

Welcome to GIS Day 2022!

Taking Santa Clara County into the future with GIS technology

November 2, 2022

Emerging Geospatial Applications in Local Government:

How the County of Los Angeles leverages geospatial capabilities to support planning and decision-making

Steven J. Steinberg, Ph.D., MPA, GISP

Geographic Information Officer
County of Los Angeles, California



Los Angeles County
Enterprise GIS



Presentation Overview

- Los Angeles County background
- Why local government uses maps
- Geospatial examples
- Data acquisition and use
 - Ground-based data
 - Image data
 - Future Directions
- Supporting government use of spatial data
- Closing comments

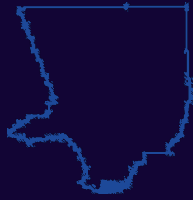




Los Angeles County Snapshot

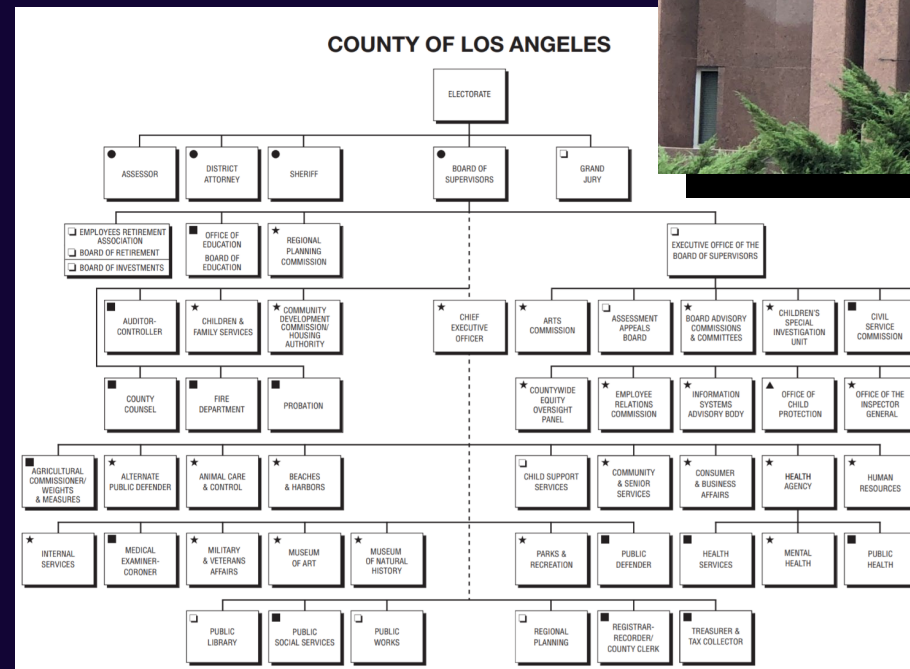
- Population of over ~10 million residents.
 - Largest county, **by population**.
 - If it were a state, would be one of the 10 largest.
- Land area of over 4000 square miles.
 - Over 65 % of this area is unincorporated.
- County is responsible for all government services in unincorporated areas.
 - County provides contract services to more than 50 cities.





Los Angeles County is **big** and complex!

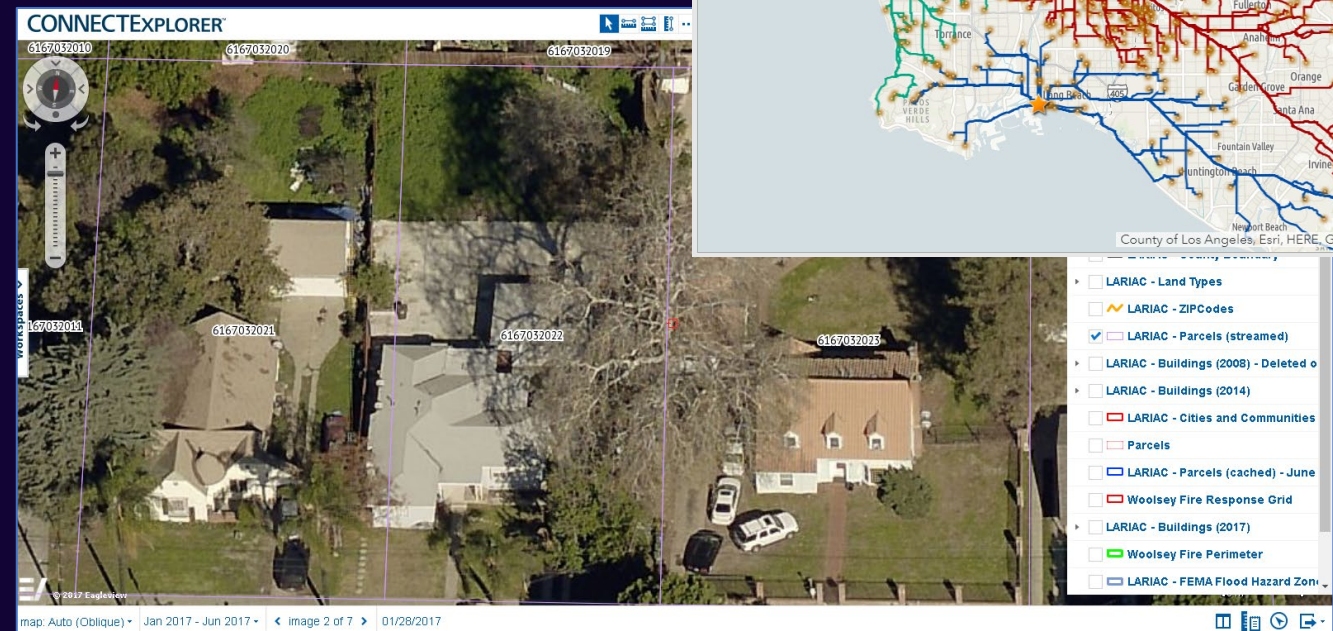
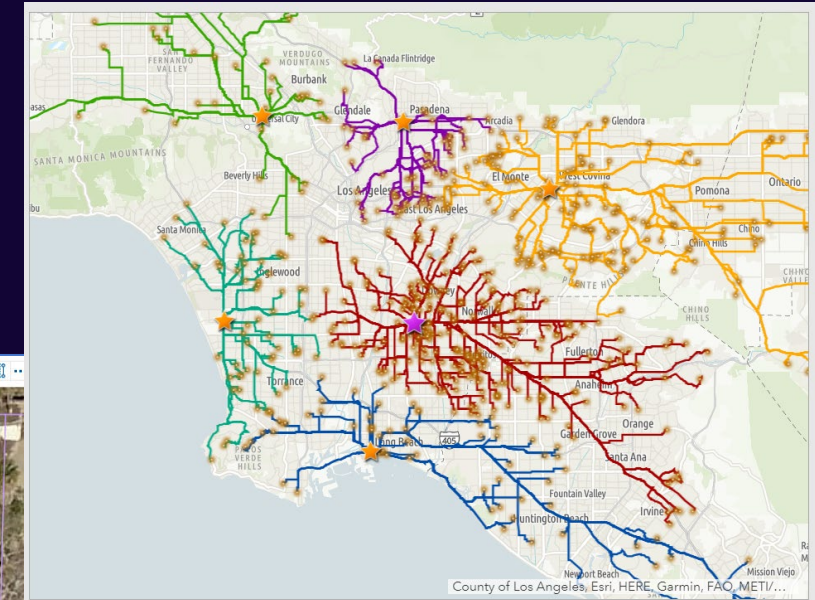
- Over 35 County Departments; ~200 committees & commissions; and over 500 school, sanitation and water districts.
- **>110,000** employees.
- **> 4,000** public buildings.
- **~63,000 acres** of parks, natural areas, and gardens.
- 2022-2023 operating budget **\$44.6 Billion**.





LA County Enterprise GIS

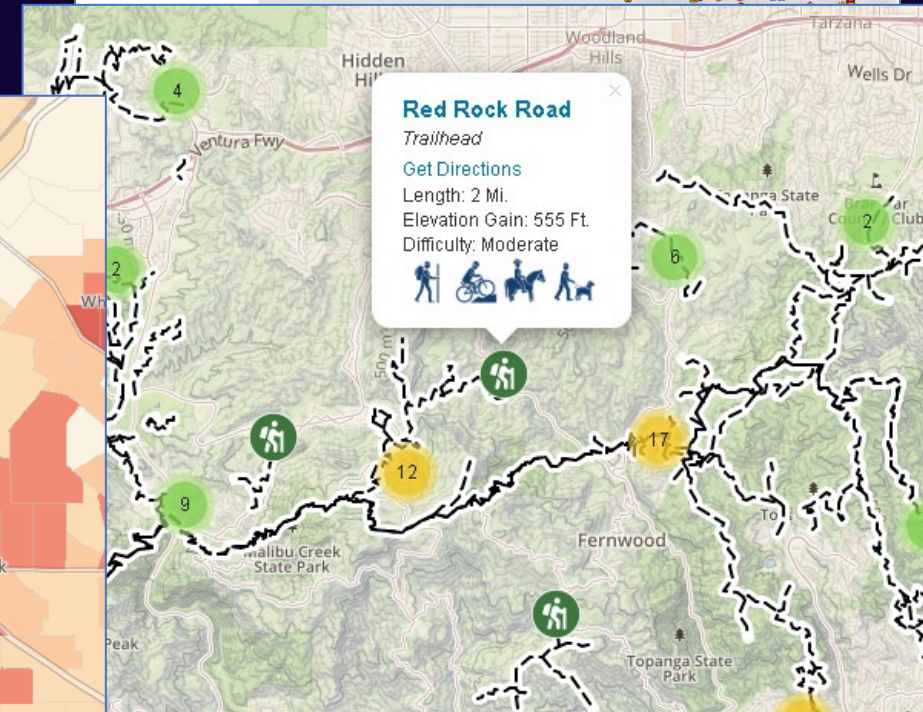
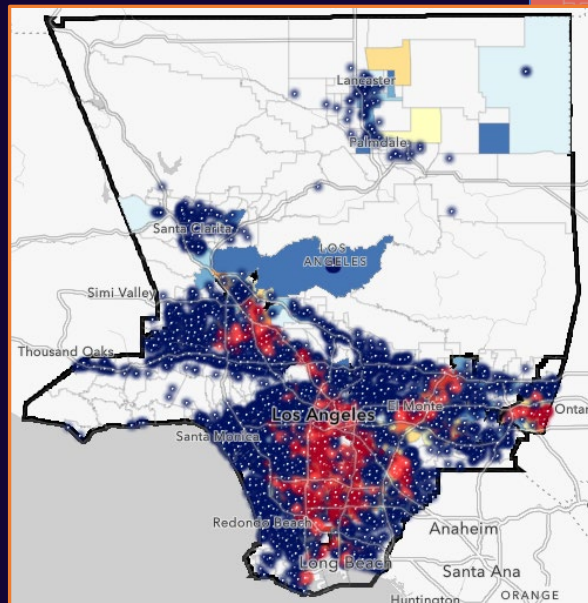
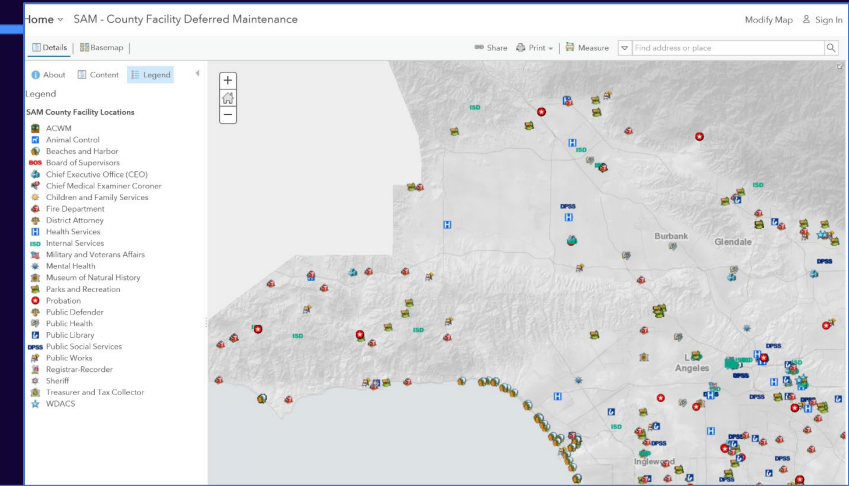
- Provides for centralized, efficient service provision
 - Common/shared infrastructure, software, workflows, and data
- Many functions have migrated from the field to the desktop (esp. during COVID-19).
- Those that must be field based can be better optimized.





