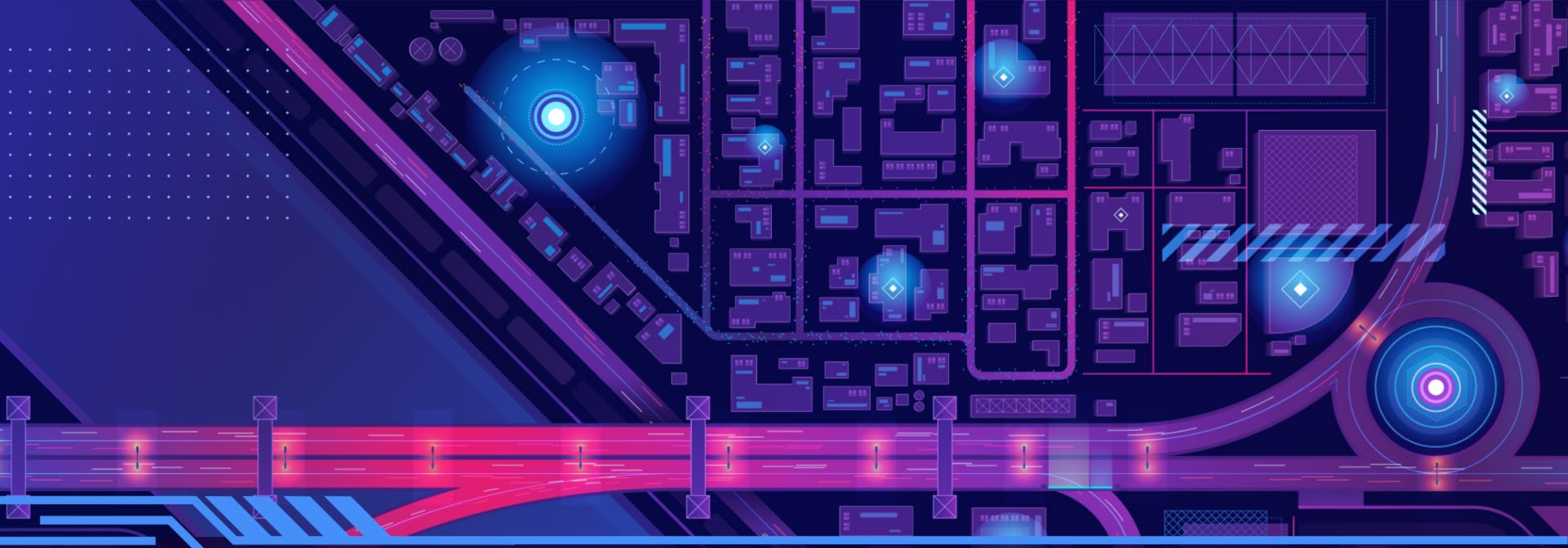


Welcome to GIS Day 2022!

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

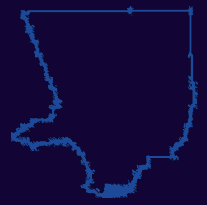
Steven J. Steinberg, Ph.D., MPA, GISP

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

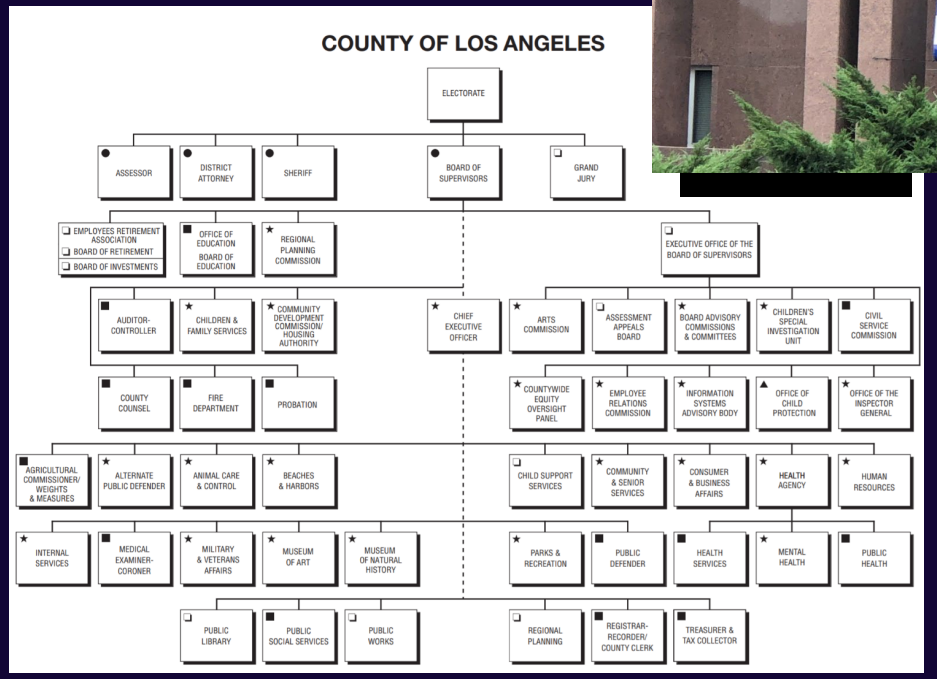


Los Angeles County Snapshot

- 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.

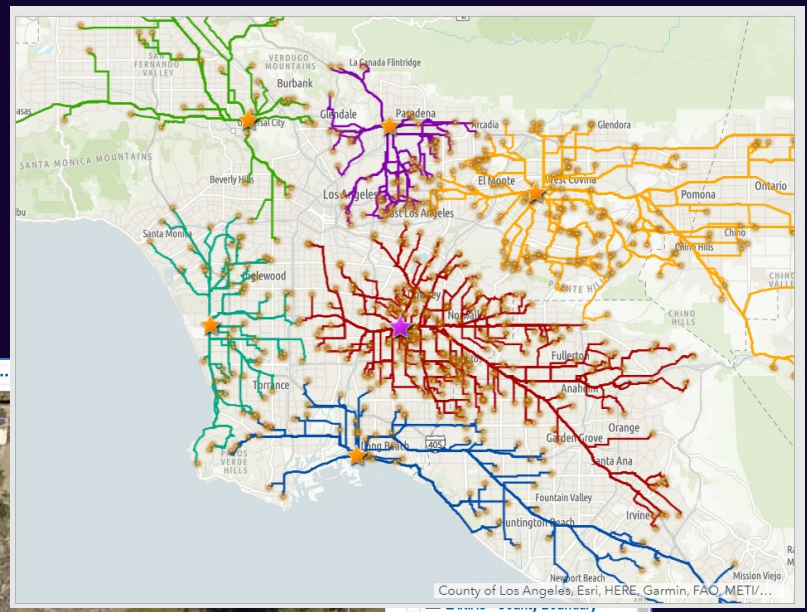
Los Angeles County is **big** and complex!

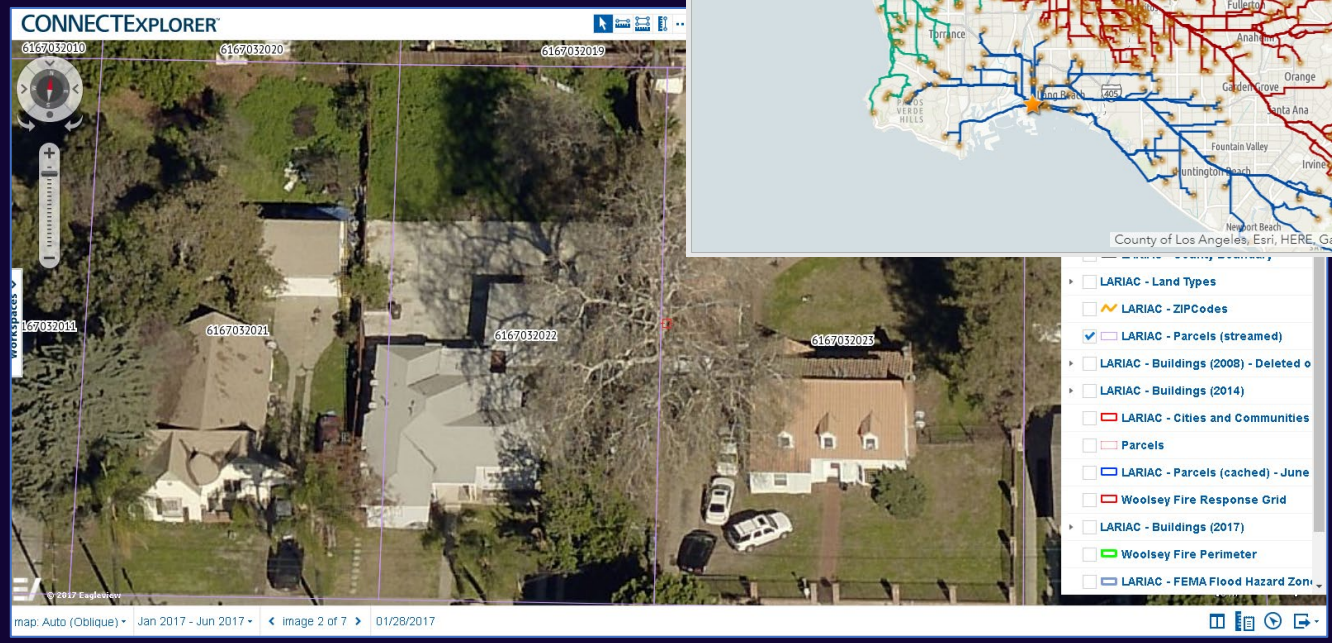
- Over 35 County Departments; ~200 committees & commissions; and over 500 school, sanitation and water districts.
- **>110,000** employees.
- **> 4,000** public buildings.
- **~63,000 acres** of parks, natural areas, and gardens.
- 2022-2023 operating budget **$44.6 Billion**.



LA County Enterprise GIS

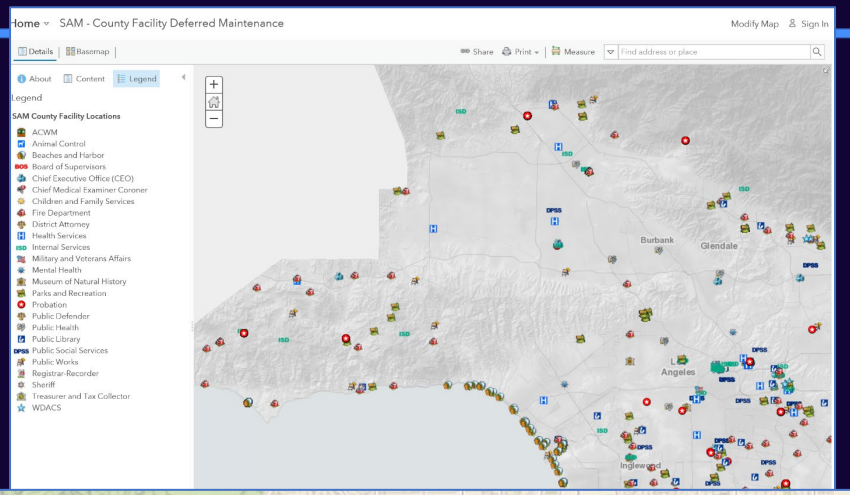
- Provides for centralized, efficient service provision
  - Common/shared infrastructure, software, workflows, and data
- Many functions have migrated from the field to the desktop (esp. during COVID-19).
- Those that must be field based can be better optimized.

