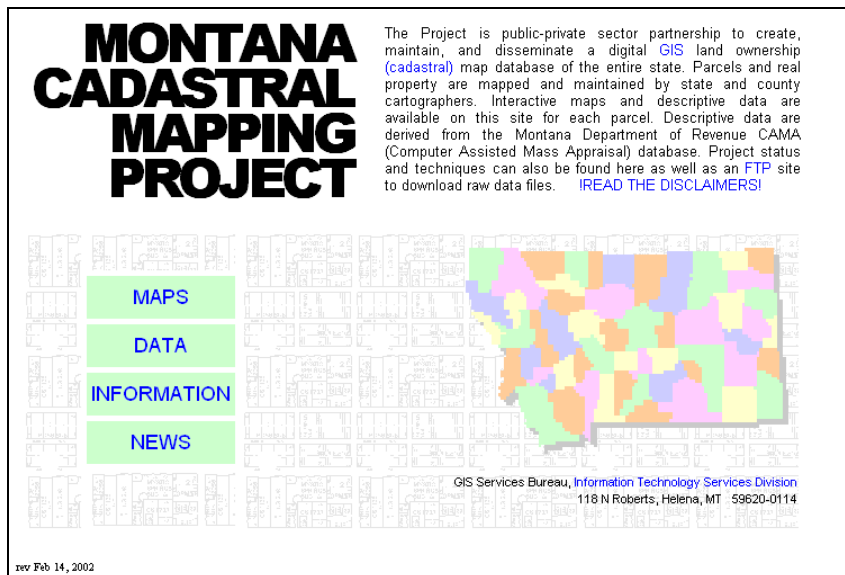


Figure 1: Montana Cadastral Mapping Project

The Montana Cadastral Mapping Project was created through Congressional support, the BLM, and the State of Montana. The State of Montana assesses and collects taxes at the State level rather than the county level as is common throughout most of the United States. This project, therefore, was an ideal way for the State to get an accurate accounting of the land ownership and assessment information in one system.

For more information about the Montana Cadastral Mapping Project, please visit <http://gis.doa.state.mt.us/>.

Another example of a survey-based GIS, is the Waukesha County, Wisconsin, land information system (<http://www.waukeshacounty.gov/landandparks/lisd/>).² This land information system (LIS) has very robust datasets ranging from digital orthophotography, to streets and highway

information, to cadastral information including parcel dimensions, ownership, and assessment information. Figure 2 is a combination of several cadastral and road features, and digital orthophotography.

A feature of the web site which is especially useful is the capability for a user to retrieve the tax information associated with a particular parcel with only a few clicks of the mouse. Figure 2 shows a parcel highlighted in yellow. The parcel by itself, as portrayed in the image, does not reveal any characteristics other than it is large compared to several of the surrounding parcels, there are several large buildings on site, and there appears to be a large parking lot on the east side of the parcel. Information such as ownership, address, legal description, or taxation information cannot be derived, with certainty, from this image.

