

# Introduction to the SEDAC Population Estimation Service and Mapping Tool, Version 3 (PESv3)

This tutorial is based on a [blog post](#), "Explore the World's Population with the NASA SEDAC CIESIN Global Population Estimation Web Mapping Application," by Esri education manager [Joseph Kerski](#). It was published on Esri's education space, [GeoNet](#), and is distributed here with his permission.

A [short video tutorial](#) is also available on You Tube  
--no log in necessary  
--available on any browser or device.

The SEDAC Population Estimation Service and associated Population Estimator mapping tool (PESv3) developed by the NASA Socioeconomic Data and Applications Center ([SEDAC](#)) operated by [CIESIN](#) provides educator and researchers with an easy-to-use tool to examine the distribution and demographic characteristics of the world's population. It also makes use of innovative Esri technology.

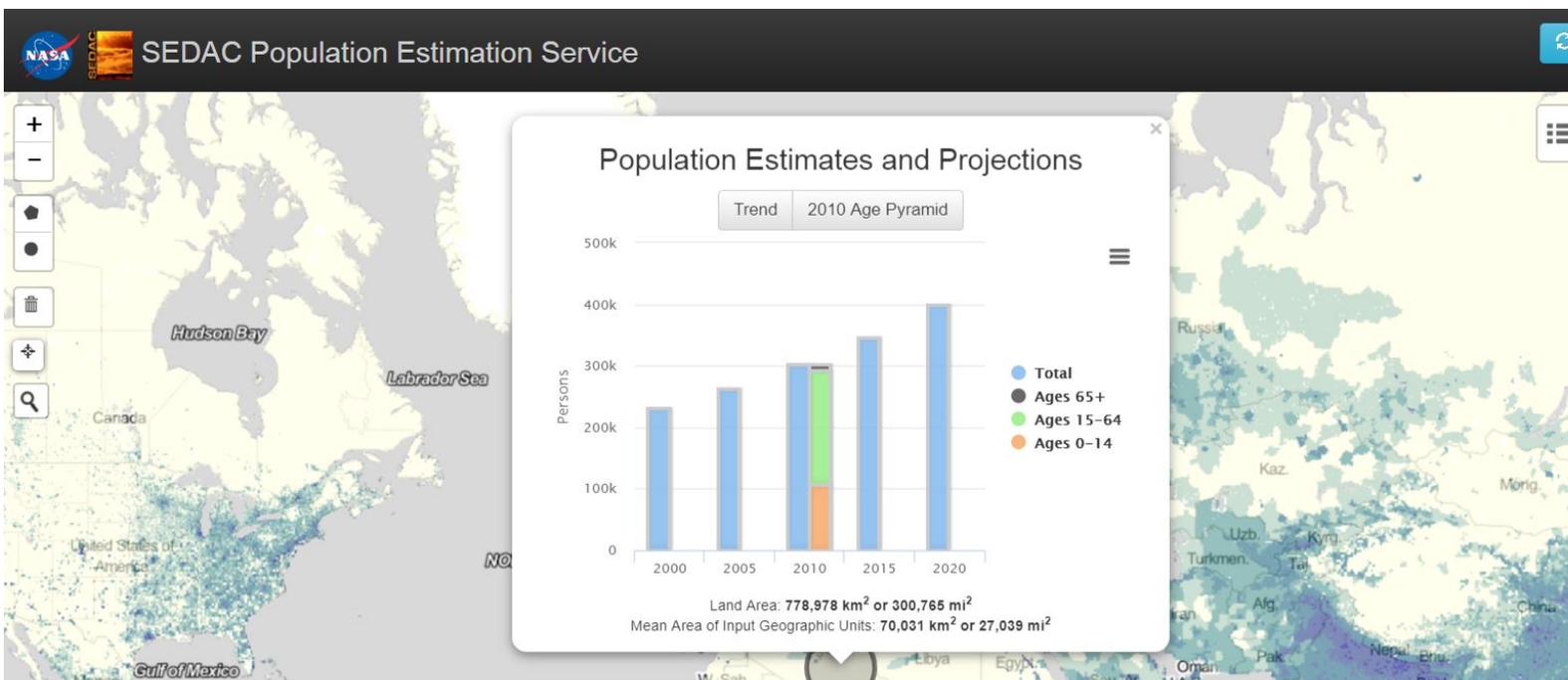
## USE THE MAPPING TOOL AND SERVICE

Go to <http://sedac.ciesin.columbia.edu/mapping/popest/pes-v3/>

Point your mouse to the white button on the upper right.