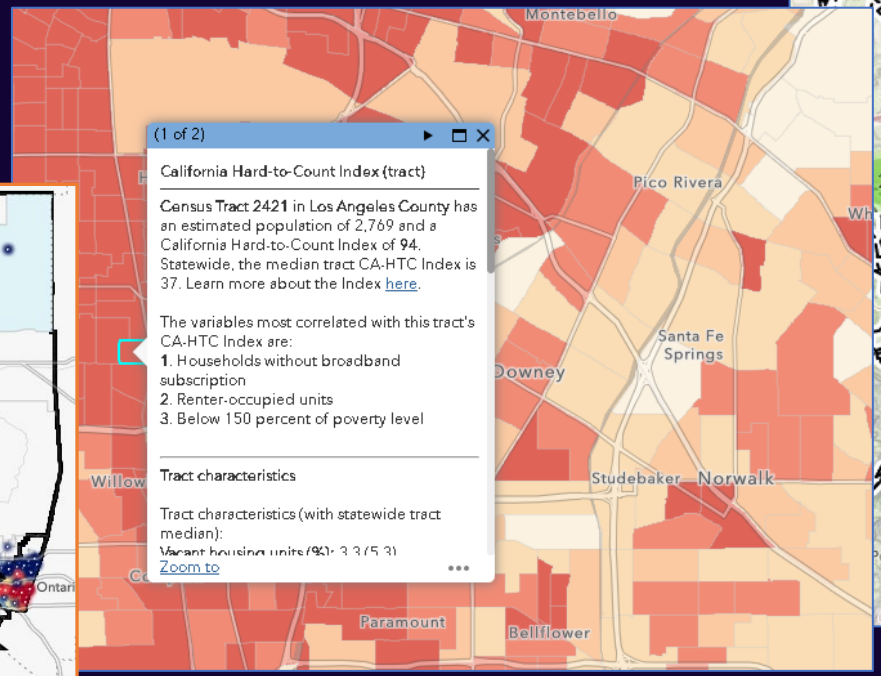


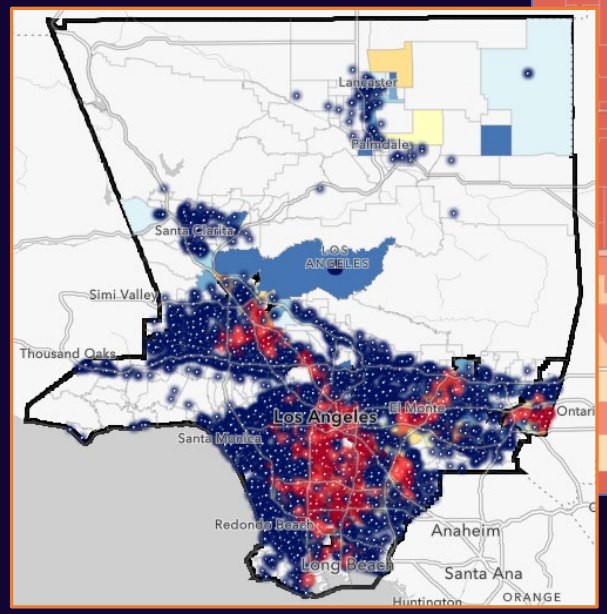


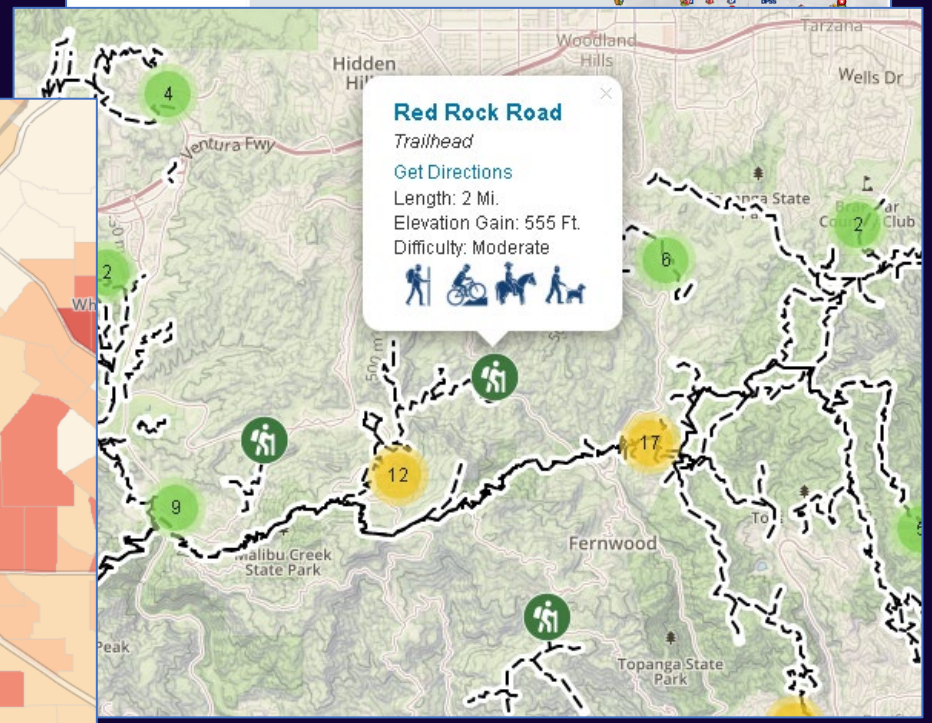
Why does government care about maps?

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



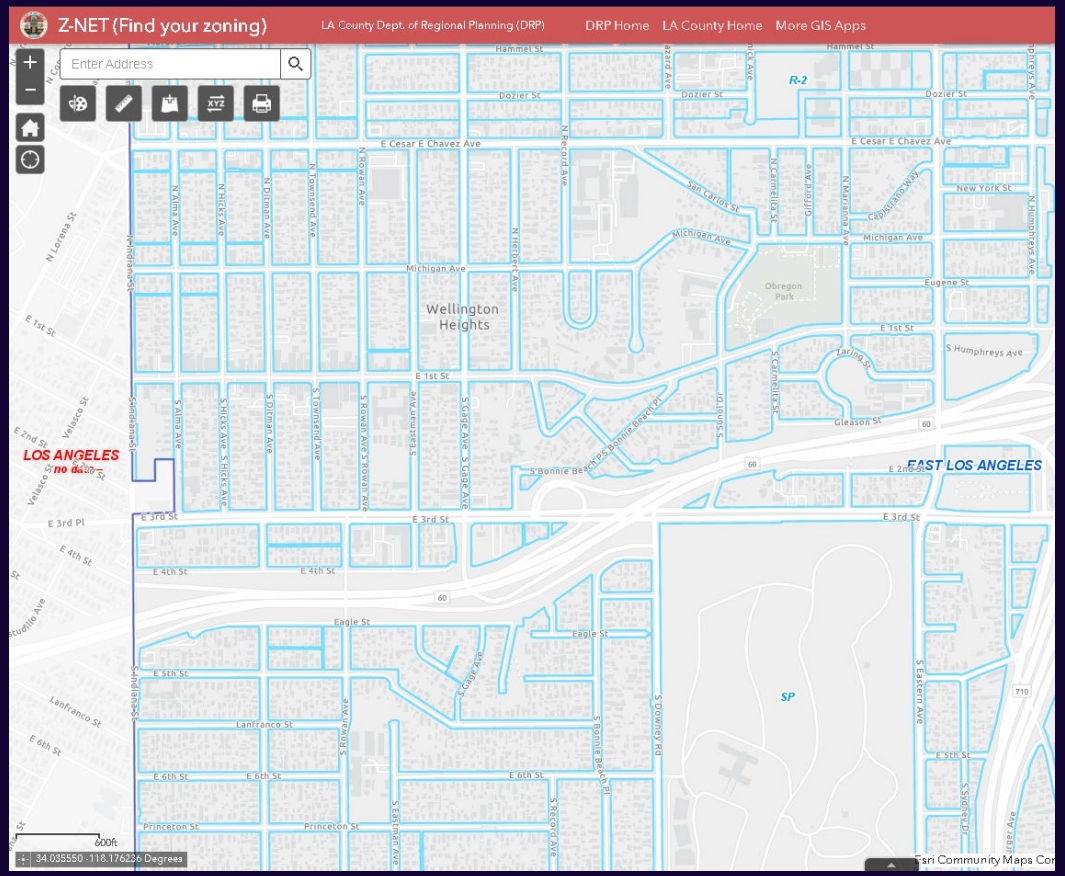






The business of government IS location-based.

- 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)?

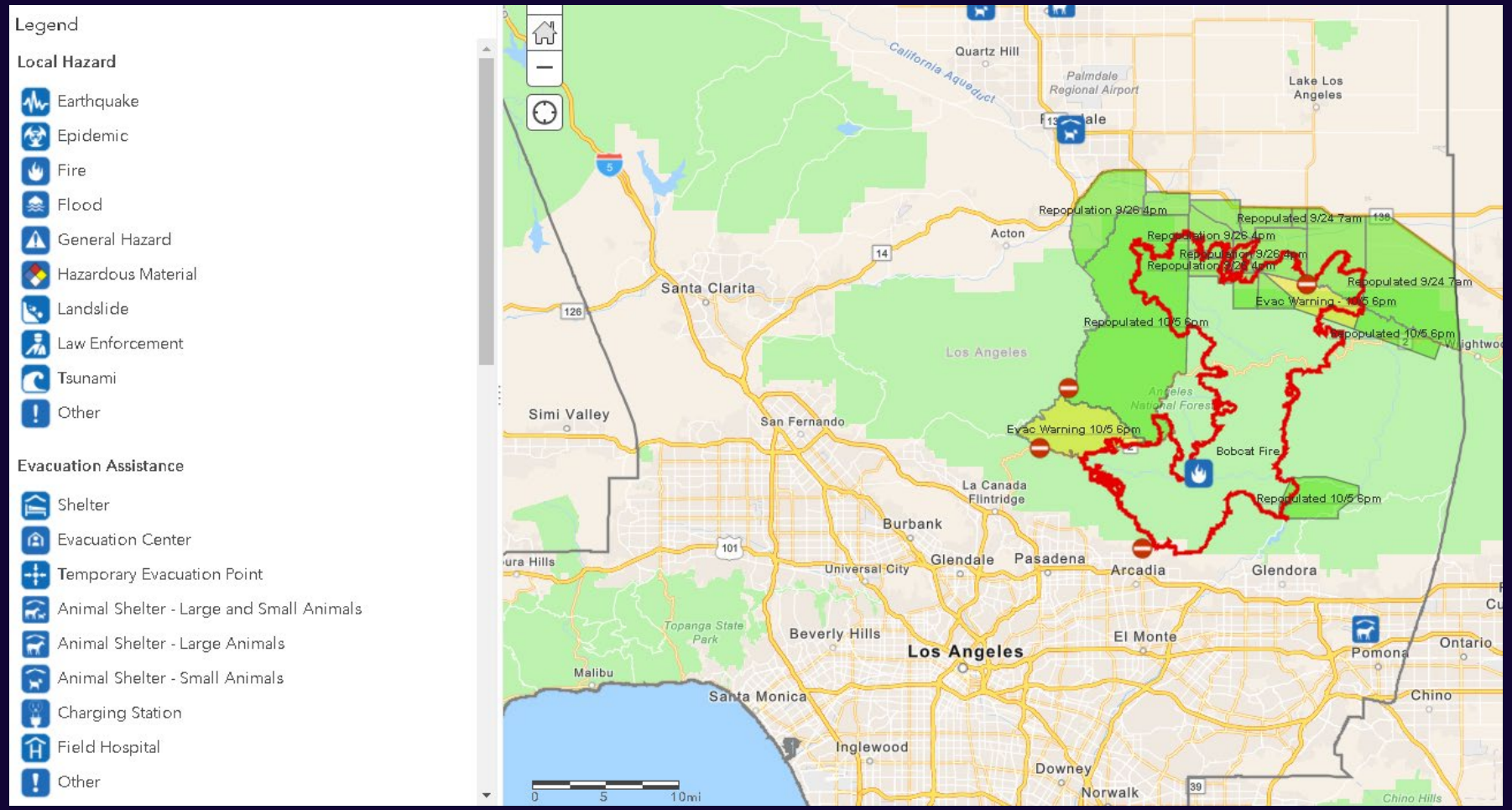
Los Angeles County established the Countywide Address Management System (CAMS) as a centralized repository of authoritative physical (situs) addresses. The Internal Services Department (ISD) Enterprise GIS Program (eGIS) manages and maintains the infrastructure behind the successful program. CAMS is 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.

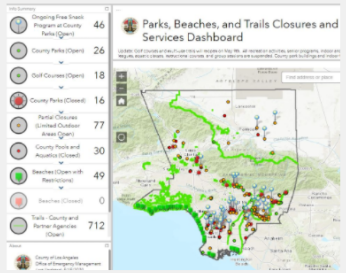
CAMS Data	CAMS Applications	CAMS GeoSearch

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

Bobcat Fire Evacuation/Repopulation Zones



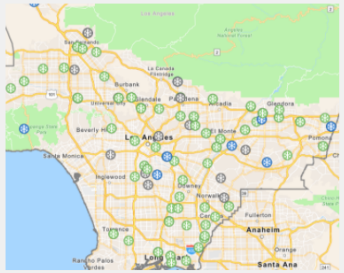
COVID-19 Public Applications



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

Application providing areas to stay active.

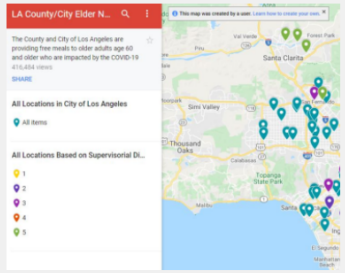
View the App



County of Los Angeles Cooling Centers

Stay Cool
Find Your Local Cooling Center in LA County

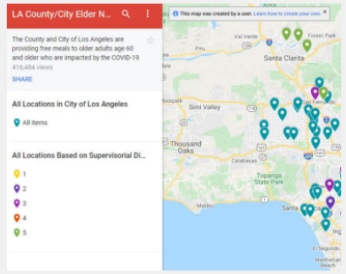
View the App



County of Los Angeles COVID-19 LA Citv/Countv Elder

Application providing meal information for older adults.