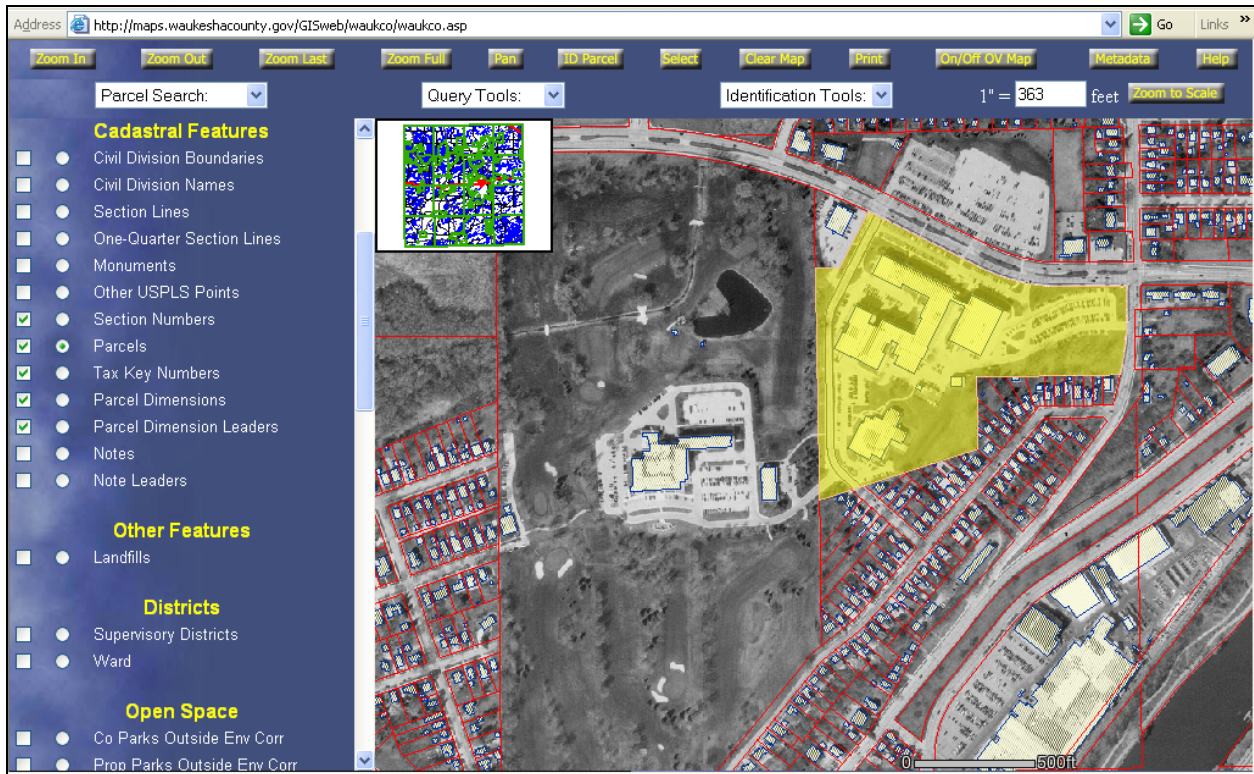


Figure 2: Waukesha County Land Information System

However, when the user identifies and selects the parcel Tax Key, as shown in Figure 3, an entire table of cadastral information is retrieved from the database and displayed on the user's computer screen, as shown in Figure 4.

Now, the “snapshot” combined with the Tax Listing Details provide the user with an extremely powerful tool. No longer does the user have to go to the tax assessor's office to retrieve this information. It is provided to him, in a digital format, which can be imported into any number of computer systems. Once imported and properly formatted, almost any sort of data analysis can be performed. Exercises once thought too difficult to be performed

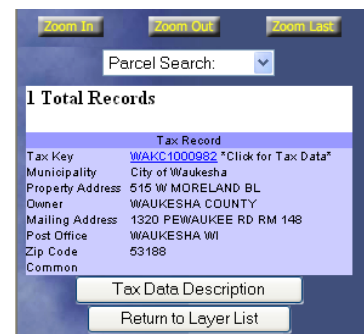


Figure 3: Tax Key (highlighted in blue)

manually can now be done in seconds. Additionally, large scale comparative analysis, or planning on a county-wide level rather than at the neighborhood-by-neighborhood level can be performed. The benefits of combining the spatial information identified in each of the various layers combined with the Tax Listing Details are endless.

Property Tax Listing - Register of Deeds/Treasurer - County Data Warehouse - version 1.05
[Search Options](#) | [View Tax Bill](#) | [View GIS Image](#) | [Help](#) Search by

Tax Listing Details

2004 REAL PROPERTY TAX LISTING Effective Date: 2/6/2004

Tax Key View: [Previous Year](#)

Address

Legal Description: PT SE1/4 SEC 34 T7N R19E BEG E LI SEC 660' S OF E 1/4 COR, S 59.75', S89 25 'W 30', SW 306.77', S89 32 'W 594.35', S0 11'E 297', S 72 40'W 687.94', N0 7'W 960.08', E 100', N28 3'E 260.38' TO S LI MORELA ND BL, SE & E ON S LI TOBEG V711 DEEDS P134 & 136 EXC V 805P333

Description

Assessment Year: 2004	Active for Assessment Year: No
First Roll Year:	Retired Roll Year:
Assessed With Others: No	Referral: No
Burial Site: No	

Listed To:
 WAUKESHA COUNTY
 C/O COUNTY TREASURER
 1320 PEWAUKEE RD RM 148
 WAUKESHA, WI 53188

Assessment Information

Assessed By: LOCAL	Assessment Type: FULL
Approved Value Year: 2003	Board of Review Date: 5/12/2003
Assessment Ratio: 88.44%	Assessment Ratio Year: 2003

Property Values:

Property Class	Acres	Land	Improvement	Total
COUNTY EXEMPT	15	\$0.00	\$0.00	\$0.00
Total:	15	\$0.00	\$0.00	\$0.00

