Urbanization of Conservation Areas in Southern Mexico City

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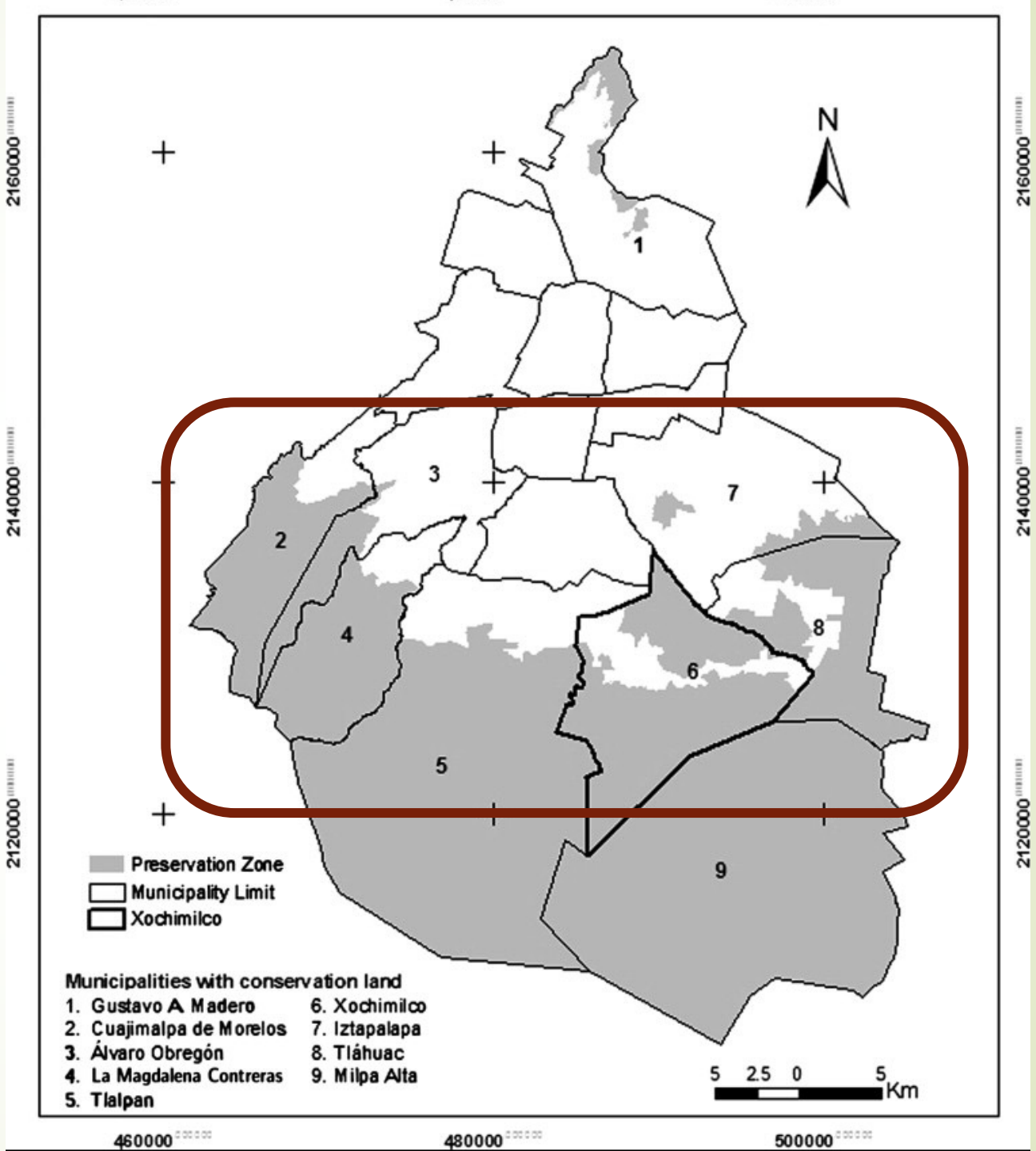
Background

Over 50% of Mexico City's land is classified as an ecological conservation zone

Rapid urbanization has forced some communities out into these lands, mainly in the city's southern region

Continued expansion produces environmental concerns, but also highlights the city's inability to provide aid to those in extreme poverty.



Map of the city's preservation zones.

