*The data consortium consists of Denver Regional Council of Governments members and regional partners with an interest in geospatial data and collaboration. The data consortium newsletter improves communication among local geographic information systems professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

# Work begins on new tool to map disproportionately affected communities

*Article submitted by Joel Minor, environmental justice program manager, and Shannon Barbare, communications specialist, at the Colorado Department of Public Health and Environment. Contact Joel at joel.minor@state.co.us.*

Meaningful action on environmental justice requires accurately mapping low-income communities and communities of color that are affected by various sources of pollution. To meet the need to represent pollution's effect on disproportionately affected communities, the Colorado Department of Public Health and Environment, along with Colorado State University's Institute for the Built Environment and Geospatial Centroid, are developing CO EnviroScreen.

CO EnviroScreen will enable users to identify disproportionately affected communities based on the definition in Colorado's Environmental Justice Act (HB21-1266). The goals of CO EnviroScreen are to:

- Pinpoint areas that have a disproportionate burden of health or environmental harm.
- Help users maximize funding and resources for policy changes and other interventions to avoid, minimize and mitigate environmental health risks. For example, Colorado Department of Public Health and Environment's Environmental Justice Advisory Board

will use CO EnviroScreen to determine where to distribute environmental justice grants created by the Environmental Justice Act.

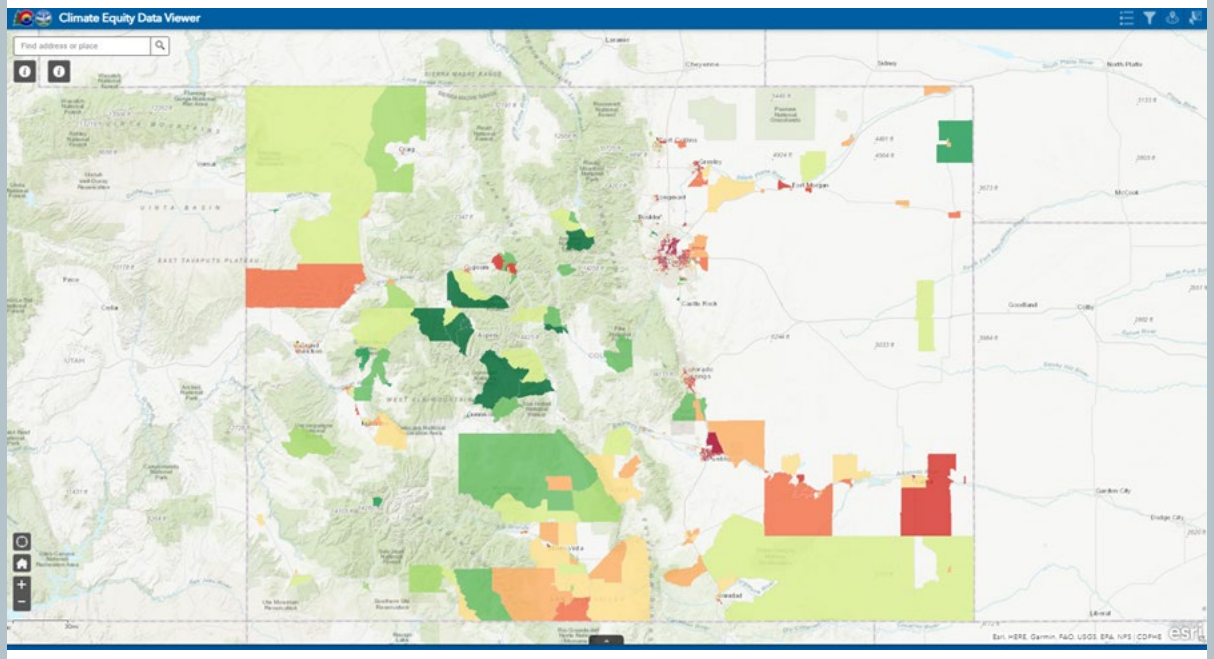
- Build public trust and empower communities to become involved in decision-making.
- Advance a healthy and sustainable Colorado where everyone has the same degree of protection from environmental health hazards.

The department is inviting community input as CO EnviroScreen's development unfolds. The team recently completed the first round of community engagement, including stakeholder interviews, focus groups and a large community meeting. The team will develop the tool based on that input, then include community members and stakeholders in beta testing and improving the tool. Colorado Department of Public Health and Environment expects to launch CO EnviroScreen in summer 2022.

Part of the definition of disproportionately affected communities in the Environmental Justice Act is a census block group where more than 40% of households are low-income, people of color or housing cost burdened. Until CO EnviroScreen is finalized, stakeholders can use a draft map layer in Colorado Department of Public Health and Environment's climate equity data viewer to identify census block groups that meet one or more of the three criteria. CO EnviroScreen uses as its basis the climate equity data viewer and will replace the climate equity data viewer once it is finalized.

CO EnviroScreen will include the full range of areas covered by the Environmental Justice Act definition of disproportionately affected communities and help identify communities "where multiple factors, including socioeconomic stressors, disproportionate environmental burdens, vulnerability to environmental degradation, and lack of public participation, may act cumulatively to affect health and the environment and contribute to persistent health disparities."

Learn more at cdphe.colorado.gov/enviroscreen.




A map layer in the climate equity data viewer shows communities that are disproportionately affected based on demographic criteria defined in the Environmental Justice Act. CO EnviroScreen will replace the climate equity data viewer when it is launched in summer 2022.

# Building a regional vision for people and nature

*Article submitted by Chris Hawkins, urban conservation program manager at The Nature Conservancy. Chris can be reached at cmhawkins@tnc.org.*

Colorado is changing rapidly for both people and nature. The climate is getting hotter, cities are growing denser and air quality continues to worsen. Many who feel the effects of the changes are marginalized communities whose perspectives are often missing from mainstream conversations about conservation. For Colorado's more vulnerable populations — especially the poor, elderly and people of color — the challenges are even more severe. Founded in 2015 and formally incorporated in 2018, the Metro Denver Nature Alliance is a coalition of more than 50 partner organizations across the seven-county Denver region — including those from the nonprofit, corporate, academic and government sectors — seeking to align nature-based efforts to ensure more equitable access to nature and to promote healthy people, communities and natural places.

The Metro Denver Nature Alliance's goal is to develop an evidence-based, equity-centered regional vision for people and nature — a landscape-scale conservation vision for the Denver region — that will help prioritize regional investments and create a more equitable and climate-resilient region that supports all walks of life. Two projects are currently underway that will help create the foundation for a regional vision that will wrap up around December 2022.

The first project is a regional equity assessment to examine data in the region regarding equity, social vulnerability and access to nature. Stakeholders will apply the project's findings to the development and implementation of programs that consider both social equity and conservation. The second project is a regional conservation assessment to identify high-priority lands and waters in the region to protect, connect, restore and enhance.

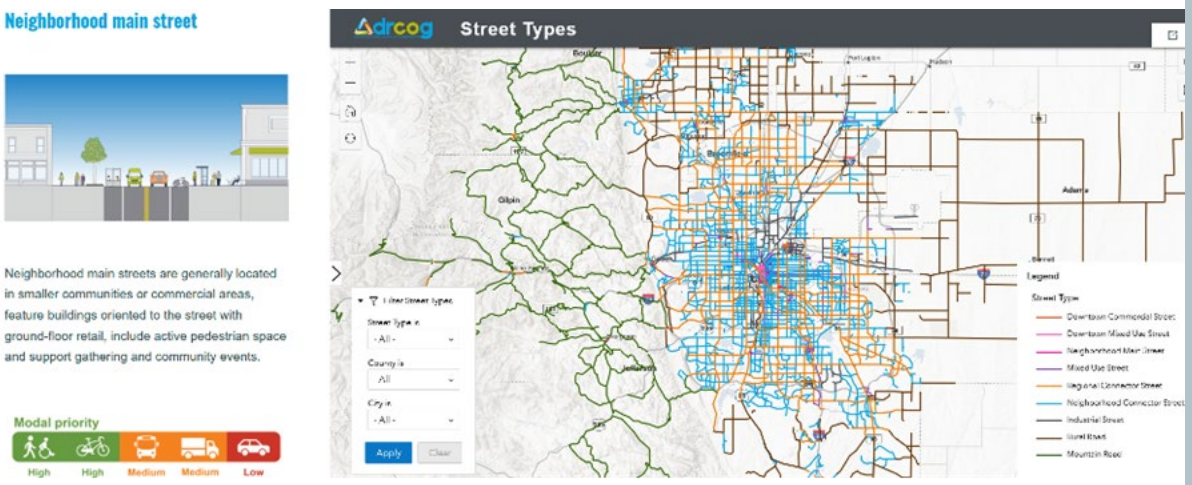
Both projects will result in a variety of products. One of the primary goals is to help partner organizations integrate geospatial information from the assessments into existing planning tools and processes at the level decisions are made around land, water and people. If you'd like to learn more about the two regional assessments or would like Metro Denver Nature Alliance to share more information with you and your organization, please reach out to the Chris Hawkins at The Nature Conservancy at cmhawkins@tnc.org.

# Complete Streets Toolkit and story map

*Article submitted by Jenny Wallace, GISP, GIS program manager at DRCOG. Jenny can be reached at 303-480-6754 or jwallace@drcog.org.*

Complete Streets are streets that provide safe and equitable options for travelers of all modes, including pedestrians, bicyclists, transit riders and motor vehicle users. DRCOG has developed a regional Complete Streets Toolkit for the Denver region. The toolkit is a resource for local governments that provides guidance to plan, design, and implement Complete Streets. The toolkit is in draft form and awaiting final Board approval.

DRCOG staff created an Esri story map to accompany the toolkit. The story map focuses on the street types that were defined in the toolkit. The embedded web map shows regional Complete Street types — users can filter by jurisdiction and street type. Each street type also has a narrative, visual cross section and shows multimodal priorities. Photos and illustrations highlight some of the design elements used to create a Complete Street, such as bicycle parking, lighting and crosswalks.




The project represents DRCOG's first official Esri story map. The map was a collective effort across DRCOG's transportation, communications and marketing, and geographic information systems teams. DRCOG staff welcome and appreciate feedback on the story map. Please check DRCOG's newest geographic information systems web product and let staff know what you think:

Complete Streets story map

# DRCOG data acquisition updates

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

## Denver Regional Aerial Photography Project 2022

Previous project partners received quotes in mid-April for participation in the upcoming imagery project. DRCOG is now accepting commitments in the form of a signed letter of intent that outlines the products and services that the partner wishes to purchase.

In addition to the traditional imagery offering, DRCOG staff are also offering a Nearmap subscription. The Nearmap subscription includes more frequently updated imagery that can be used as a supplement to the primary imagery deliverable, which is produced once every two years.

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## Regional Lidar Project 2020

DRCOG received a grant from the U.S. Geological Survey in December 2019 to collect quality level 2 lidar in 5,000 square miles of the region and derive contours in most of the Denver metro area. Flights to collect the data and data processing tasks to produce the point cloud are complete. Thorough quality control undertaken by the U.S. Geological Survey began in June and is still ongoing. The data is expected to be available for download through DRCOG's Regional Data Catalog in the first quarter of 2022.

For more information, visit the website.

Do you have an interesting use case for lidar data? Tell us about it by emailing me at asummers@drcog.org.

## Planimetric Data Project 2020

The planimetric data project began in February and deliveries began in June. Groups 1 and 2 are complete. Partners in Group 3 are reviewing their deliverables now. Group 4 is on schedule for review in early November. There are seven deliveries total. The public will have access to the data in the first quarter of 2022 via the DRCOG Regional Data Catalog.

DRCOG staff are collecting building roofprints, edges of pavement, parking, sidewalks and ramps, trails, driveways and impervious surfaces throughout the metro area. Check out the map.

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DRCOG was awarded a Colorado Water Plan Grant from the Colorado Water Conservation Board in March, which supplies a 50% match to local contributions for the project. The project kicked off in June with a presentation from Sanborn and the University of Vermont regarding the "interpretation key," an illustrated guide to the classification schema DRCOG staff use.

The product will be a 9-class, 1-meter resolution land cover dataset that covers the 6,000 square mile Denver region. Deliverables are expected in the first quarter of 2022 and will be made publicly available on DRCOG's Regional Data Catalog.

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# A study of pedestrian infrastructure and vulnerable populations

*Article submitted by Erik Braaten, University of Colorado Denver master's program graduate student. Erik can be reached at erik.braaten@ucdenver.edu.*

Sidewalks and trails make up a vital component of a region's transportation network. The Denver region's combined pedestrian network encompasses over 7,300 miles of sidewalks and trails. The quality of the region's infrastructure is critical to quality of life and access to opportunity for the roughly 3 million residents of the region, but it may not be equitably serving all populations. Former Streetsblog national editor Angie Schmitt, in her 2020 book *Right of Way* that examines pedestrian deaths in the U.S., writes that, "people who have overlapping marginalized identities — an older black man who lives in a low-income neighborhood, for example — will be the most vulnerable."

This study of pedestrian infrastructure and vulnerable populations asked, "What is the current state of pedestrian infrastructure in the Denver region relative to vulnerable populations?" Insufficient pedestrian facilities were indicated by sidewalks with a width less than 5 feet and that were within 2 feet of the road (for example, lacking a buffer between the sidewalk and traffic). The following vulnerable populations were considered:

- Percent of individuals with a disability.
- Percent of individuals age 5-plus and classified as language challenged.
- Percent of minority individuals including Hispanic and Latino.

- Percent of total households with no vehicle available.
- Percent of people age 65-plus.
- Percent of total households below poverty.
- Percent of people age 5 to 7.

The study's author analyzed DRCOG's planimetric sidewalk data by running summary statistics for sidewalk width for sidewalks within 2 feet of the edge of pavement (for example, the road) across the seven vulnerable populations above the regional average. A walkshed of 3/4 mile representing a 15-minute walk (based on an average walking speed of 3 miles per hour) was generated for each census tract based on centroids created for each tract. The analysis found that walksheds created for census tracts with vulnerable populations above the regional average consistently had inferior sidewalk infrastructure compared to those at or below the regional average based on the metric described above.

| | Sidewalk within 2 feet of EOP | | | Sidewalk more than | Total | Percent Walkshed |
|---|---|---|---|---|---|---|
| **More than Regional Average** | 3 Feet or less wide | Between 3 and 5 feet wide | 5 Feet or greater wide | 2 feet from EOP | | within 3/4 mi buffer |
| Percent of Persons with a Disability | 10 | 19 | 1 | 73 | | 40 |
| Percent of Persons 5 and Over Classified as Language Challenged | 10 | 18 | 1 | 73 | | 41 |
| Percent of Minority Persons Including Hispanic and Latino | 10 | 17 | 1 | 77 | | 40 |
| Percent of Total Households with No Vehicle Available | 9 | 15 | 1 | 77 | | 45 |
| Percent of People (Males and Females) Aged 65 and Over | 9 | 18 | 1 | 76 | | 36 |
| Percent of Total Households Below Poverty | 10 | 16 | 1 | 75 | | 42 |
| Percent of People (Males and Females) Aged 5 to 17 | 7 | 15 | 1 | 81 | | 35 |
| **Combined Vulnerable Census Tract Walksheds** | **9** | **17** | **1** | **76** | 103 | **40** |
| | | | | | | |
| **At or below Regional Average** | | | | | | |
| Percent of Persons with a Disability | 5 | 12 | 1 | 86 | | 35 |
| Percent of Persons 5 and Over Classified as Language Challenged | 6 | 14 | 1 | 83 | | 36 |
| Percent of Minority Persons Including Hispanic and Latino | 6 | 14 | 1 | 82 | | 36 |
| Percent of Total Households with No Vehicle Available | 6 | 15 | 1 | 82 | | 33 |
| Percent of People (Males and Females) Aged 65 and Over | 6 | 13 | 1 | 83 | | 39 |
| Percent of Total Households Below Poverty | 6 | 14 | 1 | 83 | | 35 |
| Percent of People (Males and Females) Aged 5 to 17 | 7 | 15 | 1 | 80 | | 40 |
| **Combined Non-Vulnerable Census Tract Walksheds** | **6** | **14** | **1** | **83** | 104 | **36** |

Figure 1: Summed totals surpass 100% due to rounding, but numbers across categories are consistent.

On average, 24% of sidewalks in walksheds affecting vulnerable populations were located within 2 feet of the road compared to 17% in walksheds where vulnerable populations were not above the regional average. The discrepancy appears to be mostly accounted for in higher percentages of sidewalks that are not only within 2 feet of the road but that are also 3 feet wide or less.

Planners could leverage similar analysis throughout the metro area to identify insufficient walksheds that affect vulnerable populations. An example walkshed is shown below.

| Sidewalk within 2 feet of EOP | | |
|---|---|---|
| 3 Feet or less wide | Between 3 and 5 feet wide | 5 Feet or greater wide |
| 33 | 32 | 1 |

| Sidewalk more than 2 feet from EOP | | Percent Walkshed |
|---|---|---|
| | Total | in 3/4 mi buffer |
| 34 | 100 | 72 |

# Using the DRCOG 2018 pilot land use land cover data to predict urban air temperature in the Denver metro area

*Article submitted by Peter C. Ibsen, Ph.D. at the U.S. Geological Survey, Geosciences and Environmental Change Science Center, Denver. Peter can be reached at pibsen@usgs.gov.*

Exposure to extreme heat can drastically increase health risks for urban residents, including increasing mortality rates during heat waves and even exacerbating serious mental health conditions (see footnotes 1 and 2). This heat risk is generally not equally distributed. Furthermore, regional climate shifts may increase urban heat as well as the inequities of heat risk, implying the need to develop city-specific resilience strategies (see Footnote 3). Addressing the inequity of urban heat can start with understanding how microscale urban land uses modify daytime and nighttime air temperature. During the day, radiative heat is captured, stored and reradiated by urban land covers. Heat transfer properties, however, differ among land covers. Using a network of air temperature sensors, deployed over Denver's urban core across a gradient of urban land covers (see Footnote 4) (Figure 1A), and regional air temperature and relative humidity at Denver International Airport as a reference, we can estimate the relative influences of land cover on air temperature with the high-resolution data. Previously, most available land cover data are available at a resolution of 30 square meters. At that scale, measuring the influence of tree canopy, turf or impervious surface on microclimate is not possible. However, with DRCOG's 1 square meter 2018 pilot land use data, in addition to identifying the influence of land cover types on microclimate, we can also use

computational models to predict microclimate air temperature over the entire Denver metro area for any given regional-scale air temperature and humidity (Figure 1B). We are fine tuning our models to provide data that can inform urban planners on the effect of specific land covers on urban heat. With citywide microclimate air temperature, city managers can have a better understanding of exactly where the urban heat is the biggest issue, while also quantifying how much urban tree cover, turf and greenspace contribute to mitigating those temperatures.

## Figure 1:

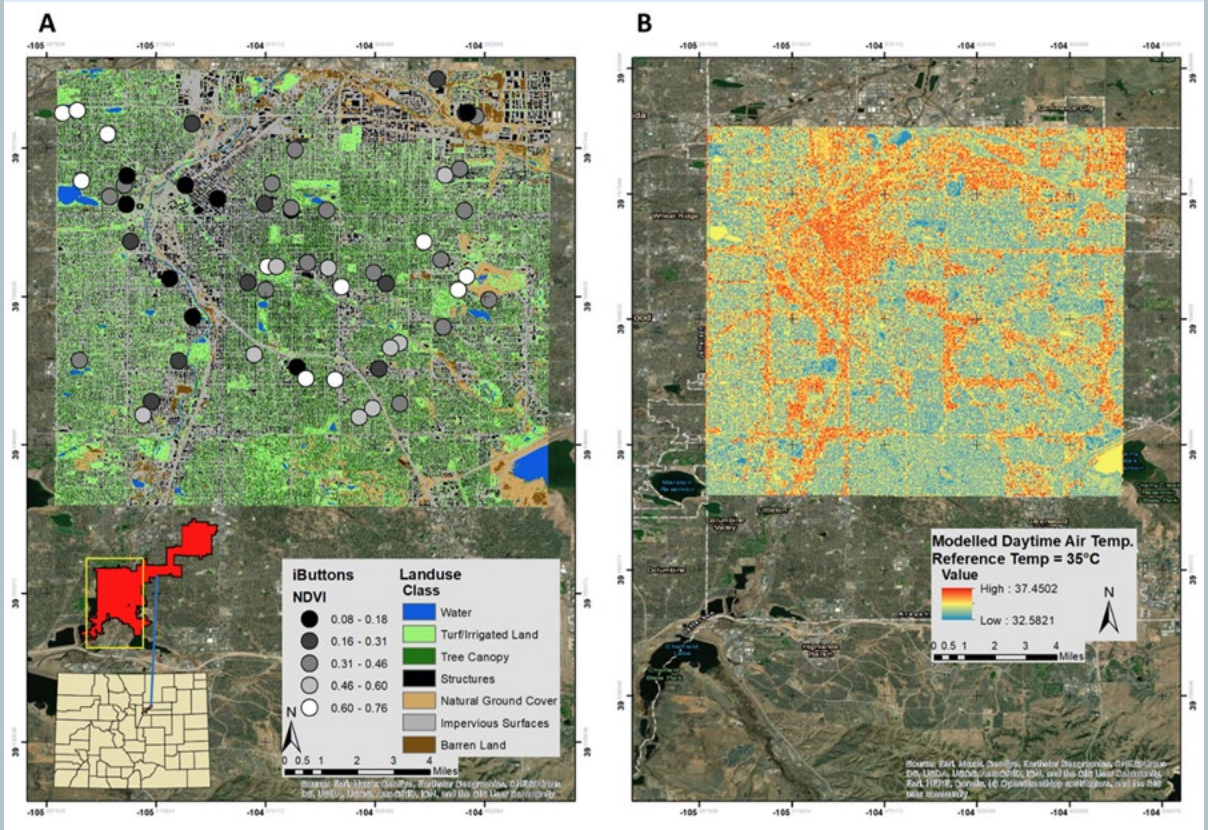


Figure 1A: DRCOG land use land cover imagery (section 12), overlaid with the microclimate sensor locations, stratified against urban greenness. 1B: Modeled daytime air temperature over the DRCOG land use land cover section 12 extent. The random forest model used Denver International Airport temperature at 30 degrees Celsius as a reference.

Footnotes:


1. Mullins, J. T. & White, C. Temperature and mental health: Evidence from the spectrum of mental health outcomes. J. Health Econ. 68, 102240 (2019).
2. Hondula, D. M., Balling, R. C., Vanos, J. K. & Georgescu, M. Rising temperatures, human health, and the role of adaptation. Curr. Clim. Chang. Reports 1, 144–154 (2015).
3. Ossola, A. & Lin, B. B. Making nature-based solutions climate-ready for the 50 °C world. Environ. Sci. Policy 123, 151–159 (2021).
4. Ibsen, P. C. et al. Greater aridity increases the magnitude of urban nighttime vegetation-derived air cooling. Environ. Res. Lett. 16, 034011 (2021).


# How Denver uses data to regulate

# marijuana locations

*Article submitted by Joey Peña. Joey can be reached at 720.865.2781 or joey.pena@denvergov.org.*

In Denver's regulated marijuana industry, location matters — especially to a city agency trying to keep marijuana out of the hands of kids.

To limit youth exposure to marijuana outlets, the City and County of Denver requires certain marijuana businesses to be 1,000 feet from specific locations, dubbed "sensitive uses." Sensitive uses include schools, childcare facilities, drug and alcohol treatment facilities, city recreation centers and outdoor pools and other marijuana businesses of the same type (store-to-store, for example).

Numerous public health, youth-serving and community organizations have expressed strong support for Denver's proximity requirements, and public health data supports the approach. For example:

- Children and young adults who are exposed to marijuana outlets with prominent signage tend to engage in more frequent use and often have greater expectations of marijuana's positive benefits (Shih et al).
- A 2020 study found an association between the density of licensed marijuana outlets with young adults' marijuana use, heavy use and intentions to use. The density of unlicensed outlets was associated with young adults' heavy marijuana use and symptoms of cannabis use disorder. (Pedersen et al)
- Research on the tobacco and alcohol industries also supports proximity requirements and limiting outlet density. (Finan et al; Gwon et al; Freisthler and Gruenewald; Chen, Grube, and Gruenewald; and Popova et al)

The city's goals for restricting outlet density and proximity to sensitive uses can present a challenge for city employees, who use the city's geographic information systems to determine whether an application for a new marijuana business is in compliance with proximity requirements.

Staff also use the systems to do preliminary, nonbinding proximity checks for new business owners to help them determine whether a location will comply with the proximity requirements. The service can save a new business owner time and capital during their search for a viable location.

To complete a proximity review, staff rely heavily on the 3-inch resolution imagery and planimetric data provided by DRCOG through contracts with The Sanborn Map Company and Kucera International, Inc.

City and County of Denver staff consider the data among the best available, and believe it would be difficult to capture better than 3-inch resolution imagery. The quality of the data helps the city provide more accurate proximity measurements during its quality control review of applications. The data also provides staff with building identification numbers, which are critical in analysis of a location.

In short, the data provided by DRCOG helps the city honor its commitment to its youth by limiting marijuana outlet density, which, in turn, limits youth exposure to marijuana commercialization and thus reduces the potential for negative health outcomes. It also helps the city provide a service to new marijuana business owners in search of a location.

# New regional bike and pedestrian count dataset and web map

*Article submitted by Jenny Wallace, GISP, GIS program manager at DRCOG. Jenny can be reached at 303-480-6754 or jwallace@drcog.org.*

DRCOG staff have compiled a regional bicycle and pedestrian count dataset that will contribute to the overall picture of multimodal transportation across the Denver region. The data is now available on the Regional Data Catalog. Bicycle and pedestrian count data will be used in implementing the Metro Vision Regional Transportation Plan and Active Transportation Plan.

Local bicycle and pedestrian counts are collected from local governments by DRCOG staff, standardized and aggregated into a regional bike and pedestrian count dataset. Bicycle counts may be from on-road or off-road facilities and include both manual and automated counts (both short-duration counts and permanent).

A special thanks to the jurisdictions and stakeholders that worked with the DRCOG team to provide data, including Boulder County, Clear Creek County, City and County of Denver, City of Lakewood and City of Littleton. Other data sources include the Colorado Department of Transportation and DRCOG. DRCOG will request local data during its annual data collection effort to update the bicycle and pedestrian count dataset. More information on the dataset schema and format can be found here.

Check out the newest web map showing the bicycle and pedestrian count data!

Web map

# DRCOG data acquisition updates

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

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For more information, visit the website.

Do you have an interesting use case for lidar data? Tell us about it by emailing me at asummers@drcog.org.

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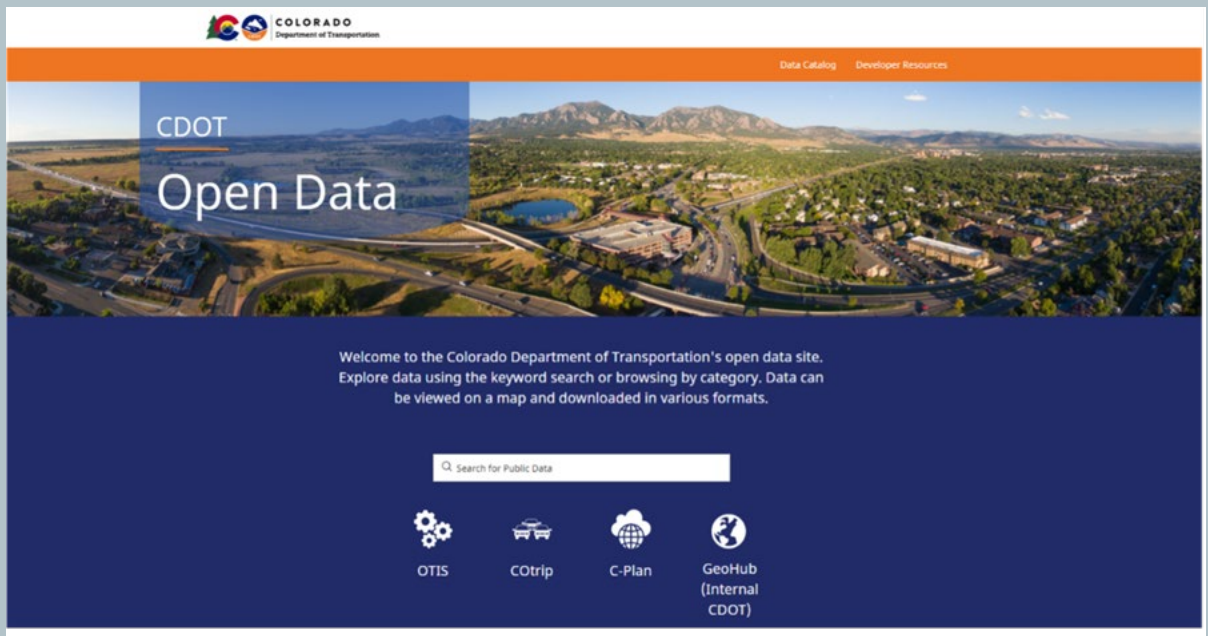



# Colorado Department of Transportation launches open data site

*Article submitted by Shelley Broadway, geographic information systems analyst at CDOT. Shelley can be reached at 303-757-9285 or shelley.broadway@state.co.us.*

The Colorado Department of Transportation has launched a public open data website

that gives users the ability to explore and download CDOT's authoritative geospatial data. Open data encourages information sharing, promotes transparency, and enhances engagement with the public.

To check out the site, visit data-cdot.opendata.arcgis.com. From the Online Transportation Information System click the "Open Data" tile.

Navigating from the main page, visitors can use the search bar to find data by keyword, use the predefined categories to browse data, or click "Data Catalog" in the top right to see all available datasets. Once a user has selected a dataset, they can see a brief description, preview the data on a map, and see associated attributes and tabular data. The search bar in the map window allows visitors to filter records by value, analyze by field, or zoom to a current location.

One of the most powerful features of the site is that it provides users a self-service tool to download data in various formats. Currently, data is available in KML, CSV and shapefile formats, or visitors can use the REST API to add the live service directly to their own maps.

Currently, the CDOT open data site has over 50 datasets, and staff plans to expand the data catalog as needs arise. The majority of the data is updated annually or on an as-needed basis. The item's metadata indicates when the data was last updated.

Users can also find links to other CDOT applications from the open data homepage, including:

- Online Transportation Information System - find information used for transportation planning and project development
- COtrip - view traveler information and current road conditions for Colorado highways
- C-Plan - CDOT's ArcGIS Online site
- GeoHub - an internal ArcGIS for Portal site for CDOT employees

If you have any questions or comments, please contact the CDOT GIS Support Unit by email to dot_generalmailbox_dtd@state.co.us.

# Arvada Emergency Business Recovery Initiative uses web app to reach public

*Article submitted by Jaime Giesen, GISP, senior GIS analyst at the City of Arvada. Jaime can be reached at jgiesen@arvada.org.*

The City of Arvada uses an interactive web map to communicate with the public about how $4.3 million in funding from the Coronavirus Aid, Relief and Security Act is being distributed to local businesses. The data represents seven types of aid and is generalized by location.

Web app

The city tracked addresses of businesses that received aid using Google Sheets. Once the GIS staff received the Google Sheets, they standardized, simplified and cleaned up address formats (for example, staff shortened "avenue" to "ave;" removed elements such as "unit," "suite" and "#;" and trimmed unnecessary spaces). The Sheets were then saved as .csv files for ease-of-use within ArcMap. The .csv files were joined to an address feature class. Staff researched addresses from the .csv files that didn't join and manually placed them on the map. One of the most common reasons for a nonmatch was that an applicant gave the incorrect suffix. For example, they may have listed their business on "street" when it is actually on "place". Other reasons for a nonmatch could include:

- Businesses with multiple locations but only one entry on the spreadsheet.
- Missing unit information.
- Generalized location information such as "at the intersection."
- Listing the name of a business park.

Next, staff used Model Builder to explore the data to find the best way to display it. Field names were simplified and a column was added and calculated to match aid type. Then the seven aid-type categories were combined into a single feature class so that overall aid within an area could be visualized using hexbin polygons. Seeing the data on the map this way made it easier fro staff to validate the analysis process by asking questions such as:

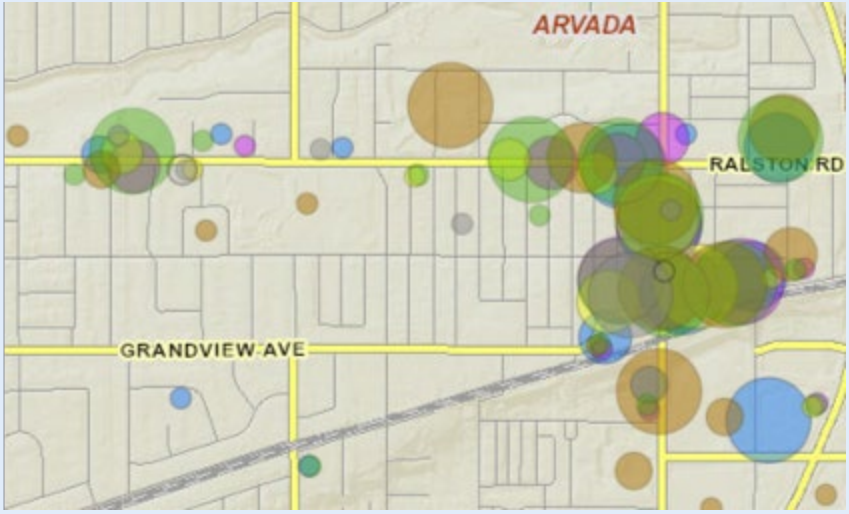
- Are there low concentrations where expected?
- Are there high concentrations where expected?
- Are there areas missing data?

Staff also spot-checked individual lines from the original Google Sheets with the values found in the final feature class.

The hexbin polygons conveyed the concept of area distribution instead of individual businesses receiving aid, so they weren't used in the final map. To satisfy the dual requirements of representing individual businesses while keeping them anonymous, staff shared the seven-point feature classes as services, brought them into ArcGIS Online and used the Cluster Points tool with a scale dependency. The Cluster Points tool in ArcGIS Online dynamically aggregates points within a distance threshold as the user zooms in and out. Staff used trial-and-error to determine the distance threshold that gave the best cartographic result. By default, the Cluster Points tool displays individual points if zoomed in far enough. Therefore, staff placed a scale dependency on each of the seven layers so that they would turn off before individual businesses were identifiable.

Finally, the web map was shared as a web app using the Web App Builder tab and its format finalized using the built-in tools provided.

Visit the city's website for more information about the Arvada Emergency Business Recovery Initiative.




# DRCOG facilitates shared micromobility data platform

*Article submitted by Emily Lindsey, AICP, transportation technology strategist at DRCOG. Emily can be reached at 303-480-5628 or elindsey@drcog.org.*

DRCOG is working with partners to pilot regional shared micromobility data sharing. Enabled by local agency agreements with operators that require Mobility Data Specification and General Bikeshare Feed Specification data, DRCOG uses Ride Report's platform to provide member governments and regional partner agencies a way to share data and understand activity for shared micromobility programs in their jurisdiction.

If you work for a DRCOG member government and have (or are considering) a shared micromobility program, please reach out to Emily Lindsey at elindsey@drcog.org.

# Join OpenStreetMap U.S.'s Mapping USA Conference: May 20th-22nd

*Article provided by Diane Fritz, OpenStreetMap U.S. board member and OpenStreetMap Colorado co-organizer. Diane can be reached via email at diane@openstreetmap.us.*

As these virtual times continue, OpenStreetMap U.S. continues to find ways for data professionals to gather and share their love of all that is OpenStreetMap. Please join the free virtual conference, Mapping USA, May 20-22.

Participants can:

- Present your work with OpenStreetMap — the call for participation is open through

April 23.

- Register to attend any of the events, such as Mappy Hour on Thursday, May 20; or workshops and talks on Friday, May 21, and Saturday, May 22.

Mapping USA

# DRCOG data acquisition updates

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

DRCOG held a meeting on March 18 to discuss these projects. If you missed it, you can view these slides.

## Denver Regional Aerial Photography Project 2022

A subset of previous project partners volunteered to evaluate vendors for the 2022 project. They reviewed six proposals containing over 20 options and ultimately selected Sanborn and Nearmap. DRCOG is currently discussing the project scope and negotiating contracts with both vendors, which will enable participant quotes to be generated. DRCOG will request partner commitments for the Denver Regional Aerial Photography Project this fall.

If you are not a project partner and would like to be, reach out to me at asummers@drcog.org. Read more about DRCOG's imagery projects on its website.

## Regional Lidar Project 2020

DRCOG received a grant from the U.S. Geological Survey in December 2019 to collect quality level 2 lidar in 5,000 square miles of the region and derive contours in most of the metro area. Flights to the collect the data are complete and quality control is expected to start in June. DRCOG staff expects deliveries in the fall and winter. The data will be in the public domain and made available for download through DRCOG's Regional Data Catalog.

For more information, visit our website.

Do you have an interesting use case for lidar data? Tell us about it by emailing me at asummers@drcog.org.

## Planimetric Data Project 2020

The planimetric data project began in February and project partners are currently reviewing a pilot. Data will be delivered incrementally starting in June to project partners. The public will have access to the data in the first quarter of 2022 via the DRCOG Regional

Data Catalog.

The partnership is collecting building roofprints, edge of pavement, parking, sidewalks and ramps, trails, driveways, and impervious surface throughout the metro area. Check out the map.

If you are not a project partner and would like to be, reach out to me at asummers@drcog.org. Read more about our planimetric data projects on our website and download datasets from past projects.

### Regional Land Cover Project 2020

DRCOG was awarded a Colorado Water Conservation Board Water Plan Grant in March, which supplies a 50% match to local contributions for this project. The project is now fully funded and will be kicking off this project in late April.

The product will be a 9-class, 1-meter resolution land cover dataset that covers the 6,000-square-mile region. Deliverables are expected in the first quarter of 2022 and will be made publicly available on DRCOG's Regional Data Catalog.

If you are not a project partner and would like to be, reach out to me at asummers@drcog.org.

## Things you might have missed

- View all DRCOG data briefs.
- View all OpenStreetMap Colorado Meetups.
- View all GIS Colorado events.
- Check out the Go Code Business Solutions Challenge.

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*The data consortium consists of Denver Regional Council of Governments members and regional partners with an interest in geospatial data and collaboration. The data consortium newsletter improves communication among local geographic information systems professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

# CDOT GIS Section strategic plan

*Article submitted by Nell Conti, geographic information systems section manager at CDOT. Nell can be reached at nell.conti@state.co.us.*

The Colorado Department of Transportation's Geographic Information Systems Section is located within the Division of Transportation Development Information Management Branch and comprises three major units: applications and data services, data management, and GIS support. The section uses a diverse array of geospatial technology to collect and manage data, develop and publish geospatial datasets and applications and complete business analytics that make it possible to model CDOT roadway assets and other supporting information for operations, planning, analysis, and performance monitoring in a location-intelligent environment.

Due to paradigm shifts in GIS technology and exponential growth in GIS services over the past decade, the section embarked on a strategic planning process in July 2020. The purpose of the effort is to define the strategic direction for the GIS Section by establishing goals and objectives along a five-year time horizon. The plan will also serve as a mechanism for communicating section priorities to the broader CDOT GIS community, CDOT leadership and external partners.

At the end of the planning process the planning team identified seven high-level goals and developed a mission and vision. The main themes for each of these goals are: data and online system governance, system architecture and database design, innovation and analytic advancement, communication, and technical support and training. In order to

achieve the high-level goals, detailed objectives were developed under each goal. The objectives form the framework for individual GIS unit work planning and staff performance goals over the next five years. Although the goals will remain static, the objectives will be reviewed, prioritized and refined annually.

The plan also highlighted the need to investigate how GIS is organized both within the section and across the organization, to explore developing a CDOTwide corporate geospatial strategy (example from the City of Toronto) and to develop collaborative pathways for integration with existing CDOT data governance efforts.

For more information or to receive a copy of the plan please contact Nell Conti, CDOT GIS Section Manager at nell.conti@state.co.us.

Mission: In collaboration with our customers we collect, manage, integrate and disseminate geospatial data as the foundation for all location-based operations and decision-making. We transform geospatial data into information through innovative visualization and analytics to help CDOT provide the best multimodal transportation system for Colorado.

Vision: We strive to integrate geospatial intelligence into all aspects of the organization to position CDOT as an innovative leader in location-aware transportation management.

# Introduction to the State of Colorado elevation and imagery data-sharing portal

*Article submitted by Tony Filipiak, manager of GIS coordination and development at the Governor's Office of Information Technology. Tony can be reached at anthony.filipiak@state.co.us.*

The GIS team at the State of Colorado Governor's Office of Information Technology is preparing to launch a new Elevation and Imagery Data Sharing Portal. The purpose of this portal is to streamline public access to a variety of geospatial data products that are made available by the State of Colorado. At launch, most of the data will consist of Digital Elevation Model and lidar data. Lidar is detailed elevation and ground cover data used in a variety of public and private industries. Going forward, more imagery and other geospatial data can be added to the catalog of available information.

Users will be able to search for data by county and year acquired and select data by seeing footprints on a map. Users who provide a valid email address will be able to download a compressed folder of the selected data. The new data portal will replace the current system that required interested parties to email the Office of Information Technology GIS team with a description of the needed area and type of data. Turnaround on the previous process could sometimes take several weeks and required significant employee effort. The new data portal data request process will be completely automated

to speed up the process, allow employees to attend to other priorities and make geospatial data more easily available to the public. Accessible, open data is a proven contributor to economic activity and community decision-making.

When available, the geospatial portal will be accessible at https://gis.colorado.gov/lidar. The team is anticipates the new data tool will be ready for use in March.

Feel free to contact the team at oit_gis@state.co.us with any questions.

# Download imagery tiles from the Regional Data Catalog

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

DRCOG has been facilitating an imagery project every two years since 2002, for which data becomes public domain as soon as it is superseded by newer imagery. Although historical imagery is available to the public at no charge, it has not been easily accessible. By making tiles downloadable for its Regional Data Catalog, DRCOG is improving the accessibility of historical data. Currently, 2012, 2014 and 2016 tiles are available for download. DRCOG staff expects to make older imagery (2002-2010) and 2018 imagery accessible by the end of the year.

To download imagery, navigate to the tile indices for 2012, 2014 or 2016 Denver Regional Aerial Photography Program imagery in the Regional Data Catalog. Zoom to the tile you want to download and select it to open the pop-up. Use the links in the pop-up to download the files.

# DRCOG's internal Analysis Challenge

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

At DRCOG, GIS professionals develop dozens of regional datasets every year that support critical processes such as forecasting and performance measurement. These datasets are essential to understanding what the future of transportation and urban development could look like in the Denver region as well as what progress we are making toward regionally shared goals. Additionally, DRCOG procures foundational datasets like imagery, planimetric data, and lidar on behalf of local governments in the region.

We have access to an immense amount of valuable data at DRCOG, but it occurs to us that we are not realizing its full potential. We spend so much time acquiring and developing data, that we have little time for analysis beyond the relatively limited scope of our traditional models and measurements.

To unlock the insights that potentially lay buried in the datasets we already have, the DRCOG GIS team has initiated an internal Analysis Challenge. The goal is to carve out time for our data experts to investigate our datasets in new and creative ways in an effort to exercise their analytical skills and discover hidden value of our existing data assets. After our second attempt, we have learned some lessons to share with any of our peers who are interested in trying something similar.

1. Carve out time for your staff to participate in the challenge by blocking off an entire day or more during which the team is protected from distractions like meetings and other assignments. It may be necessary to let others at your organization know that the team will be unavailable during the challenge.
2. Ask all participants to work simultaneously on the challenge. They may be working independently on different analyses but just having the entire team focused on creativity at the same time can be supportive and motivating.

3. Encourage the use of in-house datasets. The goal is to find new value in your existing data assets.
4. Encourage self-guided research. Often data professionals are busy pursuing answers to other peoples' questions. Allow this opportunity for them to pursue analysis that sparks their own curiosity.
5. Do a small pilot of the analysis first. It is a good use of time to test new methodologies on small areas to determine that the process is promising before applying it to a larger area that takes more time and computational resources.
6. Produce something tangible for show and tell. If possible, try to produce a visual for the team to review at the end of the challenge. These items may be the beginning of a new product or service that your team can offer!

In the future, we are considering inviting staff from other departments to join the challenge, setting up teams instead of just individual participants and offering prizes. Additionally, we plan to offer additional structure so that the Analysis Challenge is not so free-form. For example, a final product should include:

- A problem statement or question.
- A small pilot area for testing the methodology.
- Brief documentation of the methodology.
- A description of the results.
- A visual depiction of the results – maps, graphs or charts.
- Suggestions for next steps.

We are still learning how to best implement this idea at DRCOG but are hopeful that we are headed in the right direction. If you have questions or suggestions for us, please reach out!

# DRCOG's new data privacy policy

*Article submitted by Ashley Summers, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

To make informed decisions, it is necessary for DRCOG to collect, store, analyze, visualize and report data — some of which may be of a sensitive nature. DRCOG balances the need for information with the needs of the public, vendors and partners to maintain the privacy of their personal or proprietary data.

For over a year, DRCOG staff have been developing a data privacy policy to guide the handling of protected data at DRCOG. In this recently adopted document, DRCOG outlines guiding principles, roles and responsibilities, and safeguards that it employs. While this document sets an intention, it is not a detailed procedural document. DRCOG staff are currently working on complementary documents that will guide internal implementation efforts.

Read the policy.

# DRCOG data acquisition updates

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

## Denver Regional Aerial Photography Project 2020

DRCOG collected 6,000 square miles of high-resolution imagery in the spring and summer of 2020 on behalf of 48 partners. All flights are now complete, the imagery has been processed, and we are in the last stages of data acceptance testing (a partner-led effort to confirm quality). Delivery begins soon and goes through mid-March.

If you are not a project partner and would like to be, reach out to me at asummers@drcog.org. Read more about our imagery projects on our website.

## Regional Lidar Project 2020

DRCOG received a grant from the U.S. Geological Survey in December 2019 to collect quality level 2 lidar in 5,000 square miles of the region and derive contours in most of the metro area. Flights to the collect the data are complete and quality control is expected to start in March. Many thanks to our 32 local and state partners that committed funding to the project!

For more information, visit our website.

Do you have an interesting use case for lidar data? Tell us about it by emailing me at asummers@drcog.org.

## Planimetric Data Project 2020

DRCOG will begin the next planimetric data project in February.

We will be collecting building roofprints, edge of pavement, parking, sidewalks and ramps, trails, driveways, and impervious surface throughout the metro area. Check out the map.

If you are not a project partner and would like to be, reach out to me at asummers@drcog.org. Read more about our planimetric data projects on our website and download datasets from past projects.

## Denver Regional Aerial Photography Project 2022

DRCOG recently released a RFP for imagery and related products/services.

To respond, vendors must register on the BidNet Direct site at http://www.bidnetdirect.com. It can take 24 hours to receive a registration password which grants access to view the RFP. If you have questions, please submit them through the website or email bids@drcog.org.

Important dates to note:

- January 20th at 10:00am – DRCOG will hold a virtual pre-bid meeting to provide more detail on this RFP and to take your questions live. The meeting will be recorded and posted for future reference.
  - https://global.gotomeeting.com/join/205701173
  - Call-in: +1 (872) 240-3412
  - Access Code: 205-701-173
- January 29th at 4:00pm – last call for questions emailed to bids@drcog.org.
- February 19th at 12:00pm – submittals are due

# Things you might have missed

- View all OpenStreetMap Colorado Meetups.
- View all GIS Colorado events.
- Check out the Go Code Business Solutions Challenge

# Engage with us

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# Participate in a research study on geospatial skills

*Article submitted by Rebecca L. Powell, Ph.D., Department of Geography/College of Natural Sciences and Mathematics. Rebecca can be reached at rebecca.l.powell@du.edu or 303-871-2667.*

Practitioners and researchers at the Denver Regional Council of Governments, University of Colorado Denver, and University of Denver invite you to participate in a research study about geospatial skills. Researchers are surveying professionals, educators and students to understand potential gaps between geospatial training and workplace demands.

"Geospatial" refers to any work that relies on understanding geographical information. It's a broad term that encompasses topics like cartography, web mapping, geospatial data collection, analysis, data management and remote sensing.

Your involvement in the project is voluntary. The survey takes 5-20 minutes. Not participating will not affect your relationship with DRCOG, University of Colorado Denver or University of Denver. However, your involvement will help researchers understand how to better align skills taught in an academic setting with skills required in a professional setting in the geospatial industry. Findings from the study could help to develop recommendations for geospatial students, educators and professionals.

If you agree to be part of the study, start an anonymous survey about your geospatial

skills and your perceptions of market demand. Respondents may enter to win a $50 gift card!

For more information about the study, contact Rebecca Powell, associate professor, Department of Geography, University of Denver, at rebecca.l.powell@du.edu.

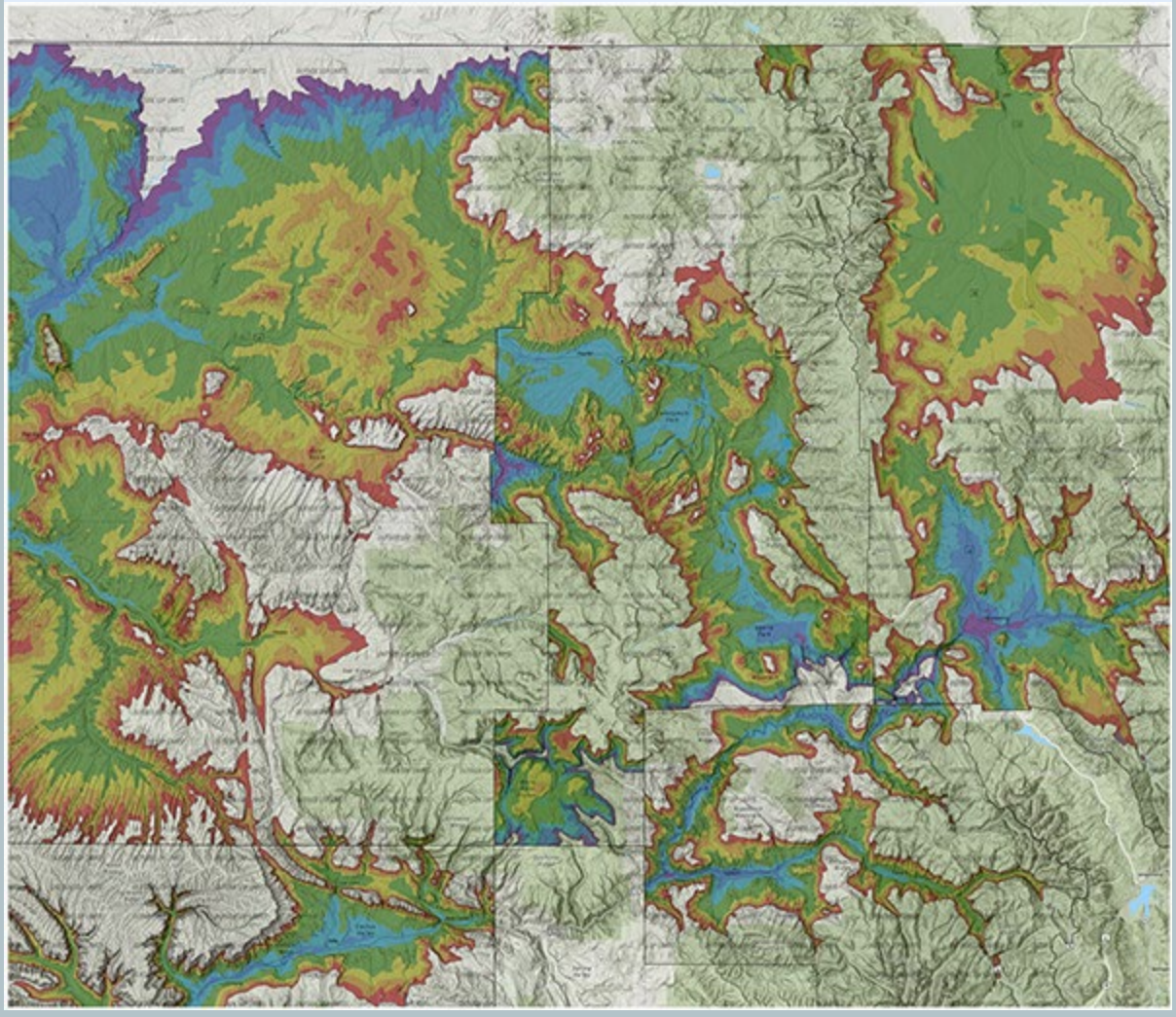
# Update to Colorado's new State Plane Coordinate System

*Article submitted by Joey Stone, global navigation satellite system coordinator at Denver Water. Joey can be reached at joey.stone@denverwater.org or 303-607-3135.*

The National Oceanic and Atmospheric Administration's National Geodetic Survey has announced a delay in the release of the modernized National Spatial Reference System. The National Geodetic Survey is now anticipating a complete rollout of the modernized National Spatial Reference System in the 2024-2025 timeframe. Although the National Geodetic Survey is delaying the release of the modernized National Spatial Reference System, Colorado Geodetic Coordination is still responsible for submitting the Low Distortion Projection layer parameters by March 2021.

The Colorado Geodetic Coordination has completed the preliminary projection designs and is currently soliciting feedback. A new Colorado Geodetic Coordination web experience has been set up to share Low Distortion Projection parameters and an online survey is available for facilitating the feedback process. The survey will be closed on Dec. 1. All Low Distortion Projection data and parameters can also be searched through ArcGIS online with the keywords "Colorado" and "LDP." Any questions or comments can be sent to ngs.colorado@gmail.com.

> visit the Colorado Geodetic Coordination web experience
>
> take the Low Distortion Projection parameters feedback survey



# DRCOG partners with the GeoEx Center at Front Range Community College

*Article submitted by Ashley Summers, geographic information systems professional, project management professional, information systems manager at DRCOG and Jamie Hoover, Ph.D., geospatial science faculty at Front Range Community College. Ashley can be reached at 303-480-6746 or asummers@drcog.org. Jamie can be reached at 303-678-3685 or jamie.hooever@frontrange.edu.*

DRCOG is working with the GeoEx Center at Front Range Community College in a mutually beneficial partnership that will allow students to volunteer on important regional projects.

The GeoEx Center at Front Range Community College was created to develop a highly-skilled and diverse geospatial workforce. The GeoEx Center's goal is to reduce the employment barrier students face due to a lack of experience by offering them the opportunity to work on real-world geospatial projects. Students are paired with local, state and federal agencies, geospatial companies and other college departments.

Student volunteers will assist on DRCOG's Denver Regional Aerial Photography Project by reviewing imagery tiles for adherence to quality specifications. Over 6,000 square miles of high-resolution imagery is collected as part of the Denver Regional Aerial Photography Project, and most of the area is reviewed by the project partners that fund the effort. To assist those partners that have large areas of interest or resource limitations, the student volunteers will be available to ensure the deliverable meets expectations.

Learn more about the Front Range Community College geographic information systems program, including its Geographic Information Systems Certificate, associate degree and the new bachelor of applied science program.

# DRCOG's 2050 small-area forecast

*Article submitted by Geoffrey Chiapella, senior planner at DRCOG. Geoffrey can be reached at gchiapella@drcog.org or 303-480-5644.*

By forecasting the growth of households and jobs in areas much smaller than counties, DRCOG staff can forecast future travel patterns to support the regional transportation planning process. A new small-area forecast of households and jobs is now available for use with upcoming travel demand and air quality conformity modeling for the *2050 Metro Vision Regional Transportation Plan.*

DRCOG's small-area forecasting process begins with county-level forecasts from the State Demography Office in the Department of Local Affairs. DRCOG then forecasts the distribution of the county-level household and employment growth across just over 2,800 small areas, known as transportation analysis zones. That information serves as one set of input assumptions for travel demand modeling efforts that forecast travel patterns between zones and on the transportation network.

To do this work, DRCOG staff rely on:

- A predictive model, known as UrbanSim, that uses nine discrete choice models that simulate household and employment location choices with real estate market dynamics and within natural and regulatory constraints.
- Extensive model inputs gathered from the U.S. Census Bureau, state and local governments and other sources to establish base year and other observable conditions; estimate, calibrate and validate model parameters; and estimate capacity for household and job growth.
- Feedback from local governments on preliminary model results to improve model inputs – DRCOG staff received nearly 900 comments from 31 local jurisdictions over two comment periods.

The resulting household and job forecast is available for viewing and downloading in a variety of formats on DRCOG's Regional Data Catalog.

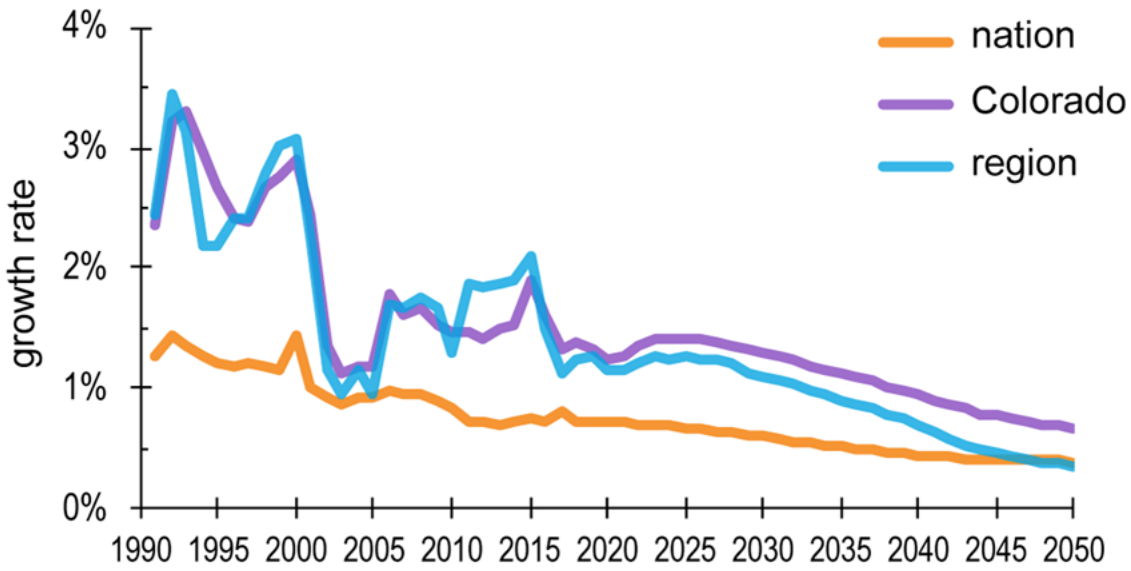
# New Denver Region Data Brief: Regional growth deceleration

*Article submitted by Andy Taylor, regional planning manager at DRCOG. Andy can be reached at ataylor@drcog.org or 303-480-5636.*

The Denver region could be home to 1.86 million households and 2.96 million jobs by 2050. However, the forecast includes less growth over the next 30 years than the region experienced over the last 30 years. Expect 14% fewer households and 21% fewer jobs to be added. Explore more about what's affecting the region's growth in the latest data brief.

To support decision-making, DRCOG staff maintain and analyze various datasets. The Denver Region Data Brief series is an opportunity to highlight insights from the datasets. Do you have questions or ideas for topics? Please contact Andy Taylor at ataylor@drcog.org.

## Annual population growth rate




Data sources: "Components of Change — Regions," State Demography Office, Colorado Department of Local Affairs: https://demography.dola.colorado.gov/births-deaths-migration/data/components-change-regions/ (accessed September 2020); "Population Estimates, Vintage 2019," "Population Estimates, Intercensals 2000-2010," "Population Estimates, Intercensals 1990-2000, "Population Projections, 2017," U.S. Census Bureau: https://www.census.gov/data/developers/data-sets/popest-popproj.html (accessed September 2020).

Data note: Projections and forecasts appear smooth in comparison to the cyclic ups-and-downs shown for past estimates and observations.

# DRCOG data acquisition updates

*Article submitted by Ashley Summers, geographic information systems professional, project management professional, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

### Denver Regional Aerial Photography Project 2020

DRCOG collected 6,000 square miles of high-resolution imagery in the spring and summer of 2020 on behalf of 48 partners. All flights are now complete, and the imagery is being processed. Partners and volunteers will be performing quality control on the data from now until mid-January.

If you are not a project partner and would like to be, reach out to Ashley Summers at asummers@drcog.org. Read more about the imagery projects on the website.

Historical imagery is available for download via the Governor's Office of Information Technology FTP site.

### Regional Lidar Project 2020

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For more information, visit the website.

Do you have an interesting use case for lidar data? Tell us about it by emailing Ashley Summers at asummers@drcog.org.

### Planimetric Data Project 2020

DRCOG is planning for the next planimetric data project. Funding partners are signing up now, and there is still time to be part of this project!

The project will be collecting building roofprints, edges of pavement, parking, sidewalks, ramps, trails, driveways and impervious surfaces throughout the Denver metro area. Collection is also planned to expand into Jefferson County this year.

If you are not a project partner and would like to be, reach out to Ashley Summers at asummers@drcog.org. Read more about the planimetric data projects on the website.

## Things you might have missed

- The next Denver Regional Data Consortium meeting is Nov. 19 at 10 a.m.
- The GIS in the Rockies virtual conference just happened. Check out posters and presentations.

- View all OpenStreetMap Colorado meetups.
- View all GIS Colorado events.

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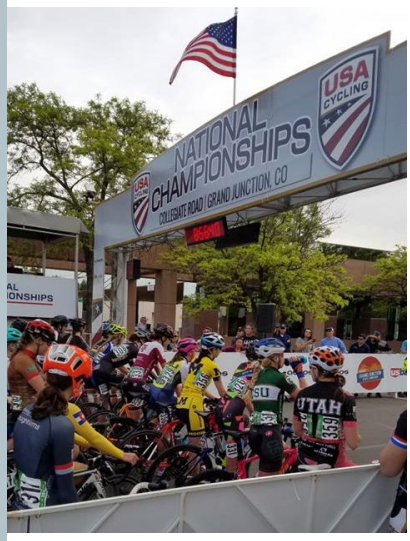
# Planimetric data for outdoor event planning

*Article submitted by Jim Castagneri, volunteer coordinator at the Rocky Mountain Collegiate Cycling Conference.*




Outdoor sporting and entertainment events are a staple of summertime at county fairs, farmers markets and urban festivals. Foot races, bike races, parades and music festivals all make use of public space to bring people together for social events. Public outdoor events are part of our culture. But what makes an outdoor event successful? They certainly have their roots of success tied to the culture and history of an area. But another key element plays an important role in the safe and successful execution of public events: site planning.

Challenges to hosting regular outdoor events can be addressed in the physical environment by building permanent facilities such as parks, fairgrounds, stadiums and band shells. When outdoor events are planned in areas not normally designed for them, many complex problems must be addressed. In today's geospatial-enabled world,

planimetric data can provide part of the solution.

When city and regional planners think about planimetric data, they imagine mapping things like utility corridors, roadways, curb lines or sidewalk locations. They might also map the locations of parks, open space or storm sewer covers. Local governments use this information for a variety of purposes from urban planning to utility work planning. So how can this fundamental type of geographic information systems data be useful for outdoor event planning? What are the needs and benefits of planimetric data for event planning?