Why does government care about maps?

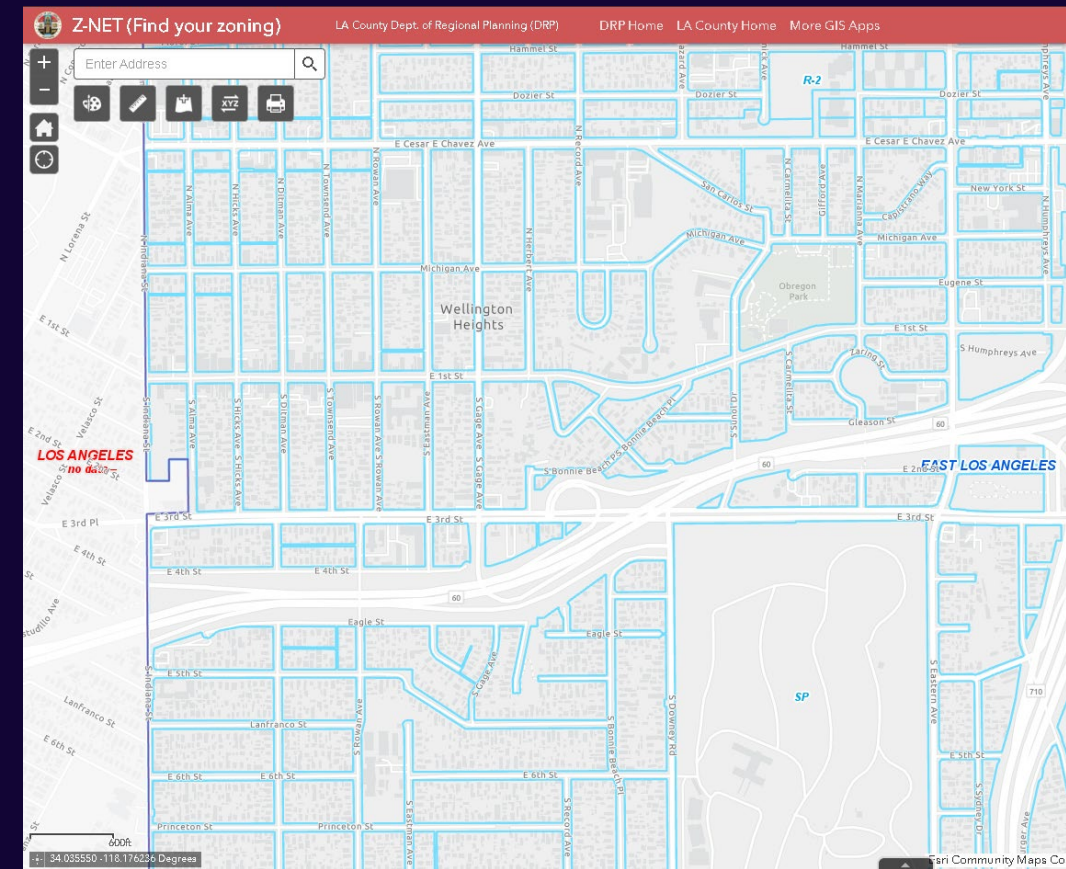
- Service provision (parks, clinics, schools, grants and funding, etc.)
- Public Participation (e.g., voting, census, community meetings...)
- Tax and fee assessments
- And much more...





The business of government IS location-based.

- This includes location-based information from a variety of sources.
 - Databases, imagery, etc.
- Some data are collected explicitly with mapping / spatial analysis in mind.
- Some data are not, but still *include* location in some form
 - APN, address, jurisdiction, service area, facility name, census block, etc...





Addressing (CAMS)

What is the Countywide Address Management System (CAMS)?

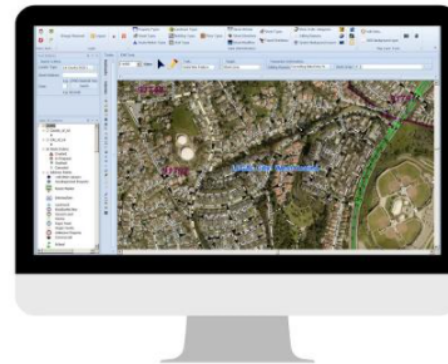
Los Angeles County established the Countywide Address Management System (CAMS) as a centralized repository of authoritative physical (situs) addresses. The Internal Services Department (ISD) Enterprise GIS Program (eGIS) manages and maintains the infrastructure behind the successful program. CAMS is critical for effectively providing services used by many departments in Los Angeles County. When used in tandem with other essential County data systems, CAMS helps support the health, safety and welfare of those who live and work in the County of Los Angeles.

CAMS includes three component parts Data, Applications, and GeoSearch functionality.

