Phase 6 Land Use Database version 2

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U.S. Geological Survey

Overview

- Current Status
- Review of Phase 6 Land Use Classes
- Rules of Reconciliation
- Results
- Next Steps

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P6 Land Use Development and Review Schedule

May 2015	Complete regional land use dataset using nationally available data: Phase 6 Land Use Database v1 (P6LU_v1).
Aug - Sep 2015	Rolling jurisdictional proof-of-concept review of how CBP is using their data.
Sep 1, 2015	Deadline to incorporate local land use/cover data. Submit P6LU_v2 to CBP Modeling Team.
Oct 15 – May 16	Incorporate additional local data and high-res land cover into P6 Land Use Database, version 3 (P6LU_v3).
Jan – Jul 2016	Rolling jurisdictional review of P6LU_v3 and CBPO response to comments.
Aug 2016	Finalization of P6LU_v3 database (1985 – 2014)
Sep 1, 2016	Submit P6LU_v3 database to CBP Modeling Team

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P6 Land Use Database Versions

Version 1 (July 2015)

- Based on national/regional data
- Includes updated sewer/septic estimates

Version 2 (October 2015)

- Incorporates some local land use/cover data
- Includes multiple wetland classes
- Includes proportions of crop and pasture/hay by LRSEG

Version 3 (August 2016)

- Incorporates local land use/cover data
- Incorporates high-resolution land cover, everywhere
- Includes new sediment delivery factors
- Includes wetland efficiencies
- Extensively reviewed

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Land Use vs. Land Cover

- Low-density Residential
- Transportation
- Agriculture
- Rural conservation

- Impervious surfaces
- Tree canopy
- Herbaceous
- Barren

Phase 6 Land Uses

- Impervious-Roads
- Turf Grass
- Open Space
- Agriculture space

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Local Data Incorporated into P6LU_v2

Local Data Type	Number of Counties
• Impervious cover	114
• Tree cover/ forest	130
• Developed lands/ parcels	146

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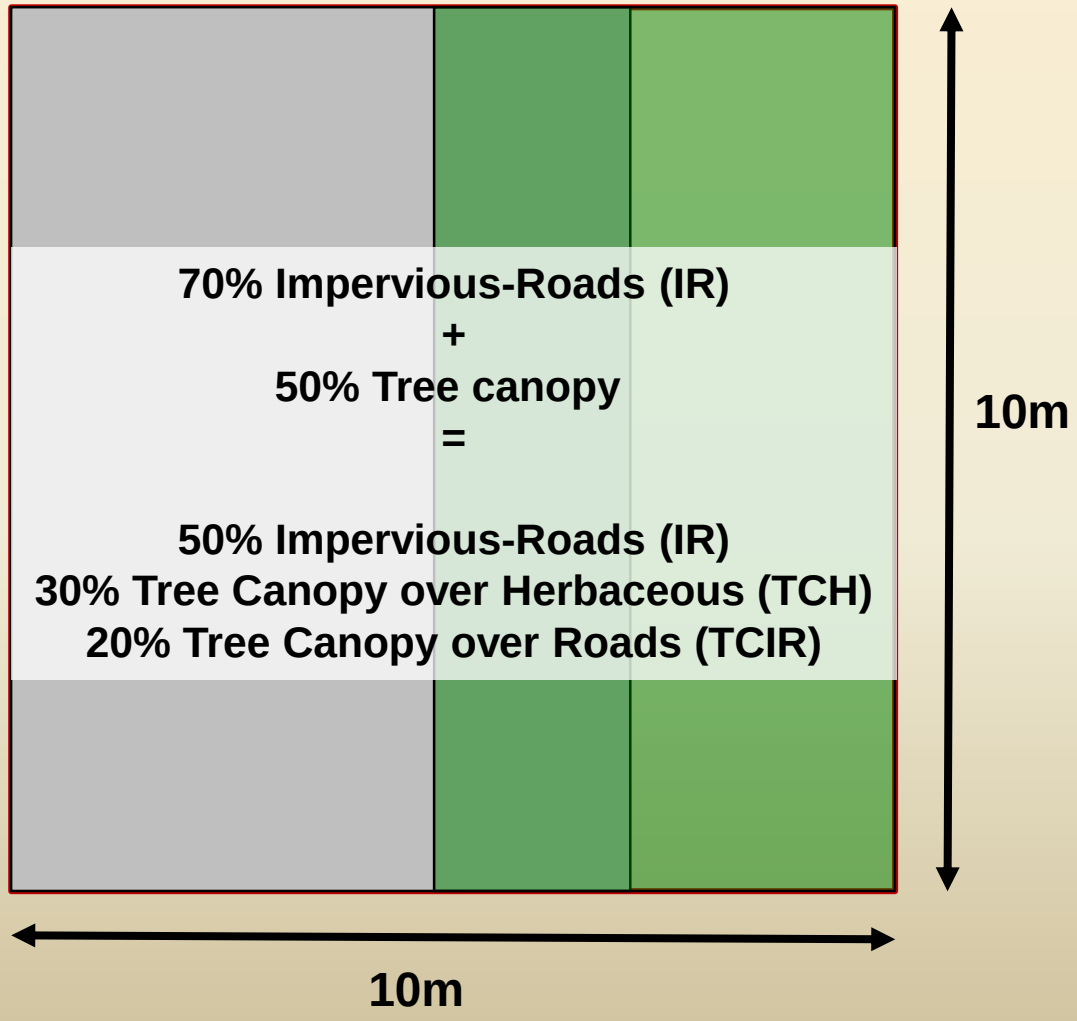
Phase 6 Land Use Database – from national data

