

Appendix 2-1. The WV-GAP land cover classification. Land cover types are described in more detail in the WV-GAP land cover atlas. The twenty-five land cover types (with corresponding 5 digit grid codes) were mapped from Landsat TM imagery to create the WV-GAP land cover and wildlife habitat maps. Source indicates source data used to map each class. Sources are described in more detail in Section 2.4.

Grid Code	Label	Source
Developed Lands		
10001	Major powerlines	DLG mask
14001	Major highways	DLG mask
16001	Populated area – mixed land cover	Census centroid mask
16002	Low intensity urban	MRLC, TM cluster labeling
16003	Moderate intensity urban	MRLC, TM cluster labeling
16004	Intensive urban	MRLC, TM cluster labeling
Agricultural Lands		
20001	Planted grassland	TM cluster labeling
20002	Conifer plantation	TM cluster labeling
21001	Row crop agriculture	TM cluster labeling
21002	Pasture/grassland	TM cluster labeling
Shrubland/Woodland		
32001	Shrubland	TM cluster labeling
32002	Woodland	TM cluster labeling
Forested Lands		
40001	Floodplain forest	Floodplain forest areas mask, TM cluster labeling
40002	Cove hardwood forest	TM cluster labeling, 1950s data for Ohio only
40003	Diverse/mesophytic hardwood forest	TM cluster labeling, 1950s data for Ohio, High Allegheny, Allegheny Mountain & Valley, and Northern Ridge & Valley
40004	Hardwood/conifer forest	TM cluster labeling, 1950s data for Western Coalfields
40005	Oak dominant forest	TM cluster labeling, 1950s data for Western Coalfields
40006	Mountain hardwood forest	TM cluster labeling, 1950s data (entire state)
40007	Mountain hardwood/conifer forest	TM cluster labeling, 1988 spruce data
40008	Mountain conifer forest	TM cluster labeling, 1988 spruce data

Appendix 2-1 Continued.

Grid Code	Label	Source
	Water	
50001	Surface water	TM cluster labeling, NWI, EPA River Reach
	Wetlands	
61001	Forested wetland	NWI
61002	Shrub wetland	NWI
61003	Herbaceous wetland	NWI, TM cluster labeling
	Barren Lands	
70001	Barren land – mining, construction	TM cluster labeling

Appendix 2-2. Landsat Thematic Mapper (TM) Scenes used by WV-GAP.

Scene Path/Row	Acquisition Date
16/32	8/24/92
16/32	6/24/93
16/33	3/01/92
16/33	5/20/92
17/32	10/2/92
17/32	5/14/93
17/33	10/2/92
17/33	7/17/93
17/34	10/2/92
17/34	7/17/93
18/32	8/6/92
18/32	4/22/94
18/33	8/6/92
18/33	7/17/93
18/34	11/29/93
18/34	5/20/94

Appendix 2-3. Descriptions of the 25 WV-GAP land cover types including mapping unit name, mapping unit code, typical species, description, and distribution information. A complete land cover map atlas is available on request. See Chapter 7 for distribution information.

Mapping Unit: Major powerlines

Mapping Unit Code: 10001

Typical Species: n/a

Description: Powerline right-of-ways from secondary data sources, not satellite data classification.

Distribution: Throughout the state.

Mapping Unit: Major roads

Mapping Unit Code: 14001

Typical Species: n/a

Description: Includes only interstate highways from secondary data sources. Other roads are not mapped or are classified as one of the developed / urban classes.

Distribution: Throughout the state, includes interstates 79, 68, 77, 64, and 81.

Mapping Unit: Populated areas – mixed land cover

Mapping Unit Code: 16001

Typical Species: n/a

Description: Rural or lightly developed areas with highly diverse and patchy land cover patterns and population densities greater than 500 persons per square mile.

Distribution: More populated regions of the state include I-79 corridor in the north-central portion of the state, the Kanawha Valley in the southwestern portion of the state, and the far eastern panhandle.

Mapping Unit: Light intensity urban

Mapping Unit Code: 16002

Typical Species: n/a

Description: Rural developed areas including small towns and hamlets, roadway strip development, suburban areas, and other areas that are primarily residential in character.

Distribution: More populated regions of the state include I-79 corridor in the north-central portion of the state, the Kanawha Valley in the southwestern portion of the state, and the far eastern panhandle.

Mapping Unit: Moderate intensity urban

Mapping Unit Code: 16003

Typical Species: n/a

Description: Concentrated residential, commercial, industrial, and institutional areas with mixed land use town centers in which a significant portion of the land area may be undeveloped.