CAMS Data



CAMS Applications



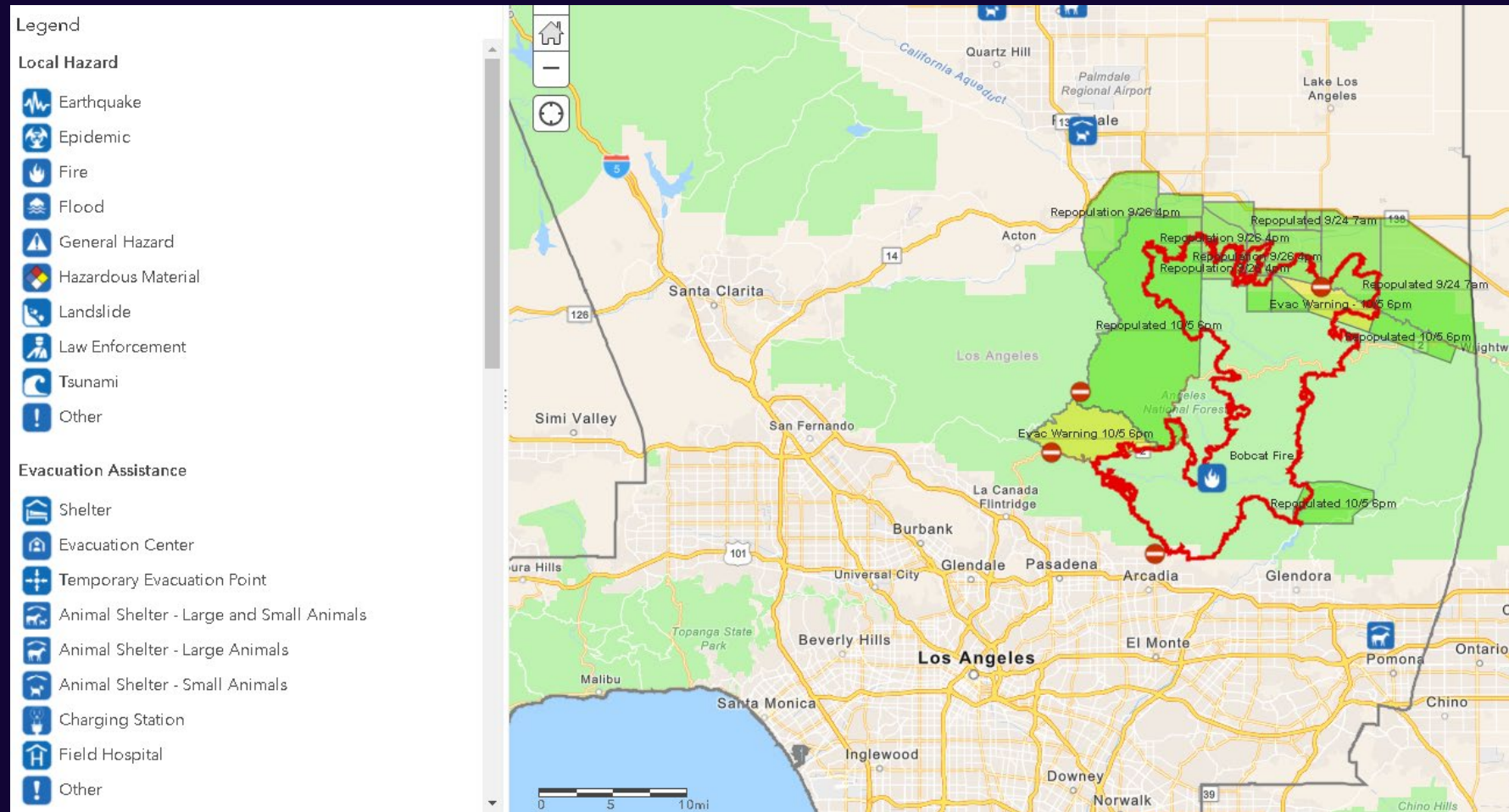
CAMS GeoSearch



<https://cams-lacounty.hub.arcgis.com/>

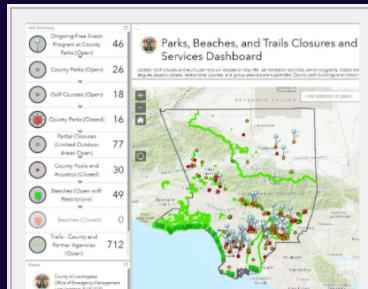


Bobcat Fire Evacuation/Repopulation Zones





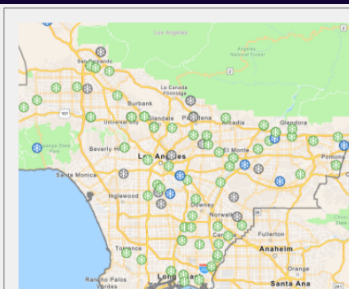
COVID-19 Public Applications



County of Los Angeles COVID-19 Parks, Beaches, and Trails Openings / Closures and Services Dashboard

Application providing areas to stay active.

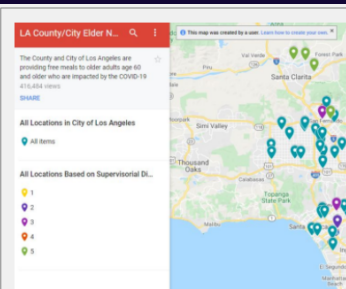
[View the App](#)



County of Los Angeles Cooling Centers

Stay Cool
Find Your Local Cooling Center in LA County

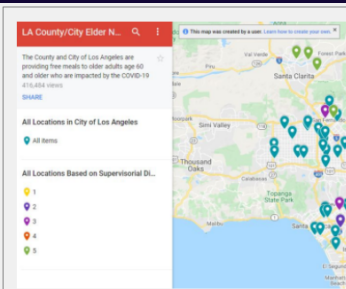
[View the App](#)



County of Los Angeles COVID-19 LA City/County Elder

Application providing meal information for older adults.

[View the App](#)



County of Los Angeles COVID-19 LA City/County Elder

Application providing meal information for older adults.

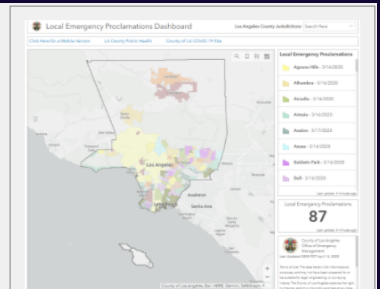
[View the App](#)



County of Los Angeles COVID-19 Food Resources Hub

Application providing food resources in Los Angeles County.

[View the Site](#)



County of Los Angeles COVID-19 Local Emergency Proclamations Dashboard

Dashboard providing local emergency proclamations for Los Angeles County.

[View the App](#)

<https://covid19.lacounty.gov/dashboards>

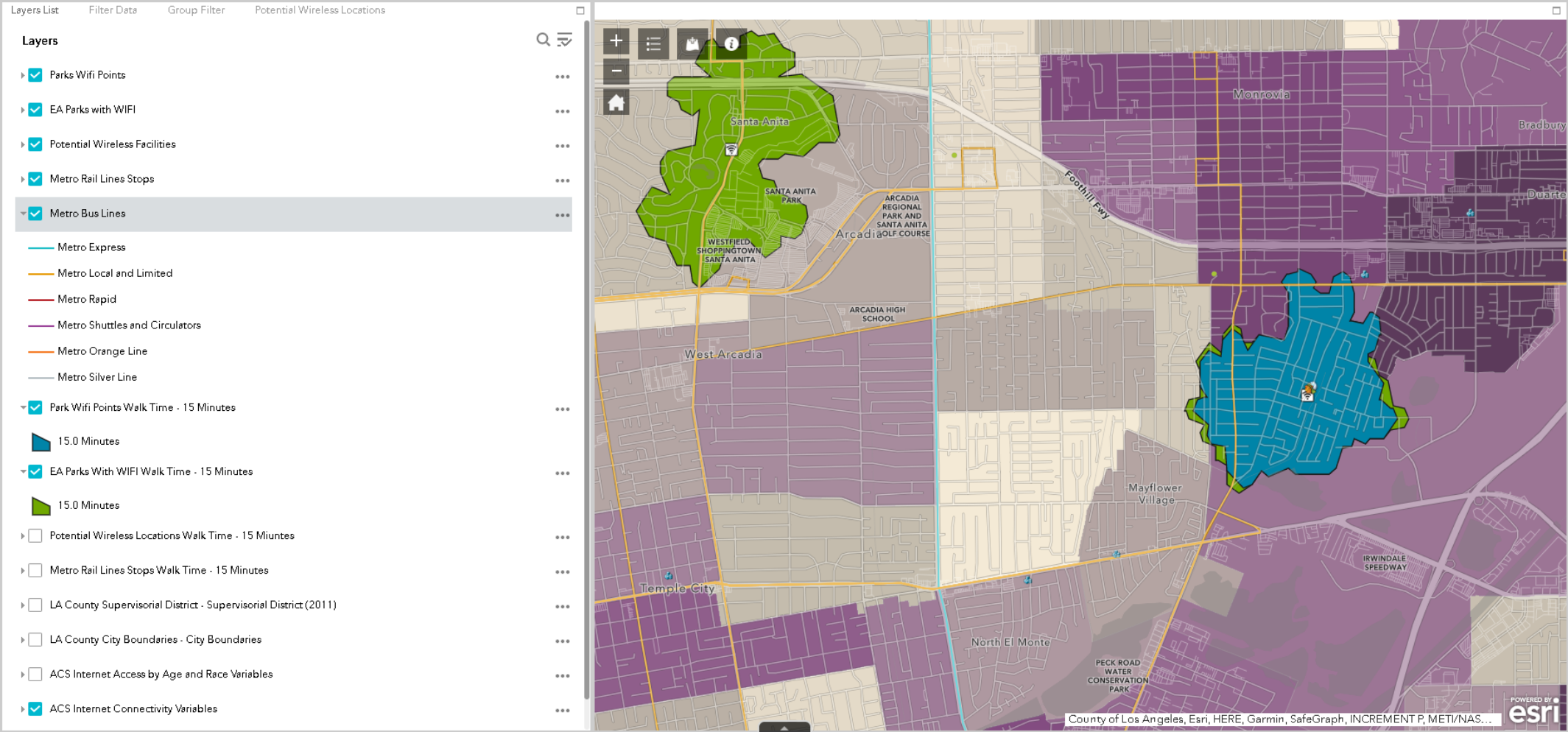




Location Analytics

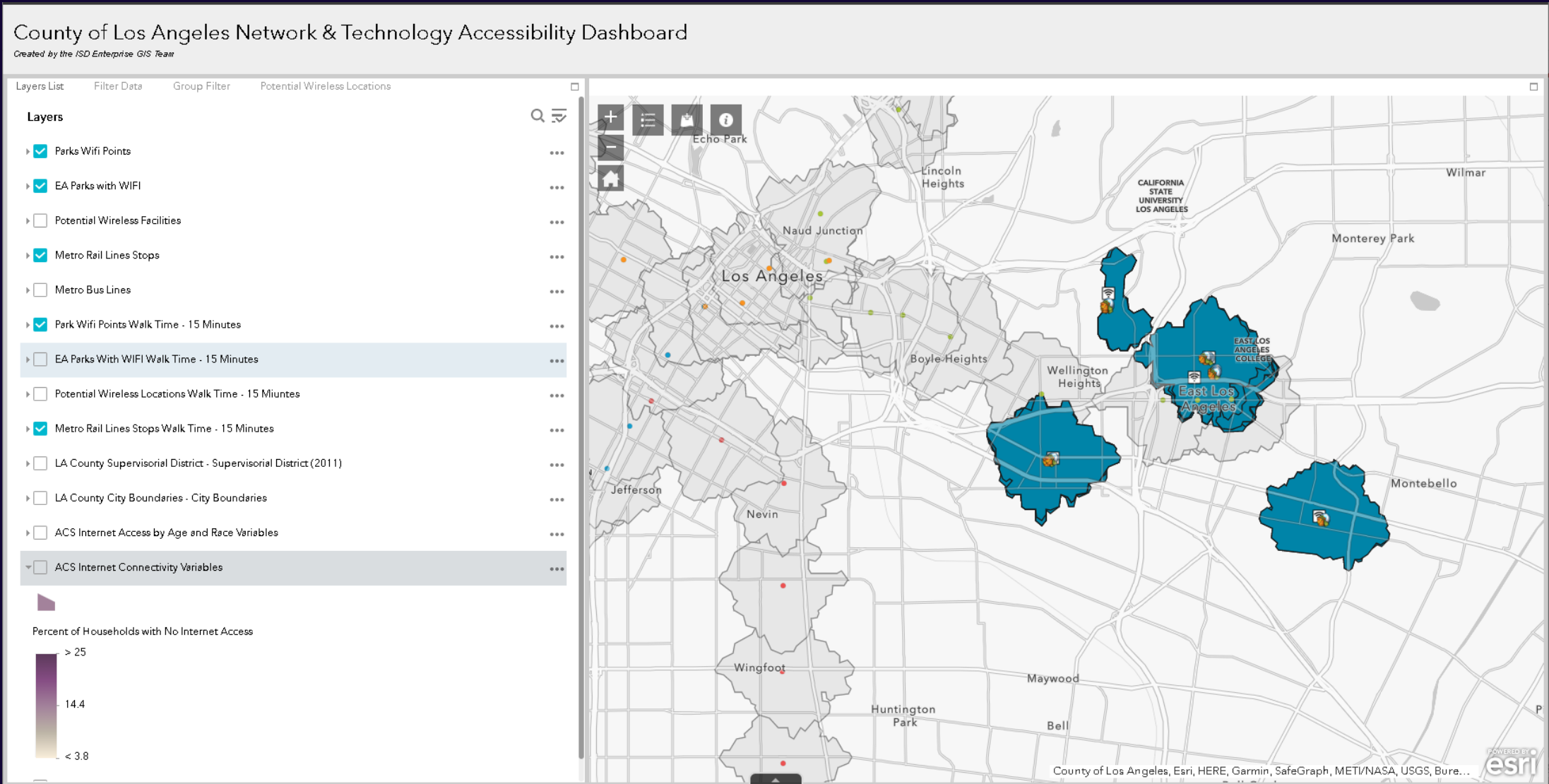
County of Los Angeles Network & Technology Accessibility Dashboard