To examine global population distribution, toggle between country boundaries, roadmap, aerial, and terrain.

This lets you can examine the relationship between the distribution of population at scales from local to global, and the relationship of the population density and amounts to terrain, landforms, climate zones, river systems, coastlines, and more.

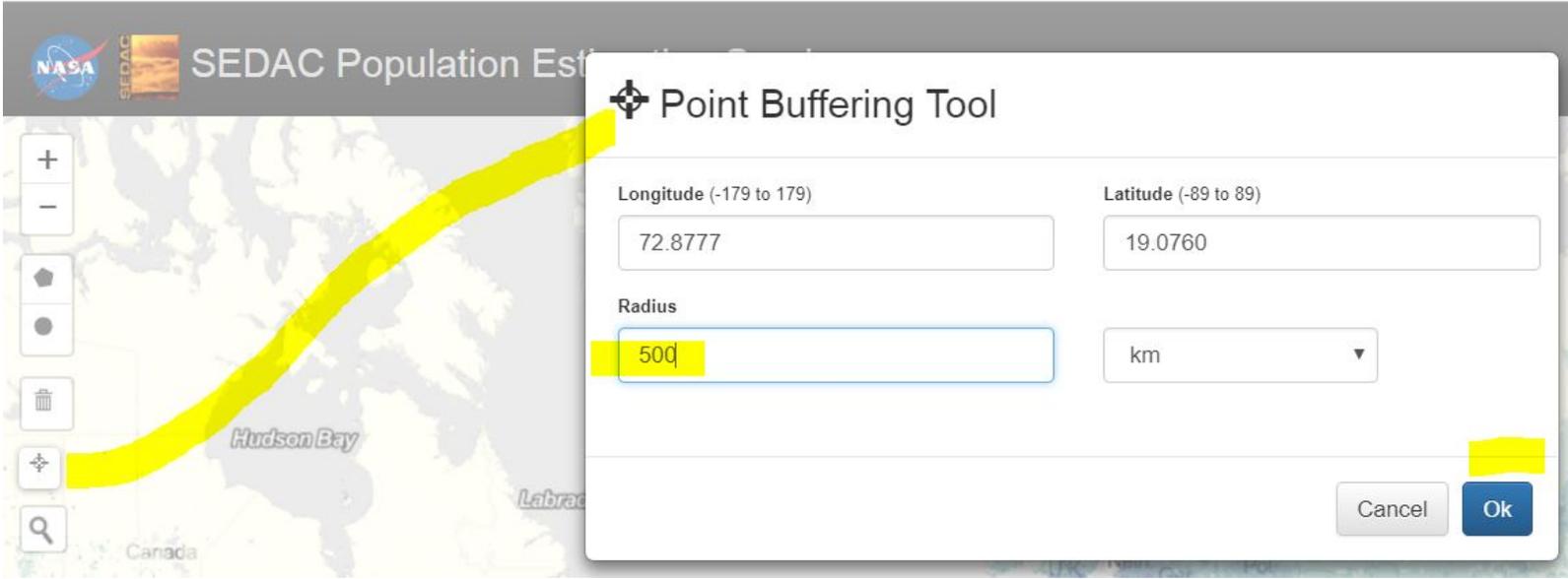


You can also view a layer called Settlement Points.

<http://sedac.ciesin.columbia.edu/data/set/grump-v1-settlement-points-rev01>.

