

Comparing Decennial Census Counts and Local Population and Household Estimates:

A Case Study in Fairfax County, Virginia



Federal Committee on
Statistical Methodology

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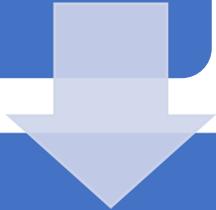
Fairfax County
Department of Management and Budget
[Economic, Demographic, and Statistical Research \(EDSR\)](#)
[Countywide Data Analytics](#)

U.S. Bureau of Labor Statistics



Objectives

Why and how does Fairfax County produce small area official estimates and forecasts on housing, population, and households?



How does Fairfax County local data compare to the Decennial Census?



How can we integrate local and federal-level statistical data systems to improve data quality and optimize mutual resource utilization?

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Why local estimates and forecasts?

- Local governments need current, relevant, and accurate data in custom areas for planning, community service delivery, and resource allocation.
- Fairfax County has leveraged administrative data to estimate and forecast demographic data to fill the gap in available federal statistics for 40+ years.

Fairfax County uses a GIS-based spatial-explicit model – Integrated Parcel Lifecycle System (IPLS) to produce local estimates and forecasts.



Demographic Reports

Small area housing, population, development, and land use information. Estimates and projections of data presented by supervisor district, planning district, human services region, and census tract and block group. Please note that the geographies contained in the reports have changed over time.

[2022](#) | [2021](#) | [2020](#) | [2019](#) | [2018](#) | [2017](#) | [2016](#) | [2015](#) | [2014](#) | [2013](#) | [2012](#) | [2011](#) | [2010](#) | [2009](#) | [2008](#) | [2007](#) | [2005-2006](#) | [2004](#) | [2003](#) | [2002](#) | [2001](#) | [2000](#) | [1999](#) | [1998](#) | [1997](#) | [1996](#) | [1995](#) | [1994](#) | [1993](#) | [1992](#) | [1991](#) | [1990](#) | [1989](#) | [1988](#) | [1987](#) | [1986](#) | [1985](#) | [1984](#) | [1983](#) | [1982](#) | [1981](#) | [1980](#) | [1979](#) | [1978](#) | [1977](#) | [1976](#) | [1975](#) | [1974](#) | [1973](#)

Integrated Parcel Lifecycle System (IPLS)



Collects, links, verifies, and utilizes the **most current administrative data from multiple databases.**



Produces new data, which is the **most accurate** for Fairfax County at the **parcel level.**



Data products are **updated annually, with point-in-time data as of Jan 1.**



Provides **estimates and forecasts (up to 30 years).**



Housing Units



Population



Gross Floor Area



Development Pipeline



Households

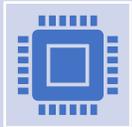


Housing Value



Existing Land Use

Integrated Parcel Lifecycle System (IPLS)