Created by the ISD Enterprise GIS Team





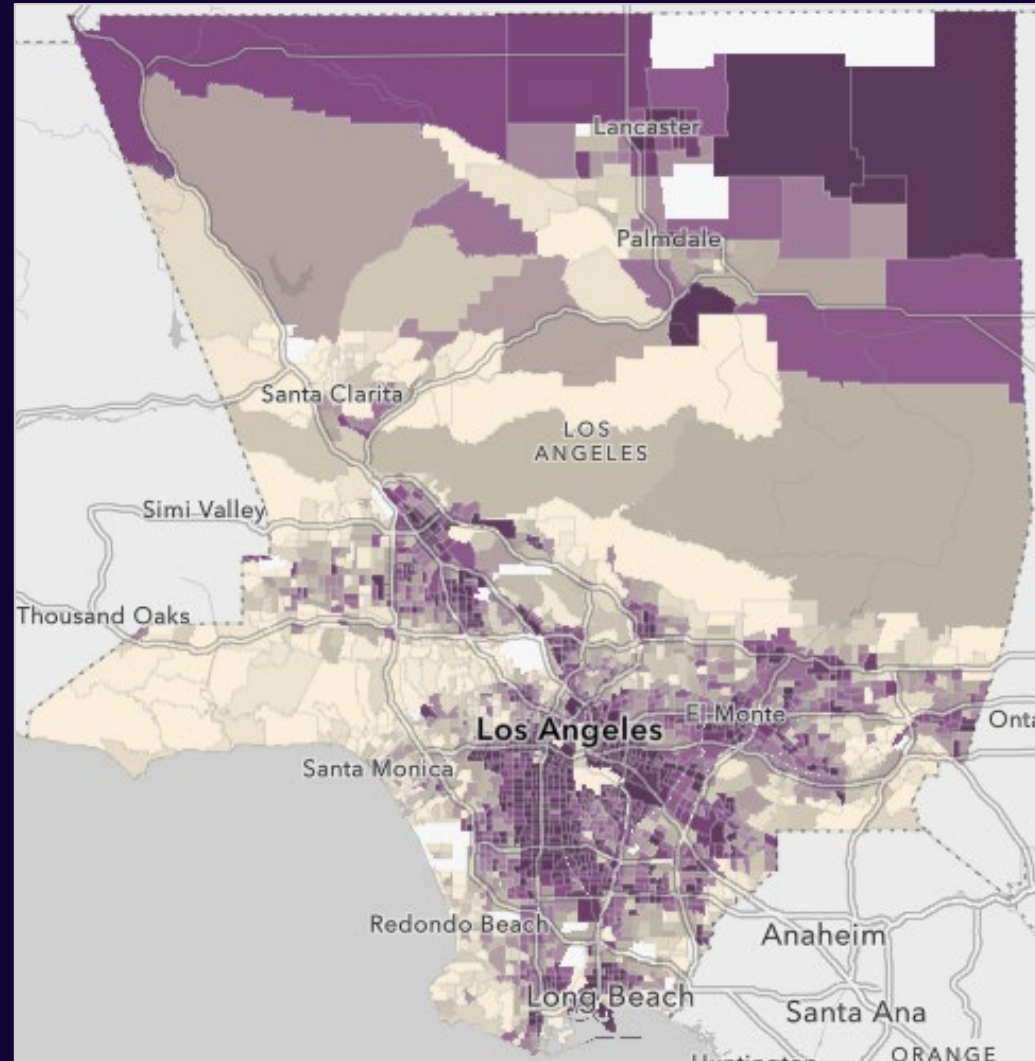
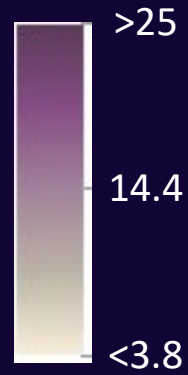
Location Analytics





The Digital Divide

Percent of Households with No Internet Access





Public WiFi Locator

LA County Hotspot Locator ...locate wifi near you

Find WiFi

Search for an address or locate on map

Find address or pla

Show results within 1 Miles

0 5

Select filters to apply

About

Welcome to the LA County Hotspot locator

There are three ways to search for WiFi hotspots:

- Enter an address in the search box. Search for an address or locate on map
- Click on the icon to search based on your current location using GPS in your phone or tablet.
- Select the location pin icon and then click a location on the map
- The initial search distance is 1 mile. You may expand the search radius with the distance slider. Show results within 1 Miles

10mi
-117.081 33.919 Degrees

County of Los Angeles, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau





How Los Angeles is Deleting the Divide



www.deletethedivide.org



DTD DELETE THE DIVIDE™ Home Programs Data Apply About Login / Sign Up

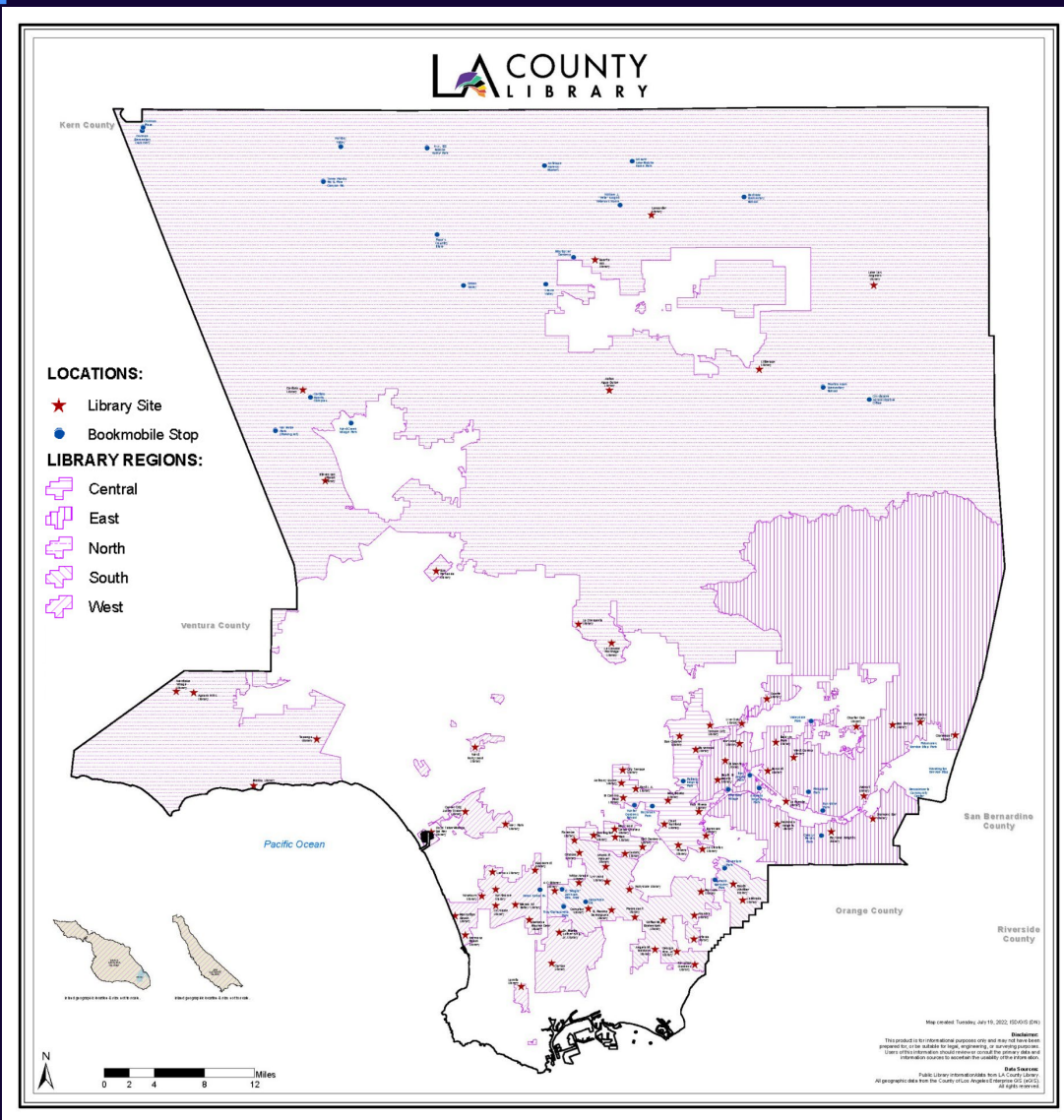
Digital inclusion means everyone is connected

Delete The Divide is an initiative led by the County of Los Angeles to advance digital equity in underserved communities through partnerships, infrastructure investments, and technology resources that empower residents and small businesses

How you can get connected



County Libraries (85) and Schools



Los Angeles County

1.4 Million
Students



70%
(1,007,933)
Socioeconomically
Disadvantaged

258,775
English Learners



169,718
Students with
Disabilities



63,117
Students
Experiencing
Homelessness



26,110
Foster Youth



80 K-12 School Districts



48 Unified
27 Elementary
5 High School

Largest:
LAUSD/440,365*
Students

Smallest:
GORMAN SD/74*
Students

1,840 Schools **372** Charters **73,737** Teachers

* Does not include charter schools

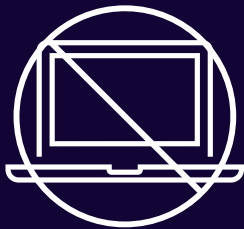




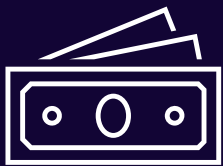
The Divide is Real



365,000 households without internet services
These households are disproportionately located in *low-income* areas and the populations are *predominately Black and Latinx*.