Jill Wigle,
The "Xochimilco model" for managing irregular settlements in conservation land in Mexico City,

Approach and Data Sources

Approach

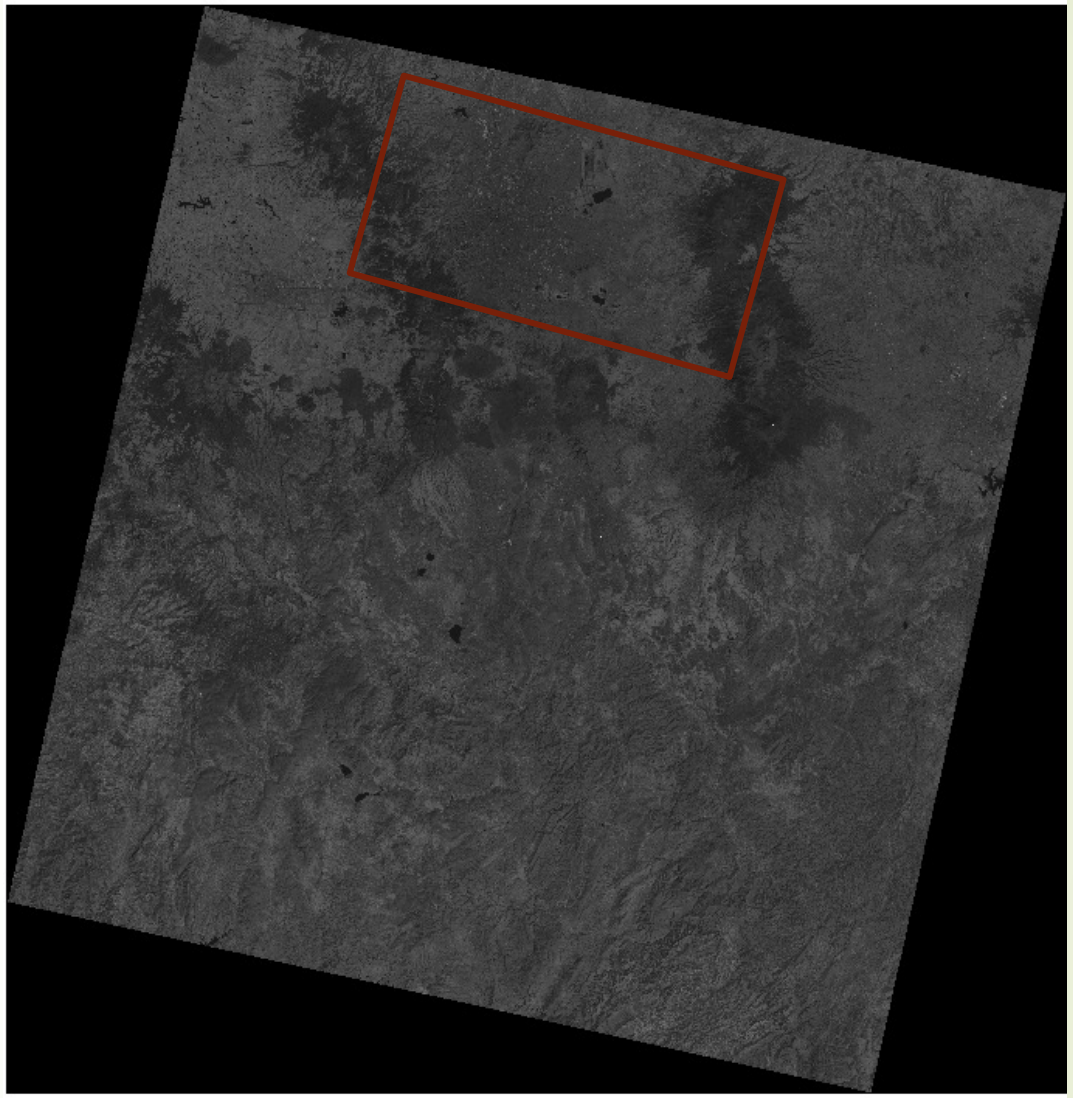
- Use Image Classification to map how much urbanization has taken place in South Mexico City from 2000 to 2020. Use Change Detection Statistics to quantify change.

