

Using Census API and ArcGIS Products to Streamline Demographic Data Retrieval, Processing, Updates, and Online Display

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2023 ACS Data Users Conference

Overview

Purpose

Automate demographic data processing and update Prince William County's demographics webpages by utilizing new software and web tools from ESRI's suite of ArcGIS Products

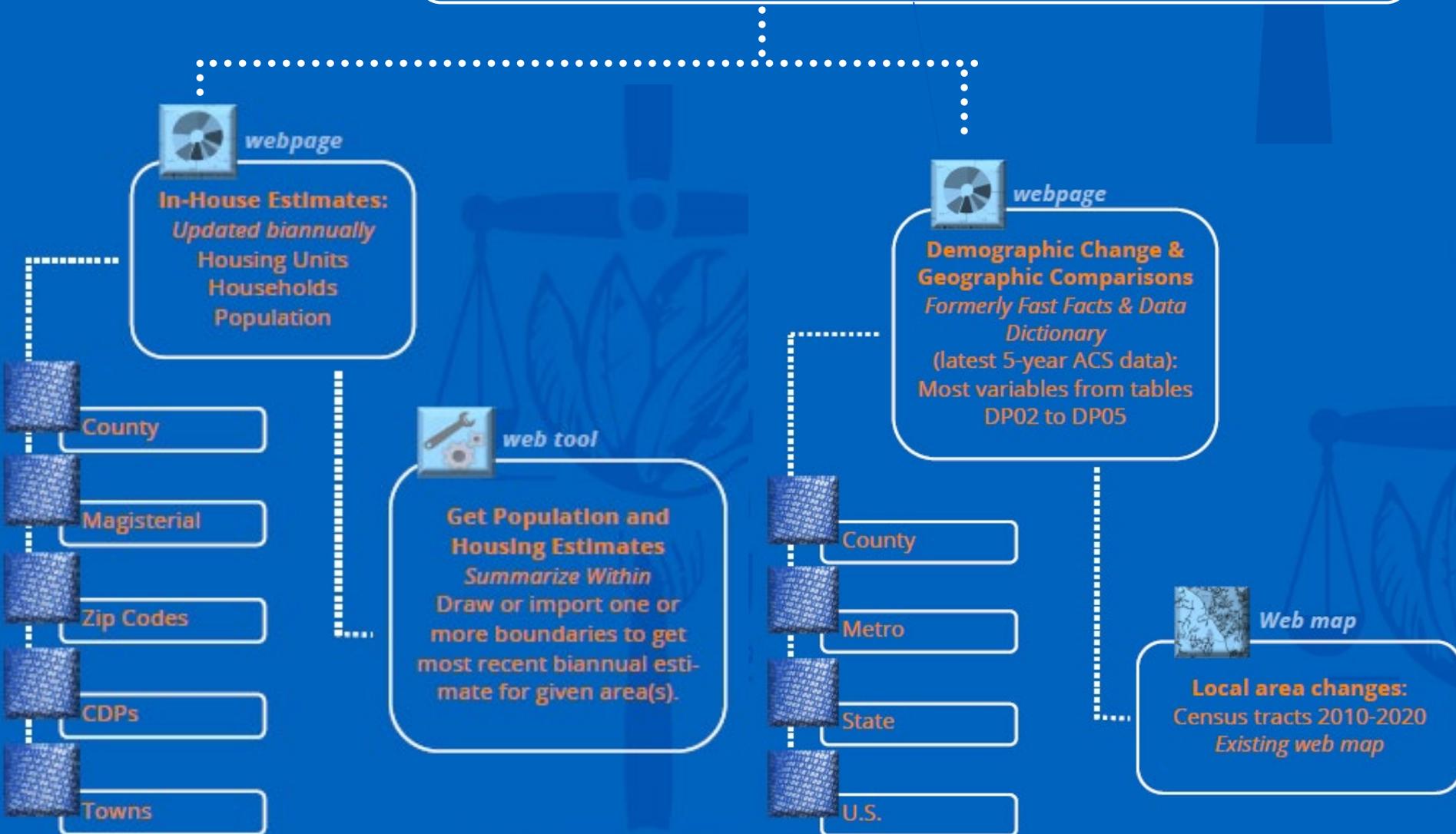
Objectives

- Upgrade webpages using ArcGIS Online applications and web development tools that have emerged since the demographic website's establishment in 2017
- Automate the time intensive tasks of retrieving, processing, updating, and hosting demographic data online
- Bolster user-friendliness and aesthetics of the webpages through a transformation of the user experience
- Increase accessibility and currency of frequently-requested data for the needs of county agencies