To answer the questions, let's explore the needs of event planners once local permits and schedules are set. Event planners generally have three areas of concern when executing large outdoor events;

1. event infrastructure placement (temporary stages, toilets, first aid, etc.)
2. crowd and resource management
3. emergency management

All three concerns must come into play in the three-dimensional space in which the event will take place. For example, how much equipment and staging space is available for the event? What is the best placement for food vendors? Are there areas that are off-limits to the public? What are the major pedestrian thoroughfares? What roads must be blocked off? Where is the nearest parking?

Not unlike larger-scale mapping applications, outdoor event planners must consider a variety of information to make relevant site layout decisions. Placement of special-event barricades, tents, emergency equipment, sound stages and other temporary structures requires planning for ease of access, emergency evacuations and crowd control, and other considerations. In the past, a paper plan might have been created using an outline of the event area. The layout of tents and other structures would be approximated with symbols or hand-drawn objects. That site plan would then be copied to share with others.

Public domain planimetric data such as that maintained by the Denver Regional Council of Governments has facilitated event planning in the GIS realm. The data can help answer a variety of questions like: How wide is a street at a major intersection? How many hectares is a grassy area identified for a concert? How far must concertgoers walk from the nearest parking lot? For crowd control and safety concerns, planimetric data can help planners identify key locations for police presence and medical personnel. Locations for portable toilets, food tents, beer garden permits, racecourse barricades, soundstages, supply trucks, utility and power line routing can all be planned more efficiently in a GIS environment. Elements can be arranged in digital space to allow for a review of equipment spacing, support access and crowd movement.

Additionally, the ability to publish the map data online allows multiple parties to review plans for adherence to local codes and resource allocation. For example, a local police department can review barricade, spectator and festival locations to determine resource and officer placement on the ground. Audio-visual equipment can be located and cabling distances measured, while mixing boards, generators and other equipment are located away from crowds in a semi-secure environment.

First responders can plan for temporary first-aid service locations and ambulance and

firetruck ingress and egress routes. Police and public security personnel can plan for security checkpoints, pedestrian flow and egress.

In my own experience it is clear: Planimetric data provides an invaluable resource for efficient site planning of public outdoor events.

Planimetric data for downtown Pueblo, Colorado. Source: Microsoft, Jim Castagneri

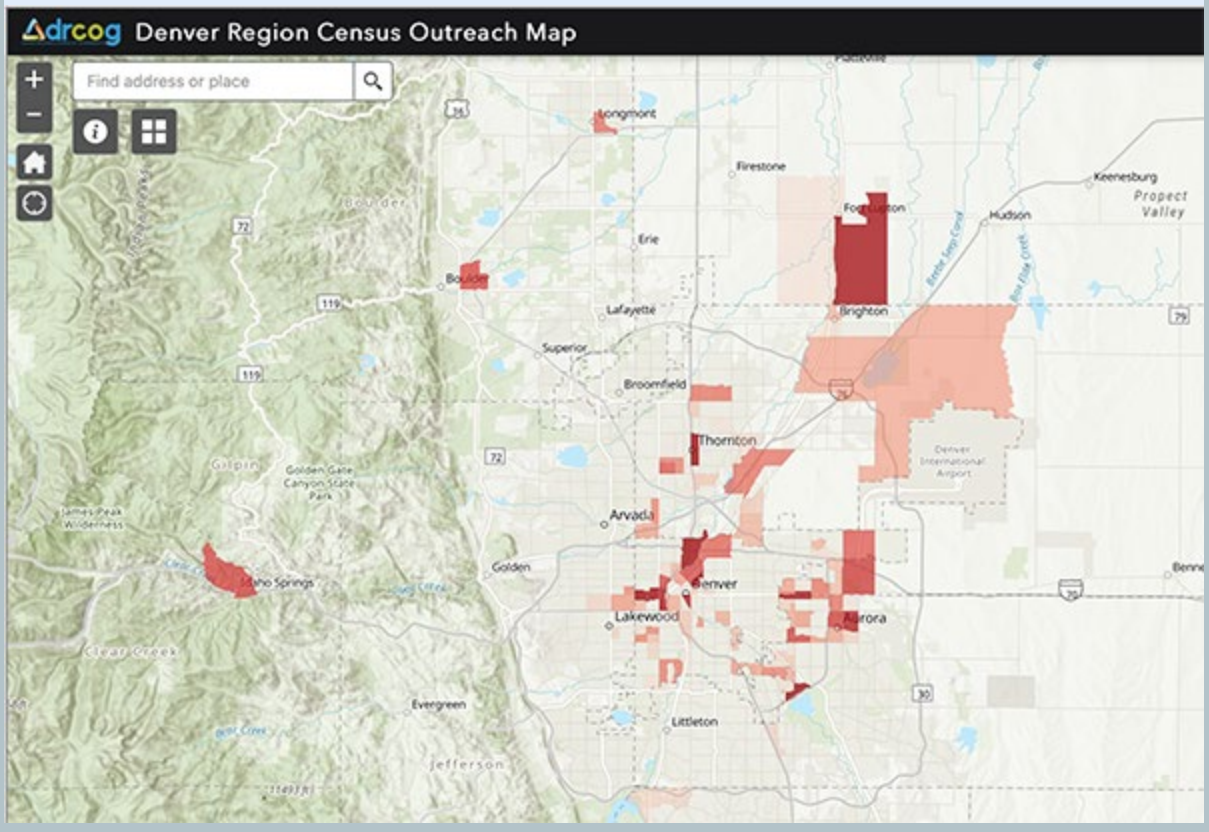
# Targeted census outreach for hard-to-count communities

*Article submitted by Lisa Houde, communications specialist at DRCOG. Lisa can be reached at 303-480-5658 or lhoude@drcog.org.*

Take the census: Responding to the census has never been easier with options to respond by mail, phone or online. Residents can now respond to the census through the summer due to operational changes in response to COVID-19. To avoid in-person interactions with census takers in the future, respond to the census now.

DRCOG census outreach: DRCOG received a grant through the Department of Local Affairs to conduct census outreach to ensure an accurate count of older adults in the region. Outreach efforts included convening a regional workgroup of organizations also working to reach older adults and promote the census; advertising through many different mediums including print, TV, digital and radio; and working with DRCOG's Area Agency on Aging staff and contractors to spread the word about the census to its clients. June was the final month of the grant, and DRCOG staff have focused on outreach to

communities with lower response rates and higher percentages of older adults. In order to target the outreach, DRCOG staff created a map that can be used to identify communities that are typically more difficult to reach and those that have lower response rates. Explore the map to learn more.




# DRCOG's Vision Zero plan

*Article submitted by Beth Doliboa, transportation planner at DRCOG. Beth can be reached at 303-480-5647 or bdoliboa@drcog.org.*

Traffic-related deaths and severe injuries are a critical and preventable public health epidemic and a social equity issue in the Denver region. In 2018, 242 people were killed and 1,866 people were seriously injured on the region's roadways. That's 2,108 people in just one year. To respond to the issue, the Denver Regional Council of Governments Board of Directors adopted Taking Action on Regional Vision Zero.

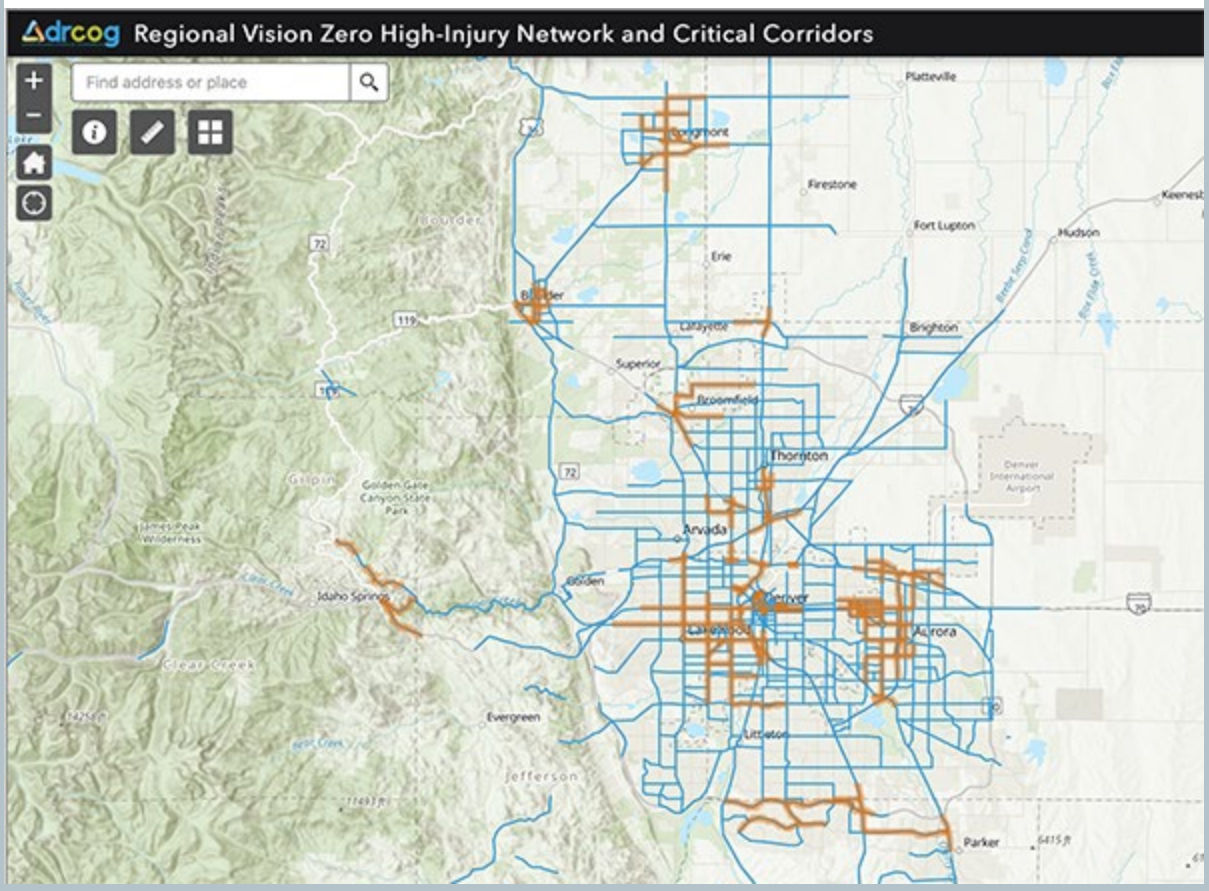
Vision Zero is a safety approach with the core principle that it can never be ethically acceptable that people are killed or seriously injured when moving within the road transportation system. It is fundamentally different from the traditional traffic safety approach in American communities in six ways by:

1. reframing traffic deaths as preventable
2. integrating human error to the approach
3. focusing on preventing fatal and severe crashes
4. establishing safe systems prioritizing human life when designing a road network
5. applying data-driven decision-making
6. establishing road safety as a social equity issue

Taking Action on Regional Vision Zero includes a toolkit for local governments to use to plan their own implementation of Vision Zero principles in their communities. The plan also sets out action initiatives, an implementation timeline and measures that will help track regional progress toward safety improvements. The plan was guided by robust public engagement over the last year, including a crowdsourced map of safety issues around the region.

Regional Vision Zero prioritizes data in decision-making. Crash data from 2013 through 2017 was used to analyze the locations of fatal and serious-injury crashes in the region to gain an understanding of the causes of the crashes and identify priority locations for safety improvements in the Denver region. The Regional High-Injury Network was developed by identifying the road segments with the highest killed and serious-injury crash density. To further identify areas of concern, DRCOG's geographic information systems team developed critical corridors along the Regional High-Injury Network by identify the top 50% of killed and serious-injury crash density corridors by each county within the DRCOG boundary.

To provide DRCOG's local jurisdictions easy access to Regional High-Injury Network and critical corridors, DRCOG's GIS team created an interactive map that includes additional layers, such as vulnerable populations.




# DRCOG data acquisition updates

*Article submitted by Ashley Summers, geographic information systems professional, project management professional, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

## Denver regional aerial photography project 2020

DRCOG is collecting 6,000 square miles of high-resolution imagery in 2020 on behalf of 48 partners. The spring flights in the metro area and eastern plains are complete. The summer flights in the mountains have just begun.

If you are not a project partner and would like to be, reach out to me at asummers@drcog.org. Read more about our imagery projects on our website.

Historical imagery is available for download via the Governor's Office of Information Technology FTP site.

## Regional lidar project 2020

DRCOG received a grant from the U.S. Geological Survey in December 2019 to collect quality level 2 lidar in 5,000 square miles of the region and derive contours in most of the metro area. Flights to the collect the data are almost halfway finished. Many thanks to the 32 local and state partners that committed funding to the project!

For more information, visit our website.

Do you have an interesting use case for lidar data? Tell us about it by emailing me at asummers@drcog.org.

## Planimetric and land use land cover project 2020

As noted above, plans are in motion for collecting a substantial amount of foundational data in 2020. DRCOG wants to make sure it leverages that investment by preparing to create derivatives that would benefit our GIS community in the region. With updated imagery and lidar, project partners can delineate, quantify, and measure many aspects of our built and natural environments. See some examples.

Discussions are happening now to shape those data products and determine potential partnerships for funding. If you're interested in knowing more, please reach out to me at asummers@drcog.org. Also, be aware of our tentative schedule:

- fall 2020 – letters of intent due from participating partners
- winter 2021 – new imagery is delivered
- spring 2021 –new lidar is delivered; derivative projects begin

# Things you might have missed

- The next Data Consortium meeting is on July 30.
- Check out DRCOG's latest data brief on COVID-19's effect on workers.
- The OpenStreetMap Colorado community continues to add DRCOG's regional building footprints to OpenStreetMap. Read an article about it in Popular Science. View all OpenStreetMap Colorado Meetups.

- Sign up to attend the GIS Colorado summer meeting on Aug. 15. View all GISCO Events.

## Engage with us

- This quarterly newsletter reaches more than 300 people, has a higher-than-average open rate, and is written by professionals like you. It's the perfect place to show off your projects, highlight your great work and contribute ideas to the GIS community in the Denver region. Newsletter release dates are the 15th of January, April, July and October (or the next business day afterward). Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org to contribute.

- Did you miss a newsletter or a meeting? Visit our website for past newsletter issues and Denver Regional Data Consortium meeting materials.

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*The data consortium consists of Denver Regional Council of Governments members and regional partners with an interest in geospatial data and collaboration. The data consortium newsletter improves communication among local geographic information systems professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

# Update on the 2020 census and coronavirus outbreak

*Article submitted by Kelly Roberts, community resource specialist at DRCOG. Kelly can be reached at 303-480-6787 or kroberts@drcog.org.*

Due to the COVID-19 outbreak, the U.S. Census Bureau has made changes to the timeline and operations for the 2020 census. The deadline for census responses has been extended from July 31 to Aug. 14. Field operations, during which census takers drop off census forms to rural communities, have been suspended.

Households began receiving invitations to participate in the 2020 census online the week of March 12. Instructions included the web address for the online questionnaire in English as well as how to respond online in 12 other languages. Census invitations also include the toll-free number to call for assistance, but due to social distancing requirements, fewer census representatives are working in the call center, causing long wait times. The U.S. Census has revised its marketing to emphasize the ease of responding online.

As of April 2, Colorado has a self-response rate of 40.3%, which is higher than the national self-response rate of 38.4%. The U.S. Census Bureau will continue to monitor the coronavirus situation in consultation with public health officials and take appropriate steps on operations as needed.

# Using DRCOG planimetric data to evaluate municipal storm drain improvements

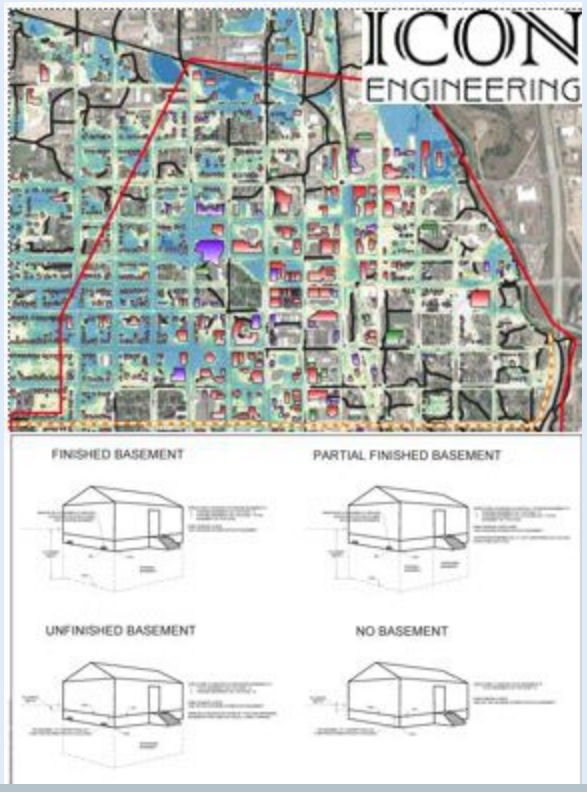
*Article submitted by John Klier, geographic information systems specialist at Icon Engineering. John can be reached at 303-221-0802 or jklier@iconeng.com.*

Front Range municipalities face numerous challenges when planning for infrastructure improvements to reduce damage in the event of a major storm. As a consultative civil engineering firm, Icon Engineering provides services to perform benefit cost analysis within a desired basin to assist in the evaluation of proposed storm drain improvements. DRCOG's planimetric data represents the effect quality geospatial data can have in performing a benefit cost analysis and translates to real-world improvement in the communities impacted by flooding.

A combination of hydraulic and hydrologic modeling is implemented to estimate potential runoff and inundation limits for flooding. Planimetric data, including building and sidewalk outlines, are used when developing land use parameters and blocked obstructions for hydraulic modeling.

On the GIS side, building data is paramount. There are several methodologies for determining damage against a given structure. The Federal Emergency Management Agency has set the standard with damage curves for a wide variety of building classifications. Building data is combined with additional tables, such as assessor's data, which help in classification. A series of zonal statistics is run against baseline terrain to determine the lowest adjacent grade on a structure and against the 2D hydraulic model results to sample projected water elevations and flooding depth on inundated structures. The results are brought into a database where calculations are run against all hypothetically inundated structures and then compared to existing conditions.

The evolution of data, including DRCOG's planimetric dataset, has allowed for more granular analysis. Estimating total flood damage provides a crucial basis in determining how funding will translate into community improvement.

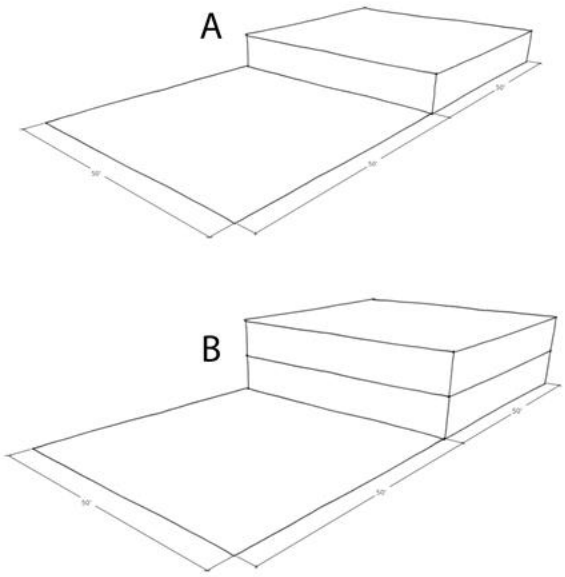



# Using DRCOG building footprints to determine floor area ratio

*Article submitted by Kristy Bruce, Master of Landscape Architecture, geographic information systems professional, planner at Logan Simpson. Kristy can be reached at 970-799-3232 or kbruce@logansimpson.com.*

Effective community planning uses a comprehensive approach for visioning and problem solving through review of existing conditions, community priorities and best practices. In both large- and small-scale planning in the DRCOG region, application of detailed, full coverage data is critical to understanding trends and identifying opportunities. Logan Simpson, an environmental and community planning firm in Fort Collins, often uses DRCOG planimetric data to understand trends, changes in the built environment and development density through floor area ratios in planning projects along the Front Range.

Floor area ratio (FAR) is the total floor area in a building compared with the area of the lot on which the building is constructed, or floor area divided by lot area. For instance, if a one-story building takes up half of a parcel, it has an FAR of




0.5. (A) If a two-story building takes up half of a parcel, it has the same area as the parcel and it has an FAR of 1. (B)

In community planning, Logan Simpson uses FAR in conjunction with land use to understand where there might be room for additional density in a large parking lot, for example, or to understand average utility usage per square foot by land use type. A project example, illustrated below, shows how Logan Simpson used building footprints to reveal FARs that can support transit. FARs, combined with dwelling units or employees per acre, can indicate where there is enough activity to support a transit stop.  Shown below, building footprints were used to determine an average FAR within a half-mile of a transit stop.

The target FAR for a bus with frequent trips is two. Logan Simpson used DRCOG building footprints to estimate the existing number of stories for buildings near transit stops and calculate FAR to determine whether a transit stop is currently feasible, or if changes in land use regulations at key locations would support additional density to make the transit stop more successful.

A key element to the success of projects crossing multiple jurisdictions is the application of DRCOG's planimetric building footprint layer. Using current and accurate building

footprint data enables us to compare each transit stop equally. The data also aids in the recommendation of bus stop locations or changes to land use code to support higher densities around proposed bus stops based in real, on the ground conditions.

# Mile High Flood District uses lidar for mapping flood hazards

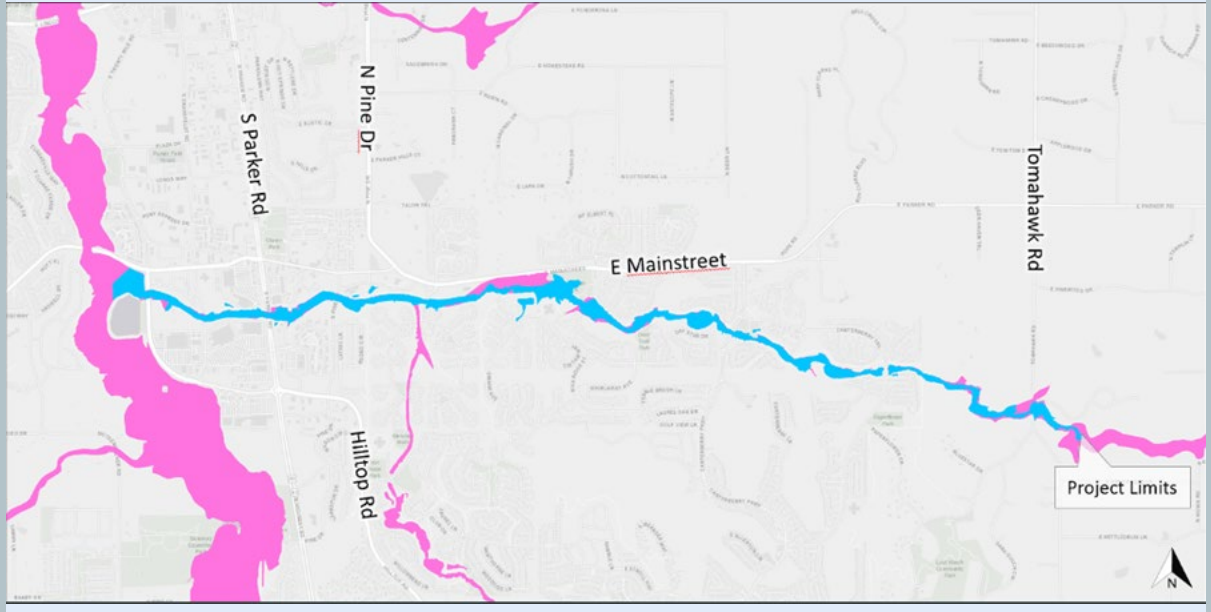
*Article submitted by Katie Evers, geographic information systems analyst at Mile High Flood District. Katie can be reached at 303-455-6277 or kevers@udfcd.org.*

The Mile High Flood District manages over 3,000 miles of major streams in Colorado. Understanding where people and property are exposed to flood hazards is central to the Mile High Flood District's mission of preservation, mitigation and education. The Mile High Flood District partners with seven counties and 35 municipalities to conduct stream studies and projects that help reduce the risk of flooding. All of its efforts rely on access to the best available elevation data. DRCOG's partnership with the U.S. Geological Survey to collect lidar provides the advantage of a reliable and consistent dataset whether a single stream or an entire watershed is studied. The Mile High Flood District uses U.S. Geological Survey quality level 2 lidar elevation products to evaluate risk through flood plain mapping, fluvial hazard zone mapping and in dam breach analysis studies.

## Flood plain mapping

Reliable flood plain maps are critical for homeowners, governments and developers to understand where flooding may occur and identifying structures at risk. The Mile High Flood District conducts flood hazard area delineation studies to create and update flood plain maps, and watershed master planning studies to identify stream improvement required to accommodate changes to the built and natural environment over time. Both are dependent on lidar-derived digital elevation models. Master planning studies provide information that can be used to guide new land development projects on flood control and stream improvement needs. The modifications to a flood plain map from a flood hazard area delineation study are submitted to the Federal Emergency Management Agency for a physical map revision of the effective FEMA flood hazard information. Lidar-derived products are also used to supplement channel surveys on smaller scale flood plain mapping revisions.

A recently completed flood hazard area delineation along Sulphur Gulch, a tributary to Cherry Creek in Douglas County, revealed a reduction in the 100-year flood plain after the hydraulic model was developed with updated lidar-derived contours and survey of major structures in the area. Current lidar in and adjacent to the flood plain allowed for more accurate hydrologic and hydraulic modeling as well as mapping that reflected current conditions. As a result, zero insurable structures were located in the 100-year flood plain. Once the flood plain is approved by FEMA, the delineation will be reflected as the effective flood plain on FEMA flood insurance rate maps for local and federal regulation.



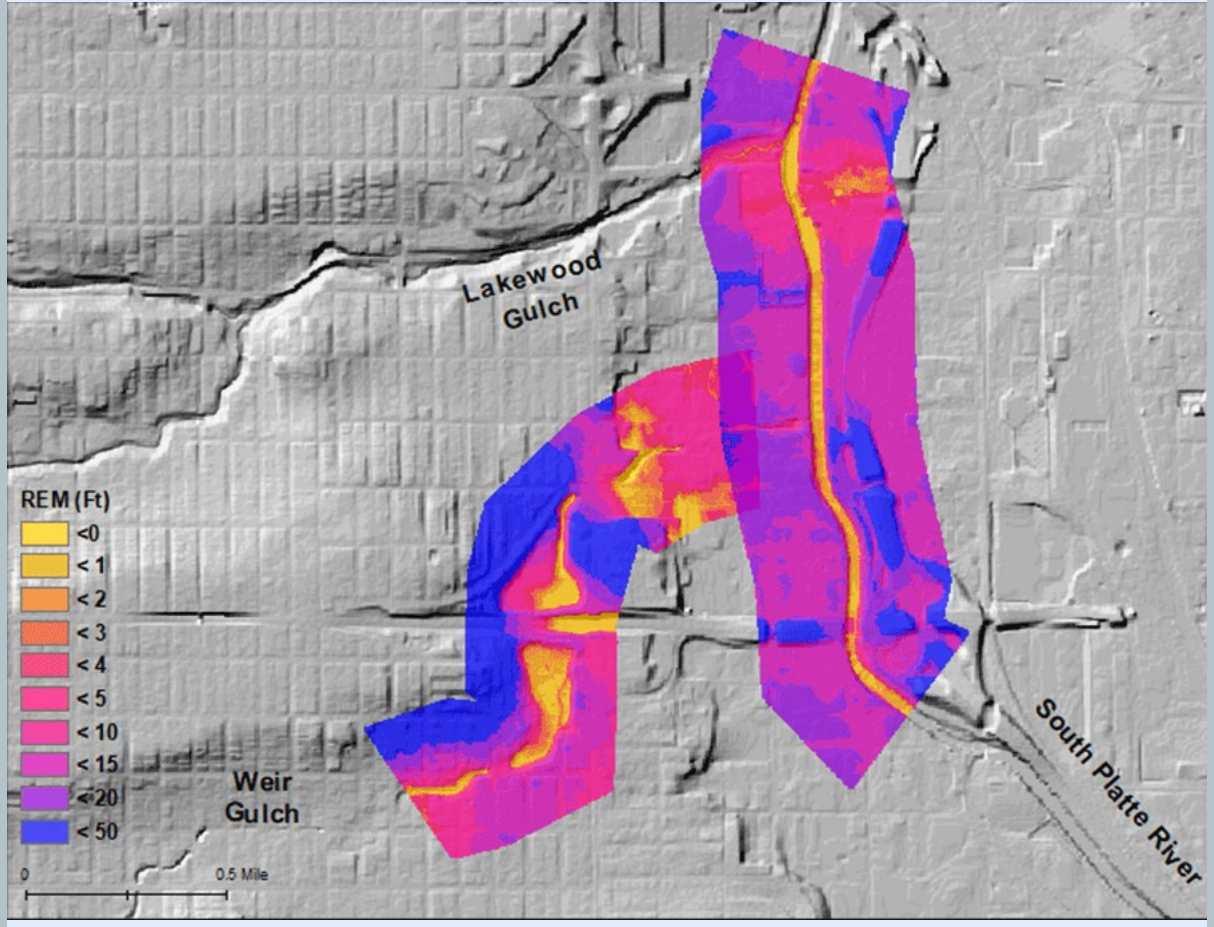

*The modified flood plain from the Sulphur Gulch flood hazard area delineation is displayed in blue. The existing mapped flood plain is represented in pink.*

## Fluvial hazard zones

Traditional flood plain maps, although critical in flood risk assessment, do not consider dynamic river processes such as erosion and sediment deposition. Fluvial hazard zone mapping, used in conjunction with flood plain mapping, helps communities better understand where they have the potential for flooding. The Colorado Water Conservation Board developed a protocol for mapping fluvial hazard zones, and access to the U.S. Geological Survey quality level 2 standard lidar provides the Mile High Flood District with data at the level of accuracy needed to map fluvial hazard zones using the Colorado Water Conservation Board's protocol. The quality level 2 data allows for the creation of lidar-derived digital elevation models with 2-foot resolution, which identifies landforms most influenced by the natural dynamics of a stream. Digital elevation model-derived datasets that are important in fluvial hazard zone visualization and analysis are hillshade and slope rasters, as well as relative elevation models.

> *"The relative elevation model enhances visualization of the fluvial signature (i.e. relic channel scars, flood plain surfaces, alluvial terraces) particularly when laid over a hillshade raster."* (Colorado Water Conservation Board, 2020).

By considering fluvial hazard zones during the design and construction of mitigation projects, the Mile High Flood District helps reduce the risk of flood damage and encourages municipalities to make more informed land use decisions.




*Relative elevation model for South Platte River and Weir Gulch. Lower relative elevation values highlight areas that could have a higher risk for erosion during a flooding event.*

## Dam breach analysis

With several dams in the Mile High Flood District, conducting dam breach analysis and inundation mapping studies is critical for local emergency managers to understand the associated flood hazards. Significant development, both residential and commercial, downstream of the Pine Gulch Dam prompted the need for a dam breach analysis study to understand the flood risk to people, vehicles and structures if an overtopping event occurred. Lidar-derived 2-foot contours and lidar-derived digital elevation models were used to determine the reservoir's surface area, storage capacity and the watershed boundary upstream of the dam, all of which were used in the hydraulic model to simulate flooding under different conditions.

*The Pine Gulch Dam was classified as high hazard because a dam failure could affect at least one resident downstream. Classifying dams as high hazard allows emergency managers to plan ahead and monitor higher-risk areas during an event.*

# Planimetric data provides insight into sidewalk infrastructure

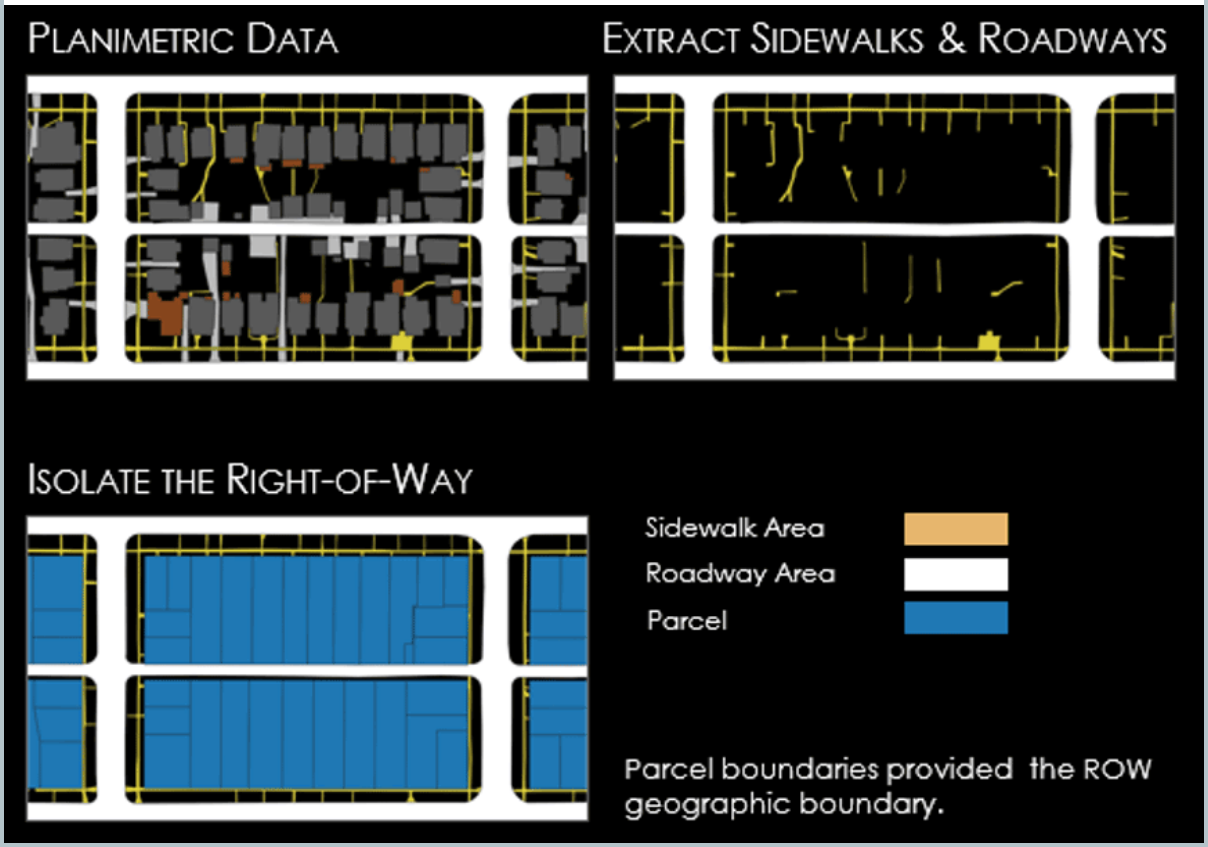
*Article submitted by Dr. Wes Marshall and Nicholas Coppola, University of Colorado Denver. Wes can be reached at wesley.marshall@ucdenver.edu, and Nick can be reached at nicholas.coppola@ucdenver.edu.*

Sidewalks are a fundamental yet under-researched topic in transportation. Most of the existing sidewalk papers tend to focus on relatively small areas due to a lack of comprehensive data. Recent advances in remote sensing technology – such as DRCOG's planimetric dataset – are presenting us with new and innovative research opportunities.

The spatial accuracy and detailed sidewalk outlines provided by DRCOG's planimetric sidewalk data sparked us to investigate additional cities with similar data. We found 24 cities from across the United States. We are digging into over 400,000 sidewalk segments to see what we can learn about characteristics such as availability and width. Next, we will compare these results against Americans with Disabilities Act requirements and guidelines from organizations such as the Federal Highway Administration, the American Association of State Highway and Transportation Officials, the Institute of Transportation Engineers and the National Association of City Transportation Officials. So far, we are finding an overall deficiency of sidewalk infrastructure. On average, U.S. cities have less than 50% sidewalk coverage. More than 40% of those are less than 4 feet wide, and at

least 10% aren't even 3 feet wide.

The sidewalk data gives us a newfound ability to quantify sidewalk characteristics at the city scale, and for dozens of cities at a time, which will help us advance mobility, accessibility and equity. Sidewalks have long been overlooked as transportation infrastructure and in terms of asset management, but thanks to DRCOG's planimetric data, studies like this are now possible.




# DRCOG data acquisition updates

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

## Regional planimetric data project 2018

Since 2014, DRCOG has facilitated a planimetric data capture immediately following the completion of an imagery project. The 2018 iteration began in Feb. 2019 and completed in Feb. 2020.

Project deliverables – except for some premium attribution reserved for funding partners – are free for public download on DRCOG's Regional Data Catalog. Learn more about 2018 project specifics and visit the webpage.

## Denver regional aerial photography project 2020

DRCOG is scheduled to collect 6,000 square miles of high-resolution imagery in the spring and summer of 2020 on behalf of 48 partners. The project is currently experiencing

difficulty due to unsuitable ground conditions, airspace closure and COVID-19, but DRCOG staff are optimistic that project requirements can still be met. Additionally, DRCOG is offering a discounted Nearmap subscription to partners that want to pay for this streaming service.

If you are not a project partner and would like to be, reach out to me at asummers@drcog.org. Read more about DRCOG's imagery projects on the website.

Historical imagery is available for download via the Governor's Office of Information Technology FTP site.

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For more information, visit the website.

Do you have an interesting use case for lidar data? Tell us about it by emailing me at asummers@drcog.org.

### Planimetric and land use land cover project 2020

As noted above, plans are in motion for collecting a substantial amount of foundational data in 2020. DRCOG staff want to make sure they leverage the investment by preparing to create derivatives that would benefit the GIS community in the Denver region. With updated imagery and lidar, we can delineate, quantify and measure many aspects of the built and natural environments. See some examples.

Discussions are happening now to shape the data products and determine potential partnerships for funding. If you're interested in knowing more, please reach out to me at asummers@drcog.org. Here's the tentative schedule:

- April 2020 – send preliminary quotes to partners for budgeting purposes
- Fall 2020 – letters of intent due from participating partners
- Winter 2021 – new imagery is delivered
- Spring 2021 –new lidar is delivered; derivative projects begin

## Things you might have missed

- Check out the new Colorado Geodetic Coordination website.
- The OpenStreetMap Colorado community continues to add DRCOG's regional building footprints to OpenStreetMap. You can help at the next Importathon on May 21. View all OpenStreetMap Colorado meetups.
- Sign up to attend the GIS Colorado summer meeting on Aug. 15. View all GIS

Colorado events.

- View Esri COVID-19 infographics by county.

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# Castle Rock launches snowplow tracking system and website

*Article submitted by Mark Maloney, information technology project manager, and Amy Hart-Dayton, GIS manager, at Town of Castle Rock. Mark can be reached at 720-733-3515 or mmaloney@crgov.com and Amy can be reached at 720-733-3550 or ahart@crgov.com.*

The Town of Castle Rock is always looking for ways to improve services provided to its residents. The recent deployment of PlowOps, its semicustom snowplow tracking system, helped with that initiative. The solution was developed by NeoTreks, Inc., a Castle Rock-based software development company, to specifically meet the town's plow tracking needs.

When a snowstorm begins, plow truck drivers step into vehicles set up with GPS receivers and cellular-enabled Samsung tablets mounted to the dashboards. The technology sends real-time data to a central office, where operations staff use the PlowOps mapping console to manage response.

The real-time data also feeds a public website so residents can see where the plows have been and how much time is expected before their street is cleared. HTML and JavaScript were used to create the site, in addition to live web map services. The mapping site is featured on the Castle Rock website.

In addition to showing the location of a snowplow, the PlowOps tool includes a paperless driver vehicle information report, the beginning and end mileage of each driver's shift and options for drivers to report obstacles in the road (including the obstacle location), such as utility holes and crashes, with a non-intrusive tap on the tablet.

Future PlowOps capabilities include measuring plow up and plow down times, measuring the volume of salt and sand spread on the road, the dynamic creation of street sweeper routes derived from locations where salt and sand were dropped and metrics to allow for more active and accurate oversight of the town's snow plow operations.

NeoTreks specializes in map-oriented technologies, both custom and off the shelf. Their corporate office is located in Castle Rock, Colorado, with a branch office in the Czech Republic.

**Figure 1: plow routes**

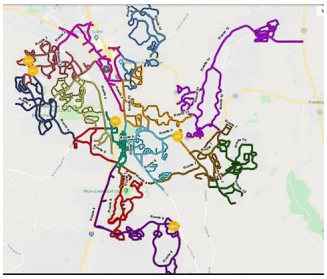
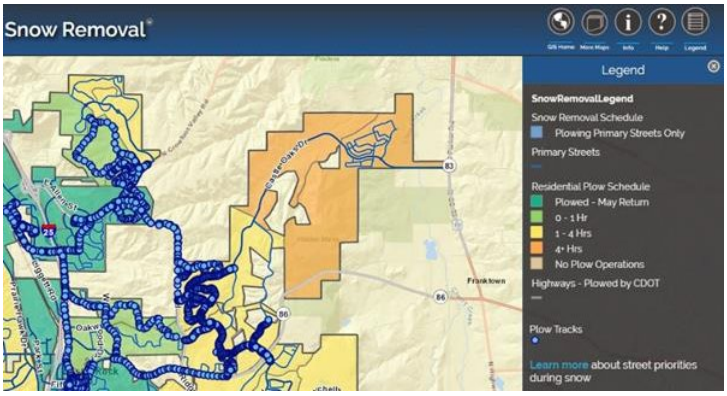


**Figure 2: public website**




# Conservation planning application uses DRCOG regional land cover data

*Article submitted by Claudia Browne, ecologist, and Chris Rehak, GIS specialist, at Biohabitats. Claudia can be reached at 720-907-6556 or cbrowne@biohabitats.com and Chris can be reached at crehak@biohabitats.com.*

**Purpose:** The High Line Canal Conservancy's stormwater transformation project is helping revitalize a 70-mile linear park-like amenity in the Denver metro area. As part of a recent Pisces Foundation grant, Biohabitats assisted the conservancy in conducting an opportunity analysis along the canal to evaluate the stacked benefits for water quality, habitat and social improvement projects. DRCOG's 1-meter regional land cover data, from the Regional Data Catalog, provided information about habitat connectivity, habitat quality and stream- and lakeside vegetation across the six jurisdiction project area.

**Overview of analysis approach:** Although the canal is a man-made feature, the analysis

was based on it serving as a riparian-like (stream side) habitat for birds, pollinators, reptiles and small mammals. Initial evaluation of habitat quality and connectivity was therefore completed by aggregating multiple cover classes from the land cover dataset and filtering the information to only include areas within a ¼-mile riparian buffer of the canal (see figure). The vegetation land cover data was then quantified along canal reaches to determine the total acreage of each vegetation type and the riparian-like habitat areas. The analysis results provided valuable information for comparing riparian habitat quantity and quality along the canal (see figure), and for identifying areas where ecological values could be improved or protected. The results were integrated with water management opportunities and social vulnerability mapping to develop concepts for stacked management approaches with the greatest benefits for wildlife, habitats and people.

**Potential future opportunities and next steps:** Across the country, there is an urgent need for improved conservation and restoration planning to reduce the rapid loss of habitat, as evidenced by recent reports of national bird population declines. An integrated land and water planning approach is also critical for watershed protection and climate resiliency. Local, high resolution land cover data provides a bridge to implementation for planners. For example, future analysis proposed by the Denver Metro Nature Alliance will focus on habitat prioritization and connectivity by summarizing vegetation classes, defining focal species and determining thresholds for habitat patch size to support the focal species. The information would be used to define and locate core habitats across the project area, representing the main hubs of habitat connectivity and areas where high biodiversity likely exists. Any remaining non-vegetated classes from the 1-meter planimetric data are then converted into a layer representing barriers that can impede movement of the focal species (roads, buildings, parking lots). This information can then be used in connectivity analysis software, which uses algorithms from electronic circuit theory to predict connectivity in heterogenous landscapes. These connectivity predictions, along with the identification of pinch-points, provide valuable information for locating areas with conservation and restoration potential.

Given the importance of conservation, restoration and other nature-based solutions for maintaining ecosystem functions and climate-resilient communities, the availability of high resolution land cover data will be integral to supporting these efforts in the future.

For additional information, feel free to contact Claudia Browne or Chris Rehak.

click to view full-size image

# The Data to Policy Project wants your questions!

*Article submitted by Diane Fritz, geospatial services specialist at Auraria Library. Diane can be reached at diane.fritz@ucdenver.edu.*

The Data to Policy Project (D2P) is an initiative hosted by Auraria Library to engage students with their community needs through course-based assignments, which culminate in data-driven policy proposals to local governments and agencies. The D2P project is open to any students from the University of Colorado Denver, Metropolitan State University of Denver or Denver Community College who want to use public data for public good, regardless of whether they are in a D2P class, pursuing an independent study project, or exploring the work for fun. (This happened last semester with the Machine Learning Club!) Participating faculty from a variety of disciplines encourage students in D2P classes to apply open data to building evidence-based policy proposals, enhancing the learning outcomes in their courses. Although some students' topic selections are self-selected, many students desire to work on pressing projects and issues identified by the community.

This is where you, the community, can help! The Data to Policy Project invites questions and topics the students can select for their semester-long projects. In turn, the students may derive novel perspectives and solutions that can help your organization or cause.

The D2P website has a submission button for **community questions** on the homepage. Incoming questions are reviewed by the D2P committee before being offered as subject

options to the students. D2P will work with you to tailor the questions for participating semester long courses. If you have supplementary data pertinent to answering the questions, D2P can supply it to the students as well. The D2P symposium occurs every semester, and students start looking for specific questions and datasets a few weeks into their classes. **Please submit your questions before the end of January** to get them in front of students for spring 2020. (Note: Questions can be submitted at any time and are kept for following semesters.)

Please reach out to Diane if you have any questions about the process or want to know of other ways to be involved with the D2P project.

# DRCOG's 2020 Census outreach

*Article submitted by Lisa Houde, AICP, public engagement specialist at DRCOG. Lisa can be reached at 303-480-5658 or lhoude@drcog.org.*

DRCOG has received a grant through the Colorado Department of Local Affairs to complete outreach work for the 2020 Census. Staff will leverage their experience, expertise and community standing to approach the hard-to-count older adult population and ensure an accurate and complete count in the 2020 Census. DRCOG will undertake a variety of methods in the outreach work, including creating resource toolkits for use by community partners, launching an advertising campaign to raise public awareness about the importance of the census, and convening a regional workgroup to share best practices, strategize and maximize combined efforts.

If you are interested in participating in DRCOG's 2020 Census outreach efforts, please contact Lisa Houde, DRCOG public engagement specialist, at 303-480-5658 or lhoude@drcog.org.

# DRCOG data acquisition updates

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

## Regional planimetric data project 2018

Since 2014, DRCOG has facilitated a planimetric data capture immediately following the completion of an imagery project. The 2018 iteration began in February 2019 and is expected to be completed in February 2020.

Project deliverables, except for some premium attribution reserved for funding partners, will be free for public download on DRCOG's Regional Data Catalog. Learn more about 2018 project specifics and visit our webpage.

## Denver regional aerial photography project 2020

DRCOG is scheduled to collect 6,000 square miles of high-resolution imagery in the spring and summer of 2020 on behalf of 48 partners. Additionally, DRCOG is offering a discounted Nearmap subscription to partners that want to pay for this streaming service.

If you'd like to become a project partner, reach out to me at asummers@drcog.org. Read more about our imagery projects on our website.

Historical imagery is available for download via the Colorado Governor's Office of Information Technology FTP site.

## Regional lidar project 2020

In the fall of 2019, DRCOG applied for a U.S. Geological Survey Broad Agency Announcement award to help us fund a 2020 lidar collection in the region, and DRCOG was recently informed that the USGS is interested in the project! More details on the partnership to come. Preliminary plans include collecting quality level 2 lidar in 5,000 square miles of the region and deriving contours in most of the Denver metro area. Many thanks to our 32 local and state partners that committed funding to this project!

For more information, visit our website.

**Do you have an interesting use case for lidar data? Tell us about it by emailing me at asummers@drcog.org.**

## Planimetric and land use land cover project 2020

Plans are in motion for collecting a substantial amount of foundational data in 2020. DRCOG staff wants to make sure they leverage the investment by preparing to create derivatives that would benefit our region's GIS community. With updated imagery and lidar, we can delineate, quantify and measure many aspects of our built and natural environments. See some examples.

Discussions are happening **now** to shape the data products and determine potential partnerships for funding. **If you're interested in knowing more, please reach out to me at asummers@drcog.org**. Also, be aware of our tentative schedule:

- now to Feb. 14 – requirements gathering surveys and meetings
- March 2 – release request for proposals to get vendor bids
- April – send preliminary quotes to partners for budgeting purposes
- fall – letters of intent due from participating partners
- winter 2021 – new imagery is delivered
- spring 2021 –new lidar data is delivered; derivative projects begin

# Changes are coming with the 2020 Census data release

*Article submitted by Zachary Feldman, economist at DRCOG. Zachary can be reached at 303-480-5637 or zfeldman@drcog.org.*

The U.S. Census Bureau will be applying differential privacy to the 2020 Census public data release. Differential privacy is the U.S. Census Bureau's method to rigorously define the acceptable privacy risk in a data release to ensure the confidential 2020 Census microdata cannot be reconstructed from publicly released tables.

What does this mean for users of the public data releases? Public tables from the 2010 Census gave total population, voting age population, total housing units and occupancy status as counted for each census block. The 2020 public tables will introduce noise so that only total housing units will be as counted for each census block. Estimates of population and demographics can significantly vary from the census count at all geographies. Even county level estimates can vary drastically from true census counts. Estimates of population by age and gender for rural areas will show the largest discrepancy.

Colorado's State Demography Office has provided resources comparing the old and new privacy methods using the 2010 Census summary file data release. Online maps comparing various estimates at multiple geographies are available here.

## Additional resources:

from Integrated Public Use Microdata Series

from the U.S. Census Bureau

## 2010 Census demonstration files:

Differentially Private 2010 Census Data

2010 Demonstration Data Products

For further information, questions or concerns, please contact Zachary Feldman at zfeldman@drcog.org or 303-480-5637 or Cindy at the Department of Local Affairs at cindy.degroen@state.co.us.

The U.S. Census Bureau is taking feedback on the 2010 demonstration files through March 1.

# DRCOG is hiring!

DRCOG will be opening a recruitment period for a **GIS analyst** in the near future. Stay tuned for more details in February, and keep an eye on the jobs at DRCOG page if you're interested in the position.

# Things you might have missed

- Congratulations to Doug Genzer from the City and County of Denver for his recent publication in the GIS&T Body of Knowledge!
- Sign up to attend the GIS Colorado winter meeting on Jan. 31. DRCOG will be there to present on regional data acquisition projects. View all GIS Colorado events.
- The OpenStreetMap Colorado community continues to add DRCOG's regional building footprints to OpenStreetMap. You can help at their next Importathon on Jan. 23. View all OpenStreetMap Colorado meetups.

# Engage with us

- This quarterly newsletter reaches more than 300 people, has a higher-than-average open rate, and is written by professionals like you. It's the perfect place to show off your projects, highlight your great work and contribute ideas to the GIS community in the Denver region. Newsletter release dates are the 15th of January, April, July and October (or the next business day afterward). Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org to contribute.

- Did you miss a newsletter or a meeting? Visit our website for past newsletter issues and Denver Regional Data Consortium meeting materials.

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# Data consortium annual survey

Your feedback is important to us! Please tell DRCOG how we can serve you better through our facilitation of the data consortium by filling out this survey by Nov. 8.

# Preplan improvements using DRCOG planimetric data

*Article submitted by Greg Hericks, GIS specialist at South Metro Fire Rescue. Greg can be reached at 720-989-2658 or greg.hericks@southmetro.org.*

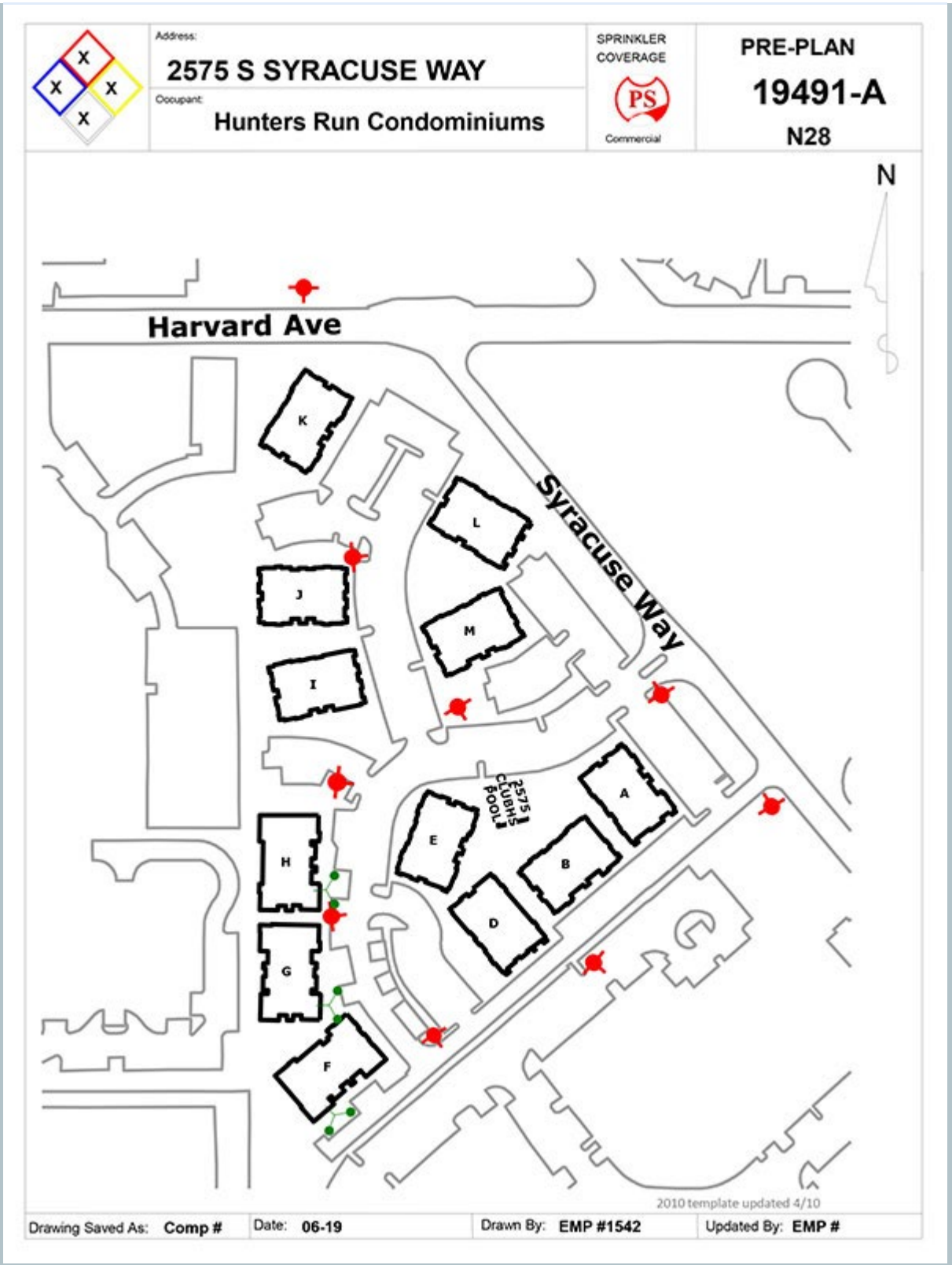
Fire and emergency medical services personnel are faced with a wide variety of emergency scenarios, and many tools and applications are used to ensure public safety and quicken response times. One of the applications used at many fire departments is known as the preplan. With an area of 285 square miles, where 29 fire stations serve over half a million residents of the south Denver metro area, South Metro Fire Rescue maintains over 6,000 preplans—one for each commercial or public building within its vast boundaries. DRCOG's planimetric data has been instrumental in improving the overall preplan process and has resulted in a more accurate and usable product for South Metro

Fire Resue's fire and emergency medical services personnel.

As the name implies, the preplan is a digital document that is reviewed prior to arriving on scene—often en route—and familiarizes first responders with building location and layout. The first page of the building preplan is an overhead drawing or site plan that serves as a map of the property. The site plan is where significant improvements have been made using planimetric data that provides a true representation of the built environment. Basic information, such as building footprints, parking lots and curb lines, is valuable to first responders in determining their quickest and best approach to the building and how it can be accessed from the street. In addition to the site plan, a floor plan (usually the second page) gives greater detail of the building interior.

South Metro Fire Rescue's preplans have evolved significantly over past years. In 2009, a typical preplan was a rudimentary digital rendering consisting of lines, symbols and text that was often distorted, not to scale and limited by the perception and imagination of the artist. Today, preplans are detailed, comprehensive, accurate and to-scale geographic information systems drawings that are far more reliable and useful in emergency situations. Thanks to the availability of DRCOG's planimetric data, South Metro Fire Rescue has saved countless hours in producing a better product. More importantly, South Metro Fire Rescue is equipping its emergency responders with a more accurate preplan that can help shave seconds off response times and contribute to more favorable outcomes in 911 emergency calls.

**Sample preplan (enlarge):**




# Peer update: The Greater Philadelphia pedestrian network

*Article submitted by Kim Korejko, data coordination manager at Delaware Valley Regional Planning Commission. Kim can be reached at 215-238-2936 or kkorejko@dvrpc.org.*

***Editor's note**: Cities, counties and regions across the nation face similar challenges in*

*their roles as planners, implementors and providers of public services. Periodically, DRCOG features a project by one of our peers to demonstrate how they are using data and technology to address an urban development or transportation topic in their area.*

The Delaware Valley Regional Planning Commission is creating a pedestrian facilities network for the Greater Philadelphia region. The GIS dataset inventories the presence of sidewalks and locations where curb ramps and crosswalks are or should be. The inventory will allow Delaware Valley Regional Planning Commission and its planning partners to map and measure the mileage and connectivity of sidewalks in the region or a local area, identify gaps in sidewalk infrastructure and set grounded targets for sidewalk network buildout. The inventory can also serve as a starting point for the development of priorities to address sidewalk gaps in the most appropriate places.

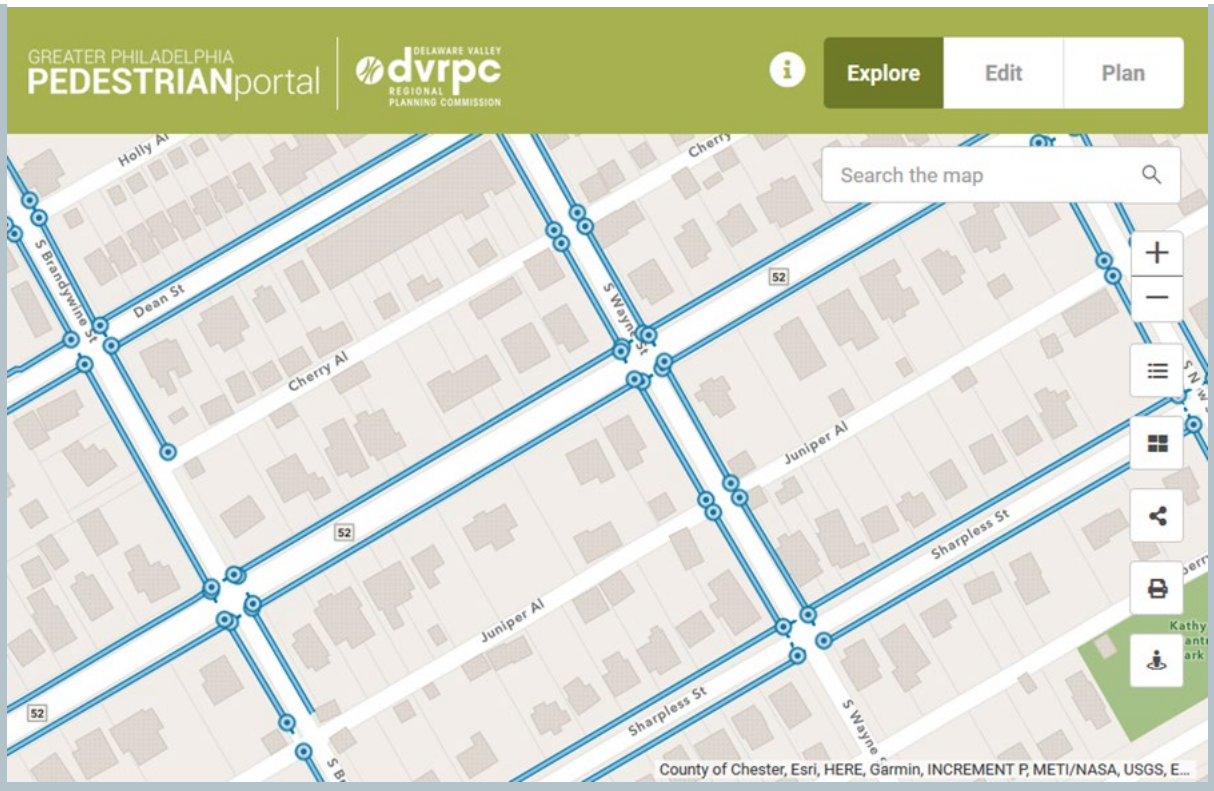
Delaware Valley Regional Planning Commission will be sharing the data through the Greater Philadelphia Pedestrian Portal, a website that: allows for collaboration between local, regional and state planning partners working on pedestrian improvements; provides access to and accommodates maintenance and enhancement of the pedestrian facilities inventory by local entities; and allows local and regional planning partners to share their pedestrian facility priorities.

The pedestrian network for the region will be released in phases, as the data is developed:

| **Counties** | **State** | **Release date** |
|---|---|---|
| Bucks, Chester, Delaware, Montgomery* | Pennsylvania | Spring 2019 |
| Burlington, Camden, Gloucester, Mercer | New Jersey | Fall 2020 |
| Philadelphia | Pennsylvania | Spring 2020 (anticipated) |

*Data for suburban Pennsylvania counties can be downloaded here.

You can follow along with the project by visiting walk.dvrpc.org.




# OpenStreetMap importathon update

*Article submitted by Margaret-Rose Spyker. Margaret is a GIS and data analyst at Xentity Corporation. She can be reached at mspyker.xentity@gmail.com.*

In the fall of 2017, a few skilled OpenStreetMap-ers in the Denver community worked with the Denver Regional Council of Governments to prepare an import of planimetric building footprints professionally created from three-inch imagery. From that point, the goal of the project became the import of over 1 million buildings in the nine-county Denver metro area. The import effort is led by a team of OpenStreetMap-ers committed to contributing and validating a series of small bulk uploads. Anyone interested in helping can join the team's monthly meetup.

The kickoff of the effort to engage editors from the OpenStreetMap community to import the data kicked off in summer 2018. Since then the team has imported more than 100,000 planimetric building footprints to bring the total number of buildings to around 300,000. Statistics on the project can be found on the tracking website OpenStreetMap Denver Buildings Import. Some challenges and opportunities have arisen, and much of what has been learned in the first year will help accelerate the process for 2020.

In tandem with the import, the development of a quality control plan has begun. The quality control plan will incorporate address cleaning and unit counts where possible. The projected deadline for the second phase is in 2021, so the Denver Regional Aerial Photography Project 2018 and 2020 data will be invaluable in achieving project timelines.