Districts:

District Type	District Name	DOR Code
CITY	WAUKESHA	291
SCHOOL	SCH D OF WAUKESHA	6174
TCDB	WAUKESHA TECH COLLEGE DIST	08

County Web Site 40

This program accesses data from databases maintained by several County Departments and Local Municipalities. There may be inconsistency in data depending on the date the information was gathered or the purpose for which it is maintained. Due to variances in sources and update cycles, there is no guarantee as to the accuracy of the data. For questions regarding tax listing, contact the County Register of Deed's Office at (262)548-7589 . For questions regarding County Tax Bills, contact the County Treasurer's Office at (262)548-7029 .

Figure 4: Waukesha County - Tax Listing Details retrieved via the Tax Key (as shown in Figure 3).

Both the Montana Cadastral Mapping Project and the Waukesha Land Information System are excellent examples of survey-based GIS's which meet the business needs of the State of Montana and Waukesha County, Wisconsin. The San Juan Basin Demonstration Project covers

a much larger area, approximately one-fourth the size of the State of New Mexico, and is being designed to take onto consideration the business needs of numerous and diverse organizations.

The vision the BLM has for the SJBDP is for it to be designed in such a way that the needs of eight federal agencies, two state governments, ten counties, twenty-three municipalities, and sixteen Indian tribes can be realized. The objective is not to homogenize the participating partner's data or force them to conform to a common data standard. The objective is to design a system which allows each partner to extract from it that data which is pertinent to its business functions, and in return, share the updated, enhanced data across administrative, physical, and intangible boundaries.

Scope – Stage One

The San Juan Basin Demonstration Project area is, as its name indicates, within the San Juan Basin, in southwestern Colorado and northwestern New Mexico (see Figure 5). This area is

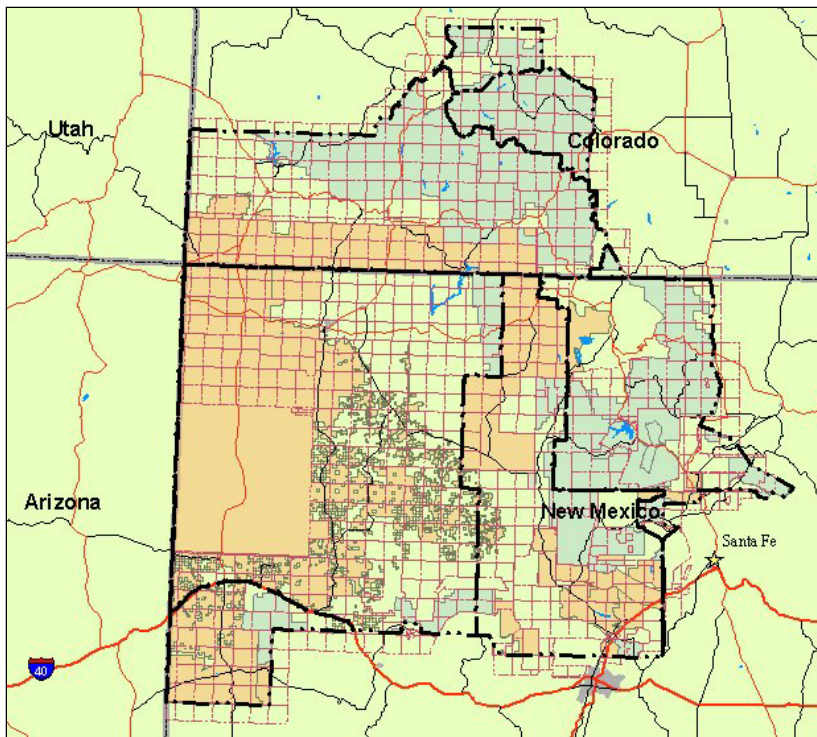


Figure 5: San Juan Basin Demonstration Project Area

known for its oil and natural gas reserves, and is the largest on-shore producer of natural gas in the nation, with over 1.2 trillion feet of natural gas produced annually.³

The infrastructure required to move such large quantities of natural gas include, but are not limited to pipelines, compressor sites, communication facilities, and transportation corridors. Managing all of these infrastructure components in one computer system would be a challenge in and of itself. Add to that, the responsibility for the security of said infrastructure, and the task quickly becomes overwhelming.