182,000 households without home computers
A computer and reliable internet service are essential to accessing education, employment opportunities, healthcare services, financial resources, support networks, and commerce.



1,100,000 households earn less than \$50,000 a year

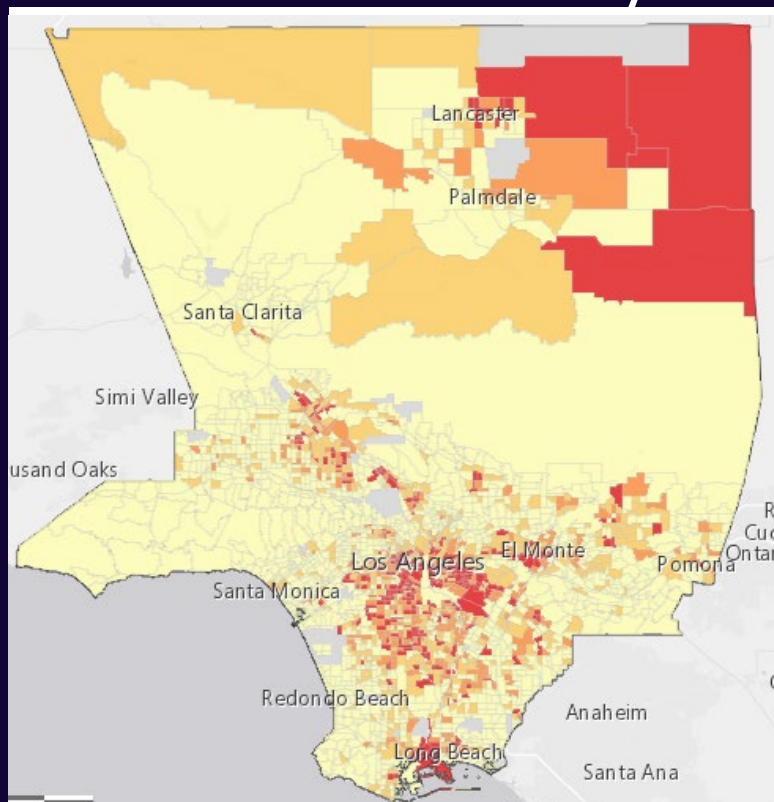
Source: U.S. Census (2019)



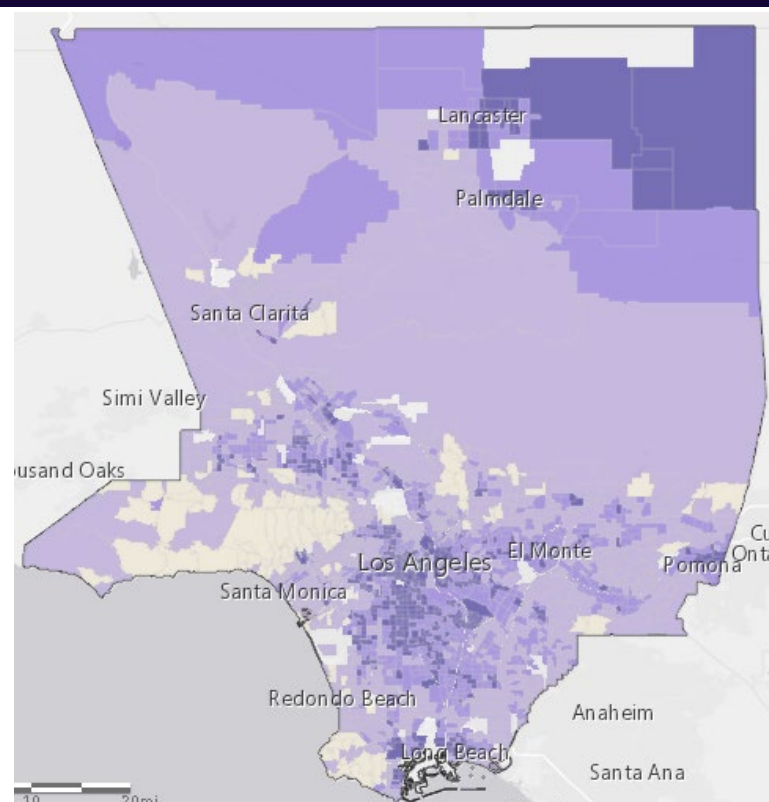
Connectivity

Income

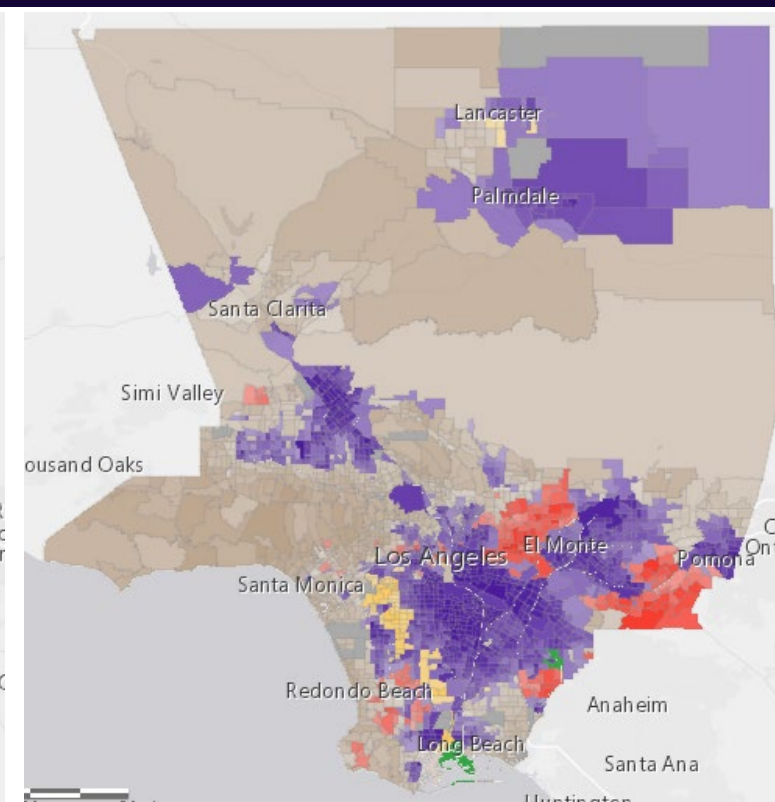
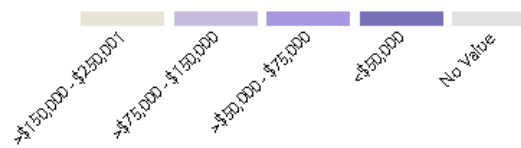
Race



Percent of households where no one can connect to or use the internet using a paid service or any free service.



Median household income in the past 12 months.



Predominant population living within an area broken down by race and Hispanic origin.





Equity Mapping

Equity Explorer

[Projects Dashboard](#)
[Projects Viewer](#)
[How to Use the Explorer](#)
[About the Layers](#)

Core COVID Filters
Thematic Filters

COVID-19 Vulnerability and Recovery Index Filters ☑

Overall Equity Index is at least

Index Need Category is any of 0 Selected

HUD Qualified Tracts Filter ☑

COVID-19 Vulnerability and Recovery Index Component Filters ☑

CSA Filter ☑

Supervisorial District Filter ☑

Equity Index

Census Tract 600304

Overall Equity Index Score: **92.03**

Possible scores range from **0** (lowest need) to **100** (highest need).

A score of **92.03** indicates **HIGHEST** need.

Map Layer List

- Boundaries - Supervisorial District (Current) ...
- Boundaries - School Districts ...
- Boundaries - HUD Qualified Census Tracts (2022) ...
- Business - Community Business Enterprise (locations) ...
- Food - CalFresh Gap Analysis (tract) ...
- Historical - Neighborhood Redlining Grade ...
- Homeless Count (csa) ...
- Household Characteristics - Disability Status (tract) ...
- Household Characteristics - Foreign Born Population (tract) ...
- Household Characteristics - Health Insurance (tract) ...

Map Legend

Index - COVID Vulnerability & Recovery (tract)

Need Tier

- HIGHEST (5)
- HIGH (4)
- MODERATE (3)
- LOW (2)
- LOWEST (1)

County of Los Angeles, California State Parks, Esri, HERE, Garmin, SafeGraph, MET/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA | The Advancement Project, Los Angeles... Powered by Esri

Selected Tracts 2,495	Population 10,040,682	Avg Index Score 50	Avg Index Quintile 3
--------------------------	--------------------------	-----------------------	-------------------------

The above statistics are based on the core COVID filters and do not account for the thematic filters
Have questions? Contact us at race-equity@ceo.lacounty.gov



ceo.lacounty.gov/recovery/arp-equity-dashboard/



Equity Mapping



Esri User Conference 2022
Special Achievement in GIS





And many, many more uses...

BUT...

...where do these **data** come from?

Geospatial applications

and the answers they provide



are only as good as the data behind them!





Some data we collect directly

- Data ingested through regular county business processes
 - Taxation and property records
 - Building permits
 - Business licenses
 - (New) parcel/street name assignments
 - County services (Health clinics, Social Services, etc.)
 - Internal planning/infrastructure data
 - Field surveys and mapping (e.g., public works, parks, agriculture)
 - And many more...