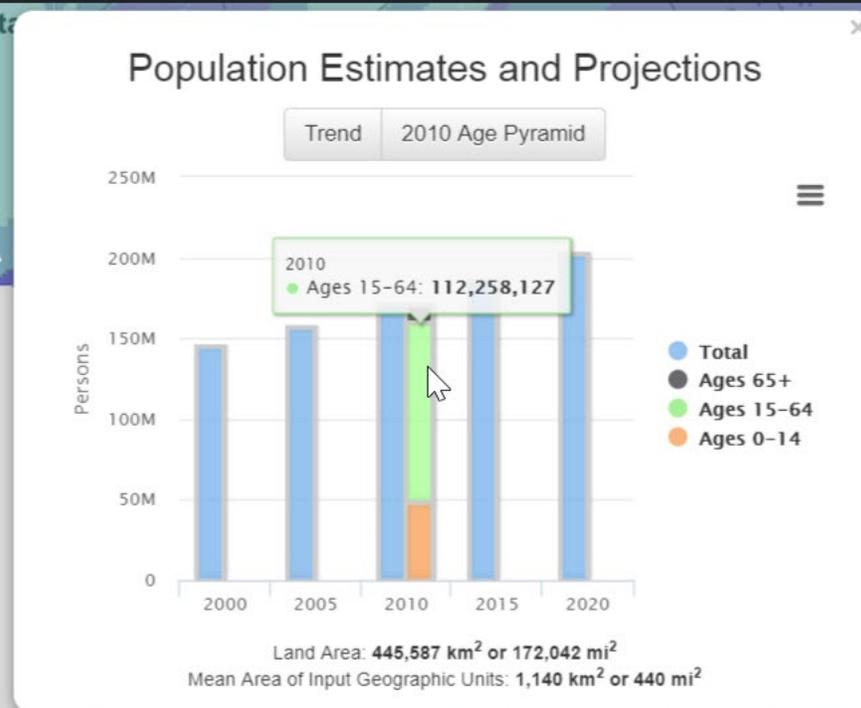
**Access the polygon, circle, or point tools.** Dive deeper into exploring the population data by accessing these tools found on the left side of the map, as *shown below*. Note that for 2010, you have even more detail on the age breakdown.

**Use the Point Buffering Tool.** This tool allows you to obtain population data for circular areas of the exact radius you choose, as *shown below* for Mumbai, India. (The latitude and longitude for Mumbai were obtained by accessing [ArcGIS](#) > Map > and using the Measure-Point Location tool.)



*The results of the point buffer are shown below.*

## SEDAC Population Estimation Service



**You can run the same procedure for other parts of the world, or simply use the polygon or circle tool, and the map holds all of your areas until you clear them. See screenshot below.**