# DRCOG's regional micromobility work group

*Article submitted by Emily Lindsey, AICP, transportation technology strategist at DRCOG. Emily can be reached at 303-480-5628 or elindsey@drcog.org.*

DRCOG's regional micromobility work group was formed in early 2019 to implement action items from two recently completed planning efforts: DRCOG's Active Transportation Plan and the Mobility Choice Blueprint report. The work group is made up of representatives from member governments and local partners including the Colorado Department of Transportation and the Regional Transportation District that are interested in small, human- and electric-powered transportation solutions such as bikes and scooters. One of the primary goals of the group is to collaborate on policy areas where a shared regional approach would benefit communities throughout the Denver region.

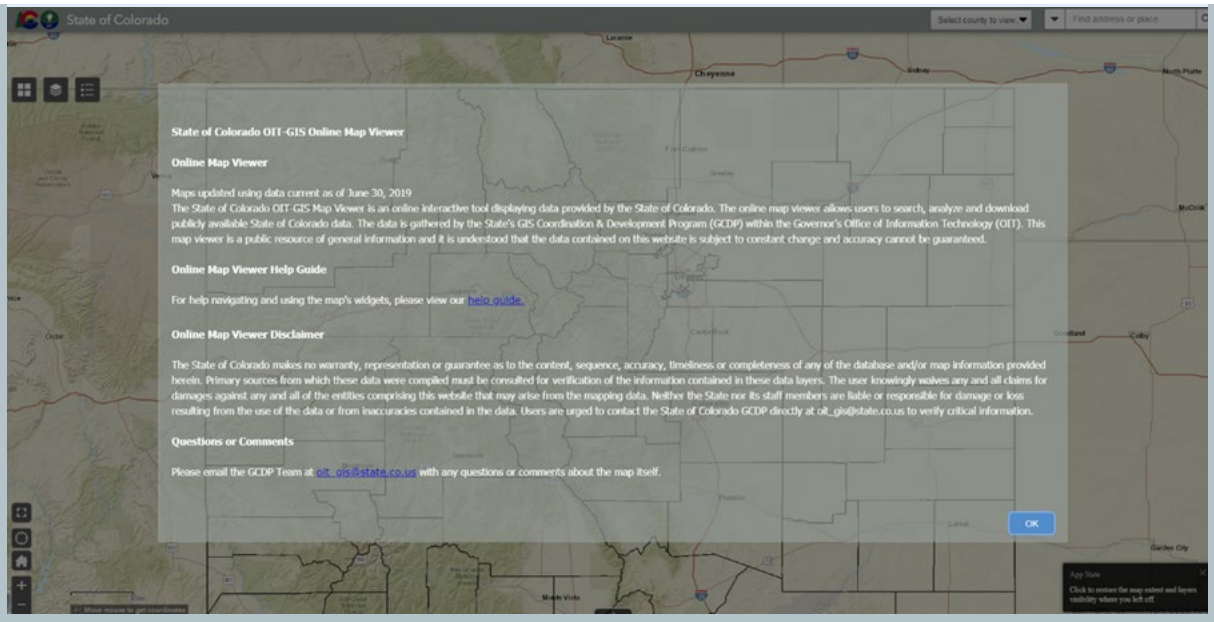
One such regional approach is collaboration on shared micromobility data standards, collection and evaluation. Public agencies can use the data generated from shared micromobility devices to regulate, evaluate and plan more effectively. The information can help communities better understand the effects of micromobility devices and how they relate to civic goals from mobility and safety to equity and air quality. Two of the most common specified data formats for micromobility data are the General Bikeshare Feed Specification and Mobility Data Specification.

For more information on the micromobility work group and data, please contact Emily Lindsey, transportation technology strategist, at elindsey@drcog.org.

# Introducing the new State of Colorado viewer

*Article submitted by Genie Hays, GIS analyst at the Colorado Governor's Office of Information Technology. Genie can be reached at 303-764-6871 or genie.hays@state.co.us.*

The State of Colorado has launched the new State of Colorado viewer! The viewer is an online interactive tool displaying data provided by the State of Colorado. The online map viewer allows users to search, analyze and download publicly available State of Colorado data. The data hosted on the viewer has been gathered from Colorado counties and state agencies by the GIS Coordination and Development program within the Governor's Office of Information Technology. For more information on the Office of Information Technology GIS team as well as its other projects, please visit its Confluence page.




# Denver GIS Day

*Article submitted by Doug Genzer, GIS data administrator at the City and County of Denver. Doug can be reached at 720-913-4839 or Douglas.Genzer@denvergov.org.*

Please join the City and County of Denver's GIS Day celebration on Wednesday, Nov. 20, from 10 a.m. to 2 p.m. in the Webb Building atrium (201 W. Colfax Ave.). This event is free, open to the public and does not require registration. GIS Day is an international event that recognizes the importance of geography and advances in geographic information systems technology. GIS is used to map, visualize and analyze data in order to better understand our world and effectively make decisions.

This year's event will showcase a wide range of GIS products, tools and applications from Denver's GIS community. Come learn how GIS is being deployed to improve the city. To celebrate this year's event, there will be a live music performance, free food, cake, prizes, presentations and interactive map displays.

**Website:** denvergov.org/gisday

**GIS Day event schedule**

**10 a.m. - GIS Day kick-off**

- opening remarks by David Edinger (chief information officer, City and County of Denver Technology Services)

**10:30 a.m. – Map, poster gallery, networking and live music performance**

- band to be determined

**11:30 a.m. - Keynote speaker**

- Frank Biasi – digital director, National Geographic Maps

**12:15 p.m. - GIS lightning talks**

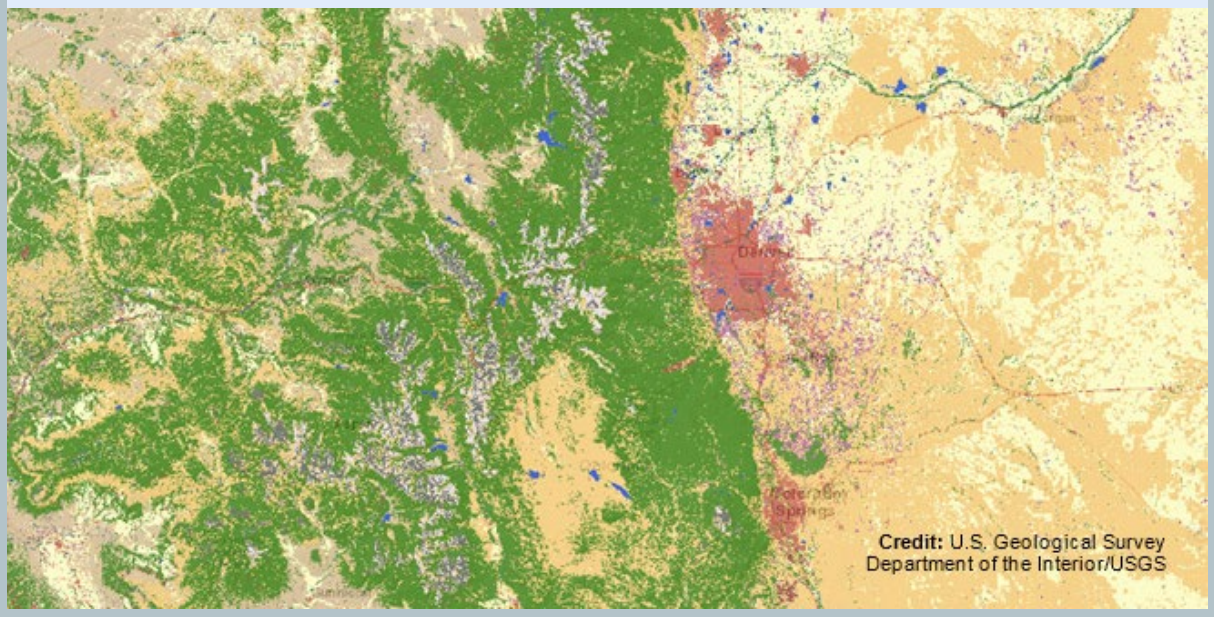
- to be determined

**All day**

- vendor displays
- exhibits
- map gallery
- food
- raffle

# New feature on the Regional Data Catalog

Check out the new feature on our Regional Data Catalog – land use land cover!




# Upcoming events

- data consortium meeting: Nov. 14 at 10 a.m. at the DRCOG offices
- GISCO events
- OpenStreetMap Colorado Meetups

# Engage with us

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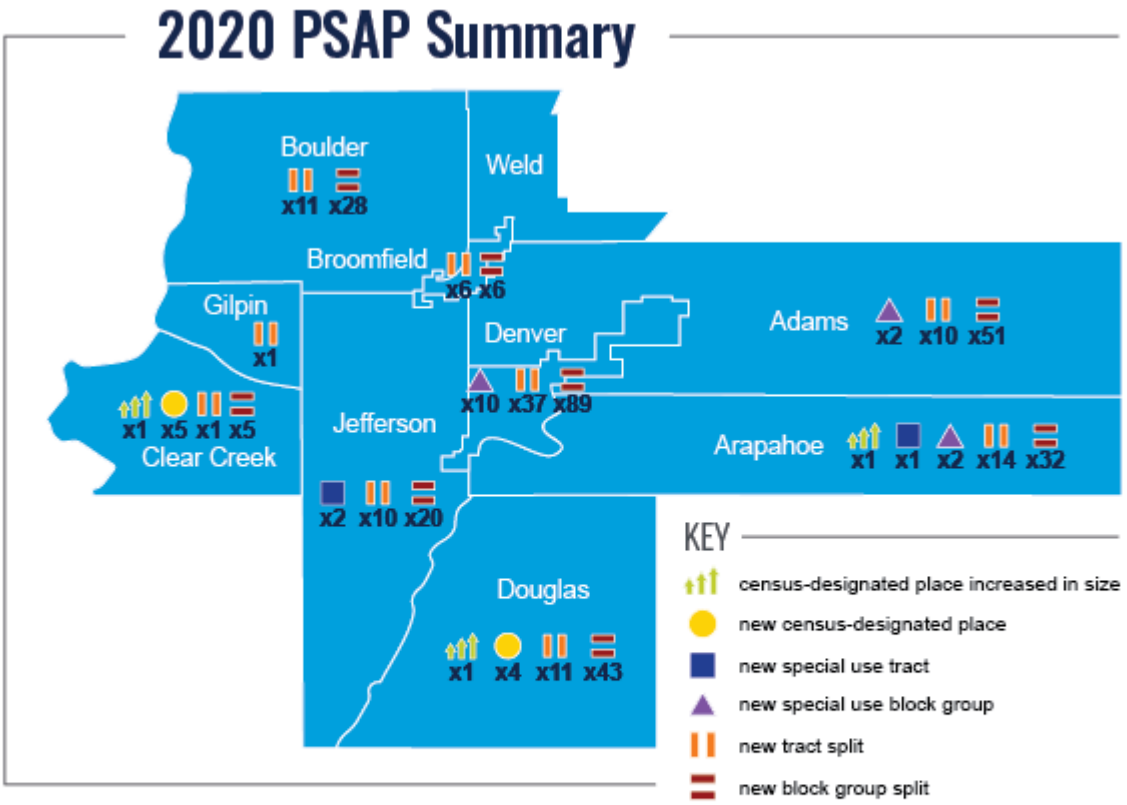
# Preparing for Census Day

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

### Participant Statistical Areas Program (PSAP) – What did we change?

In the fall of 2018, DRCOG began engaging local governments in a discussion about U.S. Census Bureau geographies. The goal was to make changes where necessary to ensure that aggregated data is still statistically valid for the next decade. The effort included evaluating predicted population growth to determine where geographies should be split or merged. After more than six months of work and collaboration, DRCOG is finally done making the required changes.

Download the interim 2020 geographies and shapefiles showing the changes we submitted to the U.S. Census Bureau.




**NEW SPECIAL USE TRACTS**

**JEFFERSON**: park/reserve – South Table Mountain and Rocky Flats
**ARAPAHOE**: park/water feature – Cherry Creek Reservoir and Park

**NEW SPECIAL USE BLOCK GROUPS**

**ADAMS**: two employment centers
**ARAPAHOE**: two employment centers
**DENVER**: seven parks, three employment centers

### Participate in the New Construction Program

To date, local governments have been asked to participate in several programs to help the U.S. Census Bureau prepare for the 2020 census:

- the Boundary and Annexation Survey (to ensure jurisdiction boundaries are correct)
- the Local Update of Census Addresses (to ensure a census survey arrives at every house)
- the Participant Statistical Areas Program (to ensure data gets aggregated and reported properly)

The Local Update of Census Addresses operation ended in 2018, but Census Day is not until April 1, 2020. There may be new construction in the interim. To ensure the new addresses receive a census survey, local jurisdictions are invited to participate in the New Construction Program. Read more.

### Learn how to reach hard-to-count areas

Check out a U.S. Census Bureau webinar on the Response Outreach Area Mapper.

Read the Every Person Counts In Colorado Act.

# 2022 Colorado State Plane Coordinate System

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

The National Geodetic Survey will release new datums in 2022 that will improve positional accuracy for mapping. As part of this effort, the National Geodetic Survey will create new projection options for each state. Read more about its effort.

The Colorado National Geodetic Survey coordinator recently invited feedback on the State Plane Coordinate System options that will be offered for our state. Colorado will officially submit its plan to the National Geodetic Survey in August.

The Colorado National Geodetic Survey Coordinator will be available at DRCOG's July Denver Regional Data Consortium meeting to discuss next steps.

# DRCOG 2018 data acquisition updates

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

**Regional Planimetric Data Project 2018**

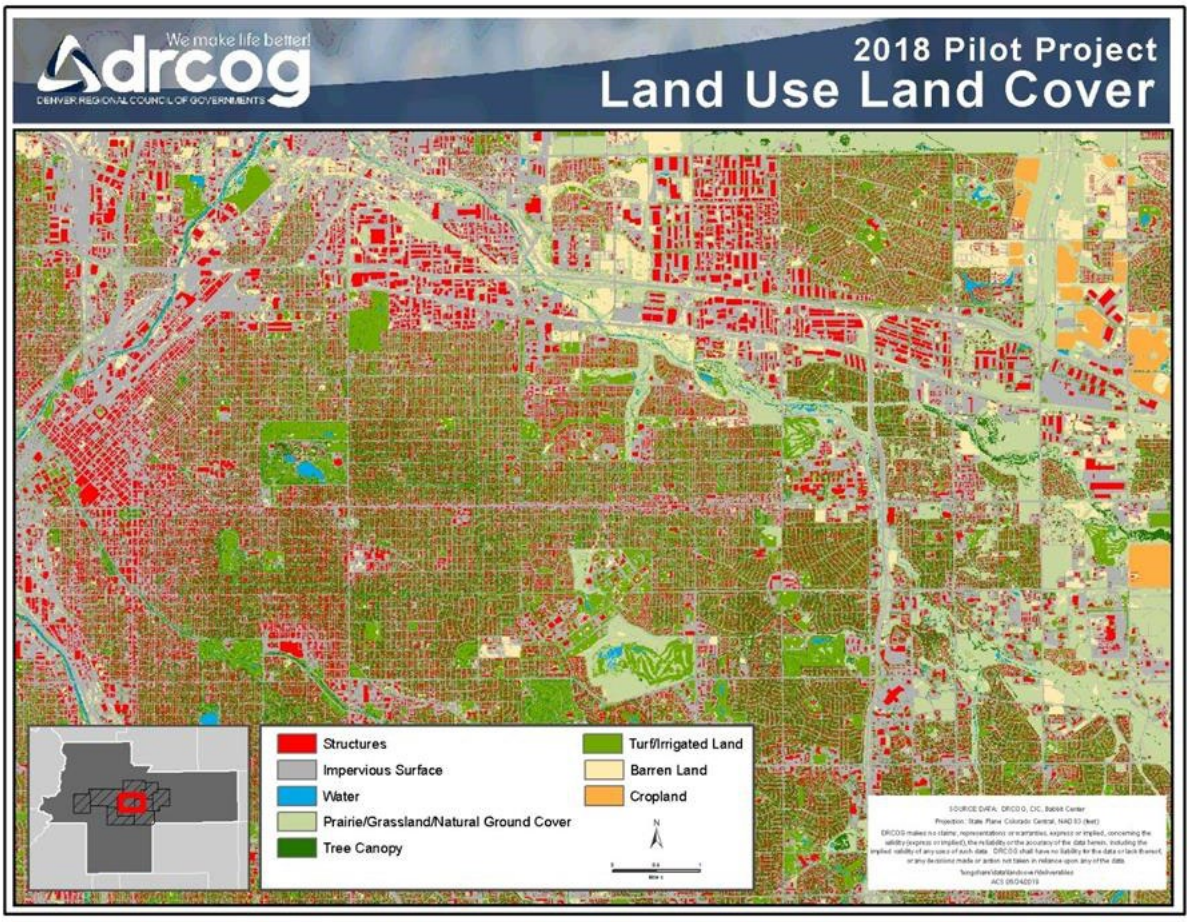
Since 2014, DRCOG has facilitated a planimetric data capture immediately following the completion of an imagery project. The 2018 iteration began in February. Deliveries will occur throughout the year, with project completion expected in early 2020.

Project deliverables – except for some premium attribution reserved for funding partners – will be free for public download on DRCOG's Regional Data Catalog. To learn more, view our project kick-off presentation, read about 2018 project specifics and visit our webpage.

## Land Use Land Cover pilot project 2018

DRCOG, in partnership with the Babbitt Center for Land and Water Policy, the Conservation Innovation Center and several local experts have just finished a pilot project to generate land use land cover data for a portion of the region. Louis Keddell from the Conservation Innovation Center will speak about the project at the upcoming July data consortium meeting. Please join us to learn more about next steps.

Download the data here: DRCOG Land Use/Land Cover Data




Thank you to volunteers from Aurora, Commerce City, Denver, Five Points Geoplanning, Littleton and the Governor's Office of Information Technology for performing quality control on the initial classification results.

Read more about the project and visit our webpage.

# DRCOG 2020 data acquisition updates

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

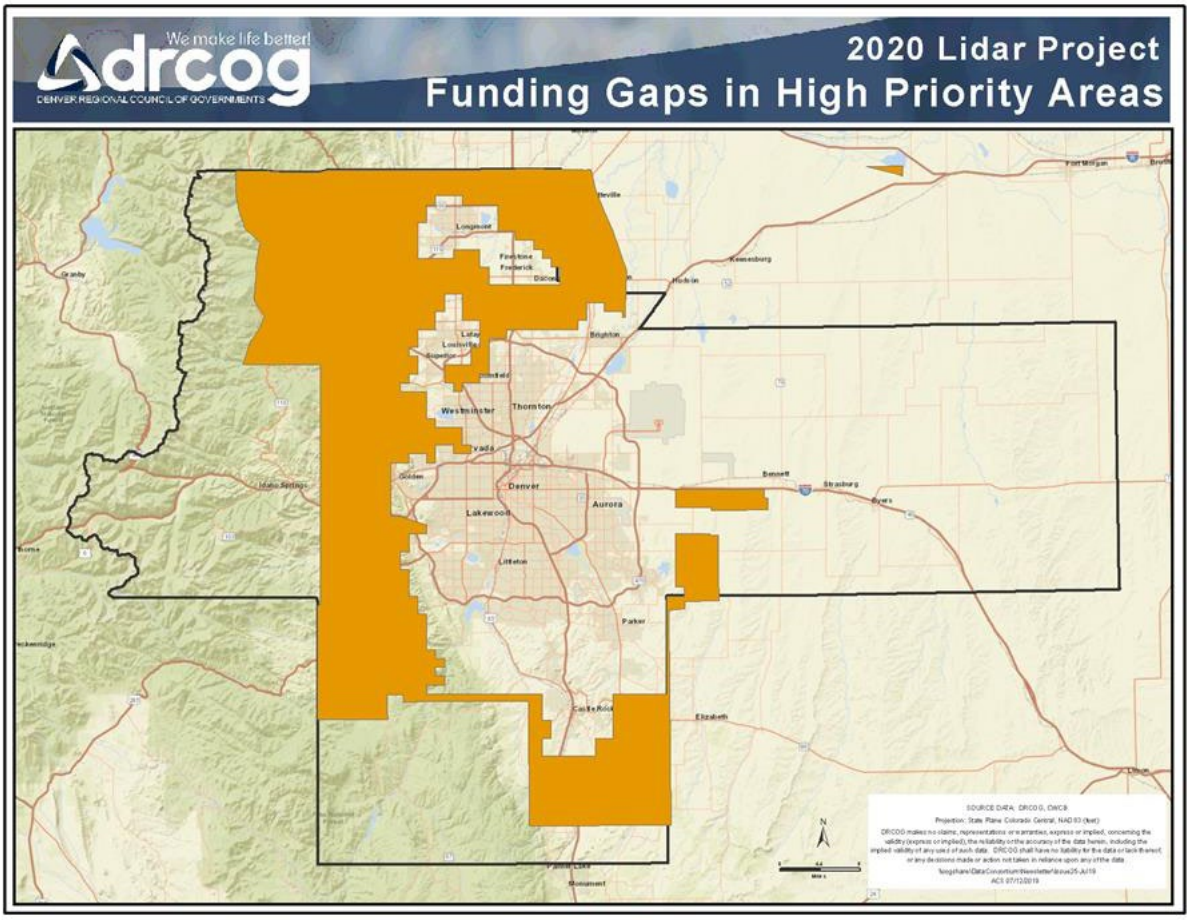
### Denver Regional Aerial Photography Project 2020

DRCOG is planning for our next imagery project, which is scheduled to collect data in the spring of 2020. Potential participants have received quotes and will be asked to commit to the projects once their budgets are final this fall. If you have not received a quote for participation and want one, please reach out to Ashley Summers at asummers@drcog.org.

Read more about our imagery projects on our website.

### Regional Lidar Project 2020

**Lidar data in the metro area was last captured in 2013. DRCOG is facilitating a project to update this data in 2020 on behalf of local partners. Due to the expense of this project, we are unable to find it entirely with local government funds. We'll be applying for a U.S. Geological Survey Broad Agency Announcement grant and are looking for additional contributors from the public and private sectors. Below is a map that shows where we currently lack the funding for an update.**




If you want to contribute to this effort, please reach out to Ashley Summers at asummers@drcog.org. For more information on the project, visit the Regional Lidar Project webpage.

# DRCOG data briefs

DRCOG staff are beginning to publish a series of data briefs to support decision-making in the region. View the first one about household growth and housing demand here and find future briefs on our website.

# Upcoming events

- Data Consortium Meeting and Social Hour, July 25
- GIS in the Rockies Conference
- GIS Colorado Unplugged
- GIS Colorado Fall Quarterly Meeting
- OpenStreetMap Colorado Meetups

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# Census aggregation tool to reduce margin of error

*Article submitted by Seth Spielman, associate professor of geography at the University of Colorado Boulder. Seth can be reached at 303-492-4877 or seth.spielman@colorado.edu.*

The American Community Survey is the largest survey of U.S. households and is the principal source for neighborhood-scale information about the U.S. population and economy.  The ACS is used to allocate billions in federal spending and is a critical input to social scientific research in the U.S. However, estimates from the ACS can be highly unreliable. For example, in the 2007–2011 ACS, of the 56,204 tracts for which a poverty estimate for children under 5 was available, 40,941 (72.8%) had a margin of error greater than the estimate. These margins of error can be hard to wrap your head around: The ACS indicates that Census Tract 196 in Brooklyn, New York has 169 children under 5 in poverty plus or minus 174 children, suggesting that somewhere between 0 and 343 children in the area live in poverty. This is the case in over 72% of census tracts in the US. Most people ignore margin of error because including it makes it hard to use the data in policy-making, research and governance.

To solve this problem, the University of Colorado Boulder developed software and a website that can be used to reduce the margin of error in the ACS. The software and website use a computational technique called “regionalization.” CU Boulder encourages use of its software and code and is happy to work with communities and individuals who need to reduce the margins of error in the ACS.

Visit the website

View the software

# Give feedback on tract renumbering proposal in Golden

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

The U.S. Census Bureau is gearing up for 2020 by soliciting feedback through such programs as the Boundary and Annexation Survey, Local Update of Census Addresses, and the Participant Statistical Areas Program. The latter is an initiative to ensure that statistical geographies like tracts and block groups are delineated in a way that best supports future data analysis.

**PSAP information guide**

DRCOG is participating in PSAP on behalf of stakeholders in the Denver region by delineating new census geographies as needed or requested by data users. To ensure statistical validity of their products, the U.S. Census Bureau requires us to make changes to geographies that are outside their recommended thresholds for minimum or maximum households. Beyond that, DRCOG is invited to make additional changes that it deems necessary based on its knowledge of expected development patterns.

After coordination with interested stakeholders over the last six months, DRCOG came up with a plan that includes many tract splits. Staff are currently working on submitting tract splits to the U.S. Census Bureau. As part of the work, DRCOG became aware of the City of Golden's proposal. The City of Golden is proposing a census tract boundary adjustment that could affect future data analysis. To briefly summarize, the city is suggesting a change from these current tract boundaries to these new tract boundaries:

The reasoning, which is explained in this letter, explains that the change is expected to make future census data aggregations more useful. However, the proposed change would cause a tract renumbering that would make comparisons to past data no longer possible. Making this change is a regional decision.

Please join us May 6 from 2 to 3:30 p.m. at the DRCOG offices to learn more and provide feedback on this proposal:

> **Golden tract renumbering proposal meeting**
> Monday, May 6
> 2 to 3:30 p.m.

> Denver Regional Council of Governments
> Red Rocks conference room (seventh floor)
> 1001 17th St., Denver, CO 80202

Can't attend in person? No problem! Participate remotely using the details below:

**GoToWebinar**

> Webinar ID: 702-798-595
> United States: 914-614-3221
> Access Code: 604-641-247

# Denver offers cooperative buying opportunity

*Article submitted by Emily Silverman, Smart City program manager at the City and County of Denver. Emily can be reached at 720-913-5467 or emily.silverman@denvergov.org.*

The City and County of Denver recently completed a professional services request for proposals — and is inviting other communities to explore potential cooperative purchasing agreements.

Over the past year, the Denver Smart City team executed an On-Call Agile Professional Services request for proposals that created a pathway for city agencies to partner with the business community. Sixty firms have been selected as eligible for contract. The resulting contracts span seven disciplines and over 70 professional competencies. Firm sizes ranged from 10-person startups to international consulting companies and businesses. Feedback indicated that the structure and innovativeness of the RFP were key elements that resulted in the high level of engagement and diversity of response from the business community.

See the RFP summary for the firms' contact information as well as two ways you might participate in cooperative agreements.

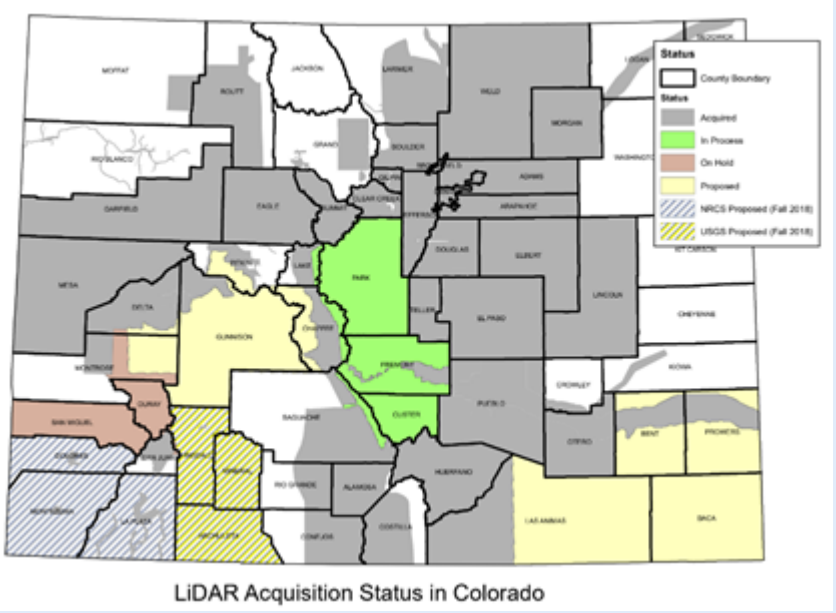
# Status of elevation data for Colorado

*Article submitted by Rick Corsi, state and local outreach coordinator at the Colorado Governor's Office of Information Technology. Rick can be reached at 303-764-7801 or rick.corsi@state.co.us.*

The State of Colorado Governor's Office of Information Technology, Geographic Information Systems Coordination and Development Program makes lidar data

discoverable and available for distribution to public agencies and private industry.

The State of Colorado currently has, or is in the process of collecting, approximately 70% or approximately 73,000 square miles of the state covered by lidar or in progress at Quality Level 2 or higher (see map below). The state's goal is to have 100% coverage within the next five years. The state seeks partnerships with federal and local agencies when planning lidar projects on the collection of data.



LiDAR Acquisition Status in Colorado

Elevation data is collected and used by the Colorado Water Conservation Board, Colorado Geological Survey, Department of Natural Resources and the Colorado Department of Transportation, among many other state agencies. Many private contractors and local agencies also use the elevation data. The data is most commonly used for planning, risk management, hazard evaluation and post-incident recovery efforts. Specific project uses include mapping of floodplains, debris flows, landslides, potentially active faults, abandoned mine land features and wildfire risk analysis.

QL2 data is collected and suffices for most projects; however, on special projects such as mapping active landslide areas, QL1 data provides the higher resolution required when performing change detection and delineating active versus inactive zones. When planning within high-risk areas such as near major airports, QL1 data is desired. CDOT also has a pilot project along highways where ultra-high-density lidar is required and used for inventory and roadway surface evaluation. Over time, the state would encourage the collection of higher level lidar in urbanized, high risk and special needs projects like transportation corridors.

Currently, the Geographic Information Systems Coordination and Development Program is providing lidar data by request through a lidar request form. Requests are normally delivered through FTP, Google Drive or on hard drives within a few days, but can take longer depending on the size of the area requested.

The state's goal over the next five years is to complete the collection of lidar data for the entire state as well as keeping the data current in rapidly changing areas. The Geographic Information Systems Coordination and Development Program is currently in the process

of standing up an automated delivery portal. The new system will provide viewing and downloading of lidar data through a clip-zip-and-ship process. At the system's launch it will be limited to lidar data, but the plan is to provide all state-housed data through the portal. The portal will provide an easier, quicker and more interactive way of delivering data. Program staff look forward to expanding the efficiencies of the new portal and fostering an environment of open data sharing.

# New roadway congestion shapefiles on the Regional Data Catalog

*Article submitted by Robert Spotts, senior transportation planner at DRCOG. Robert can be reached at 303-480-5626 or rspotts@drcog.org.*

DRCOG recently added three shapefiles to the Regional Data Catalog derived from the Congestion Management Process:

- Congested Corridors 2017
- Congested Corridors 2040
- Bottlenecks 2017

The Congested Corridors shapefiles represent the most severely congested roadway segments on DRCOG's regional roadway system. The bottleneck point shapefile identifies locations with the most severe delay in the Denver region at freeway bottleneck points, arterial-arterial intersections, and arterial-freeway ramp intersections.

Every year, DRCOG staff updates the congestion database, integrating travel speeds from INRIX, hundreds of new traffic counts, crash data and updated roadway attributes to estimate congestion on the regional roadway system. The diverse types of roadways on the 2,400-mile designated regional roadway system have daily traffic counts ranging from over 250,000 vehicles (350,000 people) on segments of freeways such as Interstate 25 to fewer than 3,000 vehicles per day (4,200 people) on rural connecting highways such as State Highway 79 north of Bennett and the Peak to Peak Highway (State Highway 119).

2040 estimates are based on forecasts from the DRCOG regional travel demand model. The model assumes that an additional 1 million people will live in the Denver region by 2040, a 32% increase from 2017. The model incorporates the future demographic makeup of the population and future transportation facilities, transit lines and employment concentrations. However, it does not include speculative factors related to emerging technologies related to vehicles, travel ways, and mobility services at this time.

DRCOG staff use a congestion mobility score for each segment in 2017 and 2040 to determine which corridors were most congested. The score includes four metrics:

- **severity:** How bad does congestion get on the roadway during rush hour?
- **duration:** How many hours per day is the roadway congested?
- **magnitude:** How many people (traffic volume) are affected by congestion on the

roadway?
- **reliability:** How often do crashes or incidents occur on the roadway?

Scores from the four categories are totaled. Roads with a total congestion mobility score of 11 or higher in 2017 or 2040 are classified as "severely congested" and are included in the shapefiles.

For additional information, visit DRCOG's congestion management process page or check out the 2017 Annual Report on Roadway Traffic Congestion in the Denver Region.

# DRCOG 2018 data acquisition project updates

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

## Denver Regional Aerial Photography Project 2018

DRCOG and its partners recently finished another high-resolution aerial imagery project covering 6,000 square miles of the region. The imagery is proprietary until superseded by newer data; it can currently be purchased from DRCOG's resellers, Harris MapMart and Sanborn. To learn more about the project in general or see a recap of 2018 project specifics, please visit the webpage.

## Regional Planimetric Data Project 2018

Since 2014, DRCOG has facilitated a planimetric data capture immediately following the completion of an imagery project. The 2018 iteration began in February and the first set of deliverables are expected by late April. Deliveries will continue through the year, with project completion expected in early 2020. Project deliverables – except for some premium attribution reserved for funding partners – will be free for public download on DRCOG's Regional Data Catalog. To learn more, view the project kick-off presentation, read about 2018 project specifics and visit the webpage.

## Land Use Land Cover Pilot Project 2018

DRCOG, in partnership with the Babbitt Center for Land and Water Policy, the Conservation Innovation Center and several local experts, is currently working on a pilot project to generate land use land cover data for a portion of the region. Volunteers from Aurora, Commerce City, Denver, Five Points Geoplanning, Littleton, the Governor's Office of Information Technology and the U.S. Forest Service have just completed quality control on the initial classification results. Final results are expected in June 2019. Read more about the project and visit the webpage.

# DRCOG 2020 data acquisition project updates

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

Planning for data acquisitions in 2020/2021 has begun. DRCOG is offering a larger package of products and services than ever before. In addition to the traditional custom-flown imagery product, partners may also partner with DRCOG to purchase streaming imagery services, oblique services, lidar, land cover classification data, and planimetric data (if minimum funding requirements are met by enough interested partners).

DRCOG distributed cost estimates in early April to enable interested parties to budget for participation in these projects. If your organization did not receive a quote and would like one, please reach out to Ashley Summers at asummers@drcog.org.

Please join us May 23 from 10 to 11:30 a.m. at the DRCOG offices to learn more about the upcoming projects:

> **DRCOG 2020 data acquisition project updates meeting**
> Thursday, May 23
> 10 to 11:30 a.m.
> Denver Regional Council of Governments
> Red Rocks conference room (seventh floor)
> 1001 17th St., Denver, CO 80202

Can't attend in person? No problem! Participate remotely using the details below:

**GoToWebinar**

> Webinar ID: 539-323-931
> United States: 562-247-8422
> Access Code: 635-170-423

# Things you might have missed

- Metro Vision Idea Exchange: One Year to Census Day
- Association of Metropolitan Planning Organizations GIS Webinar: DRCOG Active Transportation - Bicycle Facility Inventory and Micromobility

# Upcoming events

- The spring Data to Policy Project Symposium will occur on April 26 on the Auraria campus.
- Winners for Go Code Colorado 2019 will be announced on May 30 at a final awards event. Read more on the website.
- Rocky Mountain Urban and Regional Information Systems Association is offering a QGIS for the Complete Beginner workshop on April 19. Register online.

# Engage with us

- Please provide feedback on the Regional Data Catalog in this brief survey.
- This quarterly newsletter reaches more than 300 people, has a higher-than-average open rate, and is written by professionals like you. It's the perfect place to show off your projects, highlight your great work and contribute ideas to the GIS community in the Denver region. Newsletter release dates are the 15th of January, April, July and October (or the next business day afterward). Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org to contribute.
- Did you miss a newsletter or a meeting? Visit our website for past newsletter issues and DRDC meeting materials.

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First-quarter newsletter for the Denver Regional Data Consortium.

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*The data consortium consists of Denver Regional Council of Governments members and regional partners with an interest in geospatial data and collaboration. The data consortium newsletter improves communication among local geographic information systems professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

# Collaborative data development in the Mid-Ohio region

*Article submitted by the Mid-Ohio Regional Planning Commission. For more information, contact Cheri Mansperger at 614-233-4158 or cmansperger@morpc.org.*

DRCOG's peer organization in Columbus, Ohio – the Mid-Ohio Regional Planning Commission (MORPC) – recently shared how its staff collaborated with communities throughout central Ohio to maintain a convenient and useful roadway centerline and address-point file over the past decade.

MORPC took the lead in facilitating the project that includes Columbus, the 14th largest U.S. city, and many of its surrounding suburbs and townships in Franklin County. The project would not have been possible without participation from a strong geographic information system (GIS) community in the area.

The project, which continues today, was part of a larger, voluntary initiative corresponding to the State of Ohio's Location Based Response System (LBRS), launched in 2005. More information about the state's LBRS can be found here.

MORPC – as a convener of local governments – recognized the increased efficiency that consistent, accurate, current, accessible regional centerline and address data presented, as well as the potential to expand the effort to accommodate other data sets, so the Franklin County LBRS project was created.

“It was the maintenance piece that was critical and our biggest focus,” said Cheri Mansperger, MORPC’s GIS manager. “We needed the data authorities to be our partners, so we invited local jurisdictions to the table from the start. In most cases we were asking them to give up their existing GIS files and use the regional LBRS data instead.”

In return, the communities had access to collaboratively edited files that were not restricted to jurisdictional boundaries — something especially important for safety services, many of which have mutual aid agreements with neighboring communities and require access to information about businesses and residents outside of their service areas in emergencies.

MORPC set up a system to enable multiple agencies to edit LBRS data on its network and sync it with the parent file on a MORPC server. For those interested in the details: Editors just needed a secure log-in and a two-way replicate of the data via geodata services. The replicated data now act like any other feature class in their geodatabase, except that it is a child and dynamic copy that can be synchronized back to the MORPC parent. All versions are synced with the parent data weekly using a model builder script.

Quarterly meetings of GIS users in the region have provided a forum to address any issues and for MORPC to advocate approaches to make data collection and maintenance uniform among its partners. Because of the success of the LBRS project, similar files have been added for regional bikeways and sidewalks.

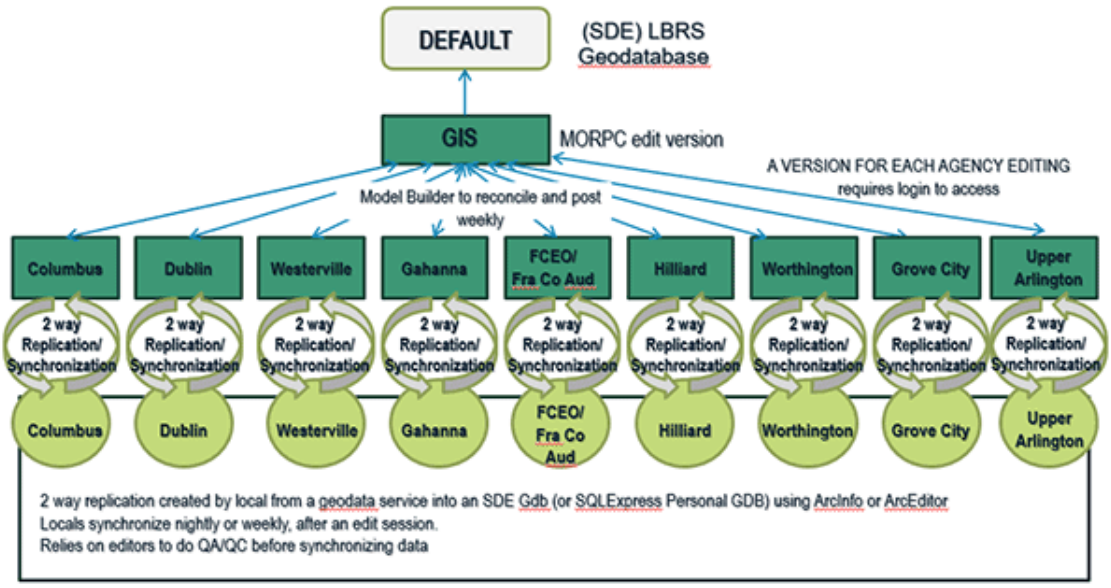



**Diagram showing the configuration of the Franklin County LBRS system**

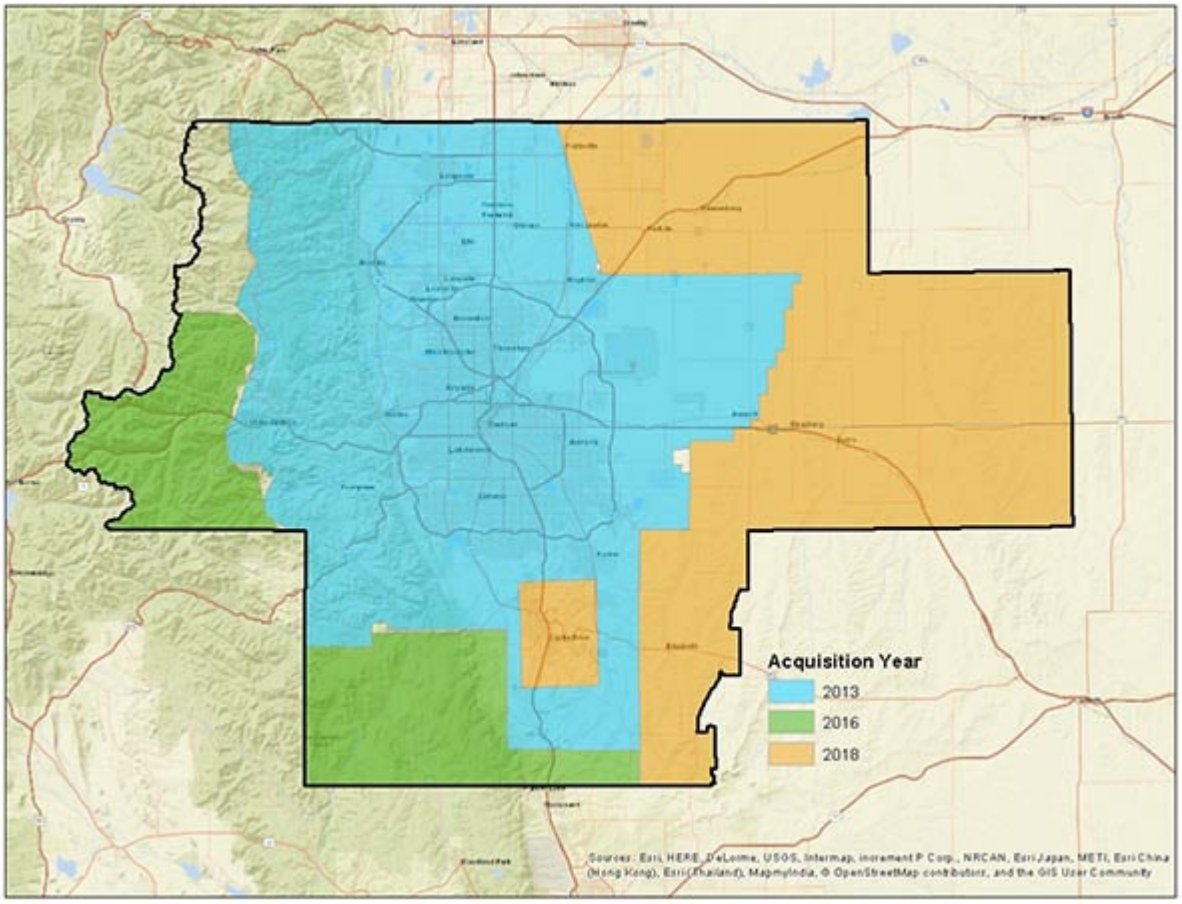
# Planning begins for a 2020 lidar capture in the Denver region

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at*

*DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

DRCOG is considering a lidar collection in 2020. While some of the region has been captured in recent years, most of the Denver metro area has not been collected since the fall of 2013. During the 2013 project, DRCOG worked with local governments to contribute to an existing Federal Emergency Management Agency project. By partnering with local, regional, state and federal partners, DRCOG was able to acquire $1.2 million of data for a local contribution of less than $400,000. That project resulted in Quality Level 2 (QL2) lidar data and 1-foot contours, which can be downloaded from the Colorado GeoData Cache and DRCOG' s Regional Data Catalog, respectively.

Based on the popularity of the data and the fact that it is becoming outdated, DRCOG is interested in facilitating a project to collect QL2 data in all areas that haven't been flown since 2013:




The project could potentially coincide with the next Denver Regional Aerial Photography Project, scheduled for the spring of 2020. The acquisition will only be pursued if there is enough interest and funding from interested parties in the region. Public and private partners are both encouraged to contribute.

To learn more about the project, please join us on Wednesday, Jan. 16, from 10:30 a.m. to noon in the Red Rocks conference room (7th floor) at DRCOG's office, 1001 17th St., Denver, CO 80202.

Can't attend in person? No problem! Participate remotely using the details below:

GoToWebinar

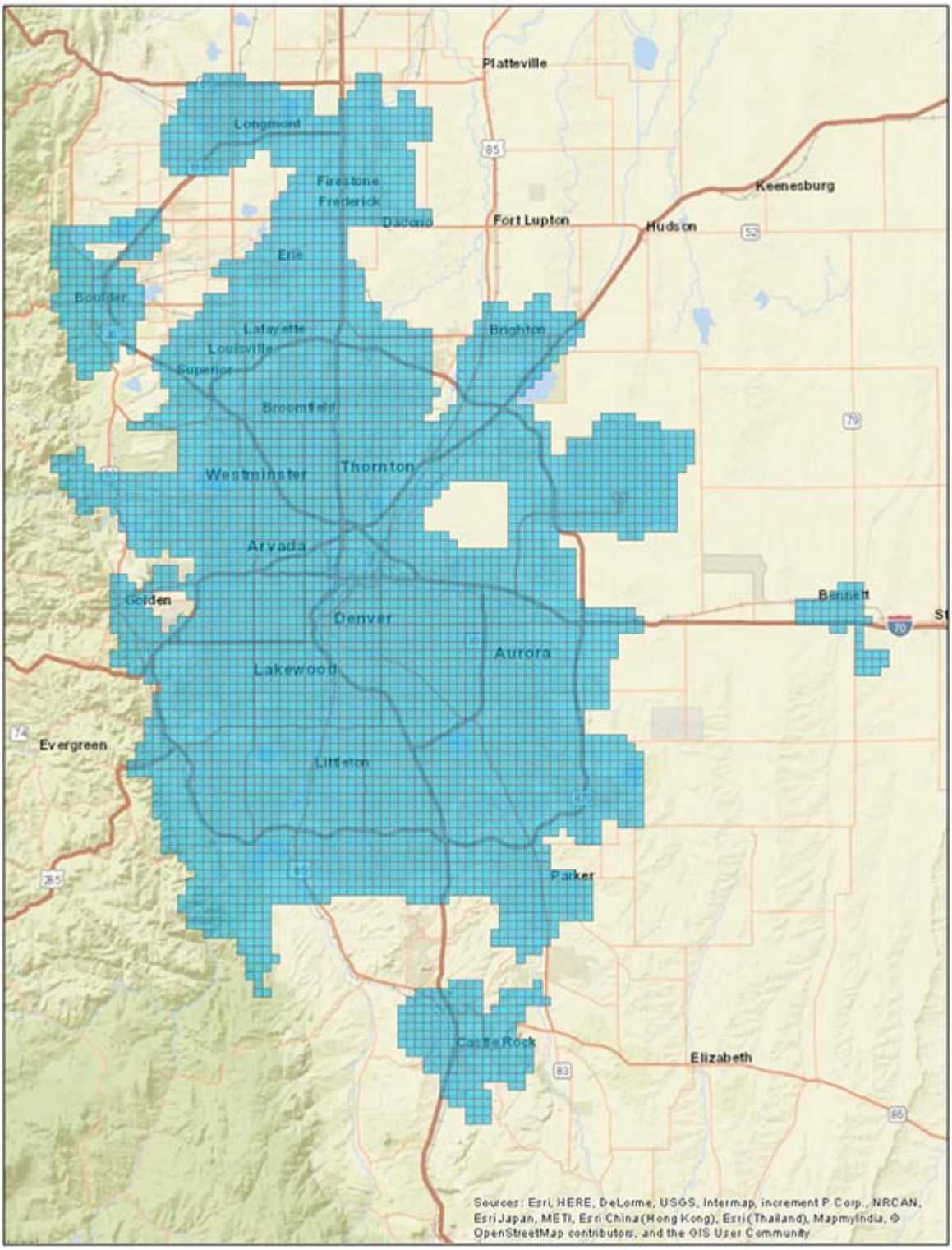
> Webinar ID: 720-012-011
> United States: 415-655-0060
> Access Code: 578-608-474

# 2018 Regional Planimetric Data Project begins

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

After almost a year of planning, the 2018 Regional Planimetric Data Project is set to begin officially on Feb. 1. DRCOG has successfully facilitated two prior projects to collect features like building footprints, sidewalk centerlines, parking lots and more for the Denver metro area. The project will expand foundational data and use DRCOG's latest high-resolution 2018 aerial imagery to delineate any changes.

Kucera International Inc. performed the data capture in 2014 and 2016. It has been selected again to perform the data update. Building footprints, edges of pavement, parking lots, ramps and trails will be captured at the same extent (1,184 square miles) that covers most of the urbanized metro area:




Other features like driveways, impervious surface, poles and signs, and pavement markings will be captured at smaller extents where additional funding was available.

The project is being funded by 28 partners:

- Arapahoe County
- City and County of Denver
- Douglas County
- Centennial
- Commerce City
- Erie
- Firestone
- Longmont
- Louisville
- Morrison
- Thornton

- Jefferson County
- Arvada
- Aurora
- Bennett
- Boulder
- Castle Rock
- Frederick
- Golden
- Greenwood Village
- Lakewood
- Littleton
- Lone Tree
- Wheat Ridge
- E-470 Public Highway Authority
- Urban Drainage and Flood Control District
- Denver Water
- DRCOG

Additionally, two private sector partners – BuildingFootprintsUSA and Felsburg, Holt & Ullevig – are donating their time to create value-added products for the funding partners. **DRCOG thanks these partners whose contributions allow us to maintain high-quality, public domain data for the region.**

Final deliverables will be available on DRCOG's Regional Data Catalog in the first quarter of 2020. If you'd like earlier access (and some other perks including extra attribution), you can still become a project partner by contributing funds. Reach out to Ashley Summers or visit DRCOG's website for more information.

# 2018 land use land cover pilot project begins

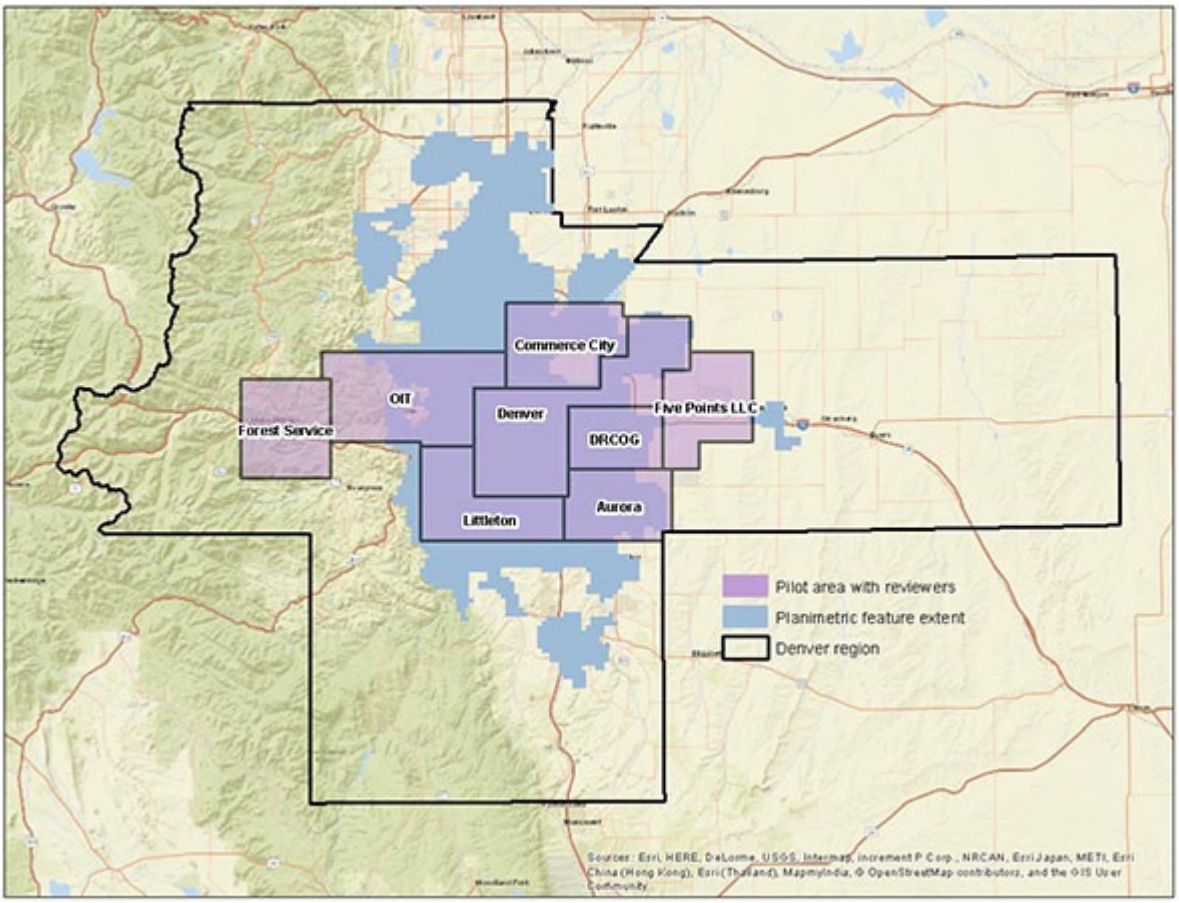
*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

In the summer of 2018, the Babbitt Center for Land and Water Policy reached out to DRCOG to discuss a potential land use land cover project in the Denver region. In partnership with the Conservation Innovation Center, the Babbitt Center has been testing innovative methods for classifying the landscape using high-resolution (1-meter) imagery. It has previously completed projects in the Chesapeake Bay area and in Pima County, Arizona.

The Denver region is an ideal place for it to continue developing its methods for several reasons:

1. The Denver region has varied terrain; offering mountains, plains and urban area to evaluate.
2. DRCOG has recent high-resolution imagery courtesy of the Denver Regional Aerial Photography Project and detailed planimetric data to help refine the results.
3. The Denver region has a history of developing data through successful partnerships.

The pilot project area will cover 1,000 square miles of the region:




The project will classify the pilot area into seven classes: structures, impervious surface, water, grassland/prairie, tree canopy, irrigated lands/turf and barren/rock. Results are expected in the summer.

The data will be provided free to DRCOG and will be a public domain product. DRCOG's contribution is to provide guidance, feedback and quality control on the deliverable. **Thanks to the United States Forest Service, the Governor's Office of Information Technology, Commerce City, Denver, Littleton, Aurora and Five Points Geoplanning LLC for volunteering their time to review the product.**

For more information, check out the website.

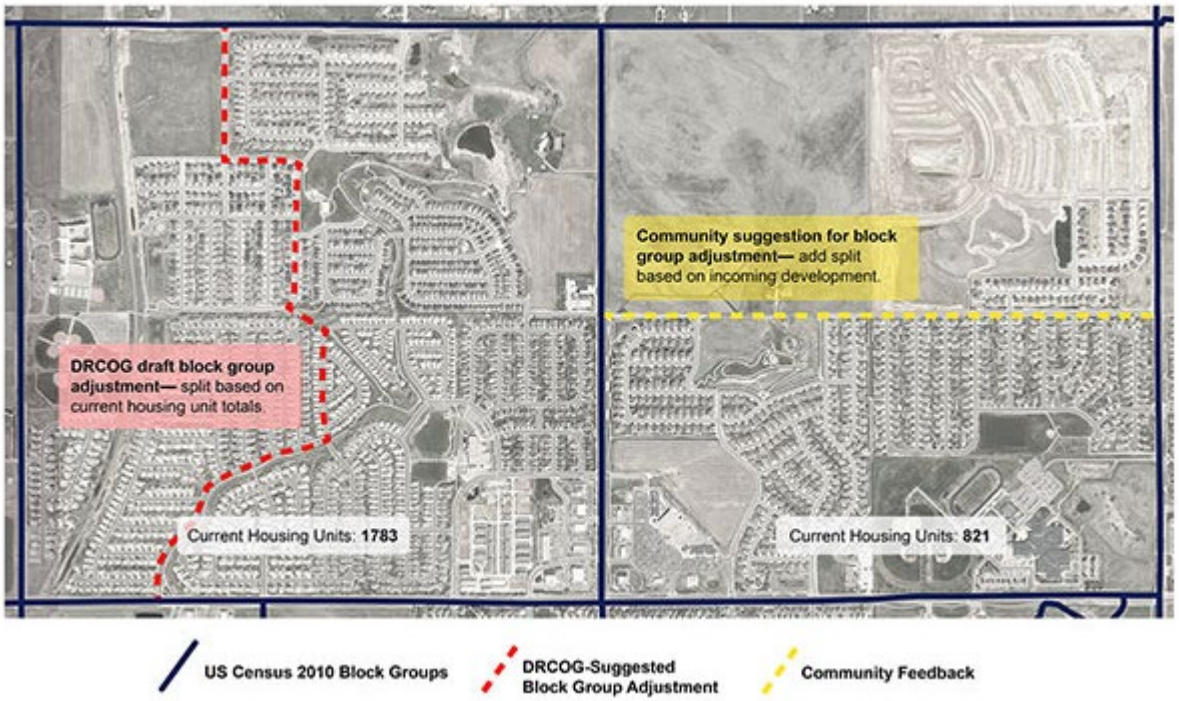
# The Denver region's Participant Statistical Areas Program (PSAP) plan

*Article submitted by Dorothy Friday, GIS specialist at DRCOG. Dorothy can be reached at 303-480-6797 or dfriday@drcog.org.*

The U.S. Census Bureau's Participant Statistical Areas Program (PSAP) is a once-a-decade opportunity to adjust block group and tract boundaries based on growing populations. Nationwide, councils of governments are coordinating regional efforts to gather local knowledge and submit a final plan to the U.S. Census Bureau. In fall 2018,

DRCOG created a draft plan for our region and compiled feedback and suggestions from regional stakeholders and member governments. Feedback was incorporated into the draft, and DRCOG has a final plan based on this information. The adjustments will be submitted to the U.S. Census Bureau through its customized Geographic Update Partnership Software (GUPS) ahead of the 2020 Census.

Review the Denver region PSAP plan here.




# Check out the new feature data set

DRCOG acquires crash data from the Colorado Department of Transportation (CDOT) annually. CDOT geocodes crashes on roadways they own, operate and maintain and DRCOG geocodes the remaining crashes on roadways that are locally owned and maintained by cities and counties. DRCOG recently updated crash data sets by standardizing field names and data types.

Data sets for 2004 to 2015 are now available on the Regional Data Catalog.

# Nominate a project, program, plan or person for DRCOG's annual awards

## Metro Vision Awards

This year's Metro Vision Awards will recognize projects and programs that help further our shared aspirational vision of the future of the Denver metro area. DRCOG welcomes

nominations of projects, programs and plans that support Metro Vision's themes. Past successful nominations have highlighted innovation, public and stakeholder engagement and coordination among local governments, state and federal partners, the business community, philanthropic and not-for-profit organizations. For more information on nomination criteria, click here.

**Metro Vision Awards**

What kinds of projects will our judges be looking for? Check out last year's winners.

### Way to Go Champion Awards

The Way to Go Champion Awards recognize innovative outreach efforts or programs that reduce single-occupant vehicle (SOV) commuting while increasing the use of sustainable transportation modes, as well as individuals who champion smart commuting. For more information and to submit a nomination, click here.

**Way to Go Champion Awards**

**The deadline for submissions is Friday, Jan. 25.**

## Upcoming events

The Denver Data Storytellers group has invited field leader Alberto Cairo to speak in Denver as part of his lecture tour about citizen data literacy. The event will be free and held at General Assembly on Thursday, Jan. 24 from 6:30 to 9 p.m. Register here.

The GIS Colorado winter quarterly meeting will be held on Jan. 25 in Castle Rock. A special training on ArcGIS Pro will be held the day prior.

The Colorado OpenStreetMap community continues to import DRCOG building footprints into the map. Join for its next Importathon event on Jan. 16.

## Engage with us

- The new version of our Regional Data Catalog launched in January. We invite you to visit the site and give us some feedback in this brief survey.
- This quarterly newsletter reaches more than 300 people, has a higher-than-average open rate and is written by professionals like you. It's the perfect place to show off your projects, highlight your great work and contribute ideas to the GIS community in the Denver region. Newsletter release dates are the 15th of January, April, July and

October (or the next business day afterward). Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org to contribute.

- Did you miss a newsletter or a meeting? Visit our website for past newsletter issues and DRDC meeting materials.

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Fourth-quarter newsletter for the Denver Regional Data Consortium.

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*The data consortium consists of Denver Regional Council of Governments members and regional partners with an interest in geospatial data and collaboration. The data consortium newsletter improves communication among local geographic information systems professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

# Give us your feedback

DRCOG needs your feedback to guide data development and collaboration efforts in the region. Please take a moment to provide your thoughts in these two surveys:

- Denver Regional Data Consortium survey: DRCOG GIS staff poll the DRDC group annually to learn how to tailor our meetings, newsletters and data development efforts to better meet the community's needs.
- Bike-sharing and dockless mobility: DRCOG transportation planning staff would like to learn more about bike-sharing and dockless mobility programs or pilots in the Denver region. If your community has or is considering a program, we would like to collaborate with you.

# RTD's quality of life study

*Article submitted by Carly Macias, senior transportation planner at RTD. Carly can be reached at 303-299-2513 or carly.macias@rtd-denver.com.*

FasTracks is the Regional Transportation District's 2004 voter-approved rapid transit expansion program transforming transportation throughout the Denver metro area. Upon completion, FasTracks will add 122 miles of new light rail and commuter rail, 18 miles of bus rapid transit and 57 new stations to the RTD system.

The quality of life study is RTD's data-driven evaluation of progress toward meeting the FasTracks program goals.