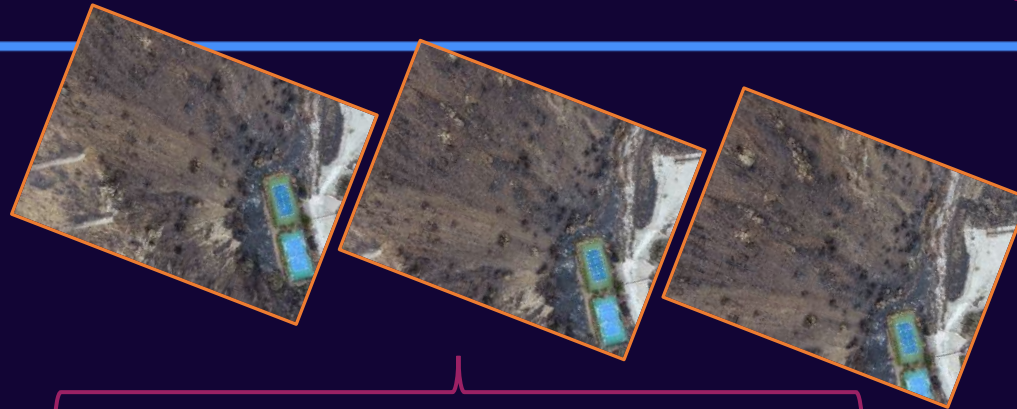
sUAS mapping

- sUAS = small unpersoned aerial systems
 - Multiple county departments exploring applications of these technologies at the site scale.





sUAS mapping



~30 min and 200 of these images provide a geolocated 3D model.



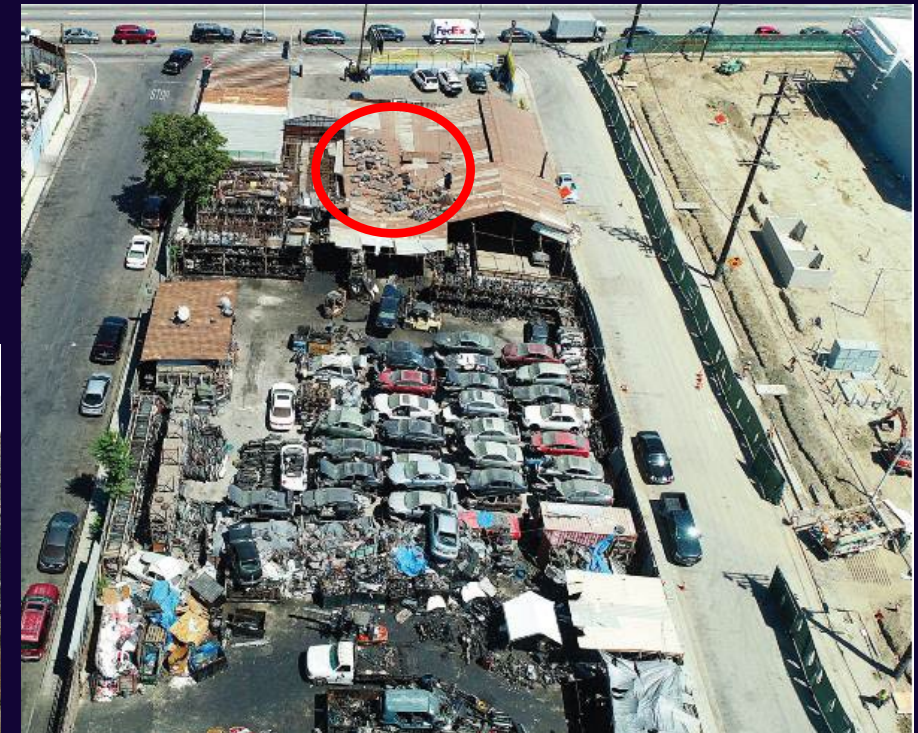
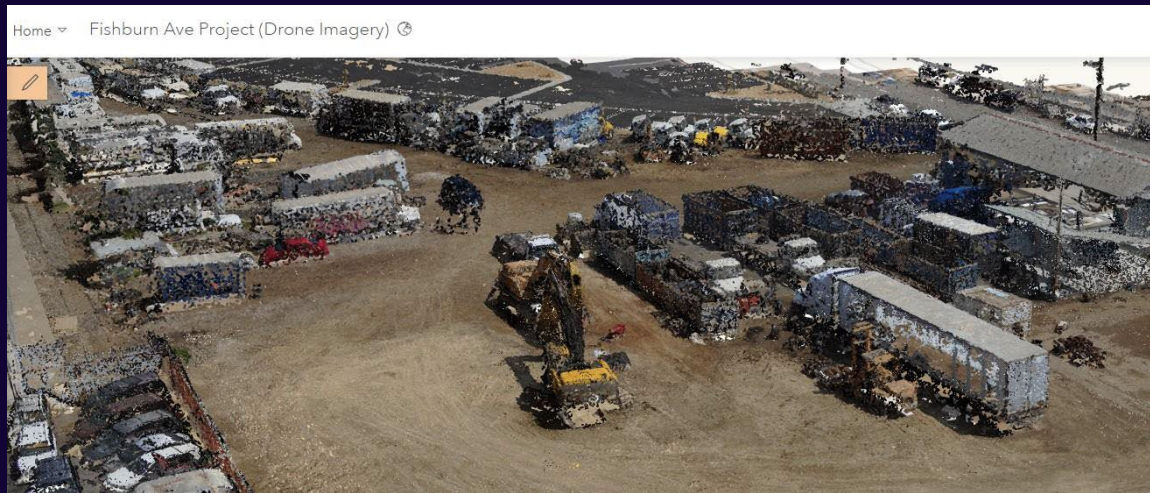
Woolsey fire damage assessment w/ LA County Fire





sUAS for site inspections

- Useful in a variety of code enforcement applications
 - Permit Inspections
 - Illegal dumping
 - Rooftop equipment
 - Industrial properties
 - Property Encroachments





“LARIAC is multi-jurisdictional purchasing arrangement that enables participating local governments and agencies to benefit from combined economies of scale to efficiently and cost-effectively acquire high-definition aerial data.”

- Government has a long history of using imagery from airborne systems

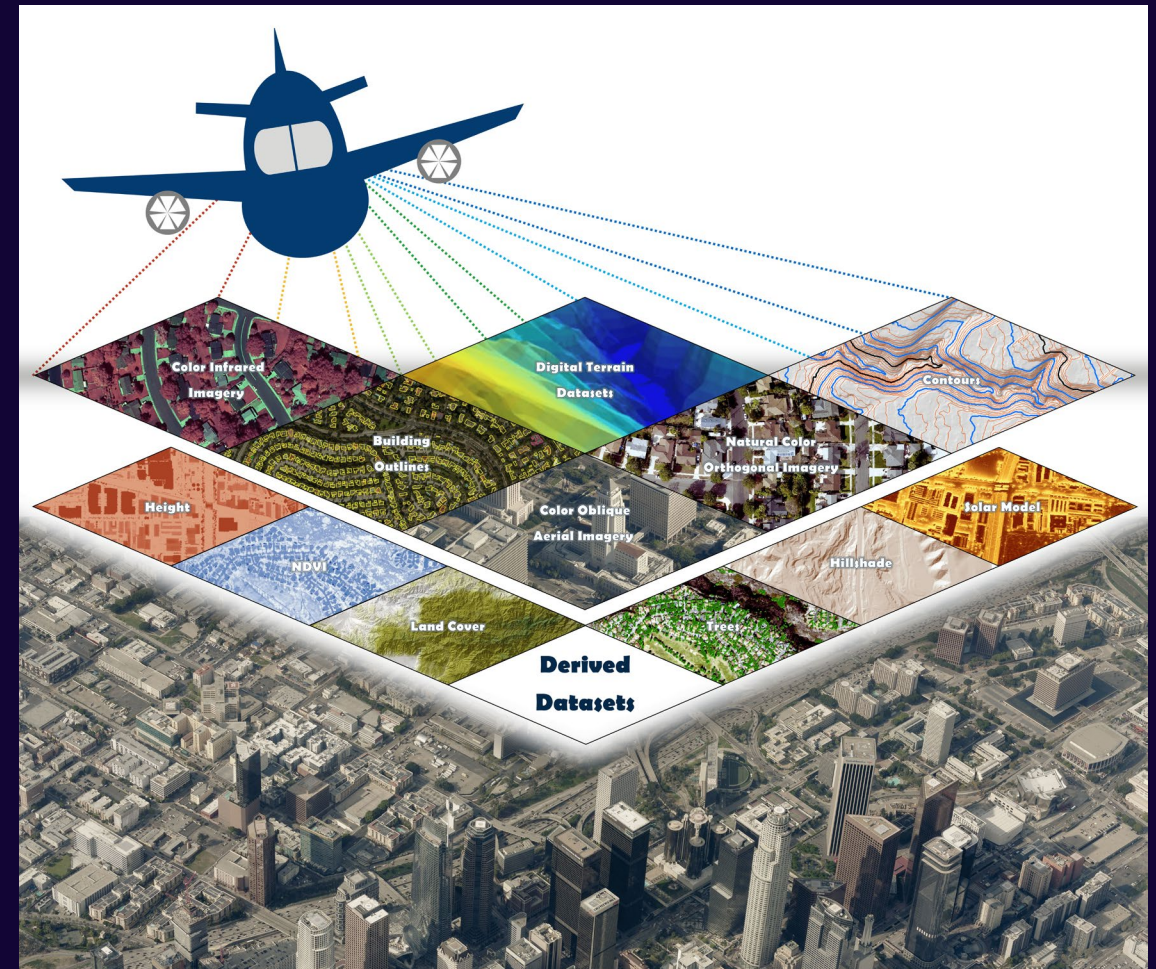


lariac-lacounty.hub.arcgis.com





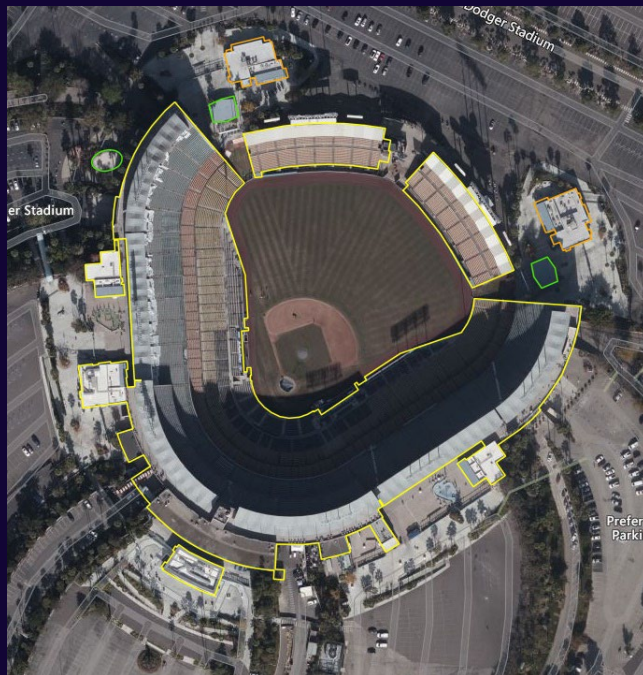
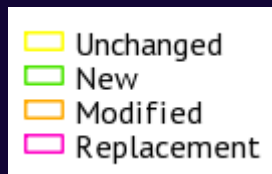
- Established in 2005.
- Each cycle is three years.
 - Completing our 6th cycle (2020-2022)
- Members “buy in” each cycle
- Resources are leveraged and optimized through collaboration
 - 30-40% saving vs. purchase from vendors
 - Overhead cost savings of 60-80%
 - Shared best practices/technical knowledge
 - Consistent dataset across jurisdictions
 - Derived data products





