

Moore Township Pollutant Reduction Plan



Prepared by:

KCE KEYSTONE
CONSULTING
ENGINEERS
www.KeystoneConsultingEngineers.com

February 4, 2019

Table of Contents

Program Components

Narrative	1
Existing Sediment Loading / Methodology	1
Areas Removed from PRP	2
Existing Best Management Practices (BMPs)	3
Proposed Sediment Reduction Best Management Practices (BMPs)	3
Funding Mechanisms	11
Estimate of Probable Costs	11
Responsible Parties for Operation and Maintenance (O&M) of BMPs	12
Schedule of The Implementation of The Proposed BMPs	13
Soils Map and Report	21
Existing Sediment Load Calculations	
Existing Sediment Loading	125
Existing Sediment Loading Area Analysis	127
Required Sediment Load Reduction Calculations	169
Proposed Bmp Reduction Calculations Summary	173
Proposed Bmp Reduction Calculations for Individual Proposed BMPs	175
Ms4 Outfall and Storm Sewer Map	202
Public Notice Advertisement	205
Public Comments and Responses	208
MCM #3	211
MCM #6	223

Appendices

Suspected Illicit Discharge Report Form	A1
Outfall Inventory and Field Screening Sheet	A1
Municipal Employee Training Annual Report Form	A2

NARRATIVE:

Moore Township is located within Northampton County, Pennsylvania. The Township is mostly rural and agricultural in nature but includes residential, commercial and industrial areas. The Township is partly located within an urbanized area as defined by the 2010 U.S. Census Bureau. The Township has a Municipal Separate Storm Sewer System (MS4) permit (NPDES No. PA132202).

The Township's urbanized areas and storm sewer outfalls drain to the Monocacy Creek, East Branch Monocacy Creek, Hokendauqua Creek and the Bushkill Creek. According to the Pennsylvania Department of Environmental Protection's Municipal MS4 Requirements Table the Monocacy Creek, East Branch Monocacy Creek and the Hokendauqua Creek are considered impaired, for 'Urban Runoff/Storm Sewer – Siltation'. Another cause of impairment to these watersheds is Flow Alterations. The Monocacy Creek, East Branch Monocacy Creek and its tributaries are designated as High-Quality Cold-Water Fisheries (HQ-CWF) and Migratory Fishes (MF) according to Pennsylvania Code, Chapter 93. The Hokendauqua Creek is designated as Cold-Water Fisheries (CWF) and Migratory Fishes (MF). The Monocacy Creek, East Branch Monocacy Creek and Hokendauqua Creek are located within the Delaware River Basin.

Due to the aforementioned impairments, the Township is required to develop a Pollutant Reduction Plan (PRP) for sediment removal. The requirements set forth in the Pennsylvania Department of Environmental Protection's National Pollutant Discharge Elimination System (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems Pollutant Reduction Plan (PRP) Instructions require a minimum 10% sediment reduction based on current sediment loading volumes. The MS4 and Storm Sewer Map, included in this PRP, show each storm sewershed, and the PRP Planning areas. The PRP planning areas are the areas within each storm sewershed that are tributary to a regulated outfall.

This Plan outlines the existing loading within the Township PRP planning Areas, highlights proposed Best Management Practices (BMPs), and provides operation schedules for short- and long-term maintenance of the proposed BMPs.

EXISTING SEDIMENT LOADING / METHODOLOGY:

The Township's existing storm sewer infrastructure has been mapped using information obtained by field survey. From the mapped storm sewer inlets, pipes, swales and outfalls, the storm sewer shed tributaries to each regulated outfall have been mapped using two-foot (2') LIDAR contours.

Existing sediment loading was then calculated using the online-based Wiki Watershed program, as developed by the Stroud Water Research Center.

The outputs from Wiki Watershed provide the land cover areas from within each PRP planning area. The table included in this narrative then converts these land cover areas from square meters to acres. Based on these areas, the following assumptions, in accordance with the 2011 National Land Cover Database (NLCD 2011), are made to calculate the amount of impervious and pervious areas within each study area:

Developed, Open Space: 19% Impervious
Developed, Low Intensity: 49% Impervious
Developed, Medium Intensity: 79% Impervious
Developed, High Intensity: 100% Impervious

For Northampton County, per Attachment B (Developed Land Loading Rates for PA Counties) in the Pennsylvania Department of Environmental Protection's PRP Instructions, the Total Sediment (TSS) loading is calculated by multiplying the Developed Impervious area by 1,839 lbs./acre/yr.; by multiplying the Developed Pervious area by 264.96 lbs./acre/yr.; and by multiplying the Undeveloped area by 234.6 lbs./acre/yr.