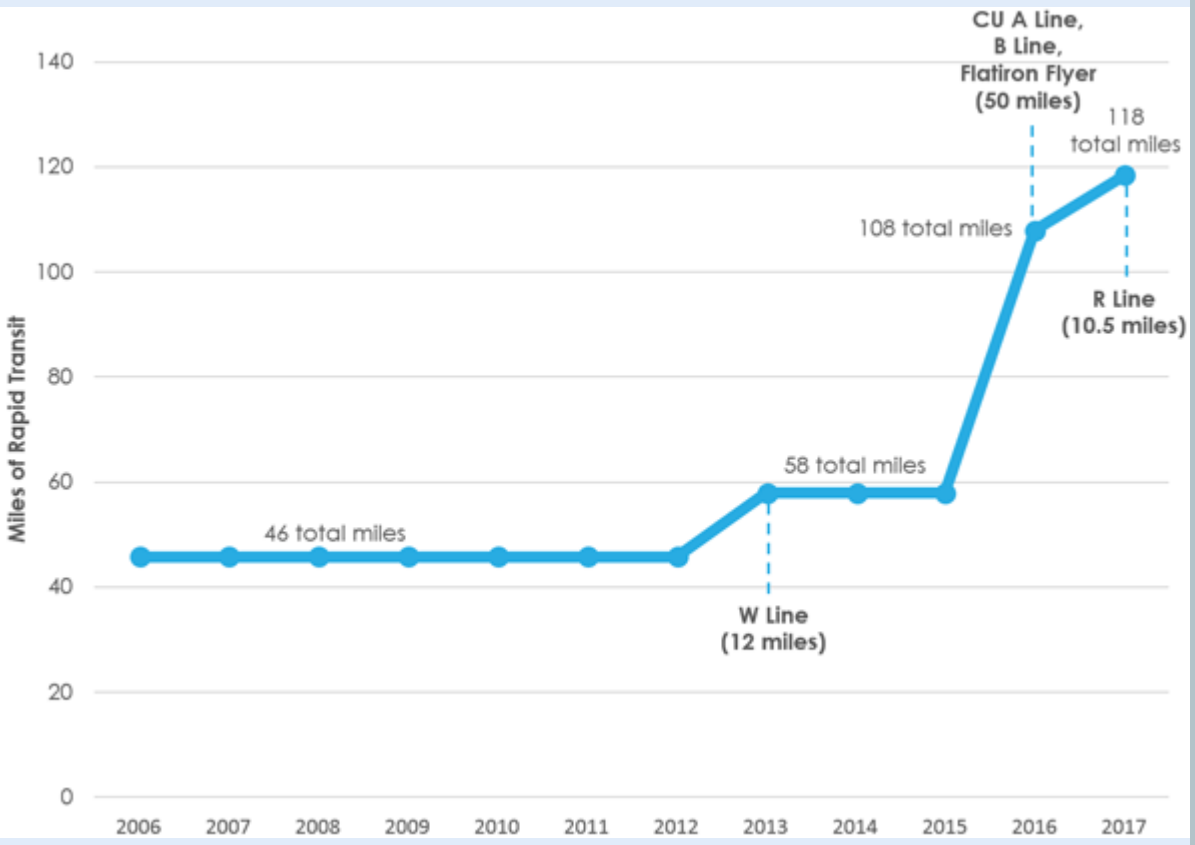
- Goal 1: balance transit needs with regional growth
- Goal 2: increase transit mode share
- Goal 3: improve transportation choices and options

## 2018 Quality of Life Report

On Aug. 7, the annual Quality of Life Report was presented to the RTD Board. The report analyzed metrics based on the most recent data available, including data from 2015 to 2017. The report is available online at http://rtd-denver.com/qol. The following section includes some interesting metrics from the report.

## Miles of rapid transit

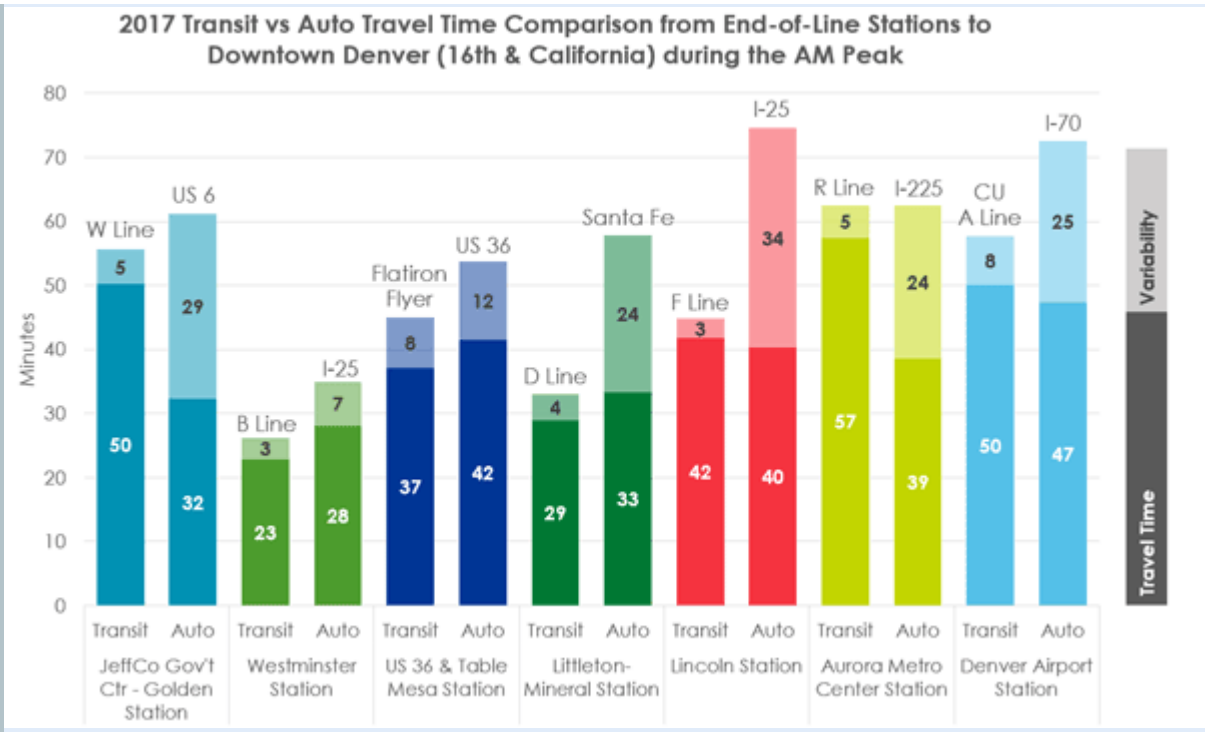
The rapid transit network has more than doubled in the past 10 years. It will continue to grow as future FasTracks lines open.




Source: RTD

## Travel time and variability

Transit and auto travel times were similar in five of the seven open rapid transit corridors. In 2017, variability added an average of 13 percent to transit travel times and 60 percent to auto travel times.



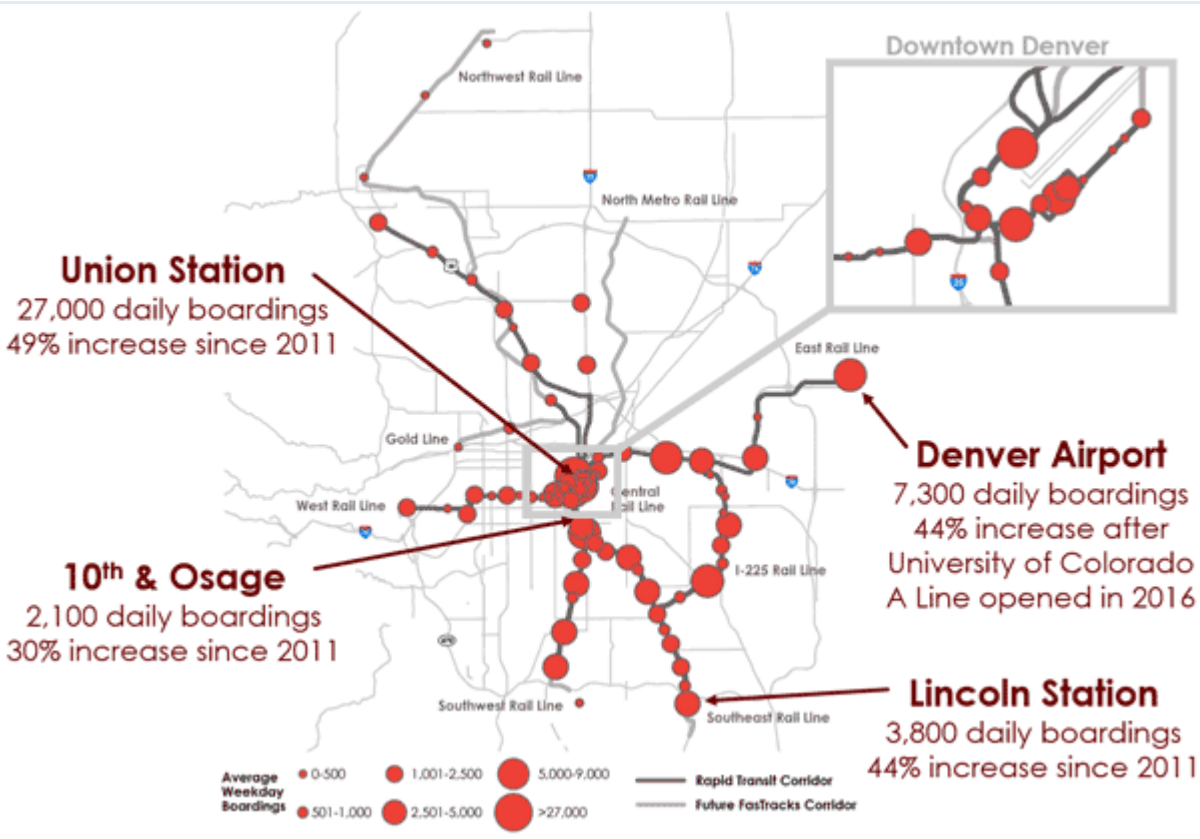

Source: RTD, INRIX, Google Maps

Note 1: Variability is the amount of time that must be budgeted in order to ensure that you arrive at your destination on time.

Note 2: Table Mesa and Aurora Metro Center stations were chosen as representative end-of-line stations for the Flatiron Flyer and the R Line.

## Transit boardings at stations

Average weekday boardings have increased at many transit stations. Union Station had over 27,000 boardings in 2017, growing 49 percent since 2011. Daily boardings at the 10th and Osage station, Lincoln station, and Denver Airport station also showed significant growth.




Source: RTD RideCheck Plus

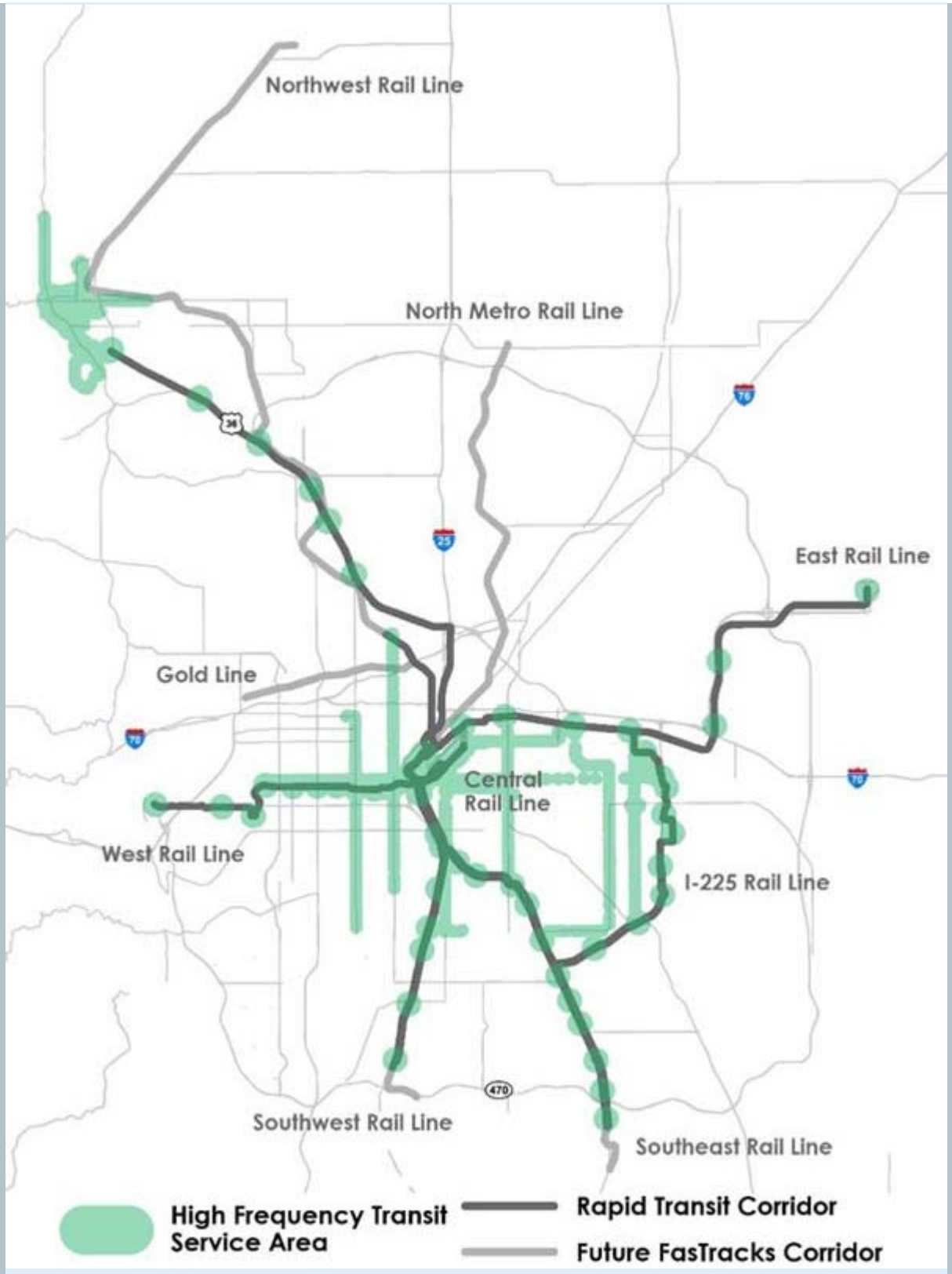
## Travel to Park-n-Rides

In 2017, 93 percent of Park-n-Ride users were in-district, while 7 percent were out-of-district. The average trip distance was 7.3 miles and the median trip distance was 3.4 miles. About 25 percent of trips were less than 2 miles long and 9 percent of trips were less than 1 mile long.

Source: RTD License Plate Survey

## High-frequency transit network

The high-frequency transit service area grew 61 percent, from 50 to 81 square miles, between 2006 and 2017. The high-frequency transit service area includes rail stations (within ½-mile), Flatiron Flyer stations (within ½-mile), and bus stops (within ¼-mile) that are served by a transit route providing four or more trips per hour from 6 a.m. to 6:30 p.m.




Source: RTD

# Developing regional intelligent transportation system architecture

*Article submitted by Greg MacKinnon, transportation operations program manager at*

*DRCOG. Greg can be reached at 303-480-5633 or gmackinnon@drcog.org.*

Federal regulation (Code of Federal Regulations Title 23, Part 940) imposes requirements on the implementation of transportation technology projects funded with highway trust funds. The requirements are twofold. First, a regional intelligent transportation systems (ITS) architecture, based on the national ITS architecture, must be established and maintained. Second, project implementation must be based on a systems engineering analysis, which begins with the regional ITS architecture.

DRCOG, in cooperation with the Denver region's stakeholders, maintains the DRCOG regional ITS architecture, a framework for the deployment of an integrated transportation system in the region. The DRCOG regional ITS architecture includes:

- identification of participating agencies and stakeholders and their roles in system implementation and operation
- identification of agreements required for maintenance and operations
- definition of system functional requirements (for example, interface requirements, required information flows and applicable national standards)
- a general project implementation sequence

DRCOG schedules at least one regional ITS architecture update per year.

Transportation technology project sponsors are responsible for applying a systems engineering analysis to the development and implementation of their projects. This begins with the identification of the portions of the regional ITS architecture being implemented. The project description also expresses the related stakeholder roles and responsibilities, system requirements and standards, and general operations and management. Additionally, the project sponsor must analyze alternative system configurations, technology options and procurement options to meet the system requirements.

Please contact Greg MacKinnon (303-480-5633) for regional ITS architecture support during the early stages of project development.

# Active Transportation Plan and new bike and pedestrian map

*Article submitted by Emily Lindsey, transportation planner at DRCOG. Emily can be reached at 303-480-5628 or elindsey@drcog.org.*

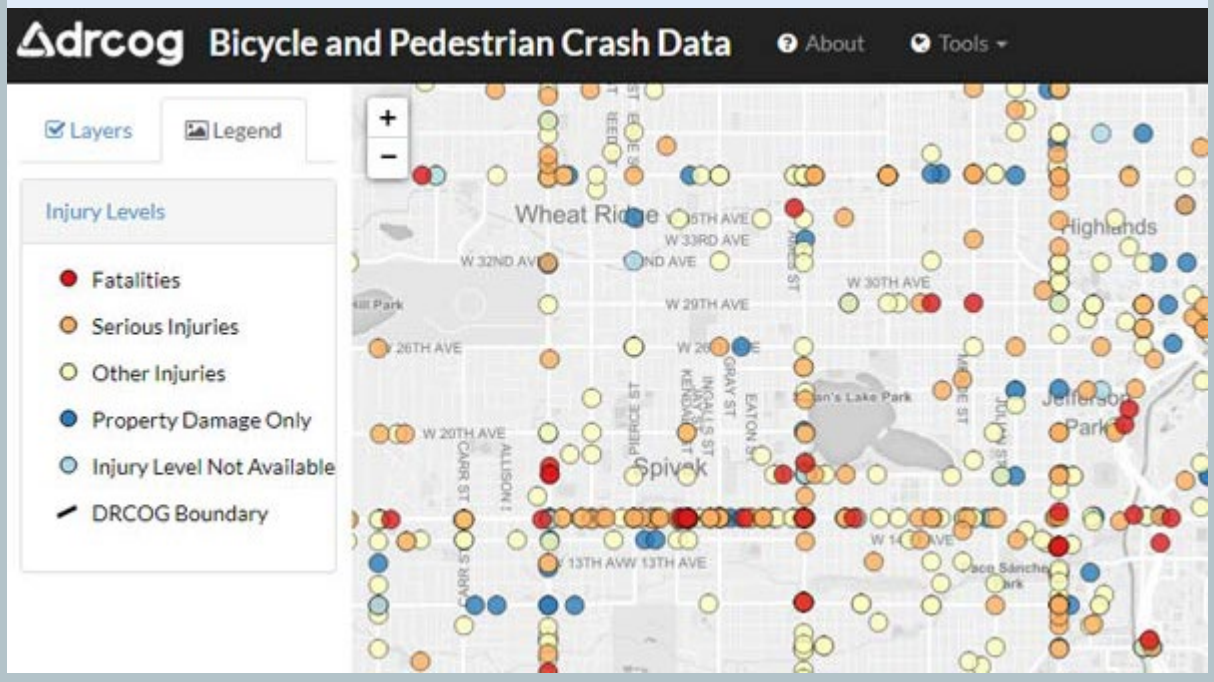
DRCOG staff, alongside the active transportation stakeholder committee, have been developing a draft Active Transportation Plan since late 2017. Informed by stakeholder and public outreach conducted earlier this year and workshops across the region with local government staff, the draft plan includes:

- a vision for a safe, comfortable and connected regional active transportation network
- a toolkit that outlines programs, policies and facilities that support active transportation

- guidance on approaches to implementing active transportation improvements
- profiles of each of the counties within the DRCOG region

Staff anticipates releasing the draft to the public this month with a 30-day comment period.

In conjunction with the development of the forthcoming bicycle and pedestrian crash report (which will also be an appendix to the Active Transportation Plan), DRCOG staff developed a bicycle and pedestrian crash data map. Users can see the locations of bicycle and pedestrian crashes from 2010 through 2015 and filter points by injury level of crash by mode. View the map.




# Using planimetric data to improve the regional housing dataset

*Article submitted by Sydney Provan, GIS intern at DRCOG. Sydney can be reached at s_provan@drcog.org.*

In 2014, DRCOG created a regional master housing data set. It contains point-level data of all the housing units in DRCOG's boundaries and is updated annually. Users can consult the data set to understand the spatial distribution of housing near transit stops, floodplains, high-risk fire zones and areas where new growth is likely to occur. As valuable as the data set has already proved to be, it is limited because the housing points do not correspond to individual buildings.

The most recent efforts to improve the housing data set have leveraged DRCOG's planimetric data to create a spatial relationship between housing points and the built environment. The planimetric roofprints layer is essential to both identifying and resolving errors where points in the housing data set do not match the corresponding building. The planimetric data has also helped identify other errors that were previously difficult to spot, like demolished structures and changes in manufactured home parks.

Improving the master housing data set to correspond with planimetric data creates opportunities for new use cases. A few examples include analyzing the distribution of housing types, linking average unit square footage to demographic data and creating more accurate models of neighborhood walkability.

# Last chance to join the 2018 planimetric project

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

DRCOG is preparing to update planimetric data in the region using 2018 imagery. This project will start in January and is intended to collect changes from 2016 in building roofprints, edges of pavement, sidewalks, parking lots and more.

To date, 21 partners have expressed their interest in contributing to the program. We are well on our way to funding the update, but we aren't there yet!

If you use the planimetric data frequently and want to ensure that your areas of interest continue to be updated, become a contributing partner.

# Census Participant Statistical Areas Program

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

The U.S. Census Bureau is gearing up for 2020 by soliciting feedback through programs like the Boundary and Annexation Survey (BAS), Local Update of Census Addresses (LUCA), and the Participant Statistical Areas Program (PSAP). The latter is an initiative to ensure that statistical geographies like tracts and block groups are delineated in a way that best supports future data analysis.

DRCOG will be participating in PSAP on behalf of stakeholders in our region. This means that we will delineate new census geographies as needed or requested by data users. To ensure statistical validity of its products, the U.S. Census Bureau will require us to make changes to geographies that are outside of its recommended thresholds for minimum and maximum households. Beyond that, we are invited to make additional changes that we deem necessary based on our local knowledge of expected development patterns.

Although DRCOG is tasked with coming up with the official "PSAP plan" that gets submitted to the U.S. Census Bureau, we know there are many parties that would like to have a say in the final product. Join us at our upcoming meeting to learn more.

> **DRCOG PSAP meeting**
> Tuesday, Oct. 16
> 2 to 4 p.m.
>
> Denver Regional Council of Governments
> 1001 17th St. Denver, CO 80202
> Aspen conference room (first floor)
>
> Visitor's map
>
> **Can't attend in person? Join us remotely:**
>
> Registration URL: https://attendee.gotowebinar.com/register/89861280214321153
> Webinar ID: 926-091-099
> Access Code: 954-451-473

# New smart data analytics challenge: Addressing Colorado's Critical Issues

The Governor's Office of Information Technology is pleased to announce a new smart data analytics challenge – Addressing Colorado's Critical Issues – and invites data

analysts from government, nonprofit and private industry to participate!

Participants in the challenge will leverage relevant public data sets to understand and develop analysis-based insights leading to solutions to three critical topics in Colorado: the opioid crisis, water supply and smart cities.

This six-week challenge will begin with a challenge kick-off event on Nov. 8, from 3:30 to 6:30 p.m. at the EXDO Event Center in Denver. The event will provide an opportunity to meet with agency personnel to define and refine analysis questions that will be most valuable to the state in addressing the topics.

Participating teams must include data analysts or scientists (students in the field are welcome) with relevant educational background and professional experience working with data and analysis in government, nonprofit or private industry. Ideally, teams will also include members familiar with the issues related to the topic areas and how data can inform solutions to those issues.

> **Timeline**
> Kick-off: Nov. 8, 3:30 to 6:30 p.m.
> Data checkpoint: week of Nov. 15
> Submissions due: Dec. 6
> Final awards: Dec. 14

**Register here**

# Engage with us

- The new version of our Regional Data Catalog launched in January. We invite you to visit the site and give us some feedback in this brief survey.
- This quarterly newsletter reaches more than 300 people, has a higher-than-average open rate, and is written by professionals like you. It's the perfect place to show off your projects, highlight your great work and contribute ideas to the GIS community in the Denver region. Newsletter release dates are Jan. 15, April 15, July 15 and Oct. 15 (or the next business day afterward). Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org to contribute.
- Did you miss a newsletter or a meeting? Visit our website for past newsletter issues and DRDC meeting materials.

Denver Regional Council of Governments
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Third-quarter newsletter for the Denver Regional Data Consortium.

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*The data consortium consists of Denver Regional Council of Governments members and regional partners with an interest in geospatial data and collaboration. The data consortium newsletter improves communication among local geographic information systems professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

# Free workshop to create your own open data site

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

DRCOG and Esri are partnering to provide a free workshop in August to help local governments create an open data site.

This hands-on, technical session will tell you everything you need to know about getting your GIS data online, using software that you probably already own.

The workshop will be held at DRCOG's offices at 1001 17th Street on Aug. 8 from 1 p.m. to 4 p.m. Some advance work is required to make the most of your time during the session and space is limited. To secure your spot and receive pre-workshop instructions, please RSVP.

Wondering what an Esri open data site looks like? Check out these excellent examples that your colleagues created:

https://data-auroraco.opendata.arcgis.com/
https://gis-bouldercounty.opendata.arcgis.com/
https://open-centennial.opendata.arcgis.com/
https://data-c3.opendata.arcgis.com/
https://data-erieco.opendata.arcgis.com/
https://data-jeffersoncounty.opendata.arcgis.com/
https://data-cityofthornton.opendata.arcgis.com/

## Go Code winner Carbos creates carbon trading app with public data

*Article submitted by Margaret-Rose Spyker, GIS and data analyst at Xentity Corporation. Margaret can be reached at mspyker.xentity@gmail.com.*

Carbos leverages public data and blockchain technology to remove the barrier to entry into the carbon marketplace. By bringing small carbon offset projects to market, Carbos allows environmentally conscious business owners to invest in local carbon sequestration resources rather than large international projects.

According to Carbos creators Nathan Tutchton, Alex Tutchton and Scott Stoltzman, Colorado has the potential to generate $30 billion from carbon trading for the agricultural sector alone. They developed Carbos to help establish an equitable system for carbon trading and to help Colorado become a leader in global carbon offset projects.

The team's recent win in the Go Code Colorado competition helped them flesh out the data details of their idea, and provided them with access to resources to leverage the public data essential to the function of their product. Beginning with a pilot for City of Boulder, street trees data is combined with assessor parcel data to calculate each site's carbon sequestration capacity.

The Carbos team found the DRCOG planimetric data and related high-resolution imagery invaluable. They used it to derive a method to calculate the amount of impervious surface for each site to generate a water sequestration score. They combined this with the carbon storage score, along with

land use grids from NREL, EPA and USGS, to further enhance the model and calculate other statistics for each site.

Colorado Secretary of State Wayne Williams with the Carbos team, winners of Go Code 2018

## Jefferson County Public Health uses GIS data to inform Safe Routes to School efforts

*Article submitted by Elise Waln, special projects coordinator at Jefferson County Public Health. Elise can be reached at emwaln@jeffco.us.*

According to the Safe Routes to School National Partnership, nearly 50 percent of all children in the U.S. (and nearly 90 percent of those within a mile of school) walked or biked to school in the late 1960s. By 2009, that number dropped to fewer than 15 percent.

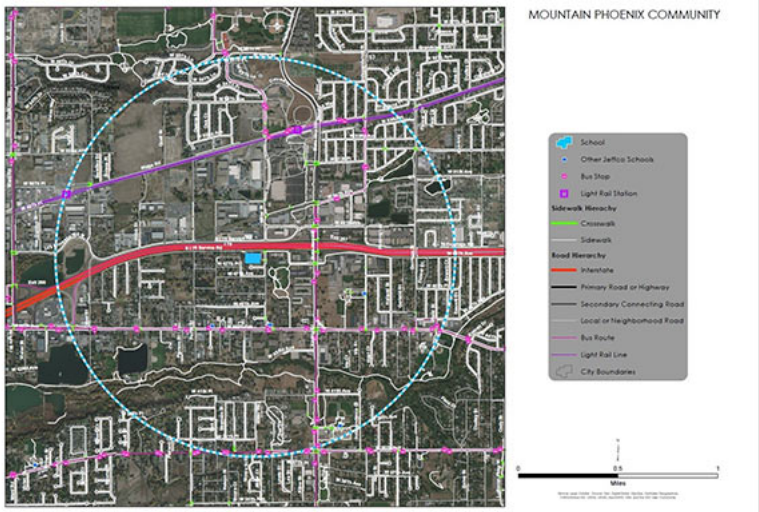
To support increased opportunities for physical activity and safety for bicyclists and pedestrians in school zones, Jefferson County Public Health was awarded a Safe Routes to Schools education grant from the Colorado Department of Transportation. Safe Routes to School programs are a way communities can work together to increase the number of students who choose active transportation — like walking and wheeling — by making it safer and more accessible for children and their families.

Over the 2017-18 school year, Jefferson County Public Health collected a variety of data to inform its Jefferson County Safe Routes to School work with partnering schools. It conducted walk audits to assess the built environment, implemented student travel tallies and parent surveys, hosted several community meetings and examined geographic information systems (GIS) mapping data.

Stakeholders provided guidance on what GIS data to examine for this project, which included:

- road hierarchy (as a proxy for traffic volume and speed)
- sidewalks
- bike lanes
- crosswalks
- signaled intersections
- public transit lines

Jefferson County Public Health staff continue to research and assess next steps for the GIS data they have collected to make it most useful for their partnering school communities. This data has sparked invaluable conversations with stakeholders on potential areas for improvements, next steps and potential safe routes for students. GIS data gathered for this project has been key to informing Jefferson County Safe Routes to School activities for its partnering schools moving forward.

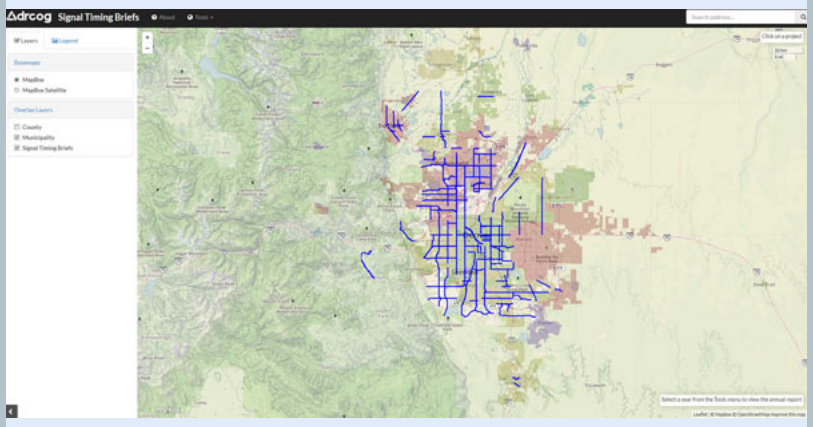



# DRCOG updates the Traffic Signal Timing Briefs map

*Article submitted by Jenny Wallace, senior GIS specialist at DRCOG. Jenny can be reached at 303-480-6754 or jwallace@drcog.org.*

Through the Regional Transportation Operations program, DRCOG staff works with member governments to develop and implement capital and signal timing coordination improvements. Capital improvements increase the ability of jurisdiction staff to maintain reliable operations while the cross-jurisdictional signal timing coordination improvements decrease delays at signalized intersections. Regional and local benefits of the program include reduced traffic congestion, improved air quality, decreased fuel consumption and improved roadway operations efficiency.

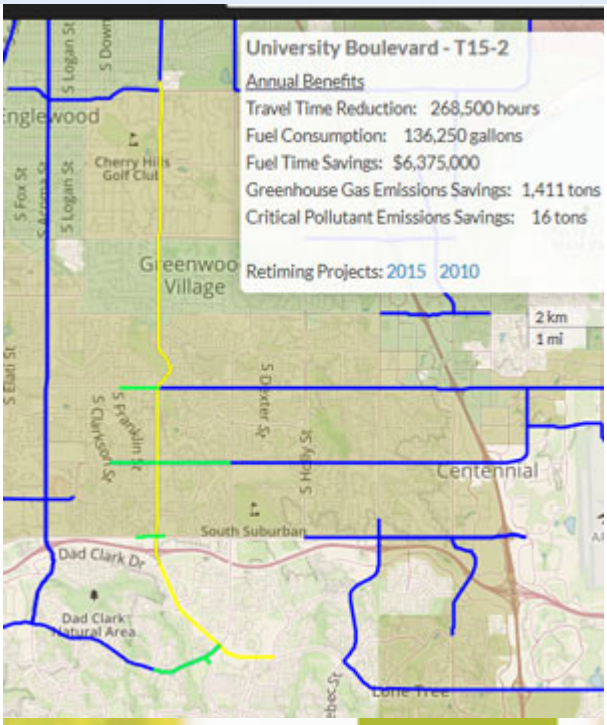
DRCOG developed the Signal Timing Briefs map to showcase the completed projects under the Regional Transportation Operations program. The web map includes annualized benefit summary statistics for each project and provides a link to the project's official brief. If a corridor has had multiple projects, links are provided for each brief. Under the "tools" dropdown, projects can be filtered by year, which then displays a link to the annual summary in the lower right-hand corner.

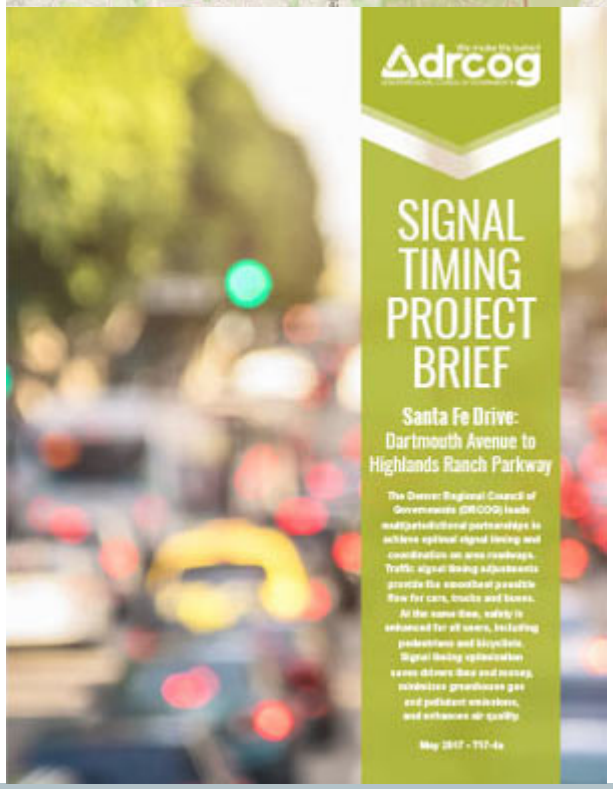



The Signal Timing Briefs map has been updated with new data. A new filter has been created for project type: signal timing or capital improvement. Additionally, the map now more accurately depicts each project area by including both main and cross corridors. When a user clicks on a feature to select a project, the main corridor is highlighted in yellow. If any cross corridors for the project exist, those corridors will appear and be highlighted in green. This improved display gives viewers a better understanding of the project scope and more closely aligns with the project brief depiction.

Check out the Signal Timing Briefs map.

To learn more about the DRCOG traffic operations program, visit its page at drcog.org.




# Comprehensive survey data for the Denver region's transit system

*Article submitted by Kevin Priestley, assistant planner at DRCOG. Kevin can be reached at 303-480-6769 or kpriestley@drcog.org.*

In 2009 and again in 2016, DRCOG worked with National Research Center, Inc. to conduct surveys of residents, businesses and employees who lived or worked near high-frequency transit. The results, published under the title "Perspectives on Transit," help local and regional stakeholders understand if, and how, the region's residents and businesses are increasing their orientation toward transit as a mobility, quality of life and economic amenity.

The report, and the publicly available data sets that accompany it, investigate location preferences among residents and businesses near high-capacity transit stations and how they changed between 2009 and 2016, as the Denver region continues to make significant investments in transit, such as the Regional Transportation District's FasTracks rapid transit system.

The surveys explore factors that affect residents', employers' and employees' location decisions, and whether they use (or plan to use) nearby transit facilities. The 2016 survey was completed by more than 2,500 residents, 1,000 businesses and 650 employees living, operating or working within walkable distance of high-frequency transit corridors. Initial findings suggest an increase in employer-provided transportation benefits such as discounted or free transit passes, a large uptick in the rate of teleworking, increased concern among businesses about the availability of free or low-cost parking and an expanding number of residents who attempt to offset the increasing cost of housing in the region by improved access to transit.

This report is not yet final, but you can download the raw data.

## GPS on benchmarks – a crowdsourced data project

*Article submitted by Pam Fromhertz, Rocky Mountain regional advisor at National Geodectic Survey, National Oceanic and Atmospheric Administration. Pam can be reached at pamela.fromhertz@noaa.gov.*

You may have heard about GPS on Bench Marks, an effort underway by the National Oceanic and Atmospheric Administration's National Geodetic Survey. The data will support the last hybrid geoid model, GEOID18, as well as the transformation between the current and future datums. The data will benefit local communities, especially in the Rocky Mountain region (Colorado, Wyoming and Montana) where there are significant gaps. GIS professionals and surveyors can assist.

There are three key phases in the effort – **recover**: finding the mark and completing a recovery note; **observe**: collecting the GPS data; and **report**: sharing the results via National Geodetic Survey's tool, Online Positioning User Service. The first phase can be conducted by anyone – no survey-grade GPS units needed. The data collection requires survey-grade equipment and a minimum of four hours of data.

Data for the hybrid geoid model must be collected and shared through Online Positioning User Service by Aug. 31. Geoid12B is the current hybrid geoid model, which is based on leveled heights, gravity measurements and GPS heights. In 2022, National Geodetic Survey will produce a geoid model based purely on gravity, called North American-Pacific Geopotential Datum of 1988 (NAPGD2022). The GPS data collected on Bench Marks will improve the transformation tools between the current vertical datum, North American Vertical Datum of 1988 (NAVD88), and the future vertical datum, NAPGD2022, and be integrated into the National Geodetic Survey Coordinate Conversion and Transformation Tool. National Geodetic Survey Coordinate Conversion and Transformation Tool is already available for conversions and transformation at https://geodesy.noaa.gov/. In 2022, changes will be 3-4 feet in Colorado both horizontally and vertically. We still have a couple of years to collect the GPS on Bench Marks data for the transformation tools. There was an article on the new systems coming in 2022 in the Denver Regional Data Consortium January newsletter.

There are many resources on the National Geodetic Survey website regarding the GPS on Bench Marks effort. National Geodetic Survey has a priority map for the country. A sign-up sheet and Rocky Mountain region map have been created where one can add their level of participation. In addition, three one-hour recorded webinars have been provided. Plus, Colorado has a new CO geomatics coordinator and working

group. More information can be found at https://plsc.net/ and by email: COCoordinator@plsc.net. The working group is looking for a representative from the GIS community.

Sign-up sheet
Volunteer status map

Part I – Basic information and resources

Part II – How to find a mark and provide a recovery note as well as an explanation of the National Geodetic Survey datasheets

Part III – How to collect your GPS data and share your results through Online Positioning User Service

Have fun conducting GPS on Bench Marks!

## Things you might have missed

- Urban and Regional Information Systems Association Salary Survey
- Census 2020 – The Participant Statistical Area Program (PSAP) is coming up. Learn more here.
- DRCOG makes historical imagery tiles downloadable via Colorado Governor's Office for Information Technology.
- Jefferson County parcels are now available for free download. Check its open data site.
- Department of Local Affairs launches new Community Profile Generator.
- The Rocky Mountain chapter of Urban and Regional Information Systems Association is hosting an ArcGIS Pro workshop on July 20. Register here.

## Engage with us

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Second-quarter newsletter for the Denver Regional Data Consortium.

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*The data consortium consists of Denver Regional Council of Governments members and regional partners with an interest in geospatial data and collaboration. The data consortium newsletter improves communication among local geographic information systems professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

## DRCOG's open data drives economic development

*Article submitted by Karl Urich, president, BuildingFootprintUSA. Karl can be reached at karl@buildingfootprintusa.com.*

Publicly produced data — made available to commercial, academic and nonprofit organizations for unrestricted use — can be used in beneficial ways that the original data producers couldn't even imagine.

BuildingFootprintUSA, based in Albany, New York, collects building footprint geospatial data from hundreds of sources nationwide and turns that data into a product. We license our products to industries as diverse as insurance, telecommunication, real estate, utility and mobile advertising.

For example, an insurance company can use building footprint-based address information to make more accurate determinations regarding whether a property is exposed to peril (such as hurricanes or floods). A telecom company might use the data to understand their existing cellular coverage and determine where it would be best to build a

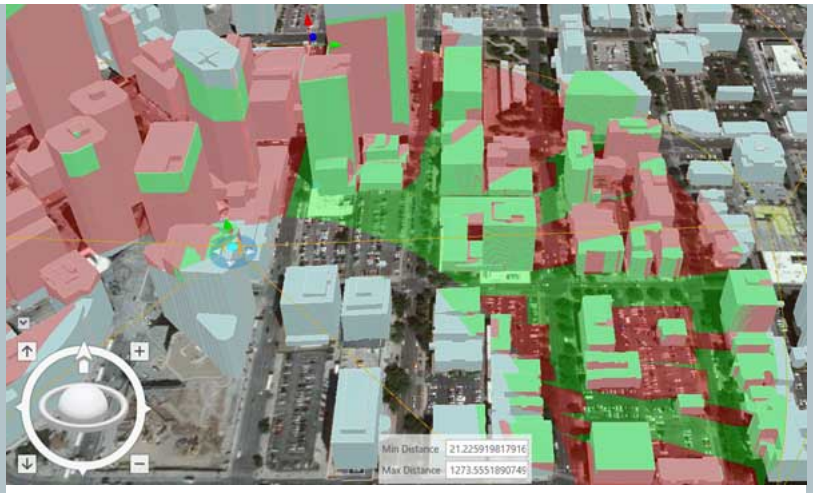
cell tower. A solar energy company can quickly identify the best rooftops for installations that meet its build-out criteria.

Open data makes it possible for us to collect the work of many and transform it into a product that supports national and local businesses. As a startup, it would be impossible for us to create such data ourselves. DRCOG data is an essential part of our nationwide product. As entrepreneurs who have become experts at determining the quality of public data, we assert that DRCOG data is in the top 10 percent of all data we have uncovered.

As we aggregate open data into our BuildingFootprintUSA products, DRCOG data is being used in innovative ways that benefit the residents of the region.

**Below: A real estate analytics company can use building footprint data and assessor data to visualize properties by use code (color) and valuation (height) in Arapahoe County.**

**Below: A wireless telecom company placing rooftop infrastructure can visualize the infrastructure viewshed then perform complex radio frequency propagation analysis in downtown Denver.**




# Planimetric data provides insight into urban clear zones, street trees and road safety

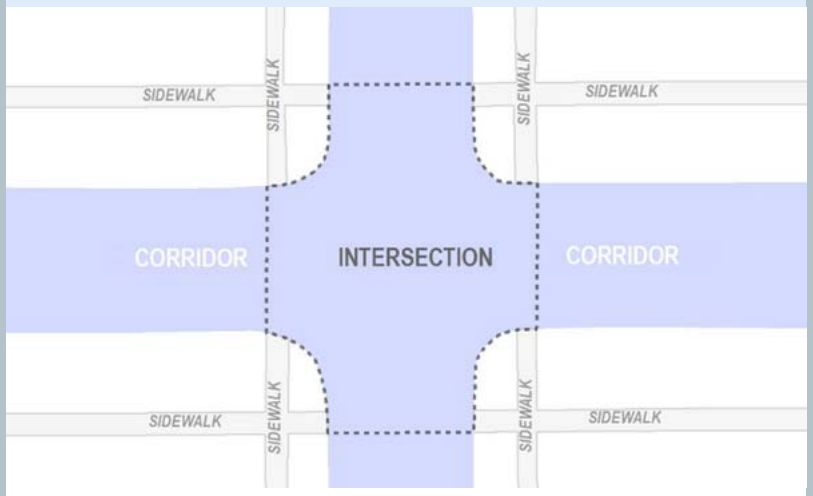
*Article submitted by Dr. Wes Marshall and Nicholas Coppola, University of Colorado Denver. Wes can be reached at wesley.marshall@ucdenver.edu,and Nick can be reached at nicholas.coppola@ucdenver.edu.*

Since the 1960s, transportation engineers have followed the practice of establishing clear zones along the roadside area where fixed-object hazards are explicitly minimized. Mounting evidence, however, is beginning to cast doubt on what we think we know about the effect of roadside clear zones on actual safety outcomes. For example, street trees in urban contexts – which provide economic, environmental and livability benefits – are also widely considered to be a road-safety detriment. Using spatial data, we reviewed the association between street tree location and tree canopy coverage of select roadways in Denver relative to crashes across different severity levels.

We collected data for our research from multiple sources, including extracting road corridor and intersection areas identified in DRCOG's edge of pavement data set and crosswalks identified in DRCOG's sidewalk data set. DRCOG's data saved time and greatly improved the quality of our research.

Results suggest that the expected road safety benefit of reduced clear zones in urban areas may be overstated. In fact, when controlling for other known factors, street trees and tree canopies that extend over the street are associated with fewer crashes.

When assessing the safety impact of street trees, we encourage planning agencies to be cognizant of context and the potential influence of street design on road user behaviors such as speed.




## Planimetric roofprint data ensures safer and more cost-effective floodplain management for your community

*Article submitted by Ryan Huffman, geographic information systems/database systems analyst at Arapahoe County. Ryan can be reached at 720-874-6685 or rhuffman@arapahoegov.com.*

DRCOG's planimetric building roofprint data is helping Arapahoe County more efficiently increase community floodplain safety and decrease flood insurance costs for its residents. The planimetric data has been a powerful resource for the county's participation in Community Rating System (CRS). CRS is a voluntary program administered by the Federal Emergency Management Agency (FEMA) as part of the National Flood Insurance Program (NFIP). CRS rewards communities for engaging in activities that reduce flood risk

with discounts on flood insurance premiums. Each CRS activity earns the community points — the more points, the larger the discount on flood insurance for the community.

Numerous DRCOG member governments already participate in CRS, but might not be aware how DRCOG's planimetric roofprint data can help. **Specifically, roofprint data provides a creditable, existing resource in performing spatial analysis on, and reporting of, insurable structures that fall or no longer fall within continuously changing FEMA and other regulated floodplains. CRS requires such activity as part of its initial and annual recertification reporting process.**

Before using planimetric roofprint data it would take Arapahoe County and the Southeast Metro Stormwater Authority staff weeks to visually inspect imagery and digitalize new structure roofprints. With the planimetric data resource, the county and authority have been able to reduce staff effort on the project to just a few days.

Arapahoe County appreciates the hard work and collaborative efforts of DRCOG and its participating partners to make planimetric features, especially roofprints, possible. Andy Kuster, GIS manager at Southeast Metro Stormwater Authority and Candida Velasquez, GIS technician at Arapahoe County deserve recognition for their continuing contributions to Arapahoe County's CRS recertification efforts.

COMMUNITY RATING SYSTEM ANNUAL RECERTIFICATION

| CRS Program Data Table | A. In the SFHA | B. In a regulated floodplain outside the SFHA |
|---|---|---|
| 1. Last report's number of buildings in the SFHA (bSF) (line 6, last report) | | |
| 2. Number of new buildings constructed since last report | + | |
| 3. Number of buildings removed/demolished since last report | – | |
| 4. Number of buildings affected by map revisions since last report (+ or –) | | |
| 5. Number of buildings affected by corporate limits changes (+ or –) | | |
| 6. Current total number of buildings in the SFHA (bSF) (total lines 1–5) | | |

## Join the 2018 planimetric data project

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

The region's 2018 Denver Regional Aerial Photography Project is off to a great start. All spring flights in the Front Range have already been completed. Final, orthorectified imagery will be delivered in December, at which point a **planimetric update** project can begin. To help all potential partners budget accurately and have time to consider their needs and wants, DRCOG is starting to plan now.

DRCOG is already engaging with existing planimetric project partners to get a better understanding of requirements for the upcoming project. We have a rough estimate of costs and are ready to provide quotes to interested entities.

**If you are not an existing planimetric project partner but you want to be involved in our upcoming project, please reach out to me at asummers@drcog.org**. By participating, you can influence how the project is conducted, the features to be collected and how they are captured and attributed. In addition to being able to tailor the project to your needs, your participation helps the wider GIS community in our region. Our strong partnerships allow us to leverage our modest budgets into quality data sets that power our distinct business needs. Please join us in this significant regional effort.

Download 2014 and 2016 building roofprints, edge of pavement, parking lots, sidewalk centerlines and more for free from our Regional Data Catalog.

## More cities and counties provide open data

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

For many years, DRCOG has compiled local data sets into regional data sets in support of analysis, modeling and measurement. DRCOG's processes have addressed not only the complexity of standardizing disparate content, but also the data-sharing restrictions imposed by each local source. In response, DRCOG built the Data Portal in 2014, an application that collects data-sharing restriction information with each submitted layer. The application helped DRCOG

understand how to protect data according to our member governments' wishes.

This year, DRCOG staff noticed a decline in use of the Data Portal. This is great news! The reason for the decline, at least in part, is because more local governments are sharing their data on their websites for free public download. The increase in local open data sites has been astounding, going from just a handful last year to 20 sites this year.

DRCOG applauds these efforts for their positive effect on our communities by equipping residents, neighbors and partner agencies with data and information.

To peruse local data, check out these open data sites:

Adams County
Arapahoe County
Arvada
Aurora
City of Boulder
Boulder County
Brighton
Broomfield
Castle Rock
Centennial

Commerce City **Just launched!**
Denver
Douglas County
Erie
Gilpin County
Greenwood Village
Jefferson County
Lone Tree
Weld County
Westminster

For regional data sets, visit DRCOG's Regional Data Catalog.

## Regional Data Catalog includes

# housing aggregates

*Article submitted by Dorothy Friday, GIS specialist at DRCOG. Dorothy can be reached at 303-480-6797 or dfriday@drcog.org.*

Planning applications at DRCOG use a geospatial inventory of individual housing unit locations to model current and future development and travel patterns. High-quality housing data improves regional models and contributes to an in-depth understanding of regional growth and behavior. It helps economists and planners predict housing availability, measure open space and improve transportation infrastructure.

Individual housing unit counts are derived from DRCOG's annual collection of county parcels, municipality land use layers, address points and planimetric building data. DRCOG supplements local data with data from InfoGroup, CoStar and University of Colorado Denver. The Area Agency on Aging also provides information on the location and unit count of assisted living facilities in the region.

The data is point-level for internal use. DRCOG now provides aggregations of the internal housing data set by city and county.

DRCOG has maintained the regional housing data set since 2014. The accuracy of housing aggregations varies by location and year. Over time, aggregations of point-level housing data are influenced by factors such as changes in municipal boundaries, changes in available source data and on-the-ground construction. For example, DRCOG planimetric data was not incorporated into the housing data set until the 2016 modeling year, and it revealed several hundred missed housing units in some smaller towns.

Despite inevitable imperfections, the DRCOG housing data set aligns well with other authoritative sources (like the U.S. Census Bureau) and provides valuable insight for research.

Download data from the Regional Data Catalog.

# DRDC workshop survey results

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

In the January newsletter, DRCOG invited data consortium members to provide feedback on the topics and technologies that DRCOG should consider featuring during a technical workshop. In a survey last summer, members indicated that workshops would be a beneficial addition to the consortium's current offerings, which include quarterly newsletters and meetings.

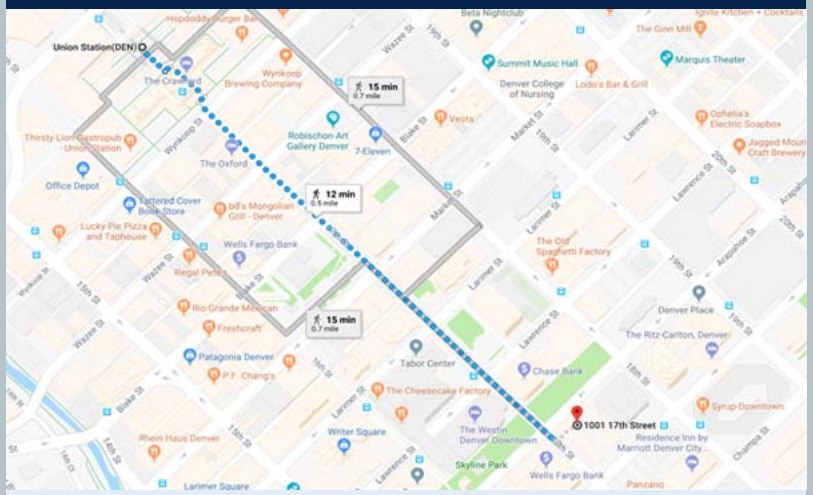
Response the workshop survey was low, with only six people providing feedback. Respondents ranked processing data with open source tools, web-mapping, ArcGIS Pro, QGIS and Python among their top choices for a technical workshop.

Esri hosted a training session on ArcGIS Pro for attendees of our spring DRDC meeting. Watch the webinar. Please also see the latest ArcGIS Pro Training Guide.

## FYI: DRCOG is moving!

In June, DRCOG will move from 1290 Broadway to **1001 17th Street**. Please pay close attention to upcoming meeting invites so you join us at the correct location.

The new offices are a short walk from Union Station. We'll also be closer to popular happy hour spots — an opportunity on which we will capitalize after our summer DRDC meeting. Watch your email for more information.



## Pop quiz

The Regional Traffic Counts map provides all-day, total traffic volume data for the period of:

> a) 2011-2016
> b) 2010-2016
> c) 2009-2016
> d) 2008-2016

Respond to Christine Connally with your answer. The first to get it right earns a free beer (or beverage of your choice) at our next happy hour event following the summer DRDC meeting.

## Engage with us

- The new version of our Regional Data Catalog launched in January. We invite you to visit the site and give us some feedback in this brief survey

- This quarterly newsletter reaches more than 300 people, has a higher-than-average open rate and is written by professionals like you. It's the perfect place to show off your projects, highlight your great work and contribute ideas to the GIS community in the Denver region. Newsletter release dates are Jan. 15, April 15, July 15 and Oct. 15 (or the next business day afterward). Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org to contribute.

- Did you miss a newsletter or a meeting? Visit our website for past newsletter issues and DRDC meeting materials.

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact Ashley Summers, DRCOG information systems manager, at 303-480-6746 or asummers@drcog.org.

Disclaimer: The information provided in this newsletter is compiled from multiple sources and is intended for informational purposes only. DRCOG assumes no responsibility or legal liability for the accuracy, completeness or usefulness of any information in this newsletter.

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First-quarter newsletter for the Denver Regional Data Consortium.

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*The data consortium consists of Denver Regional Council of Governments members and regional partners with an interest in geospatial data and collaboration. The data consortium newsletter improves communication among local geographic information systems professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

## Introducing the new Regional Data Catalog

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

DRCOG has been hosting a Regional Data Catalog since around 2010. Since the beginning, our goal has been to provide easy access to regional data for our varied audience that includes GIS professionals and planners within local governments, at our partner agencies, at academic institutions, in the private sector and the general public. To continue achieving this goal, DRCOG staff knows it must keep up with ever-changing technologies and the needs of our stakeholders.

For the past six months, DRCOG information systems staff have been working on a new version of our Regional Data Catalog. We aimed to improve discovery of data and maps by:

- categorizing information in an intuitive way
- standardizing naming conventions and keywords

- employing more flexible search methods
- allowing users to sort and filter results by topic, date and format
- advertising new additions and popular downloads
- providing more formats, including GeoJSON, WMS, KML and SHPs
- adding webmaps to a map gallery

**Regional Data Catalog**

If you have feedback for us, please take the survey.

## Workshop survey: Tell us what you want to learn

At the fall 2017 Denver Regional Data Consortium meeting, attendees suggested that DRCOG offer technical workshops. We are happy to offer assistance and excited to share our skills with you. We're also interested in the possibility of co-teaching with those of you who would like to collaborate on a class.

Whether you want to learn or teach with us, please let us know what topics, technologies and DRCOG initiatives interest you most. We want to ensure that our 2018 offerings meet your needs.

**Take the survey**

## Modernized National Spatial Reference System will bring about 3 feet of change

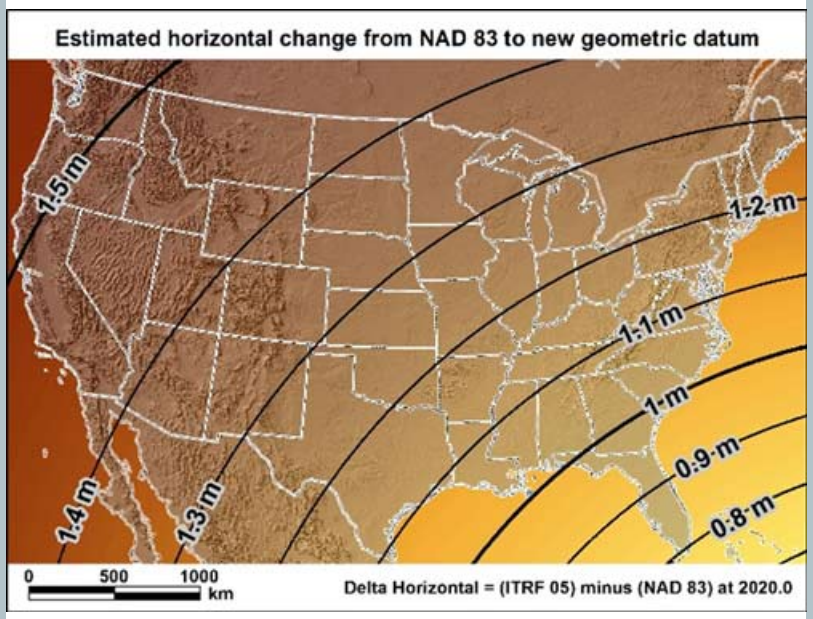
*Article submitted by Pam Fromhertz, Rocky Mountain regional adviser at the National Geodetic Survey, National Oceanic and Atmospheric Administration. Pam can be reached at 240-988-6363 or pamela.fromhertz@noaa.gov.*

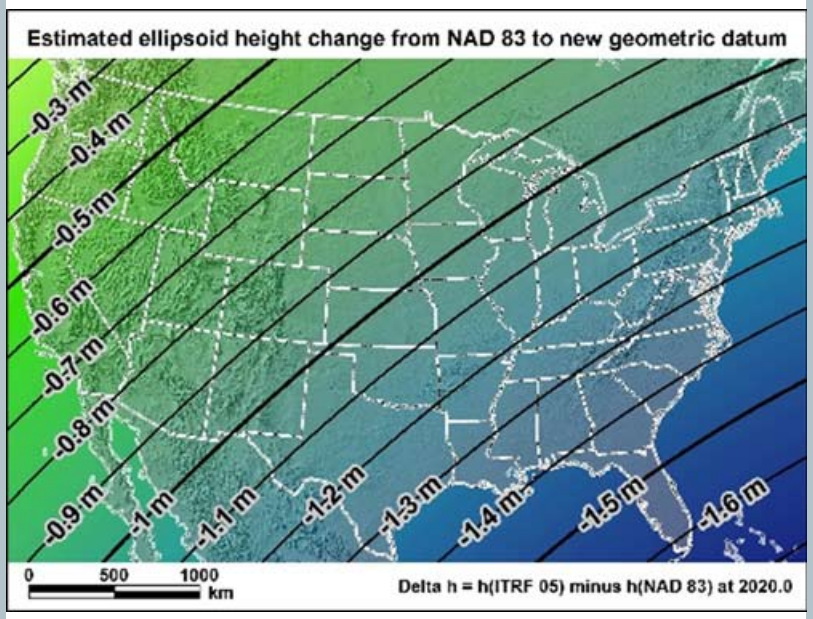
All geospatial data is defined by some type of reference frame or datum. The National Geodetic Survey (NGS) defines, maintains and provides access to the coordinate system and vertical datum for the United States, known as the National Spatial Reference System. As technology, mainly Global Navigation Satellite Systems (GNSS), is increasingly integrated into data collection, the method by which these surfaces are defined must be updated to meet users' needs. Just 30 years ago, nationwide horizontal and vertical datums were only accurate to several feet. Today, many users want to know where they are located to within a few inches and thus NGS is in the process of improving these reference systems.

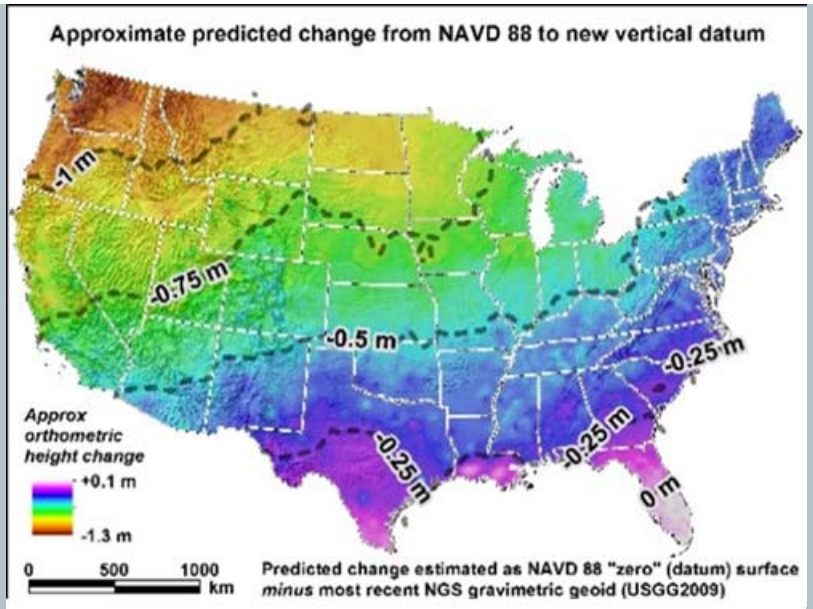
**New reference system**

There are currently two datums: a horizontal datum, North American Datum of 1983 (NAD 83), and a vertical datum, North American Vertical Datum of 1988 (NAVD 88). Ashley wrote about the horizontal datums in the October 2013 DRCOG Data Consortium Newsletter. Prior to GNSS, the survey techniques and data used to define the horizontal datums were completely independent of the vertical. Now with the advent of GNSS we get 3-D data instantaneously, and even 4-D if time is taken into account. The vertical component from GNSS is referred to as an ellipsoid height. However, that height is based merely on a mathematically defined ellipsoid so it provides minimal information about the topographic heights that conform to gravity, and which way water flows or floods. Traditionally, we use orthometric heights derived from a simple surveying technique called differential leveling. This orthometric height gives us a height relative to a standard datum surface that is roughly equivalent to mean sea level. Leveling is, however, very laborious and costly. To provide improved GNSS access to meet users' needs, NGS is re-inventing the entire National Spatial Reference System. NGS will release a new system in 2022, with two principal components: a semi-dynamic 3-D geometric reference frame, called the **North American Terrestrial Reference Frame of 2022 (NATRF2022)**, along with similar frames for the Pacific, Marina and Caribbean plates; and a nationwide geopotential datum defined by a gravimetric geoid (a surface that approximates an idealized mean sea surface), called the **North American-Pacific Geopotential Datum of 2022** or **NAPGD2022**. Changes in

published positional values in Colorado are anticipated to be on average three feet horizontally and vertically in Colorado.






Note the two images illustrating the anticipated changes: One uses the ellipsoid height and the other the orthometric height. Keep in mind the difference between orthometric and ellipsoid height in Colorado is an average of 60 feet.

