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Rural Addressing in the Mountain West
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Abstract

Rural areas of Utah are facing increasing population growth and building outside established townships, creating a need for an updated and improved E911 addressing system. The Utah Automated Geographic Reference Center (AGRC) has joined with several of these counties to assist them in this endeavor.

Working with County Recorders, Road Departments and E911 coordinators, AGRC's task was to consolidate available data, (both digital and non-digital) to assist and advise in collecting new data using GIS and GPS technologies. This process often involves accommodating existing address schemes, developing grid systems, and ensuring this data can support Automated Location Identification (ALI)/Automated Number Identification (ANI), dispatch, house addressing, signage location, and Master Street Address Guide (MSAG) creation.

This paper will review the process and learning experiences working with several county agencies, to develop a workable E911 database.

Introduction

The Utah Automated Geographic Reference Center (AGRC) provides a broad range of Geographic Information System (GIS) support to the State of Utah. Other services include stewardship of the State Geographic Information Database (SGID), the central clearinghouse for standardized digital transportation data for local, state, federal and tribal agencies in Utah. We also provide geospatial technical support for E911 implementation, including cooperatively developing and sharing the best (most accurate, current, and complete) information about the State's transportation/address infrastructure. Wayne County requested assistance in developing a county wide E911 system, which could be incorporated into a five county system serving rural areas. And because of the remoteness of many areas in the county cell phones are being used more, even though coverage is spotty in these same areas, and a improved database with more and better information was badly needed.

Located in the south central part of Utah, Wayne County goes from an 11,000 foot high Boulder Mountains down to about 4,200 feet around Hanksville's desert mesas and buttes. There are nine small towns that the mainly ranching population is centered around. The 2,544 residents of the county live in an area about 2,500 square miles, 90% of which is Federal or State ownership, including Capital Reef National Park which splits the county, leaving most people living in the western third of the county. This small tax base (population and 10 % private lands) has to support a system that needs to service the 500,000 annual visitor to the National Park alone. This puts considerable limitations to what the county can do.

Planning

Because of increase growth in several towns and lack of coverage in rural areas the E911 addressing system needed to be expanded outside existing town limits. It was decided to create a grid for each of the existing towns and community, based on section lines, natural breaks between geographic features, land ownership and using existing town grids. By working with the existing town grid, we tried to change as few residents as possible while keeping with in the newly expanded grids.

A problem had to be corrected; there were two north-south Main Street and east-west Center Street in the same zip code area. This was the area with the most changes for the residents, but because of problems with the mail they knew it was coming.

For the database, the State SGID had roads layers, and the county road department had GPS data for newer roads, and some buildings in areas, that covered the main parts of the county. The county recorders office and the assessor office had hard copy Plat maps and paper list of owners, address and phone numbers. Many addresses were assigned before the grids were created, using a best guess method. They were used for UPS, FedEx, and some utility companies and served their purpose, but once the grids were created they turned out to be off in most cases.

The county wanted new signs on main roads and roads with homes only due to cost issues. For the Federal lands, Bureau of Land Management (BLM) has signs in place, since that land is widely used for recreation and grazing. The National Forest uses their own numbering system for roads and names on main roads that go through the areas. National Parks already have the federal signs we are all use to seeing, on the main roads. The county's only responsibility would be to where a road ran through the federal land to a private area and then a special request would have to be made to install sign if it was located on federal land.

Putting the plan to work

To create the addressing grids AGRC created a script so you could enter a start point and size for the grids and customize it for each area. Some existing areas had to be adjusted when things didn't quite match. Not all original blocks were perfect squares, and the given addresses were assigned to match the oversized blocks. In these situations were a block was originally larger than a grid square, most only required a small adjustment, so it was decided to leave them as they were. One area in Loa (largest town and county seat) where the block was an actual block and half, had to be looked at. By changing it, it would affect everyone from 300 North to above 600 North, about fifteen square blocks. Since many of the older residence lived in the town, it was decided to leave things as they were, and have above 600 North to 700 North be a short block. Since there was a new small subdivision going in the new addressing would not be a problem for them.

With the grids set it was time to start assigning address. The county, assisted by AGRC set out to create a building (homes, business) layer and update the address ranges on the roads layer. Many of the homes and ranches in the outlying areas were GPS, along with any new subdivision and roads. Established homes in the towns were digitized using 2004 NAIP imagery, 2006 NAIP imagery, and 2006 HRO (High Resolution Ortho-Photography, 1 – meter resolution) imagery. Then the process of putting names with

building points began. Creating tables from the address lists and geocoding them, didn't work very well, the list were not very accurate as far as ownership and most addresses outside the main blocks of town were off far enough to create more confusion than help. A slow process of going through the points and matching them to owner names on Plat maps and address from the provided lists began. Also it came to our attention that many attribute fields required for the E911 software that is being used had different names and types than ours, for same information needed. So attribute fields to match were created then calculated in the attribute table to simplify updating the data.