Distribution: Found in more populated counties, including Monongalia County, Kanawha County, and the northern panhandle near Wheeling and Weirton.

Mapping Unit: Intensive urban

Mapping Unit Code: 16004

Typical Species: n/a

Description: Dense residential, commercial, industrial, and city core areas in which the majority of the land is developed.

Distribution: Found in major cities, including Morgantown, Fairmont, Clarksburg, Charleston, and Huntington.

Mapping Unit: Planted grassland

Mapping Unit Code: 20001

Typical Species: n/a

Description: Includes large grass areas such as parks, lawns, golf courses, cemeteries, and similar areas.

Distribution: Occurs sporadically throughout the state.

Mapping Unit: Conifer plantation

Mapping Unit Code: 20002

Typical Species: conifers

Description: Single-species planted conifer stands. Can also potentially include Christmas tree farms.

Distribution: Statewide.

Mapping Unit: Row crop agriculture

Mapping Unit Code: 21001

Typical Species: n/a

Description: Includes row crops such as corn and soybeans. May also include sparsely vegetated pasture/grassland areas that are misclassified as row crops.

Distribution: More common in the Great Valley in the far eastern panhandle and along river valleys in the Ridge and Valley region.

Mapping Unit: Pasture/grassland

Mapping Unit Code: 21002

Typical Species: n/a

Description: Includes pastureland, hay fields, old fields, abandoned farms, and other herbaceous land cover areas (excluding wetlands).

Distribution: Statewide.

Mapping Unit: Shrubland
Mapping Unit Code: 32001
Typical Species: In highlands: laurels, rhododendrons, blueberries, huckleberry, pin cherry, heath
In reverting fields: *Rubus*, hawthorn, sumacs, greenbrier, various seedling trees
Description: Natural highland scrubland or reverting agricultural fields with woody vegetation.
Distribution: Statewide.

Mapping Unit: Woodland
Mapping Unit Code: 32002
Typical Species: Pitch pine, scrub oak, red oak, black oak, red spruce, chinquapin oak
Description: Wooded areas, but not with mature closed canopy forest cover. Found on ridge tops, knobs, rocky areas, and other previously disturbed areas such as forest harvest areas, reclaimed coalmines, and the sites of forest fires.
Distribution: Statewide.

Mapping Unit: Surface water
Mapping Unit Code: 50001
Typical Species: n/a
Description: Open water including lakes, large ponds, and rivers.
Distribution: Statewide.

Mapping Unit: Forested wetland
Mapping Unit Code: 61001
Typical Species: *Salix*, *Alnus*, *Prunus*, red maple, red spruce, Eastern hemlock
Description: Palustrine forested land cover derived from National Wetlands Inventory (NWI) data. Data combined into classification to facilitate updating of NWI classifications from other data sources.
Distribution: Occurs statewide in small patches, more extensive areas found in Canaan Valley and along the Meadow River.

Mapping Unit: Shrub wetland
Mapping Unit Code: 62001
Typical Species: *Viburnum*, chokeberry, red maple, black cherry, quaking aspen, speckled alder
Description: Palustrine shrub/scrub wetland land cover derived from National Wetlands Inventory (NWI) data. Data combined into classification to facilitate updating of NWI classifications from other data sources.
Distribution: Occurs statewide in small patches, more extensive areas found in Canaan Valley and along the Meadow River.

Mapping Unit: Herbaceous wetland
Mapping Unit Code: 62002
Typical Species: *Carex*, *Scirpus*, *Juncus*, graminoid species
Description: Palustrine emergent land cover derived from National Wetlands Inventory (NWI) data. Data combined into classification to facilitate updating of NWI classifications from other data sources.
Distribution: Occurs statewide in small patches, more extensive areas found in Canaan Valley and along the Meadow River.

Mapping Unit: Floodplain forest
Mapping Unit Code: 40001
Typical Species: Sycamore, red maple, silver maple, black willow, pin oak, river birch, sweet gum, American elm, box elder
Description: Bottomland forest occurring in major river valley/riparian areas.
Distribution: Found along river valleys and bottomlands statewide.

Mapping Unit: Cove hardwood forest
Mapping Unit Code: 40002
Typical Species: yellow poplar, red oak, pin cherry, black cherry, paper birch, yellow birch, aspen, sugar maple, red maple, Eastern hemlock
Description: Found in ravines, coves and along lower north-facing slopes in generally moister locations. Species composition is generally very diverse. Local species dominance patterns are often small scale with significant species changes over relatively short distances.
Distribution: Concentrated within the Allegheny plateau region of the state, not found extensively in the Allegheny Mountains or the eastern panhandle.

