

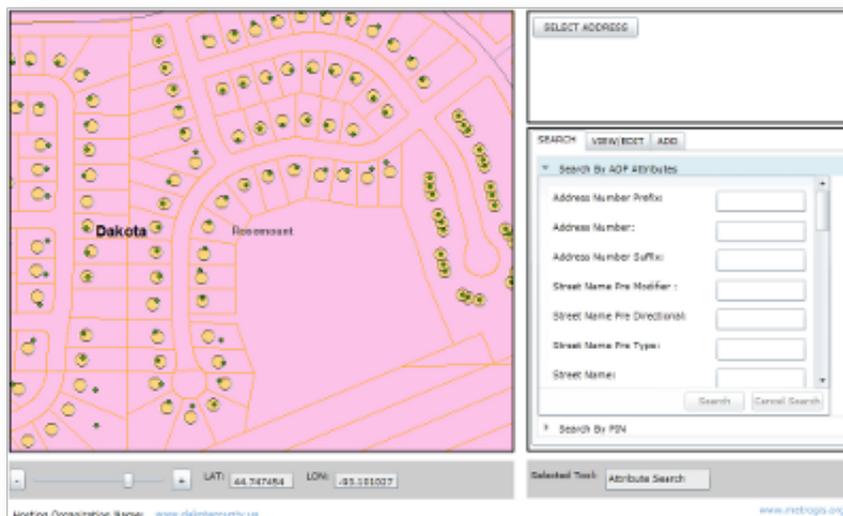
## Fall 2011 - Desktop GIS: Online Editing

By Joe Sapletal, GISP



Online editing or web-based editing has been getting some attention lately with that ability being integrated into ESRI products. Online editing is great because it can be done by someone who may not have experience with a desktop GIS like ArcMap, and it can serve as a data aggregator for a larger group of data editors. But did you know that OpenStreetMap has been editing online since 2004? Did you know that, through MetroGIS, Dakota County was participating in a pilot project for an online address-editing application?

The MetroGIS Address Workgroup contracted for the creation of a custom address-editing application to be used by the cities and counties to create, maintain and aggregate the region's address points. Recently, Dakota County and LOGIS volunteered to participate in a pilot project to get the application running on their systems and test it. The usual basic functions are in the web map - pan, zoom, identify - as is the essence of the application - to edit addresses. The address editing web map will allow users to only add, delete or edit addresses within their addressing authority. The web map doing this provides security and quality assurance that a neighboring addressing authority isn't accidentally editing another's data. It also acts as a data aggregator. Addressing authorities don't have to send their updates to someone to be incorporated into the large dataset; it is happening as they edit.



If you want to make your own web mapping application rather easily, and you have an ArcGIS Server service published with the data to be edited in it, you could use ArcGIS Explorer Online. Without any programming you could in a few minutes have a web-editing application up and running. Unlike the MetroGIS address-editing application, the ability to edit secured data doesn't exist yet.

[OpenStreetMap](#) is an example of both web editing and volunteer GIS. OpenStreetMap has been around since 2004, and has had more than 320,000 contributors "dedicated to creating and providing geographic data, such as street maps, worldwide, for free." They are editing everything from streets, to parks, to water bodies, and everything in-between. Contributors aren't restricted to a particular area, but you are able to see who is editing data, be it adding, modifying or deleting features. So, if you have better information that what is already in there, you can edit features and make notes of your changes. And again, the best part about web-based editing



is that the contributors don't have to be GIS professionals in order to edit data in this web-based editing application.

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## Fall 2011 - GIS 101: GIS Volunteers - Making the World a Better Place, One Map at a Time

By Mary Hagerman

There are many reasons to become a volunteer; to make a difference, to feel more involved, to contribute to a cause, to give back to the community, or just because it makes you feel good. But why volunteer in your field, why volunteer GIS services? One reason might be that you have something special to contribute, a skill that not many have. Volunteering in your field can also be a great avenue for self-development. Volunteering GIS services could give you the opportunity to develop new skills, explore new areas of interest, expand your horizons, and even strengthen your resume. Travel and training budget cut? Try volunteering to enhance your skillset and provide opportunities for networking with colleagues. Plus, as an added side benefit, you will be raising awareness of GIS and promoting its use.