Obstacles

Many of the guidelines we use for addressing come from such agencies as National Emergency Number Association (NENA) and Spatial Data Research, Inc, but these are rooted in urban areas or the Midwest; we found some unique situations that did not fit with known guides. Many driveways, usually to ranches, are over half a mile long and the homes are not visible from the road. In these cases it is advisable to name the roads then address the home off that road.

For our situation we had to look at several factors, first how likely was it that the land might be subdivided and new homes built. This came down to local knowledge; we had two situations where owners were known to be splitting up their land. One was being split for the family and another was planning on building summer cabins on his land to rent out. Both of these required the main road (driveway) to be named.

Next farms and ranches generally have several buildings at the location and occasionally one will be the home of another family member, which should require a separate address. However in most of these cases we did not give another address due to the close location of the buildings, and they were either older members of the same family or bunkhouses. For the working buildings shops, barns, and garages no other address were given, except in a few cases where the barn was a lot farther from the main buildings (several grid areas).

And lastly many owners in the area did not want their driveways having a sign like it was a through street; the county will required the owners to place a visible sign with their address, and name (optional) out by the main road in these instances.

Another special feature of the area is Campgrounds and RV parks. Being close to National Parks and many outdoor recreation opportunities, the county has many of these areas. Unlike mobile home parks, people staying in these parks are only there for two weeks at the longest, usually just a day or two. Because of this there was only one address given to the campgrounds, at the office or main building in the area. Once there responders could easily be guided to the designated campsite, usually numbered.

When the project first stared we were told that because of the 911 software, if the building point was more than two thirds of a grid (three quarters of a mile) away from a named road, it required an address off the grid, not nearest road. Some of the ranch homes were addressed this way, without a road reference. This obviously didn't work well once we started geocoding to test out the addressing we had completed. We were relying on the organizing county to act as the go between with the E911 system using a CAD based software product. This is not a good idea, when you are creating a database

you should know as much about the end product or user as you can. Don't rely on others to do this for you, save time and do it right the first time.

Many roads that serpentine through the county side, following valleys and ridgelines, sometimes looping back to a main road, created their own problems. Some of these you could not set a direction because they needed several directions, and they needed to be named, or renamed. This proved difficult since the main population has known these roads by certain names since they were born. Others were left the way they were; due to being on federal land and used mainly for grazing there was not much chance of development. Others were changed to "North" and "South" for the different parts of the road. Not an ideal resolution but one that worked in these situations.

Splitting roads, adding and changing names to roads, all lead to complications; many owners wanted to name roads with a family name, while in other parts they wanted to change a family name if someone new bought the land. The county finally said no to family names. Long names, named after where the road goes (Hickman to Miner Mountain Road), weren't made with signs in mind. These had to be shortened and where possible, abbreviations were used for the signs

Having as much federal and state land as the county does created its own issues, some of which are still need to be resolved. On the federal and state lands the county is required to get permission from the managing agency to place signs on the land. So a road passing through BLM you talk to BLM, same for the Forest Service and so on. If a road runs through several agencies lands you must clear it with all involved. This means everyone has to agree on names and sign styles. In Wayne County this was why many of the longer road names were left as they were. Many signs were already in place in National Forest lands and BLM managed areas, any signs the county added in their managed areas matched the names. In Capital Reef National Park, which cuts through the county ,they use their own responders but the county assists on many calls. Because of this the county and AGRC thought it would be good to create a similar addressing system in a national park. The park has an addressing system based on the main area, which included most park building and a large campground. Outlining primitive campgrounds and pullouts are known by the main road and a Longitude and Latitude (decimal degrees) not a grid based position. We gave the Park administrators a possible plan based on a similar grid using the headquarters area as the origin. So far they have yet to decide if they want to be on the system or not.

Conclusion

Communication should be a big part of any project involving this many agencies. And being able to understand that everyone moves at there own pace and has different priorities is also important. The need to include the community as much as possible, keeping them informed and getting their input on issues as you go along, only servers to help you in the end.

Planning is always much more productive than creating on the fly. Know who the end user is going to be and their requirements for any databases you will create. Become familiar with any software and processes that other agencies you work with use. This will eliminate many misunderstandings and the problems that can arise from them.

There are also unseen benefits that come along with every project. Just before we started the county commission had decided to do away with their GIS department, and leave any related work up to the road department. Once the project started and several other projects came up the need for a full time GIS person was evident and the commission reversed it decision.

The end of the project created a new database for county recorders, and assessor, giving them a better resource for checking who owned what and where and an easier way to keep the data up to date. They have also started a program where the building inspector will go out and collect a GPS point (using a simple Garmin unit) on all new homes he inspects and these will be added to the database.

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