> **Anticipated positional changes in 2022 computed for Station W 409 near Denver**
> **Horizontal:** 1.4 meters (4.6 feet)
> **Ellipsoid height:** -0.9 meters ( -2.9 feet)
> **Orthometric height:** - 0.7 meters (- 2.3 feet)

NGS intends to provide a geoid model that is accurate to within 2 centimeters (0.8 inches) for GNSS-based access to orthometric heights without leveling.In other words, you will be able to apply the geodic model accurately to your GNSS data to derive the needed height or elevation. NGS has held many workshops on the development and effects of the new reference system. Visit National Geodetic Survey: New Datums for presentations, recordings and documents. With the release of the modernized reference system in 2022, technical reports and conversion software will be available. NGS Coordinate and Transformation Tool (NCAT) is available in beta version for transforming between all horizontal datums as well as converting between various systems. I will present on this topic at the Elevations Geospatial Conference and the Rocky Mountain Survey Summit.

## Jefferson County rescinds fee

# policy for GIS data and standard maps

*Article submitted by Barbara Morey, CP, GISP, lead geographic information systems analyst/developer at Jefferson County Information Technology Services. Barb can be reached at 303-271-8041 or bmorey@jeffco.us*

Jefferson County has long had a policy of charging a fee for GIS data and maps. The Board of County Commissioners voted unanimously to rescind that policy effective Jan. 10, 2017 – approximately one year ago. The county continues to charge a fee for custom GIS processing, analysis, maps and parcel data.

Though a fee is no longer charged, the county still required a signed license agreement. This meant staff continued to be involved in each request, which kept the process of distributing data slow. The Information Technology Services geographic information systems staff worked with the county attorney on the licensing details and ultimately received permission to adopt a Creative Commons license. Because the Esri Open Data site uses Creative Commons licensing, Jefferson County could distribute data using ArcGIS Open Data.

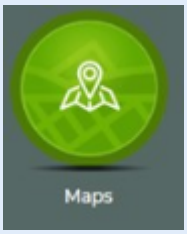
In June 2017 Jefferson County made available 29 GIS data sets on the site and ceased other distribution methods for non-fee data. The data available via ArcGIS Open Data includes the most-requested items from Address points to Zoning. See the complete list at the end of this article. The standard maps, in PDF format, are available free of charge on the county website.

The GIS data is also available to view, search for property or permits, identify layers, and to print at the Jefferson County online map, "jMap."

To access the data available to download, go to Jefferson County page on the ArcGIS Open Data site.

To download the standard maps, in PDF format, go to the county website and select the green "Maps" icon.

Data available for download:




- Address
- Ambulance District
- Bike Plan
- Colorado state house district
- Colorado state senate district
- Colorado U.S. house district
- City boundary
- City precinct

- City ward
- Commissioner district
- County boundary
- County precinct
- Fire bond district
- Fire district
- Foothill park and rec
- Improvement district
- Metropolitan district
- Open space parks
- Open space trails
- Park district

- Regional Transportation District
- Sanitation district
- South Jeffco local improvement district
- Streets
- Traffic impact fee area
- Urban renewal district
- Water district
- Water and sanitation district
- Zoning

## Recap of the LUCA technical

## workshop

The U.S. Census Bureau held a technical workshop for the Local Update of Census Addresses at DRCOG on Dec. 12.

LUCA is the only opportunity offered to tribal, state and local governments to review and comment on the U.S. Census Bureau's residential address list for their jurisdiction prior to the 2020 Census. The program for the 2020 Census was introduced in January of 2017. Registration for the program began in July and ended Dec. 17, 2017.

The technical workshop was designed for local address coordinators, GIS practitioners or local planners to help them understand the LUCA process and their participation in the program.
If you missed it, you can watch the recorded webinar and view the slides.

For more general information on the U.S. Census Bureau, attend upcoming virtual trainings entitled Your Community by The Numbers.

## Join the 2018 planimetric project

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

DRCOG and its partners have just successfully finished the second regional planimetric project! Our first project collected features from 2014 aerial imagery and the second recorded changes seen in 2016 imagery. Both sets of data include building roofprints, edge of pavement, parking lots, sidewalk centerlines and more, and are available for free download from our Regional Data Catalog. We invite you to take a look and put the data to good use!

With projects as large as these – covering so much area and including so many small details – there's never really much time to rest on our laurels. As soon as we've finished one project successfully, we're already on to the next one. That's where you come in.

Our 2018 Denver Regional Aerial Photography Project is gearing up and planes are expected to be in the air by March. Final, orthorectified imagery will be delivered to us in December, at which point a planimetric update project can begin. To help all potential partners budget accurately and have time to consider their specific needs and wants, DRCOG is starting to plan now.

DRCOG is already engaging existing planimetric project partners in surveys to get a better understanding of requirements for the upcoming project. During the first quarter of this year, we will determine our parameters and get rough cost estimates to equip our partners for 2019 budget discussions.

**If you are not an existing planimetric project partner but you want to be involved in our upcoming project, please reach out to me at asummers@drcog.org.** By participating, you can influence how the project is conducted, the features to be collected and how they are captured and attributed. In addition to being able to tailor the project to your needs, your participation helps the wider GIS community in our region. Our strong partnerships allow us to leverage our modest budgets into quality data sets that power our distinct business needs.  Please join us in this significant regional effort.

## RTD releases 2017 customer satisfaction survey results

In case you missed it, read the press release.

## Your article goes here!

The Denver Regional Data Consortium newsletter is facilitated by DRCOG but written by GIS professionals like you. This quarterly newsletter reaches more than 200 people and has a higher-than-average open rate. It's the perfect place to show off your projects, highlight your great work and contribute ideas to the GIS community in the Denver region.

Newsletter release dates are Jan. 15, April 15, July 15, and Oct. 15 (or the next business day). Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org to contribute.

## Pop quiz: Can you answer these questions about the region?

Which county has the highest median home value?

> a) Arapahoe
> b) Boulder
> c) Denver
> d) Douglas

Which county had the largest percent of people older than 60 in 2016?

> a) Boulder
> b) Clear Creek
> c) Gilpin
> d) Jefferson

Hint: Use DRCOG's Community Profiles. We've updated them since the last newsletter with the latest American Community Survey data!

If you know the answer, respond to Christine Connally. The first to respond with the correct answer will be recognized in the next newsletter.

**Congratulations to the winner from the last newsletter:** Rachel Parinello - Boulder

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact Ashley Summers, DRCOG information systems manager, at 303-480-6746 or asummers@drcog.org.

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Third-quarter newsletter for the Denver Regional Data Consortium.

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*The data consortium consists of Denver Regional Council of Governments members and regional partners with an interest in geospatial data and collaboration. The data consortium newsletter improves communication among local geographic information systems professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

## DRDC survey results

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

Over the summer, DRCOG conducted a survey of the Denver Regional Data Consortium to better understand how we can serve you through collaborative projects, meetings and newsletters.

Here are some highlights:

- DRCOG's most important data consortium role – and one for which we are uniquely qualified – is facilitating projects to acquire data. Among respondents, 74 to 79 percent rated DRCOG facilitation of the Denver Regional Aerial Photography Project, planimetrics and LIDAR as "very valuable."
- The majority of respondents are "very satisfied" with the frequency and length of our meetings and newsletters, but only "mostly satisfied" with content. More member content, as opposed to DRCOG content, is a suggested as an improvement, but 78 percent of survey-takers said they would prefer not to contribute.

- 68 percent voted to allow vendors to present at meetings if they didn't give a sales pitch.
- 90 percent voted for DRCOG to continue offering remote attendance options (but 68 percent said remote participation decreases collaboration).
- 63 percent voted for DRCOG to facilitate other types of networking and collaboration opportunities.

Based on the results, DRCOG has developed the following plans for improvement:

- a new way to submit articles: Let us interview you and we'll write the article!
- a new newsletter section: "Meet a local government GIS department."
- a new 2018 meeting schedule to accommodate socializing and encourage in-person attendance
  - spring meeting: 11:30 a.m. to 1:30 p.m. with catered lunch (and a potential vendor presentation)
  - summer meeting: 3 to 5 p.m., followed by happy hour
  - fall meeting: 10 a.m. to noon, followed by a technical workshop
- a new data pursuit: routable street centerlines

Join us for our next meeting Nov. 9 to learn more.

Note: Results are from 19 respondents out of 252 survey recipients.

## Denver Water landscape classification project

*Article submitted by Robert Stansauk, GIS supervisor, and Phillip Segura, division senior analyst, at Denver Water. Robert and Phillip can be reached at robert.stansauk@denverwater.org or phillip.segura@denverwater.org.*

**Background**

Roughly 40 percent of the water Denver Water treats is used outdoors (irrigation, for example). We have the data necessary for accurate billing based on our rate structures. However, when it comes to better understanding water use behavior we have lacked information about landscape

preferences and trends which have a huge effect on decision-making. The landscape classification project provides robust data to aid in the decision-making and planning processes by many of our groups.

At a high level, this data allows us to understand trends in water use and prepare for factors which will have a major effect on our system such as climate change and population growth. Denver Water can now understand the unique characteristics that affect water use for the individual customer, giving us the ability to help them use water efficiently.

Specifically, this data helps:

- our Conservation group measure water use efficiency
- our Demand Planning group understand customer water use and how it could change in the future, which in turn helps with facility sizing requirements
- our drought response by knowing which customers may be able to achieve reductions
- us understand water reuse based on water rights
- us evaluate customer response to potential rate changes (for example, affordability)

**Process**

We began by using the 2014 Denver Regional Aerial Photography Project imagery and 2014 planimetric data. We use Earth Resources Data Analysis System (ERDAS) Imagine and ERDAS Objective to classify the imagery by neighborhood (one neighborhood at a time). We use Esri for most of the pre- and post-processing. To date we have completed north and south Park Hill.

The general workflow is:

1. pre-processing
- select and merge planimetric features by neighborhood
- create image mosaics
- create classification .aoi files for ERDAS

2. classification
- use ERDAS Objective to classify individual layers (vegetation, shadows, turf, concrete, alternative and unclassified impervious)

3. post-processing
- perform quality assurance on each layer
- merge all layers into a topologically clean vector layer

**Results**

## North Park Hill 2014

**(percentages for whole neighborhood)**

Planimetric (47%) - Edge of pavement (roads), parking lots, sidewalks, driveways, rooftops

Vegetation 1 (2%) - Green plants at time of imagery (spring). Mostly coniferous. Includes shrubs, hedges, other plants, and clusters of bare branches.

Shadows (10%) - Shadows at day/time imagery was taken.

Vegetation 2 (8%) - Plants and trees with leaf off at time of imagery. Mostly deciduous. This represents the minimum number for the neighborhood.

Turf (23%) - Turf in early spring can be green, brown, or patchy.

Concrete (2%) - Includes colored concrete, asphalt, brick, stone paths and patios. There is no way to prevent some overlap with the Alternative layer (i.e. decorative rock).

Alternative (3%) - Includes mulch, decorative rock patches, dirt. There is no way to prevent some overlap with the concrete layer (i.e. decorative rock).

Unclassifed (5%) - "everything else" examples include, junk piles, cars, tarps, play toys, etc. Usually the feature(s) captured are on top of a pervious surface.

**Summary**

Several enabling components came together simultaneously to make this project possible, including 1) DRAPP imagery 2) DRCOG planimetric data 3) a customer focus in our strategic plan and 4) a new model for tracking customer characteristics developed in our Conservation section.

There were also two important keys to our success. First, ERDAS Objective was the right tool for us. It classifies the

image by emulating the human visual system for image interpretation. It uses machine learning and interpretation cues (for example, shape, size, spectral, texture and associations) – not to mention all the other functionality that comes with ERDAS Imagine. The second key is the quality assurance process. The layers we are creating have similar and overlapping spectral signatures (for example, sometimes old mulch can look like dead grass, or a concrete patio might be stained with a natural color that looks like some variation of dirt). These characteristics make it necessary for Denver Water staff to review and edit the results.

## Register for LUCA and attend a technical workshop

The U.S. Census Bureau will hold a technical workshop for the Local Update of Census Addresses at DRCOG the morning of Dec. 12.

LUCA is the only opportunity offered to tribal, state and local governments to review and comment on the U.S. Census Bureau's residential address list for their jurisdiction prior to the 2020 census.  The program for the 2020 census was introduced in January 2017.  Registration for the LUCA program began in July and ends Dec. 17.

The technical workshop is designed to help local address coordinators, GIS practitioners and local planners understand the LUCA process and how they will participate in the program.

Census staff will discuss and demonstrate:

- LUCA program timeline
- participation options
- LUCA data format
- use of the U.S. Census Bureau's Geographic Update Partnership Software (GUPS) based on QGIS
- use of ArcGIS and Microsoft Excel

Participants can expect a detailed view of the process including a technical discussion on address lists and GIS data processing. Participants will spend several hours reviewing sample data using live software and discuss the U.S. Census

Bureau's geocoding tool as part of the process. While not required, attendees may bring their own laptop, ArcGIS, Microsoft Excel and local address list to explore LUCA processing options. Presenters will demonstrate a prototype but are unable to distribute the U.S. Census Bureau's GUPS tool.

Preregistration is required.

**REGISTER**

## Turning 'dead end' sign asset data into an asset inventory

*Article submitted by Ryan Huffman, geographic information systems/database systems analyst at Arapahoe County. Ryan can be reached at 720-874-6685 or RHuffman@arapahoegov.com.*

Arapahoe County's Road and Bridge Division was recently in a tough situation. We were faced with a shrinking budget, aging sign assets and a pressing federally mandated deadline for sign retroreflectivity compliance.

We desperately needed to collect data on the county's solid inventory and develop a sustainable way to keep it current. The next step was to use the collected data to accurately budget for and plan sign and post replacement.

The resulting project involved a great deal of staff collaboration and included technical innovation. Such innovations included barcoding all signs using rugged tablets with sufficient GPS receivers. Staff coupled a robust mobile software package with web map services to handle complexities in robust data attribution and offline mapping.

In 2017 we passed an important milestone: 13,547 sign and 5,746 signpost active asset data records were brought online within the asset management system. As a result, the Road and Bridge Division was able to better understand the type and location of assets. Further analysis of the data allowed county staff to achieve compliance and better allocate their budget. Most importantly, Arapahoe Country made

improvements and ensured the safety of its roadways. The project involved considerable collaborative effort, and has set the standard for future endeavors.

## DRCOG performs economic analysis for City of Golden

*Article submitted by Xavier Gitiaux, economist at DRCOG. Xavier can be reached at 303-480-5642 or xgitiaux@drcog.org.*

DRCOG's Regional Planning and Development team recently conducted a pilot to tailor data analysis to the needs of local governments. The pilot supports investment decisions in smaller communities by reviewing data within the local context and comparing macroeconomic trends and local opportunities.

Regional Planning and Development staff applied the concept to the City of Golden in partnership with its Downtown Development Authority. Robin Fleischmann, redevelopment specialist for downtown Golden, explained that "the City of Golden wanted to tailor its economic development strategy for the local business community and the generally available employment and wage data was not specific enough for that purpose. Knowing that it has economists on staff, Golden approached DRCOG for help."

Using the Longitudinal Employer-Household Dynamics data, the American Community Survey and the American Community Survey Public Use Microdata Sample, the Regional Planning and Development team discovered that manufacturing, although shrinking, remains the leading employment sector in Golden. But the team discovered most current economic growth is fueled by the professional and technical services and leisure and accommodation sectors. The analysis highlighted the extent to which Golden's

employment market relies on commuters from east Denver, Lakewood, Wheat Ridge and Arvada, and how current constraints on the housing market in Golden might limit future job growth. Fleischmann finds this information useful "to refine local economic development policy and incentives including tax increment financing, business grants and community partnering."

Regional Planning and Development staff will expand the pilot to other small communities since the effort aligns with DRCOG's objective to inform local strategies with data and make connections among local contexts and regional economic and demographic trends.

## Join the 2018 Denver Regional Aerial Photography Project

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

After much coordination and planning, the specifications for the 2018 Denver Regional Aerial Photography Project (DRAPP) are final. The upcoming project – to be flown in the spring and summer of 2018 – will include **double the amount of 3-inch resolution imagery** in the metro area's urban core. In addition, the project will produce the same high-quality deliverables of past projects that are snow- and leaf-free, minimize building lean and shadows, and meet industry standards for positional accuracy. Read more in our handout.

There is still time to become a DRAPP 2018 project partner. If you represent a public entity interested in the project, contact Ashley at 303-480-6746 or asummers@drcog.org for a quote.

## Contributing 600,000-plus building roofprints to OpenStreetMap

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

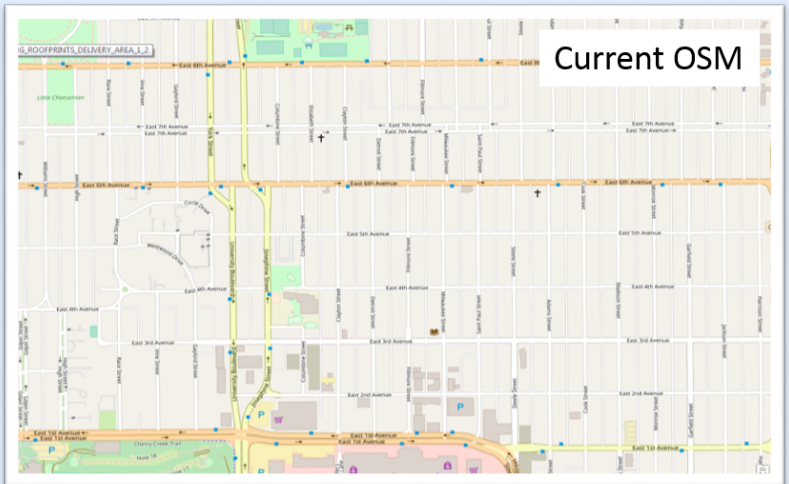
DRCOG, on behalf of 21 partners in the region, completed the Denver metro area's first-ever regional planimetric project in June 2016 (based on 2014 aerial imagery). The contributing partners agreed to publish data immediately in the public domain, so DRCOG made it available for free download from the Regional Data Catalog.

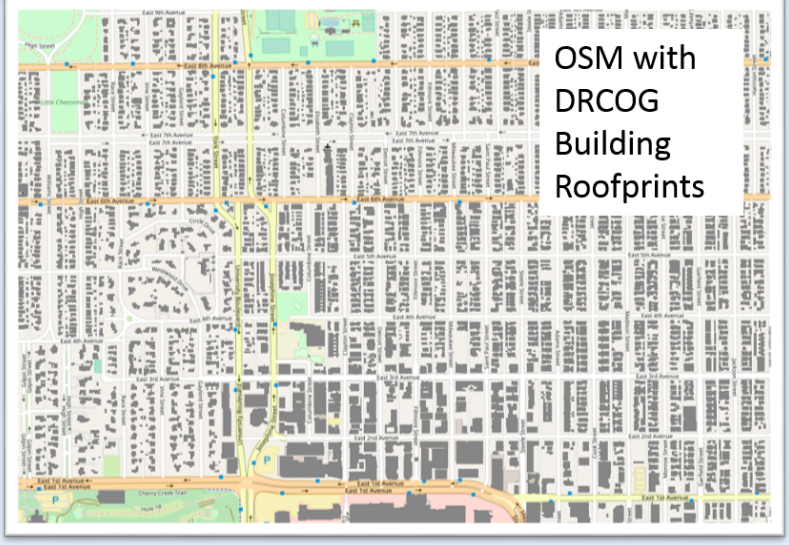
To maximize the usefulness of this detailed data, the DRCOG team also decided to provide the data to OpenStreetMap (OSM). Although we have several planimetric features, we decided to start with contributing **more than 600,000 building roofprints** in the Denver metro region. DRCOG reached out local OSM volunteers for guidance on making planimetric features available. Over the next year, we documented our plan, prepared our data for import and finalized licensing language consistent with the OSM model.

An important consideration was that bulk imports into OSM are not preferred, as they might overwrite previously contributed data. To ensure that existing data was preserved, we determined that our data would need to be checked in by volunteers instead of uploaded all at once. OSM volunteers spent a considerable amount of time configuring a Tasking Manager that divides the data into chunks that can be individually vetted and approved.

DRCOG and the OSM volunteers will discuss the project at the State of the Map Conference in mid-October.

Later in the year, we will host mapping parties to encourage communities to submit data. Stay tuned for an invite!




## Your article goes here!

The Denver Regional Data Consortium newsletter is facilitated by DRCOG but written by GIS professionals like you. This quarterly newsletter reaches more than 200 people and has a higher-than-average open rate. It's the perfect place to show off your projects, highlight your great work and contribute ideas to the GIS community in the Denver region.

Newsletter release dates are Jan. 15, April 15, July 15, and Oct. 15 (or the next business day). Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org to contribute.

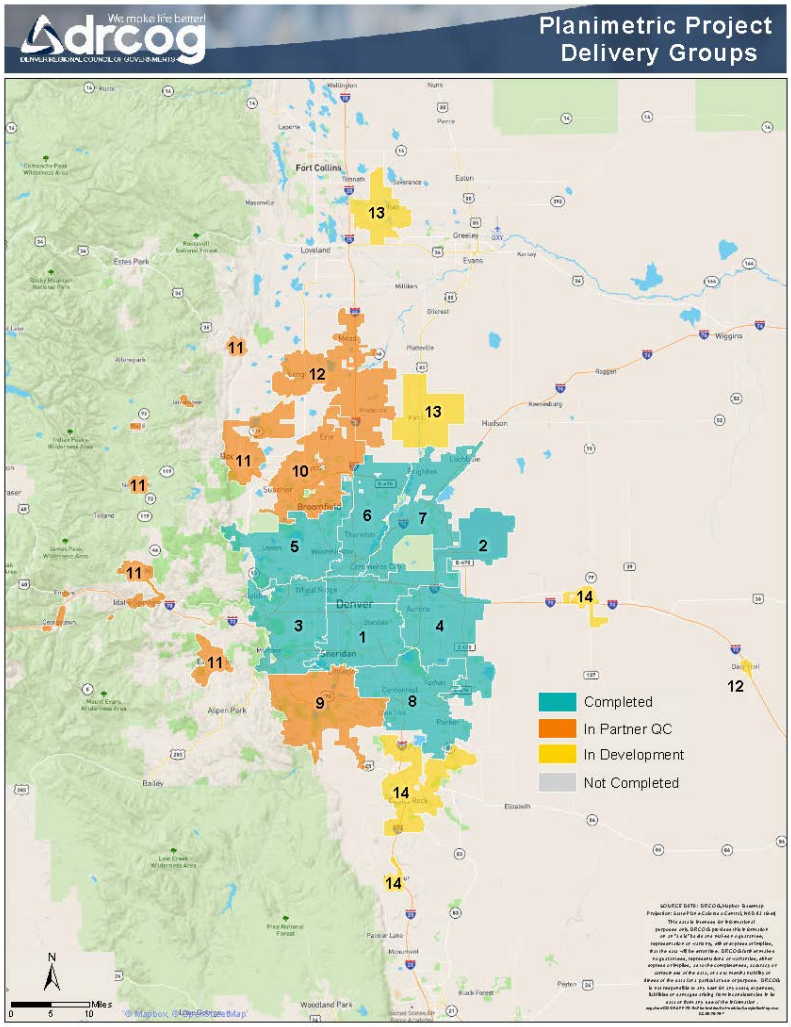
## Things you might have missed

- DRCOG featured on the Cesium blog

- Check out a graphic summary of RTD's Quality of Life Report. Read more on the RTD website.
- Fall DRDC meeting: Nov. 9

## New and updated resources in the Regional Data Catalog

- Crash data 2014
- Planimetrics 2016: See our progress on this project! Note: Data is being delivered on a rolling basis. At the end of the project in December, we will upload a final, compiled data set for each feature.




The DRCOG information system team has slowed down on adding content to the Regional Data Catalog while we work on a new version of the application. We intend to improve discovery of data and maps by:

- categorizing information in an intuitive way
- adding new data sets that are specific to DRCOG's areas of expertise
- standardizing naming conventions and keywords
- employing more flexible search methods
- allowing users to sort and filter results by topic, date, format
- advertising new additions and popular downloads
- adding web maps to the map gallery
- improving navigation between the Regional Data Catalog and other DRCOG web properties

Stay tuned for the new site soon.

## Pop quiz: Can you answer this question about the region?

Which two cities have the largest combined population?

> a) Parker and Glendale
> b) Commerce City and Bennett
> c) Castle Rock and Mead

Hint: Use DRCOG's Community Profiles.

If you know the answer, respond to Christine Connally at cconally@drcog.org. The first to respond with the correct answer will be recognized in the next newsletter. Also, Ashley will treat you to a beer (or beverage of your choice) at our next happy hour. Good luck!

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact Ashley Summers, DRCOG information systems manager, at 303-480-6746 or asummers@drcog.org.

Disclaimer: The information provided in this newsletter is compiled from multiple sources and is intended for informational purposes only. DRCOG assumes no responsibility or legal liability for the accuracy, completeness or usefulness of any information in this newsletter.

Denver Regional Council of Governments
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The data consortium consists of Denver Regional Council of Governments members and regional partners with an interest in geospatial data and collaboration. The data consortium newsletter improves communication among local GIS professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.

## In this issue, July 2017


- Take the Denver Regional Data Consortium survey
- Census technical workshop for Local Update of Census Addresses in October
- Update on the 2016 Planimetrics Project
- Update on the 2018 Denver Regional Aerial Photography Project
- Your article goes here!
- Things you might have missed
- New and updated resources in DRCOG's Regional Data Catalog


## Take the Denver Regional Data Consortium survey

We're so glad you're part of the Denver Regional Data Consortium community! Please take a moment to give DRCOG feedback on how to make DRDC even more valuable.

Results will be summarized in the fall newsletter.

**Please note:** Our next DRDC meeting is July 27 from 10 to 11:30 a.m. at DRCOG in the Independence Pass conference room.

## Census technical workshop for Local Update of Census Addresses in October

The U.S. Census will hold a technical workshop for the Local Update of Census Addresses at DRCOG the morning of Oct. 11.

The Local Update of Census Addresses (LUCA) is the only opportunity offered to tribal, state, and local governments to review and comment on the U.S. Census Bureau's residential address list for their jurisdiction prior to the 2020 Census. The program for the 2020 Census was introduced in January of 2017. Registration for the program began in July and ends Dec. 17.

The technical workshop is designed for local address coordinators, GIS practitioners, or local planners to help them understand the LUCA process and how they will participate in the program. Workshop conveners will discuss and demonstrate:

- LUCA program timeline
- participation options
- LUCA data format
- use of the U.S. Census Bureau's Geographic Update Partnership Software (GUPS) based on QGIS
- use of ArcGIS and Microsoft Excel

Participants can expect a detailed view of the process with a technical discussion on address lists and GIS data processing. Workshop participants will spend several hours reviewing sample data using live software and discuss the Census Bureau's geocoding tool as part of the process. While not required, attendees may choose to bring their own laptop, ArcGIS, Microsoft Excel and local address list to explore LUCA processing options. Workshop conveners will demonstrate a prototype but are unable to distribute the U.S. Census Bureau's GUPS tool.

Pre-registration is required.

## Update on the 2016 Planimetrics Project

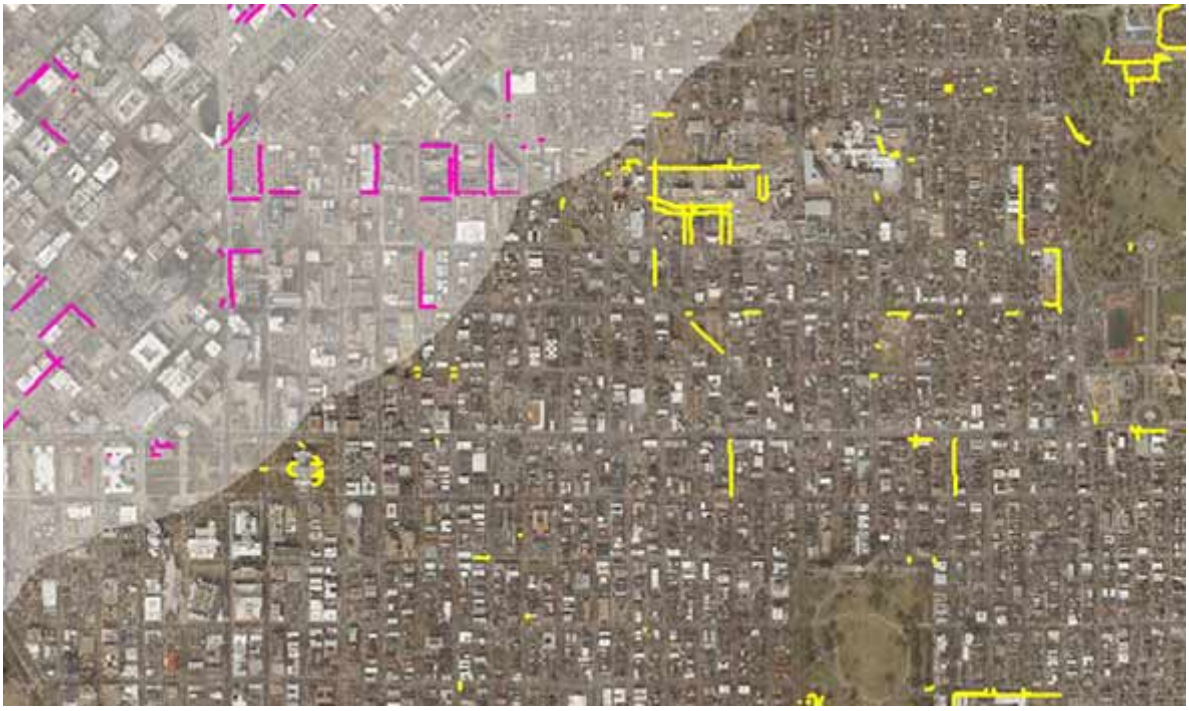
*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

In our January newsletter, we reported that DRCOG and several partners were attempting to perform an update of the 2014 planimetric data using 2016 DRAPP imagery but were unable to close the funding gap required. We are happy to say that more partners joined the project - for a total of 27 - and we are now underway creating a full update to our previous product.

The 2016 planimetric project is segmented into 14 groups for processing and delivery. All areas are expected to be delivered by the end of 2017. Groups 1 and 2 are already available for download from our Regional Data Catalog.

The 2014 data has proved useful for a variety of applications, including pedestrian-routing, building inventories, creating emergency response plans and sidewalk quality and availability studies. The 2016 data can help us evaluate change over time by enabling us to do such things as quantifying new impervious surface (above) or locating our recent infrastructure investments.

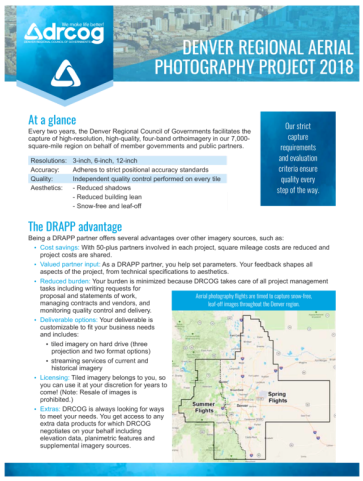
The image below compares new sidewalks built within (pink) and outside of (yellow) a transit-oriented development area (half-mile around a transit station).



Stay tuned to our Regional Data Catalog as we expect to upload more data each month. If you find this data useful for your work, please consider sending us a summary of your analysis. Understanding how the community is using our data helps us continue to offer it for free.

## Update on the 2018 Denver Regional Aerial Photography Project

DRAPP 2018 starts next spring but it's never too early to start planning! For those that haven't participated before, here's a quick summary of DRAPP: In the spring and summer of every even year, DRCOG facilitates a project to acquire high-resolution aerial imagery for our 7,000-square-mile region. The project takes two years to plan, execute, and deliver the imagery, but it's worth the wait. The resulting data is four-band, leaf-off, snow-free and follows best-practice recommendations for positional accuracy standards suggested by the American Society for Photogrammetry and Remote Sensing.




[Read more about the benefits of DRAPP](#).

DRCOG held a kick-off meeting May 11. You can find the presentation and minutes on our website. Following this meeting, past project partners received quotes to participate. If you did not receive a quote and want one, please email me at asummers@drcog.org. We will be signing up project partners from now until the end of the year - but sooner is better if you want input into the specs!

## Your article goes **here**!

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The newsletter is published Jan. 15, April 15, July 15 and Oct. 15 (or the next business day afterward). Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org to contribute.

## Things you might have missed

- Three teams win big - Go Code Colorado 2017
- Colorado Senate Bill 17-040 passes (modifications to the Colorado Open Records Act regarding structured data)
- Colorado GIS Summit 2017 (P.S. Subscribe to the Office of Information Technology's YouTube Channel.)
- Walk and Talk with Colorado Chief Data Officer Jon Gottsegen
- Join us at our next Denver Regional Data Consortium meeting on July 27

## New and updated resources available in DRCOG's Regional Data Catalog

- 2015 ACS Five-Year Survey: Block Group Level Data, Colorado
- 2015 ACS Five-Year Survey: Tract Level Data, Colorado
- 2015 ACS Five-Year Survey: Place Level Data, Colorado
- 2015 ACS Five-Year Survey: County Level Data, Colorado
- Assisted Living Facilities
- Denver Region Municipalities 2017 (map)
- Municipal Boundaries 2017
- Nursing Homes

- Parks, Recreation and Open Space (The new incarnation of our old "Open Space" layer. Read about the new schema in our April newsletter.)
- Parks, Recreation and Open Space 2015
- Parks, Recreation and Open Space 2014
- Participating Governments (map)
- Planimetrics 2016
- Rapid Transit System 2040
- Regional Traffic Counts
- Regional Zoning 2016 (map)
- Regional Zoning 2016
- Schools Pre-kindergarten to College 2016
- Unincorporated Areas 2017

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact Ashley Summers, DRCOG information systems manager, at 303-480-6746 or asummers@drcog.org

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Try it free today

Dear Colleagues,

Please join us on **Thursday, July 27** from 10 to 11:45 a.m. in the Independence Pass Conference Room at our office, 1290 Broadway, for the second data consortium meeting of 2017.

- Agenda

**Can't attend in person?** No problem! Join the meeting from your computer, tablet or smartphone.

1. Register for the webinar at https://attendee.gotowebinar.com/register/5657599037014168066

2. Use your microphone and speakers (VoIP) —a headset is recommended. You can also dial in using your phone.

United States: 1-415-655-0060
Access code: 232-739-431

If you have any questions, please contact DRCOG Information Systems Manager Ashley Summers, at 303-480-6746 or asummers@drcog.org.

Thanks,
Ashley

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# DENVER REGIONAL DATA CONSORTIUM

# AGENDA

10 to 11:45 a.m.
Thursday, July 27, 2017
Denver Regional Council of Governments
1290 Broadway, Denver, CO 80203
Independence Pass Conference Room (first floor, west side)

Parking recommendations here

## Meeting Objective:

Promoting collaboration and information-sharing among GIS professionals in the region by featuring presentations and discussions led by members of the data consortium.

| | |
|---|---|
| **10:00 to 10:05 a.m.** | **Introductions**<br>Ashley Summers, DRCOG |
| **10:05 to 10:30 a.m.** | **Transitioning to ArcGIS Pro**<br>Dave Vaillancourt, Esri |
| **10:30 to 10:50 a.m.** | **GIS Enterprise Upgrade**<br>Doug Genzer and Bruce Reagan, City and County of Denver |
| **10:50 to 11:10 a.m.** | **Colorado Geoportal Project**<br>Philip B. White, University of Colorado Boulder |
| **11:10 to 11:35 a.m.** | **Conference Recaps – ICACI and Esri UC**<br>Christine Connally, DRCOG and Mike Garcia, Commerce City |
| **11:35 to 11:45 a.m.** | **Update on DRCOG Initiatives:**<br>Planimetrics 2016<br>Denver Regional Aerial Photography Project 2018<br>Reimagined: Regional Data Catalog and Denver Regional Visual Resources |

The data consortium consists of Denver Regional Council of Governments members and regional partners with an interest in geospatial data and collaboration. The data consortium newsletter improves communication among local GIS professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.

## In This Issue, April 2017


- The U.S. Census Bureau's geocoding services
- DRCOG's new Parks, Recreation and Open Space layer
- Denver Regional Visual Resources news
- Denver Regional Aerial Photography Project 2018
- Governor's Office of Information Technology launches new website
- FYI on federal bills H.R. 482 and S.B. 103
- Go Code Colorado announces finalists
- Your Article Goes **Here**!

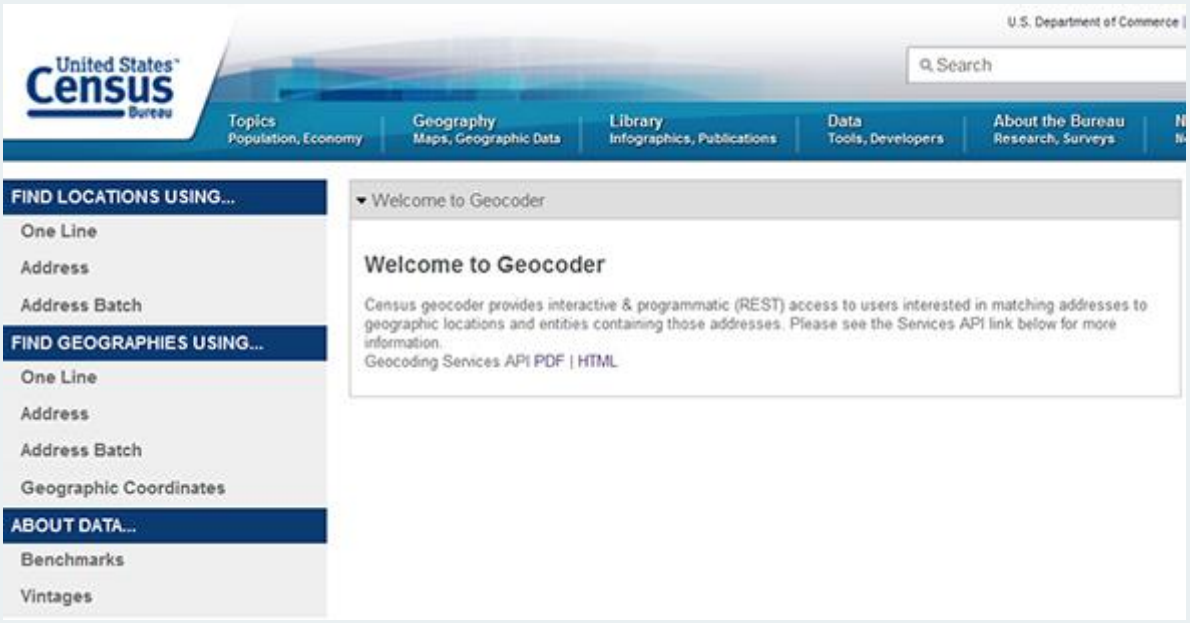

## The U.S. Census Bureau's geocoding services

*Article submitted by Jim Castagneri, geographer at the U.S. Census Bureau. Jim can be reached at 720-962-3882 or james.d.castagneri@census.gov.*

The U.S. Census Bureau has offered an online geocoding tool since 2014. Last summer the Census Bureau added an application program interface to provide additional functionality and customization for programmers. This service is intended for application developers who want to leverage the geocoding capability of the Topologically Integrated Geographic Encoding and Referencing (TIGER) system.

This service is designed for coding a provided address, or file of addresses, to a latitude/longitude coordinate based on data that has been loaded into the geocoding engine from a master address file/TIGER benchmark database. The optional inclusion of the geographic lookup (geoLookup) adds information to the result relating to various Census and political geographies that cover the latitude/longitude coordinate. GeoLookup results can also be obtained directly by searching on the latitude/longitude coordinates.

See the U.S. Census geocoder for full details.

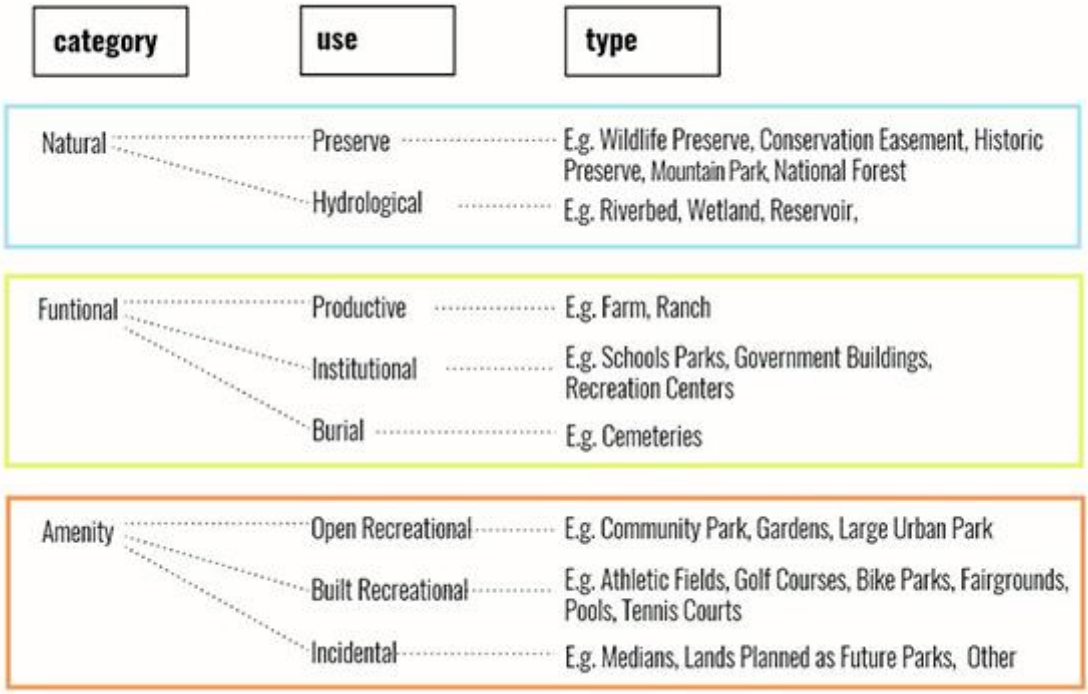



## DRCOG's new Parks, Recreation and Open Space layer

*Article submitted by Dorothy Friday, GIS specialist at DRCOG. Dorothy can be reached at 303-480-6797 or dfriday@drcog.org.*

DRCOG's Regional Planning and Development team has developed a new schema for the DRCOG Open Space dataset. Starting with the existing dataset, the team redefined the attributes to differentiate between open space, athletic fields, preserved lands, recreation centers and many other land uses. The new schema is illustrated in detail below, and the data can be found and explored as the Parks, Recreation, and Open Space (PROS) dataset on the regional data catalog in May.

"The PROS dataset is local data, described and attributed to help with local planning and operations," said DRCOG planner Andy Taylor. "Adding the ability to differentiate among the features from these local datasets in a clear and consistent way helps us, and others, to ask regional and cross-jurisdictional questions and understand regional trends."




**CITATION:** (These categories were derived using guidance from Carys Swanick, Nigel Dunnet, and Helen Wooley's "Nature, Role and Value of Green Space in Towns and Cities: An Overview," *Built Environment*, 2003; and Donna Erickson's *Metro Green: Connecting Open Space in North American Cities*, 2006.)

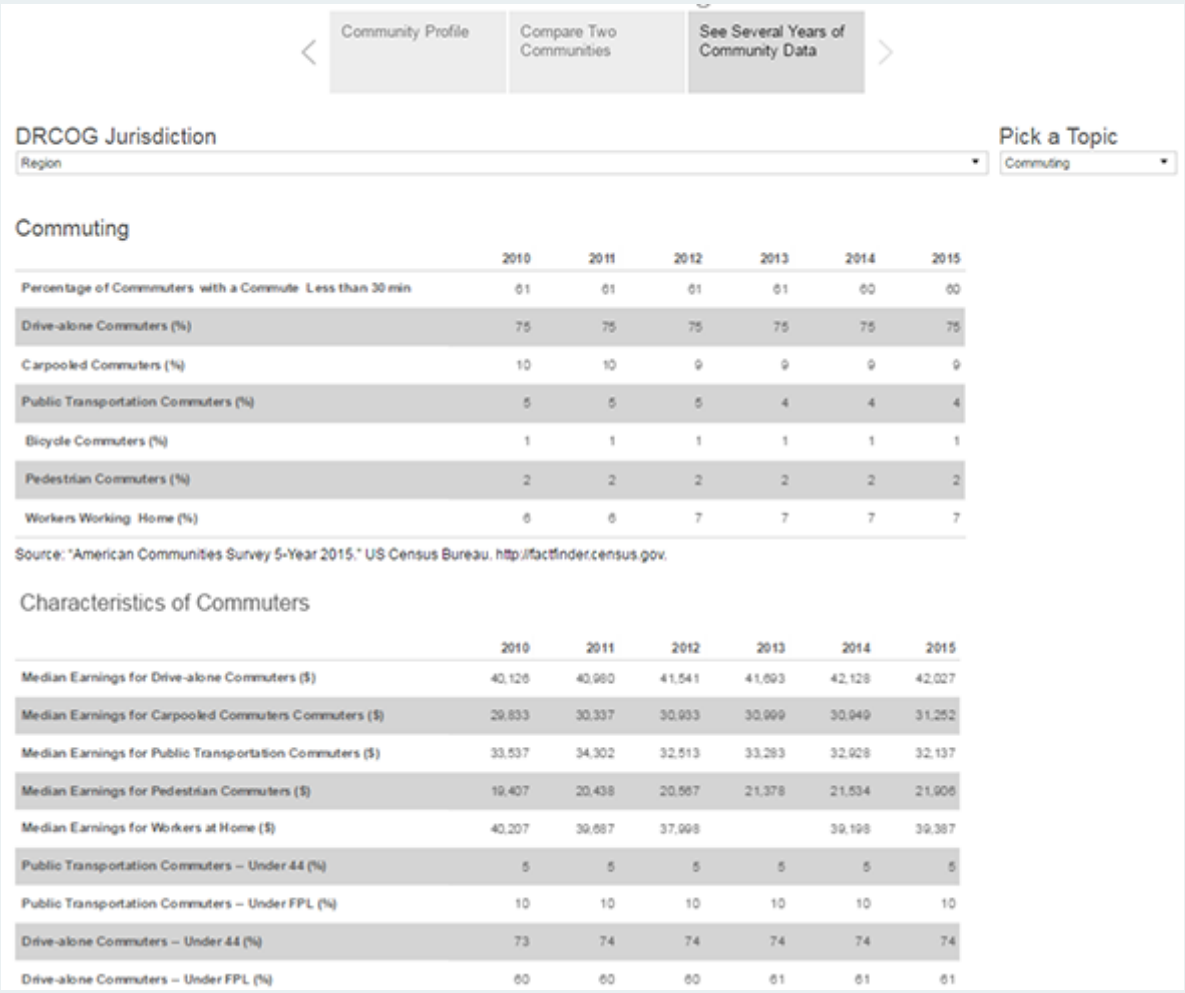
## Denver Regional Visual Resources news

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

DRCOG launched the Denver Regional Visual Resources (DRVR) site in October 2015. This relatively new feature on our website is a repository of infographics, web maps and data stories that explain the state of our region in an interactive and dynamic way. We've been slowly refining the site and its visualizations to better suit your needs and have more changes planned. In the meantime, we have two news items to share with you.

1. Much to our surprise, *Westword* named DRVR the "Best View of Denver by the Numbers." We're proud to be recognized and excited about the opportunity to share our visualizations with a larger audience in our region.

2. We've recently updated our Community Profiles visualization. Now you can explore several years of U.S. Census data for a community. Check it out!



Community Profile | Compare Two Communities | See Several Years of Community Data

DRCOG Jurisdiction

Region

Pick a Topic

Commuting

Commuting

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| Percentage of Commmuters with a Commute Less than 30 min | 61 | 61 | 61 | 61 | 60 | 60 |
| Drive-alone Commuters (%) | 75 | 75 | 75 | 75 | 75 | 75 |
| Carpooled Commuters (%) | 10 | 10 | 9 | 9 | 9 | 9 |
| Public Transportation Commuters (%) | 5 | 5 | 5 | 4 | 4 | 4 |
| Bicycle Commuters (%) | 1 | 1 | 1 | 1 | 1 | 1 |
| Pedestrian Commuters (%) | 2 | 2 | 2 | 2 | 2 | 2 |
| Workers Working Home (%) | 6 | 6 | 7 | 7 | 7 | 7 |

Source: "American Communities Survey 5-Year 2015." US Census Bureau. http://factfinder.census.gov.

Characteristics of Commuters

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| Median Earnings for Drive-alone Commuters ($) | 40,126 | 40,980 | 41,541 | 41,693 | 42,128 | 42,027 |
| Median Earnings for Carpooled Commuters Commuters ($) | 29,833 | 30,337 | 30,933 | 30,999 | 30,949 | 31,252 |
| Median Earnings for Public Transportation Commuters ($) | 33,537 | 34,302 | 32,513 | 33,293 | 32,928 | 32,137 |
| Median Earnings for Pedestrian Commuters ($) | 19,407 | 20,438 | 20,567 | 21,378 | 21,534 | 21,906 |
| Median Earnings for Workers at Home ($) | 40,207 | 39,687 | 37,998 | | 39,198 | 39,387 |
| Public Transportation Commuters – Under 44 (%) | 5 | 5 | 5 | 5 | 5 | 5 |
| Public Transportation Commuters – Under FPL (%) | 10 | 10 | 10 | 10 | 10 | 10 |
| Drive-alone Commuters – Under 44 (%) | 73 | 74 | 74 | 74 | 74 | 74 |
| Drive-alone Commuters – Under FPL (%) | 60 | 60 | 60 | 61 | 61 | 61 |

## Denver Regional Aerial Photography Project 2018

The Denver Regional Aerial Photography Project (DRAPP) 2018 starts next spring but it's never too early to start planning! DRCOG is currently working with the DRAPP steering committee and 2016 partners to evaluate and adjust project parameters.

For those who haven't participated before, here's a quick summary of DRAPP. In the spring and summer of every even-numbered year, DRCOG facilitates a project to acquire high-resolution aerial imagery for our 7,000-square-mile region. The project takes two years to plan, execute and deliver the imagery, but it's worth the wait. The resulting data is four-band, leaf-off, snow-free and meets strict positional accuracy standards set by the American Society for Photogrammetry and Remote Sensing. Check out the project extent to see where we acquired 3-inch, 6-inch, and 1-foot resolution imagery. Learn more about our 2016 project.

If you've been a project partner in the past or want to be one for the 2018 project, please let me know. You are invited to a kick-off meeting on May 11; watch for an official invitation to be emailed soon. If you don't already receive DRAPP emails and you want to be on the distribution list, please email me at asummers@drcog.org.

For more information on DRAPP, visit the DRCOG website.

## Governor's Office of Information Technology launches new website

*Article submitted by Windy Fischer, senior GIS analyst at the Governor's Office of Information Technology. Windy can be reached at 303-764-6842 or*

*windy.fischer@state.co.us*.

The GIS Coordination and Development Program of the Governor's Office for Information Technology (OIT) is pleased to announce the launch of its new GIS website and data explorer. The GIS website helps users discover GIS data while also providing a place for state agencies, county and municipal partners, and other stakeholders to find GIS support. The site provides a menu of services including enterprise data sets, data management, web application development, hosting and business support services. The program's primary goals are to help Coloradans find GIS data and to reduce the cost and labor of duplicating data-related projects within local and state agencies.

Key features of the new site include:

- Products and services offered by the GIS Coordination and Development Program (GCDP)
- Quick access to GIS data and applications, including:
  - Colorado Information Marketplace
  - OIT GCDP enterprise datasets, services and a public geocoder
  - GIS Data Explorer showing local data available
  - Colorado Broadband Map
  - GCDP-hosted applications (for example the Trustlands GIS App for the Colorado State Land Board)
- The OIT GCDP events calendar to view details of upcoming and previous events, previous event media, and status of GCDP's enterprise datasets
- Ability for state agencies and stakeholders (municipalities, counties and partners) to request services

## FYI on federal bills H.R. 482 and S.B. 103

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

H.R. 482 and S.B. 103 are federal companion bills that were introduced in mid-January and are currently referred to their respective financial services committees. The bills — both entitled "Local Zoning Decisions Protection Act of 2017" — begin with nullifying a U.S. Department of Housing and Urban Development rule that was published in 2015.

Notable is Section 3 which states, "Notwithstanding any other provision of law, no federal funds may be used to design, build, maintain, utilize, or provide access to a federal database of geospatial information on community racial disparities or disparities in access to affordable housing."

Several organizations have voiced their opposition to these bills, including the American Association of Geographers, the National Low Income Housing Coalition and many more. There is also a MoveOn.org petition seeking signatures.

## Go Code Colorado announces finalists

*Article submitted by Andrew Cole. Andrew can be reached at 303-869-4908 or andrew.cole@sos.state.co.us.*

On April 10, Go Code Colorado announced 10 finalist teams from Challenge Weekend, held in five cities across the state in early April.

Two teams from each of the five Challenge Weekend sites in Colorado Springs, Denver, Durango, Fort Collins and Grand Junction will next participate in Go Code Colorado's expenses-paid Mentorship Weekend.

Go Code Colorado, a program run by the Colorado Secretary of State, challenges entrepreneurs, software developers and innovators to build apps that deliver public data into the hands of business decision-makers.

"Each year, Go Code Colorado participation and enthusiasm increases across the state," said Wayne Williams, Colorado secretary of state. "The high-caliber app and business concepts created during challenge weekend will further encourage government entities of all sizes to make their data available to developers and entrepreneurs so its inherent value can be fully utilized."

More than 230 individuals participated in Challenge Weekend, building apps and business concepts with their teammates, coding and analyzing data. Finalist teams demonstrated ideas that demonstrated feasibility and attractiveness to the marketplace, used data to create value for business decision-makers, and set new standards in innovation for Colorado businesses.

Finalists within the Denver region were ersity, a hiring tool to help companies build diverse teams and Magpie Supply, a solution to solve transportation problems for farmers in Colorado.

The 10 finalist teams will meet again for Mentor Weekend April 21-23 in Boulder with Go Code Colorado partners Google, CA Technologies, Techstars, House of Genius and Boomtown to further develop their apps and businesses.

A May 24 final competition will take place at the Denver Performing Arts Center, during which a panel of judges will select three winning teams to receive a contract with the state that includes $25,000 per team.

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The Data Consortium consists of Denver Regional Council of Governments members and regional partners with an interest in geospatial data and collaboration. The Data Consortium newsletter improves communication among local GIS professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.

## In This Issue, January 2017


- U.S. Census Presents "Road to 2020"
- DRCOG's New Land Use Forecast and Land Use Explorer
- DRCOG's Denver Regional Aerial Photography Project Update
- DRCOG's Planimetric Project Update
- Did You Miss the Last DRDC Meeting?
- Your Article Goes **Here**!
- Publications
- New/Updated Resources Available in DRCOG's Regional Data Catalog


## U.S. Census Presents "Road to 2020"

*Article submitted by Angeles Ortega, partnership specialist for the 2020 Census, U.S. Census Bureau. Angeles can be reached at 720-962-3872 or angeles.ortega@census.gov.*

As of Jan. 1, there were only 1,186 days until Census Day 2020 (April 1). This census will require counting an increasingly diverse and growing population of around 330 million people in more than 140 million housing units.

The count is mandated by Article I, Section 2 of the Constitution and takes place every 10 years. The data collected determine the number of seats in the U.S. House of Representatives (apportionment) for each state and how to distribute billions in federal funds to local communities.

The U.S. Census Bureau is currently researching four areas representing the major cost drivers of the decennial census:

1. Using the internet to increase self-response.
2. Using existing government data sources to answer census questions and reduce follow-up workload.
3. Automating operations to increase productivity, reduce staff and reduce offices.
4. Using existing maps and addresses to reflect changes rather than walking every block in every neighborhood.

The decennial census requires years of research, planning and development to ensure an accurate and complete count.

The participation of local governments in our geography programs now is vital, because it allows us to correctly count your community's residents. Stay tuned for information from the U.S. Census and DRCOG regarding how to get involved.

For more information, visit the U.S. Census Bureau.

## DRCOG's New Land Use Forecast and Land Use Explorer

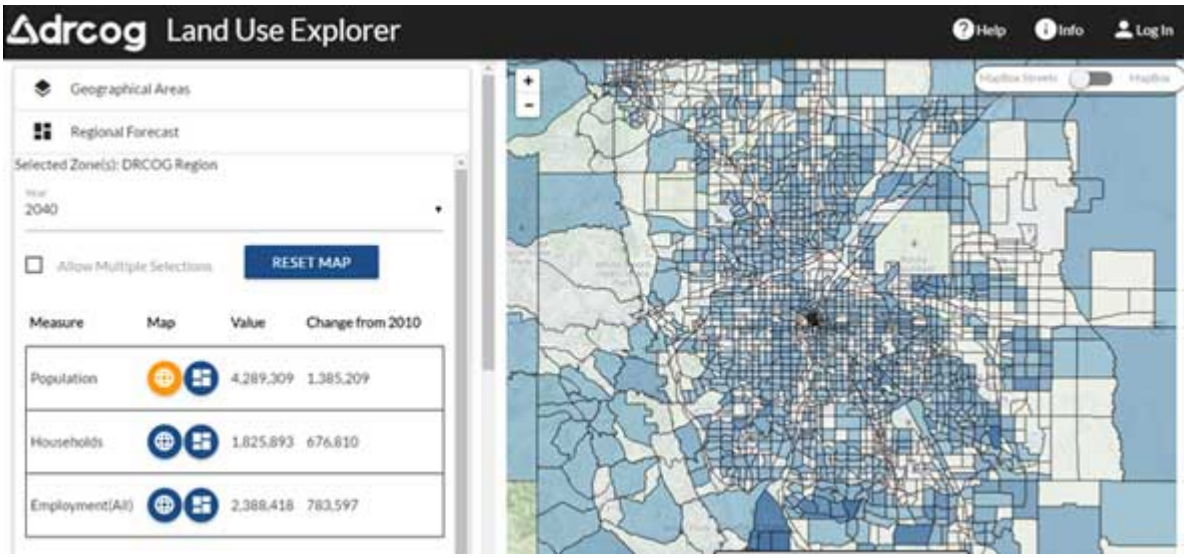
*Article submitted by Dan Jerrett, DRCOG chief economist, and Justin Martinez, DRCOG economist. Dan can be reached at 303-480-5644 or djerrett@drcog.org. Justin can be reached at 303-480-5637 or jmartinez@drcog.org.*

One of DRCOG's roles as a metropolitan planning organization is to make predictions about where people will live and work in the future, so services like transit and regulations like zoning can be planned to meet upcoming needs. This process starts with understanding the current environment and then uses assumptions about key variables and a sophisticated model to forecast future conditions.

DRCOG recently completed a new land use forecast for the nine-county region using UrbanSim, a new model. UrbanSim is a computational representation of metropolitan real estate markets interacting with transport markets. It models the choices made by households, businesses and real estate developers, including how those choices influence governmental policies and investments. The socioeconomic team at DRCOG worked with member jurisdictions to collect data on zoning and future build-out plans to better inform the forecasting process. The updated forecast produces a spatial allocation of households and employment to the horizon year of 2040.

To help visualize the data, DRCOG is launching a new web map that provides an interactive look into the most recent regional land use forecast. Through Land Use Explorer, users will be able to view population, household and employment forecasts for areas that interest them (for example, traffic analysis zones, municipalities, counties and urban centers). A unique feature of Land Use Explorer is that users will be able to aggregate forecast totals across custom regions of multiple traffic analysis zones, making it easier for planners to view population, household and employment forecasts that more closely match small area planning subregions. The Land Use Explorer will also promote collaboration with stakeholders in the DRCOG region by enabling them to provide feedback on the UrbanSim forecast through a commenting feature.

Look for it online soon!




## DRCOG's Denver Regional Aerial Photography Project Update

*Article submitted by Ashley Summers, GISP, PMP, DRCOG information systems manager. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

In the spring and summer of every even year, DRCOG facilitates a project to acquire high-resolution aerial imagery for our 7,000-square-mile region. The project takes two years to plan, execute and deliver the imagery, but it's worth the wait. The resulting data is four-band, leaf-off, snow-free and meets strict positional accuracy standards set by the American Society for Photogrammetry and Remote Sensing. Check out the project extent to see where we acquired 3-inch, 6-inch and 1-foot resolution imagery.

Imagery will be available for the public to purchase as a web map service or by the tile this spring from our resellers - Harris MapMart and Sanborn Map Company. Contact Tyler Rowse or Jason Caldwell, respectively, for quotes.

This effort is funded by 50 organizations including seven DRCOG counties, 30 DRCOG cities and towns and 13 regional partners. Project partners experience deep discounts on the data, receive data before it's available to the public and help determine acquisition specifications. If you'd like more information on how to become a partner on the upcoming 2018 project, contact Ashley Summers, DRAPP project manager at 303-480-6746 or asummers@drcog.org.

## DRCOG's Planimetric Project Update

*Article submitted by Ashley Summers, GISP, PMP, information systems manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

In June 2016, DRCOG wrapped up a large data acquisition project that produced detailed infrastructure information for the region. In partnership with 21 local and regional partners, we acquired information such as building outlines, sidewalks, parking lots and structures, and pavement information drawn through interpretation of aerial imagery. All data is available for free, public download from the Regional Data Catalog.

So far, the data has proved useful for a variety of applications, including pedestrian routing, building inventories, impervious surface analysis, creating emergency response plans, and sidewalk quality and availability studies.

DRCOG is coordinating an effort to keep this data up-to-date. Already 25 partners have expressed interest in funding updates and new data collection across the region. Work is expected to begin in the first quarter of this year and will use the 2016 DRAPP imagery as the source. Data is expected to be delivered in the third quarter of this year and will be made available via DRCOG's Regional Data Catalog.

Even with 25 partners, we do not yet have funding to update the entire area captured via the previous project. If you are concerned that your area of interest will not be covered and would like to contribute funding to acquire that area, please contact Ashley Summers, planimetric project manager at 303-480-6746 or asummers@drcog.org.

## Did You Miss the Last DRDC Meeting?

In November, the Denver Regional Data Consortium (DRDC) meeting featured updates from DRCOG, the U.S. Census Bureau, and Governor's Office of Information Technology. If you missed the meeting and you want to see what's on the horizon for these agencies, check out the presentation materials.

## Your Article Goes **Here**!

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The next newsletter goes out in April. Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org to contribute.

## Publications

- DRCOG GIS staff wrote an article that appeared in ESRI's *ArcUser* Fall 2016 issue! Read about how DRCOG's webmap cut costs on the planimetric project by allowing partners to do their own quality assurance/quality control in "Collaborative Quality Control Saves Money on Data Project."
- Local GIS guru Brian Timoney does a cool analysis on the "Geographic Patterns of Car Sharing in Denver."

## New and Updated Resources Available in DRCOG's Regional Data Catalog

- Transportation Management Areas and Organizations
- Assisted Living Facilities
- Nursing Homes
- Metro Vision 2040 Regional Roadway System (map)
- Metro Vision 2040 Fiscally Constrained Roadway Network (map)
- Mile High Compact Participants (map)

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact Ashley Summers, DRCOG information systems manager, at 303-480-6746 or asummers@drcog.org

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## In This Issue, October 2016


- National Renewable Energy Laboratory Uses DRCOG Building Roofprints to Estimate Energy Savings
- OpenColorado Upgrades the Data Catalog
- DRCOG Launches New Signal Timing Briefs Map
- Centennial Offers a Virtual Tour of Local Breweries
- Your Article Goes **Here**!
- New/Updated Resources Available in DRCOG's Regional Data Catalog


## National Renewable Energy Laboratory Uses DRCOG Building Roofprints to Estimate Energy Savings

*Article submitted by Dan Macumber, NREL commercial buildings engineer. Dan can be reached at Daniel.Macumber@nrel.gov.*

**Right: A NREL engineer views building data in 3D.**

Photo credit: Kenny Gruchalla, NREL

Researchers at the National Renewable Energy Laboratory in Golden have been generating city- and district-scale energy models based on public data sets including the new building roofprint data from DRCOG.