Phase 1

Web Updates

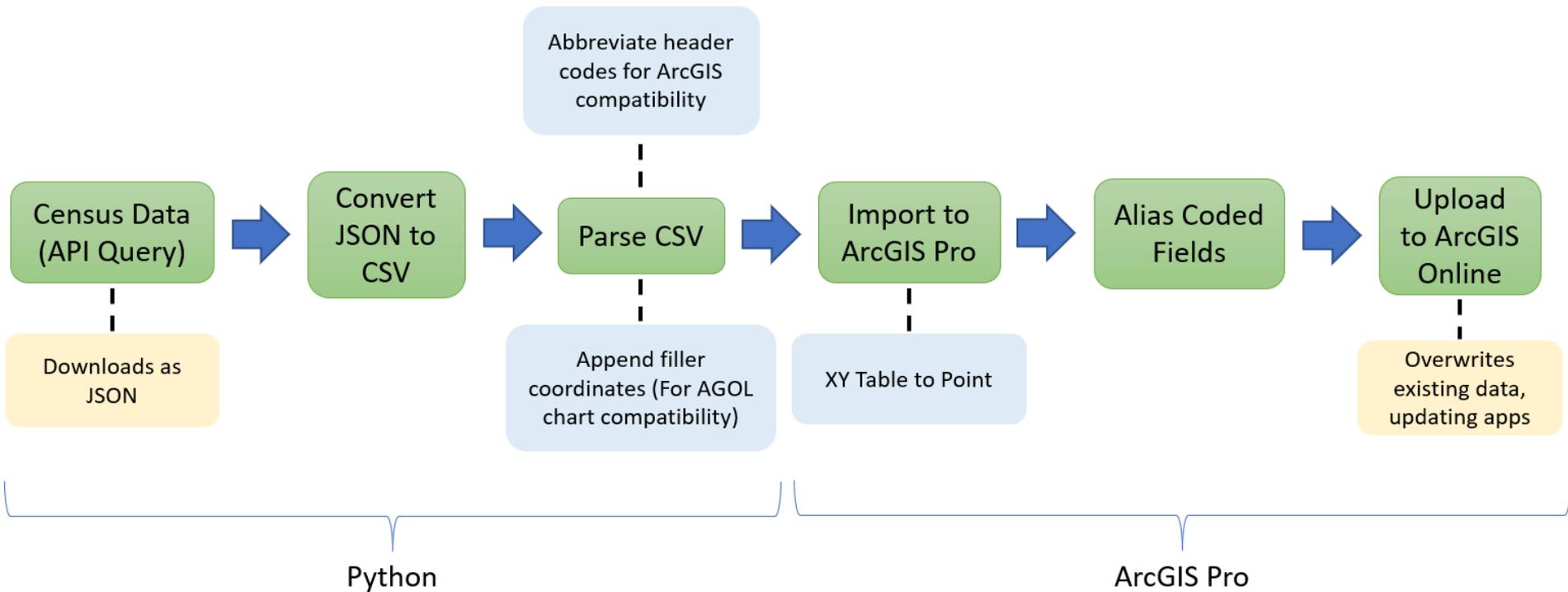
New Homepage and webpages designed through ArcGIS Hub
Content will go live while other webpages are replaced



Phase 1

Automation

Greatly increase workflow efficiency by automating the process of posting and updating demographic data on the web from end to end



Phase 1 Automation



Demographic Change & Geographic Comparisons
Formerly Fast Facts & Data Dictionary
(latest 5-year ACS data):
Most variables from tables DP02 to DP05

Creation of custom geoprocessing tool

- Utilizes the Census Bureau's API language to call data tables from the web
- Automation of data processing
- A simple code change updates the entire dataset. Successfully tested with apps unchanged



Geoprocessing

← Cen2ProPt2AGOLAlias →

Parameters | Environments ?