View the App



County of Los Angeles COVID-19 LA Citv/Countv Elder

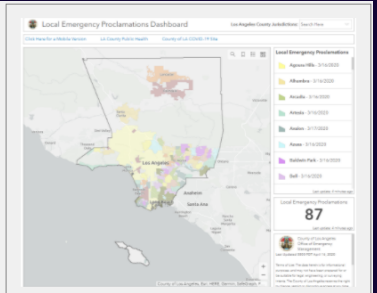
Application providing meal information for older adults.

View the App

County of Los Angeles COVID-19 Food Resources Hub

Application providing food resources in Los Angeles County.

View the Site



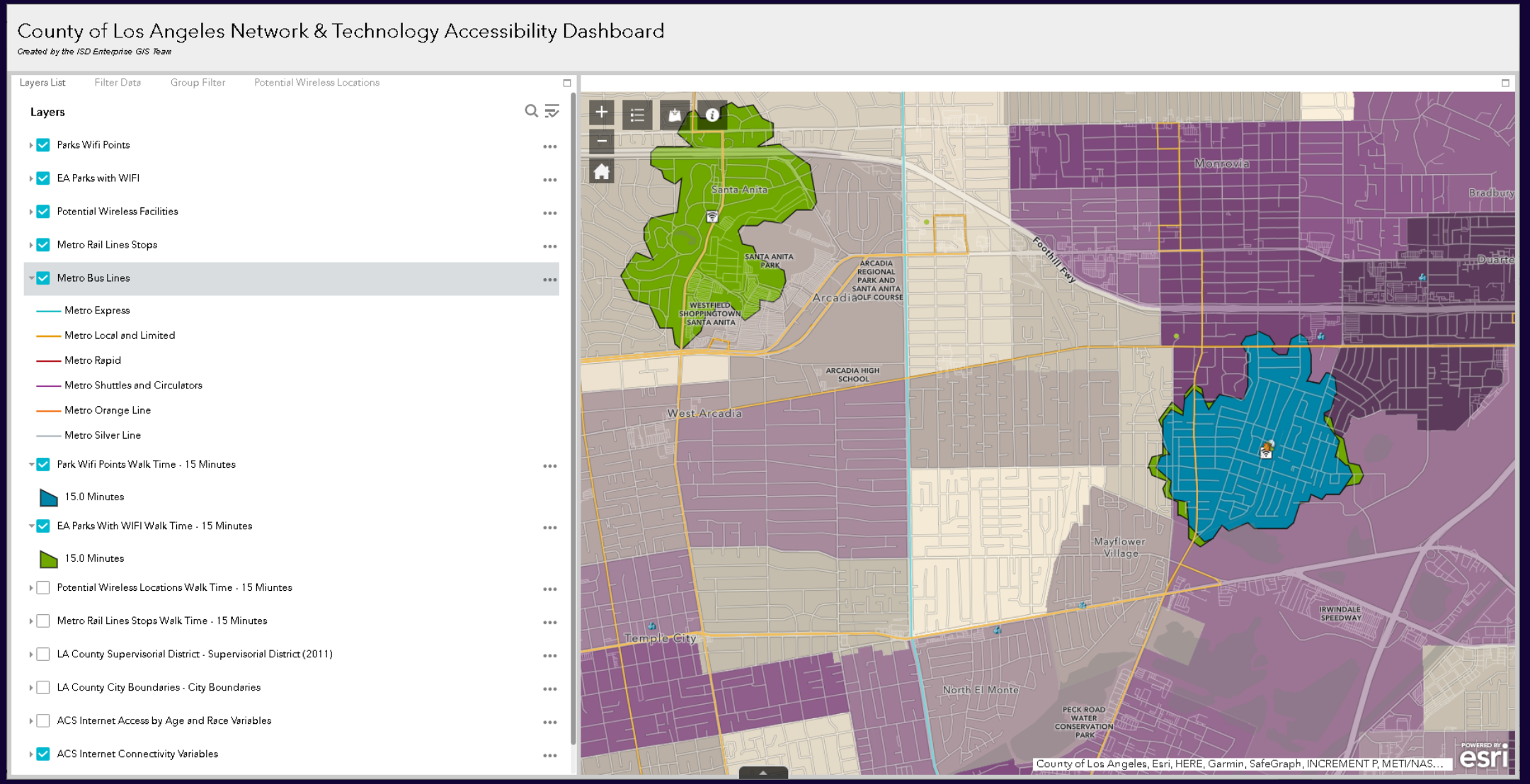
County of Los Angeles COVID-19 Local Emergency Proclamations Dashboard

Dashboard providing local emergency proclamations for Los Angeles County.