- Assume minimal overlap among tree canopy, turf grass, and impervious surfaces within the same pixel.



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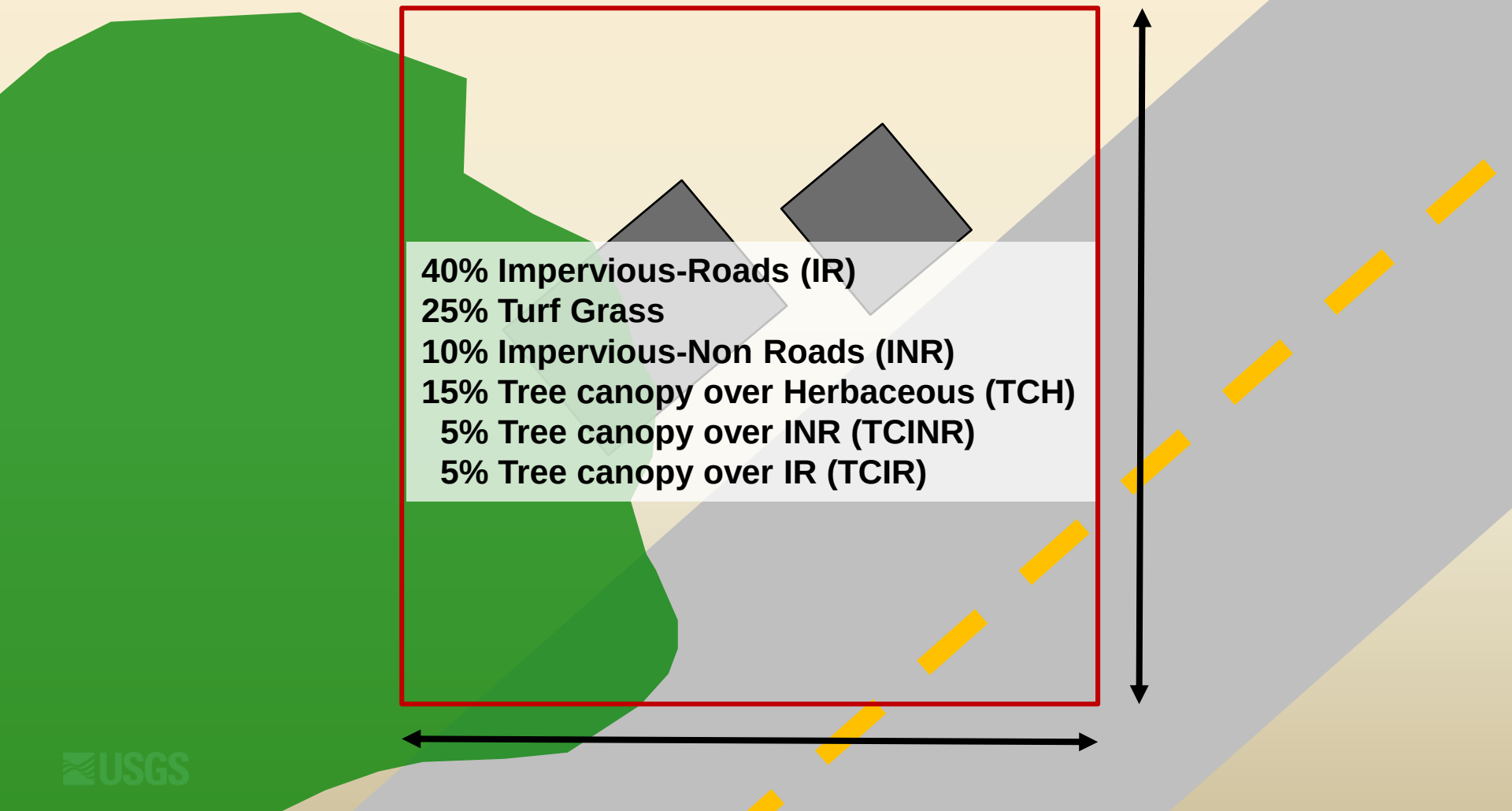
Phase 6 Land Use Database – from local data