Data Sources

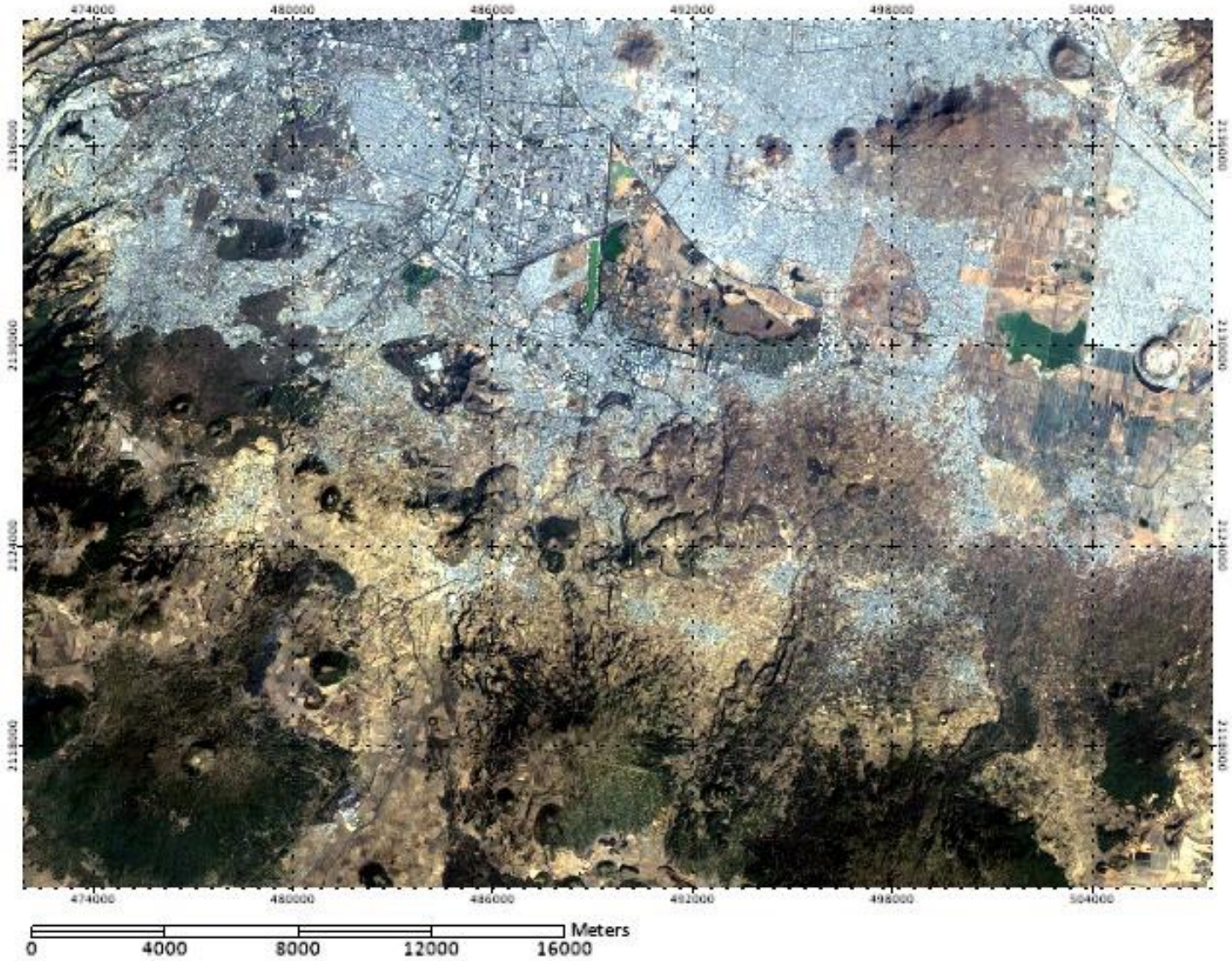
- 2000
  - Landsat 5, Feb. 10, 2000.
  - LT05_L1TP_026047_20000210_20161215_01_T1
- 2020
  - Landsat 8, Feb. 17, 2020
  - LC08_L1TP_026047_20200217_20200225_01_T1

Producing Rasters from Landsat Data

- Determine the extent of South Mexico City and clip each Landsat band to desired view
- Convert Landsat bands to indicate reflectance
- Combine appropriate reflectance bands to produce true color RGB maps.