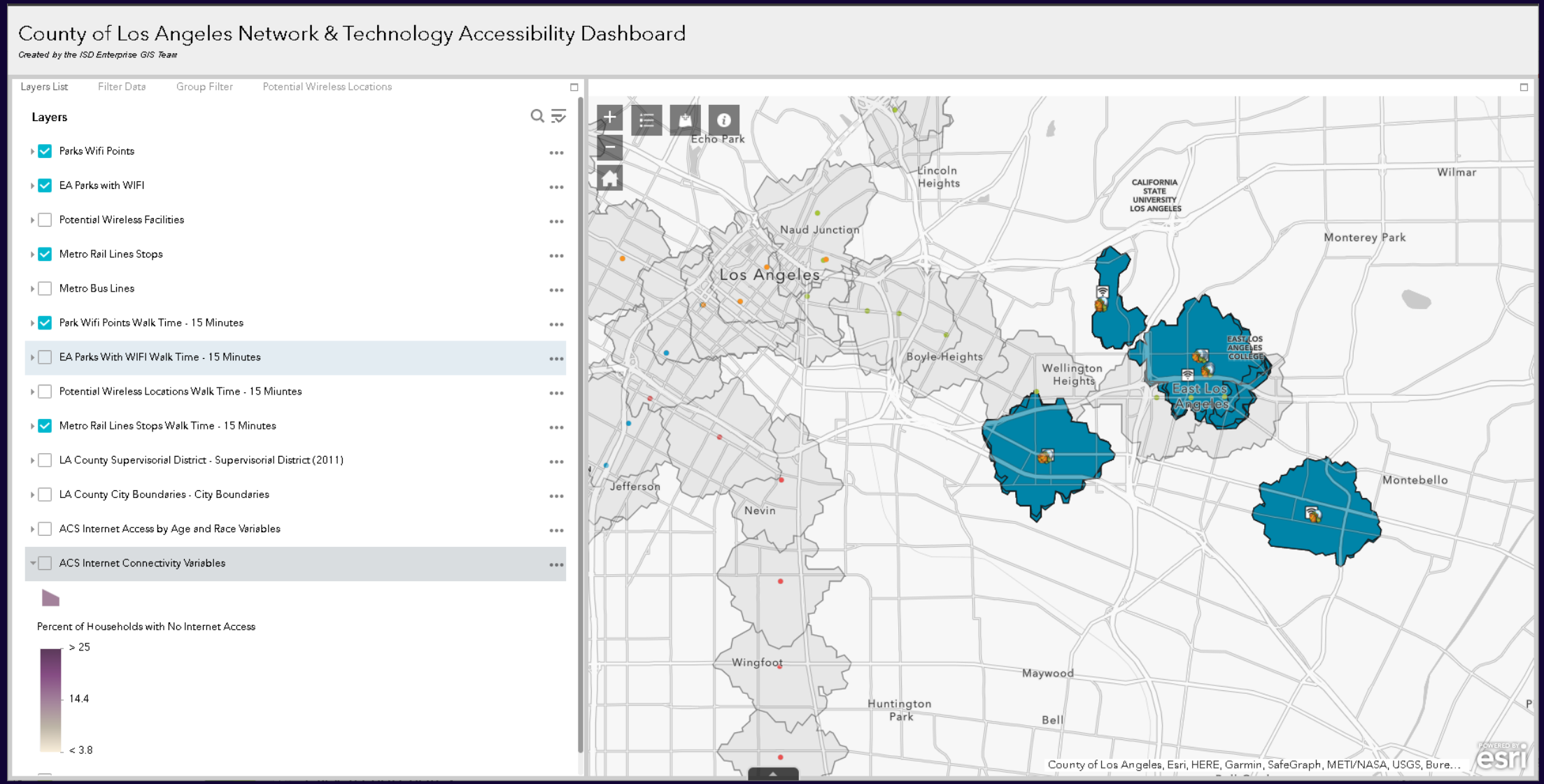
View the App

https://covid19.lacounty.gov/dashboards

Location Analytics



Location Analytics



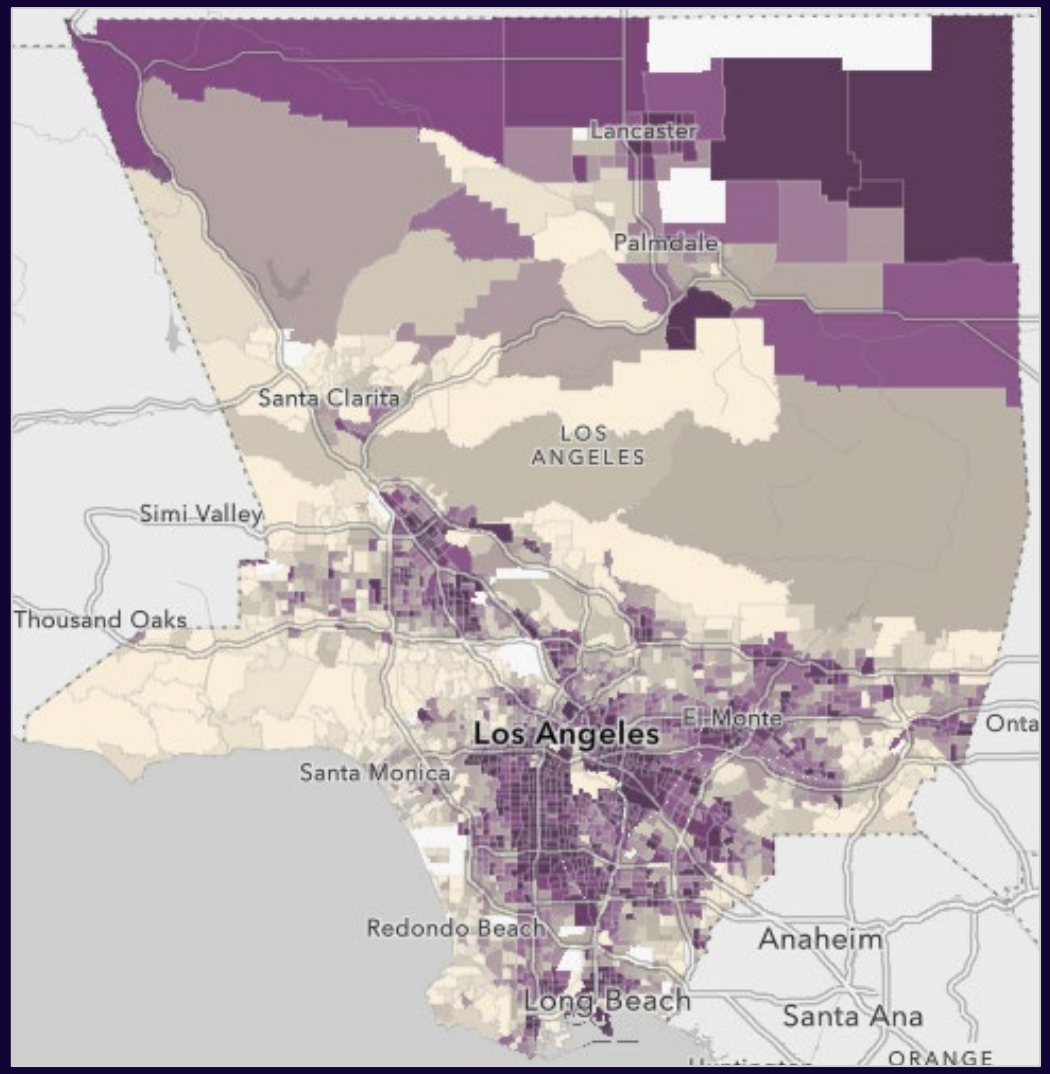
The Digital Divide

Percent of Households with No Internet Access

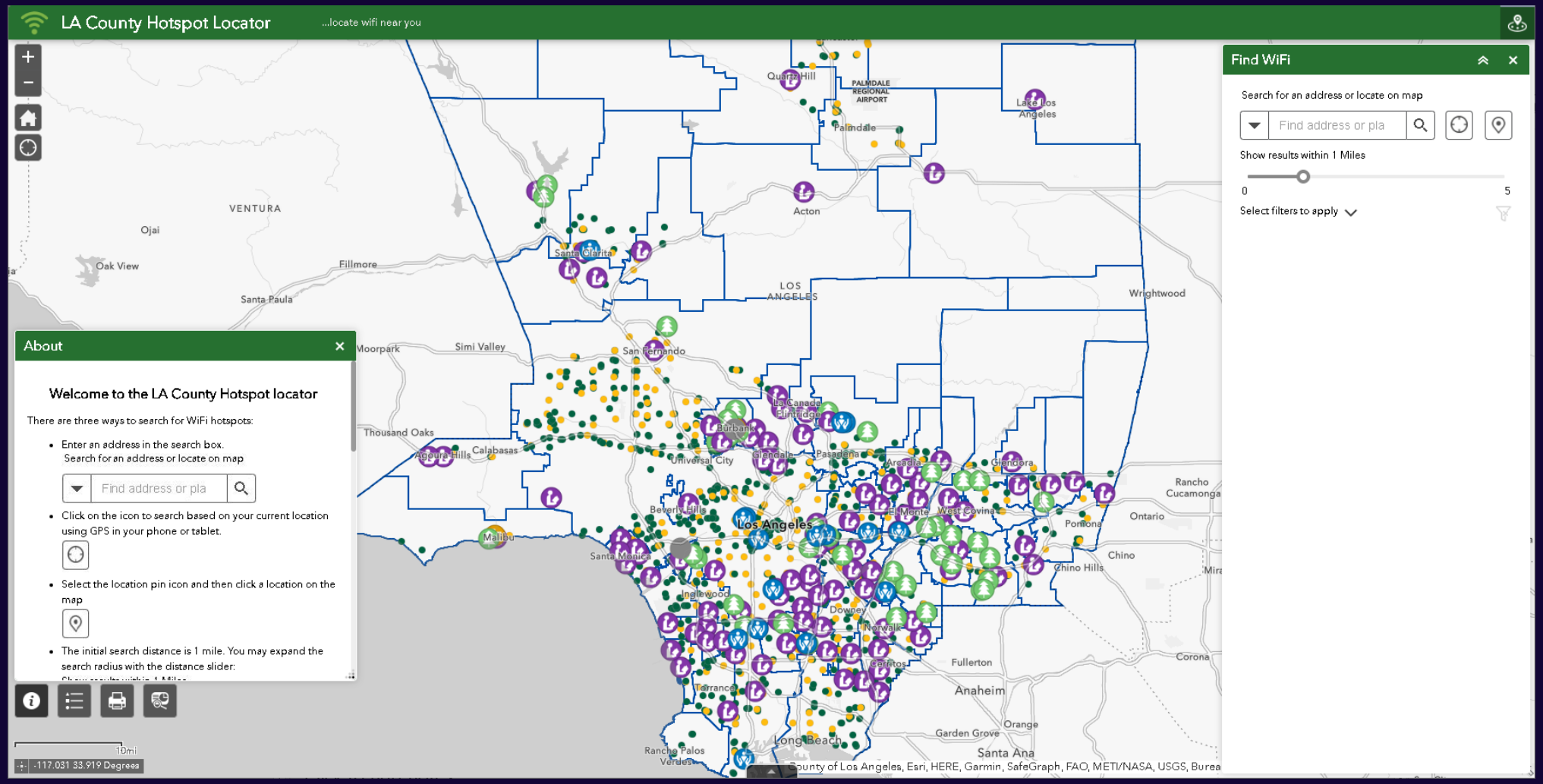
>25

14.4

<3.8



Public WiFi Locator



www.findwifi.lacounty.gov

How Los Angeles is Deleting the Divide

www.deletethedivide.org

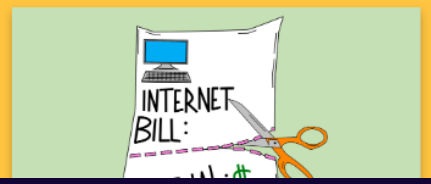
DTD DELETE THE DIVIDE™

Home Programs Data Apply About Login / Sign Up

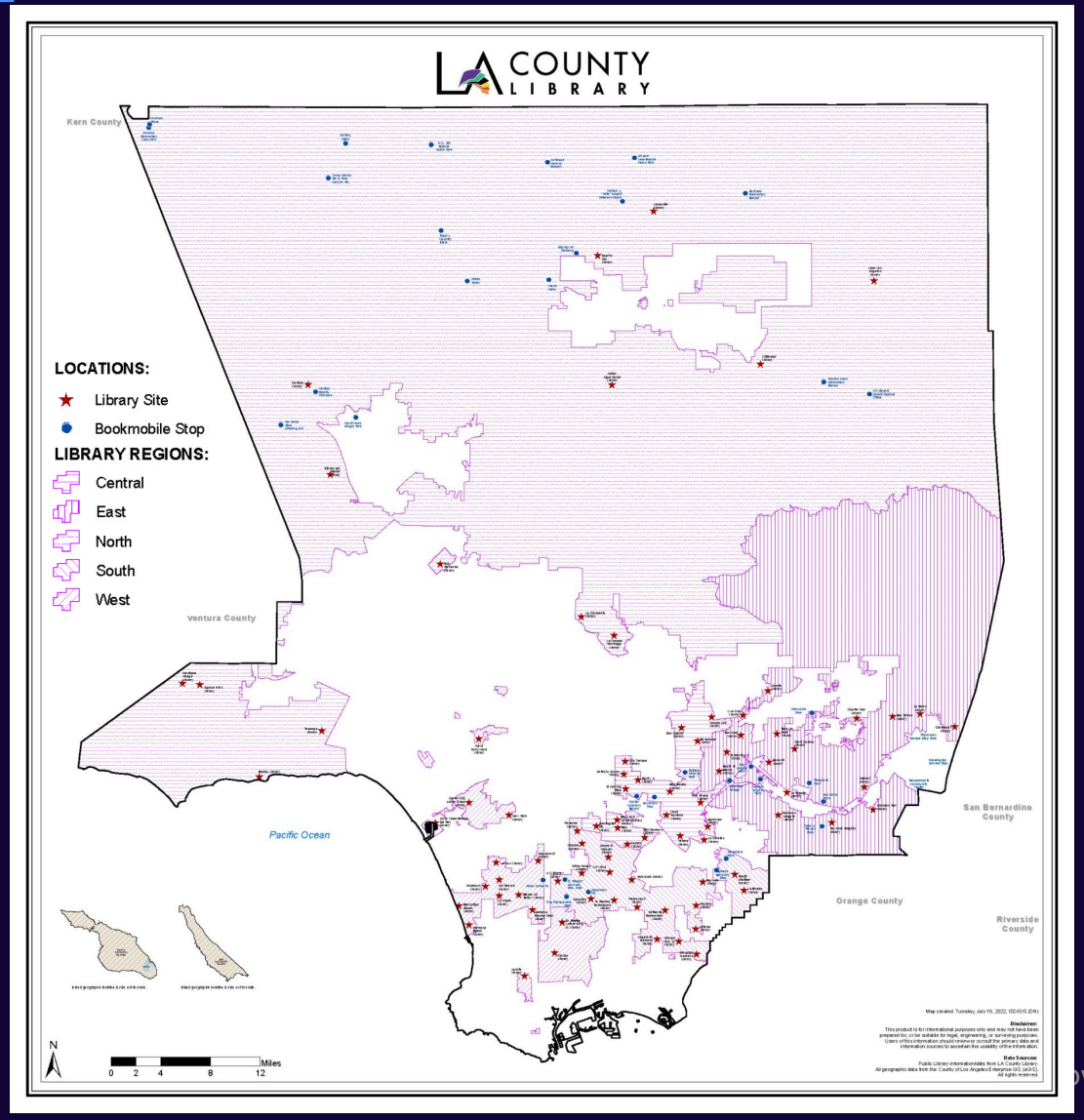
Digital inclusion means everyone is connected

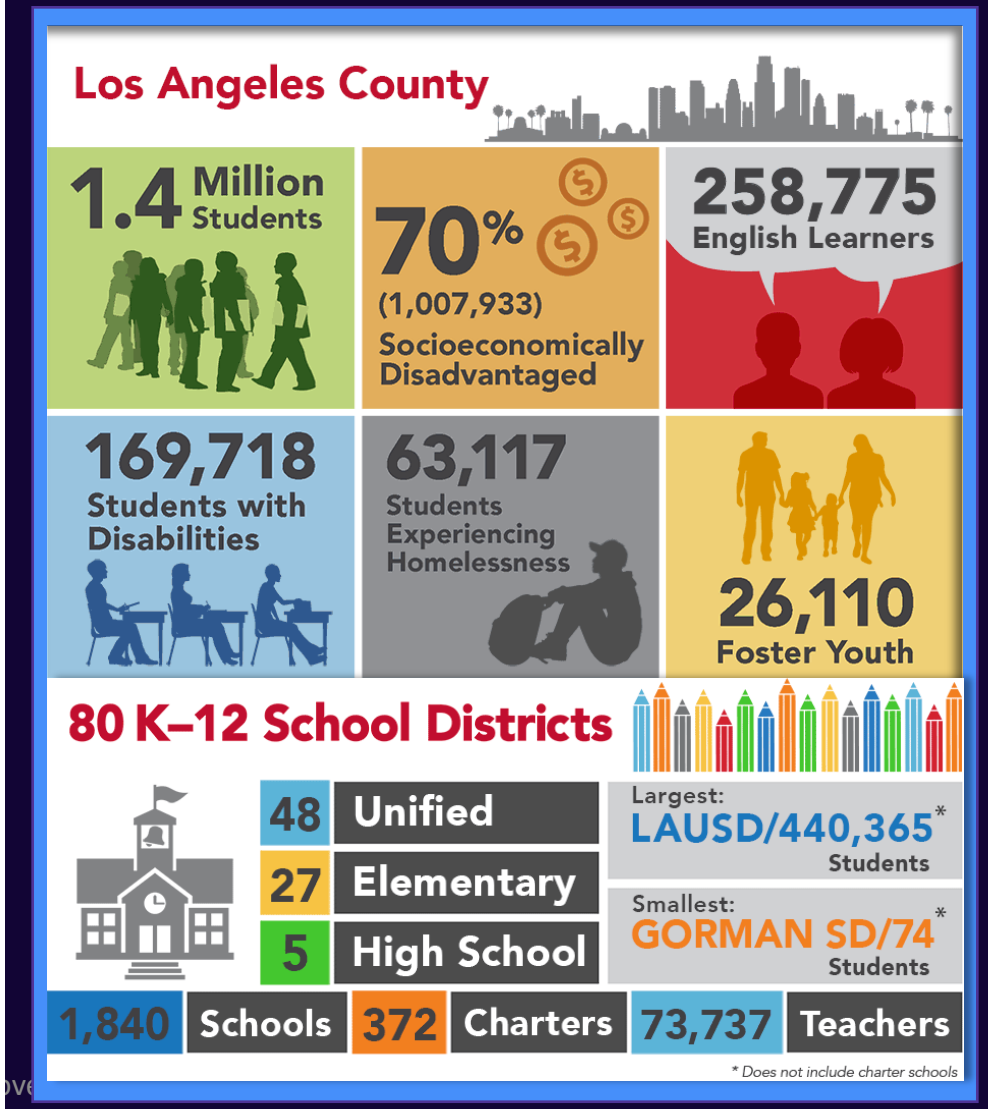
Delete The Divide is an initiative led by the County of Los Angeles to advance digital equity in underserved communities through partnerships, infrastructure investments, and technology resources that empower residents and small businesses

How you can get connected



County Libraries (85) and Schools





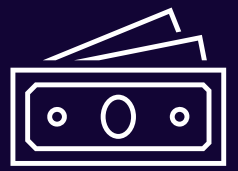
The Divide is Real

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

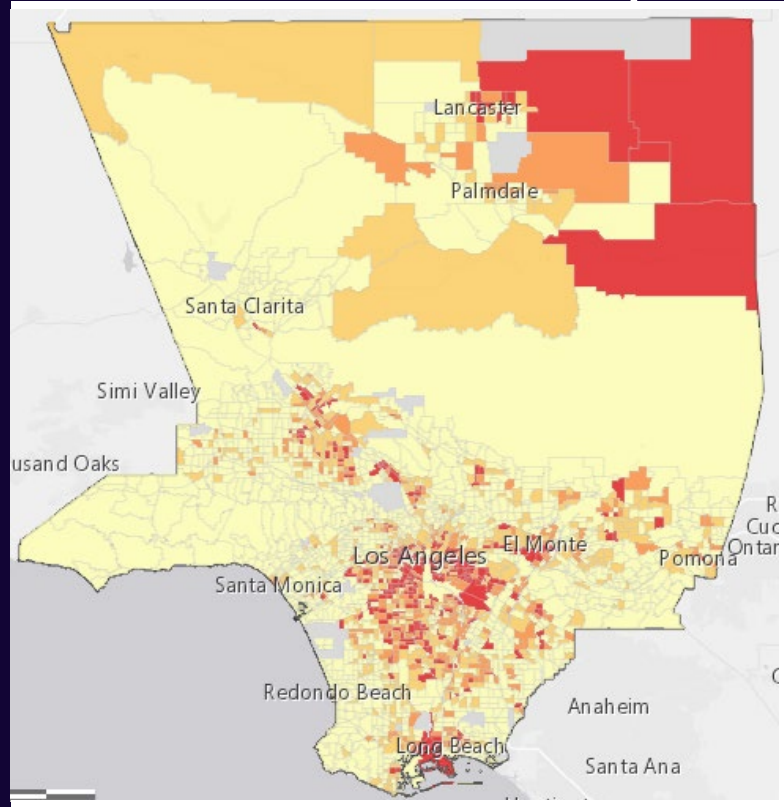
A computer and reliable internet service are essential to accessing education, employment opportunities, healthcare services, financial resources, support networks, and commerce.