- Fourteen different 10m resolution raster datasets
- Most with fractional and continuous pixel values



Phase 6 Land Uses – version 2 (P6LU_v2)

Primary Sectors:

- **Agriculture**
- **Developed**
- **Natural**

Overlays:

- **Developed Areas**
- **Federal Agency Lands**
- **Combined Sewer Overflows (CSS)**
- **Municipal Separate Storm Sewer System (MS4)**
- **Wastewater Sewer Service Areas**

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P6LU_v2: Developed

Impervious Surfaces

- **Roads (IR)**
- **Non-Roads (e.g. buildings) (INR)**
- **Tree Canopy over Impervious (TCIR + TCINR)**

Turf Grass

- **Turf Grass (TG)**
- **Tree canopy over Herbaceous (TCH)**

Construction (CN)

Excavation (zero acres- placeholder for v3)

- **Abandoned Mines (ABN)**
- **Active Mines (EXT)**

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Phase 6 LUv2 - Natural

Forest

- **Disturbed (DFR)** (zero acres- placeholder for v3)
- **Harvested (HFR)**
- **Natural/Undisturbed (FOR)**

Wetlands

- **Floodplain (FWT)**
- **Non-floodplain/Other (SWT)**

Open Space

- **Open Space (OSP)**
- **Tree Canopy over Scrub-shrub (TCS)**

Water (WAT)

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P6LU_v3: Agriculture

Commodity Crops/ Grains

- Grain with Manure
- Grain without Manure
- Silage with Manure
- Silage without Manure
- Small Grains and Grains
- Small Grains and Soybeans
- Full Season Soybeans

Specialty Crops

- Specialty Crops High
- Specialty Crops Low
- Other Agronomic Crops

Pasture/ Hay

- Legume Hay
- Other Hay
- Pasture

Other

- Farmstead
- Permitted Feeding Space
- Non-Permitted Feeding Space
- Ag Open Space