NREL's system combines data from multiple public data sources to create individual OpenStudio energy models for specific buildings. For cities with energy data transparency laws, actual energy use of buildings reported through the SEED platform can be used to calibrate the energy models to historic data. Once researchers create an energy model for a particular building they are able to estimate the energy savings of common energy efficiency measures. Doing this at a city scale allows cities and utilities to study the potential effects of energy efficiency programs as they seek to meet aggressive goals for energy and carbon savings. DRCOG's data set allows researchers to customize each building model to a unique building

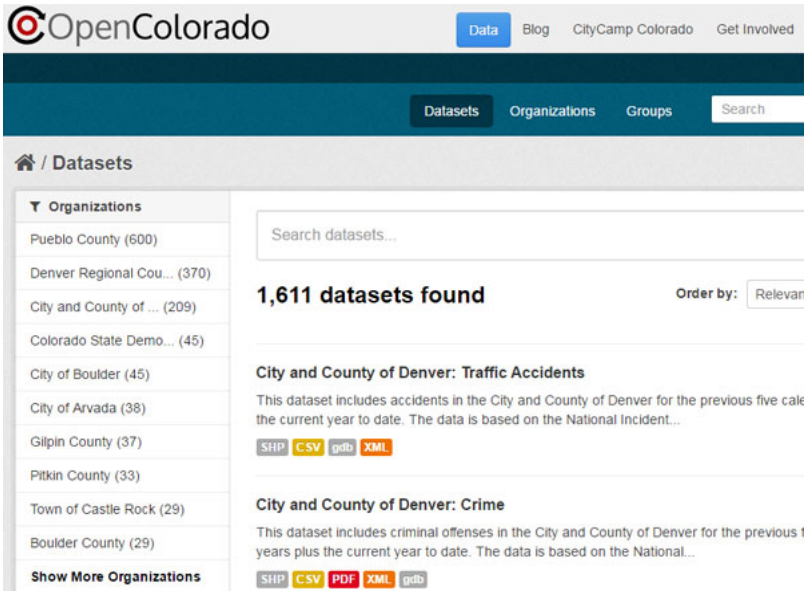
footprint, further reducing uncertainty in the model and improving its predictive capabilities.

Access to detailed public data, such as DRCOG's building roofprints, will enable NREL to provide more specific recommendations for cost effective energy efficiency upgrades. Public open data can provide a wealth of information and will help NREL improve energy use at a large scale.

## OpenColorado Upgrades the Data Catalog

*Article submitted by Scott Primeau, OpenColorado president. Scott can be reached at 303-877-0009 or scott.primeau@opencolorado.org.*

OpenColorado recently upgraded its data catalog to CKAN version 2.5.2, with the help of Xentity Corporation.




The upgrade brings several functional and performance improvements, such as:

- More built-in dataset previews;
- A more user-friendly look and feel;
- API access to datasets;
- The option to mark datasets as private or public;
- Improved dataset authorization under organizations; and
- Performance improvements.

OpenColorado is also planning more enhancements in the near future, including:

- Data catalog analytics;
- Enhanced dataset views; and
- Federating data with other data catalogs.

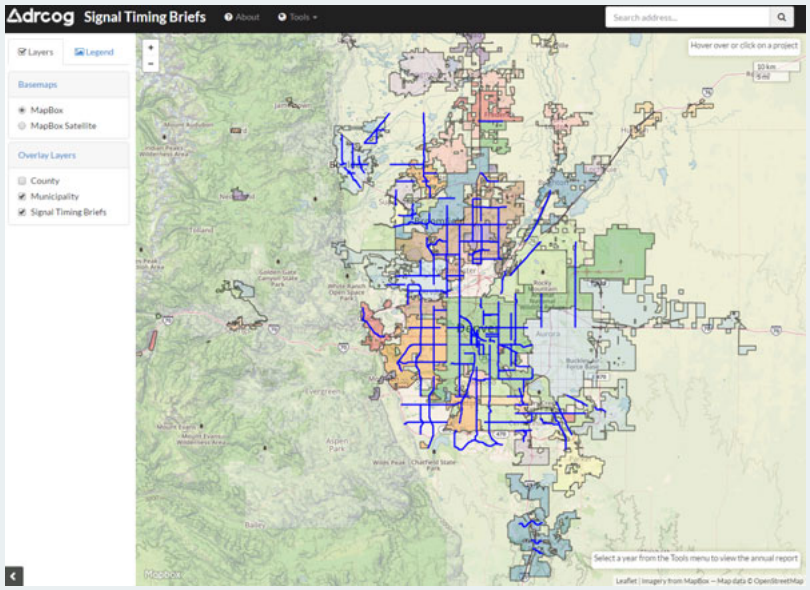
Scott Primeau, OpenColorado president, expressed appreciation to the catalog's data partners for their support and encouragement to continue to improve. Xentity Corporation provided pro bono development support for the upgrade, as well as several other improvements to the OpenColorado data platform. As OpenColorado works toward expanding the data catalog, it welcomes continued input and support from its data partners.

## DRCOG Launches New Traffic Signal Timing Briefs Map

*Article submitted by Jenny Todd, senior GIS specialist at DRCOG. Jenny can be reached at 303-480-6754 or jtodd@drcog.org.*

DRCOG's has unveiled a new web map related to traffic signal timing. Through its Transportation Operations Program, DRCOG staff works with member governments to develop and implement capital and signal timing coordination improvements, increasing the ability of jurisdiction staff to maintain reliable operations while decreasing delays at

signalized intersections across jurisdictions. The cooperative effort reduces traffic congestion, improves air quality, decreases fuel consumption and improves roadway operations efficiency.




Like DRCOG's other web maps, the Signal Timing Briefs map is built on an open-source stack. DRCOG uses a combination of JavaScript, Leaflet and Bootstrap to develop its maps. Recently, DRCOG has started using the D3 JavaScript library for additional flexibility and enhanced visualizations (the Signal Timing Briefs map uses D3 to draw and filter the GIS data).

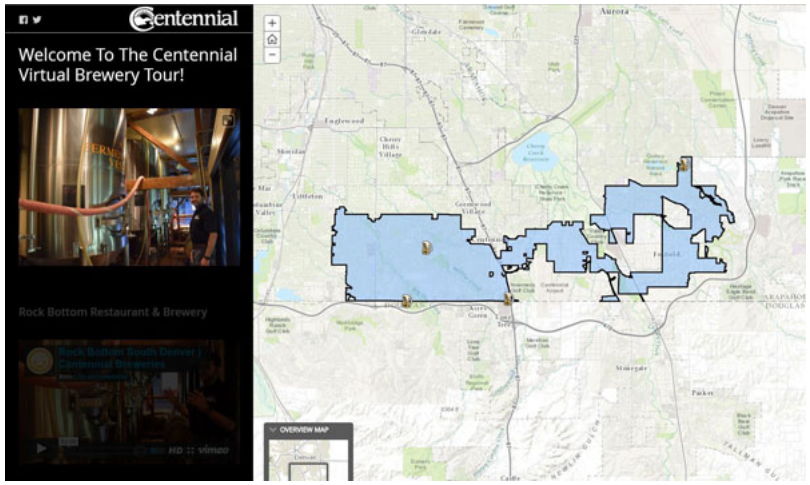
The Signal Timing Briefs map shows the projects completed during the last ten years. Users can find summary statistics for each project and link to the project's official timing brief. If a corridor has had multiple projects, users can view the brief for each year the project was conducted. Lastly, when users filter by project year, they can access an annual summary in the lower right-hand corner.

DRCOG staff appreciates comments and feedback on the Signal Timing Briefs map.

## Centennial Offers a Virtual Tour of Local Breweries

*Article submitted by Derek Stertz, GIS and data analytics supervisor at Centennial. Derek can be reached at 303-754-3445 or dstertz@centennialco.gov.*

There are five breweries in Centennial — with more to come — and the City of Centennial wanted to create an easy, interactive way for residents to discover what's in their own backyard.




The Centennial Virtual Brewery Tour, resulting from collaboration among the city's communications, Geographic Information Systems and economic development departments, takes residents and non-residents on a web-based journey through the breweries and introduces them to the people and ideas behind the local craft-beer industry.

Using an online mapping tool from Esri, the tour pinpoints the exact location of each brewery while displaying (on the same screen) recorded interviews with the brewmasters, behind-the-scenes photos and detailed narratives that provide a glimpse inside the arduous-but-rewarding world of beer-making.

Go to www.centennialco.gov, click on the "Things to Do" tab, then click on "Virtual Brewery Tour" under the "Places To Go" section. Cheers!

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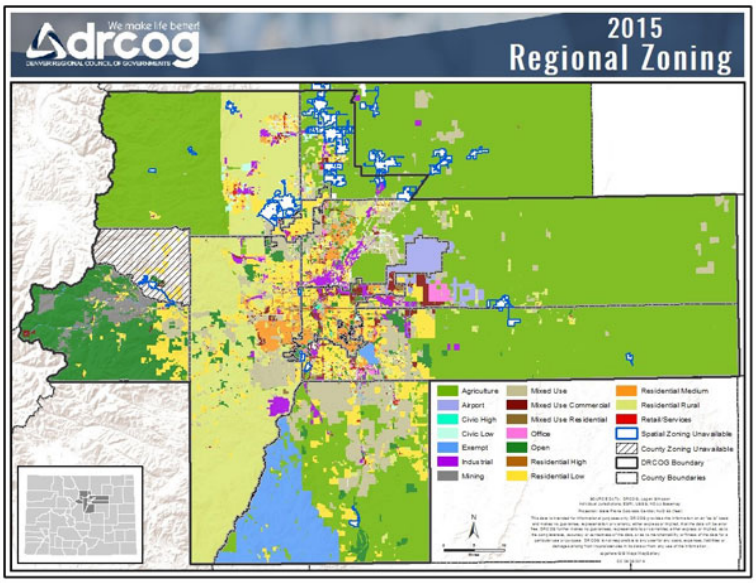
The next newsletter goes out in January. Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org by December to contribute.

## New/Updated Resources Available in DRCOG's Regional Data Catalog

Crash Data Points 2013
Open Space 2015
Open Space 2015 (map)
Employment Data 2005-2015
Municipal Boundaries 2016
Unincorporated Areas 2016
Regional Zoning 2015 – Check out our latest regional zoning data! It fills in previous gaps including Weld County, Frederick, Brighton, and Sheridan. More than 3,700 acres of zoning information has been added.
Regional Zoning 2015 (map)

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# DENVER REGIONAL DATA CONSORTIUM

## In This Issue, July 2016


**DRCOG Completes Regional Planimetric Data Project**
**DRCOG Data Used by GoCode Colorado Winners**
**GIS in the Rockies 2016**
**Your Article Goes Here!**
**New Resources Available in the Regional Data Catalog**


## DRCOG Completes Regional Planimetric Data Project

*Article submitted by Ashley Summers, GISP, PMP, DRCOG information systems manager (303-480-6746, asummers@drcog.org).*

The 2014 Regional Planimetric Project is officially finished! Data can be downloaded now from our Regional Data Catalog. This specialty data consists of information like building outlines, sidewalks, parking lots and structures, and pavement information drawn through interpretation of aerial imagery. Uses include pedestrian-routing, building inventories, impervious surface analysis, creating emergency response plans, and sidewalk quality and availability studies.

In April, partners that contributed to the project were honored at DRCOG's Annual Awards Celebration. Partners include:

| | | |
|---|---|---|
| City of Arvada | Denver Water | City of Lone Tree |
| City of Aurora | City of Englewood | City of Lakewood |

| | | |
|---|---|---|
| Town of Bennett | Town of Frederick | City of Louisville |
| Town of Castle Rock | City of Glendale | City of Northglenn |
| City of Centennial | Golden | Regional Transportation District |
| City of Commerce City | City of Greenwood Village | City of Thornton |
| City and County of Denver | City of Lafayette | City of Wheat Ridge |

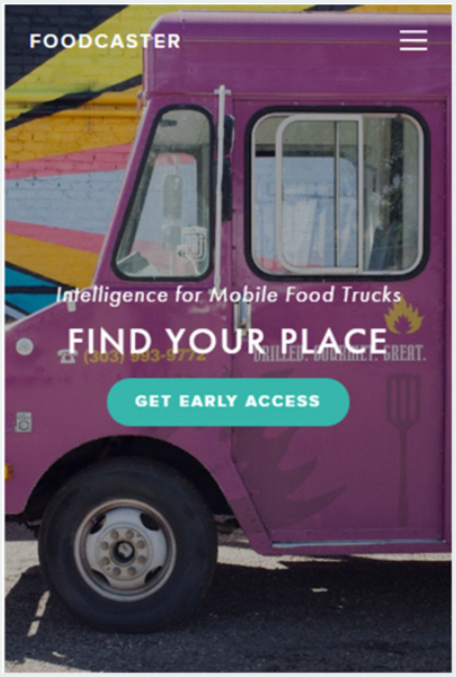
Now that the project is complete, we encourage local planners, researchers, entrepreneurs, private industry and others to apply this data in innovative ways. So DRCOG can better understand this project's return on investment, we ask users to contact us with feedback on the data and their experiences with it.

Even though we've just finished this project, it's already time to start thinking about updates. Based on the success stories we've heard so far, we understand this data to be very valuable. DRCOG would like to see this information kept updated and in sync with the aerial photography program which occurs on even-numbered years. We are tentatively planning a project update for 2017 (based on the 2016 imagery). This update will only be possible with contributions from the user community. Please email us if you are interested in contributing!

## DRCOG Data Used by GoCode Colorado Winners

*Article submitted by Margaret-Rose Spyker, GISP, LEED GA, GIS and data analyst at Xentity Corporation (269-806-1948 or mspyker.xentity@gmail.com) and Ashley Summers, GISP, PMP, information systems manager at DRCOG (303-480-6746 or asummers@drcog.org).*

GoCode Colorado is a program sponsored by the Business Intelligence Center in the Secretary of State's office and supported by two contractors: Xentity Corporation and LadyCoders Productions. The former works with government agencies to make quality datasets available in the state's open data portal: the Colorado Information Marketplace. The latter is fostering a developer community oriented towards building businesses through the use of public data.

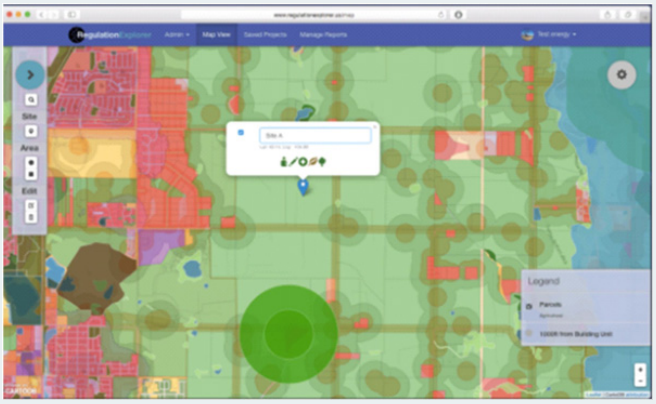



GoCode Colorado just finished its third annual app challenge in which teams competed to create apps that leverage data in the public domain. Ten finalist teams advanced from the first round of competition. During this process, GoCode Colorado partnered with many public data providers, and served as a data liaison, helping developers to better understand and use the data they needed to build insightful applications. Public entities contributed to this entrepreneurial endeavor by making data publicly available and machine-readable for the coding community.

Three of the 10 finalists were awarded $25,000 toward the development of a business around their app. Almost all of the ten finalist teams used DRCOG datasets. Two of the winning teams are described below:

Foodcaster helps food trucks find the best location to park by informing food truck owners

of parking regulations, foot traffic and other tips such as local events and activity through its mobile app. Foodcaster used public datasets showing bicycle and pedestrian foot traffic (to find concentrations of people), cellular service data (to ensure that mobile merchant systems can be used), parking regulations, Google Maps, Twitter social data and Facebook events. DRCOG data was also used: zoning (to quickly find commercial areas and places eligible for seasonal festivals) and planimetrics (to identify sites that can physically accommodate temporary parking of oversize vehicles near buildings).



Regulation Explorer helps oil and gas companies find the best locations by putting Colorado oil and gas regulations on the map in combination with environmentally and culturally sensitive areas. Regulation Explorer streamlines the permit process for energy companies, providing these companies with all of their options before they invest heavily in a well location. Datasets used include: community anchor institutions, roads, parks, county parcels and land management datasets. DRCOG data was also used, including: zoning, planimetrics, nursing homes and assisted living facilities.

This article is an excerpt from a Xentity blog.

## GIS in the Rockies 2016

GIS in the Rockies, the Rocky Mountain West's premier geospatial information and technology conference, returns to Denver Sept. 21 and 22, 2016.

**Conference highlights include:**

- **Two dynamic keynotes:**
    - Matt Sheehan, founder, principal and senior GIS developer at WebMapSolutions and blogger
    - Brian Timoney, owner of The Timoney Group and Colorado geospatial fixture
- **Pre-conference professional workshops (Tuesday, Sept. 20):** Stay on top of ever-changing technology
- **Career development academy:** Interview skills/resume-building workshop, mock interviews, career topic roundtables, university and GIS Society booths.
- **Great slate of exhibitors**
- **Post-conference tours (Friday, Sept. 23):** Boulder Emergency Operations Center, DigitalGlobe Headquarters, Denver International Airport Enterprise GIS Program
- **Conference social event:** Networking and GISITR geo quiz

See the full schedule of events (including sessions, poster session, GIS scavenger hunt and field data collection tools demonstration), learn more and register at GIS in the Rockies.

**July 26: GIS in the Rockies networking event**

Join the GIS in the Rockies Planning Committee for a geospatial networking meetup at 6 p.m., Tuesday, July 26 at Fado Irish Pub across from Coors Field. Food is provided at no charge courtesy of GIS in the Rockies. Network with geospatial professionals including conference keynoter Brian Timoney and learn more about GIS in the Rockies and the great events the conference has to offer.

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The next newsletter goes out in October. Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org by September to contribute.

## New Resources Available in the Regional Data Catalog

- Municipalities 2016 and map
- DRAPP project areas 2016
- Traffic analysis zone boundaries
- Bicycle facilities
- Regional traffic counts
- Final planimetrics data
- Regional aging population
- Strava Bike To Work Day Riders

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## In This Issue, April 2016


**West Meadows Metropolitan District Uses DRCOG's Planimetric Data**
**Start-up Uses DRCOG's Planimetric Data to Help the Visually Impaired**
**Regional Planimetric Project Update**
**Denver Water Uses DRCOG's Regional Zoning Data**
**DRVR Workshops and Training**
**Your Article Goes HERE!**
**New Resources Available in the Regional Data Catalog**


## West Meadows Metropolitan District Uses DRCOG's Planimetric Data

*Article submitted by Jim Castagneri, geographer at U.S Census Bureau (720-962-3882, James.D.Castagneri@census.gov).*

As a geographer with the U.S. Census Bureau, I spend my days working with geospatial data from a variety of sources. So when my role as secretary of the West Meadows Metropolitan District required map information about the infrastructure of the district and surrounding neighborhoods, I naturally turned to GIS. Unfortunately, until the recent release of planimetric data from DRCOG, I had little option but to hand-digitize much of what I needed. My requirements were not quite engineering-level data, but more detail than what public data (like TIGER) could provide. I was faced with hand digitizing sidewalks and road edges, greenways, and rights of ways. For a small district, this is not a huge task. You might wonder; why does a special district need such things?

Metropolitan districts in Colorado often provide municipal services for unincorporated areas that might normally be provided by a city. In our small district, we are responsible for all landscape maintenance and facility upkeep along the right of way for West Coal Mine Avenue. This includes landscaping, sidewalk concrete, street lights, path lighting, sprinkler lines, turf, trees, flower beds, and park benches. The board of directors is responsible for executing and managing annual contracts for maintenance services and repairs. Without an accurate map of the district, it is very difficult to keep track of resources and improvements that have been made. This is where planimetric data in a GIS will prove invaluable for the West Meadows Metropolitan District. We can now plan, monitor, and evaluate work in a more efficient manner. We can produce work orders and request for proposal that include accurate maps of the area in question. This leads to more concise work descriptions and more clearly defined contracts. We can analyze

distances, area measurements, and determine which housing units might be affected by trenching for water lines for example.

Creating such data in-house would be cost prohibitive for all but the largest districts. By providing open-source planimetric data to public, DRCOG has changed the face of managing special districts forever.

## Start-up Uses DRCOG's Planimetric Data to Help the Visually Impaired

*Article submitted by Sumanth Channabasappa, Co-founder and CTO at eyeBot (Sumanth.asap@gmail.com).*

At eyeBot LLC we are building solutions to help the blind and visually impaired solve a big everyday problem: How to safely navigate city streets and indoor areas. Challenges for blind and visually impaired people range from an absence of spatial awareness to, unfortunately, collisions with obstacles and vehicles. Just ask our colleague and CEO Mike Hess!

As a Colorado startup, we want our cities to lead the nation in enabling accessibility and welcoming blind and visually impaired users. To realize our initial mobile app based interface we needed local geographic data with more granularity than what Map providers were offering. We were recommended the DRCOG Planimetric data by friends who work for the City and County of Denver and the State of Colorado. This proved to be a fruitful suggestion. This data is now a part of our solution that provides spatial awareness.

We are in the process of testing and refining our solution with the help of BVI friends, and in early discussions about trials to make cities more accessible. As one can imagine our solutions have many uses beyond the blind and visually impaired community.

## DRCOG's Regional Planimetric Project Update

*Article submitted by Ashley Summers, GISP, DRCOG information systems manager (303-480-6746, asummers@drcog.org).*

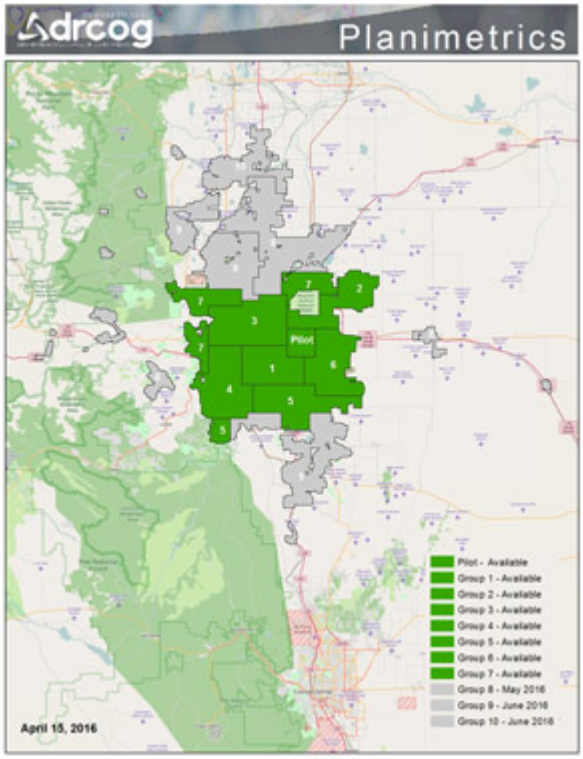
DRCOG is nearing the end of a giant project to procure detailed infrastructure data for the region. Currently eight of 11 sections of the region have been delivered and we are on schedule to finish mid-summer. Check out our progress on the map. Data can be downloaded now from our Regional Data Catalog.

DRCOG would like to thank the partners that contributed funding to the purchase of this data for the region. Without their participation, this project could not have happened.

"Their foresight to imagine the process improvements, innovative research, and entrepreneurship fostered by this data shows their commitment to regionalism." *— DRCOG Executive Director Jennifer Shaufele*

These partners will be recognized at DRCOG's Annual Awards dinner April 27:

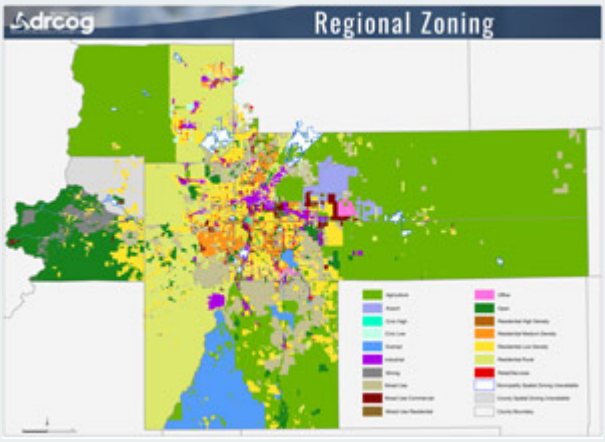
- Brian Davis - City of Arvada
- Bill Keever - City of Aurora
- Trish Stiles - Town of Bennett
- Jeff Caldwell - Town of Castle Rock
- Derek Stertz - City of Centennial
- Kirk Hayer - City of Commerce City
- Doug Genzer - City and County of Denver
- Robert Stansauk - Denver Water
- John Voboril - City of Englewood
- Cindy Kamigaki - Town of Frederick
- Kevin Brown - City of Glendale
- Kim Soulliere - City of Golden
- Jack Cornelius - City of Greenwood Village
- Roger Caruso - City of Lafayette
- Mike Demmon - City of Lone Tree
- Kevin Corzine - City of Lakewood
- Chris Neves - City of Louisville
- Travis Reynolds - City of Northglenn
- Dan Jackson - Regional Transportation District
- Deborah Wilson - City of Thornton
- Annabel Montoya - City of Wheat Ridge




## Denver Water Uses DRCOG's Regional Zoning Data

*Article submitted by Mitch Horrie at Denver Water (303-628-6703 or mitch.horrie@denverwater.org).*

Denver Water serves 1.3 million people in a service area that spans 336 square miles and includes the City and County of Denver and many surrounding suburbs. How the Denver metro region grows will influence the demand for water and we must be prepared to meet the water needs of our service area into the future.




Denver Water has long relied on DRCOG's demographic projections to generate water demand forecasts. More recently, we have been interested in integrating zoning information into our water demand forecast modeling. The regional zoning data provided by DRCOG is valuable in planning to meet the water needs of the future because it helps shed light on the opportunities and limitations for growth in our service area as we explore futures where population grows at varying rates and patterns.

Check out DRCOG's Regional Zoning Data and Map in the Regional Data Catalog.

## DRVR Workshops and Training

*Article submitted by Ashley Summers, GISP, DRCOG information systems manager (303-480-6746, asummers@drcog.org).*

DRCOG launched the new Denver Regional Visual Resources (DRVR) site in October 2015 and has spent the first quarter of 2016 on a roadshow to introduce it to planners, GIS professionals, community advocates, and media in the region.

We're hearing that the site is useful for grant writing, seeing local projects/programs in context, understanding trends for better planning, and for making presentations. Some of our workshop attendees said:

> "... the maps were visually appealing, and the data behind them is so robust." It will be useful "when assisting small business entrepreneurs and nonprofits needing info on demographics and statistical facts in the Denver metro area." — Denver Public Library
>
> "I'm thrilled to have the data accessible in one resource." — Local newspaper
>
> "This has the potential to be of great use to a number of city departments such as Community Development, City Manager's Office and Finance." -- Local GIS Coordinator

Learn more about DRVR through our handout and FAQs.

If you'd like for someone from DRCOG to reach out to your agency about DRVR, please us know. We are happy to show you around the site!

## Your Article Goes HERE!

The Data Consortium Newsletter is facilitated by DRCOG but is designed to be written by GIS professionals like you. This quarterly newsletter reaches more than 200 people and has a higher-than-average open rate. It's the perfect place to show off your projects, highlight your great work, and contribute ideas to the GIS community in the Denver Region.

The next newsletter goes out in July. Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org by June to contribute.

## New Resources Available in the Regional Data Catalog

- Planimetric Data - Areas 1 -7 now available for download
- Regional Zoning - Check out the map and the GIS data
- Legislative Profiles - Check out the PDFs and the interactive DRVR visualization
- Community Profiles - Check out the PDFs and the interactive DRVR visualization
- All new branding - Check out our updated Map Gallery

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact DRCOG Information Systems Manager Ashley Summers at 303-480-6746 or asummers@drcog.org

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## In this Issue, January 2016

**DRCOG Creates Regional Zoning Layer**
**Enhancing the OpenColorado Data Catalog**
**Your Article Goes Here!**
**Learn about DRVR at CAVEA**
**Mile High Data Day**
**DRCOG's Annual Data Request**
**Regional Planimetric Project Update**
**New Data Available in the Regional Data Catalog**
**Interesting Reading**

## DRCOG Creates Regional Zoning Layer

*Article submitted by Ashley Summers, GISP, DRCOG information systems manager (303-480-6746, asummers@drcog.org).*

DRCOG has been working on a regional zoning layer for many months and we're happy to report that we see a light at the end of the tunnel! Creating this layer is difficult because local zoning codes vary substantially across the region. Our goal is to create a regional classification in which local codes are nested.

Over the summer and fall of 2015, DRCOG worked with a consultant to mine data from all the available zoning codes in the region. We then crosswalked those codes to a regional code containing 17 categories and mapped the results using local spatial data. DRCOG then dissolved the data by the regional categories so local data at the parcel level is obscured.

This month local jurisdictions will get to preview the data before DRCOG makes it public in the spring via the Regional Data Catalog. A draft map is attached to illustrate the product.

DRCOG intends to create this regional dataset annually.

## Enhancing the OpenColorado Data Catalog

*Article submitted by Scott Primeau, president, OpenColorado (303-877-0009, scott.primeau@opencolorado.org)*

Xentity Corporation recently reached out to OpenColorado to offer pro bono technical and development support for data.opencolorado.org. With data.opencolorado.org running on CKAN, OpenColorado represented a good opportunity for Xentity to build its expertise with the open-source data platform.

Xentity also supports the State of Colorado's open data platform, data.colorado.gov, by curating, publishing and maintaining data in support of Go

Code Colorado.

Some of the recent improvements that Xentity has supported are:

- Resolving data upload problems;
- Building a backup and recovery process;
- Restoring the data catalog test site; and
- Upgrading the data catalog to CKAN version 2.3.1.

With these efforts, Xentity and OpenColorado are building needed infrastructure to upgrade and enhance the data catalog with the latest open data tools and capabilities.

For those who use the OpenColorado data catalog for publishing or accessing data, we invite you to review the test site at demo.opencolorado.org and provide feedback for improvement.

Enhancing the data catalog is one of OpenColorado's focus areas for building long-term stability for the organization and the data catalog. The pro bono support also allows OpenColorado to keep its costs low and continue making the data catalog free to use.

In previous years, OpenColorado was funded through corporate, government and nonprofit sponsorships. We would like to build a more sustainable funding model supported by OpenColorado's users.

We are seeking contributions from our data partners and others who use the data catalog. The OpenColorado data platform will remain free to use, and your contributions will help continue moving us forward.

OpenColorado's costs remain low, less than $200 per month, thanks to volunteer management and pro bono technical support. Even a small contribution will help. Please contribute here.

## Your Article Goes Here!

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The next newsletter goes out in April. To contribute, please contact Ashley Summers at 303-480-6746 or asummers@drcog.org by March.

## Learn about DRVR at CAVEA

Save the date! DRCOG will host a workshop featuring our newest website addition - Denver Regional Visual Resources (DRVR). This site provides interactive graphics and dynamic visualizations that explain key regional topics including economics, demographics, transportation and aging. The workshop will focus on what information is available and how it can be used at the local level.

Read more here and join us on the morning of **Feb. 17** at the Center for Advanced Visualization and Experiential Analysis (CAVEA) on the Metropolitan State University of Denver campus.

Due to space, participation is limited to 25 attendees, so register early. Laptops for exploring DRVR will be provided.

More information and a formal invitation will follow shortly  If you have questions or comments, please contact Ashley Summers at 303-480-6746 or asummers@drcog.org.

**Register Now!**

## Mile High Data Day

In today's open-data culture, we have the ability to use data to tell stories, collaborate across organizations and make data-informed decisions that have the power to improve lives.

The Piton Foundation's Data Initiative, Open Colorado, Denver Regional Council of Governments, University of Colorado Denver, and Mile High Connects invite you to learn how to combine these elements and use open data to drive social change at the first-annual Mile High Data Day **Feb. 19** at the University of Colorado Denver.  Join the Denver metro region's data community as we share best practices and strengthen our region's data culture.

Mile High Data Day attendees will have the opportunity to:

- Build relationships, share best practices and learn from experts.
- Strengthen partnerships between social-change and data organizations.
- Create a vision for a network focused on using data to support community change.

Mile High Data Day will include keynote speaker Steve Spiker, panels and interactive breakout sessions. Visit The Piton Foundation's website for more information or register online.

## DRCOG's Annual Data Request

*Article submitted by Ashley Summers, GISP, DRCOG information systems manager (303-480-6746, asummers@drcog.org).*

Earlier this week, DRCOG reached out to local jurisdictions to ask for spatial data. Our 2016 request consists of the following datasets:

- Open space
- Zoning
- Bikes and Trails
- County and Municipal Boundaries
- Parcels

- Buildings/Addresses
- Districts and Authorities
- Building Permits
- Subdivisions → **New this year!**

Information on each of these items was provided in the request, including the specific attribution we need and why these layers are important to DRCOG.

Additionally, DRCOG serves as an intermediary data manager between local and state government. The State Office of Information Technology (OIT) is interested in additional datasets. Local jurisdictions may respond to them directly or they can use the DRCOG Data Portal as the means of responding to both DRCOG and state requests. For convenience, DRCOG staff will pass data of state interest along to OIT.

Please let us know if you didn't receive the official request and feel free to contact us with questions or concerns.

## DRCOG's Regional Planimetric Project Update

*Article submitted by Ashley Summers, GISP, DRCOG information systems manager (303-480-6746, asummers@drcog.org).*

DRCOG's Regional Planimetric Project is moving along on schedule! The goal is to purchase detailed infrastructure information for more than 1,000 square miles of urbanized area in the Denver Metro Region. To date, four out of 11 areas have been completed and made available for public download on the Regional Data Catalog. Check out a map of the progress.

All datasets from the project are being put immediately in the public domain to foster innovative research and entrepreneurship in our communities. Already this data is being investigated for pedestrian-routing, building inventories, mobile apps to aid the visually impaired, impervious surface analysis, and sidewalk quality/availability studies.

Available datasets include: Building Roofprints, Trails, Ramps, Centerline Sidewalks, Pavement Lines, Pavement Polygons, Parking and (for a smaller geography) Polygon Sidewalks,  Driveways, Water Bodies, River Lines and River Polygons.

All data has been digitized from the 2014 Denver Regional Aerial Photography Project (DRAPP) imagery. This project is funded by DRCOG in partnership with 20-plus local and regional partners.

## New Data Available in the Regional Data Catalog

Higher Education

Schools Pre-K to 12th Grade

Planimetric Data

## Interesting Reading

- Broomfield's Open Data Portal in ArcGIS
- Colorado GIS Tactical Plan
- Colorado LIDAR Plan

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact DRCOG Information Systems Manager Ashley Summers at 303-480-6746 or asummers@drcog.org

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October 15, 2015

## In this Issue

DRCOG Launches Denver Regional Visual Resources (DRVR) Site
Participate in the 2016 Denver Regional Aerial Photography Project (DRAPP)
Celebrate GIS Day with the City and County of Denver
Save the Date - Mile High Data Day
Planimetrics Data Available Now
Your Article Goes HERE!
New Data in the Regional Data Catalog
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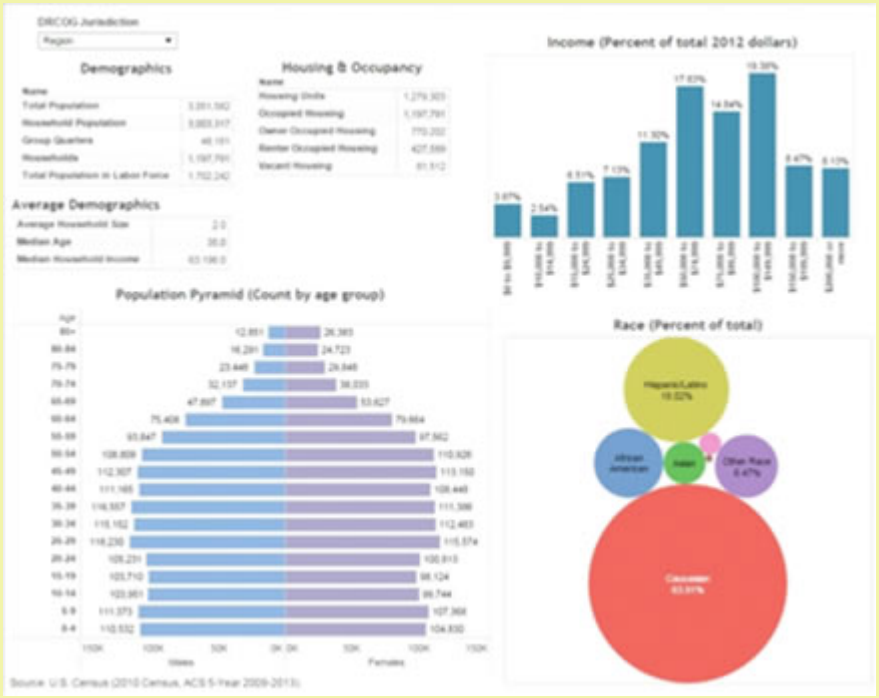
*The Data Consortium consists of DRCOG members and regional partners with an interest in geospatial data and collaboration. The Data Consortium Newsletter is designed to improve communication among local GIS professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

## DRCOG Launches Denver Regional Visual Resources (DRVR) Site

***Article submitted by Ashley Summers, GISP, Information Systems Manager and DRVR Project Manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.***

In early October, DRCOG launched a new online tool called Denver Regional Visual Resources (DRVR). DRVR is a repository of data-driven stories and infographics

that explain the state of our region, focusing on transportation issues, employment and population trends, land use, and aging. These resources are meant to explain issues quickly and clearly, to provide a basis for discussion, and to inform decision-making.




DRVR is a public tool meant for a wide audience. Our goal is to empower anyone with an interest in local and regional planning topics - from local officials, to community and advocacy groups, to the public. It provides regional context and local insight on key topics supports data-driven decision making by showcasing important data topics in a compelling way.

Learn more here and check it out for yourself at https://drcog.org/DRVR.

## Participate in the 2016 Denver Regional Aerial Photography Project (DRAPP)

***Article submitted by Ashley Summers, GISP, Information Systems Manager and DRAPP Project Manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.***

Every two years, DRCOG facilitates the Denver Regional Aerial Photography Project to acquire high- resolution imagery for the entire Denver region. Planning is currently underway for the 2016 project.

Recently the DRCOG board approved the DRAPP selection committee's

recommendation of the **Sanborn Map Company, Inc**. as the 2016 imagery acquisition vendor. Contracting has begun and project requirements are being finalized.

DRCOG also recently received bids for an independent quality control vendor. This vendor will make sure that every tile across our 7,000 square-mile region is checked and approved. Vendor interviews will be performed in mid-October and a decision will be made shortly thereafter.

DRCOG will begin signing up partners for the 2016 project in early November. **If you are interested in participating, please contact Ashley Summers at asummers@drcog.org.**

## Celebrate GIS Day with the City and County of Denver

Autumn is in the air and this can only mean one thing: GIS Day is right around the corner! This year's event will take place in the Wellington Webb Bldg Atrium (201 W Colfax Ave) on Wednesday, **Nov. 18 from 10 a.m. - 2 p.m**. The event will showcase a wide range of GIS products, tools and applications from Denver's GIS community. Additionally, there will be a map gallery, interactive map displays, live music performances, presentations, cake and prizes!

## Save the Date - Mile High Data Day

In today's open data culture, we have the ability to use data to tell stories, collaborate across organizations, and make data-informed decisions that have the power to improve the lives of others. The Piton Foundation's Data Initiative invites you to learn how to combine these elements and use open data to drive social change at the first annual Mile High Data Day, which is happening on **February 19, 2016** at the University of Colorado Denver.

Join Denver's data community as we share best practices and strengthen our region's data culture. Mile High Data Day 2016 will include speakers, panels and interactive breakout sessions. More details will be available soon, but we hope you will plan on attending!

## Planimetrics Data Available Now

***Article submitted by Ashley Summers, GISP, Information Systems Manager and DRAPP Project Manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.***

The Denver Regional Planimetrics Project is starting to produce data! To date, 280+ square miles of coverage has been delivered to DRCOG. DRCOG and its regional partners are performing quality control checks on the data and working with the vendor to finalize the deliveries. The pilot data - a 25 square mile area - is completely done and is available for you to download from our Regional Data Catalog.

The data includes building footprints, edge of pavement, parking lots, trails and sidewalks. All data will be public domain and will be made available for download from DRCOG's Regional Data Catalog as it is completed.

## Your Article Goes HERE!

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The next newsletter goes out in January. Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org by December to contribute.

## New Data in the Regional Data Catalog

- Open Space 2014
- Planimetrics Data
- 2012 & 2013 Census Bureau's Longitudinal Employment Household Data

## Contact Us

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact DRCOG Information Systems Manager Ashley Summers at 303-480-6746 or asummers@drcog.org

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July 20, 2015

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## Urban Growth Boundary/Area Updates

***Article submitted by Andy Taylor, AICP, Senior Planner at DRCOG. Andy can be reached at ataylor@drcog.org or 303-480-5636***

Since the adoption of Metro Vision 2020 in 1997, the Urban Growth Boundary/Area, or UGB/A, has tracked the region's growth and development. The UGB/A reflects a bottom-up approach to growth management that relies heavily on voluntary collaboration among communities.

The UGB/A includes areas that are 1) currently urban, or 2) anticipated by local communities to be urban in the future. DRCOG relies on local data and input to identify both.

To identify what is currently urban, local data is run through DRCOG Board-adopted mapping rules. DRCOG staff are looking for local GIS staff and planners who are willing to provide feedback on this process later this year. Please contact Jenny Todd (jtodd@drcog.org) if you would like to participate.

Identifying areas for future urban development is the domain of our local governments. Local governments request UGB/A from the DRCOG Board to cover these areas based on local knowledge and plans. The Board has deferred discussions of UGB/A while it attends to updates to the Metro Vision plan. Based

on the anticipated schedule for adopting Metro Vision, DRCOG staff believes communities would be invited to submit requests for UGB/A late in 2015 or the first quarter of 2016.

Much has changed at the local level since the last cycle of UGB/A requests in 2009. Feel free to contact Andy Taylor (ataylor@drcog.org) with any questions or comments. Over the next few months DRCOG staff will be reaching out to local communities to learn more about their experiences managing their UGB/A. Please be on the lookout for opportunities to provide feedback.

## DRAPP 2016 Planning is Underway

***Article provided by Ashley Summers, Information Systems Manager, DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.***

Every two years, DRCOG facilitates the Denver Regional Aerial Photography Project to acquire high-resolution imagery for the entire Denver region. Planning is currently underway for the 2016 project. In March, DRCOG released an RFP for Aerial Imagery Acquisition and Processing. The vendor bids were evaluated, and the top four vendors were interviewed by the selection committee. The committee is made up of partners that volunteered to be part of this critical process and includes representatives from Commerce City, Douglas County, Denver Water, Weld County, Lone Tree, Greenwood Village, Westminster, Denver, Arapahoe County, Wheat Ridge, Castle Rock, Adams County, and Jefferson County. All potential partners have been asked to participate in the planning process by filling out a requirements survey for the 2016 product. Results show that the product in 2016 needs to be similar to previous products, so we will be contracting for 4-band orthoimagery at 3-inch, 6-inch, and 1-foot resolutions.

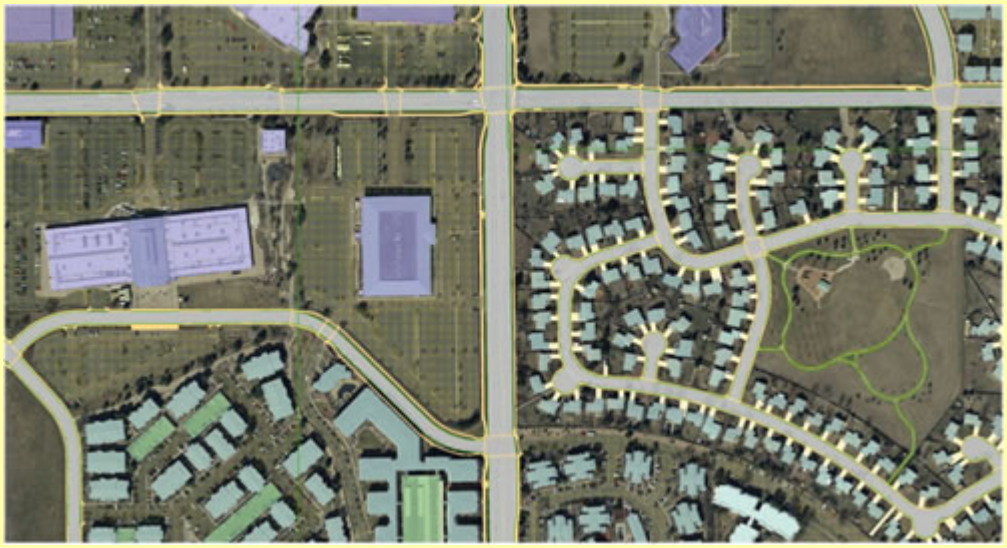
Our next step is to release an RFP for an independent quality control vendor. This is necessary to make sure that every tile across our 7,000 square mile region is checked and approved.

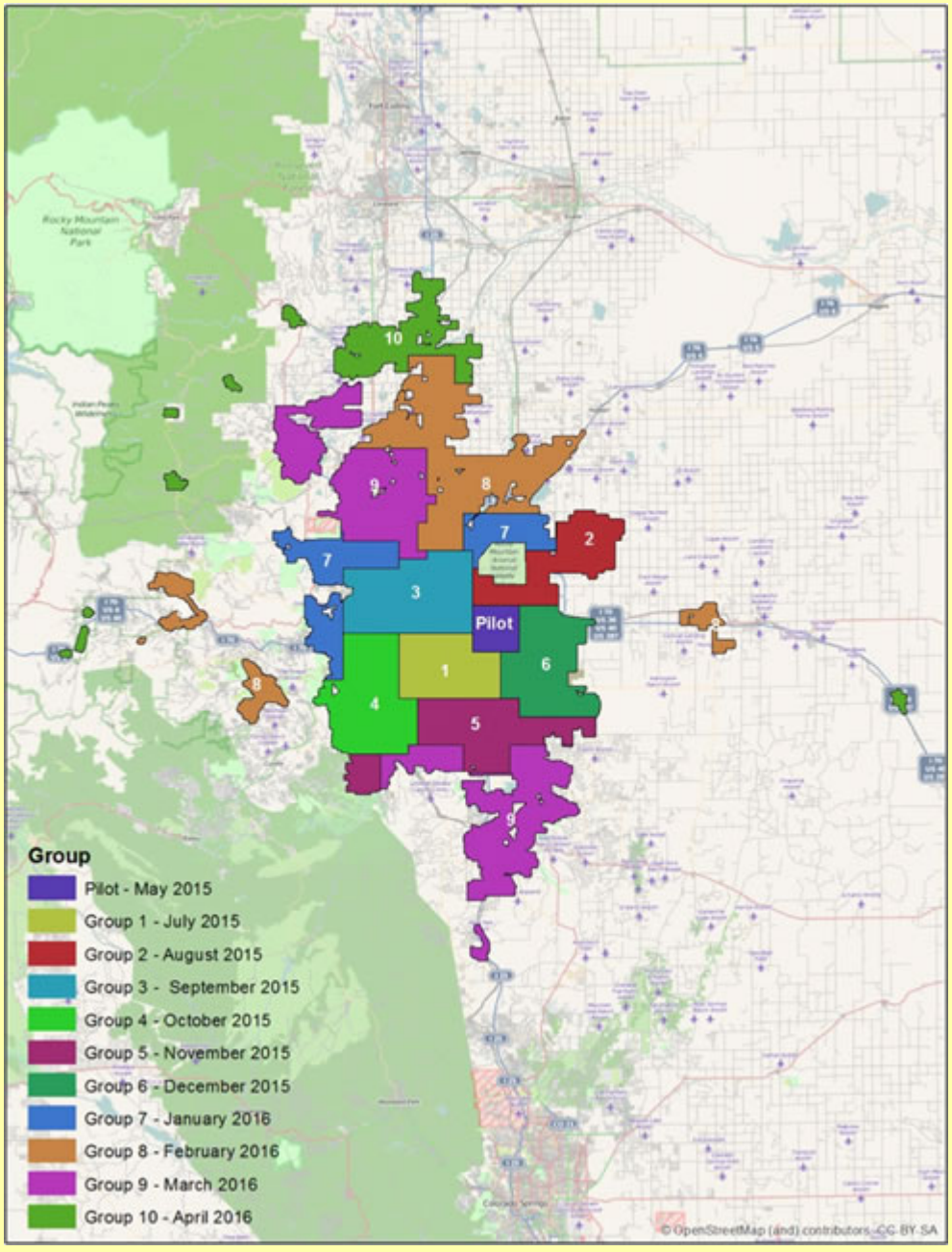
In the fall of 2015, DRCOG will begin officially signing up partners for the 2016 project. If you are interested in participating, please contact Ashley Summers at asummers@drcog.org.

## Sneak Peek at Planimetrics Data!

***Article provided by Ashley Summers, Information Systems Manager, DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.***

The Denver Regional Planimetrics Project is starting to produce data! A 25 square-mile pilot has already been delivered and QAQC'ed by regional partners. The vendor is scheduled to deliver a 70 square-mile area at the end of July. This data includes building footprints, edge of pavement, parking lots, trails and sidewalks. All data will be public domain and made available for download from DRCOG's Regional Data Catalog as it is completed. Please see attached for the delivery map.




Rocky Mountain National Park
10
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Pilot
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5
9
8
Group
Pilot - May 2015
Group 1 - July 2015
Group 2 - August 2015
Group 3 - September 2015
Group 4 - October 2015
Group 5 - November 2015
Group 6 - December 2015
Group 7 - January 2016
Group 8 - February 2016
Group 9 - March 2016
Group 10 - April 2016
© OpenStreetMap (and) contributors, CC-BY-SA

## Using InfoGroup Data at the City and County of Denver

***Article submitted by Doug Genzer, GISP, GIS Data Administrator at the City and County of Denver. Doug can be reached at Douglas.Genzer@denvergov.org or 720-913-4839.***

The City and County of Denver has used Infogroup data since 2012 and will be participating in DRCOG's regional funding of the data for 2016. The data are used by various agencies including; Office of Economic Development, Community Planning and Development, Office of Emergency Management, and Technology Services GIS.

The data has been processed into a GIS layer, and is used mostly as general reference layers for businesses data. The data has both NAICS and PRMSIC codes, with text descriptions for each, which allows for specific categories of businesses to be queried out.

Some examples of how the City has used the data:

- Mapping places of worship for the Gang Taskforce
- Mapping drug and alcohol treatment facilities for marijuana analysis
- As a source of daytime and nighttime employment data for emergency management
- Identify employment centers (density of number of employees and number of businesses)
- Targeting for business outreach for retention, expansion and attraction efforts
- Supplement information about the local business environment for the Office of Economic Development's Strategic Lending group
- Understand neighborhood dynamics including business types and sizes
- Analyze locations of employment density in relation to transit
- Identify geographic clusters of businesses in a certain industry group

The data does have its limitations, which includes some data being geocoded to parcel centroids, completeness, and the fact that the data is a snapshot in time. Despite these caveats, the data allows the organization to hit the ground

## New Douglas County, CO GIS Open Data Site

***Article provided by Joel Hanson, GIS Services Manager, Douglas County. Contact him at 303-663-6285 or jhanson@douglas.co.us***

The Douglas County GIS Services Team is happy to announce our new GIS Open Data site for your use: access the site from the following link: http://gis.dougco.opendata.arcgis.com

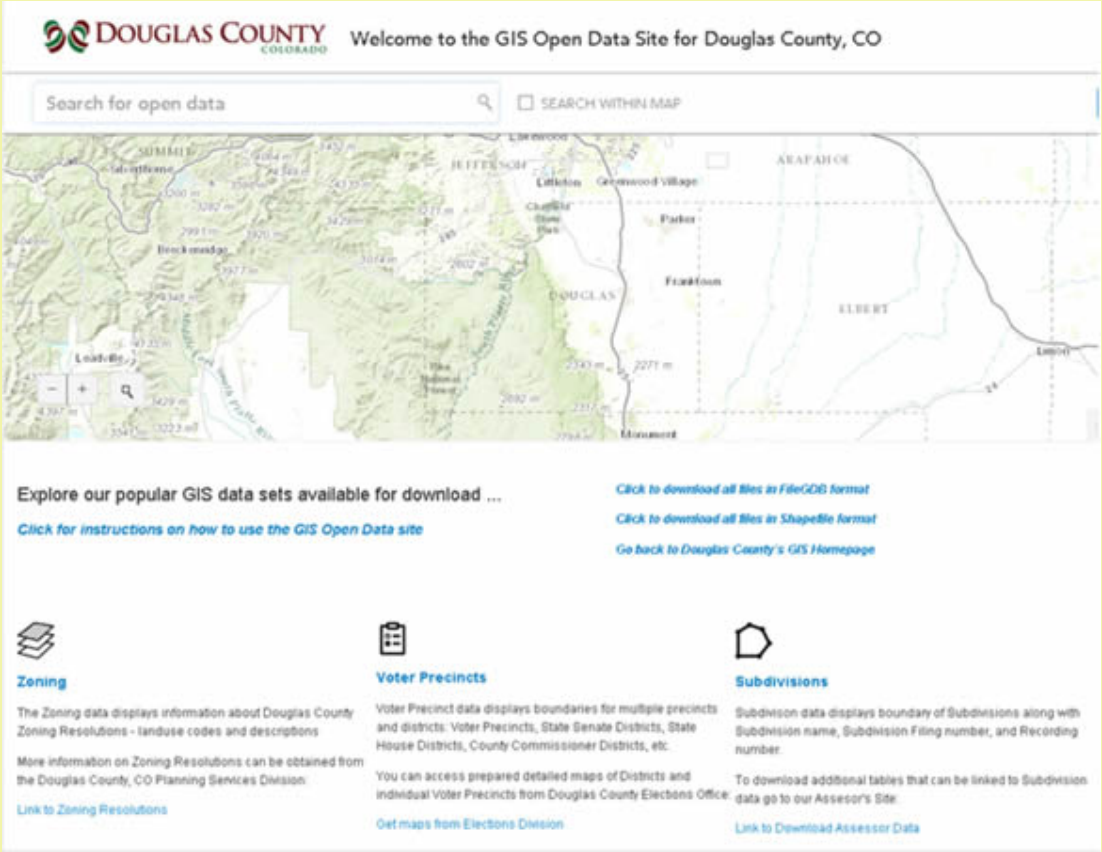
The new Douglas County GIS Open Data site replaces our old "Data Disk" and was built using our ArcGIS Server and ArcGIS Online infrastructure with hope of aiding the community of GIS professionals. The ArcGIS REST services that feed this site are updated on a monthly basis, and you can link to other sites within Douglas County (and beyond) to retrieve non-spatial data from our Assessor's Office, Clerk and Recorder, Department of Community Development, NOAA, and more. As this site is hosted on ArcGIS Online, we have enabled some "beta" functionality to see how the site performs in providing abilities to preview and analyze the GIS data sets before you decide to download as a spreadsheet, KML, SHP, GeoJSON feed, zipped fGDBs, zipped SHPs, or link directly to the data in your ArcGIS Online web map. Also, the entire site can become a JSON-GeoJSON feed if you are willing to search the web on how to do that.

So, if any of you are looking for free GIS data for purposes of your work, play, or academics I invite you to check out this site to gather data that can assist your

needs. We no longer require signed data agreements for the standard GIS data provided on this site. If you are interested in custom data, hourly rates will apply to that request. Custom data requests can be made via instructions and documents that you can find on our home page:
http://www.douglas.co.us/government/departments/gis/data-products/

In closing, I invite you to feel free to check out this site and explore our GIS data offerings. If you have comments or questions, feel free to contact us via the link provided at the bottom of the Douglas County GIS Open Data homepage.

http://gis.dougco.opendata.arcgis.com




## GIS Coordination Efforts at OIT

***Article provided by Jon Gottsegen, State GIS Coordinator. Jon can be reached at jon.gottsegen@state.co.us or 303-764-7712.***

The State of Colorado is furthering GIS coordination through funding of additional coordination staff and operations. This support was motivated, in part, by the need to coordinate data after the September 2013 floods. One immediate action by the Office of Information Technology's (OIT) GIS Coordination and Development Program to act on this support was a GIS Data Coordination Summit held in May.

The Summit, held at the Colorado History Center, was attended by approximately 80 participants from local, regional, state and federal agencies, including DRCOG and several of DRCOG's member jurisdictions. The purpose was to provide actionable feedback regarding the objectives and specific data on which state GIS coordination should focus. The attendees helped to identify the lines of business that deserve the most attention in relation to geographic data and the most critical data sets for those lines of business. The top five lines of business according to the participants were emergency management, transportation, law enforcement, economic development and information technology. Natural resource management, specifically water, was close to this top five as well. The critical data

sets included roads, addresses, parcels, high resolution imagery, statewide imagery (i.e., National Agricultural Imagery Program (NAIP)), and railroads. From this input OIT has developed a tactical plan for coordination over this fiscal year.

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The next newsletter goes out in October. Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org by September to contribute.

## New Data in the Regional Data Catalog

- 2015 Muni Boundaries
- 2011 & 2012 Crash Data
- 2040 Metro Vision Road Network
- TIP Polygons 2016-2021
- TIP Lines 2016-2021

Also, check out our updated TIP Webmap:
http://gis.drcog.org/tip-projects-map

## Contact Us

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact DRCOG Information Systems Manager Ashley Summers at 303-480-6746 or asummers@drcog.org

***Disclaimer:*** The information provided in this newsletter is compiled from multiple sources and is intended for informational purposes only. DRCOG assumes no responsibility or legal liability for the accuracy, completeness or usefulness of any information in this newsletter.

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April 15, 2015

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*The Data Consortium consists of DRCOG members and regional partners with an interest in geospatial data and collaboration. The Data Consortium Newsletter is designed to improve communication among local GIS professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

## DRCOG Starts Work on a Regional Zoning Map

***Article provided by Ashley Summers, Information Systems Manager, DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.***

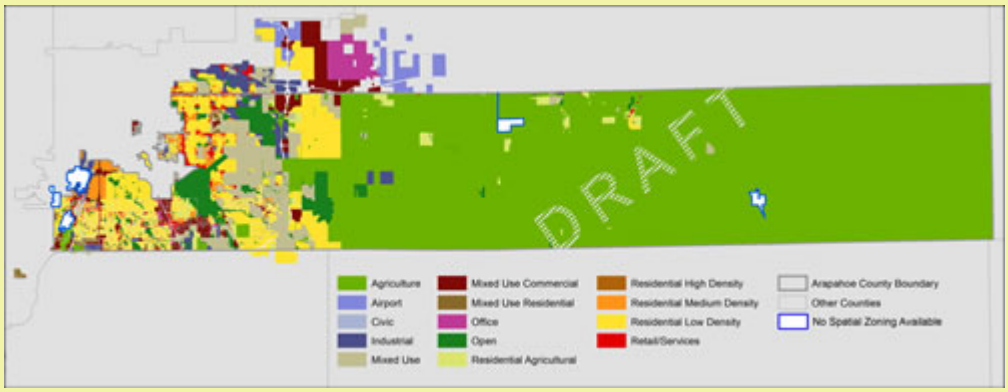
DRCOG is currently working with a consultant to create a regional zoning map. The consultant is compiling and reading the zoning codes for all jurisdictions in the DRCOG region. The goal of this project is two-fold.

First, the consultant will use the information to develop Floor Area Ratios (FAR) for each zoning type. This metric is used in UrbanSim - the DRCOG land use model - for determining where future development can occur.

Second, the consultant is putting together a crosswalk of local codes to a regional classification system. The regional categories are more general and allow us to make a standardized regional zoning map. The following categories are included:

- Agricultural
- Civic
- Industrial
- Mixed Use
- Mixed-Use Commercial
- Mixed-Use Residential
- Office
- Open Space
- Residential Agricultural
- Residential Low
- Residential Medium
- Residential High
- Retail / Services
- Airport
- Utilities

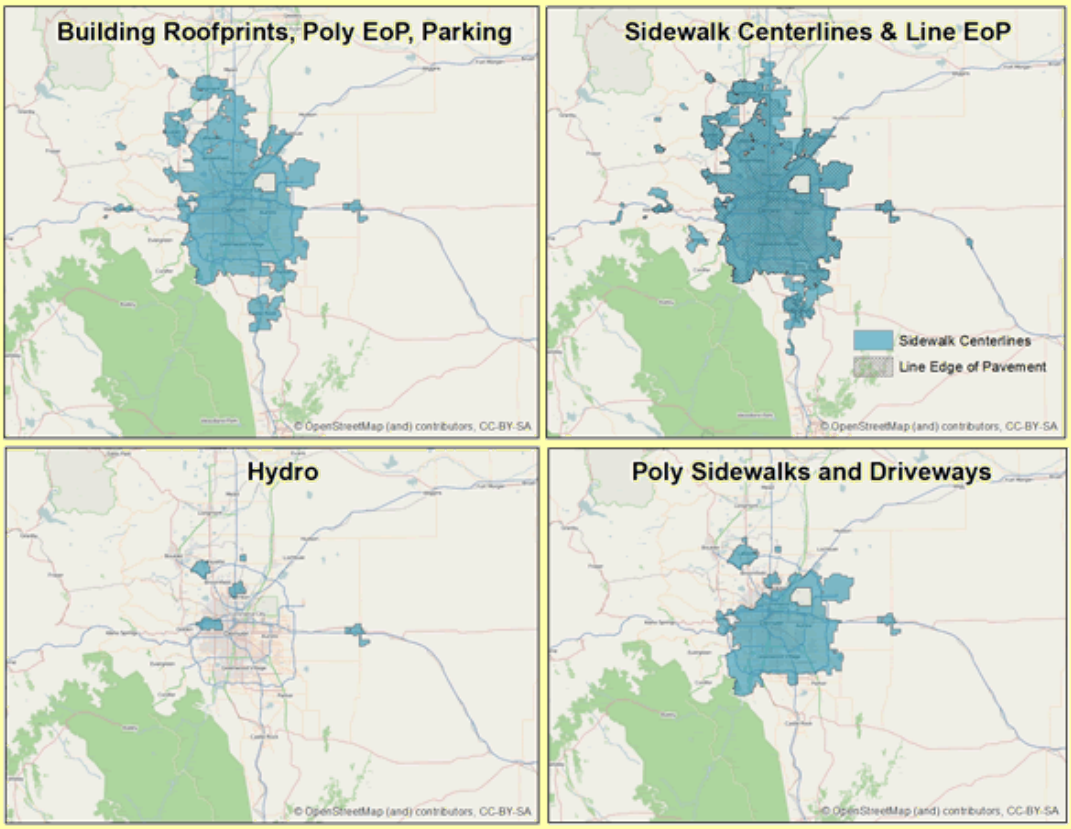
Arapahoe County was the pilot for this project. e draft regional zoning map is shown here. We expect to complete the map for the entire region by August 2015.