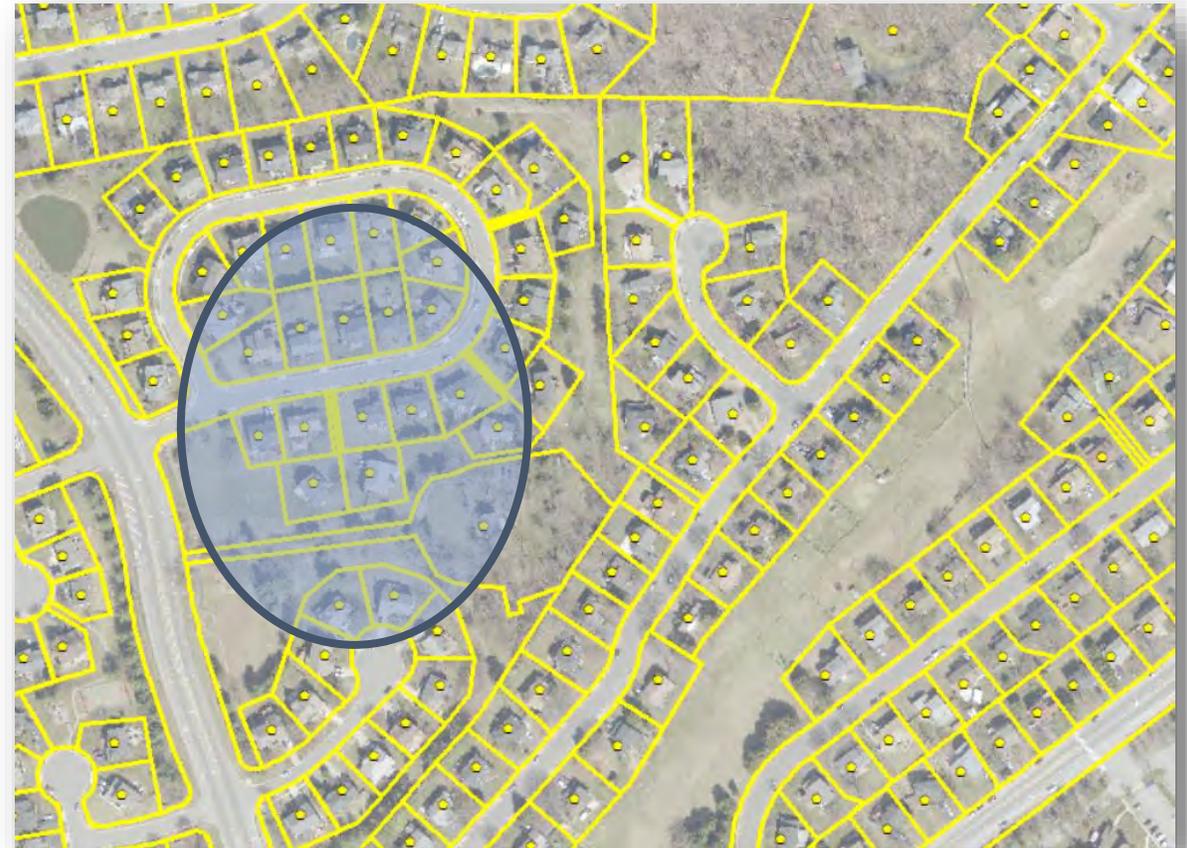
Data is stored in a **spatial database**, with Parcel Identification Number and Spatial Location as primary keys.



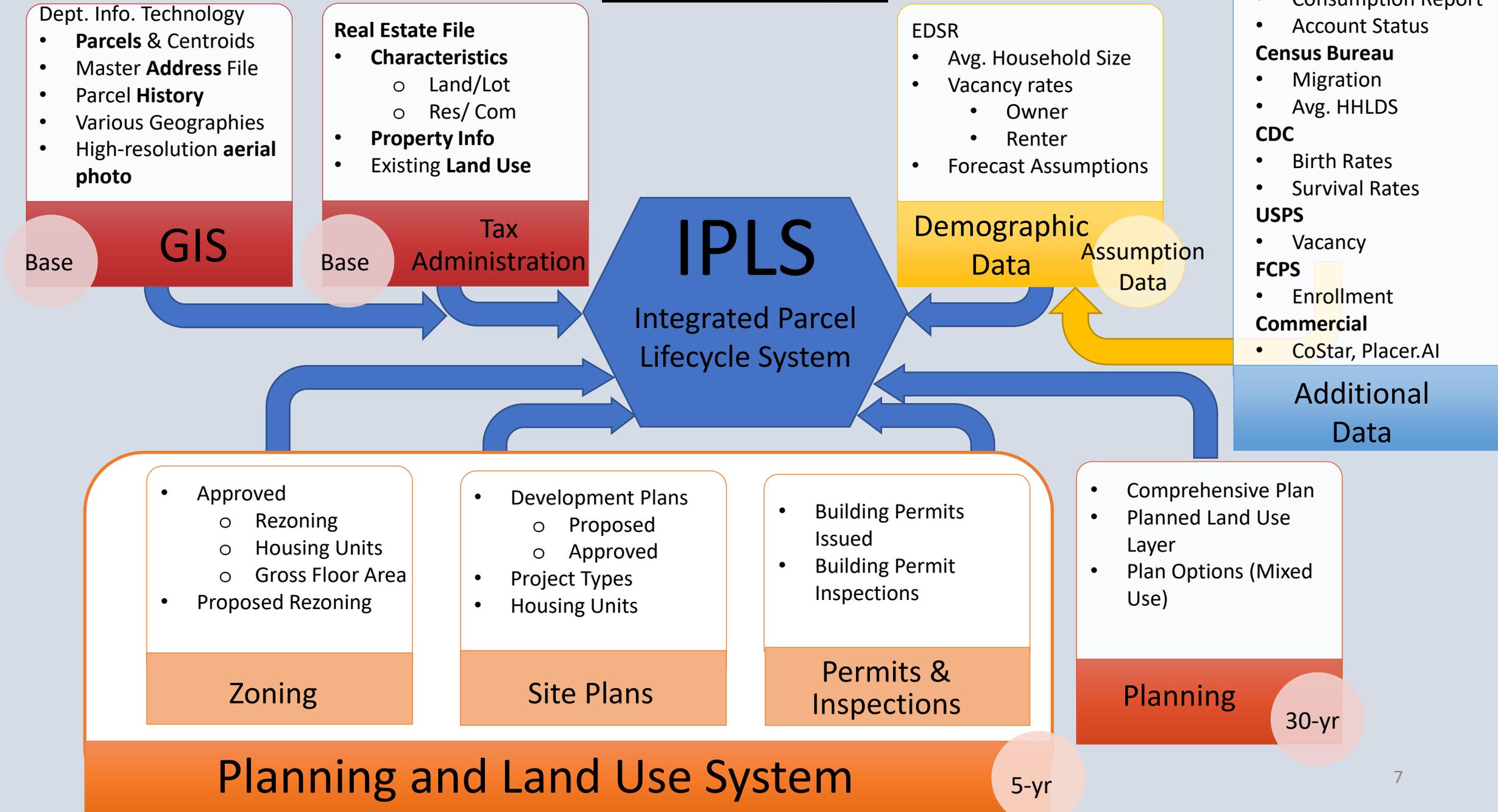
Data can be summarized **at any custom geographies**.