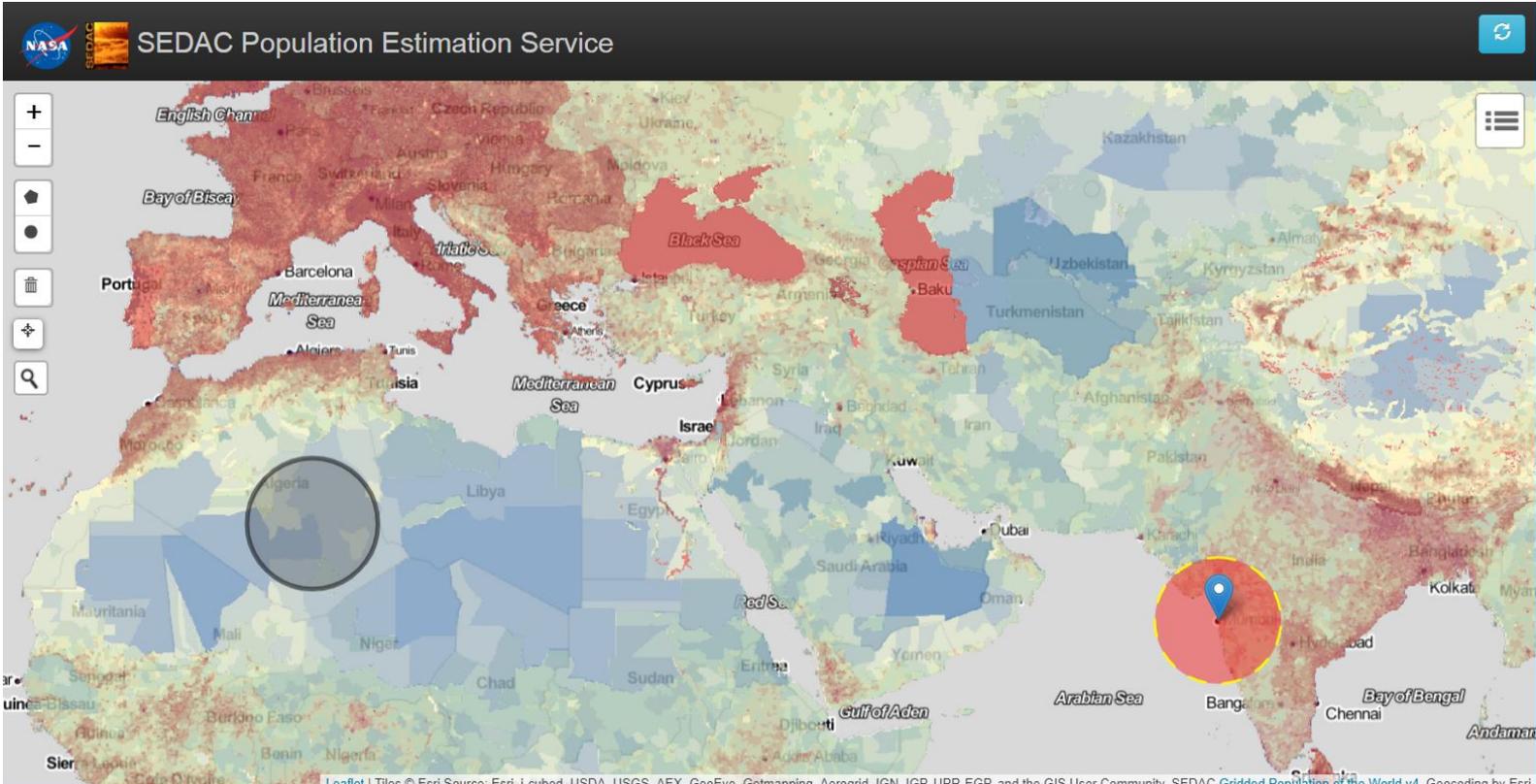
With these areas displayed, you can then compare the number of people, age of the population, and change over time:

-- Which areas of the world contain the fewest people?