South Mexico City. Feb 2000. (Landsat 5 3-2-1 RGB)



South Mexico City. Feb 2020. (Landsat 8 4-3-2 RGB)

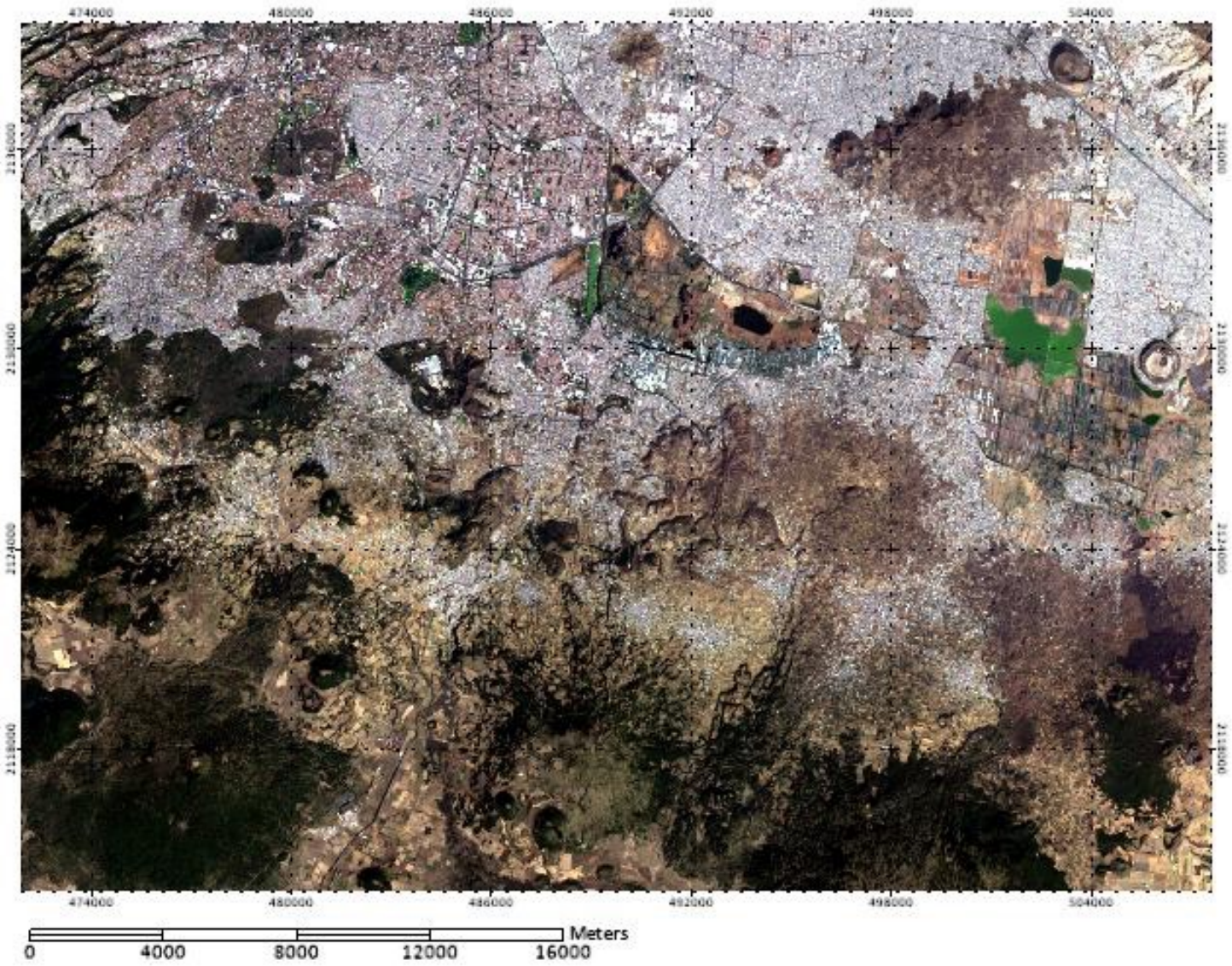


Image Classification Specifics

Maximum Likelihood Algorithm

Three Classes:

- Natural Land—no distinction between types of vegetation
- Water
- Urbanized Land