Workspace: CensusUpload.gdb

API URL: https://api.census.gov/data/2021/acs/acs5/sul

Name: Place_of_Work

Map: Map

Web Layer Name: Census_Data

Summary:

Tags:

Description:

Overwrite Service

Output Directory: CensusUpload

Lookup Table: lookupFin.csv

> Configuration

> Share with

Run

Phase 1

Web Updates



Home | Department of Information Technology | Geospatial Technology Services | Demographics

Demographics

[View 2020 Census Data](#)

The most popular data points about population, households, housing units, and socioeconomic for Prince William County, the Washington D.C. metropolitan area, and the Commonwealth of Virginia.

Population

Biannual Estimates
In-house Population estimates for Prince William County produced twice a year.

Population Projections & Annual Estimates
Population projections & estimates for Prince William County and its magisterial districts.

Data Dictionary

Standard Data Dictionary
This is Prince William County's official dataset of current demographic data for county staff members, the general public, and external entities. Updated every January.

DEMOGRAPHIC MAPPING

PWC Demographic Mapper
Create colorful, custom maps of Prince William County, Manassas, and Manassas Park using data from the U.S. Census 2010, and the latest American Community Survey (ACS) 5-Year Estimates.

DATA & HISTORY

Get Census Data
Obtain data from the U.S. Census Bureau for any location.

Post-WWII Population Growth

ECONOMIC DATA

Select Economic Stats
Labor force, employment, unemployment, employment by industry, and employer data for Prince William County and the region.

Other

Quarterly Report Archives
A demographic and economic quarterly newsletter that was discontinued after the 2nd Quarter of 2016. These archives go back to 2009.

Prince William Demographics

[Population Estimates](#)

[Comparative Stats](#)

[Economic Stats](#)

[Data Dictionary](#)

[Post-WWII Growth](#)

[GIS Home](#)

[More >](#)

Total Population

489,763

▲ 2nd most populous in VA
▲ 2020 Census: 482,204
[PWC-GTS_2022-Q2](#)

Diversity Index

73.7

▲ 10th most diverse in U.S.
▲ Most diverse in VA
[Census Bureau](#)

Avg. HH Size

3.12

▲ DC Metro Avg.: 2.74
▲ Among highest in DC area
[US Census Bureau](#)

Median HH Income

\$113,831

▲ 26th highest in U.S.
▲ 9th highest in DC Metro
[US Census Bureau](#)

New Features

[Population Estimates & Projections](#)

Current population and housing estimates produced biannually by the demographer. Use a new interactive tool to query geographic areas and draw your own features! View graphs and tables of historic estimates and COG projections.

[Comparative Demographics](#)

Need to compare Prince William County demographics with the metro, state, and nation? Our new interactive dashboards display the latest comparative US Census American Community Survey 5-Year Estimates.

Browse by Topic

- [County Population & Demographics](#)
- [Economic Stats](#)
- [Demographic Data Sources](#)
- [Interactive Data and Maps](#)

Phase 1 Web Updates

Population Estimates

The methods behind the county's population, household, and housing unit estimates have changed. Please review the new methods below the data table.

If you are looking for the county's official demographic dataset, please see the [Standard Data Dictionary](#)

For other population data and projections, see the [annual estimates page](#). For 2020 Census data, click here

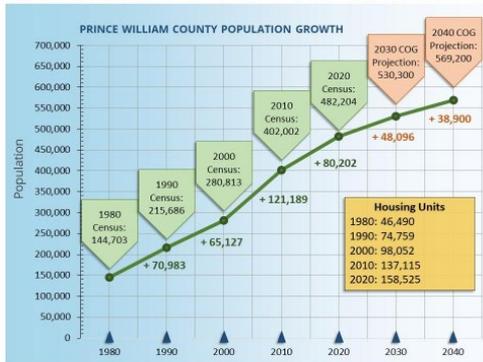
Decennial Census Data (US Census Bureau)