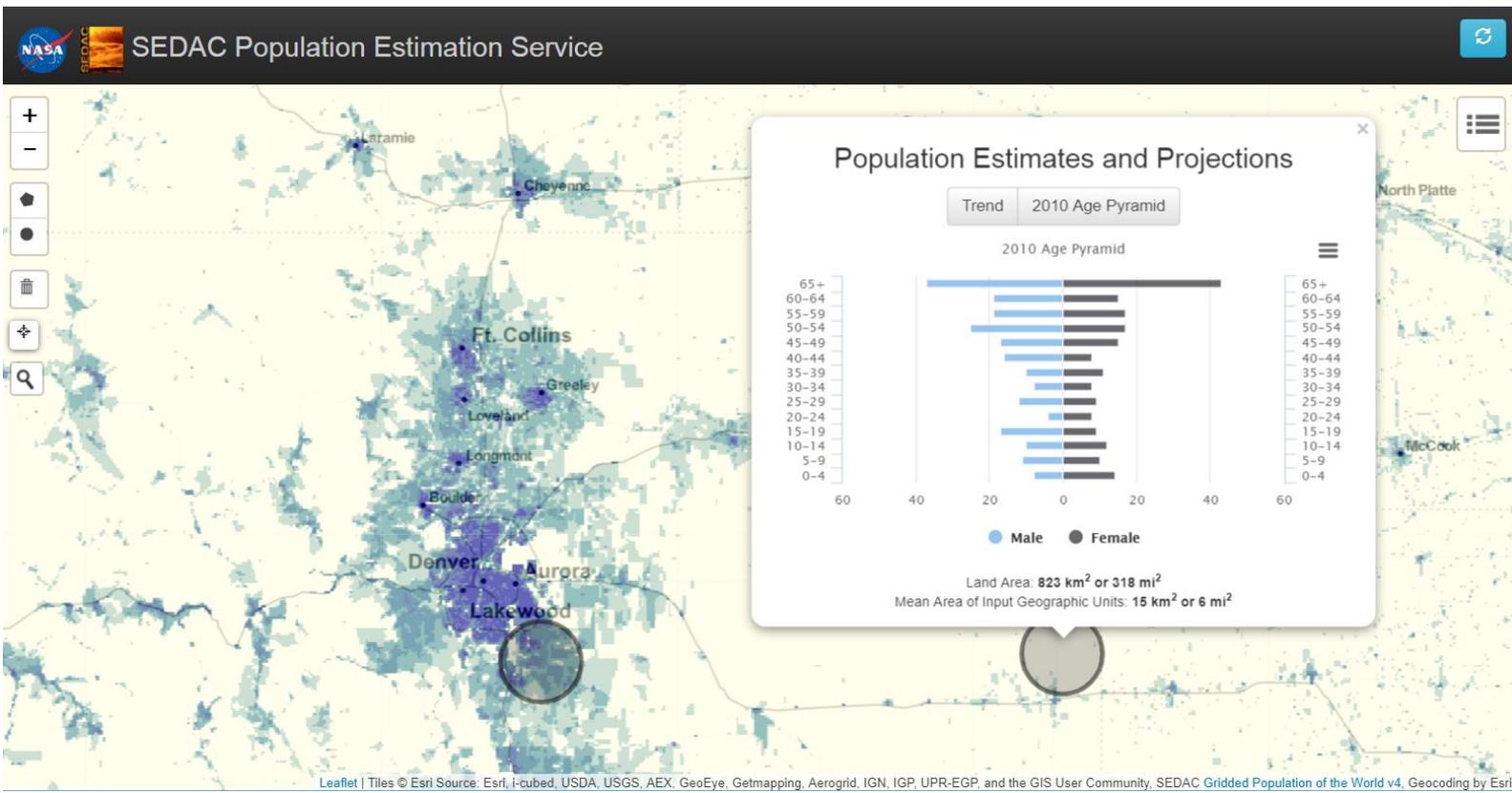
--Is it southern Algeria in the Sahara, as I investigate *below*, or is it northern Siberia or central Australia?

--Why are some areas experiencing a high rate of population, growth, while other areas are experiencing slower rates, and still others are decreasing?