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

Source: U.S. Census (2019)

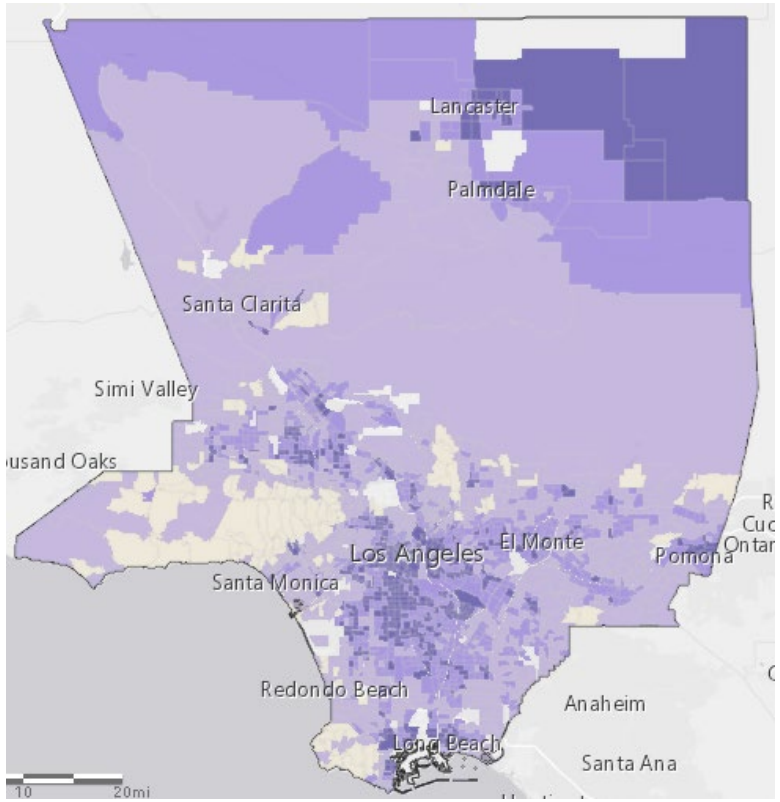
Connectivity



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

20 – 100%
15 – 20%
10 – 15%
0 – 10%
No Value

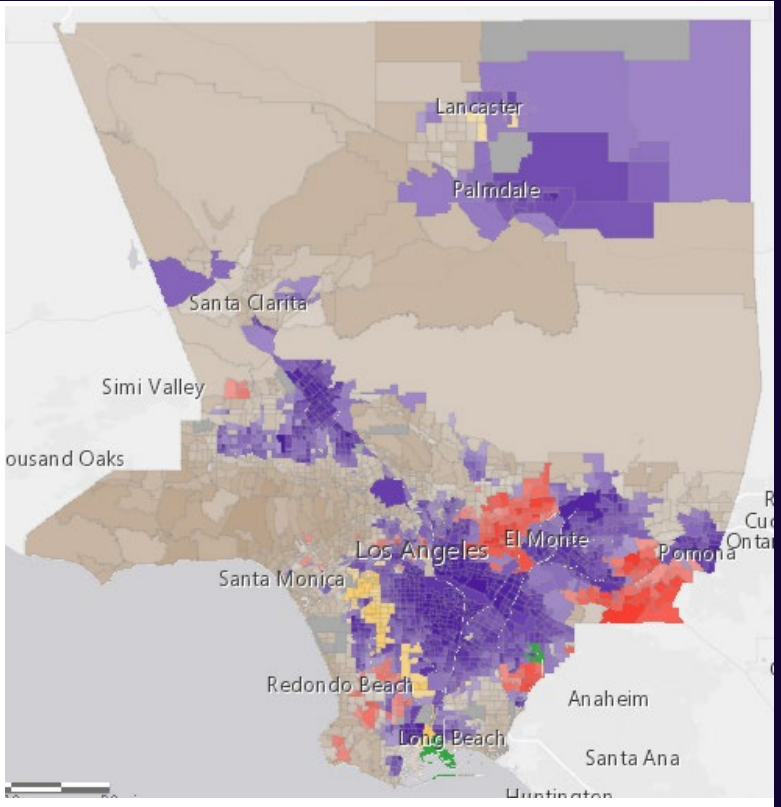
Income



Median household income in the past 12 months.

>$150,000 - $250,001
>$75,000 - $150,000
>$50,000 - $75,000
<$50,000
No Value

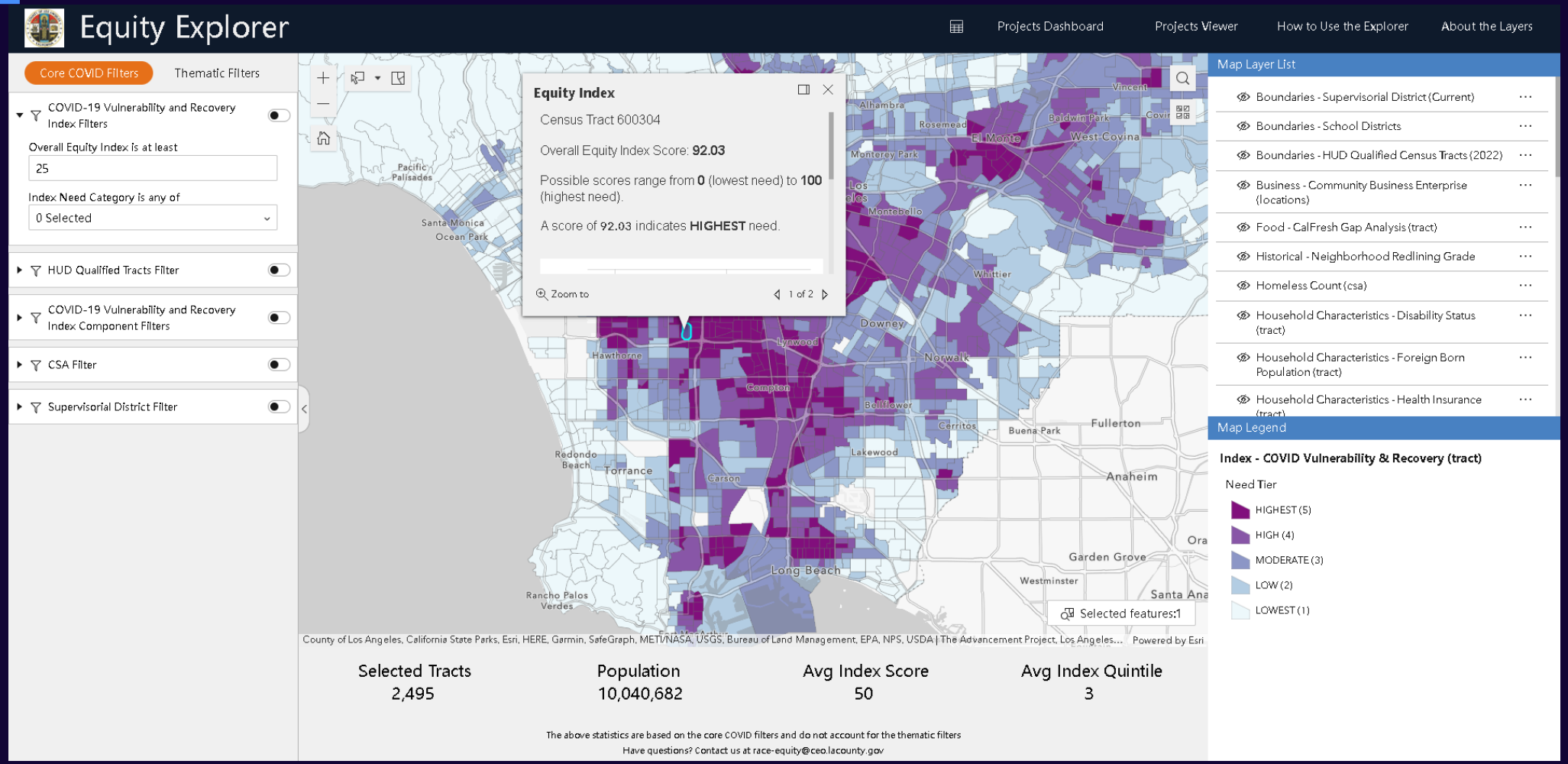
Race



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

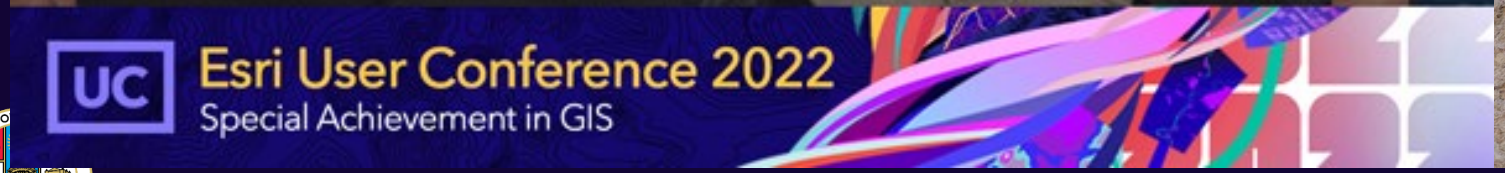
Non-Hispanic White Population
Hispanic or Latino Population
Black or African American Population
Asian Population
American Indian and Alaska Native

Equity Mapping



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

Equity Mapping



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!