Volunteer opportunities for GIS people can be found in a variety of different flavors. GIS volunteers work in schools, helping teach about maps and geospatial concepts, or help students get started on their own GIS projects. Non-profits and developing communities can benefit from volunteers training members in the use of GIS or helping implement and/or expand a GIS. Volunteers might work to collect data; digitizing, geocoding, or GPSing for a project or study; or creating base data to help get an infant GIS off the ground. GIS volunteers are often involved in crisis or disaster response as well, mapping the extent of the damage or affected area, mapping evacuation areas and routes, tracking response and recovery efforts, and communicating information to the public about road blocks, facility closures, and shelter locations.

Volunteer opportunities can take many forms; take the time to find what is right for you. Disaster response, or opportunities tied to a particular event, are typically short notice, short term, and are often on location. Volunteering in schools or with youth clubs tends to be ongoing and longer term. There are opportunities for more skilled volunteers, such as web development, database creation and administration, and spatial analysis. There are also opportunities that require only basic skills like data collection and mapping. While disaster response and education are most effective on-site, tasks like data collection, web development, and analysis can often be done remotely, from the volunteer's home or office. There are many opportunities available thru a variety of organizations; here are just a few examples.

ESRI and National Geographic teamed up to create the [GeoMentor](#) program, where volunteers who use geography in their everyday jobs pair up with a school or youth group, such as 4H clubs or scout troops, to help them develop skills in geographic thinking. A GeoMentor works with the teacher or group leader to teach youth how to use geographic tools like maps, globes, terrain models, and satellite and aerial imagery to understand geographic concepts. Thru geography projects in the classroom or out in the field, youth learn to recognize how location (where things are) and proximity (how things relate to other things) influence our decisions and shape the world around us.



[GISCorps](#) is a program of URISA that coordinates short term, volunteer GIS services to underprivileged communities. GIS volunteers help by providing services like mapping, data collection, geocoding, remote sensing, spatial analysis, and application development to support disaster response, humanitarian relief, community planning and development, health, education, local capacity building, and more. Although projects are typically short term, they are not necessarily tied to a specific event. Some projects are implemented on-site; however, many are remote projects, allowing volunteers to work from their home or office.





[CrisisCommons](#) coordinates volunteers to aid in the relief efforts of crises, such as hurricanes, earthquakes, floods, or tornados. For instance, CrisisCommons volunteers were involved in relief efforts for the earthquake in Haiti and the earthquake and tsunami in Japan.

[Crisis Mappers](#) (under the umbrella of CrisisCommons) is a coalition of technical volunteers such as software developers, IT professionals, GIS professionals, online security experts, researchers, and humanitarian relief experts, mobilized to assist with humanitarian response. Their aim is to use technology and dynamic mapping to facilitate rapid response to crises, ultimately saving lives.

Volunteers use crowd-sourced information from social-media sites, Twitter, blogs, text messages, and news reports for up-to-the-minute information which is overlaid onto post-event imagery and published in an online map of the crisis area. The maps help responders locate incidents and resources like security threats, refugee movements, field hospitals, shelters, collapsed buildings, blocked roads, flooded areas, and downed bridges, and aid relief workers in quickly getting resources, like food, water and medicine, to where they are needed most.

So how do you get involved? Organizations such as these often have job searches and application information right on their websites. There are also sites like [World Volunteer Web](#) and [Volunteer Match](#) that are geared toward matching volunteers with opportunities. [HandsOn Twin Cities](#) is a local organization that provides information on volunteer opportunities in the Minneapolis-St. Paul metro area.

Volunteering using specialized skills like GIS provides valuable services to a cause or relief effort, and raises awareness of the capabilities of GIS. Additionally, it benefits the volunteer thru skill building, networking, and the chance to use their skills for rewarding and meaningful work.

