

# Deep Learning Derived 2020 Land Cover Data from H-GAC

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Houston-Galveston Area Council  
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## Land Cover Data- Overview

- Popular Land Cover Data Types for H-GAC region
  - MRLC - NLCD
  - NOAA – C-CAP
- Land Cover data release frequency
  - Generally, in 5-year interval
    - NLCD: 2001, 2006, 2011, 2016
    - C-CAP: 2001, 2006, 2010, 2016
  - It takes about 3-4 years to release a version
- H-GAC produces in-house LC with less delay
  - Started in 2015, then 2018
  - New release is 2020

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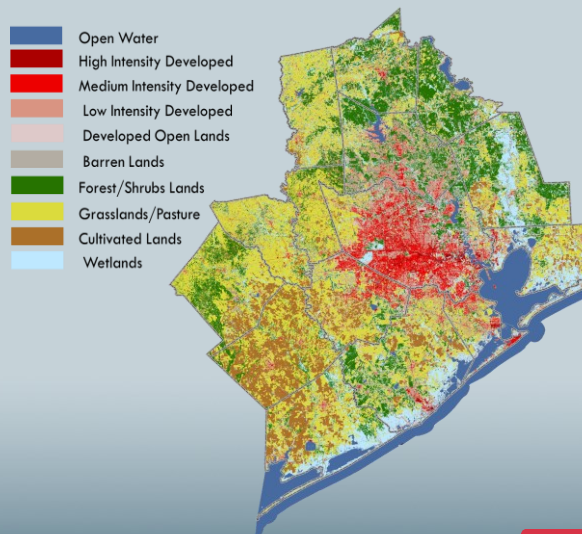
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# H-GAC Land Cover Data Development

- **Use Remote Sensing and Geospatial techniques**
  - ENVI – for Image processing
  - ArcGIS Desktop – Classifications and post-classification analysis
- **Imagery Source**
  - Level 1, Landsat 8 OLI/TIRS
  - H-GAC Aerial imagery
- **Image Classification**
  - Pixel based classification using both Supervised and Unsupervised classification techniques

## H-GAC Land Cover Data 2015 and 2018

- **Anderson Level 1, 10 Major Land Cover classes**
  - Compatible with both consolidated NLCD and C-CAP
  - 30-meter (98.425 ft) resolution
  - Over 70% kappa accuracy
  - H-GAC 13 counties + 2 additional counties
  - Available to download with metadata and technical documents



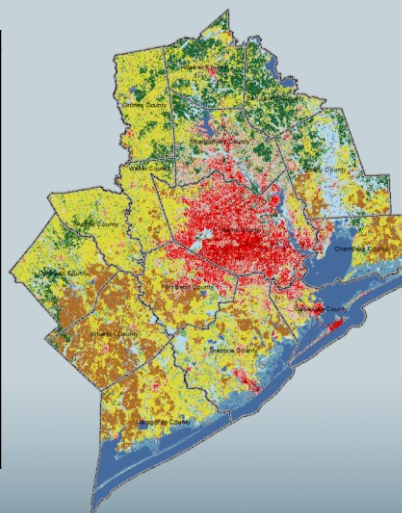
# H-GAC Land Cover Data 2020

- Deep Learning Image classification technique
  - ArcGIS Pro 2.7
  - Python scripting
  - Deep Learning Libraries for ArcGIS Pro is essential
  - Train Deep Learning Model tool can be used to create Model definition file

# H-GAC Land Cover Data 2020

- 15 Classes dataset
  - Fully compatible with NLCD
  - 30-meter (98.425 ft) resolution

Level 1 Class	15 Class Classification
Water	Open Water
Developed	Developed, Open Space
	Developed, Low Intensity
	Developed, Medium Intensity
	Developed High
Barren	Barren Land (Rock/Sand/Clay)
Forest	Deciduous Forest
	Evergreen Forest
	Mixed Forest
Shrubland	Shrub/Scrub
Herbaceous	Grassland/Herbaceous-
Planted/Cultivated	Pasture/Hay
	Cultivated Crops
Wetlands	Woody Wetlands
	Emergent Herbaceous Wetlands



# H-GAC Land Cover Data 2020

- <https://www.h-gac.com/land-use-and-land-cover-data>

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## Land Use & Land Cover Data

### Regional Land Use Information System (Regional Growth Forecast)

View and query our land use data, review our land use map and submit data queries for the H-GAC region with our [Regional Land Use Information System](#) web based mapping application.

