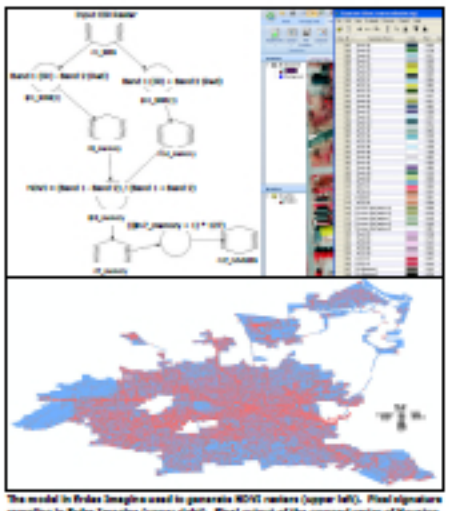
# Visualizing Impervious Surface Change 2010-2012

## Impervious Surface Analysis: Combining Data Sources to Aid Drainage

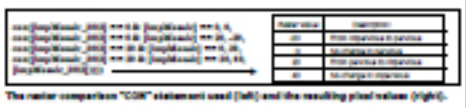
### Analysis Process:

The analysis for change detection was run to show several types of surface changes. Firstly, the analysis (2010 data) was completed to determine the pervious / impervious surface totals for the City of Houston. This analysis was completed in Erdas Imagine using the NDVI algorithm and a custom breaking point of 121 (taken from 0-255). This breaking point ultimately determined the ground cover classification as pervious or impervious and was agreed on after hundreds of pixel signatures were gathered in Erdas Imagine and tested across the City for continuity.

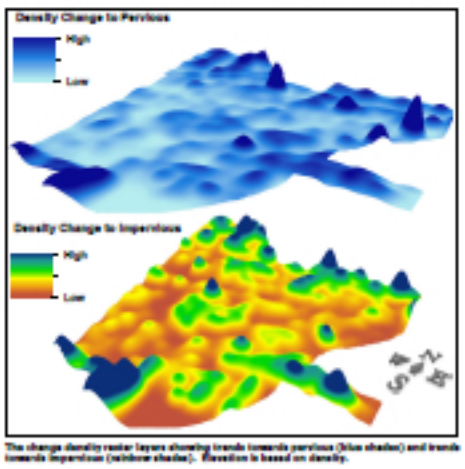


The model in Erdas Imagine used to generate NDVI rasters (upper left). Pixel signature sampling in Erdas Imagine (upper right). Final output of the cropped raster of Houston, showing two classifications for pervious and impervious (bottom).

Afterwards, the impervious surface raster layer was regenerated using updated data from 2012. The next step was to compare these two raster layers, and combine the data into a single layer denoting areas of change. The output showed all locations designated into four categories (no change in pervious, impervious to pervious, pervious to impervious, or no change in impervious).

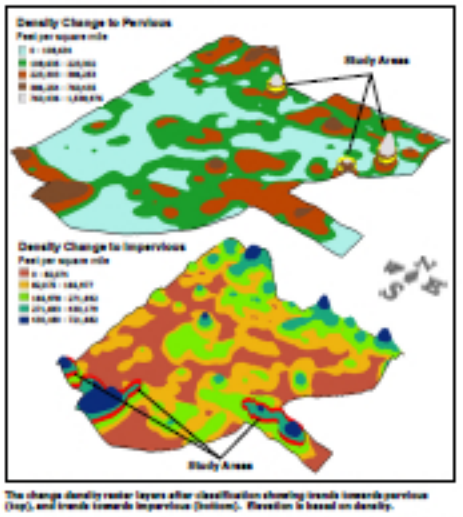


The raster comparison "COM" statement used (left) and the resulting pixel values (right).



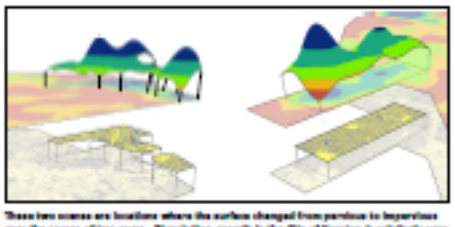

The change density raster layers showing trends towards pervious (blue shades) and trends towards impervious (rainbow shades). Elevation is based on density.

The next step was to classify and compare the two raster density layers and locate areas that were specific in their trends toward becoming impervious or becoming pervious. These target areas were flagged as locations within the City to be further examined and analyzed.




The change density raster layers after classification showing trends towards pervious (top), and trends towards impervious (bottom). Elevation is based on density.

The final step was to visualize these focus areas, displaying the density raster layers in 3D while also showing the change detection raster responsible for the increased density (and thus the height in the model) below each focus area.



These two scenes are locations where the surface changed from pervious to impervious over the course of two years. Pipestone growth in the City of Houston is relatively easy after examining the data. This analysis only represents two years of change, but the project scope is five years in length. The trends for build-up and demolition will be determined as the yearly data is updated, analyzed, and compiled into a temporal dataset.