Primary tools: Spatial SQL Server Database, Esri ArcGIS, SAS/R.



IPLS Data Input



Estimate Methodology

Housing Units



Households



Population

Real Estate Tax Assessment & GIS files

- Example determinants: Type of unit, age of the structure, percent complete, structure condition, market value, existing land use, zoning, aerial photo, and access to utilities.

Households = Occupied Housing Units

- Owner vacancy: Fairfax water consumption rates
- Renter vacancy: Fairfax County rental housing survey research
- Supplementary vacancy: USPS quarterly data

Population = Households x Household Size + Group Quarter Population

- Average Household Size: U.S. Census Bureau, School Enrollment, locational movement from mobile apps
- Group Quarter Population: Fairfax County GQ survey research

Forecast Methodology

Short-term forecast

1-5 years

- Residential Development Activities
- Rezoning Pending -> Rezoning Granted -> Development Plan Submitted -> Development Plan Approved -> Building Permit Issued -> Under Construction

Long-term forecast

6-30 years

- Comprehensive Plan
- Mixed Used Plan Options
- Parcel Characteristics: age of structure, location, steepness, flood plains, etc.

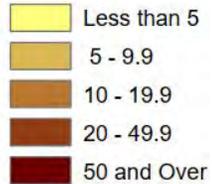
Fairfax County, Virginia
January 2022



Figure 4.1
Year 2050
Forecast Population Density
by Census Block Group



Persons Per Acre



Note: Population of City of Fairfax is not included.
Source: Population Density from Fairfax County Integrated Parcel Lifecycle System.

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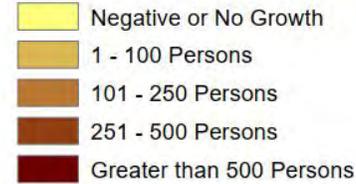
Fairfax County, Virginia
January 2022



Figure 4.2
2022 - 2050
Forecast Population Growth
by Census Block Group



Population Growth



Note: Population of City of Fairfax is not included.
Source: Fairfax County Integrated Parcel Lifecycle System.

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Data Output Example:
Forecast Population Density and Growth in 30 years

Forecast Accuracy

Short-term forecast

5-year projection accuracy: 99.3%

- Evaluation data: 2007-2022
- Average percent error: 0.7% over-forecasted

Long-term forecast

10-year projection accuracy: 97.3%

- Evaluation data: 2007-2022
- Average percent error: 2.7% over-forecasted

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Comparisons:

DP1 | Profile of General Population and Housing Characteristics

	2020 Decennial Census PL	2020 Fairfax County IPLS	Difference (Census-IPLS)	%Diff
Population	1,150,309	1,171,848	-21,539	-1.8%
Housing Unit	427,149	424,087	3,062	0.7%
Household	411,055	417,464	-6,409	-1.5%
Group Quarter Population	11,396	12,215	-819	-6.7%
Average Household Size	2.77	2.78	-0.01	-0.3%
Vacancy Rate	3.8%	1.6%	2.2%	141.5%
Owner Vacancy	0.7%	0.6%	0.1%	20.7%
Rental Vacancy	5.4%	3.9%	1.5%	38.8%
Housing Tenure				
Owner-occupied	65.7%	66.6%	-0.9%	-1.4%
Renter-occupied	34.3%	33.4%	0.9%	2.7%

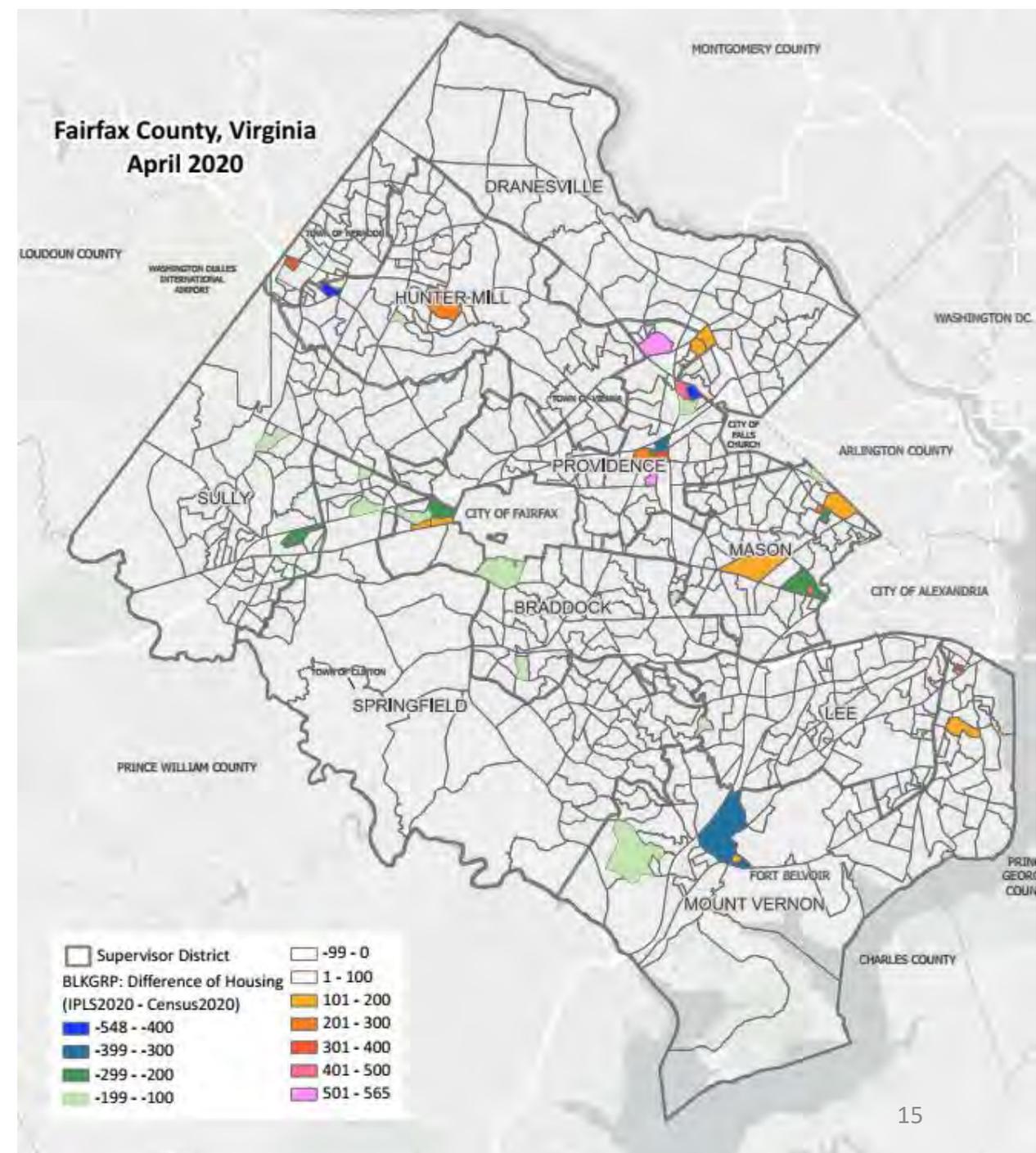
Comparisons

At the county level

- Fairfax County's local data aligns with Decennial Census figures for Housing Units, Average Household Size, Owner Vacancy, and Housing Tenure.
- Fairfax County's local estimates for *households and the overall population*, including group quarter population, exceed Decennial Census figures.
- Fairfax County's local estimates indicate lower *rental vacancy rates* than the Decennial Census.