Therefore, when considering the overall objective of the SJBDP, it is clear how a slow, methodical approach to building components of the Project must be maintained. The portions of the SJBDP discussed in this paper are the very beginning stages of the Project aimed at gaining the attention and support from the federal agencies, state governments, counties, municipalities, and tribes mentioned earlier, whose daily operations are directly related to the production of oil and gas in the Basin.

The Geographic Coordinate Data Base

The BLM's Geographic Coordinate Data Base (GCDB) is the foundation layer of the SJBDP. It is to this layer that all other layers in the Project are referenced. The GCDB is a collection of geographic information representing the PLSS, computed from BLM survey records (official plats and field notes), local survey records, and geodetic control.⁴

The GCDB is collected on a township basis and can be used to subdivide parcels of land to two and one-half acres or less. The survey boundaries are delineated by computing the geographic positions of township, section, aliquot part, government lot, and special survey corners. Next, official land descriptions are assigned to each land unit in the grid. The records are then reformatted so GIS software can be used to spatially view the PLSS information.⁵

The SJBDP GCDB layer is made up of more than 900 townships in Colorado and New Mexico, which have been collected, adjusted, and transformed into a single, seamless layer. Though portions of the GCDB have been identified as requiring additional information to properly compute the PLSS, this does not affect the entire layer. These special areas are attributed in the GIS as requiring further attention, and will be enhanced with additional survey information at a later date.

Land and Mineral Records

The next set of information currently included in the SJBDP, and referenced to the GCDB, is what the BLM calls Case Recordation and hosted in the Land and Minerals Records – LR2000 system. Case Recordation contains information about leases, permits, contracts, grants, agreements, and patents issued by the BLM since 1982. Case Recordation also includes information about oil and gas, coal and other minerals, sand and gravel, rights-of-way, land exchanges and acquisitions, land classifications, land sales, etc.⁶

Legal land descriptions are used to cross-reference the information in LR2000 with the GCDB. The various types of land status are referenced by parcel in the SJBDP, and areas such as pipeline rights-of-way, can be traced over the public lands.

Next Steps – Stages Two, Three, Four, etc...

The GCDB and the Case Recordation information currently incorporated into the SJBDP are two of the data sets maintained by the BLM. A third layer currently referenced in the Project is digital orthophotography. During the upcoming months, the BLM hopes to be able to use the current information to attract more partners to the Project. Specifically, if the federal agencies, state governments, counties, municipalities, and tribes mentioned earlier can use this information to satisfy their business needs and realize a savings from what they are currently spending on similar efforts, there is great potential for the Project to grow. At this time, two tribes and one county are interested in becoming partners in the project and the BLM has not even “taken the show on the road.”

Conclusion

The original objective of the Homeland Security San Juan Basin Demonstration Project was to gain the interest and support of the Department of Homeland Security. Since that effort was met with little support, it was the BLM's position that support has to come from the grassroots level. If support can be garnered from the people on the ground and in the field who work with this data each day, BLM anticipates a majority of the organizations who conduct business in the San Juan Basin will want to be a part of this Project.

Since the start of the SJBDP in June 2003, there have been discussions in the private sector about the Project and its potential. Unofficially, several private oil and gas companies who operate in the San Juan Basin have shown an interest in the Project. If the appropriate safeguards can be put in place, and the right partnerships formed, the SJBDP has the potential of incorporating private (corporate) pipeline and pipeline right-of-way information into the Project. This information, coupled with the data acquired from additional partners will make this an incredibly powerful tool in all levels of government, in Indian country, and in the private sector.

It is the goal of the BLM to create a system which utilizes readily-available technology and data sets, satisfies the business needs of the Project's partners, and becomes a self-sustaining (self-funding) project which is recognized and supported by the Department of Homeland Security.

The Homeland Security San Juan Basin Demonstration Project is a work in progress, therefore, periodic updates shall be made to this paper. Corrections, additions, and deletions may be made at the discretion of the author.

For the latest copy of this paper or to learn the status of the Homeland Security San Juan Basin Demonstration Project, please contact Jason G. Racette, Cadastral Surveyor, via telephone at 202-452-0345 or via e-mail at Jason_Racette@blm.gov.

NOTES

1. <http://gis.doa.state.mt.us/> (February 17, 2004)
2. <http://www.waukeshacounty.gov/landandparks/lisd/> (February 17, 2004)
3. *Project Overview*, Barry H. Adams, Bureau of Land Management, Farmington, New Mexico.
4. <http://www.blm.gov/gcdb/> (February 17, 2004)
5. *See Id.*
6. <http://www.blm.gov/lr2000/> (February 17, 2004)