	Population	Population: Group Quarters	Population: MCIQ Non-Barracks Housing	Housing Units	Households	Occupancy Rate	Avg. Household Size
2000 Census	280,813	2,389	n/a	98,052	94,570	96.45	2.94
2010 Census	402,002	2,520	n/a	137,115	130,785	95.38	3.05
2020 Census	482,204	3,018	n/a	158,525	153,745	96.98	3.12

PWC Biannual Estimates

	Population (All)	Population: Group Quarters	Population: MCIQ Non-Barracks Housing	Housing Units
2020 Q4	486,504	3,812	3,487	158,011
2021 Q2	488,629	3,812	3,487	158,701
2021 Q4	490,250	3,812	3,487	159,251
2022 Q2	492,576	3,812	3,331	161,631

Annual Population Estimates



Notes: Population numbers from 1980 to 2020 are from the U.S. Census decennial counts. Three decadal population projections are produced in conjunction with COG (Metropolitan Washington Council of Governments) every 2-3 years using and are subject to change with real estate market and economic fluctuations as well as with local planning and land use policy changes. The 2030 and 2040 projections in the chart above represent COG 9.2 forecasts. **New COG 10.0 projections will be released in the second half of 2022.**

MWCOG FORECASTS: ROUND 10.0 OF THE COUNTY'S COG PROJECTIONS WILL BE AVAILABLE LATER IN 2022.

To view and download forecast data for Prince William and all COG jurisdictions, please visit MWCOG's Cooperative Forecasts page.

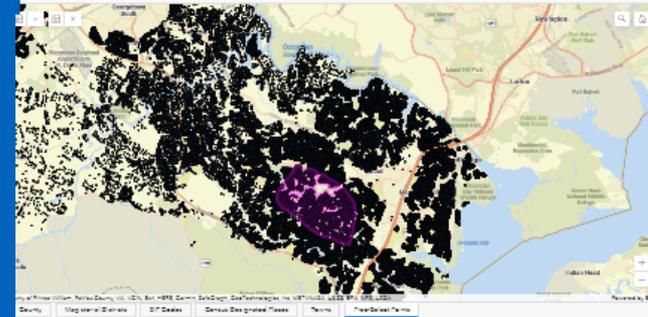
ANNUAL POPULATION ESTIMATES

Year	Population	Housing Units	Households	Source
1990	215,686	74,759	70,233	1990 Census
1991	220,626	76,331	71,522	PWC Office of Information Technology
1992	225,735	78,353	73,208	PWC Office of Information Technology

Estimates and Forecasts

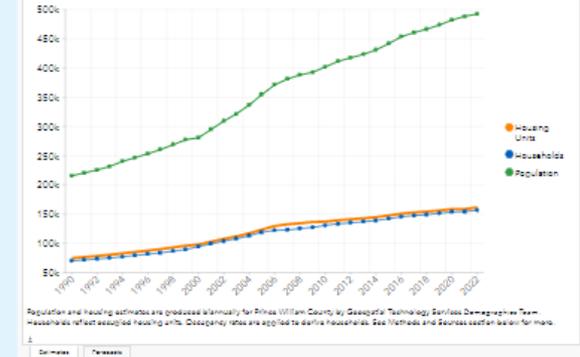
Population and housing estimates produced biannually and forecasts (including employment) produced in conjunction with MWCOG

Estimator Tool: 2022 Quarter 2



Total Selected Points	8.47k
Total Population	26.80k
Group Quarters Population	28
Total Housing Units	8.47k
Total Households	8.26k
Average Household Size	3.24