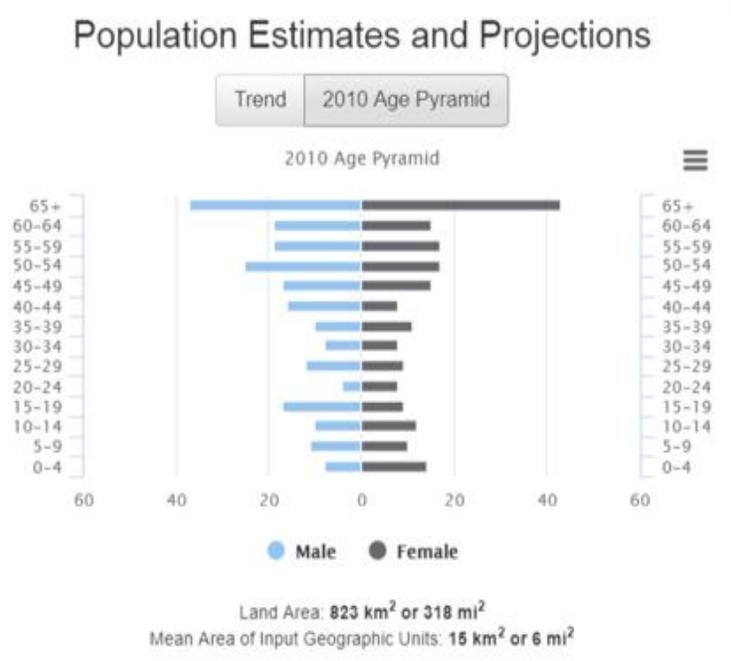
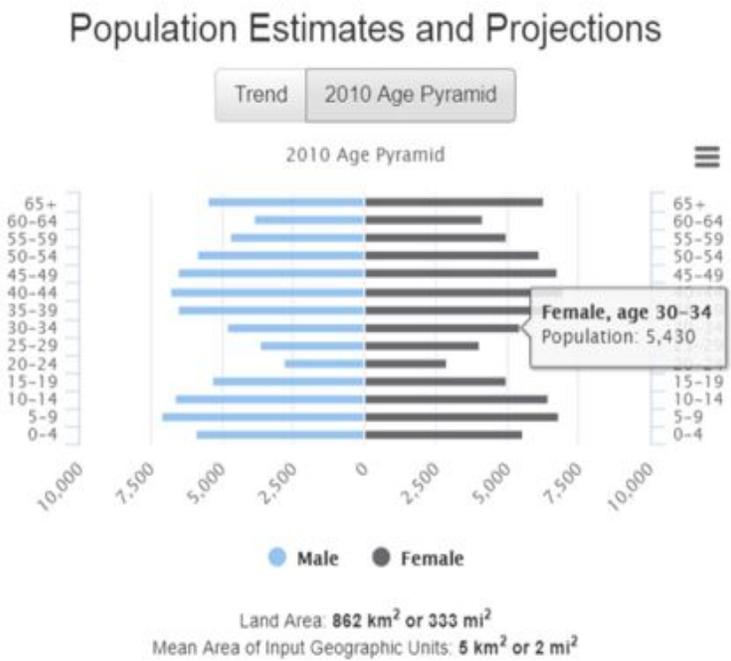
--What are the implications of growth and decline for those areas?