Products

- Topographic mapping (surface model) and 2ft contours
- Building footprints and change (new, modified, replaced) 3yr cycle
- (occasionally) LiDAR and other derived products





Imagery is crucial in change assessment





Bobcat Fire (Sept. 2020)

Bobcat Fire Post-Disaster Imagery provided by GIC/Vexcel Imaging

Find address or place

1 layer(s) selected

Angeles National Forest

100ft
-117.859 34.414 Degrees

Microsoft | Esri, HERE, Garmin, iPC **esri**

The image shows a web-based map interface. The main view is an aerial satellite image of a forested area. In the lower-left quadrant, there is a parking lot with several cars and a few buildings. A red pin is placed on one of the buildings. To the left of the parking lot, the text 'Angeles National Forest' is visible. The interface includes a search bar at the top with the text 'Find address or place', a zoom control on the left, and a layer selection indicator showing '1 layer(s) selected'. On the right side, there is a vertical strip showing a zoomed-in view of a rocky, charred area, likely a fire scar. At the bottom left, there is a scale bar for 100 feet and coordinates: '-117.859 34.414 Degrees'. At the bottom right, there are logos for Microsoft, Esri, HERE, Garmin, and iPC, along with the Esri logo.



Bobcat Fire (Sept. 2020)

Bobcat Fire Post-Disaster Imagery provided by GIC/Vexcel Imaging

Find address or place

1 layer(s) selected

geles tional Forest

Microsoft | Esri, HERE, Garmin, iPC

POWERED BY esri



Bobcat Fire (Se

Bobcat Fire Post-Disaster Imagery provided by GIC/Vexcel Imaging



100ft
-117.857 34.415 Degrees



What's next?

- Data from additional perspectives
- Leveraging emerging tools for ML/AI feature extraction
- Speed process of data collection and analysis
- Extend applications into new realms



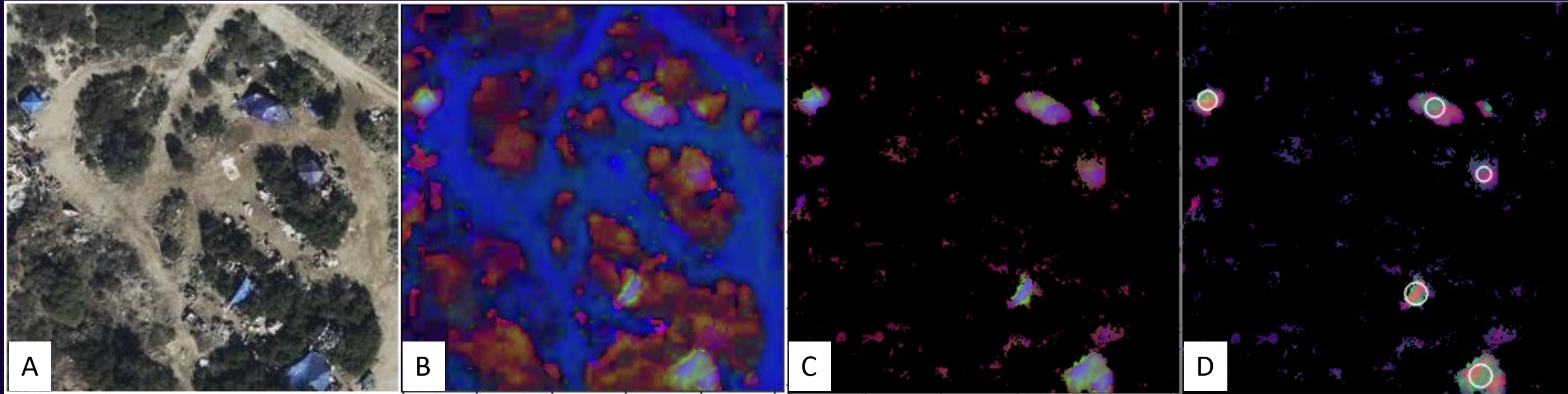
Street Level Feature Extractions



- Assets (signs, lights, manholes, etc.)
- ADA ramps and clearances
- Paint markings
- Pavement, curb and sidewalk condition;
- Street slope and crown
- Bridge clearances
- etc...



sUAS for identification of at-risk populations



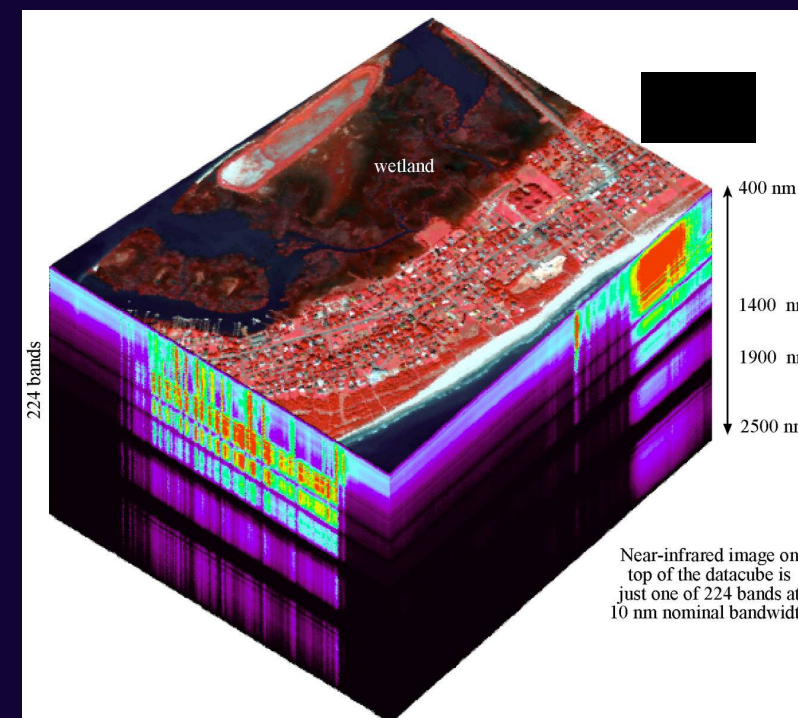
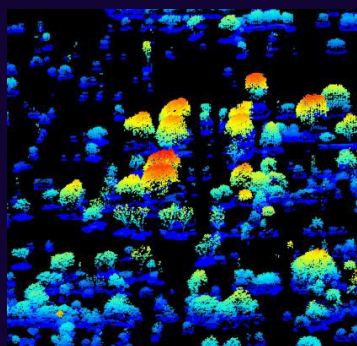
- A) Orthoimage tile within the study area.
- B) HSV-converted tile
- C) Masked tile removes areas with low saturation and value.
- D) Blob detection identifies objects that contrast their surroundings.





Mapping our trees

- We [governments] know our “public trees” (somewhat).
- We know little to nothing about the rest of the trees.
- Data are infrequently updated and expensive to collect.
- Trees can be mapped using remote sensing.
- Desired information: species, size, and condition.
- Assist stakeholders to deploy expertise more efficiently.





Observations on Local Govt. use of geospatial

- There are MANY opportunities to use ML/AI to leverage investments in imagery:
 - Change detection
 - Feature extraction
 - Emergency response
 - Real-time analysis
 - Predictive modeling
 - ...and more
- Work-from-home significantly raised the profile of geospatial methods and applications in local government.





Governments have LOTS of (spatial) data!

[Please use it!]

The screenshot shows the County of Santa Clara Open Data Portal. At the top left is the County of Santa Clara logo and the text "County of Santa Clara Open Data Portal". To the right is a search bar with a magnifying glass icon and the word "Search". Below the header is a navigation menu with links for "Home Page", "Browse", "Video Tutorial", and "Developers", and a "Sign In" button on the far right. The main banner features a night cityscape with a network overlay and the text "County of Santa Clara Open Data Portal". Below the banner is a grid of eight data categories, each with an icon, a title, and a brief description:

- Business**: Data on businesses, community and economic development
- Education**: Data on local schools
- Environment**: Data on sustainability, energy and resource use, and environmental conditions
- Government**: Data on finance, budget, taxes, employees, etc
- Health**: Data about diseases, services, and health habits affecting our community
- COVID-19**: Data on COVID-19 cases
- Public Safety**: Data on crime, fire, and enforcement
- Transportation**: Data about public transit



data.sccgov.org



Bringing it all back home

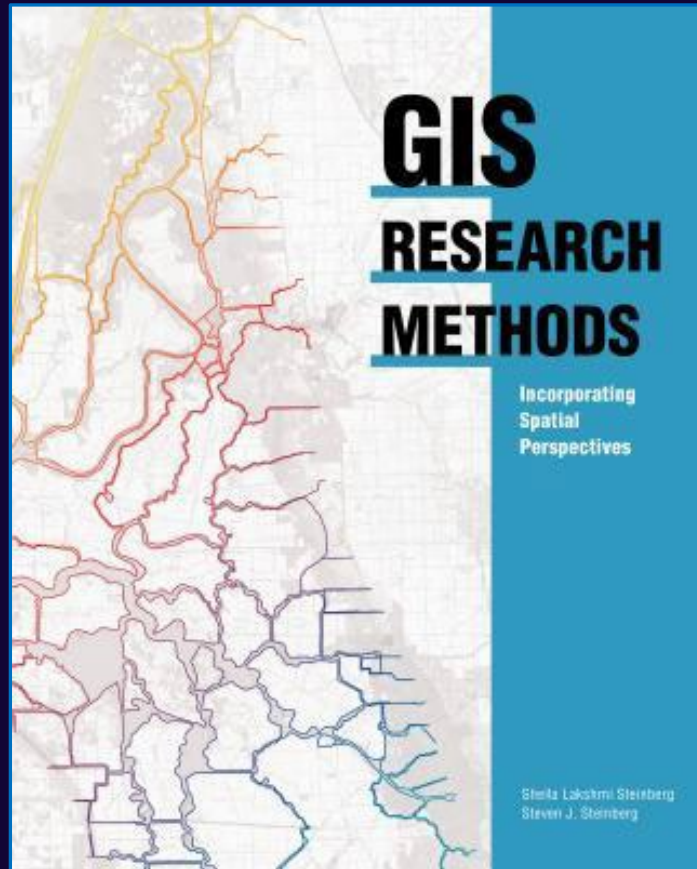
- Its not about the tech – but rather a means to an end (decision-making).
- Local governments require **accurate** and **timely** information.
 - Opportunities for desktop assessments and analysis (vs. extensive field work.)
 - Analytics to support effective, **data driven** decisions.
 - Enhanced ability to turn data around quickly.
 - Reduction of human inconsistency / error.
- PLUS – maps are great communication tools!



