knowledge about land use and land cover has become increasingly important as the Nation plans to overcome the problems of HAPHAZARD, UNCONTROLLED DEVELOPMENT, DETERIORATING ENVIRONMENTAL QUALITY, LOSS OF PRIME AGRICULTURAL LANDS, DESTRUCTION OF IMPORTANT WETLANDS, AND LOSS OF FISH AND WILDLIFE HABITAT.

### Land Use vs. Land Cover

<table>
<thead>
<tr>
<th>Land use is what people do on the landscape:</th>
</tr>
</thead>
<tbody>
<tr>
<td>✅ Agriculture</td>
</tr>
<tr>
<td>✅ Commerce</td>
</tr>
<tr>
<td>✅ Settlement</td>
</tr>
<tr>
<td>✅ Recreation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Land cover defines the material on the lands surface:</th>
</tr>
</thead>
<tbody>
<tr>
<td>✅ Crops</td>
</tr>
<tr>
<td>✅ Water</td>
</tr>
<tr>
<td>✅ Forest</td>
</tr>
<tr>
<td>✅ Buildings</td>
</tr>
</tbody>
</table>

Land Cover is an excellent indicator of Land Use.

### Land Classification Standardization

- Increase Use of land base in the 1960’s, led to an increase need for Legislatures, Government Agencies and Planners to have more current and accurate land use data.
- Land Cover/Use data often was not shared with other government and planning agencies.
- Data collected was often too specific to a project and not of use to other projects or at a later date.
- The different classification systems used made it difficult to be utilized in other studies.
Problems with Land Use Standardization

- Incomplete data coverages
- Changing definitions of categories.
- Changing methods by source agencies.
- Varying data age.
- Incompatible classification systems being used by agencies.

Utilizing Remote Sensing for Classification Standards

- The minimum area which can be classified in a particular land cover or land use category is dependent on the scale and resolution of the remote sensor data.
- Land use requires interpretation of more elements of the image to determine classification: color, texture, shadow, pattern, association, shape, size, etc.
- Other data, such as topographic maps, road maps, and field studies are utilized when detail beyond the capacity of the remote sensor is needed.
Spatial Resolution

Level Classification is dependent on spatial resolution of the image.

Maximum resolution needed:
- Level I: 80 meter
- Level II: 2.5 meter
- Level III: 0.9 meter
- Level IV: 0.45 meter

Land Cover Classification Levels

- **Level I: Global/Continental**
  1. Urban or Built-up Land
  2. Agricultural
  3. Rangeland
  4. Forest Land
  5. Water
  6. Wetland
  7. Barren Land
  8. Tundra
  9. Perennial Snow or Ice

- **Level II: Biome/Region**
  Example: Agricultural
  21. Cropland and Pasture
  22. Orchards, Groves, Vineyard
  23. Confined Feeding Operation
  24. Other Agricultural Land

  Example: Water
  51. Streams
  52. Lakes
  53. Reservoirs
  54. Bays and Estuaries
Level I: Global
AVHRR
MODIS
resolution: 250 m to 1.1 km

Level II: Continental
AVHRR
MODIS
Landsat Multispectral Scanner
Landsat Thematic Mapper
resolution: 30 m to 1.1 km

Generalized Vegetation Classification
Level III: Biome
Landsat Multispectral Scanner
Landsat Thematic Mapper Plus
Synthetic Aperture Radar
resolution: 30 m to 80 m

Level IV: Region
Landsat Thematic Mapper
SPOT
High Altitude Aerial Photography
Synthetic Aperture Radar
resolution: 3 to 30 m

Figure 2: Houston Regional Land Cover

Boundary Waters Canoe Area
Level V: Plot
Stereooscopic Aerial Photography
IKONOS
QuickBird
resolution: 0.25 to 3 m

Level VI: In situ Measurement
Surface Measurements and Observations

Upland Forest
Wetland
Burn
USGS Land Cover – Historical Milestones

1970s
Anderson et al., System for Land Use and Land Cover Classification
Conterminous United States Mapped Using Aerial Photography

1980s
75% of the State of Alaska Was Mapped Using Landsat Satellite Data

1990s
Multi-resolution Landscape Characterization Consortium (MRLC) Formed with Environmental Protection Agency (EPA), National Oceanic and Atmospheric Administration (NOAA), and US Forest Service (USFS).
First 1-km Global Land Cover Characteristics Database Completed
Land Cover and Vegetation Databases of the U.S. Using Landsat Thematic Mapper Data Completed
Gap Analysis National Vegetation Mapping Initiated

2000s – New Directions
Systematic Assessment of National Land Use Dynamics
Operational Baseline Mapping of Land Cover Characteristic

National Land Cover Dataset

The Geographic Face of the Nation – Land Cover

[Map of the United States showing land cover types]
Oregon Land Cover Standard

- Resolution Standards:
  - Statewide/Regional = 30 m
  - Basin/Ecoregion = 10 m
  - Watershed/County = 4 m
  - Local/Site = 0.5 m
- Three Levels of Classification:
  - Example:
    - 600. Non-Natural Woody
    - 610. High Structure Agriculture
    - 881. Orchards
    - 882. Berries/Vineyard
    - 883. Christmas Trees
    - 884. Nurseries
    - 620. Non-native/exotic invasive
Resources

- Bosworth, Mark. GIS Program Manager, Metro.
- www.landfire.gov; www.epa.gov; www.houstonregionalforest.org