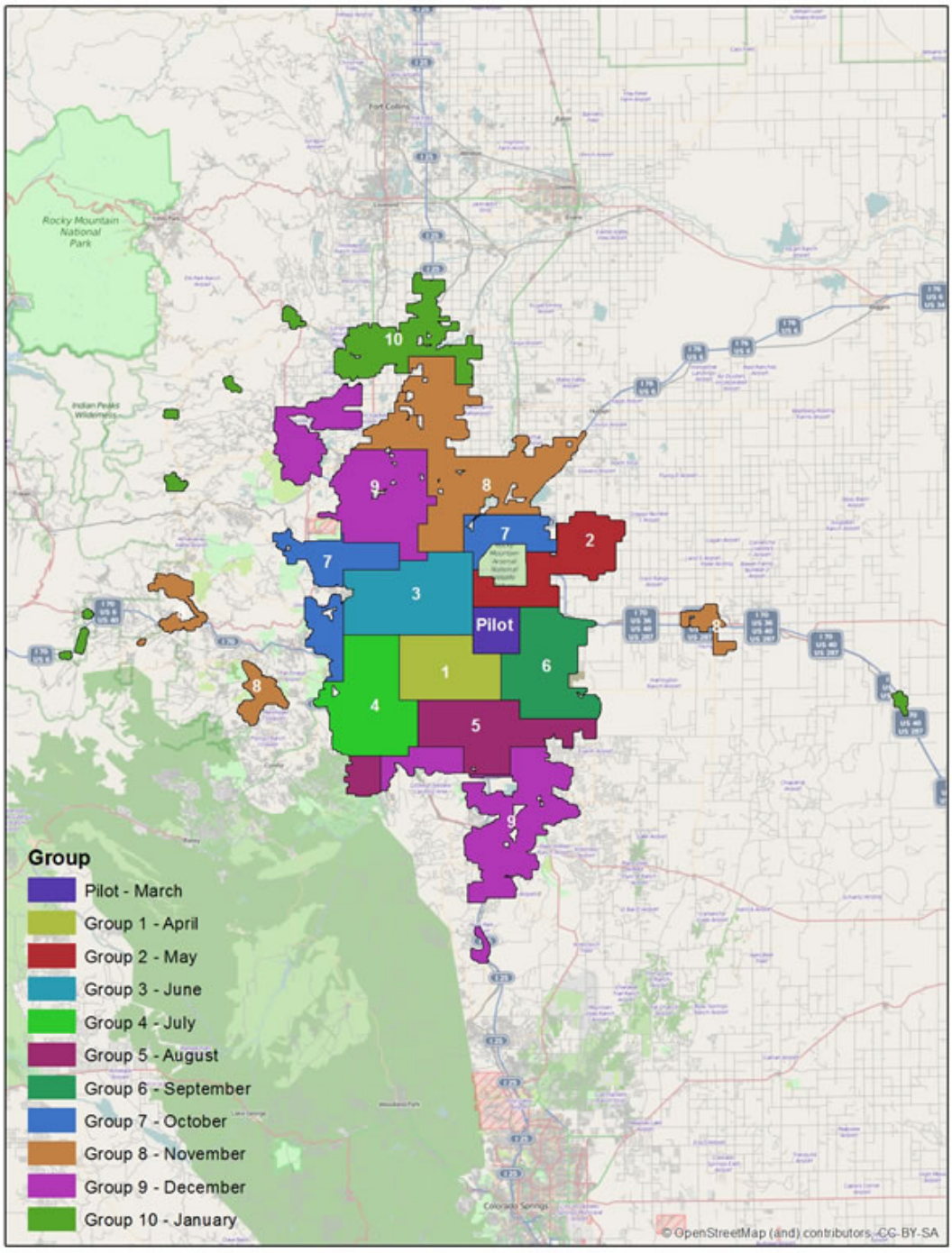

## Planimetric Project Update

***Article provided by Ashley Summers, Information Systems Manager, DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.***

DRCOG is working with 25 regional partners and Kucera International, Inc. to develop regional planimetric data. This project will collect building roofprints, sidewalk centerlines, edge of pavement and other impervious surfaces (e.g. driveways). We are attempting to collect regional coverage for many features, but the area may be adjusted based on contributions from partners (you can still contribute to the project!).




We are excited to announce that this data will be in the public domain and available in the Regional Data Catalog. Deliveries to DRCOG will be progressive and continue throughout 2015. expect to start offering data on our website in May/June.




If you have questions or would like to contribute to this project, please contact Ashley Summers at 303-480-6746 or asummers@drcog.org.

## Your Article Goes HERE!

The Data Consortium Newsletter is facilitated by DRCOG but is designed to be written by GIS professionals like you. This quarterly newsletter reaches 175 people on average and has a higher than average "open rate," which shows us that you're interested in the topics showcased here. It's the perfect place to show off your projects, highlight your great work, and contribute ideas to the GIS community in the Denver Region.

The next newsletter goes out in July. Please contact Ashley Summers at 303-480-6746 or asummers@drcog.org by June to contribute.

## 2015 Data Request and the Data Portal

*Article provided by Ashley Summers, Information Systems Manager, DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

DRCOG sent a data request to member jurisdictions on January 21, 2015 asking for the following nine datasets:

- Open Space
- Zoning
- Employment/Business Data
- Building Permits
- Bikes/Trails
- County and Municipal Boundaries
- Special District Boundaries
- Parcels
- Buildings/Addresses

The 2015 request was unique in three ways. First, we utilized a new application - the Data Portal - for the collection effort. Second, we built a dynamic link to Open Colorado from the Data Portal, incentivizing jurisdictions to make their data free and open to the public. Third, we partnered with the Governor's Office of Information Technology (OIT) to gather and pass along the data that is mutually beneficial to both agencies.

Below is our preliminary report based on the submissions we received by the request deadline (each year some additional datasets are provided after the deadline for various reasons).

- On average, we saw a **24% increase** in the amount of requested data that was submitted, when compared to the response in 2014.
- The vast majority of jurisdictions adopted the Data Portal submission method. The Data Portal currently has **70+** registered users.
- Of the **298** datasets provided in the Data Portal, **234 (79%)** were categorized as "open." **Thirty-one** out of **38** jurisdictions **(82%)** took the initiative to make some or all of their data shareable. This means that DRCOG is not limited to only using this data internally, but may also aggregate it and share it publicly in the Regional Data Catalog. This is great progress towards our goal of more open data in the region!
- Twelve DRCOG member governments contribute to Open Colorado. Two joined the site after we issued our request and five others added to their Open Colorado contributions to accommodate the DRCOG request.
- DRCOG will be passing along over **200** datasets to the Governor's Office of Information Technology. Jurisdictions that allow this pass-through of data only had to respond to the DRCOG request and now do not have to respond to OIT's request.

Overall, we feel that this year's data collection effort and the use of the Data Portal were a great success. Thank you all for your participation and support!

## Contour Data Available!

DRCOG is hosting 1ft and 2ft contour data in the Regional Data Catalog. This data is a result of the LIDAR 2013 project (a partnership between FEMA, USGS, and DRCOG).

If you use the data for a project, we'd be interested in hearing how it worked for you. Please contact us with your story!

## GIS in the Rockies Announcement

### *GIS IN THE ROCKIES REGISTRATION OPEN!*
### *EARLY REGISTRATION DISCOUNT AVAILABLE!!*

The 28th annual GIS in the Rockies conference returns to The Cable Center in Denver **September 23 & 24, 2015** offering outstanding professional workshops and presentations, networking, exhibitors, job fair, social events and more.

Discounted early registration is available for **$250** - a $75 savings!

### *CALL FOR PAPERS*

GIS in the Rockies invites you to share your professional geospatial knowledge and experience at a conference workshop or technical session. All submissions are welcome - commercial, open source and academic presentations.
Questions about GIS in the Rockies? Email chair@gisintherockies.org

## Contact Us

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Jan. 15, 2015

## In this Issue

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## DRDC 2014 Survey Results

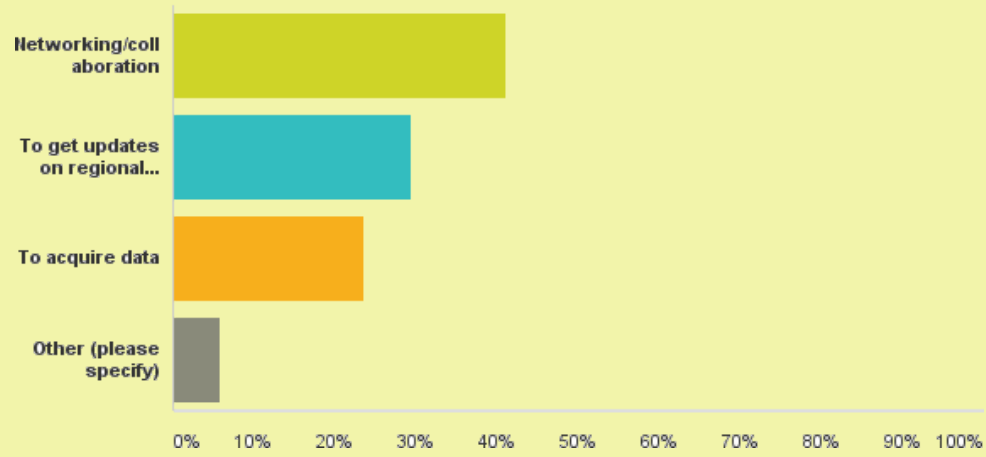
In the last newsletter, we asked you to respond to a survey about the Data Consortium.

The Data Consortium Survey was meant to inform DRCOG about the needs of the GIS professionals from local government in our region. Currently, DRCOG facilitates 2-3 consortium meetings per year and coordinates this quarterly newsletter. The purpose is to help us share information on our work, learn from one another, collaborate on joint projects, network, and brainstorm about innovative ways to use GIS in local and regional government.

We had 17 respondents to the survey (30% of our member governments and 9% of the recipients of this newsletter). The majority (41%) said that the primary reason they participate in the Data Consortium is to collaborate and network.

## Q1 What is the primary reason that you participate in the Data Consortium?

Answered: 17 Skipped: 0




The respondents indicated that they would like to see the following topics addressed through the Data Consortium:

- Better data sharing options
- Built environment
- Historical data
- Data standards, accuracy, and completeness
- LIDAR
- Framework layers
- Methods of aggregation used by counties
- Data sharing
- Collaborative efforts

We asked the respondents to indicate the importance of several regional layers The following is a ranking of those layers:

1. Building Points/Addresses
2. Parcels
3. Jurisdictional Boundaries
4. Land Use
5. Bike Paths/Trails
6. Zoning
7. Building Footprints
8. Open Space
9. UGBA

In terms of data development and distribution, we asked what DRCOG's role should be. In summary, the respondents felt that DRCOG should be a coordinator, facilitator and project manager. DRCOG should continue to determine which data layers are of value to local governments and pursue their development and/or acquisition. DRCOG should serve as a central repository for data as well as serving as the hub for networking and connecting GIS professionals from different agencies. DRCOG should also merge local data into regional datasets as well as creating regional datasets from state and federal sources that local governments could use.

In addition to those roles listed above, respondents asked us to focus on long-term strategies related to large data acquisitions (imagery, planimetrics, LIDAR), to provide technical support to small communities,  to continue work on coordinated data requests/automated data links between agencies, and to influence regional open data policy.

When asked what one thing we could change to make the DRDC better, the best response was "food at meetings." We hear you loud and clear. We wish we had food at meetings too.

Thanks to all who responded! Your feedback is essential to guide our efforts with the Data Consortium. We look forward to a productive 2015 with you all!

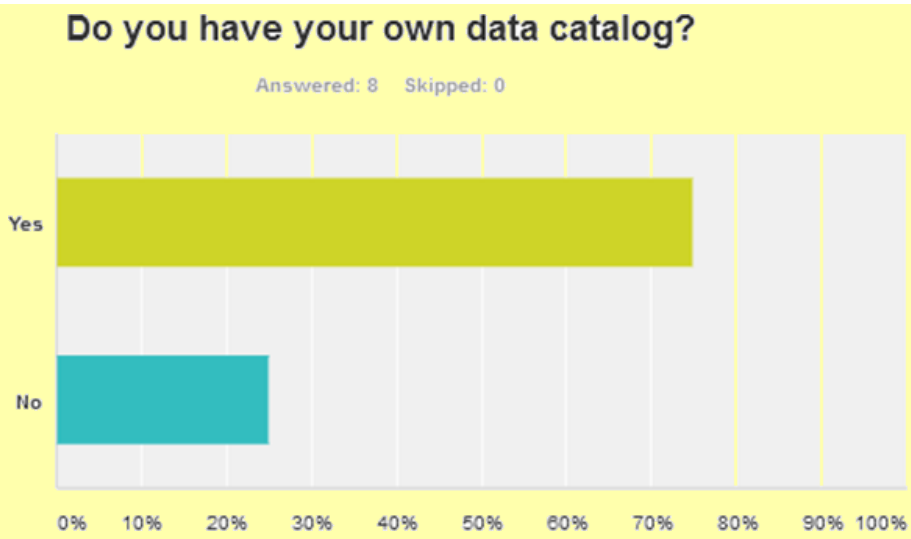
## OpenColorado Data Partners Survey Results

***Article provided by Scott Primeau, President, OpenColorado.  Scott can be reached at scott.primeau@opencolorado.org.***

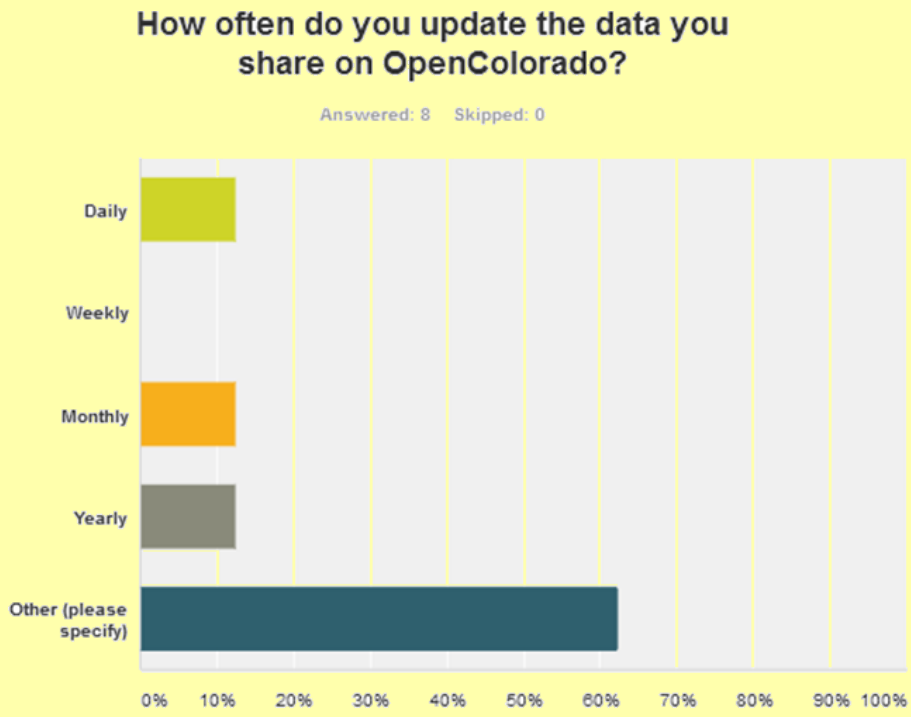
OpenColorado's data catalog grew approximately 50% in 2014, to 1,200 data sets. Fifteen cities, counties, and other organizations are now sharing data through data.opencolorado.org. This growth shows Colorado local governments' continued and expanding commitment to supporting their communities through open data. In 2014, OpenColorado asked its data partners to share their experience with publishing data.

- The survey found:
- Most of the respondents provide their own data catalog;
- The frequency of data updates varies by jurisdiction;
- Most jurisdictions update data monthly or less often;
- Names and personal contact information were the most common data elements that had to be removed before publishing data; and
- "Priorities of other projects" was the most commonly cited challenge to publishing data.

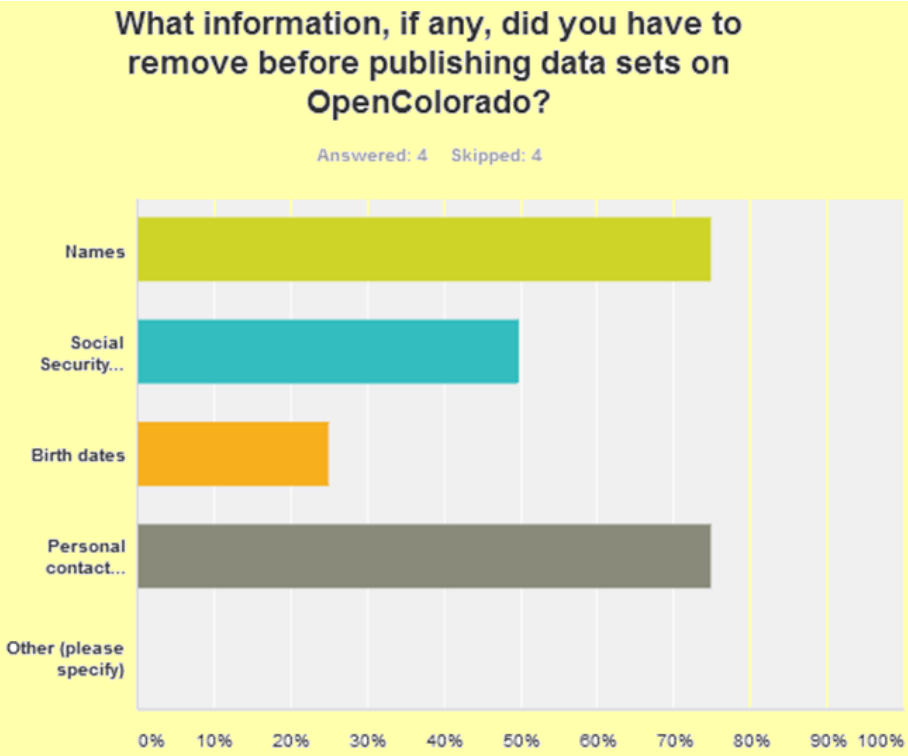
The following are the survey results.

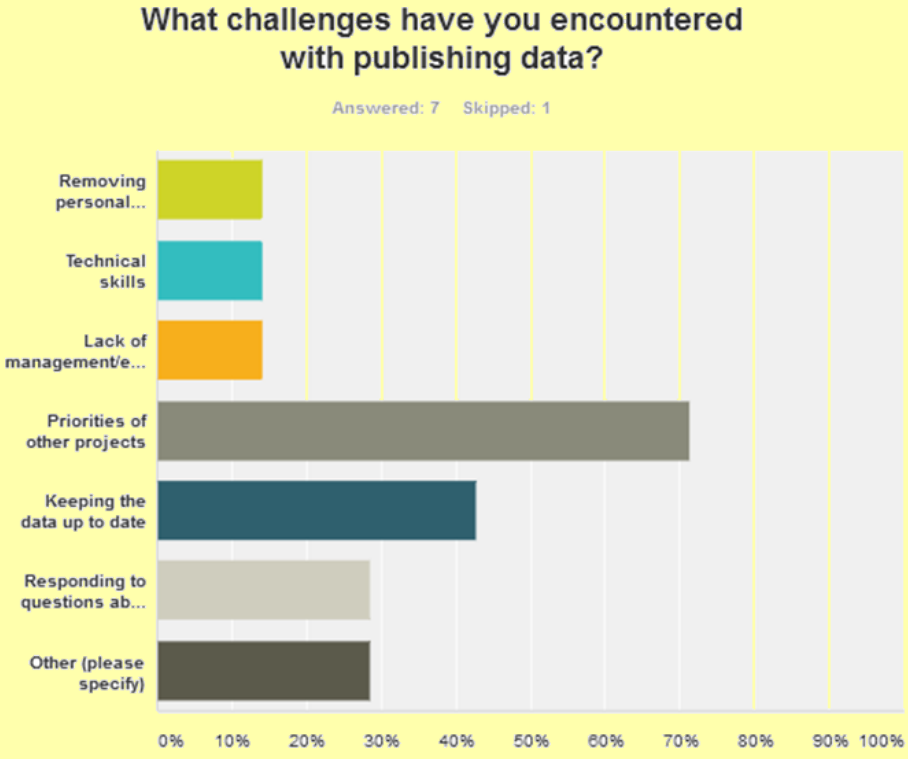



Most of the OpenColorado data partners are sharing data through their own data catalog in addition to publishing to OpenColorado. This creates the dual benefit of providing data where citizens may expect to find it and building a central open data catalog.




As reported in a recent Government Technology article, updating data is one of the keys to realizing the full benefits of open data. The reasons for not updating data, could include technical challenges, the ease of use of the data platform, and other priorities.




In contrast to a 2014 Center for Digital Government survey that said "Open Government /Transparency/Open Data" is the number one priority for city CIOs, OpenColorado's data partners are indicating that the priorities of other projects are still a challenge for publishing and maintaining open data.

Overall, the results of OpenColorado's survey and the growth of the OpenColorado data catalog show that cities and counties are successfully working through the obstacles to open data and continuing to make more data available

## Share Your Open Data Story - Take this Survey!

One of the issues that we've consistently struggled with is trying to openly share GIS data amongst government agencies and from government to the public. DRCOG has heard time and time again through our DRDC meetings and surveys that our member governments feel that DRCOG is uniquely positioned to help the region pursue an open data policy.

DRCOG has been researching open data policies across the nation - how they've come about and why they are important. One excellent resource is MetroGIS, a consortium in Minnesota that is similar to the DRDC and that successfully influenced the seven counties in their region to adopt open data sharing policies. One of the critical actions that MetroGIS took to convince their elected officials was to create a body of research that supported an informed decision on policy adoption. It contained sections on:

- Making Public GIS Data Free & Open: Benefits and Challenges;
- Existing Practice Interviews;
- Public Data Case Law Summaries;
- Statute Language Relevant to Data Availability; and
- Disclaimer Language Samples.

DRCOG would like to follow in their footsteps and use the framework that made them successful. To get started, we are asking for your help to gather information on existing practices regarding data sharing.
This is your chance to influence regional policy. **Take the survey!**

## Denver Regional Equity Atlas User Stories

*Article provided by Ashley Summers, Information Systems Manager, DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

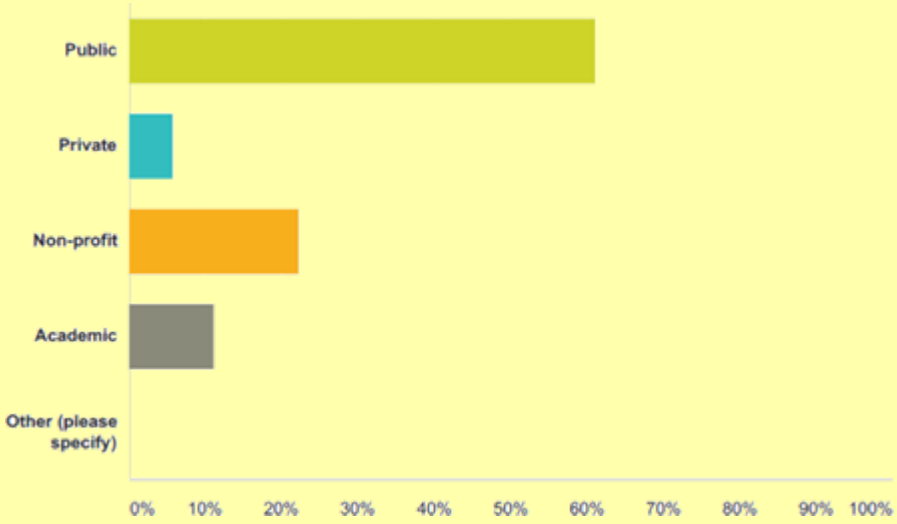
Since the Denver Regional Equity Atlas (REA) launched in February 2014, we have seen it put to good use in a variety of ways. From grant applications to focus groups to blogs about light rail ridership, the REA has proved useful for making a case about access to opportunity in the Denver Metro area.

The site was created through a partnership between DRCOG, Mile High Connects and the Piton Foundation and was funded through the Sustainable Communities Grant. The goal was to take an existing printed atlas and make it into a dynamic, interactive, online map. The new version of the atlas allows users to make custom maps with a variety of data from five major topic areas including demographics, housing, employment, health, and education. Additionally, the users can drill-down from the regional perspective to a local focus, share and save their maps, and view summary statistics that dynamically update based on the user's areas of interest. The site is publicly accessible and usable without creating an account, however users may register if they wish to save their custom maps for future use.

Since the launch of the REA, we've seen the following activity:

- Over 3,000 users (277 registered)
- Over 17,000 page views
- 120 custom maps that have a geography selected in the charts region
- Over 200 custom maps created by logged in users
- #1 Viewed Map: Concentration of Low Income Households in the Denver Region (313 views)
- #2 Viewed Map: Distribution of Denver Residents who are 55 and Older (155 views)

DRCOG recently surveyed the registered users to find out who is engaging with the site and what they are working on. We found that the majority of registered users work in the public sector, but that the site is also being utilized in the non-profit, academic, and private sectors. Of the respondents to the survey, 44% have been able to use the REA in their work.




Applications of the Regional Equity Atlas include:

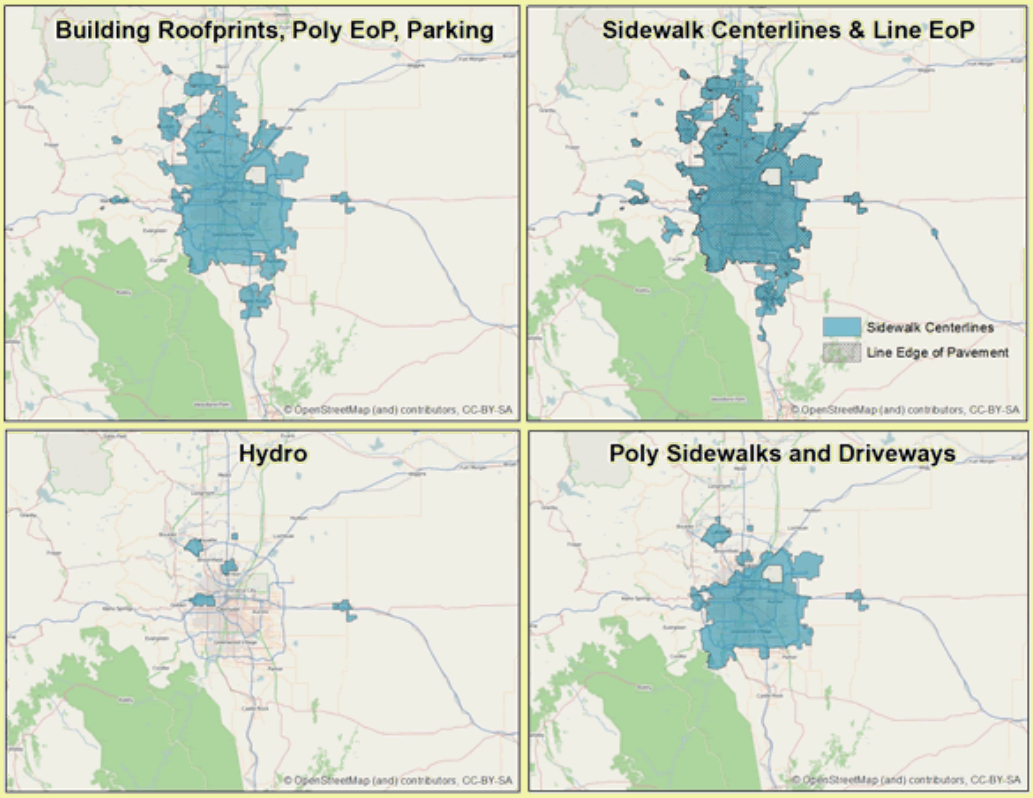
- To help construct a 5-Year Consolidated Plan for the U.S Department of Housing and Urban Development for the City of Aurora;
- To make a case in Sun Valley about how planning can intentionally integrate shared spaces as a way to bring in needed amenities and services;
- To prepare for a focus group with national AARP policy committee for background on areas with high concentrations of 55+ population compared with areas with rent-burdened housing;
- To look at housing density around light rail stations along the West Line compared to the Denver Central Business District. Read the article here.

Start using the Regional Equity Atlas today!

## DRAPP 2014 & Planimetrics 2015- Project Updates

*Article provided by Ashley Summers, Information Systems Manager, DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

The DRAPP 2014 Project is coming to a close. Deliveries of the final tiled imagery has started and will continue until the end of January. The final data is also being loaded into a WMS for partners to use. For entities that did not participate in this project, the final tiles and WMS will be available for purchase from MapMart in February 2015. Please contact Chris Sheil at csheil@mapmart.com for a quote. After the completion of the DRAPP 2014 project, the imagery acquisition vendor, Kucera International, Inc. will begin work on Planimetric Feature Project. They will be using our 2014 imagery to collect building roofprints, edge of pavement, parking, sidewalks, driveways, and hydro features, as shown in the extent below.




The data will delivered progressively as it is finished, starting in April 2015 and continuing through the end of the year. All data will be public domain.

This project is being funded by 24 regional partners and DRCOG. **There is still time to participate and contribute funds!** Please call Ashley Summers at 303-480-6746 for more information.

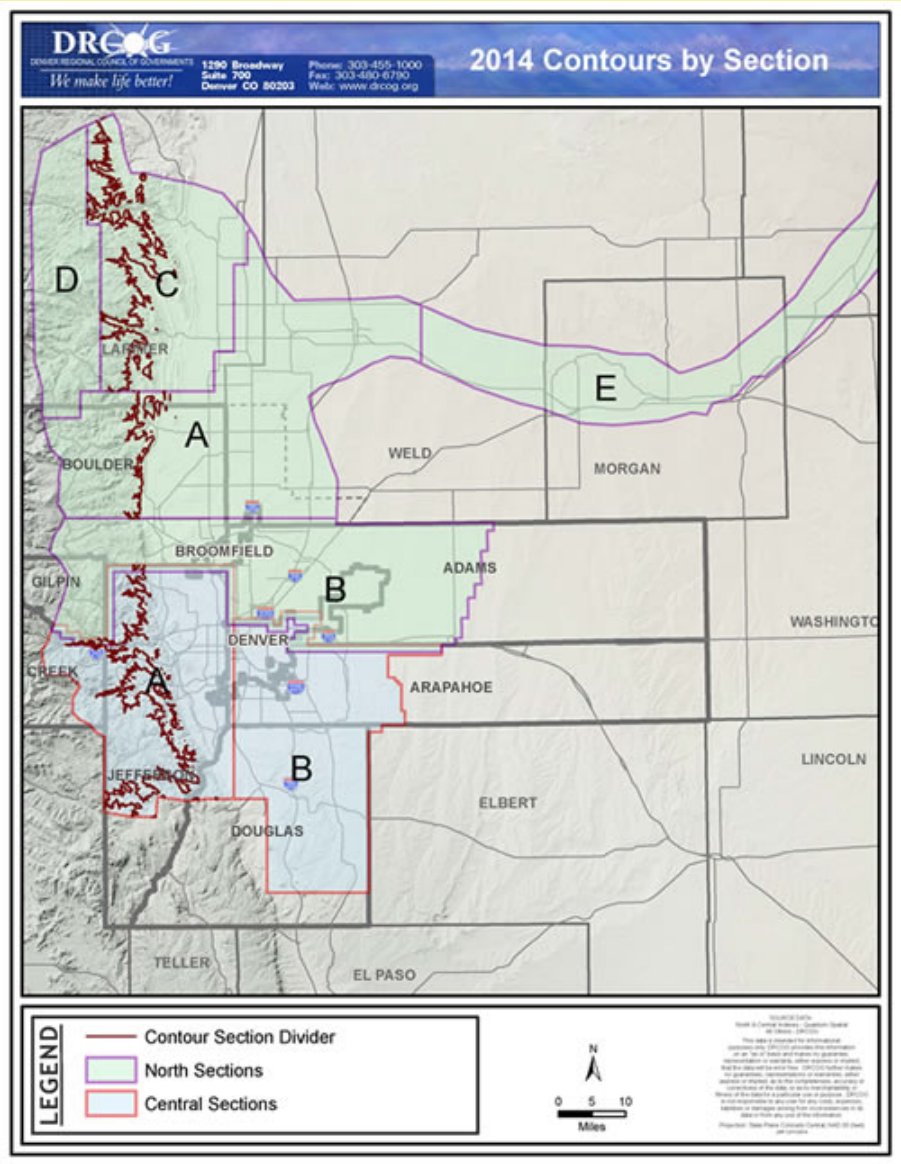
## LIDAR & Contour Data Available

*Article provided by Ashley Summers, Information Systems Manager, DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

As mentioned in our October newsletter, the FEMA/USGS LIDAR project that was initiated in the fall of 2013 is finally finished! The data, which includes classified points clouds, a Digital Evaluation Model (DEM), and contours, is available for download.

For point clouds, DEMs, and contours (all in UTM)- check the Office of Information Technology's (OIT's) new site, the Colorado GeoData Cache.

For contours (in State Plane) - check out our Regional Data Catalog [insert link]. The data is so large that we've split it up into smaller chunks that are easier to download. Some sections are split by elevation. If you simply merge the "high" and "low" datasets back together after downloading, you will have a full section. Please contact Josh Pendleton at 303-480-6784 or jpendleton@drcog.org if you need assistance.




## DRCOG 2015 Call for Data

*Article contributed by Ashley Summers, Information Systems Manager at DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

DRCOG is about to issue its annual call for data. The request will go out next week and will ask local governments to submit the following datasets to DRCOG via our new Data Portal.

1. Open Space
2. Zoning
3. Employment/Business Data
4. Building Permits
5. Bikes/Trails
6. County and Muni Boundaries
7. Parcels
8. Buildings/Addresses
9. Special Districts

**How does DRCOG use local government data?**
DRCOG uses data collected from its members to create regional datasets for planning, forecasting, and modeling regional transportation and development. For example, local data feeds UrbanSim (a land use model) and FOCUS (a transportation model) to create more accurate predictions for the future. We also use local data during Metro Vision scenario planning, DRAPP planning and TIP evaluations. A few illustrations of these processes can be found here.

Whenever possible, DRCOG compiles local data into publicly shareable regional datasets and makes them available on the DRCOG Regional Data Catalog. Currently, we provide Regional Open Space, County and Municipal Boundaries and Regional Bike Inventory as a free download.

**How should local governments submit their data?**
DRCOG recently built a new, online application called the Data Portal for data exchange with local governments. The Data Portal requires a login. If you have not had the opportunity to attend a workshop or webinar and do not yet have a login, please contact Jenny Todd at jtodd@drcog.org.

## New in the Regional Data Catalog

- Origin-Destination Data from the Census (where people live and travel to everyday)
- Residence Area Characteristics
- Workplace Area Characteristics
- Data from Colorado Homeland Security North Central Region (NCR) GIS Data Repository

  Schools
  School Districts
  Railroads
  Roads
  Water Bodies
  Rivers
  Addresses
  Trails

## Articles and Videos

- **Webinar: The Value of Effective Data Construction for Rural Communities**
- **What Counts: Harnessing Data for America's Communities**

"Successful community building requires many elements-a clear understanding of needs and opportunities, engagement of residents, support from all levels of government, collaboration among people and across programs. It also requires knowledge of what is happening in real time, whether strategies are working and how they can be improved. Building on the message of integrated, collaborative community development in Investing in What Works for America's Communities, the current volume, **What Counts: Harnessing Data for America's Communities helps us understand how to efficiently turn the volumes of data now available into the information needed to achieve the results communities want**."- Melody Barnes, CEO, Melody Barnes Solutions, and former Director, White House Domestic Policy Council

- **White House Launches Open Data Disaster Portal**
- **Open Data Visualization Tool Challenges Traditional GIS**

- **Open Data: What Is It and Why Should You Care?**
- **CDOT opens bike map access to local agencies**
- Thoughts on the GeCo in the Rockies Conference 2014:

http://www.webmapsolutions.com/thoughts-geco-conference-gis-industrysplitting
http://www.webmapsolutions.com/is-gis-splitting-what-the-experts-think

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Oct. 15, 2014

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New Technologies Unveiled at ESRI UC
FOSS4G Recap
Upcoming Events
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## Data Portal Update

*Article provided by Jenny Todd, Senior GIS Specialist, DRCOG. Jenny can be reached at 303-480-6754 or jtodd@drcog.org.*

DRCOG has completed development of its new Data Portal, a login-only site for secure data exchange between DRCOG and its members. When DRCOG makes future requests for data, the Data Portal will be used to transmit that data. Similarly, DRCOG will load data onto the site for members to download. The application uses the CKAN platform, which is an open source data management system. Open Colorado uses CKAN as well, so the Data Portal can pull data available in Open Colorado. The Data Portal will allow for more efficient, secure, and consistent exchange of data. Some benefits of using the Data Portal include:

- Communicate using Disqus threads
- License agreements loaded with data

- Transaction logging
- DRCOG data will be distributed through site

This fall, DRCOG will be holding two Data Portal training workshops for members **Thursday, Oct. 30** and **Wednesday, Nov. 5,from 9 a.m. to noon** at the Center for Advanced Visualization and Experiential Analysis (CAVEA) on the Metropolitan State University Campus. These workshops will provide instruction on using the Data Portal, including setting up administrators and users on the site, adding data, downloading data, and communicating using Disqus threads. GIS staff at our member jurisdictions were sent invitations to attend. If you have not received this invitation, please contact Jenny Todd-RSVPs are requested by **Oct. 24**

## Making GIS Accessible to Non-GIS Professionals

*Article provided by Bill Jeffrey, City of Westminster. Bill can be reached at wjeffrey@CityofWestminster.us.*

While GIS professionals tend to have a combination of experience and education that makes the basics of GIS seem like self-evident facts, most casual GIS users in an organization probably find it quite daunting. Anyone who has ever tried to walk a first-time user through an ArcMap session knows that a typical response sounds something like "why is it so complex?" In some cases the GIS professional's wealth of knowledge can work against them, as they have forgotten the "beginner's mind" of first delving into this field. Because of this, it can be hard to make GIS accessible.

A GIS professional may work with dozens of customers within their organization, all with vastly different conceptions of what GIS is and how it should function. This poses a real challenge since we want to continue creating powerful and often complex analytical tools, while also being stewards of accessible spatial information.

GIS tools often spread in an organization from the bottom up, so working closely with end users is critical. Being an evangelist for geographic technology and trumpeting success stories can help to spread the word. Sometimes what a seasoned GIS pro assumes is needed may actually miss the mark of what a field or office user may consider of primary importance. Getting to know their needs is key.

Move continuously to new solutions, but don't neglect to understand your users' culture, where they are coming from, and what is already a part of their workflow.

When looking at tools, there are usually many different ways to achieve the same result. Generally, the simpler the better. When approaching flashy new tools with

exciting new APIs, it is easy to get caught up in details that may not really matter in the end. To the end user, it just needs to work!

In order to keep users informed of the current possibilities of your system, it is important to create and maintain an ongoing training curriculum. To be successful, outreach and educational programs should be frequent and timely, be comprised of succinct classes, and focused to the audience. It can also be helpful to have material available outside formal classes, ideally in the form of a FAQ or wiki.

Finally, systems integration is key to making GIS accessible. To a novice user, having GIS, asset management, document management, or other systems as separate tools just seems wrong. They do, after all, refer to the same objects on the ground. Working to allow these systems to talk to one another has far-reaching benefits across the organization.

## State Geographic Data Coordination Activities

*Article provided by Jon Gottsegen, State GIS Coordinator, OIT. Jon can be reached at 303-764-7712 or jon.gottsegen@state.co.us.*

The Governor's Office of Information Technology (OIT) is statutorily mandated to coordinate geographic information and technologies across the state. A significant component is providing a clearinghouse of geographic information for GIS users to find and access geographic information easily. Another component is stewardship or active management of statewide data for important or statewide data sets. OIT also coordinates communication of activities among local and state agencies to foster possible collaboration or cost sharing in these efforts. OIT has been developing a capability for discovering and accessing geographic data over the last few years and has several modes available for delivering these data to interested users. The catastrophic flooding last fall emphasized the need to share GIS data easily, so OIT is continuing to develop these tools. This article describes the data discovery and access efforts in OIT. It will be clear that these efforts mirror those of DRCOG, so OIT and DRCOG are communicating regularly to identify possible areas of overlap or cooperation.

The most important step in making data available and used in the state is making sure the data are discoverable. In other words, what is available, where is it and how does a potential user obtain it? OIT's solution for this is the Colorado Information Marketplace (CIM), found at data.colorado.gov. This software as a service site is the state's site for data transparency. It allows for uploading of data and interaction with the data in the form of graphs, filters and maps on Google's base map. It is OIT's intent to use data.colorado.gov as the primary place to discover available data from state government in Colorado.

Once data are discoverable, the next step is ensuring that the data are accessible through various modes. OIT has developed several mechanisms for this. OIT has implemented two File Transfer Protocol (FTP) instances should a user be interested in downloading data for use locally: one for public data not requiring any security (ftp://gisftp02.state.co.us) and one, known as the CO State GeoShare, which is secured for restricted data (https://gisftp02.state.co.us).

OIT has also implemented a map-based application, the Colorado GeoData Cache (https://geodata.co.gov), to find and download data sets such as LiDAR or imagery. This application resulted from coordination of participation in a LiDAR flight after the catastrophic flooding last fall. However, it is proving useful for other data as well. This site is built on open source software, and it allows users to zoom in on an area of interest and obtain the data in that area. This is important for data like LiDAR or imagery because they are often organized into multiple tiles, and it is often difficult to know which particular tiles are of interest.

As OIT matures its technologies and procedures for making data available, we will work to make the full range of state-owned data transparent and usable. We will continue to work with DRCOG and other local and regional governments to support the most effective way for exposing data they wish to be available as well. We look forward to this ongoing partnership. For additional information, please contact Jon Gottsegen, State GIS Coordinator (jon.gottsegen@state.co.us).

## DRAPP Update & Related Projects

*Article provided by Ashley Summers, Information Systems Manager, DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org.*

The Denver Regional Aerial Photography Project completed its 2014 flights over the summer. All 7,000 square miles of the imagery is currently being processed to meet stringent quality standards. Throughout the fall, the final imagery will be checked by an independent quality control vendor before being accepted. The project is still on schedule to deliver final imagery to partners in December 2014. For entities that did not participate in this project, the final tiles and WMS will be available for purchase from MapMart in January 2015.

In related news, the FEMA/USGS LIDAR project that was initiated in the fall of 2013 is finally finished! The data, which includes classified points clouds, a Digital Evaluation Model (DEM), and contours, is being distributed to DRCOG partners this month. Within weeks, the public can expect to find this data available for download on Office of Information Technology's (OIT's) new site, the Colorado GeoData Cache.

Also of interest is that the DRAPP consortium is still pursuing a planimetrics project to follow the successful completion of DRAPP 2014. The current plan includes the joint purchase of building footprints, edge of pavement, parking, sidewalks, driveways, and hydro features for much of the region. Board approval for this project will be sought in November. For more information on this initiative, contact Ashley Summers at 303-480-6746 or asummers@drcog.org.

## DRDC Survey

Take our Data Consortium Survey so we can learn how to better serve you!

## The Colorado Open Data Ecosystem

*Article provided by Scott Primeau, President, OpenColorado. Scott can be reached at 303-877-0009 or scott.primeau@opencolorado.org.*

Colorado's open data offerings have been growing steadily over the past four years and are on track for even bigger growth in the near future. This open data and civic innovation growth has come through several nonprofit, government, quasi-government, and citizen-led efforts.

For example, OpenColorado, data.opencolorado.og, provides a free, self-service open data platform that allows cities, counties, and other organizations to publish data sets in a central location.

While several organizations are building open data platforms and services, the goals of the different groups are very much aligned-promote transparency, improve government services, collaborate with citizens, and build better communities. The following graphic illustrates Colorado's open data offerings and community building efforts.

Colorado's open data organizations have made very good progress on transparency and citizen collaboration, but there is still more work to do. More jurisdictions need to share data. Governments and other open data providers need to give more support to their user communities. We need to continue building a unified open data offering.

OpenColorado is also interested in hearing from our users. We would appreciate any feedback you may have on the OpenColorado data catalog:

OpenColorado Survey .

## New Technologies Unveiled at ESRI UC

*Article contributed by Todd Bleess, GIS Specialist, DRCOG. Todd can be reached at 303-480-6797 or tblees@drcog.org.*

The annual Users Conference held by ESRI in San Diego is always a showcase for their newest ideas and products. This year two of the biggest new products that they showed off to their customers were ArcGIS Pro and Web AppBuilder for ArcGIS. Both are expected to be released in Q4 this year, although beta versions are available now for those eager to dive in.

ArcGIS Pro is the product that has been receiving the most attention as it's going to bring a new, modern suite of mapping and analysis tools to GIS professionals. First things first, ArcGIS Pro is not ArcGIS Desktop: these are companion programs that can be run at the same time. ArcGIS Pro will be made available to those organizations that are current on maintenance.

One thing that organizations with newer hardware should appreciate about ArcGIS Pro is its speed. Pro will be a native 64-bit application to take better advantage of newer computers. It will also have a more contemporary look than ArcGIS for Desktop. The ribbon interface that is now seen in many newer applications will be present in Pro as well. This should make customization of the interface a bit easier than what we have been used to with toolbars. Another major feature that has been on the wishlist for many of us for a long time is the ability to save multiple layouts in the same project.

One change with ArcGIS Pro, which may be seen as a negative or positive depending upon your viewpoint, is the introduction of Python 3.4 as the standard development language. ArcGIS Desktop has used Python 2.x and this will continue as 10.3 will ship with Python 2.7. Two different versions of Python will be necessary if you wish to develop with both software packages on the same machine.

Not as widely publicized but potentially more important for some organizations is the Web AppBuilder for ArcGIS.  As web applications become increasingly important in GIS, programming skills have also become increasingly important to support these applications. The need for those skills is unlikely to go away anytime soon, but Web AppBuilder promises the ability to create fully functional applications that can be used on any device without writing any code. It will allow numerous customizations in themes and appearance and will include widgets which can be plugged in to support specific functionality such as scale bars and geocoders. ESRI is also encouraging the creation of custom widgets which can be shared among the GIS community to meet specific needs.

With these new technologies and more to come, the end of the year has the potential to be an exciting time for ESRI users.

## Why did I attend a Free and Open Source Software for Geospatial (FOSS4G) conference this year?

*Article contributed by Dave Murray, GIS Coordinator, City of Westminster. Dave can be reached at dmurray@cityofwestminster.us or call me at 303-658-2014.*

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Other than the fact that the conference was located in beautiful Portland, Oregon in the fall, this is the question that I asked myself before I completed my registration and booked my flight. Since the City of Westminster has a full suite of commercial off the shelf (COTS) GIS software, what did I think I would learn? Well, it was quite surprising and can be summed up in one word: "integration." My goal was to see what capabilities were available in the open source GIS world and see if it would make sense to begin integrating them into our current GIS practices. Other attendees who have mature FOSS4G implementations may be interested in talking and learning from the individuals who work with and create the software.

I attended several presentations that spoke directly to my question.  The open source community has realized that organizations will not scrap their existing systems just to move to a platform that doesn't charge a licensing fee.  The hybrid mode of the best offerings from commercial and open source has made sense for a number of organizations.  Included in these are Charlotte, North Carolina, the State of Wyoming, and the Portland Regional Council among others.

I have no illusions as to how difficult this will be. There are many impediments to bringing in new ways of managing and using GIS data. But what I saw at the FOSS4G conference in Portland, Oregon gave me hope that the open source community understands my needs and will work with us to provide solutions to our geospatial problems. If you would like to discuss this topic, please e-mail me at dmurray@cityofwestminster.us or call me at 303-658-2014.

You can find talks from the conference here: https://2014.foss4g.org/live/.

## Upcoming Events

- GIS Colorado Fall Meeting - **October 24th**
- GIS Day - **November 19th**

## Contact Us

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact DRCOG GIS Manager Ashley Summers at 303-480-6746 or asummers@drcog.org

***Disclaimer:*** The information provided in this newsletter is compiled from multiple sources and is intended for informational purposes only. DRCOG assumes no responsibility or legal liability for the accuracy, completeness or usefulness of any information in this newsletter.

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July 15, 2014

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*The Data Consortium consists of DRCOG members and regional partners with an interest in geospatial data and collaboration. The Data Consortium Newsletter is designed to improve communication among local GIS professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

## Progress Report on the DRCOG Data Portal

*Article provided by Jenny Todd, Senior GIS Specialist, DRCOG. Jenny can be reached at 303-480-6754 or jtodd@drcog.org.*

In the April, 2014, edition of the Data Consortium Newsletter, we introduced the Data Portal project. The Portal is an online application for data exchange between DRCOG and its members. It will replace the former data collection process of using the ftp site or email communication. The Data Portal will allow for more efficient, secure, and consistent exchange of data. Some of the advantages of using the Data Portal include:

- Secure site for data sharing
- Reduced errors in data transmissions
- Increased communication between DRCOG and its members
- Storing of data license agreements
- Transaction logging

Beta testing of the Data Portal is now underway! This is an important step in the project as it gives the DRCOG team a chance to address user questions or concerns.

Thank you to the following organizations who have volunteered to participate in beta testing of the Data Portal:

- Aurora
- Boulder County
- Commerce City
- Federal Heights
- Firestone
- Colorado State Office of Information Technology
- Thornton

If you would like to participate as a beta tester, it is not too late! Please email asummers@drcog.org if you are interested. If you want to learn more or have questions, consider attending the GoToMeeting conference call scheduled **Tuesday, July 22 from 10 - 11 a.m.** The details are listed below:

1. Please join the meeting.
https://www3.gotomeeting.com/join/458483742
2. Use your microphone and speakers (VoIP) - a headset is recommended. Or, call in using your telephone.
Dial +1 (312) 757-3131
Access Code: 458-483-742
Audio PIN: Shown after joining the meeting
Meeting ID: 458-483-742

In the fall, DRCOG will schedule several workshops for its members. These workshops will provide instructions on using the Data Portal, including setting up administrators and users on the site.

## DRCOG Shares Regional Business and Residential Datasets

In June of 2014, DRCOG purchased business and residential data from InfoGroup (formerly InfoUSA) to supplement existing built environment data that feeds the UrbanSim Land Use Model. During the purchase, DRCOG negotiated a deal with InfoGroup that allows sharing these datasets with DRCOG member governments and select partners.

The Infogroup business and residential data are valued at $28,000, but offered to DRCOG members and approved partners at no cost.

Attributes include, but are not limited to:
**Business:** Company name, address, number of employees, work at home information, modeled square footage
**Residential:** address, demographics, own vs. rent info, sale date, sell price, year built, square footage

This data covers the entire DRCOG region, has been geocoded, and is accurate for 2014. A 2000 and 2005 historical business dataset is also available free of charge. To obtain this data, your organization will need to sign a license agreement. All data will be distributed through the new DRCOG Data Portal.

For access, please contact Ashley Summers at 303-480-6746 or asummers@drcog.org.
To read more about InfoGroup, see its white paper.

## DRAPP Update and Related Projects

The Denver Regional Aerial Photography Project has completed its 2014 flights. The summer acquisition was particularly challenging this year because of late, slow-melting snow events and overcast afternoons that shortened our daily flight windows. The flight crews prevailed and all the imagery is now undergoing processing. The flights that were completed in the spring are available to DRAPP partners in their interim form (i.e. not orthorectified or color-balanced) in a WMS hosted by MapMart Cloud. The project is still on schedule to deliver final imagery to partners in December 2014. For entities that did not participate in this project, the final tiles and WMS will be available for purchase from MapMart in January 2015.

In related news, the FEMA/USGS LIDAR project that was initiated in the fall of 2013 is progressing well and the data is already being used to orthorectify the 2014 DRAPP imagery. The data, which includes classified points clouds, a Digital Evaluation Model (DEM), and contours, has been delivered to USGS for QAQC. DRCOG partners are expecting to see the final deliverables in August/September. Shortly thereafter, the public can expect to find some or all of this data for download on Office of Information Technology (OIT's) new site, the Colorado GeoData Cache.

Also of interest is that the DRAPP consortium has recently starting considering a planimetrics project to follow the successful completion of DRAPP 2014. The scope is still evolving, but current discussions include the potential joint purchase of building footprints, edge of pavement, parking, sidewalks, driveways, and hydro features for much of the region. For more information on how to partner with DRCOG on this potential initiative, contact Ashley Summers at 303-480-6746 or asummers@drcog.org.

## How Does Local Data Drive Regional Decision Making?

On June 25, DRCOG GIS Manager Ashley Summers gave a presentation to the DRCOG Board explaining how local data becomes information that drives regional decision-making. The purpose of this informational talk was to bring awareness to the state of DRCOG's data at a regional and local level, to outline why we often struggle with collection and compilation, and to show how data affects the analysis, forecasting, and planning efforts that inform influential decisions.

Elected officials need answers to many questions when they collaborate and negotiate at the DRCOG table. Questions like, "How is the region doing on our Metro Vision goals?" or "How do jurisdictions contribute to those goals at a local level?" or "Where does the region need to focus energy to make improvements?" The answers lie in current, accurate, and consistent information - information synthesized from detailed local data and compiled into a big-picture regional look.

To better understand the process, let's look at two of the datasets DRCOG collects from jurisdictions:  land use and zoning. The data is quite different across the region, so DRCOG finds commonalities and standardizes them into a dataset that can be used to draw broader conclusions on a regional scale. Once it's been compiled, the data is fed into UrbanSim, DRCOG's land use model, which not only leads to Small Area Forecasts, but also produces an output that goes into the DRCOG's travel model and air quality conformity model.  Each model result is contingent on the one before it and directly tied to the quality of the source data, which begins at the local level.

Check Out More Data Processes Here:

- Land Use and Zoning
- Bikes and Trails
- Buildings

- Open Space
- Parcels and UGB/A

DRCOG reaches out to jurisdiction staff throughout the year for data. The DRCOG GIS Team initiated a data collection effort in January 2014 to acquire geospatial data from the region's local governments. Specifically, the 10 datasets requested were:

- municipal and county boundaries,
- parcels,
- open space,
- trails,
- bike facilities,
- buildings,
- land use,
- zoning, and
- urban growth boundary/area (UGB/A).

DRCOG staff would like to see improvement in the submission of buildings, land use, bike and trails, and UGB/A. The goal is also to make requests routine so the response is closer to the deadline. Finally, a consistent way to mine the data of jurisdictions without GIS is needed.

The presentation included these statistics and made suggestions regarding how improve the responses to the data collection effort.

DRCOG suggested that elected officials and other members of a jurisdiction's leadership team investigate options to set us up for success. For example, getting more staff, more technical resources, or allowing more time to be spent where needed. **Local staff must be enabled and supported to get this job done**.

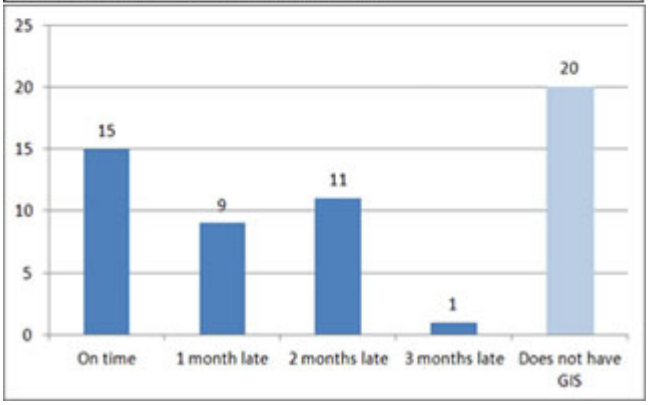
| Dataset | % Received | % Not Available | % Missing |
|---|---|---|---|
| County Boundaries | 100% | 0% | 0% |
| Parcels (from Counties) | 100% | 0% | 0% |
| Municipal Boundaries | 79% | 8% | 13% |
| Zoning | 90% | 5% | 5% |
| Trails | 72% | 21% | 8% |
| Open Space | 74% | 15% | 10% |
| Buildings | 51% | 38% | 10% |
| Land Use | 62% | 21% | 18% |
| Bike Faciliites | 28% | 13% | 59% |
| UGBA | 41% | 8% | 51% |

These percentages are based on GIS - enabled jurisdictions only. Members without GIS capabilities were not included in this analysis.

% Received = Number of datasets we received divided the number of jurisdictions that are gis-enabled and expected to respond.

% Not Available = Though the data collection process, we learned that this percentage of gis-enabled jurisdictions do not maintain this information.

% Missing = The percentage of jurisdictions that may have the data but didn't provide it and didn't tell us explicitly that they don't maintain it.




The "takeaways" shared with the Board were simple and to the point:

- The best and most detailed data is at the local level. You are the experts;
- DRCOG is here to help, committed to continuously improving the information it provides; and
- A call to action: Let's make an investment in building a strong foundation together.

## Regional Open Space Data Now Available in the Regional Data Catalog

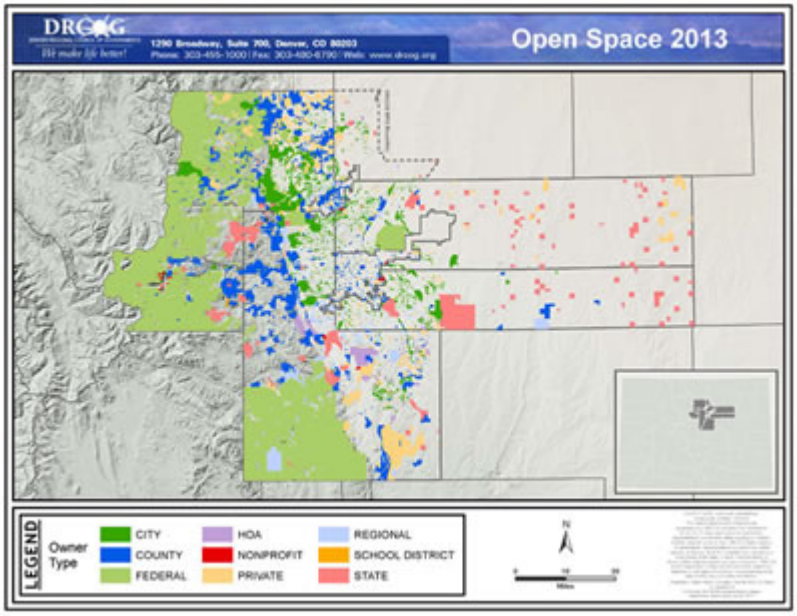
In 2012, DRCOG began creating a new open space layer with the Common Spaces Data Consortium subcommittee. From this subcommittee and its Data Dash in September 2012, parks and open space data was obtained from several cities and counties as well as Colorado State Parks and the South Suburban Parks and Recreation District. This data was combined with DRCOG's original open space layer, Greenprint and COMap data and clipped at the county level. The data was then compared with parcel data and aerial photography to resolve discrepancies between datasets to ensure recent land use changes had not changed the nature of areas identified.

Open space data was included as part of DRCOG's data request to local governments in early 2014. With this request, a large number of new and updated local open space datasets were incorporated into the open space layer. Some proprietary data obtained from COMap was removed. This made it possible to make the data available to DRCOG members and the general public.

DRCOG is creating the open space layer primarily to meet in-house business needs such as Metro Vision and model development. Because of these needs, not all data considered open space by local jurisdictions is incorporated into the layer. For example, trails are excluded from the open space layer because those features are maintained in a different dataset. Thin strips of planned green areas, such as medians and street right-of-ways, are also excluded from the layer. Lastly, drainage ditches and ponds are omitted unless they have recreational value beyond water retention. In general, an area of land needs to be developable to qualify for the layer.

Thank you for all of the data you have provided to assist in the creation of this data. Updates are ongoing, so if you find any parks or open areas that have been missed, please feel contact DRCOG to make the data as accurate as possible. Data collected will also be used as part of DRCOG's annual data request to make annual updates.

Download the data from the Regional Data Catalog
Download the map from Map Gallery




## Neighborhood Delineation Tool

*Article provided by Jennifer Newcomer, Director of Research, The Piton Foundation. Jennifer can be reached at 303-825-6246 or jnewwcomer@piton.org.*

The Piton Foundation's Data Initiative has a deep understanding of issues facing

lower-income communities. Established in 1991, the Data Initiative has been a leader in Colorado for analyzing and sharing data to improve community decision-making. It is a go-to source for comprehensive, accurate and easy-to-access neighborhood-level data.

In response to changing demographics and economic conditions in metro Denver, the Data Initiative is shifting its focus from a historically Denver-centric one to a 7-county regional view. The first web-based application that will be created with this expanded geographic reach is an updated Community Facts tool, which will offer free, neighborhood-level data.

As part of the Community Facts update, the Data Initiative is developing a classification scheme that will delineate neighborhoods for the entire metro region. The Data Initiative created a mapping tool that allows residents and community members to provide feedback on draft neighborhood boundaries that have been identified. Through this tool, you can create a neighborhood map that will help the Data Initiative refine its delineation results. **The deadline for providing feedback is September 19, 2014**.

If you have questions about the mapping tool, or would like to receive regular updates on the new Community Facts tool's development, please contact Piton's director of research, Jennifer Newcomer.

## Articles of Interest

The Twin Cities region did some research on free and open data. On October 23, 2013, the MetroGIS Policy Board adopted a Resolution of Support for Free and Open Public Geospatial Data and are advancing their recommendation and supporting research to the governments in the Seven County Metropolitan region.

The Open Data 500 is the first comprehensive study of U.S. companies that use open government data to generate new business and develop new products and services.

Building a Government Data Culture

Check out this Interactive Webmap Showing Open Data Policy Adoption in the Nation

## Upcoming Events

- Geospatial Conference in the Rockies (GeCo in the Rockies) is a joint conference between GIS in the Rockies and GeCo West, sponsored by GIS Colorado. GeCo in the Rockies 2014 - September 22-26 - Register now!
- DRCOG Idea Exchange - August 21 - Stay tuned for an invite to this event. Typically, the DRCOG planning team hosts these meetings to get feedback from planners on a variety of Metro Vision topics. For this meeting, we will be focusing on data. A preliminary agenda includes: an overview of how DRCOG uses local data for analysis, a Data Portal demo, a Regional Equity Atlas demo, an intro to The Piton Foundation's Community Facts Tool, and a look at neighborhood delineations throughout the region.

## Highlights

- DRCOG Website Gets a Makeover. Check it out here!
- Check out the region's progress on our Metro Vision Goals here!

## Contact Us

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact DRCOG GIS Manager Ashley Summers at 303-480-6746 or asummers@drcog.org

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April 15, 2014

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*The Data Consortium consists of DRCOG members and regional partners with an interest in geospatial data and collaboration. The Data Consortium Newsletter is designed to improve communication among local GIS professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

## DRCOG Begins Development of Data Portal

*Article provided by Ashley Summers, GIS Manager, DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org*

In January, DRCOG made a request to members for data. It was our largest such request to date, consolidating requests from across the agency. We asked for all types of data, from jurisdictional boundaries to parcels to land use to bike facilities, among others. During this effort, we noted many areas where improvements could be made, such as

- Duplicate requests to jurisdictions due to the size of our contact list;
- Submission process complicated by varied methods (e.g. email, FTP, snail mail);
- Manual submission tracking, leaving lots of room for error.