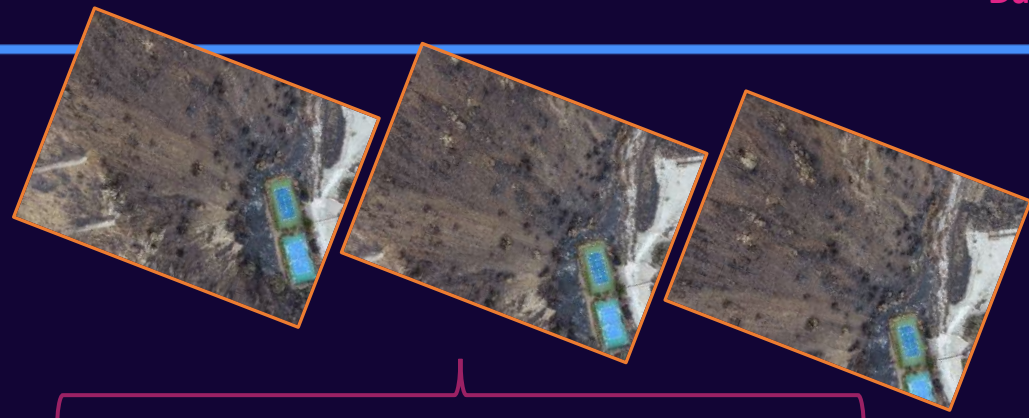
Some data we collect directly

- 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

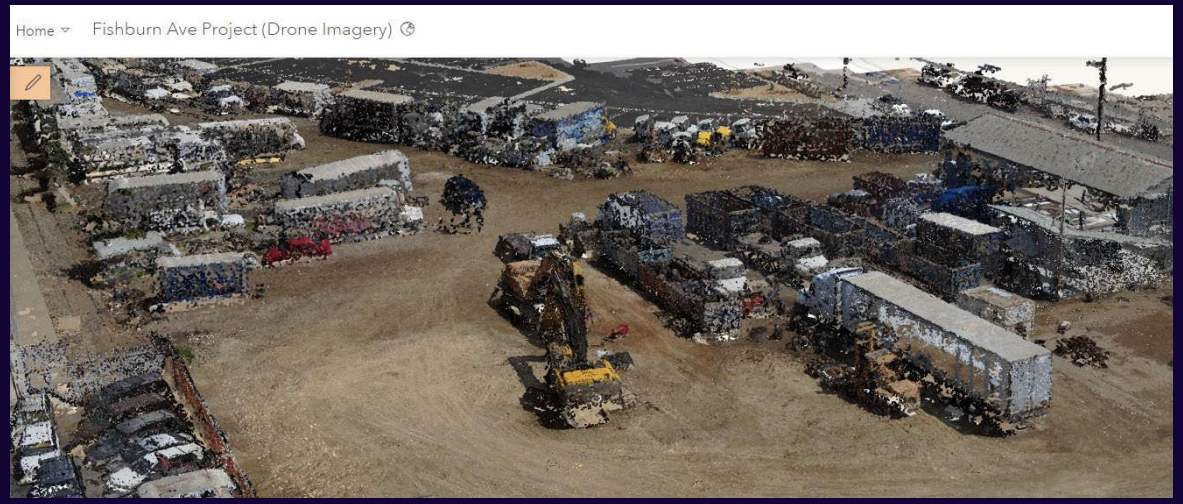


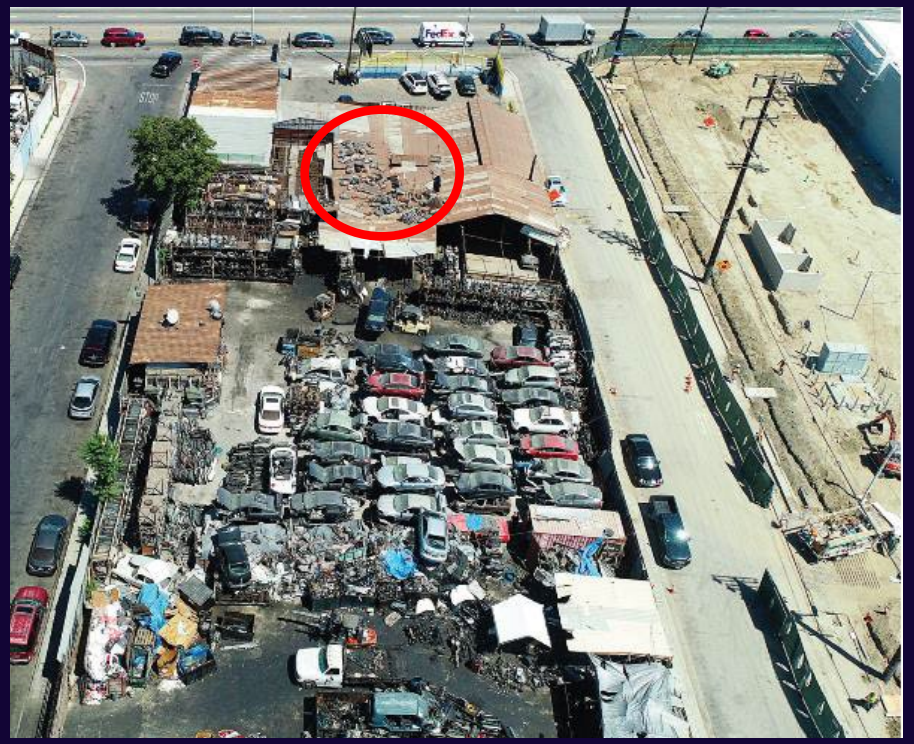
~30 min and 200 of these images provide a geolocated 3D model.

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



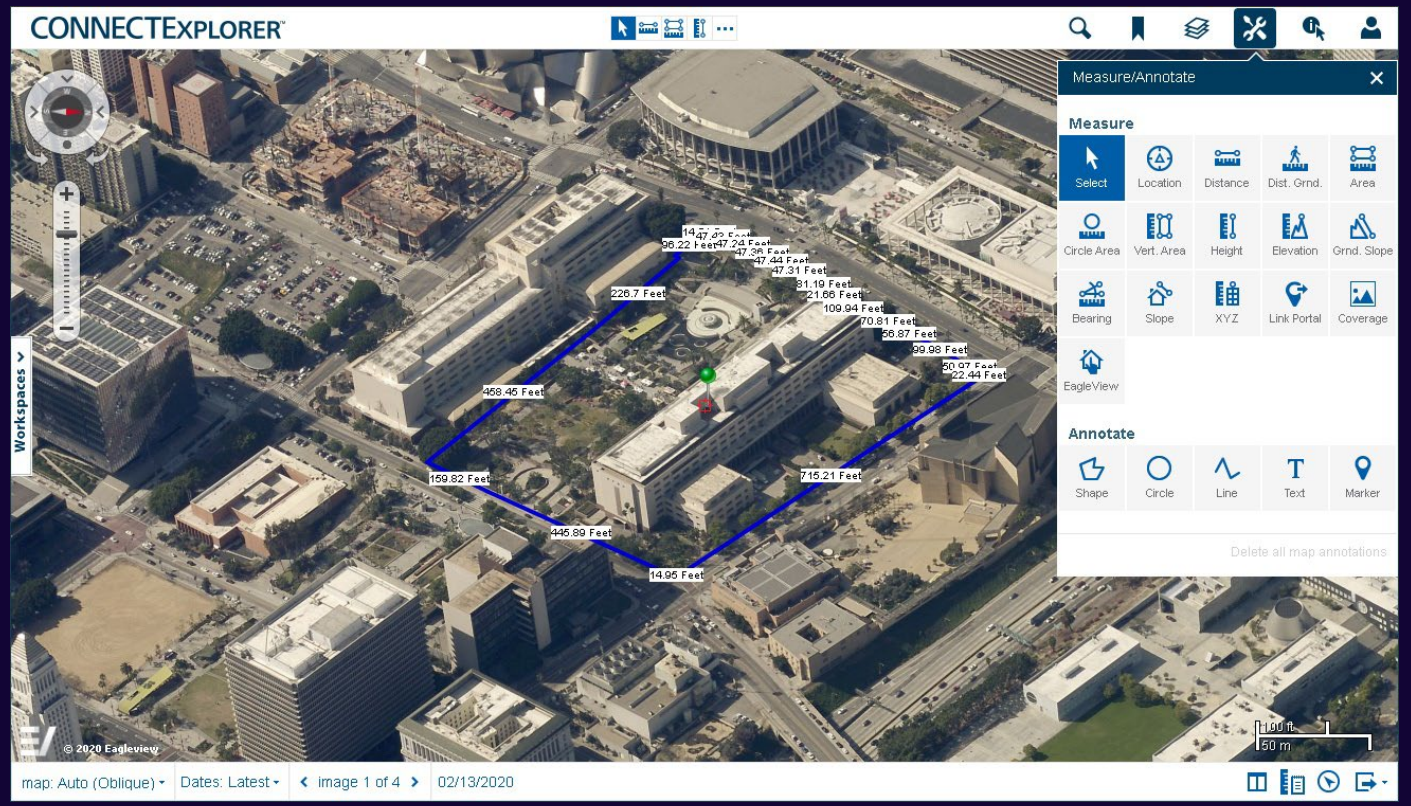


LARIAC
Los Angeles Region Imagery Acquisition Consortium

"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."

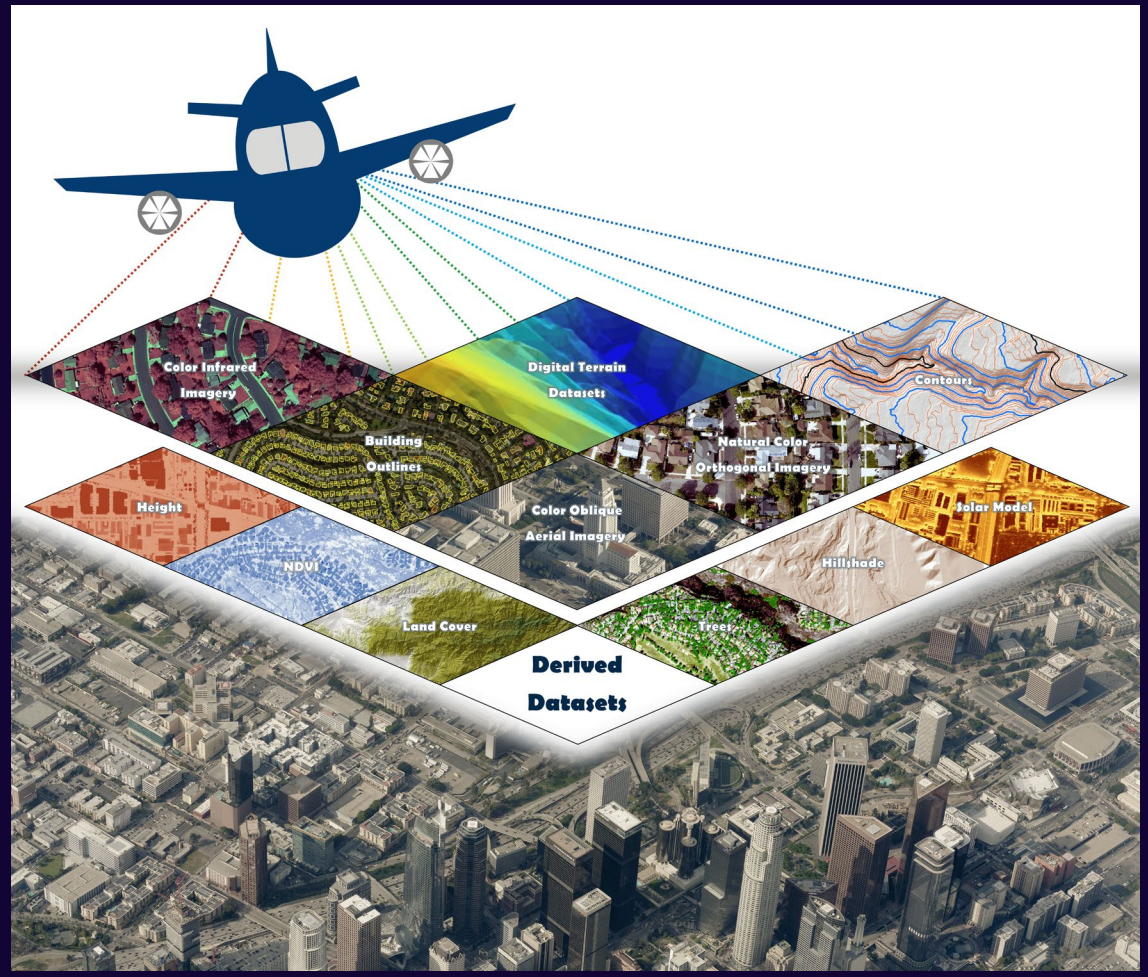
- Government has a long history of using imagery from airborne systems

lariac-lacounty.hub.arcgis.com



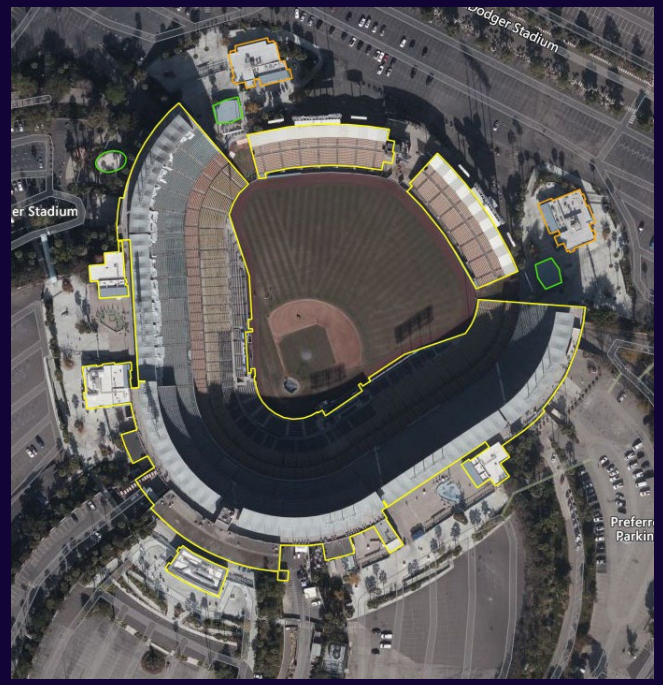
LARIAC
Los Angeles Region Imagery Acquisition Consortium

- Established in 2005.
- Each cycle is three years.
  - Completing our 6th cycle (2020-2022)
- Members “buy in” each cycle
- Resources are leveraged and optimized though 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