Population and Housing Estimates



Annual Population and Housing Estimates

Year	Housing Units	Households	Population	Source
1990	74,759	70,233	215,686	1990 Census
1991	76,331	71,522	220,626	PWC Office of Information Technology
1992	78,353	73,208	225,735	PWC Office of Information Technology
1993	80,375	74,903	231,237	PWC Office of Information Technology
1994	82,397	77,101	237,237	PWC Office of Information Technology
1995	84,419	79,299	243,237	PWC Office of Information Technology
1996	86,441	81,497	249,237	PWC Office of Information Technology
1997	88,463	83,695	255,237	PWC Office of Information Technology
1998	90,485	85,893	261,237	PWC Office of Information Technology
1999	92,507	88,091	267,237	PWC Office of Information Technology
2000	94,529	90,289	273,237	2000 Census

Phase 1

Web Updates



Fast Facts

Prince William County, Virginia
Total Area (land & water): 347.33 sq. miles
 Official County Basemap

County Boundaries & Water Features: Eastern border: Potomac River, NE border: Occoquan River/Reservoir & Occoquan Bay, N-NW border: Run, SE border: Chopawamsic Creek

Bordering Counties and Cities: Clockwise from the North: Fairfax County (N,NE), Manassas Park City (N), Manassas City (Central), Charles County (E), Stafford County (S), Fauquier County (W-SW), Loudoun County (N-NW)

Combined Statistical Area (CSA): Washington-Baltimore-Arlington, DC-MD-VA-WV-PA (548)

Metropolitan Statistical Area (MSA): Washington-Arlington-Alexandria, DC-VA-MD-WV MSA (47900)

Metropolitan Division: Washington-Arlington-Alexandria, DC-VA-MD-WV (47894)

Comparative Stats

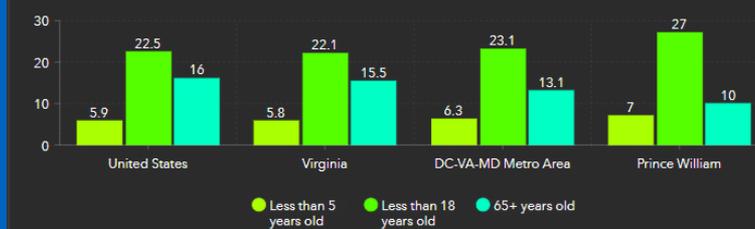
	Prince William		D.C. Metro*		Virginia		United States	
	Value	%	Value	%	Value	%	Value	%
FWC Population Estimate 2021Q4	480,250							
Total population (2020 Census)	482,204	(X)	6,385,162	(X)	8,631,393	(X)	331,449,281	(X)
Male	233,306	50.0	3,055,672	48.9	4,186,543	49.2	160,818,530	49.2
Female	233,528	50.0	3,194,637	51.1	4,322,815	50.8	165,750,778	50.8
Median age (years)	35.4	(X)	37.2	(X)	38.4	(X)	38.2	(X)
Under 5 years	33,751	7.2	401,752	6.4	508,122	6.0	19,650,192	6.0
Under 18 years	126,298	27.1	1,434,062	22.9	1,868,997	22.0	73,296,738	22.4
65 years and over	46,209	9.9	816,437	13.1	1,314,345	15.4	52,362,817	16.0
Not Hispanic or Latino (2020 Census)	360,680	74.8	5,290,212	82.9	7,722,644	89.5	269,369,237	81.3

Comparative Demographic Stats

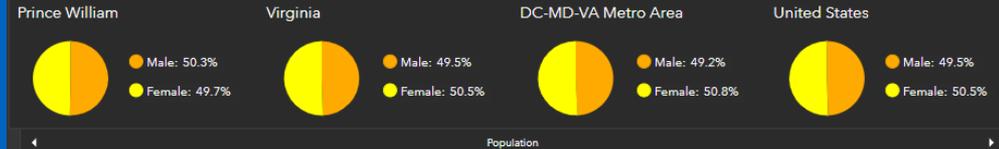
Stats comparing Prince William and larger geographic entities to help form demographic narratives for reporting purposes.