Current and Future Land Use, and Regional Growth Forecast data displayed in the Regional Land Use Information System application are available for download in ESRI file geodatabase format (requires version ArcGIS 10.0 or higher). Please use our [online Data Request Form](#). Upon successful completion of the online form, which includes acceptance of our terms and conditions, you will receive an e-mail confirmation with a link directing you to the download website.

### Land Cover Change Application

The [Land Cover Change Application](#) summarizes the trend how much and what land cover types has been changed between 1996 and 2011 within H-GAC region based on National Land Cover Data (NLCD). It allows search by counties and do direct comparison between 1996 and 2011 change by type of land cover.

### H-GAC Land Cover Data Sets

#### 2020 15 Class Land Cover Data Set

These land cover datasets were produced by the Community and Environmental Planning GIS (CE GIS) at the H-GAC for the purpose of developing land cover data product with a level of accuracy suitable for planning and research applications at the regional scale.

The dataset was developed based on Landsat 8 Operational Land Imager (OLI) and the Thermal Infrared Sensor (TIRS) scenes of 30m resolution acquired from the USGS. Four scenes with 0-5% cloud cover were used to cover the entire area. Using pixel classification with Deep Learning (DL) techniques available in ESRI ArcGIS Pro product with Image Analyst extension, the images were classified into 15 major land cover classes. Classification classes were determined based on NLCD land cover classification schemes. The output cell size is in 30 meter (98.425 Feet) resolution.

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# H-GAC Land Cover Data 2020

- <https://www.h-gac.com/interactive-web-applications>

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## Interactive Web Applications

This page showcases the interactive web applications developed by H-GAC's Community & Environmental Planning Department, as well as a few related external applications.

Click on a thumbnail below to view a brief description of the application. To view the application, click on "Launch Application". You can filter applications using the list of filters listed below or select "Show All" at anytime to view all applications.

Please note that when you select an "External App" you will be leaving H-GAC's website.

### Disclaimer

These applications are intended for general reference and planning purposes only. Mapping may not reflect on the ground conditions. The Houston-Galveston Area Council makes no further claims as to the accuracy or reliability of the data, and neither assumes, nor will accept liability for their use.

Show All	Environment	Employment	Census
Planning	Topics	Transportation	Growth Forecast
Land Use	Water Quality	External Apps	

### List of Applications

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# H-GAC Land Cover Data 2020

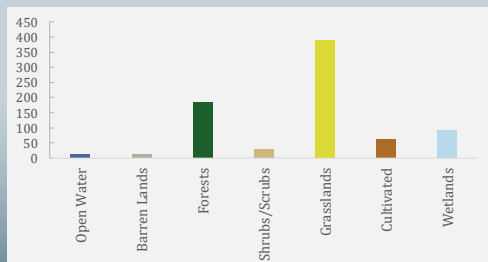
## Land Cover Data applications

- Change detection
- LULC forecast
- Land/Watershed Characterization
- Watershed/Hydrological Modeling
- Ecosystem resource planning

## LC Change Detection: From 2016 to 2020

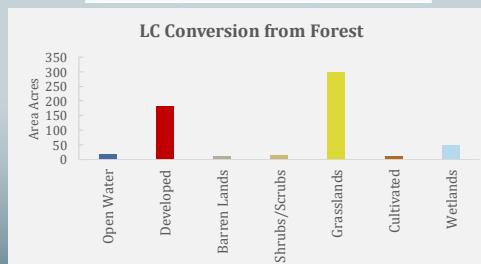
### LC Conversion to Developed

2016	2020	Area_Sq_Miles
Open Water	Developed	11.9
Developed	Developed	2252.4
Barren Lands	Developed	11.7
Forests	Developed	184.3
Shrubs/Scrubs	Developed	29.8
Grasslands	Developed	389.6
Cultivated	Developed	61.9
Wetlands	Developed	91.7



### LC Conversion From Forest

2016	2020	Area_Sq_Miles
Forests	Open Water	16.6
Forests	Developed	184.3
Forests	Barren Lands	11.4
Forests	Forests	1540.7
Forests	Shrubs/Scrubs	14.3
Forests	Grasslands	298.0
Forests	Cultivated	10.1
Forests	Wetlands	50.0



# Contact and links

H-GAC Interactive Tools Page

<https://datalab.h-gac.com>

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