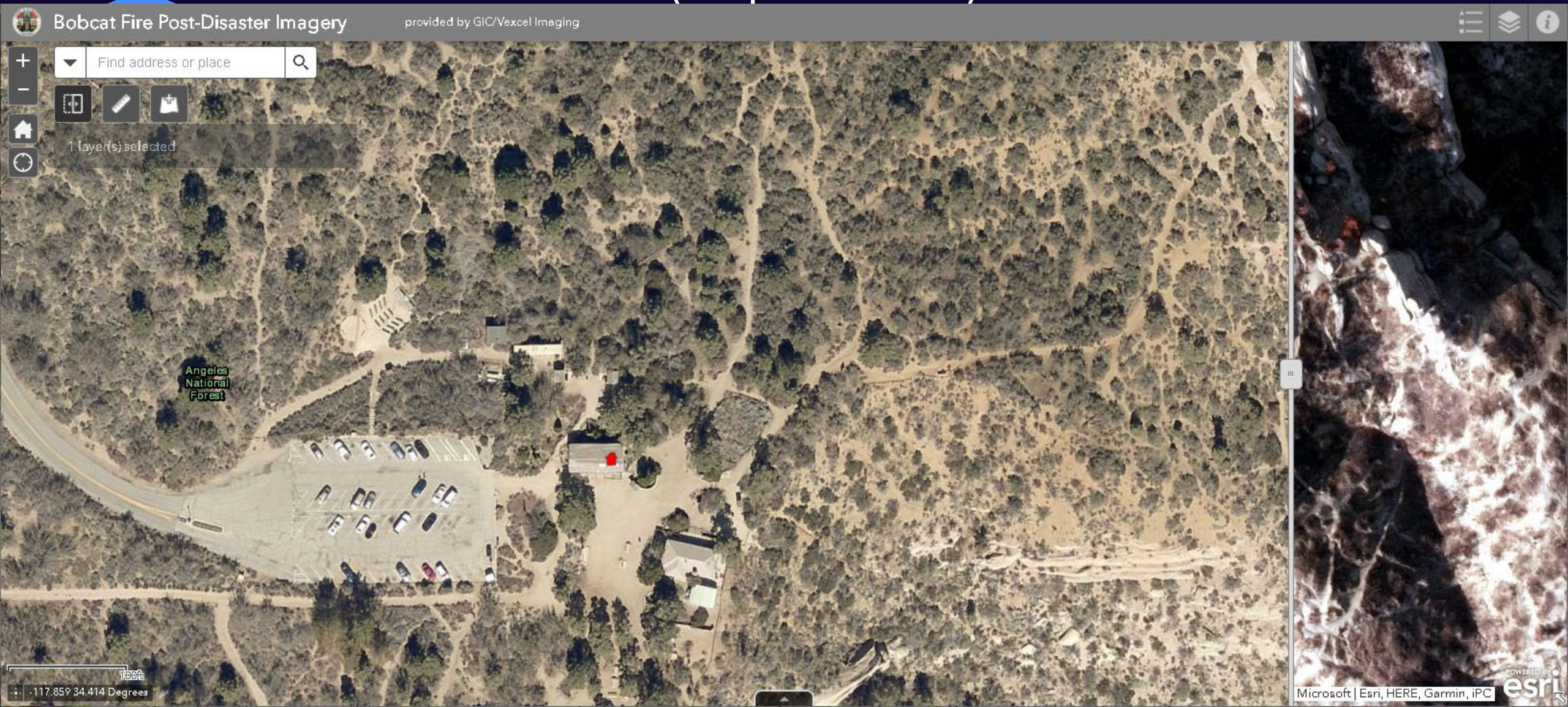
- Topographic mapping (surface model) and 2ft contours
- Building footprints and change (new, modified, replaced) 3yr cycle
- (occasionally) LiDAR and other derived products



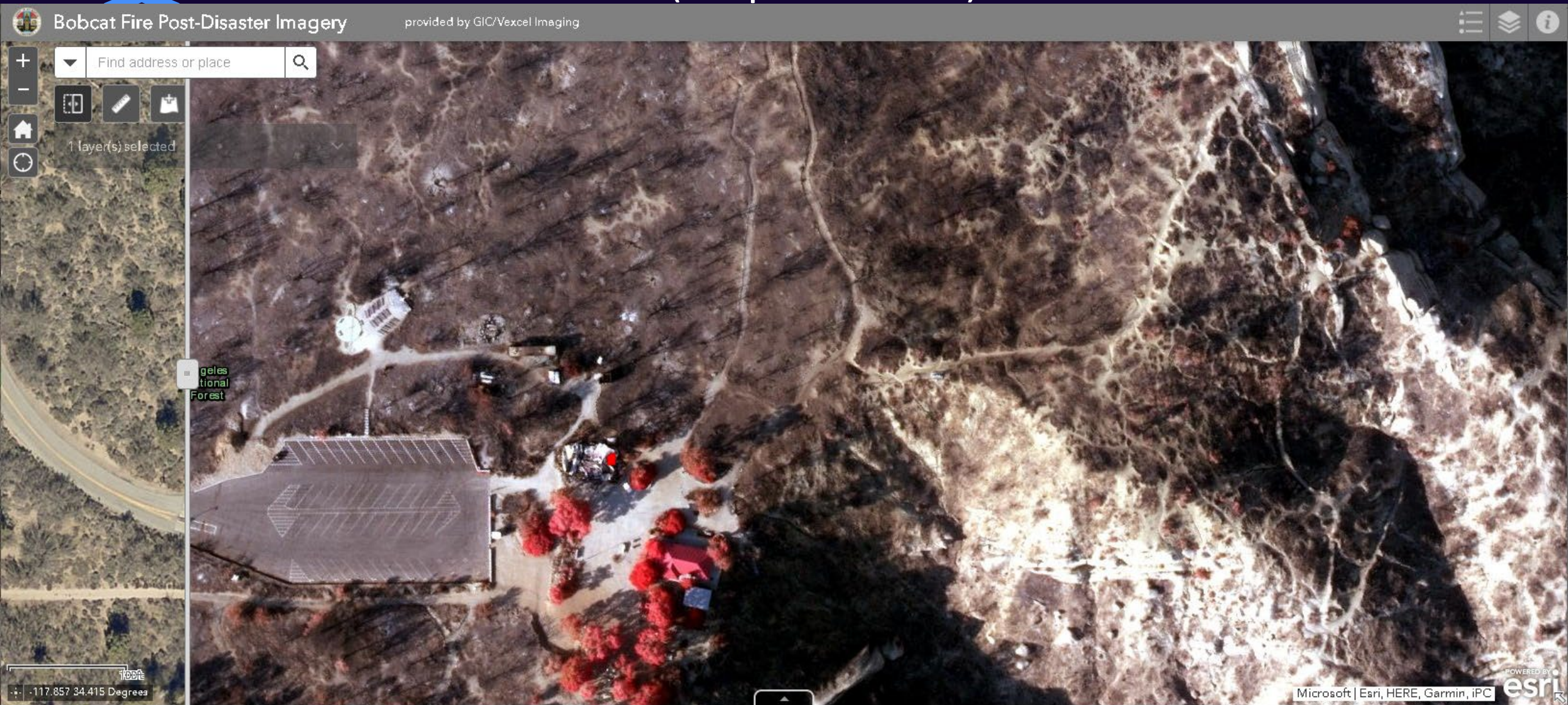
LARIAC
Los Angeles Region Imagery Acquisition Consortium

Imagery is crucial in change assessment

Bobcat Fire (Sept. 2020)



Bobcat Fire (Sept. 2020)

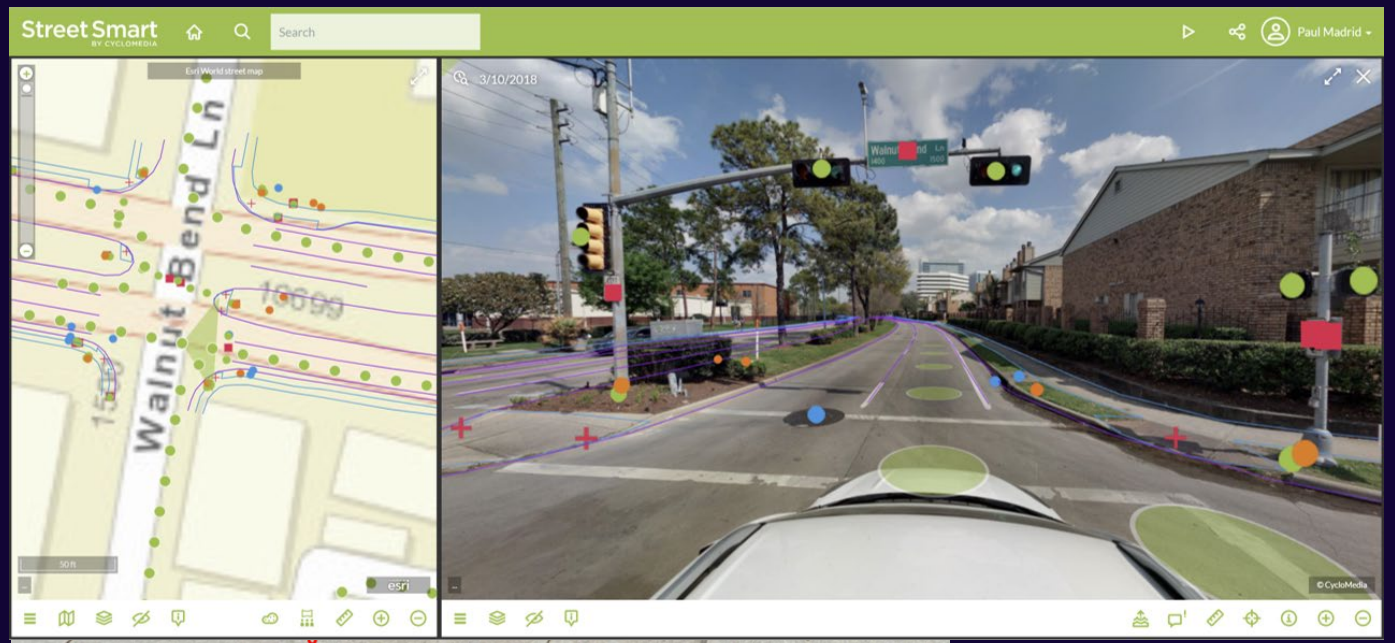


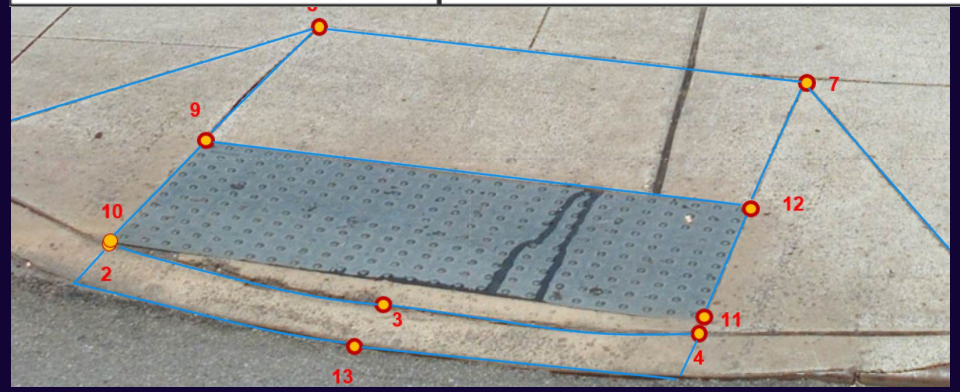
Bobcat Fire (Se

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

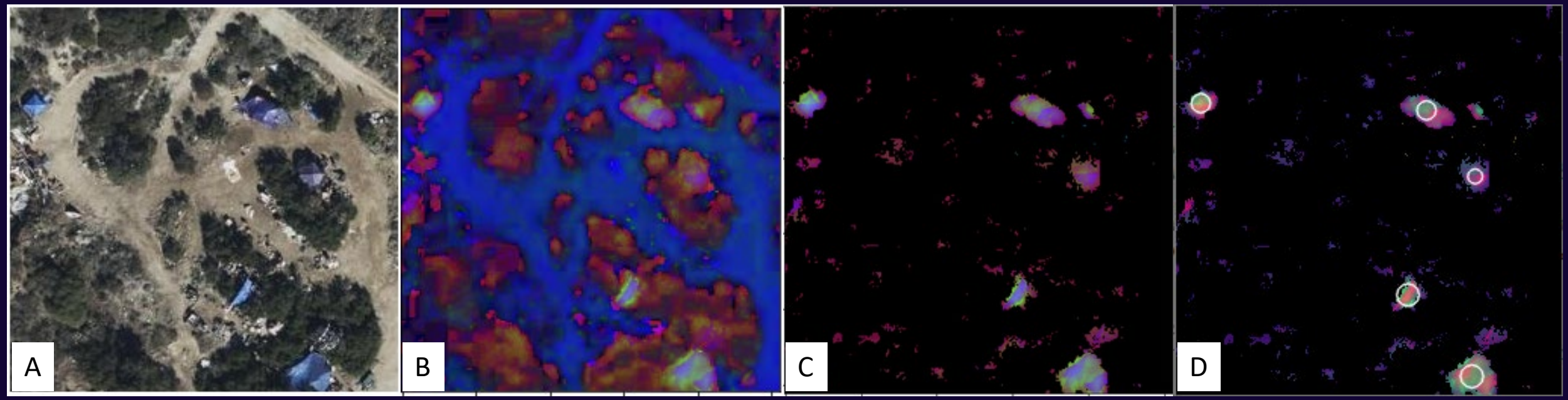
Street Level Feature Extractions





- 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.