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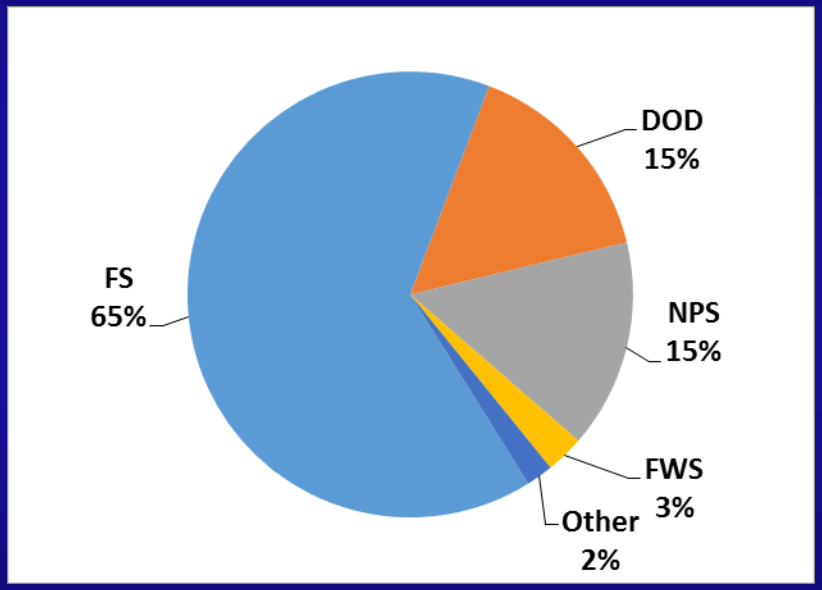
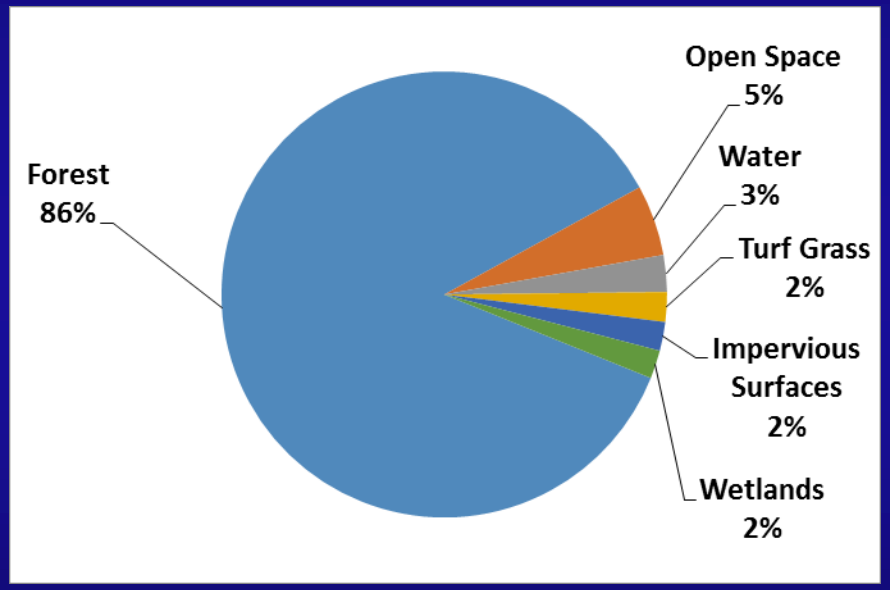
Results - Federal Lands

By Agency



By Land Use



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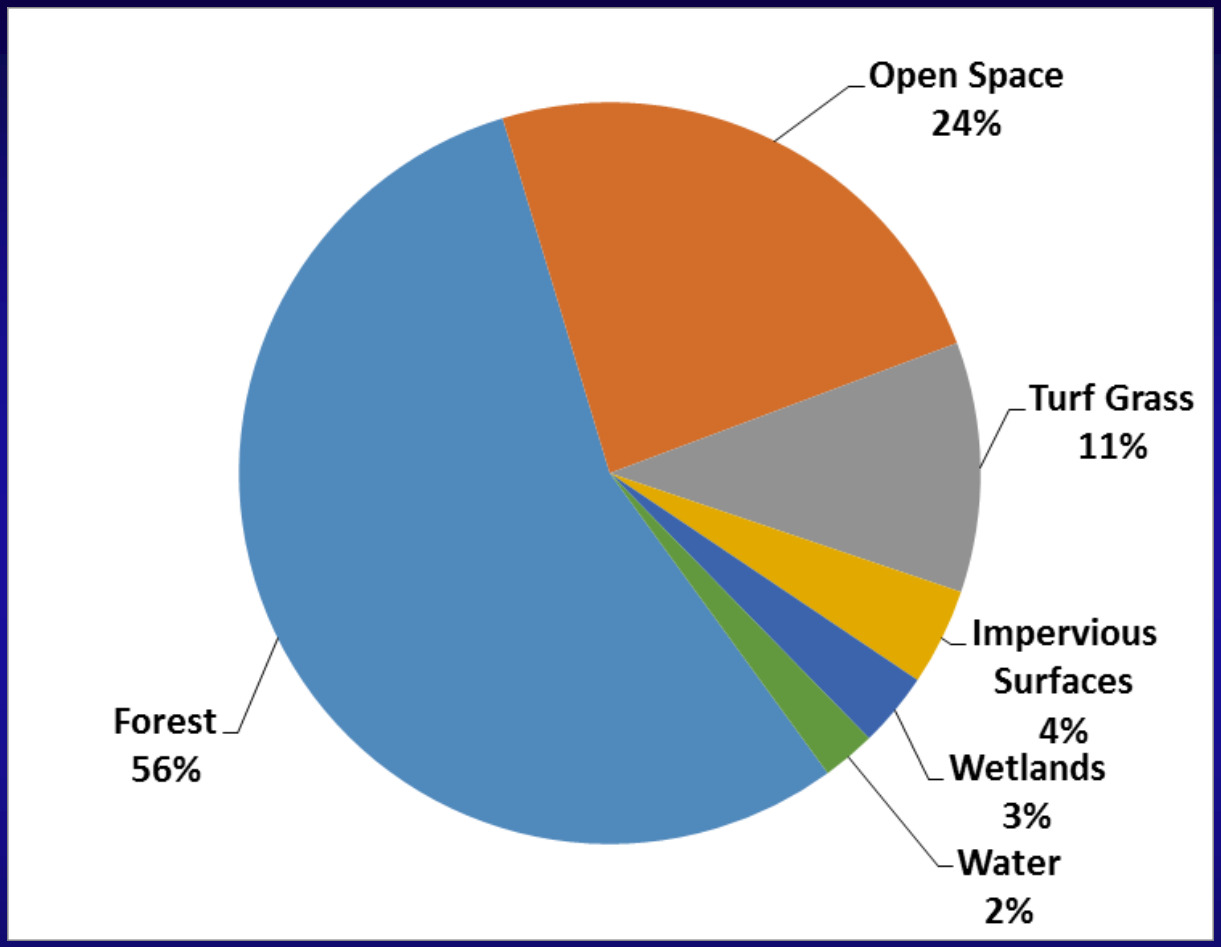
Results – Land River Segments