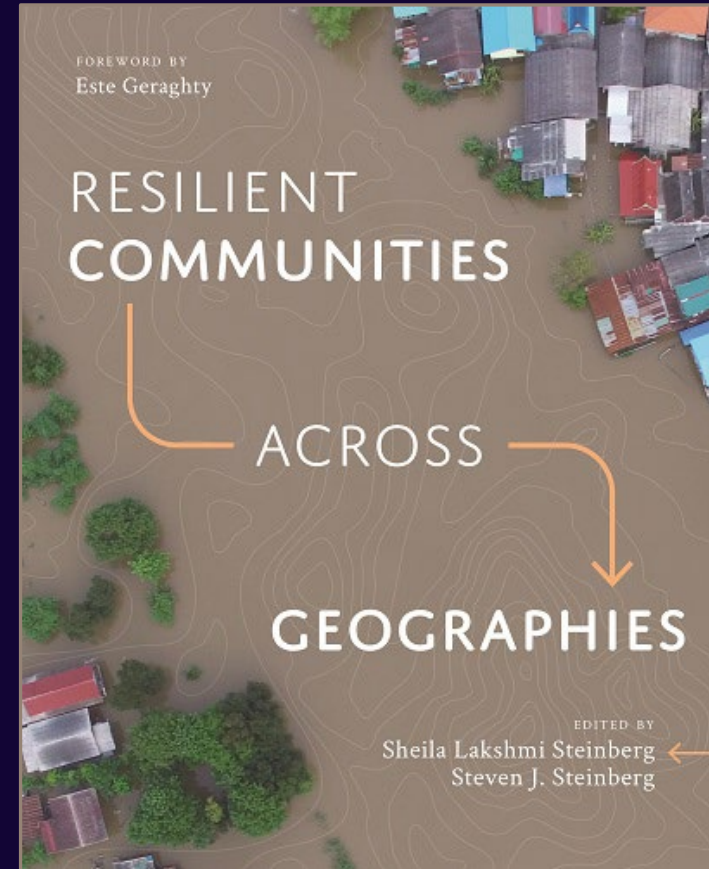
...those who know me know a Dylan reference is mandatory in most of my talks



I'd be remiss not to pitch some books! 😊



S.L. Steinberg and S.J. Steinberg (2015)
GIS Research Methods
 Esri Press, Redlands, CA.



S.L. Steinberg and S.J. Steinberg , eds (2021)
Resilient Communities across Geographies
 Esri Press, Redlands, CA.





Please join us on November 16

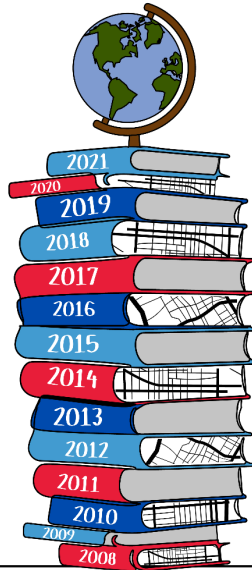


COUNTY OF LOS ANGELES

MAPPING L.A. COUNTY'S STORY

CELEBRATING OUR

15th ANNUAL GIS DAY



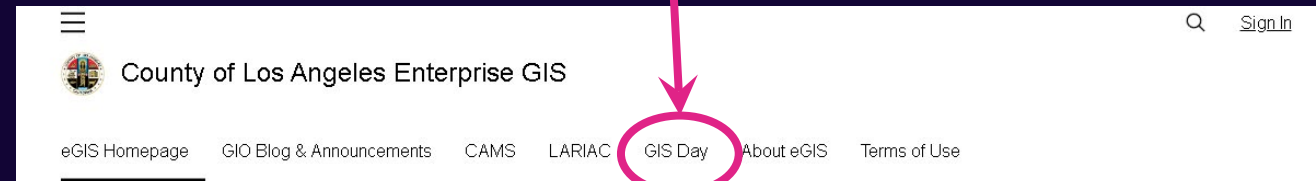
DR. BONNY MCCLAIN
KEYNOTE SPEAKER

**AUTOBIOGRAPHICACY: THE STORY
OF LOS ANGELES COUNTY IN MAPS**

NOVEMBER 16th



Visit gis.lacounty.gov and click up the GIS Day link to sign up!



County of Los Angeles

Enterprise Geographic Information Systems





Thank you for your attention!

County of Los Angeles

Enterprise Geographic Information Systems



Steven J. Steinberg, Ph.D., MPA, GISP

Geographic Information Officer
County of Los Angeles, California





Consolidated list of links:

- Countywide Addressing: <https://cams-lacounty.hub.arcgis.com/>
- COVID-19 Public Applications: <https://covid19.lacounty.gov/dashboards>
- Public WiFi Locator: www.findwifi.lacounty.gov
- LARIAC: <https://lariac-lacounty.hub.arcgis.com/>
- Santa Clara County GIS Data: <https://data.sccgov.org/>
- Delete the Divide: <https://www.deletethedivide.org>
- Books:
 - [GIS Research Methods \(2015\)](#)
 - [Resilient Communities across Geographies \(2021\)](#)



Questions	Answers
<p>how about the transit travel time?</p>	<p>The MTA access map used an out of the box tool. It does count for the historical traffic information in the algorithm. What time of the day, where would be the best route for the certain time of the day, and mode of transportation (walk, bike, auto etc.). Although this is out of the box, they are valuable as we don't often think about the travel time especially in providing the social services. For example, when you open a clinic, you want to be close to other social services facilities. People must go to one place, and then go to another place. When people do not have their own cars and must rely on public transportation, we want to cluster the service locations in one place to make their travel easier for them. We started looking into more of this type of clustering services.</p>
<p>The street level feature extractions by consultant?</p>	<p>Pilot study was done by our vendor as a case study a couple years ago. Now we are putting up for a bid to cover entire unincorporated County.</p>
<p>Why unincorporated areas?</p>	<p>The reason for this is specifically because of the jurisdiction and based on where the funding is coming from. Our public works are willing to do this for entire unincorporated area because they need these data to address infrastructure planning in the unincorporated areas for which the County is responsible. If other cities within the county want to piggyback this contract, they will be welcome to do so, we wrote the RFP to allow for additional partners. The vendor offers standard feature extractions capabilities as out of the box tool. The area that we are going to ask for the vendor will include many of these standard products and perhaps some custom feature extraction.</p>

Q & A

Questions	Answers
<p>What's the source for the street view images? Google?</p>	<p>These images were collected by the vendor. It looks like a Google Street View; I call it Google Street View on steroids. The camera that they use provides much higher resolution to the point where I can read the tags on the streetlight from the image. They also collect LiDAR simultaneously which provides a fully measurable 3D model of the streetscape allowing us to measure heights and distances, etc. There are several vendors who can do this type of work.</p>
<p>Hello Steven, Could you please share how much of the budget is currently vested into business data analytics; KPI;s for BI and AI, besides data collection and geospatial display (mapping).</p>	<p>This is a difficult question to answer given our federated model. GIS staff and operations are spread across 14 Departments and about 155 positions. With the exception of the Enterprise Team, housed in Internal Services, most GIS operations, especially many related to data analysis are captured under the regular budget of each Dept. The Enterprise team uses a membership and services model in which some of these sorts of efforts would be captured and is highly variable depending on priorities of the County and individual Departments requesting eGIS assistance for analytics and related efforts. Other efforts, particularly those that are more complex/specialty like ML/AI are spread among eGIS, other departmental operating units and outside collaborators (Universities, vendors, etc.) and not always explicitly funded -- particularly when working with Universities, much of those efforts are built into student projects and research which is unfunded.</p>

Q & A

Questions	Answers
<p>You mentioned ML/AI tools that make your job easier. Do you really need a CS background in order to know how to utilize them?</p>	<p>Not necessarily. Some of them are out of the box but some of them are developed inhouse. Example of the inhouse algorithm includes the blob detection of tents in homeless example and tree classification. They were done by partnering with universities. We as County employees did not necessarily have the machine learning and AI background, but students and faculties on this project had the ML/AI skills. They were developing ML algorithm to do the feature extraction. It's an open question whether we need an internal staff who has this skillset, as these skillsets are required infrequently. With that said, internally our enterprise GIS team is working on the ML algorithm to find cooling towers for public health. Remains to be seen.</p>
<p>How do you decide what outside data is valid enough to be integrated into your maps?</p>	<p>If it is a contract, we will write the specifications. We define how good the data must be to be accepted. In our air photo and street view program and many other contracts, we determine the data quality acceptance criteria. Usually, we follow existing industry standards. For example, for arial photo, we follow the standards by professional association for the aerial imagery and Lidar (ASPRS?). There are other industry standards or survey standards that we can follow. If the data is publicly contributed data, we must perform QAQC. For example, in our Countywide Address Management Systems (CAMS) program, cities provide the data to us, and County runs the automated checks to assure the data meets the minimum standards (such as schema). If the data does not pass the check, we will request the contributor to fix. There are other technologies and tools that we use to automate the QAQC, and rank how good they are. Regardless, we must be responsible to vet the data.</p>

Q & A