Mapping Unit: Diverse/mesophytic hardwood forest
Mapping Unit Code: 40003
Typical Species: basswood, buckeye, beech, yellow poplar, black cherry, sugar maple, red maple, red oak, white oak, Eastern hemlock
Description: The forests are characterized by high species diversity or species dominance patterns that are localized in very small areas.
Distribution: Predominant forest cover throughout much of the Allegheny Plateau region of West Virginia.

Mapping Unit: Hardwood/conifer forest
Mapping Unit Code: 40004
Typical Species: Red oak, black oak, white oak, scarlet oak, chestnut oak, blackjack oak, pitch pine, scrub pine
Description: Includes non high-elevation forest types such as oak–pine forest. Typically occur as xeric or dry forests along ridges and south–facing slopes in the less mountainous areas of the state. Soils may be shallower and rocky.

Distribution: Found in the Ridge and Valley section to the east and in the hills west of the Allegheny Mountains.

Mapping Unit: Oak dominant forest

Mapping Unit Code: 40005

Typical Species: white oak, black oak, chestnut oak, red oak, hickory, occasionally chestnut

Description: Oak dominant forests occur throughout much of West Virginia. These areas generally occur on poorer/well-drained soils, ridges, or south and west facing slopes. Dominant species include white oak, black oak, chestnut oak, and red oak mixed with red maple, yellow poplar, beech, and sugar maple.

Distribution: Found in the Ridge and Valley section to the east and more extensively in the hills west of the Allegheny Mountains.

Mapping Unit: Mountain hardwood forest

Mapping Unit Code: 40006

Typical Species: sugar maple, yellow birch, white ash, basswood, red maple, hemlock, white pine, white ash, black cherry, red oak, cucumber tree

Description: Northern hardwood forests that dominate the mountainous higher elevation areas in the state. Found on richer, moist soils at elevations between 2500-3000 feet (approx. 750-900 m).

Distribution: Higher elevation areas throughout the Allegheny Mountains.

Mapping Unit: Mountain hardwood/conifer forest

Mapping Unit Code: 40007

Typical Species: red spruce, balsam fir, Eastern hemlock, Eastern white pine, sugar maple, beech, yellow and paper birch

Description: Found in the higher elevation areas of the state with red spruce, balsam fir, Eastern hemlock, Eastern white pine, sugar maple, beech, and yellow and paper birch. Found at elevations generally over 2500 feet (750m).

Distribution: Found in the higher elevation areas of the state along the Allegheny Mountains.

Mapping Unit: Mountain conifer forest

Mapping Unit Code: 40008

Typical Species: red spruce, balsam fir, yellow birch, paper birch, red pine

Description: Occurs in the highest elevations of the state. May include small pure stands of red spruce and red spruce with balsam fir with secondary amounts of yellow and paper birch.

Distribution: Highest elevations in the Allegheny Mountains. Distribution of balsam fir is more limited.

Appendix 2-4. Land cover classification error matrix for comparison of WV-GAP land cover types with US Forest Service Forest Inventory and Analysis (FIA) points. Analysis provided by Northeast Experiment Station FIA Program. Comparison based on FIA points forested in both datasets only. Please note that this accuracy assessment is extremely sensitive to the crosswalk between FIA vegetation types (species based) and WV-GAP land cover types (ecological complex-based). Shaded values on the diagonal indicate points that were classified as the same type in both datasets.

	FIA Point Data									
	Floodplain forest	Cove hardwood forest	Diverse/mesophytic hardwood forest	Hardwood/conifer forest	Oak dominant forest	Mountain hardwood forest	Mountain hardwood/conifer forest	Mountain conifer forest	TOTAL	User's Accuracy (%)
WV-GAP Land Cover Data										
Floodplain forest	1		4	1		2			8	13
Cove hardwood forest		6	36		6	12			60	10
Diverse/mesophytic hardwood forest	5	86	337	26	130	61			645	52
Hardwood/conifer forest		4	16	20	16	2		1	59	34
Oak dominant forest	1	30	167	38	70	26			332	21
Mountain hardwood forest		6	57	2	17	57		1	142	40
Mountain hardwood/conifer forest						3			3	0
Mountain conifer forest				1				1	2	50
TOTAL	7	132	617	88	239	163	0	3	1251	
Producer's Accuracy (%)	14	5	55	23	29	35	0	33		