Urban, Extractive 1850 CE

Revision of 5.4.16 by Andrew Sluyter.

Much of the work on this layer was done by Andrew Layman during January through April, 2016, while he was an architecture major at LSU.

In order to identify cities that were likely large enough to be significant for the purposes of LandCover6K probable candidates were selected based on population and then mapped to calculate their areas. Ultimately, only maps of urbanized areas equal to or greater than 500 ha (5 km^2) were retained for LandCover6k. An area of 500 ha is approximately 8% the size of the grid cells of 8,000 m by 8,000 m (64 km^2/6,400 ha) used to judge the level of generalization appropriate for the project. So even an area of 500 ha, which, if a square, would have sides about 2.25 km (2,250 m) long, is not particularly significant and serves as an absolute lower threshold.

Urban population estimates for the world's largest cities of the past 4,000 years are based on a mix of empirical evidence and modeling, as listed below for Middle America for 1800, 1850 and 1900 CE (Chandler 1987). The estimates define a city as including "suburbs lying outside the municipal area, and omitting farmland lying within the municipality" (Chandler 1987, 1). Starting with the cities with the highest population estimates in 1850 CE, the built-up areas were mapped to determine if they met the threshold of 500 ha. Since some cities lacked population estimates for 1850 CE, estimates for 1800 and 1900 CE were also tabulated to decrease the possibility of missing a city that reached the 500 ha threshold in 1850 CE.

1850 Rank	City	1800 Population	1850 Population	1900 Population
1	Mexico City	128,000	170,000	368,000
2	Havana	60,000	131,000	243,000
3	Puebla	65,000	70,000	98,000
4	Guadalajara	31,000	63,000	101,000
5	Guatemala City	25,000	40,000	74,000
6	Guanajuato	53,000	33,000	41,000
6	Kingston	27,000	33,000	46,000
7	San Luis Potosi	Unknown	30,000	61,000
7	Leon	Unknown	30,000	63,000
8	Zacatecas	33,000	29,000	39,000
9	Oaxaca	25,000	25,000	35,000
9	Merida	28,000	25,000	43,000
10	Port Au Prince	19,000	21,000	61,000
-	Real de Catorce	20,000	Unknown	Unknown
-	Monterrey	Unknown	Unknown	62,000
-	San Salvador	Unknown	Unknown	59,000

For Mexico City, a large-scale urban footprint map for 1845 was scanned and georeferenced (Gutiérrez de MacGregor 1990). Once digitized, QGIS calculated the area of the polygon to be 999 ha, meeting the threshold of 500 ha.

For Havana, the built-up area was taken from a historic city map for 1851 (Rodriguez and Santana Duque Estrada 2013, 184). Once scanned, georeferenced, and digitized, QGIS calculated the area of the multipart polygon to be 629 ha, meeting the threshold of 500 ha.

For Puebla, the built-up area was taken from a historic military map (Alvarez 1856). Once scanned, georeferenced, and digitized, QGIS calculated the area of the polygon to be 422 ha, not meeting the threshold of 500 ha.

For Guadalajara, a large-scale urban footprint map for 1884 was scanned and georeferenced (García de Alba García 1990). Once digitized, QGIS calculated the area of the polygon to be 586 ha, meeting the threshold of 500 ha.

Since Puebla and Guadalajara straddle the 500 ha threshold and had populations greater than 60,000 in 1850 CE, it was assumed that any city with a population of less than 50,000 would not reach the threshold of 500 ha. However, because neither Monterey, San Salvador, nor Real de Catorce had a population estimate for 1850 CE in the primary source (Chandler 1987) but were known to be significant cities, they were also analyzed to determine if they reached the 500 ha threshold.

For Monterrey, another source provides 1850 CE population estimate of approximately 15,000 (Boyer and Davies, 1973, table 30). Nonetheless, a large-scale urban footprint map for 1845 was scanned and georeferenced (García Ortega 1990). Once digitized, QGIS calculated the area of the polygon to be 484 ha, not meeting the threshold of 500 ha.

For San Salvador, a map for circa 1900 provided the built-up area (Barberena et al. 1905.). Once digitized, QGIS calculated the area of the polygon to be well below 500 ha.

No suitable map was located for Real de Catorce, but for that city to reach a population of 60,000 by 1850 CE, it would have had to triple its population in five decades. While Real de Catorce was a mining town that boomed during the 1800s, it is unlikely to have grown from 20,000 in 1800 CE to 60,000 in 1850 CE, during a period in which Mexico underwent revolution, civil war, and foreign invasion. And, consequently, Real de Catorce is unlikely to have reached the threshold of 500 ha (Russell 2010).

The following table summarizes the principal results of the analysis. Mexico City, Havana, and Guadalajara were the three cities to reach the threshold of 500 ha for inclusion in the layer.

City	1850 Population	Year of Map	Area (ha)
Mexico City	170,000	1845	999
Havana	131,000	1851	629
Guadalajara	63,000	1884	586
Monterrey	unknown	1865	484
Puebla	70,000	1856	422

There were no areas equal to or greater than 500 ha of extractive land-use in Middle America in 1850 CE. During the colonial period, mines and placers for gold, silver and other precious metals and stones remained small in scale or consisted of extensive systems of subsurface shafts and tunnels. Quarrying for clay, limestone, and other building stone impacted mainly small areas. The political instability of the revolutionary period discouraged capital investment until after the French Intervention, and not until the Porfiriato (1876-1911) did large open-pit mines become established, such as the copper mine at Cananea in northern Mexico (Russell 2010).

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