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## Fall 2011 - Tech Talk: The 2010 Census - Figuring Out the Census Bureau's Website

By Scott Laursen

In the last newsletter we talked about using TIGER files to create the boundaries of your Census data maps. Now that you have your boundaries, you need to get the data from the Census Bureau that you want to map. One way, of course, is to call up the Office of GIS and ask us to give the data to you, which we will of course be happy to do. However, if you aren't sure what exactly you need, or if you just want to get it yourself, the best way is to go to the Census Bureau's website. There you can find more data than you can imagine, not just from the 2010 Census and the American Community Survey (ACS), but also from the 2000 Census.



The Census Bureau's home page is <http://www.census.gov>. This site is huge, as you can well imagine. The home page has many links, almost too many. It can be downright daunting to try and figure out where to go to get what you are looking for. I have found that the quickest way to get to the data is to use the menu items on the left-hand side (see yellow outline in image above). Start with the American FactFinder item. This currently takes you to a temporary page that lets you choose between two applications: the New FactFinder, and the original (they call it Legacy) FactFinder application. If you want data from the 2010 Census, click on the New FactFinder link. If you want ACS data, click on the Legacy FactFinder link. The Legacy FactFinder application will be phased out some time in the fall of 2011, after all of the SF1 data has been released. The data currently found there will then be moved to the New FactFinder, but in the meantime, the Legacy FactFinder is the place to go to look for ACS data. If you're not sure where the data you want is located, I recommend starting with the New FactFinder. The 2010 Census data is currently more accurate than the data from the ACS, so that is the preferred data to have, if you can find what you are looking for there. Remember, though, that the 2010 Census data has no information regarding income or poverty, just population and household counts, race and ethnicity, gender, and age information. If you are looking for income or poverty data, you will have to get it from the ACS.

The New FactFinder is a highly interactive application, and it tries to make it easy for you to get at just the data you need by narrowing your options based on the various search criteria you enter into the application. I strongly recommend reading through the FactFinder Help window, which you bring up by clicking on the white question mark in a blue circle found in various places throughout the application. The Help window gives you detailed instructions on how to use the application. It will save you time in the long run.

If you don't know exactly what data you are looking for, try starting with the Quick Start area in the middle of the page. This lets you type in general search terms and select from the lists the site gives you. You start with the



entire dataset, but as you type in your terms, the application filters out the data you don't need, eventually leaving a list of just the data you are looking for. You have to read the list carefully, however, because the original datasets contain information from both the 2010 and the 2000 Censuses, so you need to pay attention to what exactly you are getting back from your searches.

areas as you go, until you again arrive at just what you are looking for.

If you have a good idea of what you want, try navigating through the Your Selections options on the left side. Each of the large buttons (Topics, Geographies, etc.) opens a temporary window that responds interactively to your requests. Walk your way through the various filters, choosing your topics and geographic

The ACS data is currently found on what is called the Legacy FactFinder. This version is somewhat easier to use, in my opinion, than the New FactFinder, but the application is also more limited. To access the ACS data, start with the menu items along the left-hand side. Hover your mouse over Data Sets, then, from the drop-down list that pops up, choose American Community Survey.



ACS data is based on one-, three-, or five-year samples of data, with the five-year estimates being the only ones that include areas as small as census tracts. The three-year estimates include data for areas with populations as small as 20,000 people; the

one-year estimates are for areas with populations of 65,000 people or more. The ACS FactFinder webpage contains several years worth of sample data, with the most recent being 2009. Choose which year and sample collection you want by selecting the appropriate circle, then go to the right-hand side of the selected area and choose Detailed Tables. This will bring you to an interactive wizard that walks you through what geographic level you want your data to be at and exactly which pieces of information you want to obtain. After you have selected

your data, the website produces a table for you that you can print or download, as you wish.

The most important advice that I can give you about using these applications is, BE PATIENT. You are essentially attempting to locate a needle in a huge haystack of information, and it will inevitably take you a while to find what you need. If you are a beginner, give yourself plenty of time to get used to the application and how it works. Once you start looking for your data, expect to have a few instances where you get the wrong data and have to backtrack. In the end, though, it will be worth it.