Demographic Dashboard: 2017-2021 ACS

Percentage of Population by Age



Median Age
 Prince William County
35.7
 DC-MD-VA Metro
37.5
 Virginia
38.5
 United States
38.4



Source: Most recent U.S. Census American Community Survey (ACS) 5-Year Estimates. The ACS is a yearly sample of the population and contains margins of error. For more information about the ACS, please visit <https://www.census.gov/programs-surveys/acs>

Standard Data Dictionary

The US Census 2016-2020 American Community Survey (ACS) 5-Year Estimates will not be released until mid-late March, 2022 due to COVID delays. At that time, this page will be updated with new data.

County (FIPS):	Prince William (153)	The Federal Information Processing Standard (FIPS) code that uniquely identifies counties in the U.S.
Region (FIPS):	South Region (3)	Regions are groupings of states based on geographic location in the U.S.
Region Division (FIPS):	South Atlantic (5)	Region divisions are groupings of states based on geographic location within each region.
Combined Statistical Area (CSA) (FIPS):	Washington-Baltimore-Arlington, DC-MD-VA-WV-PA (548)	CSAs are groupings of two or more MSAs that have a high level of economic and social connectivity (measured by commuting to work).
Metropolitan or Micropolitan Statistical Area (MSA) (FIPS):	Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Statistical Area (47900)	Metropolitan and micropolitan statistical areas (referred to collectively as Core Based Statistical Areas (CBSAs) in the U.S. CBSAs are groupings of one or more U.S. counties that contain a core urban area accompanied with adjacent counties that have a high level of economic and social connectivity (measured by commuting to work) as delineated by the Office of Management and Budget (OMB). A metro area houses an urban core population of 50,000 or more people. A micro area houses an urban core population of between 10,000 and 50,000 people. See reference maps or delineation files .
Metropolitan Division (FIPS):	Washington-Arlington-Alexandria, DC-VA-MD-WV Metro Division (47894)	Metropolitan Divisions are groupings of counties (or equivalent) within a Metropolitan Statistical Area (MSA) that have an urban core with and a population of at least 2.5 million people. Not all MSAs have Metropolitan Divisions. Entities within Metropolitan Division have strong economic and social connections (measured through commuting).
Council of Governments (COG):	Metropolitan Washington Council of Governments (MWCOG)	Councils of Governments (COGs) are regional planning groups across the U.S., each of which consists of elected public officials and planning authorities from a metropolitan area. The Metropolitan Washington COG includes the District of Columbia, 4 counties and 5 independent cities in Virginia, and 4 counties and 8 cities in Maryland. Visit the MWCOG website .

Fullscreen

Share this card

Phase 2

- Continuation of web updates to fully transition away from current webpages
- Finish up Bureau of Labor Statistics API for integration with the data processing automation tool. This would allow for the automation of labor force and employment data and seamless updating on online apps
- Place priority on a one-stop-shop for Finance, Budget, and other annual reporting data needs:
 - Fiscal Health Report
 - County Statement: Local Economy section
 - Annual Comprehensive Financial Report
 - Police annual accreditation report
- Story map for historical research conducted on the history of PWC's post-WWII development

Phase 2: Additional Web Updates



webpage

Finance and Budget Annual Data Requests

Total Population and % Change

- Decennials & most recent year, 1900-present, raw and % change
- *County, MSA, VA*

Total Annual Population and % Change, 2010-Present + 2020-2050 projections (COG).

Select Demographics (latest 5-Year ACS)

- Median age, % under 18, & 65 and older, % with high school diploma or higher (pop 25+), % with bachelor's degree or higher (pop 25+) (*County, VA, U.S.*)
- Median Household Income
 - Top 30 counties in the U.S.
 - Top 10 counties in the MSA.
 - Top 10 counties in VA

Age Group and Median HH Income Changes

- Age group distribution 1980-present (*decennials and ACS*). *Under 18, 18-64, 65+ (% and % change)*
- Median Household Income: 1980-present (*decennials and latest two ACS 5-Year surveys*)

Bureau of Labor Statistics: Previous 10 years of annual data for the following (*County, MSA, VA, U.S.: not seasonally adjusted*)

Local Area Unemployment Stats (LAUS):

- Civilian labor force
- Employment
- Unemployed and % unemployed

OCEW Stats (total, all industries):