Notes:

1. **Total Acreage of Open Space is currently very high because it includes AG, which will be subtracted out.**
2. **Acreages exclude tidal wetlands which will be simulated in the Water Quality model.**

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Methods

1. Develop a Phase 6 Land Use database with information for all land uses and overlays.
   - fourteen 10m land use raster layers
   - Six raster overlays
   - 20 million records

2. Reconcile spatial overlap between different land uses.

3. Estimate additional impervious and turf grass acreages associated with rural development.

4. Summarize land use acreages by LRSeg for 2011 base year

5. Incorporate MDE/MDP data for 2011 base year

6. Backcast land uses to 1984 and forecast to 2013

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Methods (cont'd)

- Adjustments to the land use layers had to be made at the pixel level FIRST, because source data sets came from different sources and from different years.
- The fractions of different land uses within each pixel must all be >=0 and all land use fractions must add up to exactly 100.
- Subtractions or additions to land uses will proceed in a hierarchical manner.
- TCIR and TINR were concatenated to create the TC land use class.
- Construction/Extraction class will be calculated after completion of LU classes.

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Hierarchy of Land Use Fractions

1. Impervious Surfaces
2. Water
3. Wetlands
4. Forest
5. Turf Grass
6. Open Space

Example: Impervious Surfaces

IR – TCIR = IR_adj

INR - TCINR = INR_adj

If (IR_adj + TCIR + INR_adj + TCINR) > 100, reduce INR_adj and TCINR values proportionally in new fields INR_adj2 and TCINR_adj so that the sum of these land uses <= 100.

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Backcasting Land Uses to 1984

Data informing backcast for all land uses:

- 30m-resolution Land Cover: 1984, 1992, 2001, 2006, and 2011.
- Decennial Census of Population and Housing: 1980, 1990, 2000, 2010.
- Census of Agriculture: 1982, 1987, 1992, 1997, 2002, 2007, 2012

Developed land uses on non-federal lands change in proportion to changes in total housing units.

Natural land uses change in proportion to changes in land cover.

Agricultural land uses change according to the Census of Agriculture.

On federal lands, developed land uses change in proportion to changes in land cover and natural lands are adjusted proportionally.

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Next Steps

- Focus groups to review Phase 6 Land Use Data website.
- Update Phase 6 Land Use website.
- Host webinar presenting Phase 6 Land Use website, data review methodology, CBP expectations, and review schedule.
- Begin synthesizing high-res land cover and local land use data for final land use dataset (P6LU_v3).
- Reconcile CBP and MDE/MDP land use classification and aggregation methodologies (Pilot County: PG County, MD)