

Data Visualization and Access Services for Global Man-made Impervious Surface (GMIS) and Human Built-up and Settlement Extent (HBASE) Data Sets

Kytt MacManus¹, Sri Vinay², Frank Pascuzzi³, Al Pinto⁴, Greg Yetman⁵, Panshi Wang⁶, Chengquan Huang⁷, Eric Brown de Colstoun⁸

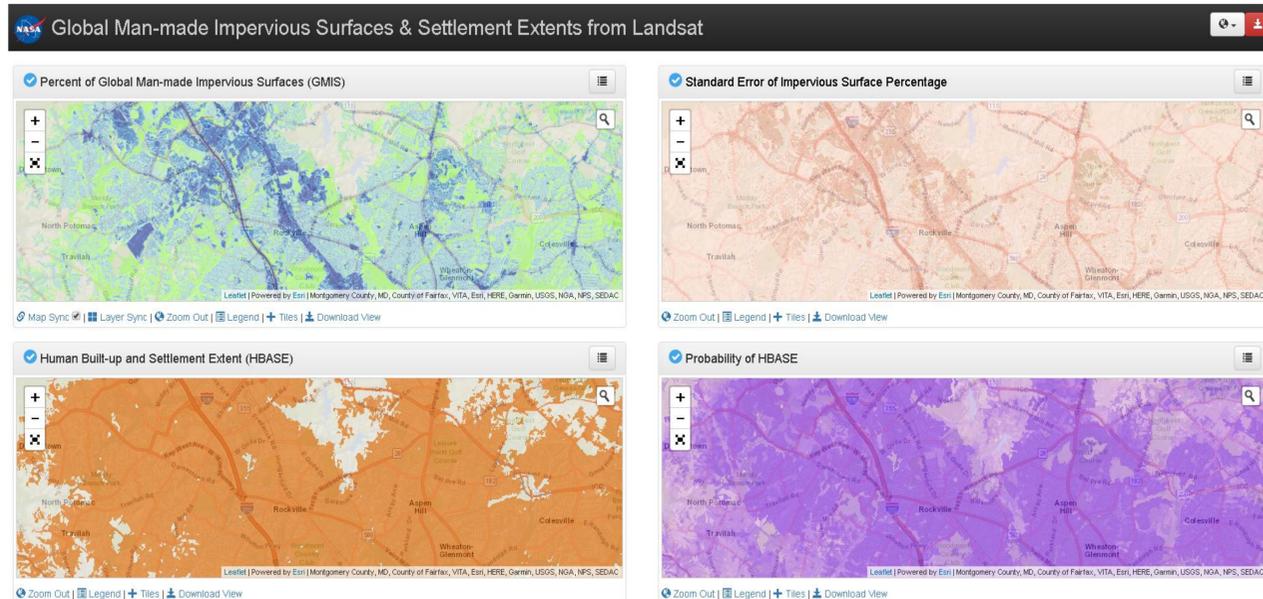
¹kmacmanu@ciesin.columbia.edu, ²sri@ciesin.columbia.edu, ³fpascuzzi@ciesin.columbia.edu, ⁴apinto@ciesin.columbia.edu, ⁵gyetman@ciesin.columbia.edu

Center for International Earth Science Information Network (CIESIN), Columbia University

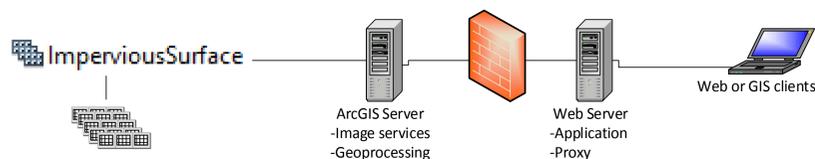
⁶pawang@umd.edu, ⁷cghuang@umd.edu - Dept. of Geographical Sciences, University of Maryland

⁸eric.c.browndecolsto@nasa.gov - Biospheric Sciences Laboratory, NASA/GSFC

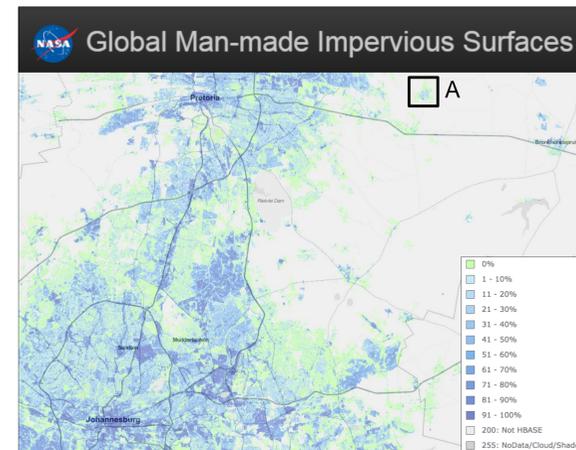
The NASA Socioeconomic Data and Applications Center (SEDAC) has developed a set of image and geo-processing services and a web application leveraging these services to visualize, analyze, and download data layers and corresponding uncertainty layers from the GMIS and HBASE data sets produced by researchers at NASA Goddard and University of Maryland, led by Eric Brown de Colstoun and Chengquan Huang. The data can be downloaded at 30m, 250m, or 1km resolutions in Geographic coordinates or in UTM zones. Users can sub-set the data by country, tile, user-supplied shapefile, or user-drawn polygon. The services can also be accessed by external client applications and visualization tools, such as NASA's WorldView, NOAA's Climate Explorer, ArcGIS Online, and QGIS.



