Developed land cover of Puerto Rico

William A. Gould, Sebastián Martinuzzi, and Olga M. Ramos González.
USDA Forest Service International Institute of Tropical Forestry (IITF)

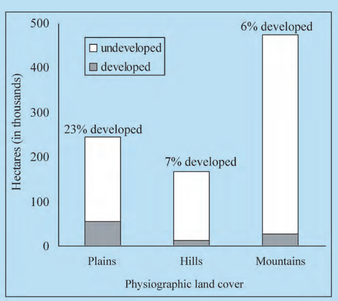
PRGAP ANALYSIS PROJECT
IITF GIS and Remote Sensing Lab
A center for tropical landscape analysis

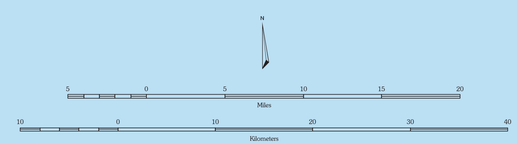
Map Description

This map shows the distribution of developed land cover in Puerto Rico (Martinuzzi et al. 2007). Developed land cover refers to urban, built-up and non-vegetated areas that result from human activity. These typically include built structures, concrete, asphalt, and other infrastructure.

The developed land cover was estimated using Landsat 7 ETM+ satellite images pan sharpened to a spatial resolution of 15 meter. Multiple Landsat ETM+ images, ranging from the years 2000 to 2003, were used to create a mosaic of the island. The Iterative Self-Organizing Data Analysis Technique (ISODATA) unsupervised classification algorithm (ERDAS 2003) was used to analyze the mosaic and map the urban/built-up cover.

The resulting map gives us an idea of the distribution of developed lands in Puerto Rico. For the years 2000 to 2003, Puerto Rico had 95 342 ha of developed land cover, 11% of the island's surface. Developed pixels are distributed throughout the island, including large clusters in coastal plains and valleys, and linear developments along highways and roads. A few less developed regions appear without this human impact: Regions that are protected, have steep slopes, are dedicated to agriculture, or are wetlands. In analyzing the relationship of development with the major physiographic units of the island, i.e. plains, hills, and mountains, we found that 60% of the development occurs in the plains, where the most productive lands for agriculture are also located. As a result, one-quarter of the soils of the plains have been transformed into built-up areas. In the hills and mountains the presence of developed areas represents less than 7% of the total area.





SCALE: 1: 260 000
Lambert Conformal Conic Projection
North American Datum of 1983 (NAD 83)

Elevation (m)
- 0 - 50
- 50 - 150
- 150 - 400
- 400 - 700
- 700 - 1000
- Above 1000*

* Maximun elevation 1330

Land use
- Developed lands (98 698 ha)

Administrative
- Urban centers

Hydrography
- Lakes/Reservoirs
- Rivers/Streams

References
ERDAS IMAGINE 8.7. 2003. Leica Geosystem GIS and Mapping LLC.

Martinuzzi, S.; Gould, W.A.; Ramos González, O.M. 2007. Land development, land use, and urban sprawl in Puerto Rico integrating remote sensing and population census data. Landscaping and Urban Planning 79: 288-297

Additional data sources
Elevation data: The elevation data were derived from the USGS National Elevation Dataset (NED) digital elevation model (DEM). This data set is a raster product assembled by the U.S. Geological Survey (USGS). The NED is designed to provide national elevation data in a seamless form with a consistent datum, elevation unit, and projection. Data corrections are made in the NED assembly process to minimize, but not eliminate artifacts, perform edge matching, and fill sliver areas of missing data. NED has a resolution of one arc-second (approximately 30 meters) for the contiguous United States, Hawaii, and Puerto Rico and a resolution of two arc-seconds for Alaska. The hillshade was calculated using ArcGIS 9.1 and spatial analyst extension.

Hydrography data set: The hydrography dataset was derived and generalized from The National Hydrography Dataset (NHD). The NHD was originated by the U.S. Geological Survey in cooperation with U.S. Environmental Protection Agency, USDA Forest Service, and other Federal, State and local partners. 2005, Reston, Virginia. This data set is presented as vector digital data generally developed at 1:24 000 1:12 000 scale.

Urban centers: This data set was developed by the GIS and Remote Sensing Lab of the International Institute of Tropical Forestry using visual interpretation of existing maps. Each point in the data set represents the approximate urban center for each municipality.

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USDA FS IITF, Jardín Botánico Sur, 1201 Calle Ceiba, Río Piedras, PR 00926-1119, Puerto Rico.