**Population Age Pyramids.** For example, see the older population predominating on the Great Plains of Colorado.

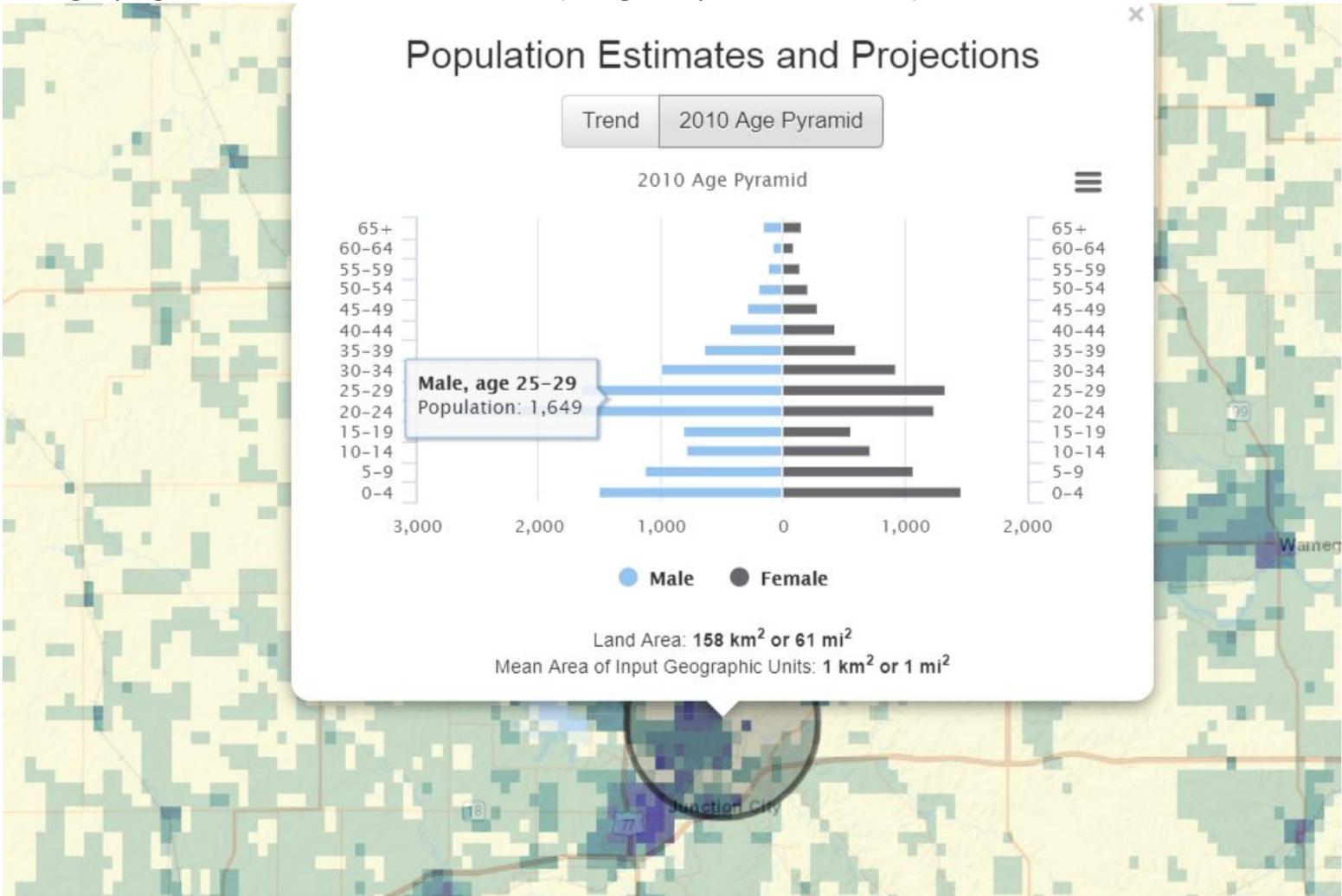


This same pyramid is shown *below, right*. But *below, left* is the data for roughly the same geographic area in the southeast part of the Denver metropolitan area. The numbers in metro Denver are much higher (thousands in each age category vs. only a few dozen on the Great Plains), but also the age structure is much different—with 30- to 50-somethings raising kids, and not as many people over 65 or 20 year olds. What do these neighborhoods look like? **Change the base map to Imagery, Zoom in**, and find out.



Where are the 20-somethings? Look at neighborhoods near light rail lines in central cities, or college towns, or, in the case below, military bases. Here we are examining Fort Riley, Kansas, a large military base; note the age structure and also

the slightly higher number of males than females (though fairly similar in number).



### EXAMINE METADATA

One of the key concepts when learning about Web mapping applications such as this is to get into the habit of examining the metadata. The values for this mapping service are calculated using Zonal Statistics on 1km rasters from the Gridded Population of the World (GPW4) data, described here:

<http://sedac.ciesin.columbia.edu/data/collection/gpw-v4>

The GPW data has been refined, curated, and is updated with the highest attention to quality and detail with an expert staff of statisticians and rigorous methods. The age data specifically references the Basic Demographic Characteristics data set here:

<http://sedac.ciesin.columbia.edu/data/set/gpw-v4-basic-demographic-characteristics-rev10>

## **EXAMINE THE MEAN AREA OF GEOGRAPHIC UNITS**

Another way to focus attention on the data and methods is to examine the Mean Area of Geographic Units on the right side of the mapping service. This clearly shows that the data collection units are different for central Kazakhstan than for, say, Vietnam. Note that the settlement points layer referred to above are there for reference and are not used in the Zonal Stats Calculations.

For any questions about the Population Estimation Mapping Service and mapping tool, or other CIESIN/SEDAC data and services, contact [ciesin.info@ciesin.columbia.edu](mailto:ciesin.info@ciesin.columbia.edu).

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