At the census tracts and block group level

- Geographic variations are observed.



Why the discrepancies?



The COVID-19 pandemic introduced changes in Group Quarter population and housing occupancy between January and April 2020.



Differential privacy noise undercounts the population and households in large counties, which will affect many other federal statistics beyond Decennial Census counts.



Slight differences in definition can also be attributed to discrepancies, such as in Housing Units.



Geographical misplacement of housing units, households, and population onto adjacent blocks or tracts. Corrected through the 2020 Census Count Question Resolution operation.

The local model helps to detect and address these discrepancies and provides more accurate statistics.

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What has been done?



Fairfax County has used local population and house data to assist the decennial census throughout various stages: LUCA, PSAP, Redistricting, CQR, and methodology evaluation to provide feedback to the Census Bureau.



Fairfax County has leveraged federal statistical data products to fill local data gaps and facilitate data-driven decision-making and evidence-based policymaking.



Fairfax County has made federal statistics readily accessible to the public in user-friendly formats.

Our Wishlist

Localities and federal statistical **agencies strengthen communication, streamline partnerships** for productive collaborations, and mutually support optimizing resource utilization.

Federal statistical agencies **consider local planning and service needs** when designing surveys and programs, e.g., the most frequent language spoken at home.

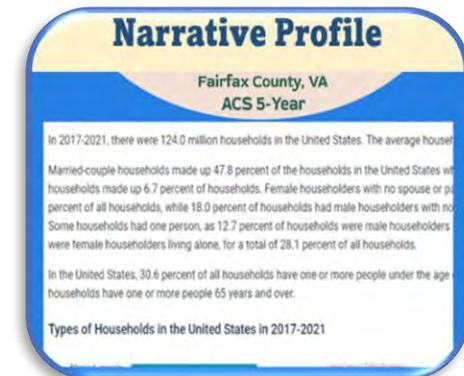
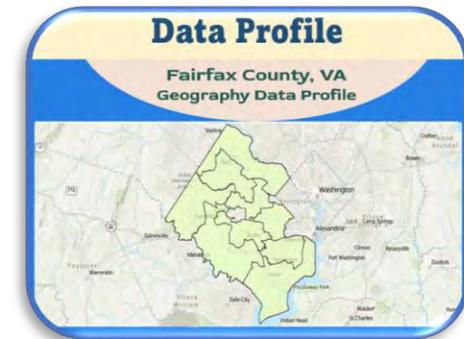
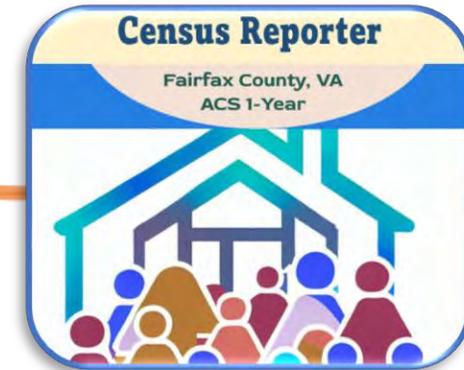
Federal statistical agencies try to have accurate and reliable data for **sub-county and smaller geographies** for localities to consume, e.g., disclosure avoidance implementations.

Federal statistical agencies share **customizable toolkits** for localities to **connect to or regionalize**, e.g., Data tools, interactive applications, and visualizations.

Federal agencies could provide **data standards guidance and quality control procedures** for local governments, e.g., Statistical Quality Standards.

The mechanisms of the Integrated Parcel Lifecycle System can be **transferrable and scalable** for use in other counties or local governments.

Fairfax County's administrative data-derived statistics can **systematically support the Census Bureau** and other federal statistical agencies' programs to reduce the data collection burden and improve data quality.





Where is
the
potential?

How can we integrate local and federal-level statistical data systems to

- reduce data collection burden,
- improve data quality,
- and optimize mutual resource utilization?

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<https://www.fairfaxcounty.gov/demographics>

