



## Maryland Department of Planning 2010 Land Use/Land Cover Update

### MDP Land Use Basics

MDP has produced a statewide Land Use/Land Cover map, representing different points in time, since 1973. MDP currently makes the 1973 and 2002 datasets available for historic comparison. The MDP data is representative of both statewide and county trends in development (acres by type, and its primary purpose is to track the conversion of resource land to development. Land use/land cover information for the entire State of Maryland is provided based on imagery and parcel data (*MDProperty View*). The updated Land Use/Land Cover dataset is reviewed by local jurisdictions and comments are incorporated into the final product.

### The Land Use/Land Cover Classes

The land use database used by the Maryland Department of Planning is based on the Anderson Level I classification, a standard classification system used by land planners. Based on the number of housing units per acre, this classification scheme divides developed land into nine land use/cover categories (see [-Land Use/Land Cover Classification Definitions](#)).

The primary purpose of the land use/land cover data set is to provide a generalized view of how developed land has changed throughout the state, primarily capturing the conversion of resource land to development and characterizing the type of development (e.g. low density or high density residential development, commercial, industrial). For the 2010 update, changes within the Agriculture and Forest categories were not captured, meaning that updates were not made to whether forested land is deciduous or evergreen or whether agricultural land is cropland or pasture.

An important change in the 2010 land use layer is the addition of two land use categories: Very Low Density Residential and Transportation. The Very Low Residential category accounts for situations such as unwooded 5-acre lots developed with a single home. While this land use may appear to have land cover characteristics of pasture land, from a land use perspective the land is considered developed. Cumulatively, this type of development has implications for roads, septic systems, schools, and other infrastructure.

The Very Low Density Residential category represents large lot development between 5 and 20 acres in size. This category is broken down further into two different classes, parcels that are developed within the 5-20 acreage range with a dominant land cover of open fields or pasture ( land use code191), and those with a dominant land cover of deciduous, evergreen or mixed forest (land use change 192).

The other new land use category is Transportation. For the 2010 update, transportation features include major highways, light rail or metro stations and large “Park ‘N Ride” lots, generally over ten acres in size. Major

highways were defined as those appearing on the State Highway maps as Controlled Access Highways or Primary Highways. While it is recognized that there are many other types of roadways that make up large areas, those acreages are tagged with the use of the surrounding land use.

## Overall Mapping Process

The MDP data is a GIS land use and land cover data product originally generated by aerial photographic interpretation with updates from LANDSAT satellite imagery. The data are routinely updated with improvements to better characterize the landscape. In 2010, significant improvements were made, including using enhanced 2007 aerial imagery from the National Agriculture Imagery Program (NAIP) and the 2008 edition of the *MDProperty View* product. This improved base data (higher resolution imagery and the incorporation of more parcel data) has greatly improved the quality of the 2010 dataset.

The addition of the two new land use categories mentioned above (Very Low Density Residential and Transportation) impact the ability to make direct comparisons of the land use statistics for different timeframes. To resolve this problem, MDP was able to incorporate some of these improvements into the 2002 land use dataset for comparison purposes. This involved using GIS analysis tools; NAIP imagery and *MDProperty View* data to add in the new categories, improving inconsistencies in the classification of land use types and improving the mapping of agricultural and forest lands. These GIS processes focused on finding major inconsistencies between the data sets. The resulting GIS datasets for 2002 will be made available upon request, but are not designed to replace the existing 2002 GIS files.

## 2010 Detailed Methodology

### Required Layers:

- 1) 2007 NAIP Imagery
- 2) 2002 Land Use/ 2010 Land Use
- 3) 2008 Property View parcel points
- 4) 2008 Property View Tax Maps

### Process Basics:

This update of the Land Use/Land Cover, named for its release date in the year 2010, was derived using the National Agriculture Imagery Program (NAIP) high resolution Aerial Imagery in conjunction with parcel level information and tax maps from the 2008 edition of Maryland Property View. NAIP imagery is acquired at a one-meter ground sample distance (GSD) with a horizontal accuracy that matches within six meters of photo-identifiable ground control points, which are used during image inspection.

The update process for this layer involved taking the 2002 release of the Land Use/Land Cover data set as the base, overlaying that with the 2007 NAIP imagery and 2008 parcel information (points and tax maps) to digitize land use changes. Edits/changes to the Land Use/Land Cover data set were based on visual analysis of the imagery and parcel information. The parcel database was specifically used to identify new improved

parcels by type (residential, commercial, industrial, and institutional); using the Department of Assessments and Taxation (SDAT) land use information, parcel size (acres) and year built from the parcel database. Queries developed with this information helped to identify changes in developed land uses categories; Very Low Density Residential, Low Density Residential, Medium Density Residential, High Density Residential, Commercial, Industrial, and Institutional.

The results of the parcel queries were then verified visually using the aerial imagery. Once verified, edits were made to follow the aerial imagery, with the tax map and parcel layer providing the general shape of the parcel if needed. The exception to this was for the Very Low Density categories (191,192) - this is a new category for the 2010 release. For this category, the tax map parcel outline was *followed* instead of precisely following the imagery.

Developed lands were generally defined as clusters of 5 or more developed parcel points, again the exception is Very Low Density Residential, where each instance is mapped. For instances of 5 or more points of similar land use; tax map boundaries were roughly captured and priority was given to match the aerial imagery.

The mapping of Agricultural and Forest lands were verified through visual analysis of the imagery if there was new forest or agricultural lands, they were classified as either deciduous forest (41) or cropland (21) since we did not focus on this type of detail for this update.

In mapping the Very Low Density Residential category, imagery was used to differentiate whether the land cover of the parcels were primarily agriculture/open land vs. forested. Parcels were labeled as 191 where more than 50% is agriculture/open land and 192 where more than 50% of the parcel is forested.

Generally, mapping and editing changes of the layer were performed at a scale of 1:12,000 which is consistent with the scale and resolution of the source imagery. In some areas it was necessary to zoom closer to accurately capture certain parcels- but overall this is a *generalized* land use/land cover layer. Editors were asked not to change the shoreline or County boundary from the original file, however in some circumstances it became necessary to follow the imagery to adequately capture development that has occurred.