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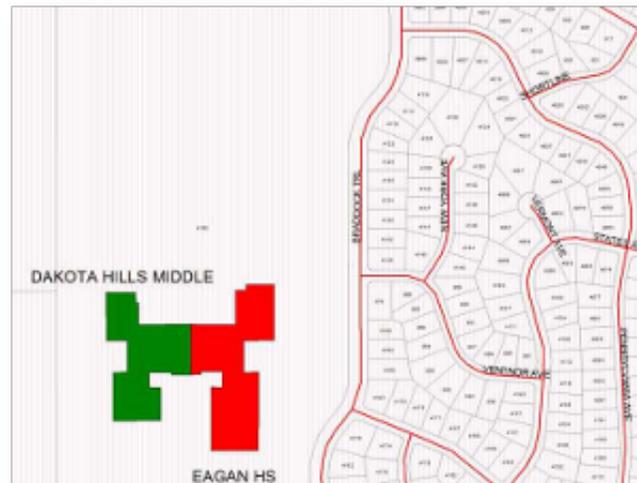
## Fall 2011 - Department Spotlight: Using GIS to Help Determine School Bus Routes in District 196

By Karen Dayon and Tom Voigt, Rosemount-Apple Valley-Eagan Public Schools (ISD #196)



Each school day, over 23,000 school children are bused to and from District 196 schools. We're all familiar with the big yellow school buses that traverse our roads, but did you ever stop to wonder why the bus might be stopping where it is? Why it's on the route that it's traveling? Perhaps this article will provide some insight as to why.

The first step is to identify which of those students living in the district are to receive transportation services. The school board has established that any elementary child living more than one mile from school will receive busing, and that distance increases to 1.5 miles for secondary students. The district measures lineal distance from student accessible school entrances, following sidewalks and walking paths, until it reaches a street centerline. From that point, ArcGIS, using the Network Analyst extension, is used to 'spider' out along all public streets from that point, to a distance that will total the appropriate distance from the door. District policy states that if the distance line completely passes through the lot parcel, then the student is within distance to walk to school.



*Dakota Hills Middle School Walking Distance Map*

That, of course, is just the first step. The district then takes into consideration other mitigating factors. Railroad tracks, Principal Arterial streets and Minor Arterial streets are considered hazardous, and students will be bused if their route to school requires them to cross one. Collector streets will be defined as hazardous if one of several criteria are met, including variables like width, availability of sidewalks, posted speed limits, traffic control, and average daily traffic volume.

Once students are identified as 'riders' the routers begin their step of placing students at stops. Students are geocoded into the district's routing software, EduLog, along with existing bus stop locations. Bus stops typically remain in the same location from year to year, unless conditions in the area change and warrant the need to relocate a stop location. If that is the case, the router often will utilize Pictometry Online, reviewing the proposed stop location to determine if the location is suitable, and if necessary, will drive to the location for review. Once a student is assigned to a stop location, they will typically stay assigned to that location for the duration the student

attends that particular school. Therefore, the router just needs to review the screens for unassigned students, and assigns those students to their closest bus stop.



Now that we've identified who rides the bus, and where they should be to get on the bus, the final step is to build the bus route. Often using previous routes, the router analyzes which buses would currently be under-capacity, which are over-capacity, and determines how many buses will be required for that particular school. From there, the router literally "connects the dots" of bus stops, and builds a route with an effort to maximize on bus capacity, route duration, and other route considerations. For instance, the routers try to minimize the number of "left turn at light" intersections a bus uses, as they can often cause delays. They also try to limit, as best as possible, having the buses cross Cedar Avenue. The software then determines, based on boarding times and posted speed limits, what the various stop times for the buses will be. Under normal conditions, our drivers are within one minute of accuracy to their posted schedules, and accuracy is second only to safety to a transportation department. Once the high school students are dropped off, that same bus then begins its middle school route, and finally its elementary route – with the process then repeating in the afternoon. This continues, every school day, rain, snow or shine, as the district's fleet of buses safely and efficiently bring students to and from school.

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