- At-place employment
- Places of employment
- Avg. weekly wage

Industry-Level Data (NAICS sectors) (*county, previous 5 years*)

- Avg. employment and % (out of employment total by industry sector), with 5-year % change

Largest Employers (*top 25 in the county, latest*)

Housing units by type of structure: *county; previous decennial censuses back to 1980 and most recent year (in-house estimates); totals and %'s*

Phase 2

Web Updates



Select Economic Stats



SUMMARY OF LATEST PRINCE WILLIAM COUNTY EMPLOYMENT DATA:

Labor Force:	244,657*	Aug., 2022
Employment:	237,234*	Aug., 2022
Unemployment Rate:	3.0*	Aug., 2022
Establishments of Employment:	10,421*	1st Quarter, 2022
Employment at PWC Establishments:	130,107*	1st Quarter, 2022
Average Weekly Wage:	\$1,069.00*	1st Quarter, 2022

Sources: United States Department of Labor: Bureau of Labor Statistics. *Local Area Unemployment Statistics (LAUS)*; *Quarterly Census of Employment and Wages (QCEW)*. <https://www.bls.gov/data/unemployment>

Notes: An "establishment" is an economic entity that produces goods and services, usually at a single location, and is involved in one or predominantly one industry activity. "Employment at PWC Establishments" indicates the total number of employees working in Prince William County establishments. These employees may reside inside or outside of the county.

*Preliminary estimate

EMPLOYEES AND ESTABLISHMENTS IN PRINCE WILLIAM

Source: United States Department of Labor: Bureau of Labor Statistics. *Quarterly Census of Employment and Wages*. <http://data.bls.gov/>

Estab. of Empl. = Establishments of Employment; Empl. in PWC = Employees Working in PWC

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Estab. of Empl.	7,275	7,421	7,687	7,958	8,037	8,254	8,870	9,212	9,233	9,452	9,535	9,615	9,968
Change		2.01%	3.58%	3.53%	0.99%	2.70%	7.46%	3.86%	0.88%	1.68%	1.11%	0.83%	3.67%
Empl. in PWC	102,075	103,877	108,137	112,954	116,645	119,463	122,607	126,283	127,892	130,335	133,237	125,254	130,075
Change		1.77%	4.10%	4.43%	3.27%	2.42%	2.63%	3.00%	1.27%	1.87%	2.08%	-5.99%	3.85%

*Preliminary estimate

AVERAGE ANNUAL UNEMPLOYMENT RATES

[The ratio of unemployed to the civilian labor force expressed as a percent: 100 * (unemployed/ labor force). In this case, each year represents the mean of all monthly unemployment rates for that year. MSA - Metropolitan Statistical Area

Budget and Finance Reporting

Economic and demographic data for finance and budget reporting



An official website of the United States government [Here is how you know](#)

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<iframe src="https://data.bls.gov/cew/apps/table_maker/v4/table_maker.htm?type=6&year=2022&qt=2&own=5&area=51153&supp=1" title="W3Schools Free Online Web Tutorials"></iframe>

Total Population 492,576 ▲ 2nd most populous in VA ▲ 2020 Census: 482,204 WVC GIS, 2022 Q2	Diversity Index 73.7 ▲ 10th most diverse in U.S. ▲ Most diverse in VA Census Bureau	Avg. Household Size 3.21 ▲ DC Metro Avg.: 2.74 ▲ Among highest in DC area US Census Bureau	Median HH Income \$107,707 ▲ 24th highest in U.S. ▲ 9th highest in DC Metro US Census Bureau
Total Population 492,576 ▲ 2nd most populous in VA ▲ 2020 Census: 482,204 WVC GIS, 2022 Q2	Diversity Index 73.7 ▲ 10th most diverse in U.S. ▲ Most diverse in VA Census Bureau	Avg. Household Size 3.21 ▲ DC Metro Avg.: 2.74 ▲ Among highest in DC area US Census Bureau	Median HH Income \$107,707 ▲ 24th highest in U.S. ▲ 9th highest in DC Metro US Census Bureau

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