To address these issues, DRCOG recently began developing the Data Portal - an online application for data exchange between DRCOG and its members that makes data collection and distribution easier for everyone. The site is planned to:

- Be a "one-stop shop" for uploading and downloading data from DRCOG;
- Be a secure site that allows transfer of non-public data;
- Provide one profile per member with multiple, individual logins;

- Track all transactions of data and supporting files;
- Track all data agreements/restrictions so you can verify what we have on file.

DRCOG uses this data collected from its members to create regional datasets for planning, forecasting, and modeling regional transportation and development. For example, local data feeds UrbanSim (a land use model) and FOCUS (a transportation model) to create more accurate predictions for the future. We also use local data during Metro Vision scenario planning and DRAPP planning.

We are planning a beta launch this spring/summer. If you would like to be a beta tester, please email asummers@drcog.org.

## The Town of Superior's Virtual Review Process

*Article provided by Lisa Ritchie, Management Analyst, Town of Superior. Lisa can be reached at 303-499-3675, extension 131, or lisar@superiorcolorado.gov.*

The Town of Superior has engaged MIG/Winston Associates (MIG) of Boulder, Colorado as a consultant to create and maintain a virtual 3D model of the town. The model is to be used to facilitate conceptual understanding and visualization of proposed development within the context of the Superior Town Center and surrounding area by the Board of Trustees and the public during development review and approval.

MIG has designed custom software for real-time simulation that allows users to move freely through the extensive model and view proposed development from any angle. Additionally, it includes tools to help verify accuracy and prove the validity of the model should it be questioned as well as determine the proposed development's visual impacts (including view planes) and measure compliance with regulations. The Virtual Model was created using LiDAR data obtained from DRCOG, the Town's GIS data, and aerial photography from the DRAPP program.

The Virtual Review Process will be used for development approval in the Superior Town Center. The applicant has the option to prepare a virtual model, with specific requirements, of the proposed building(s), or retain MIG, through the Town, to perform the work. Once MIG has inserted the proposed building(s) into the model, it will be shown in context with the surrounding buildings at public presentations. Trustees, staff, and the public will be able to look at it from various vantage points, drive-by at specific speeds, fly-around, etc.

This Virtual Review Process is intended to be a win-win for both the Town and developer. While this additional step is required, it may be equal to or less expensive than developing a separate physical or 3D model. This process will be utilized in upcoming Final Development Plan reviews this coming Spring and Summer 2014. Over time, the model will build out as the Superior Town Center builds out, to accurately reflect grading, views, structures and landscaping amenities. For questions on the Virtual Model or the process, please contact Lisa Ritchie with the Town of Superior at 303-499-3675 or lisar@superiorcolorado.gov.

## GeCo in the Rockies

Are you looking to showcase your great work, a cool new process, tool, or application?

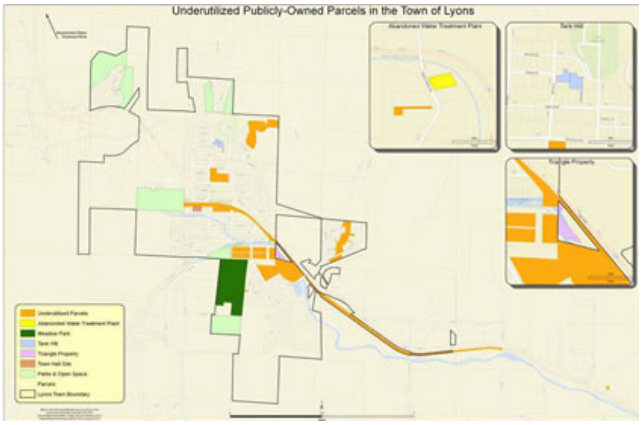
**GeCo in the Rockies can help!**

GeCo in the Rockies, a collaborative conference between GIS in the Rockies and GeCo West will be held **September 22-26, 2014,** in beautiful Grand Junction, Colorado. GeCo in the Rockies will be the premier geospatial technology and information event of 2014. You have an opportunity to be a part of this event. Join us as a presenter!

You are invited to share your professional geospatial knowledge, experience, and accomplishments at a technical session or with a poster display. Abstracts are being accepted now. Details can be found at http://www.gecointherockies.org/abstractsubmission. **The abstract deadline is May 2.**

The GeCo in the Rockies Planning Committee looks forward to seeing you in Grand Junction!

## Resilient Colorado and Technical Assistance for the City of Lyons Flood Recovery




Resilient Colorado and Technical Assistance for the Town of Lyons Flood Recovery is an initiative of the University of Colorado Denver College of Architecture and Planning to assist Colorado communities recovering from the September 2013 floods. The initiative connects faculty and staff experience, student passion, and communities to facilitate recovery and contribute to a more resilient Colorado.

The departments of Planning and Design, and Geography and Environmental Sciences at University of Colorado Denver (UCD) have begun work with the Town of Lyons to provide technical assistance during its flood recovery planning process. Over the past 12 weeks, the Town of Lyons has been conducting weekly meetings with recovery working groups. At the end of this process, the town will have a recovery action plan, and UCD will have contributed maps and analysis for

the planning process, with a polished 30-40 page planning document expected by May. Engagement will continue in the summer with a field studio on housing development in Lyons, and Resilient Colorado will be a multi-year engagement with Lyons.

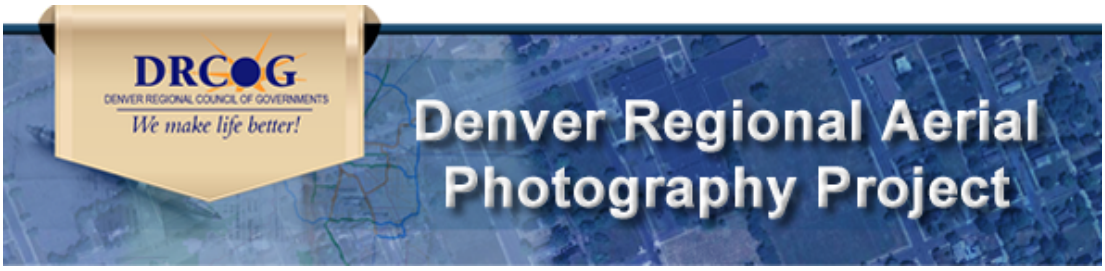
Several instructors in both the Planning and Design, and Geography & Environmental Sciences departments agreed to help provide assistance when possible, including the production of the draft recovery plan, data, and GIS-driven maps. The objective is to provide students with the opportunity to work with a real-world client on a current relevant project, while simultaneously providing the Town of Lyons with professional and technical resources not normally accessible.

Data sources for this collaboration are being provided by Digital Globe , FEMA, DOLA, Boulder County, DRCOG, RTD, and USDA, among others. Digital Globe, in particular, generously provided a package of high-resolution panchromatic and multispectral satellite imagery covering the recovery area for before, during, and after the flood for our analyses.

In addition, students and faculty have participated in volunteer recovery efforts in the Town of Lyons, working alongside residents and meeting with the Town Administrator for a tour of the town and discussion of the challenges the recovery process in Lyons faces over the next few years.

## DRAPP 2014 Update

*Article provided by Ashley Summers, GIS Manager, DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org*




Today marks the end of the spring flight window! Kucera International, Inc. successfully completed flights in Denver Metro, the eastern plains, and Weld County. The interim data is currently being reviewed and delivered to our data acceptance testing (DAT) and web map service (WMS) vendor, IntraSearch. Partners are expected to receive WMS access to the interim imagery in May.

The last deadline for participation is fast approaching. If you are interested in being a DRAPP 2014 partner but have not yet received a quote or submitted all your paperwork, contact the Project Manager Ashley Summers ASAP!

**Save the Date!** The next DRAPP meeting will occur on **April 24th** at **10 a.m.** at DRCOG. For more information, contact Ashley Summers at 303-480-6746 or asummers@drcog.org.

## Bike to Work Day

*Article provided by Christine Connally, GIS Analyst, DRCOG and Catherine Sanders, Regional TDM Program Sales Specialist, DRCOG. Christine can be reached at 303-480-6717 or cconnally@drcog.org. Catherine can be reached at 303-480-6757 or csanders@drcog.org.*

Bike to Work Day is held each year in Colorado on the fourth Wednesday in June: this year's event is **June 25**. Bike to Work Day is an extraordinary community event because of the 150+ stations throughout the region, which serve free food and beverage to cyclists on Bike to Work Day. Bike to Work Day stations are

organized by volunteers - companies, non-profits, and partnerships. DRCOG's Way to Go program, which organizes Bike to Work Day, is always looking for new stations, especially in under-served areas. If you would be interested in organizing a breakfast station or afternoon water aid station, please visit http://waytogo.org/biketowork for more information, or contact btwd@drcog.org.

## The latest Census American Community Survey data

*Article provided by Josh Pendleton, GIS Specialist, DRCOG. Josh can be reached at 303-480-6784 or jpendleton@drcog.org*

The latest Census American Community Survey data has been released recently, and DRCOG has added selected tables to our Regional Data Catalog. Listed below are the tables available in .csv format, at the Block Group, Place, and Tract levels.

**2012 ACS 5 Year Survey - Block Group Level Data, Colorado**

Assorted ACS Data from tables at the Census Block Group Level
B01001 - SEX BY AGE
B01003 - TOTAL POPULATION
B11005 - HOUSEHOLDS BY PRESENCE OF PEOPLE UNDER 18 YEARS BY HOUSEHOLD TYPE
B11016 - HOUSEHOLD TYPE BY HOUSEHOLD SIZE
B19101 - FAMILY INCOME IN THE PAST 12 MONTHS (IN 2010 INFLATION-ADJUSTED DOLLARS)
B25001 - HOUSING UNITS
B25003 - TENURE
B25024 - UNITS IN STRUCTURE
Download - http://gis.drcog.org/datacatalog/node/305

**2012 ACS 5 Year Survey - Place Level Data, Colorado**

Assorted ACS Data from tables at the Census Designated Place Level
B08013 - AGGREGATE TRAVEL TIME TO WORK (IN MINUTES) OF WORKERS BY SEX
B08101 - MEANS OF TRANSPORTATION TO WORK BY AGE
Download - http://gis.drcog.org/datacatalog/node/304

**2012 ACS 5 Year Survey - Tract Level Data, Colorado (Table 1)**

Assorted ACS Data from tables at the Census Tract Level - Table 1
B08013 - AGGREGATE TRAVEL TIME TO WORK (IN MINUTES) OF WORKERS BY SEX
B08101 - MEANS OF TRANSPORTATION TO WORK BY AGE
B08201 - HOUSEHOLD SIZE BY VEHICLES AVAILABLE
B08202 - HOUSEHOLD SIZE BY NUMBER OF WORKERS IN HOUSEHOLD
B17001 - POVERTY STATUS IN THE PAST 12 MONTHS BY SEX BY AGE
B19080 - HOUSEHOLD INCOME QUINTILE UPPER LIMITS
B19081 - MEAN HOUSEHOLD INCOME OF QUINTILES
B19082 - SHARES OF AGGREGATE HOUSEHOLD INCOME BY QUINTILE
B19101 - FAMILY INCOME IN THE PAST 12 MONTHS (IN 2010 INFLATION-ADJUSTED DOLLARS)
Download - http://gis.drcog.org/datacatalog/node/306

**2012 ACS 5 Year Survey - Tract Level Data, Colorado (Table 2)**

Assorted ACS Data from tables at the Census Tract Level- Table 2
B04001 - FIRST ANCESTRY REPORTED
B07001 - GEOGRAPHICAL MOBILITY IN THE PAST YEAR BY AGE FOR CURRENT RESIDENCE IN THE UNITED STATES
Download - http://gis.drcog.org/datacatalog/node/307

**2012 ACS 5 Year Survey Metadata**

A description of each census ACS table included in the above 4 tables, and each column within those census acs tables. For example, column B01001_1 in one of the above 4 tables is Table B01001, Line 1, in the metadata; and so on.
Download - http://gis.drcog.org/datacatalog/node/303

With each of these tables, the GEOID10 field is the linkable geographic unique id that links to the GEOID10 field in the Census 2010 Tract, Block Group, and Designated Place geographic datasets already available in the Regional Data Catalog.
**Tracts (Census 2010)** - Download - http://gis.drcog.org/datacatalog/content/tracts-census-2010
**Block Groups (Census 2010)** - Download - http://gis.drcog.org/datacatalog/content/block-groups-census-2010
**Census Designated Places (Census 2010)** - Download - http://gis.drcog.org/datacatalog/content/census-designated-places-census-2010

## Articles of Interest

Data Sharing Leads to Powerful Tools for Fighting Fire

Latest GAO Report: GIS

## Meetings

Upcoming DRAPP meeting - 4/24
Upcoming DRDC meeting - 6/26

## Contact Us

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact DRCOG GIS Manager Ashley Summers at 303-480-6746 or asummers@drcog.org

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January 15, 2014

## In this Issue

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*The Data Consortium consists of DRCOG members and regional partners with an interest in geospatial data and collaboration. The Data Consortium Newsletter is designed to improve communication among local GIS professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

## DRAPP 2014 update

The 2014 Denver Regional Aerial Photography Project (DRAPP) is officially underway! In early November, a group of partners interviewed and selected Kucera International, Inc. and IntraSearch/MapMart as the 2014 DRAPP vendors to recommend for DRCOG Board approval. This is the same vendor team as in 2012. The vendors were officially approved Nov. 20 and a kickoff meeting was held at DRCOG Dec. 9. Contracts are being drafted currently and we expect them to be fully executed by Feb. 1.

DRCOG will be contacting potential partners through the end of January to provide quotes and gauge interest in project participation. If interested, the partner will receive a Letter of Intent (LOI), which is the method of solidifying the contract between DRCOG and partners and clarifies the amount due. If you are not

contacted by DRCOG and wish to participate in DRAPP 2014, please contact Ashley Summers at 303-480-6746 or asummers@drcog.org.

LOIs are due to DRCOG by Feb. 1, 2014.

## DRCOG Partners with FEMA and USGS for LiDAR

*Article provided by Ashley Summers, GIS Manager, DRCOG. Ashley can be reached at 303-480-6746 or asummers@drcog.org*

In October 2013, FEMA/USGS initiated a project to collect LiDAR in response to the Colorado flood disaster. Their project extent overlapped in part with the DRCOG region. Since DRAPP members had previously expressed interest in LiDAR data, DRCOG pursued partnership on this federal project and was able to pass on significant cost savings to its partners.

DRCOG and its partners are scheduled to receive deliverables covering 3,600 square miles. Those deliverables include a classified point cloud, a hydro-flattened digital elevation model (2.5' pixel), and 1ft. contours.

All the data in the DRCOG region was collected before the snowstorm hit in early December. A couple of re-flights may need to occur in a small section of the mountainous terrain once conditions improve.

The data will be finalized and in the public domain by late spring 2014. This delivery is well aligned with the DRAPP schedule and will enable this data to inform a more accurate imagery product

## The Location of Disaster

*Article provided by Victoria Smith-Campbell, GIS Specialist. Victoria can be reached at 720-515-6277 or victoria@enthusd.com*

There have been numerous stories on the 2013 Colorado Floods. Press releases have summarized the amazing numbers. Reporters have documented the heartbreaking stories of fatalities and people losing their worldly possessions. Our state has risen to the challenge and is recovering from this horrific disaster.

During a disaster, there are at least three separate areas to consider:

- Crisis Communications- external to organization
- Planning and Operations- internal to organization
- Interagency Coordination- typically internal to government and partners

**Crisis Communications** is a different type of map making. The goal is to quickly communicate only the essential information. Typically this information includes: evacuation areas, human and animal shelter locations, information centers, and the affected area (fire perimeter, flood extent, rockfall, etc.). Focus on areas you want people to receive services at or stay away from. Generally, this will be a subset of the operational data with friendlier icons in an interactive format. As a member of the Jefferson County Incident Management Team (IMT) we used Google Maps to deliver simple interactive maps during the 2013 Flood. The JeffCo IMT map received over 1.8 million direct hits and positive feedback. Google.org aggregated multiple-county information into a single map including Boulder, Jefferson, Larimer, Weld, and Adams County data. The Google.org crisis map also integrated incident information with Civil Air Patrol photos and national data with Red Cross shelters, National Oceanic and Atmospheric Administration (NOAA) US Significant River Flood Outlook, and Weather.gov Watches, Warnings and Advisories.
*Goal- Provide for safety through information*.

**Planning and Operations** for Incident Management Teams (IMT) or Emergency

Operations Centers (EOC) at the local or state level is a much more formal process with a regimented set of products and timelines. At the IMT level there are standardized symbols, directory structures, naming conventions, and transition guidelines. In the EOCs dozens of GIS staff across the state conducted queries on enterprise parcel databases, analyzed road networks for detours, and consolidated damage assessment information to support the disaster declaration process (bits and bytes = additional support).
*Goal- Provide information informing decision-making and operations in order to provide resources to the affected communities.*

**Interagency Coordination** enables everyone to understand what resources are available, ensure the tasking of resources includes all needs, and data gathering efforts are not duplicated. Thousands of staff gather information and data that is combined and sorted into a systematic picture. Twitter was an essential form of communicating between agencies both to amplify messages and to communicate privately through direct messages. During the floods, the State of Colorado created a Google Group just for GIS communication. This allowed government and partner organizations to share information, ask questions, and answers were found.
*Goal- Create data once for many uses. Everyone has access to relevant resources*

During the Colorado floods, numerous tools and platforms were used to communicate location both internally and externally. There were many successes and challenges that continue to help us develop as a community.
Questions for reflection:

- What is your strategy to get geospatial information out to the public? If you post PDFs will you also share the data?
- Do you know how the data you are collecting is being used up the chain for situational awareness or the disaster declaration process?
- If a disaster happened in your jurisdiction, how would you reach your GIS neighbors? How will they reach you? Do they know who to call? Are you at a different phone number? On Twitter?

For information during emergencies you can find information at:
www.coemergency.com or on Twitter @coemergency

Locate information on your local emergency management office:
http://www.coemergency.com/p/local-info-sources.html

## Not Just Civic Idealism: The Dollars and Cents of Open Data

*Article provided by Brian Timoney, Principal, The Timoney Group. Brian can be reached at 303-929-3722 or brian@thetimoneygroup.com.*

It's an accomplishment of sorts that the open data movement has been around long enough to acquire its own outdated stereotype of being strictly the domain of youthful idealism among tech-savvy hacker types. And like many stereotypes, there's a grain of truth in it: yes, we still have hackathons and references are made to a new type of "digital government"--more responsive, more transparent, etc. But to a long-time observer, what's most interesting is the argument for the economic benefits of open data are fast becoming conventional wisdom.

The management consultancy McKinsey recently released a study estimating a potential $3-5 trillion (yes, that's a "t") global economic impact among seven economic sectors. The case of Climate Corporation is instructive: combining decades of U.S. weather, soil, and crop yield information freely available from the government, it was able to craft a new type of crop insurance product for farmers. Monsanto recently purchased the company for $930M.

So what's changed? Obviously the rise of cloud-based server and database infrastructure has driven the cost of storing and publishing data down to pennies

per gigabyte. But equally important has been the growing adoption of analytics or "data science" to uncover more sophisticated insights than what's traditionally been revealed by standard statistics. The haystacks of data are only getting larger; and tools such as R and Hadoop are being deployed to help find the valuable needles.

But this strikes most of you as very big picture. So let's talk about financial benefits of open data your organization may not have considered. In transitioning from a data sales model to an open data model, the City of Denver saw a 75 percent reduction in phone calls seeking data acquisition. Less quantifiable but very real were the efficiency gains in interdepartmental data flows as communication friction is removed when information requests can be fulfilled immediately with a simple URL link.

The barriers to opening your data continue to get lower. CKAN, the platform that powers Data.gov, Data.gov.uk, and our homegrown OpenColorado.org is free, open source software. Even easier for getting started is using Github as your publishing platform as the city of Chicago has done with some of its most popular datasets (https://github.com/Chicago).

In the current environment of frozen budgets and stretched resources, it's becoming clear that stewards of government information can no longer afford not to enjoy the variety of economic benefits created by open data.

## DRCOG Models for Scenario Planning

*Article provided by Gabrielle Voeller, Planner, DRCOG. Gabrielle can be reached at 303-480-6765 or gvoeller@drcog.org.*

DRCOG staff is working hard on Metro Vision 2040, the next iteration of the regional long-range plan. As part of this process, the planning team is engaged in scenario planning to test different future outcomes that will inform the plan's goals and policies. Scenario planning is complex, but it basically goes like this: "If we did X starting now, what would our region's land use and transportation patterns look like in 2040?"

In the near future at DRCOG, a cutting-edge new land use model (UrbanSim) and sophisticated transportation model (FOCUS) will work together to make detailed predictions for each scenario. Because UrbanSim is in the final stages of calibration, DRCOG's modelers have created an interim tool called PointSim to begin the scenario planning process.

PointSim takes the zone-level quantities of households and jobs (specified by the land use model) and intelligently places them at specific points inside each zone. Many of the built environment datasets created for UrbanSim were use to this point-level placement, such as parcels, buildings, and establishment locations.

Using PostGIS tools, staff created a script that ranks each parcel in a zone by how attractive it is for development based on factors such as distance to transit, highways, schools, parks, retail, and civic institutions. Each parcel also was given a capacity for households and jobs, depending on its land use. For example, a parcel with an apartment building would have a larger capacity for households than a

parcel containing a single-family home; a school parcel would have a larger capacity for education jobs than entertainment jobs. Taking both the parcel ranking and its capacity into consideration, PointSim creates a certain number of points in each parcel within the zone, up to the total number of points specified by the land use model.

Some scenarios require different numbers of households and jobs in each zone (e.g. changes to the zone-level totals), while other scenarios require changing how the points are allocated within the zone (e.g. changing the parcel capacities and parcel-ranking algorithm). This tool has helped bridge the divide between old and new models, and provided point-level detail to use in the regional planning process.

This picture of Sloan's Lake shows household points in blue, education jobs in red, service jobs in yellow, and retail jobs in green. PointSim was designed to exclude the lake and park, ensuring no future development was allowed in these types of areas.

PointSim has served as a critical stopgap tool to forecast population and employment at a parcel level for the Denver region's travel model. DRCOG is excited to announce the UrbanSim rollout this spring.

The new land use model will be used for future land use runs, providing for more realistic socioeconomic results in locational patterns and related traffic impacts. DRCOG will be holding meetings in early spring 2014 with its member governments to share information and data from UrbanSim.

For more information, please contact Gabrielle Voeller at gvoeller@drcog.org or 303-480-6765.

## Community Profiles

Article provided by Robin Reilley, Planner, DRCOG. Robin can be reached at 303-480-6739 or rreilley@drcog.org

Community Profiles are a popular product that DRCOG provides for member governments and the public at large. The Profiles represent a statistical snapshot of Census, in this case the 2010 Census, American Community Survey (ACS), and DRCOG data sets representing demographic, travel, planning and transportation information.

With 56 member governments there is a great deal of data to distill. Each document possesses 5 graphs, 4 tables and one map. The new Community Profiles are available in the Regional Data Catalog here: http://gis.drcog.org/datacatalog/subjects/community-profiles

For more information on the Community Profiles, contact Dan Jerrett, DRCOG

Regional Economist, at djerrett@drcog.org or 303-480-5644.

## Articles of Interest

MetroGIS recommends 7 counties make geospatial data free and open:
http://www.minnpost.com/politics-policy/2013/12/metrogis-recommends-7-counties-make-geospatial-data-free-and-open

Public Records Request Denied?
http://www.gisn8.com/2013/03/public-records-request-denied.html

Public Issue Participation Can Prevail
http://www.sensorsandsystems.com/article/columns/32300-public-issue-participation-can-prevail.html

Open data: Unlocking innovation and performance with liquid information
http://www.mckinsey.com/insights/business_technology/open_data_unlocking_innovation_and_performance_with_liquid_information

## Meetings

a. Materials from the 8/29 DRDC meeting
b. Next DRDC meeting is 2/27/14

## Contact us

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact DRCOG GIS Manager Ashley Summers at 303-480-6746 or asummers@drcog.org

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October, 2013

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*The Data Consortium consists of DRCOG members and regional partners with an interest in geospatial data and collaboration. The Data Consortium Newsletter is designed to improve communication among local GIS professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter is published quarterly.*

*Some links in this newsletter go to sites maintained by the federal government. These sites are not being maintained during the shutdown; the links should function correctly again once the situation in Washington changes. We apologize for the inconvenience.*

## Nederland uses LiDAR Data for decision-making

Article provided by Lex Ivey, TerraCognito GIS Services Principal. Lex can be reached at 303-258-3515 or lexivey@terracog.com.

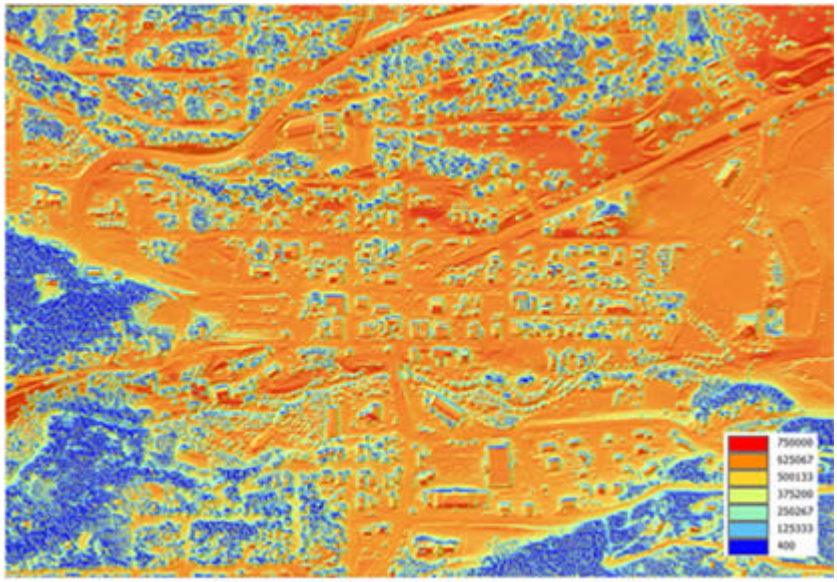
In the mountains of Boulder County, the Town of Nederland has begun using Colorado Water Conservation Board (CWCB) LiDAR for planning and design decision making. TerraCognito GIS Services has been retained by the town to process the raw LiDAR point data into usable contours and raster surfaces. The refined datasets will initially be used in mapping and modeling efforts related to the town's infrastructure master plan, but that's just the beginning. The town hopes to fully leverage this rich dataset in fire protection planning, storm water management, economic impact studies, solar radiation potential, and other projects requiring highly accurate mapping and visualization.

While LiDAR data is expensive and not normally available to small towns like Nederland, Mayor Joe Gierlach immediately saw the benefit of using the data resource. Having this highly accurate elevation information is crucial for land-use planning as well as conservation efforts, especially in mountainous areas. Mayor Gierlach and Lex Ivey are optimistic that making use of the CWCB LiDAR data will

help streamline public works-related operations of the town, help its Downtown Development Authority with a commercial floor space inventory, and help communicate information to residents when making decisions for the present and the future of Nederland.

Hillshade of Digital Surface Model (DSM) of downtown Nederland--First Returns

2-ft Contours of downtown Nederland




Solar Radiation Map (WH/m²)--downtown Nederland

## DRAPP 2014 update

The 2014 Denver Regional Aerial Photography Project (DRAPP) is picking up steam. RFPs were released in late August. We received a total of 16 bids: six for imagery, four for DAT, four for LiDAR and two for WMS.

During the first week of October, DRCOG distributed the bids to evaluation teams made up of potential DRAPP 2014 partners. This process of having our partners evaluate, score, and interview our potential vendors is essential to the success of DRAPP because it helps ensure the chosen vendor is acceptable to our varied partner group.

Scoresheets are due back to the DRCOG Project Manager Oct. 24. That means there is still time to participate in the evaluation process! Please get in touch ASAP if you would like to review bids from any of the categories (Imagery, LiDAR, Quality Control, WMS/Resale).

Based on the closeness of the scores, DRCOG will determine how many of the candidates to interview. We usually bring in the top two from each category. Interviews will be held sometime between Oct. 28 and Nov. 4. Approval of the vendors by the DRCOG Board will be sought Nov. 20.

Our next meeting will be held the morning of Nov. 21. All potential partners should attend. At that point, we will have chosen a vendor, and project costs will be known. This meeting will be the primary time for you to represent your organization's needs on a few remaining specifications before the final contracts are written with the vendor in January 2014.

Also, please be alerted that Letters of Intent (LOIs) will be going out earlier than normal for this project. The Letter of Intent (LOI) process is the means by which DRCOG solidifies the contract with partners and clarifies the amount due. These will be sent to potential partners in late November/early December and need to be signed and returned as soon as possible.

If you have questions or concerns, please contact Ashley Summers at asummers@drcog.org or 303-480-6746.

## Colorado Data Summit brings data community together

*Article provided by Brian Gryth with the Colorado Secretary of State's office. Brian can be reached at 303-894-2200, ext.6213 or Brian.Gryth@SOS.STATE.CO.US.*

The Colorado Secretary of State's Office recently created a Business Intelligence Center (BIC) to "aggregate public data and make it available to the widest audience in the most useful format." To this end, the BIC hosted a Colorado Data Summit in late August to encourage a more cohesive open data community, identify issues and opportunities, and determine next steps for this statewide initiative. Attendance included representatives from cities, counties, regional and state government, non-profits, universities, the health care industry and private technology firms.

For those of us in the GIS community, the issues surrounding inaccessible data are well known. Silo-ed or restricted data leads to duplication of effort, as each organization has to mine, "clean," and interpret similar datasets, instead of sharing one amongst themselves. Due to current data restrictions, each organization in the state that needs this information must request it, pay for it, and prepare it for analysis. This process not only wastes time and money, but creates inconsistencies between datasets and results that are supposed to be comparable.

Another identified barrier is lack of a governance structure for open data to guide standardization of data models and associated data products (e.g. metadata). A governance structure could also create a policy framework for data publishing that honors ownership and maintains data integrity.

The group went on to discuss the need for a central repository for data that could serve as a "one-stop-shop" for the State of Colorado. Currently, there are many data portals working toward this goal. The Colorado Information Marketplace, OpenColorado, and the Piton Foundation's Colorado Data Engine all serve out statewide data. DRCOG serves regional-level data through the Regional Data Catalog, and many local governments are beginning to put data on their own websites.

While there were many issues and barriers to be discussed, there are equally as many opportunities for success. For example, better illustrating the benefits of open data versus the perceived risks could help build momentum for change. Celebrating the organizations already ushering in change by sharing their own data, and engaging the data user community to provide organizations with feedback on data usefulness are other strategies that were discussed.

Next steps for this group include meeting again in a few months to continue this discussion and to make an action plan.

## What is a datum realization and why should we care?

Article written by Ashley Summers, DRCOG GIS Manager, inspired by Pam Fromhertz, NOAA NGS Colorado Geodetic Advisor. Ashley can be reached at 303-480-6746 or asummers@drcog.org; Pam can be reached at 303-202-4580 or pamela.fromhertz@noaa.gov.

In the world of GIS, we understand the importance of specifying the correct projection and datum of our data. To neglect this could cause misalignments or distortions that lead to error in our analyses. Even though we know this in theory, how many of us dig deeper into the accuracy issue and ensure that we are specifying the correct Datum Realization, Epoch and Geoid for all our datasets and capturing that in the metadata? Probably not many. That may need to change in the near future because with increasing capabilities of our data collection technologies (e.g. LiDAR) and more demanding project requirements (e.g. to support survey-level work), failing to understand and address these components could lead us down a rabbit hole of errors.

For those of us who haven't been in school for while or those who picked up GIS on the job, here's a little refresher on terms.

**An Ellipsoid** is a mathematical surface. Its dimensions are determined as a best fit to the world's geoid model and allows for easier calculation of positions.

**The Origin** in the past (e.g. for NAD27) was a point at Meades Ranch, KS based on the Clarke ellipsoid of 1866. The origin for more recent datums (e.g. NAD83 and WGS84) is the center of the earth's mass based on the Geodetic Reference System of 1980 (GRS 80).

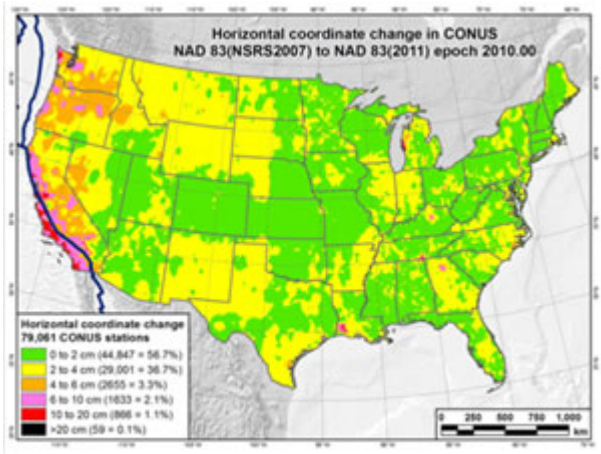



*Image from [http://www.spatial-ed.com](http://www.spatial-ed.com)*

**A Horizontal Datum** refers to the reference specifications of a system of coordinates. The datum will specify the ellipsoid and the origin.

**Datum Realization** (also referred to as a Datum Adjustment) occurs when the National Geodetic Survey (NGS) re-computes the positions of known points (i.e. survey marks) based on new data observations to account for technological improvements and movements across the earth's surface.

**An Epoch** is the date that the coordinates were held in the realization. An epoch is simply an extra level of granularity used to provide a time stamp of the positional information. This has become more critical in places that are very tectonically active (Note that Colorado is fairly tectonically stable, so we don't have to worry much about epochs).

**A Geoid** represents the gravity potential that approximates mean sea level.

To summarize those terms, let's dissect this coordinate system description:

**NAD 83(2011) epoch 2010.00.**

- NAD83 - North American Datum of 1983. This is the geodetic datum. It references the GRS80 ellipsoid.
- (2011) - The year of the latest NGS datum realization.
- epoch 2010.00 - The time stamp of when the observational data computations were held.

**Now the big question: Why do we care about these things?**

**Answer: Because it can affect the accuracy of our work.**
NGS has made four realizations to NAD83.

1. The **first realization** was released in 1986 before GPS (so it was 2-dimensional). The relative national network accuracy was at the 1m level.
2. The **second realization** was done on a state-by-state basis due to the advent of GPS, and exceeded the accuracies published in the 1986 realization. This realization occurred in Colorado in 1992. It is referred to as the High Accuracy Reference Network (HARN) realization and it increased accuracy nationally tenfold; to the 10cm level. Relative accuracy was actually at the 2 cm level here in CO from the HARN.
3. The **third realization** was released in 2007 - called NAD83 (NSRS2007) - and was based on approximately 70,000 monuments. The data from GPS observations on the monuments were tied to 700 stations in the Continuously Operating Reference Stations (CORS) network - called NAD83(CORS96). Due to the continuous GPS data collected by CORS, the nationwide accuracy level increased to 1cm, and again, Colorado remained at a relative accuracy at the 2 cm level. (Keep in mind that this realization, as well as the first two, has been officially superseded).
4. The **fourth realization** was released in 2011 - called NAD83(2011) epoch 2010.00. Observed data at approximately 80,000 NGS monuments were tied to 1195 CORS (IGS08) epoch 2005.00 and produced better absolute accuracy, both horizontally and vertically. If you use any of the NGS products or tools (e.g. Opus, NGS CORS data) it is best to use this realization to ensure consistency.

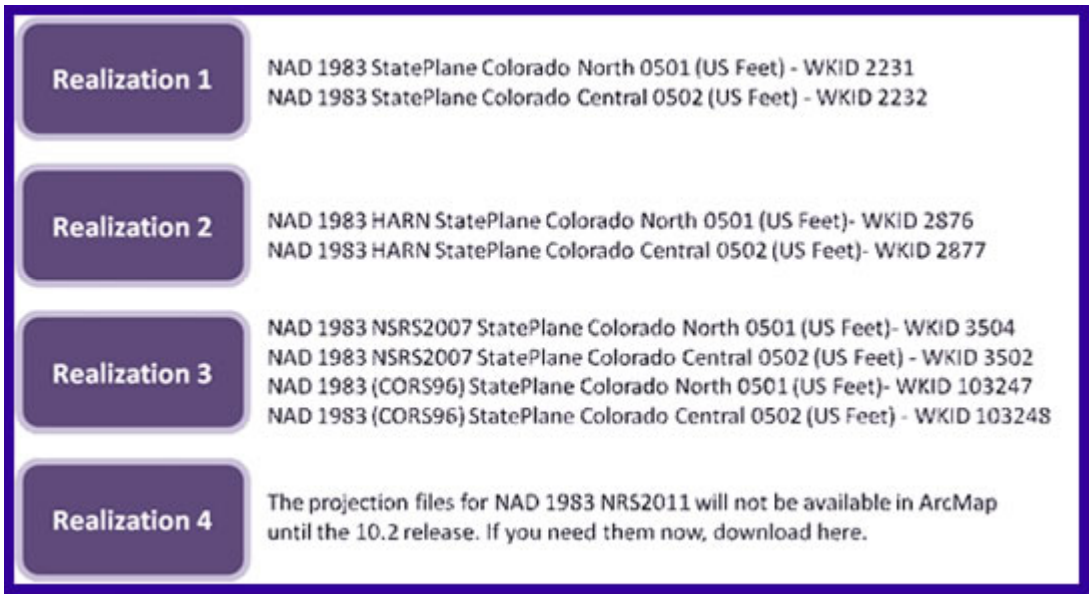
For much of the analyses that we do in government GIS, we are looking at data trends at a less-detailed level. Plotting incidents of crime, estimating canopy cover in urban landscapes, and determining a walkshed to a train station don't rely on sub-centimeter accuracy.

However, when you are building bridges, putting in water lines, or working with planimetric data (e.g. Edge of Payment or Building Outlines) the difference between 1cm, 10cm, and 1m could be substantial. It all comes down to what you are trying to do with your GIS data.

**The most important concepts to take away from this article are:**

1. **Consider updating your datasets to the most recent datum realization to stay in sync with NGS. If you can't do that, then...**
2. **Document, document, document the full projection and datum for all your datasets and data sources so that you and all users of your data know the level of error when the data is applied.**

**How to apply this knowledge in ArcMap:**
Most of us use a State Plane projection in US Feet - either North or Central, so that leaves us with the following eight options when mapping our data. Here's how we think they correspond to the realizations listed above.*




Read about the differences between CORS96 and NSRS2007 here.
Download NAD 1983 NRS2011 projection files here.

**Pam, Ashley, and ESRI Technical Support collaborated on crosswalking these projections to their corresponding realizations. With that said, the authors have not yet found official documentation that confirms these assertions.*

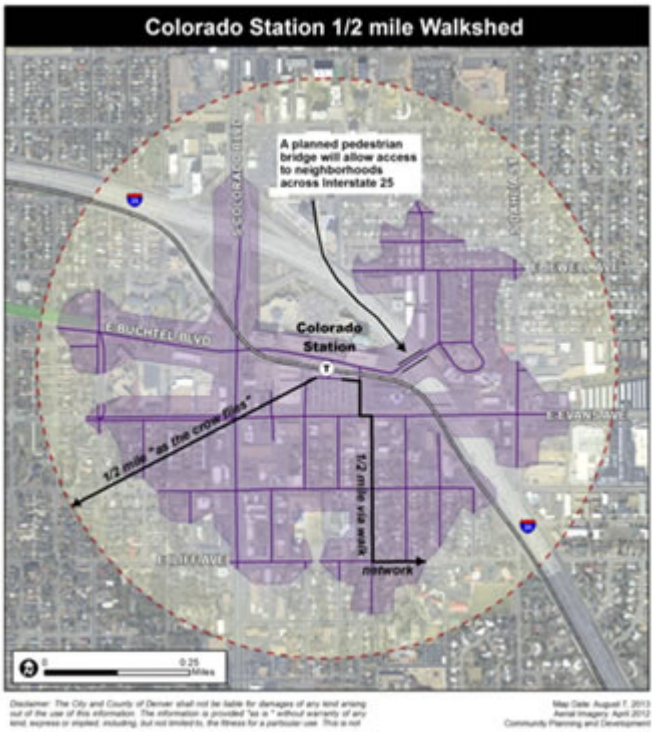
**Next Steps**
We will be featuring more articles and presentations on this topic through the Data Consortium over the next several months. In the interim, if you have specific questions or want more information on this complex topic, please contact Pam Fromhertz at NOAA.

## City and County of Denver maps walksheds around transit stations

*Article provided by Andrea Santoro with the City and County of Denver. Andrea can be reached at 720-865-2946 or andrea.santoro@denvergov.org.*

As the population of the Denver metro area continues to grow, improving mobility and transportation infrastructure is key to our region's success. We have seen the commitment to an expanded rail transit system with the Regional Transportation District's FasTracks program and the recent opening of the West Rail Line, connecting downtown Denver to Golden. As this system is being constructed and stations are established, transit area planning and Transit-oriented Development (TOD) have become a high priority for the City and County of Denver. Denver's Community Planning and Development Department (CPD) has taken the lead on this by maintaining a TOD Strategic Plan and adopting numerous station area plans specific to individual stations.

TOD is defined as the development surrounding a transit station, where the station is a key feature. TOD areas ideally contain high-density and a mix of land uses, where people can live and work and move around without dependency on an automobile. They are generally identified by their walkshed, which covers the distance it is assumed that people will walk to get to a transit station. For light rail and commuter rail, it is estimated that people are willing to walk approximately half a mile. In the past, CPD has mapped TOD walksheds "as the crow flies," which does not necessarily represent the area where people are physically able to walk. To produce more accurate representations of the transit station walksheds, CPD's GIS staff utilized Esri's Network Analyst to map a half-mile distance against a walk network, incorporating off-street trails, and taking into account barriers such as interstates, rivers, and railroads.




The process of mapping the walksheds began with preparing the base data, or the walk network, against which the analysis would be run. The street network was modified to exclude streets where people do not walk, such as highways and highway ramps. Pedestrian bridges and off-street trails were added in, as well as future connections and network intersections. The dataset is populated with key attributes for distance, walk speeds, and time traveled, which allow the software to map all possible half-mile routes traveling away from each station. An area is generated by connecting the half mile routes, creating the walkshed polygon. This map of Perry Station shows the traditional half-mile buffer as compared to the modified walkshed derived from the walk network. By mapping the actual half-mile walksheds, CPD is able to assess connectivity, identify barriers, and evaluate where potential infrastructure improvements would be most beneficial, and planners are able to more effectively plan for future development

## What can a public entity charge for electronic data in Colorado?

*Article provided by Dave Murray with the City of Westminster. Dave can be reached at 303-658-2140 or dmurray@CityofWestminster.us.*

I posed this question to one of our staff attorneys a few months back. There was a landmark case out of California this year; The Sierra Club vs. Orange County, which required the county to produce the records requested not to exceed the cost of duplication. Cost recovery could not be applied by the county and especially not to the tune of $475,000, which was the price of their landbase. While this case was out of California and not Colorado, legal rulings out of California can influence similar cases here.

So what does Colorado permit a public entity to charge under the Colorado Open Records Act (CORA) for electronic data?

1. Nominal research and retrieval fee for the information requested. A fee of $15 to $20 per hour has been upheld as a reasonable fee in Black v. S.W. Water Conserv. Dist., 74 P.3d 462.
2. The actual cost of manipulating data in order to generate a record requested by a person. CRS 24-72-205 (3).
3. If the public record is a result of computer output other than word processing, the fee for a copy, printout, or photograph thereof may be based on recovery of the actual incremental costs of providing the electronic services and products together with a reasonable portion of the costs associated with building and maintaining the information system. **Such fee may be reduced or waived by the custodian if the electronic services and products are to be used for a public purpose, including public agency program support, nonprofit activities, journalism, and**

**academic research. Fee reductions and waivers shall be uniformly applied among persons who are similarly situated**. CRS 24-72-205 (4)
4. All costs associated with records transmission but no fee for sending digital records via email. HB 13-1041.

In the case of a public entity that is charging for electronic data, the options suggested by our staff attorneys are:
**Option 1.** Work with Data Consortium members to persuade the charging entity that the data is being used for a "public purpose" and request the fee be waived per CRS 24-72-205 (4).

**Option 2**. Inquire as to other entities receiving this information from the public entity at no charge and convince the entity that the Data Consortium members are "similarly situated" as describe in CRS 24-72-205 (4).

**Option 3**. Ask the public entity the basis for the fees they charge so we can determine if the fees are consistent with CORA.

**Option 4**. If legally defensible, challenge the fee schedule in court.

The Data Consortium's mission is to provide members with the most current authoritative information to serve our customers. When some jurisdictions do not participate, we all lose. We are left scrambling to come up with data to fulfill our roles. This is why the effort to acquire data for public purposes is so important. Moving forward, I suggest we consider Option 1 when faced with government entities that charge for their data. A collective effort at making a formal request to waive fees for those of us in the public sector could be an effective course of action. Hopefully these entities would come to realize the greater benefit of sharing data and amend their current policies.

Options 2 and 3 would be the next steps to help us understand the scope of how data is being sold and to whom. As the CORA states, a portion of the cost of creating the data can be recovered. Do charging entities have a review schedule for their fees like many private- sector companies? Also, what constitutes a case where data is freely given to government entities and is it consistent with CORA? While jurisdictions like Denver and Broomfield have given up charging for digital data, what revenue is being generated by those that do? These are just some of the questions that would help us make a better case for data sharing.

The last option is not viable at this time. Court proceedings are expensive and time-consuming. Still, if it comes to that, there must be enough participants willing to fund an effort to make the case worthwhile. If you think of all the time wasted in duplicate effort, the economics become more favorable.

This is an ongoing effort that will discussed and followed up on at future Data Consortium meetings. If you have any comments or would like to discuss this effort, please contact Dave Murray at 303-658-2140.

**Additional reading:**
21st Century Sunshine: Modernizing CORA
What is a reasonable CORA fee?
Changing technology landscape requires changing open data policies

## What's the plan for the Regional Data Summit?

DRCOG hosted its largest Regional Data Summit to date last January. We had excellent attendee turnout, and a full day of thought-provoking presentations and discussions. Although DRCOG staff were pleased with the event, the post-event survey showed mixed results on how to move forward. The Regional Data Summit premiered in 2009 as a way to highlight the accomplishments of the Regional Data

Consortium - a group of GIS professionals in the region working "to support informed decision making in the Denver region by organizing, developing, maintaining, sharing, enhancing, and distributing regional data." As many of our regular Data Consortium meeting attendees know, this mission is challenging. Collaborating to create authoritative, regional data takes staff time, executive support, agreement on methodologies and schemas, and consensus on a data sharing policy. As the Data Consortium coordinator, I am happy to report that we are beginning to make progress on some of these components by encouraging a more open and collaborative Data Consortium meeting format and by issuing a quarterly newsletter that highlights our successes and challenges. With that said, there is a considerable amount of work to be done to get traction and until we make further progress, DRCOG is postponing the Regional Data Summit. When we meet again for this celebration, the role of the Data Consortium and the purpose of the Data Summit will be clearly defined and set up for success!

## Meetings

a. Materials from the 8/29 DRDC meeting
b. Next DRAPP meeting is 11/21/13
c. Next DRDC meeting is 2/27/14

## Contact us

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact DRCOG GIS Manager Ashley Summers at 303-480-6746 or asummers@drcog.org

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July 15, 2013

## In this Issue

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*The Data Consortium consists of DRCOG members and regional partners with an interest in geospatial data and collaboration. The Data Consortium Newsletter is designed to improve communication among local GIS professionals and features updates from all levels of government as they relate to data and geospatial initiatives in our region. This newsletter will be published quarterly.*

## Introducing DRCOG's cutting-edge land use model - UrbanSim

For the past few years, DRCOG has been hard at work developing a new land use model. Land use models start with information on the existing built environment, including current zoning rules, how land is being used, and what types of buildings, jobs and people exist where. Then, using data on development trends, population growth, and other socioeconomic factors, the model makes predictions about what our region could look like in the future. These predictions inform planning and policy and are an essential component of the Metro Vision process.

The new model, UrbanSim, is a cutting-edge tool with substantially more analysis capability than previous models. This increased capability comes from the detailed data that powers the model. DRCOG spent years compiling, cleaning, analyzing and standardizing local building, parcel, and job data to feed into UrbanSim,which will allow it to do analysis at the parcel level.

Currently, UrbanSim is being calibrated with a target date for completion in fall of 2013. Watch for more information about UrbanSim's launch in upcoming issues.

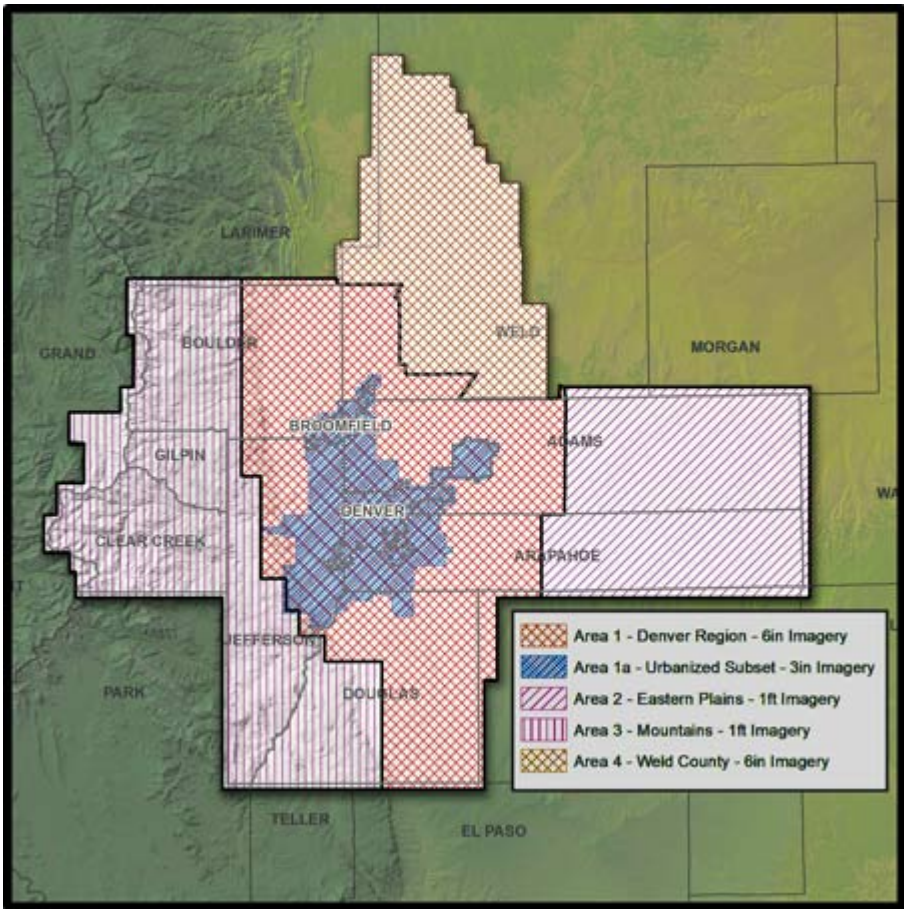
## DRAPP 2014 planning is underway

Planning for the next Denver Regional Aerial Photography Project (DRAPP) has

already started. Previous partners had asked that additional deliverables, such as Light Detection and Ranging (LIDAR) and 3-inch resolution imagery, be considered as part of the 2014 project. To accommodate these potential additions, the planning process started in April 2013 with budget discussions. A LIDAR workgroup was also formed to provide guidance for this type of acquisition. RFPs are being drafted for imagery, data acceptance testing, web-mapping services, and a LIDAR acquisition. These documents are being reviewed by groups of volunteers made up of interested and knowledgeable partners.

The preliminary DRAPP 2014 Timeline is:
**June 2013** - Provided RFPs to review workgroups
**July 2013** - Finalize the RFPs
**August 2013** - Release RFPs for bids
**October 2013** - Vendor selection
**November 2013** - Vendor approval by DRCOG Board
**December 2013** - Preparation of Scopes of Work
**March/April 2014** - Spring imagery flights (could also include LIDAR)
**June 2014** - Summer imagery flights (could also include LIDAR)
**Fall 2014** - Potential LIDAR flights (if they haven't occurred already)

If you are interested in volunteering throughout the RFP process, have any questions about DRAPP, or would like to join (new participants may join the 2014 project until early next year), please contact Ashley Summers at 303-480-6746 or asummers@drcog.org.



**Click here for larger view of map!**

## U.S. Census launches Geographic Support System Initiative

*Article provided by Jim Castagneri with the US Census Bureau in Denver. Jim can be reached at 720-962-3882 or james.d.castagneri@census.gov.*

The Geographic Support System Initiative (GSS-I) is an integrated program of improved address coverage, continual spatial feature updates, and enhanced quality assessment and measurement.

The Census Bureau designed this voluntary program to make the 2020 Decennial Census more efficient by collecting address and map information from its partners throughout the decade. By working with partners at all levels of government, the Census Bureau intends to create an accurate and up-to-date address list for most jurisdictions without the need for conducting a full address canvassing operation just before the 2020 Census. This will save time and resources during census operations as well as improve data collection and quality for current surveys, including the American Community Survey.

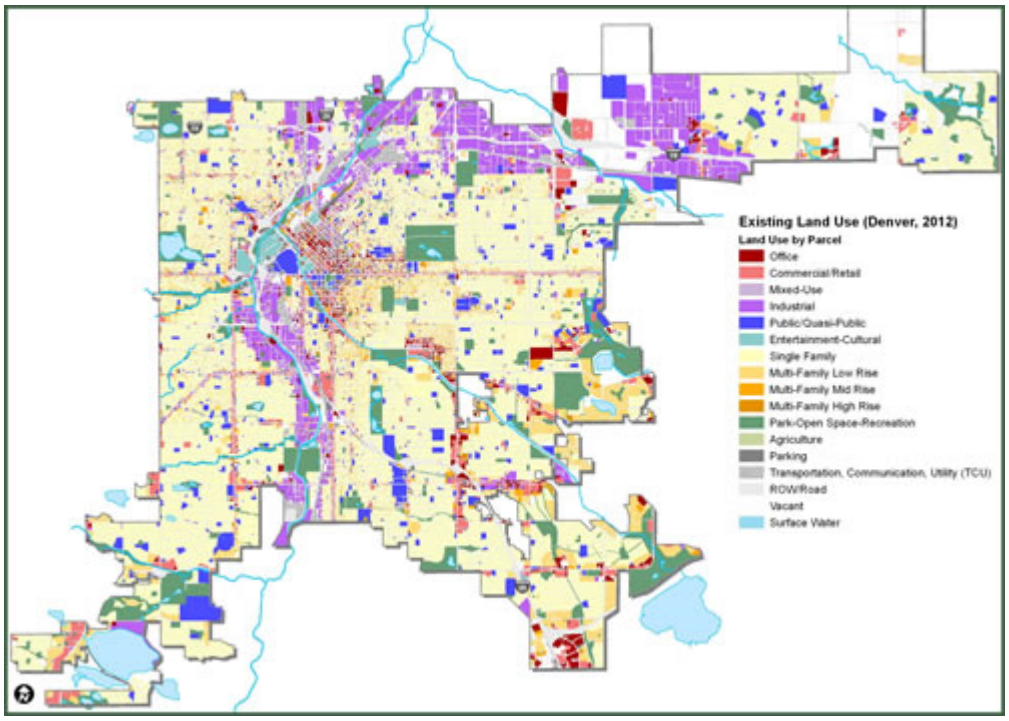
1. Address improvement: explore methodologies to achieve complete coverage and a current address list, concentrating on rural areas, Puerto Rico, and group quarters, and improving geocoding of all addresses to their location
2. Feature improvement: continual update of the street network and attributes to improve the matching of addresses to their correct geography
3. Quality improvement: broaden quality assessments and provide quantitative measures
4. Improved Partnerships: strengthen existing and develop new partnerships

Visit http://www.census.gov/geo/www/gss/ to learn more.

## DRCOG and the City and County of Denver collaborate to address local and regional planning needs

*Article provided by Andrea Santoro with the City and County of Denver. Andrea can be reached at 720-865-2946 or andrea.santoro@denvergov.org.*

Existing land use is a fundamental representation of the built environment in the field of urban and regional planning. Evaluating the current distribution of uses can tell a lot about the character of a landscape, while projecting future demand is critical to establishing a long-term, sustainable, land-use plan.




Several years ago, the City of Denver's Community Planning and Development Department (CPD) recognized that the Assessor's parcel data was not sufficient for analyzing existing land use consistently across the city. There are hundreds of tax classifications in the parcel layer, many of which do not represent true ground conditions. This drove CPD to derive its own more simplified and accurate land use layer. It was around this time that DRCOG was also developing a regional built environment layer for use in its predictive modeling software, driving another need for a generalized land use schema.

While the ultimate uses of these land use layers would vary between CPD and DRCOG, it seemed that creating a schema that could accommodate both needs and minimize redundant data processing would be the best approach. CPD and DRCOG drafted their initial land use classifications, and discussed those which overlapped or conflicted with each other. For example, DRCOG's multi-family classifications have a focus on ownership (apartment vs. condominium), while CPD's focuses on density (low-, mid-, or high-rise). To address this and other discrepancies, CPD incorporated two tiers of land use classes into their schema: Level I, which consists of 18 highly generalized classes, and Level II, which has a finer grained breakdown of uses. The Level II values translate directly to DRCOG's schema, while Level I accommodates the needs of CPD. Below is an example of how the schemas are related.

| CPD Land Use Level II | CPD Land Use Level I | DRCOG Land Use |
|---|---|---|
| Apartment Condominium | Multi-Family Low Rise | Apartment Condominium |
| Apartment Condominium | Multi-Family Mid Rise | Apartment Condominium |
| Apartment Condominium | Multi-Family High Rise | Apartment Condominium |
| Factory Manufacturing | Industrial | Industrial Industrial |
| Library School | Public/Quasi-Public | Government School |
| Museum | Entertainment-Cultural | Government |

As CPD and DRCOG continue to update their land use layers in the future, the groundwork laid through collaboration will make it simplify consistent updates.

## DRCOG distributing InfoGroup residential and business data

In September of 2012, DRCOG purchased business and residential data from InfoGroup (formerly InfoUSA) to supplement existing built environment data that feeds the UrbanSim Land Use Model. During the purchase, DRCOG negotiated a deal with InfoGroup that allows sharing these two datasets with DRCOG member governments and partners.

The Infogroup business and residential data are valued at $25,000, but were offered to DRCOG partners and members at no cost.

**Attributes include:**
**Business:** Company name, address, work at home information, modeled square footage, lat/long etc.
**Residential:** address, demographics, own vs. rent info, sale date, sell price, year built, square footage etc.

This data covers the entire DRCOG region and is accurate for 2012.

For access to this data, please contact Ashley Summers at 303-480-6746 or asummers@drcog.org.

## New additions to the Regional Data Catalog

A large amount of data was recently added to DRCOG's Regional Data Catalog, including 2012-17 Transportation Improvement Project data, updated Urban Center data, and several census and boundary layers created through collaboration with Data Consortium subcommittees.

Also available are the Municipal Boundary and County boundary dataset for 2013. The Data Consortium Boundaries Subcommittee decided to use agreement points from the Colorado North Central Homeland Security Region (NCR) as a guide to resolve boundary discrepancies when creating the 2013 Regional County Dataset. The NCR Agreement Points are agreed-upon locations between counties where a road enters or leaves their jurisdiction. Boundaries were not necessarily snapped to the NCR Agreement Points. The Regional Municipal Boundary Dataset also used NCR agreement points where municipal boundaries followed county boundaries. The Agreement Points shapefile is also available on the Regional Data Catalog.

The Data Consortium Census Subcommittee was tasked with making census tables easily linkable to existing census geographies and available for download. In the Regional Data Catalog a selection of tables are now available for download in .csv format. As this is only a small selection of the census data available, future additions could depend on user demand and feedback. From the 2010 Census, the following tables are available at the Block Group and Tract levels. The Tract data covers the entire state, while the Block Group data covers the Denver-Aurora-Boulder CSA (DRCOG + Park, Elbert, & Weld Counties).

- Urban And Rural
- Occupancy Status
- Vacancy Status
- Hispanic or Latino Origin by Race
- Sex by Age

From the 2011 American Community (ACS) 5-Year Survey, the following tables are available at the Statewide Tract level.

- First Ancestry Reported
- Poverty Status In The Past 12 Months by Sex by Age
- Aggregate Travel Time To Work (In Minutes) Of Workers by Sex (Also by Place)
- Means of Transportation To Work By Age (Also by Place)
- Family Income In The Past 12 Months (In 2010 Inflation-Adjusted Dollars)
- Commuting Matrix (2010, County Level Only, No Metadata table needed)

Each of the Census and ACS tables mentioned above also have a corresponding downloadable metadata table with full field definitions. The geographies these tables link to are already available for download in the Regional Data Catalog: 2010 Census Tracts, 2010 Census Block Groups, and 2010 Census Designated Places.

## Moving Open Data Forward

*Article provided by Scott Primeau with OpenColorado. Scott can be reached at scott.primeau@opencolorado.org*

When OpenColorado formed three years ago, one of the biggest questions about open data was "why?" Three years later, the question is "how?"

City, county, state, and federal governments across the U.S. and worldwide are seeing the value of publishing data for public consumption. You can see this in examples from Arvada, Denver, San Francicso, Cook County, IL, the U.S. federal government, and many others around the world.

Now we are working on how to make public data widely available. I use the term "public" because we are dealing with the public's data that governments hold. This data comes from citizens' and businesses' interactions with government.

Identifying, acquiring, and utilizing the knowledge, skills, and technology to publish large amounts of data is a challenge. Even for large governments that have the resources to set up a data catalog, open data competes with many other priorities, like education, health care, and public safety.

OpenColorado has been providing a solution to many of those challenges. By providing an easy-to-use, centralized data catalog OpenColorado is eliminating the infrastructure needed for governments and other organizations to publish data. Through http://data.opencolorado.org, an organization can upload a data set or link to a data set on the organization's servers.

Sharing data through OpenColorado builds a single source for Colorado city and county data. This allows the public to use information to build websites, apps, and other products that support commerce, entertainment, and overall well-being.

Real estate website Zillow is an example of how private citizens can develop government-held data into a useful product.

Thanks to government and private sector collaboration, entrepreneurs and innovators are developing many more tools from open data. Hack-a-thons have become a common event for governments and other organizations to promote open data and fuel business development.

Cities around Colorado have felt the hack-a-thon enthusiasm and have held several events in the past year. Starting with the Code for Communities hack-a-thon in July 2012, Colorado citizens have hacked in Longmont and at Hack4Colorado, the largest hack event on the National Day of Hacking. OpenColorado has been a proud supporter of those events and very excited to see open data coming to life.

Please visit our website, check out our data, and stay in touch

## Contact us

For more information on any of the topics mentioned in this newsletter or if you have an idea for an article, please contact DRCOG GIS Manager Ashley Summers at 303-480-6746 or asummers@drcog.org

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