Image Classification: Feb. 2000

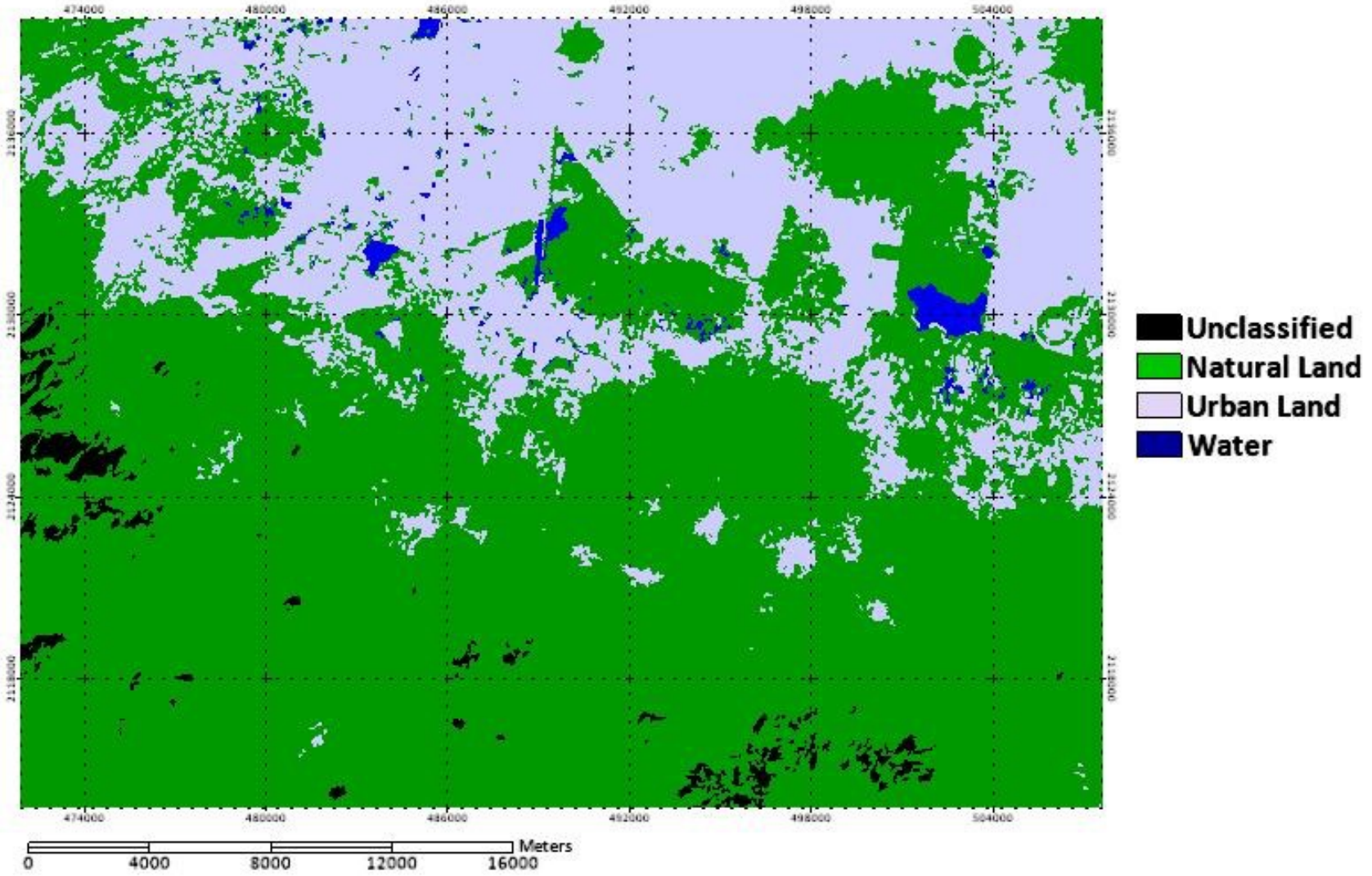
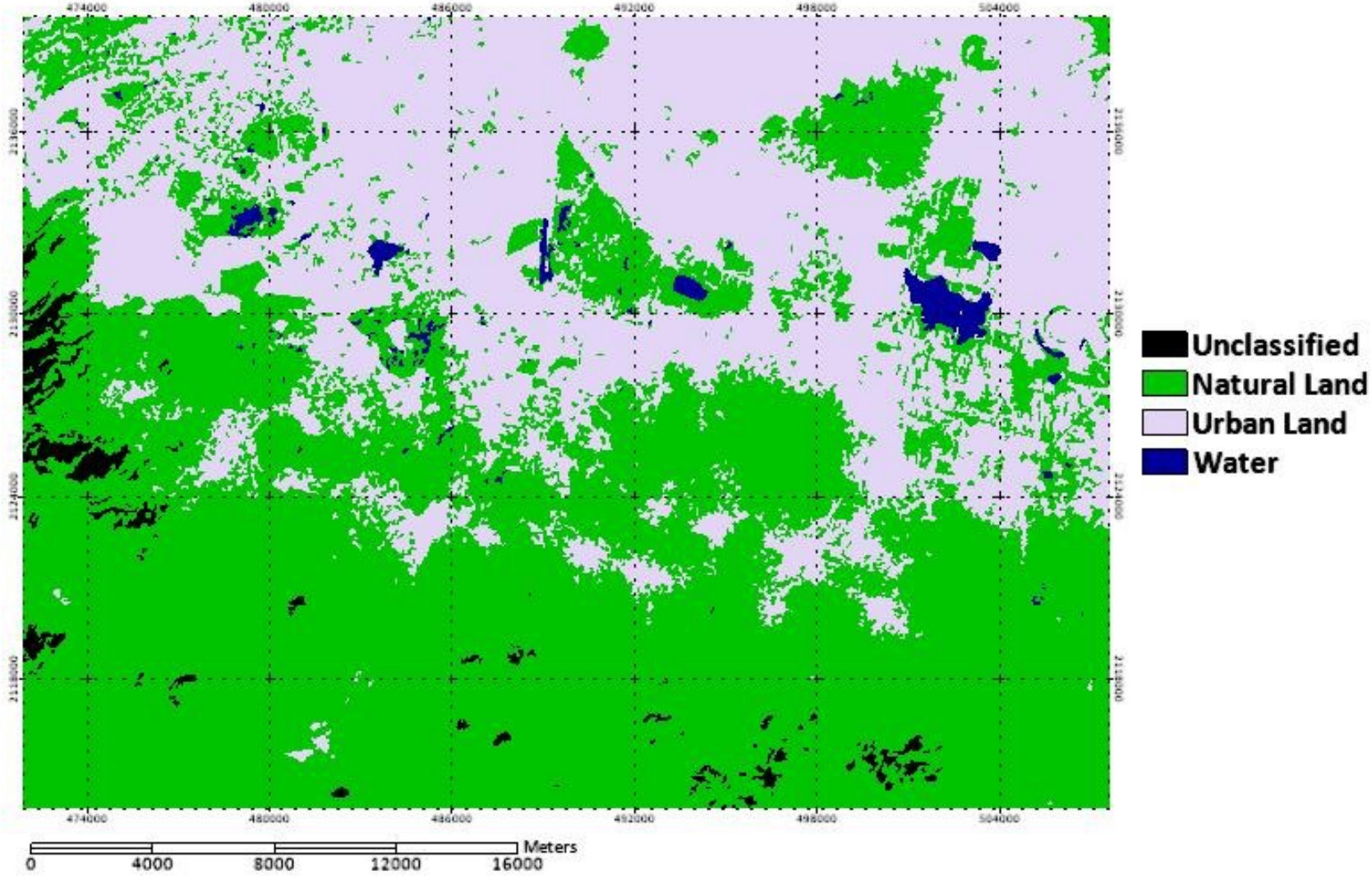
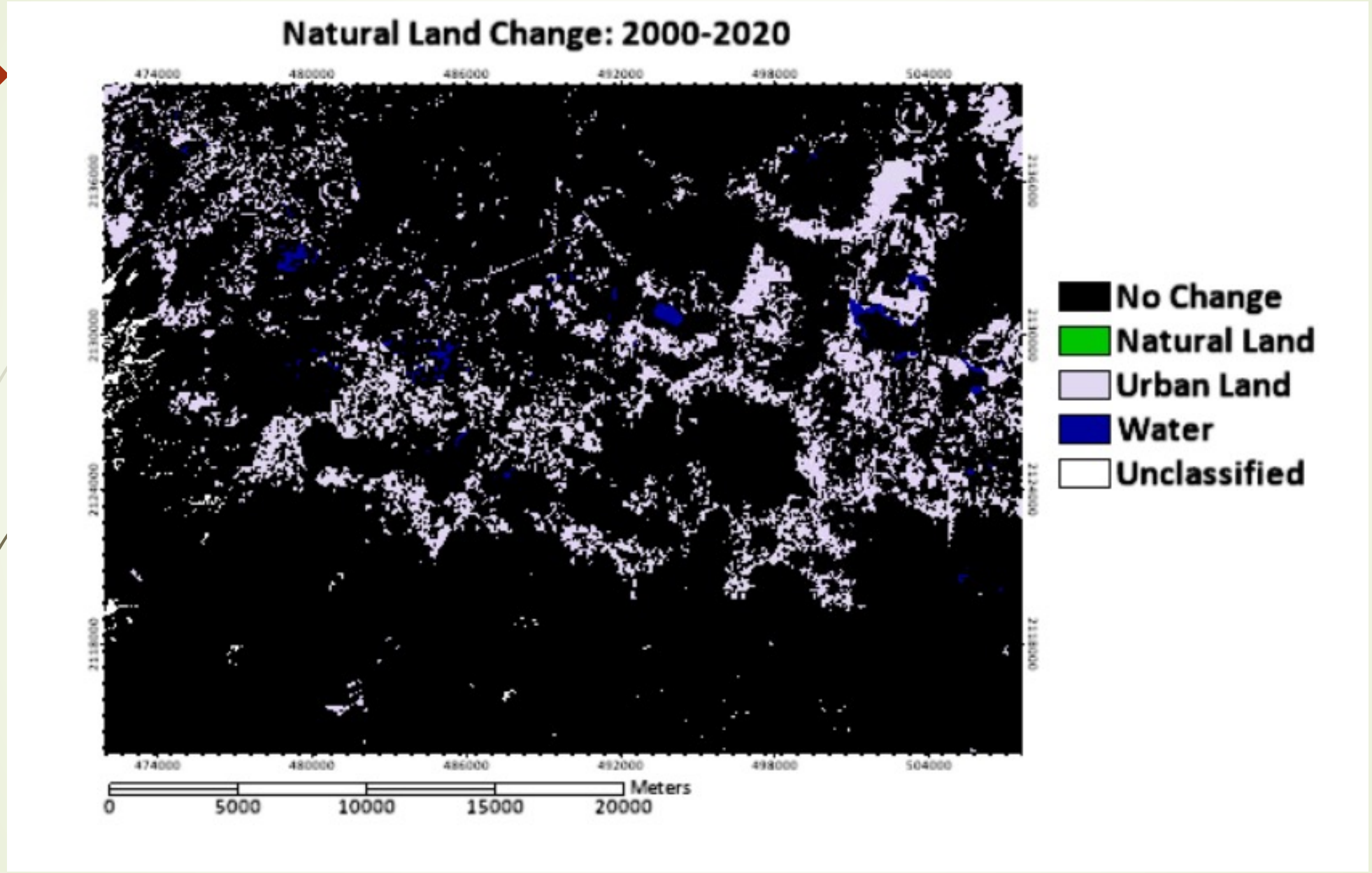


Image Classification: Feb. 2020




Natural Land Change: 2000-2020
474000
480000
486000
492000
498000
504000
2136000
2130000
2124000
2118000
No Change
Natural Land
Urban Land
Water
Unclassified
Meters
0
5000
10000
15000
20000

Results and Conclusions

- Natural Land lost 100.42 km2 (-15.83%) of area, overwhelmingly toward Urban Land.
- Urban Land gained 100.60 km2 (+36.5%) of area, again overwhelmingly from Natural Land
- Conclusions
  - There has undeniably been significant urbanization in the southern part of Mexico City from 2000 – 2020, including in protected zones.
  - City should address the root causes of the urbanization—one such factor may be an affordability crisis among economically disadvantaged groups in the city.
- Future Directions
  - NDVI Time analysis
  - Effects on water shortage in the city (protected lands exist, in part to help aquifers replenish)