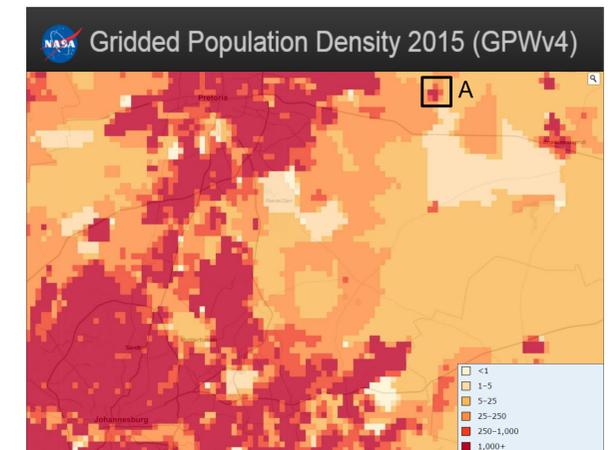
The four global layers have been published as image services at 30m resolution using Esri's ArcGIS Server®, allowing access to the data and visualizations via Esri and OGC standards. A custom Geoprocessing service permits sub-setting, re-projection, and resampling of the 675 four-layers input data tiles for download.



SEDAC services include access to more than 250 data layers related to population, settlements, infrastructure, agriculture, environmental pollution, land use, health, hazards, climate change and other aspects of sustainable development via OGC compliance web services, including WMS, WFS, and/or WCS; spatial query services that support Web Processing Service (WPS) and ESRI REST requests; and web map clients and a mobile app that utilize SEDAC and other open web services.

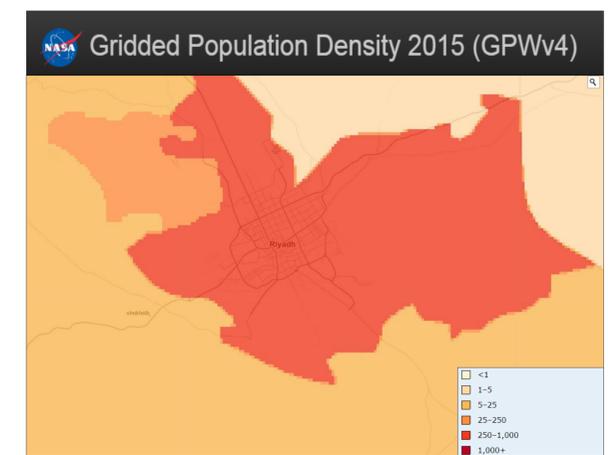
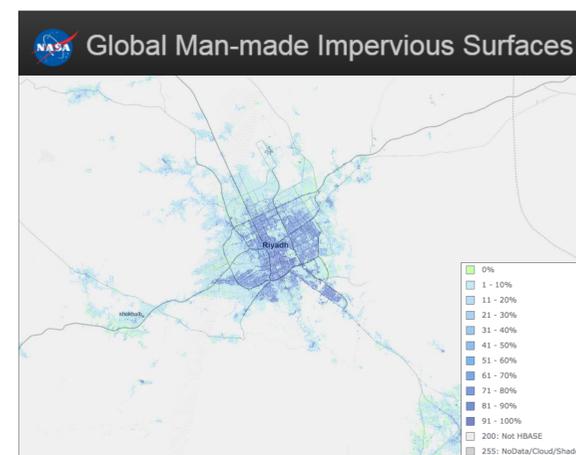


The Impervious Surface Percentage layer from the Global Man-made Impervious Surface (GMIS) dataset is based on a data classification from LandSat 8 and is available globally through SEDAC.



The Gridded Population of the World Version 4 (GPWv4) Data Collection uses information from the 2010 round of Population and Housing Census to create a globally harmonized raster dataset of population estimates.

The images above are centered near Johannesburg, South Africa. They depict significant correspondence between the population density from very high resolution census information used in GPWv4 for South Africa (Enumeration Areas) and the GMIS Impervious Surface classification. This is highlighted specifically in the callout A which focuses on a small peri-urban settlement just outside of Pretoria.



The images above are geographically centered near Riyadh, Saudi Arabia. Saudi Arabia is a country where high resolution information from Census 2010 is difficult to obtain. As such, the GPWv4 collection uses information at the Governorate level in this location (roughly equivalent to U.S. Counties). As can be seen in the images, GMIS offers a great potential for improving the precision and accuracy of population estimates in areas where detailed input census information are not available.



<http://sedac.ciesin.columbia.edu/data/set/ulandsat-gmis-v1>