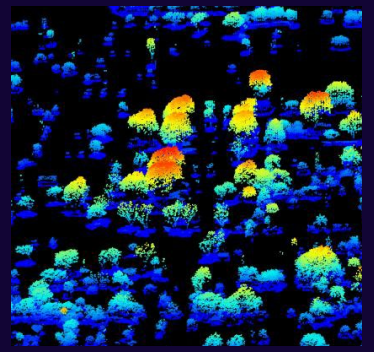
B) HSV-converted tile

C) Masked tile removes areas with low saturation and value.

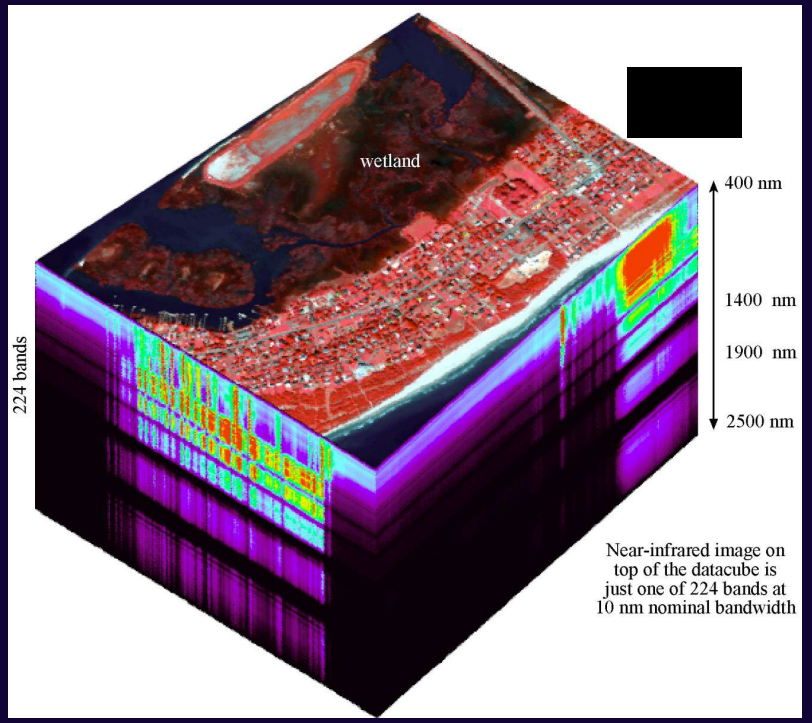
D) Blob detection identifies objects that contrast their surroundings.

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.



UCLA College | Social Sciences Geography Earth Lab Boulder

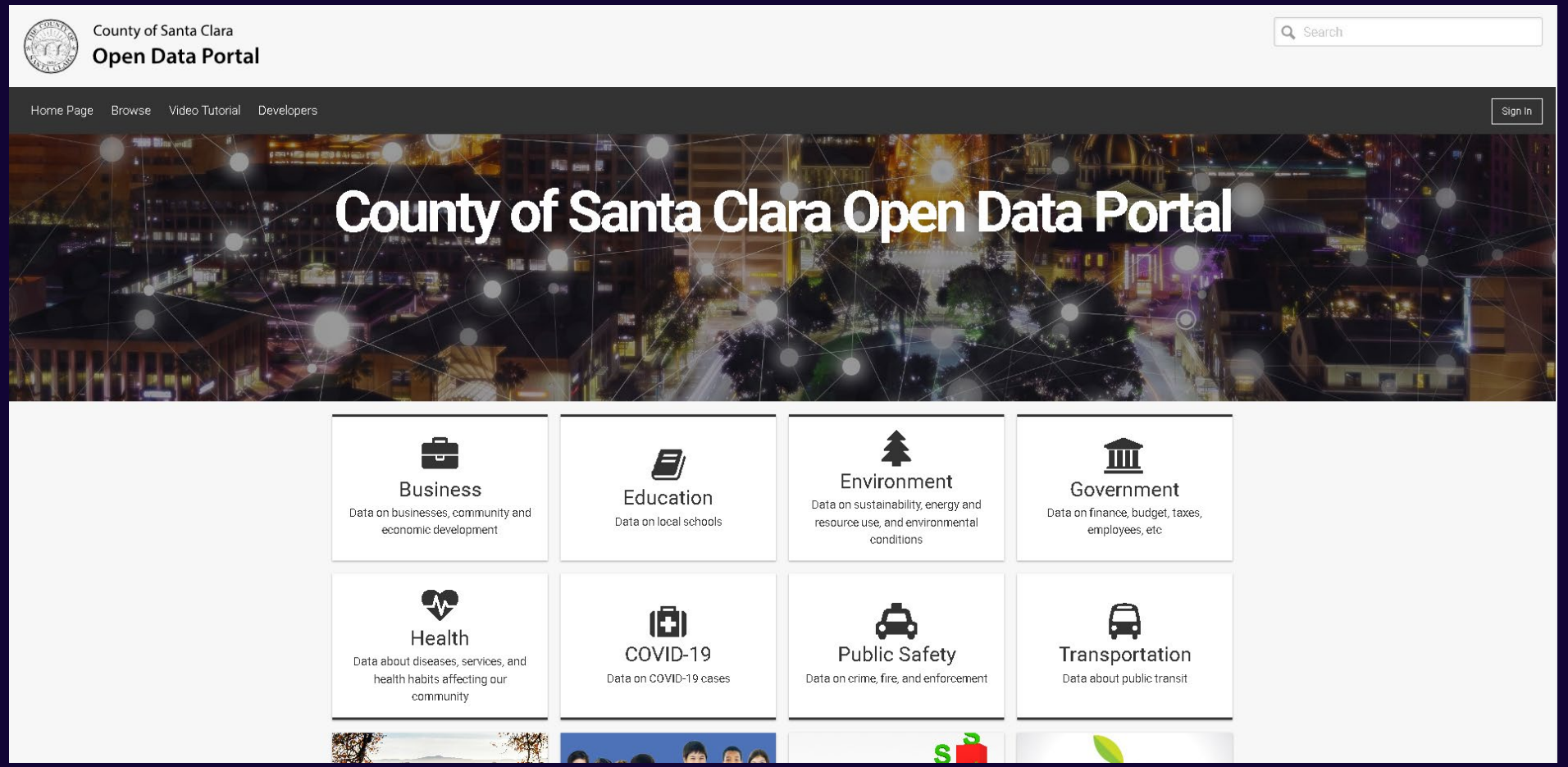


Observations on Local Govt. use of geospatial

- 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!]



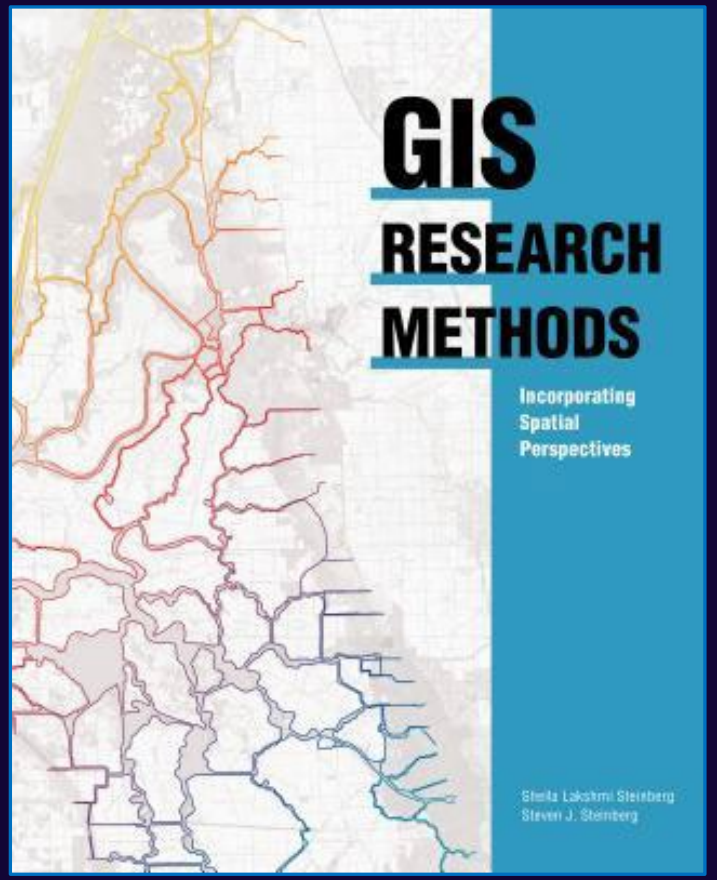
data.sccgov.org

Bringing it all back home

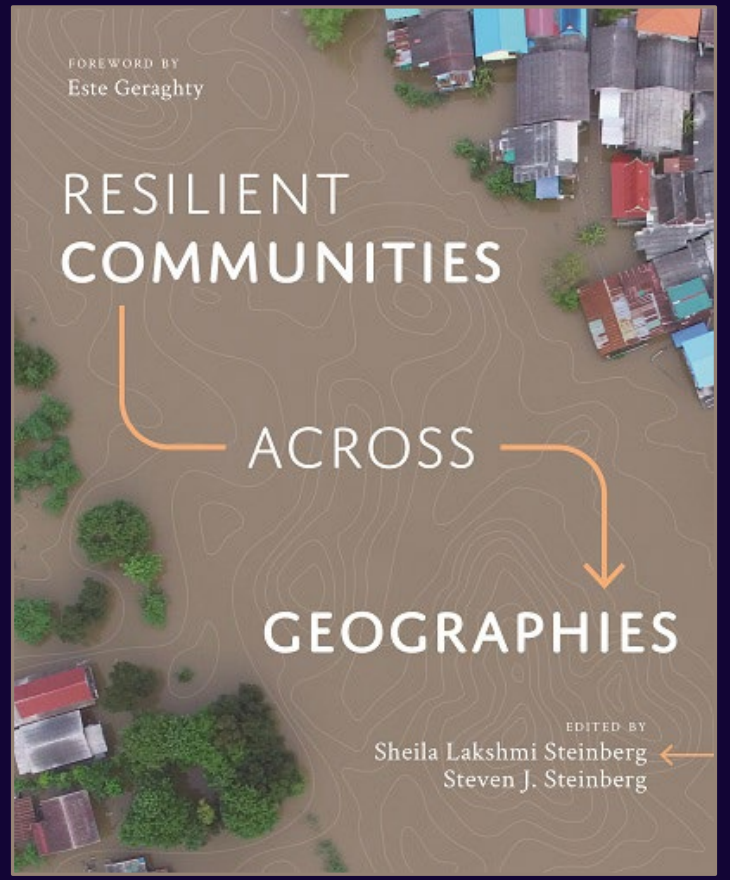
- Its not about the tech – but rather a means to an end (decision-making).
- Local governments require **accurate** and **timely** information.
  - Opportunities for desktop assessments and analysis (vs. extensive field work.)
  - Analytics to support effective, **data driven** decisions.
  - Enhanced 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.

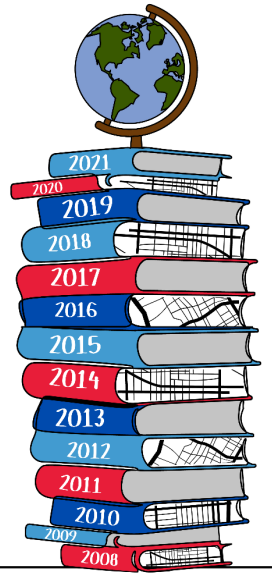
Please join us on November 16

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!

Thank you for your attention!

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
how about the transit travel time?	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.
The street level feature extractions by consultant?	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.
Why unincorporated areas?	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.

Q & A

Questions	Answers
What's the source for the street view images? Google?	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.
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).	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.

Q & A

Questions	Answers
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?	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.
How do you decide what outside data is valid enough to be integrated into your maps?	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.

Q & A