A total sediment loading, in lbs. per year, was calculated for each storm sewershed. These totals were then added together to generate the existing sediment loading for each watershed.

AREAS THAT HAVE BEEN PARSED (EXPLANATION FOR REMOVAL OF AREAS FROM PRP):

The following areas have been parsed out from the Township's PRP plan.

- The Stormwater Subareas shown on the Subarea map as sheet flow are areas that do not have a direct discharge point to the Surface Waters of the Commonwealth. These areas have been removed from the PRP Calculations for the Existing Sediment Loading.
- The Stormwater Subarea located between Outfall H024 and Outfall H028 sheet flows into the Hokendauqua Creek and does not have a direct discharge point.
- The Stormwater Subarea located North of Outfall #M005 sheet flows into the Monocacy Creek and does not have a direct discharge point.
- The Stormwater Subarea located to the East of Outfall #005 sheet flows into the Borough of Chapman and does not have a direct discharge point.
- The Stormwater Subarea located South of Outfall #M001 sheet flows into the Monocacy Creek. This area contains no existing Stormwater Facilities and as such does not have a direct discharge point into the Surface Waters of the Commonwealth.
- The Stormwater Subarea located South of Outfall #M006 sheet flows to the Monocacy Creek and does not have a direct discharge point.
- The Stormwater Subarea located North of Outfall #M006 sheet flows to the Monocacy Creek after it enters the Borough of Chapman.
- The Stormwater Subarea located on the Western side of the Township sheet flows into the Hokendauqua Creek.
- The Stormwater Subarea located South of Outfall #H037 sheet flows to the Hokendauqua Creek and does not have a direct discharge point.
- The Stormwater Subarea located North of Outfall #EBM018 sheet flows to the East Branch Monocacy Creek. The existing storm system located North of Outfall # EBM019 are Privately owned and no Municipal water enters their facilities.
- The Stormwater Subarea located West of Outfall #EBM018 sheet flows to the East Branch Monocacy Creek and does not have a direct discharge point.

- The Stormwater Subarea located Southeast of Outfall #M007 sheet flows to the Monocacy Creek and does not have a direct discharge point.

EXISTING BEST MANAGEMENT PRACTICES (BMPS):

No existing BMPs exist within the PRP planning area. Therefore, no credits have been taken to reduce the existing sediment loading.

PROPOSED SEDIMENT REDUCTION BEST MANAGEMENT PRACTICES (BMPS):

To reduce the required sediment loading, a series of proposed BMPs will be implemented. The requirements of the proposed BMPs and their anticipated operation and maintenance schedule are described as follows:

1. BMP 6.6.3: Dry Extended Detention Basin:

General design considerations:

Dry Extended Detention Basins should be constructed in accordance with the recommendations outlined in the December 30, 2006 Pennsylvania Stormwater Best Management Practices Manual. A summary of design considerations is as follows:

- Extended detention basins should be designed to mitigate runoff peak flow rates. An emergency outlet or spillway which is capable of conveying the spillway design flood (SDF) should be included in the design. The SDF is usually equal to the 100-year design flood.
- Extended detention basins should be designed to treat the runoff volume produced by the water quality design storm.
- Extended Detention Basins are designed to achieve a specified detention time. Details on the detention time are outlined in Chapter 3 of the Pennsylvania Stormwater Best Management Practices Manual dated December 30, 2006.
- The lowest elevation within an extended dry detention basin should be at least 2 feet above the seasonal high water table. If high water table conditions are anticipated, then the design of a wet pond, constructed wetland or bioretention facility should be considered

Specific design considerations:

This PRP proposes the conversion of six existing detention basins into dry extended detention basins. All Basins are located on privately-owned lands.

Basin Retro Fit #1 - The existing basin located in the sewershed area for Outfall # M004 will be regraded, seeded and two fore bays will be installed in accordance with the recommendations outlined in the December 30, 2006 Pennsylvania Stormwater Best Management Practices manual.



Google Earth image: 2840 W Beersville Road. (Existing site area for proposed Dry Extended Basin Conversion).

Basin Retro Fit #2 - The existing basin located in the sewershed area for Outfall # H036 will be regraded, seeded and two fore bays will be installed in accordance with the recommendations outlined in the December 30, 2006 Pennsylvania Stormwater Best Management Practices manual.



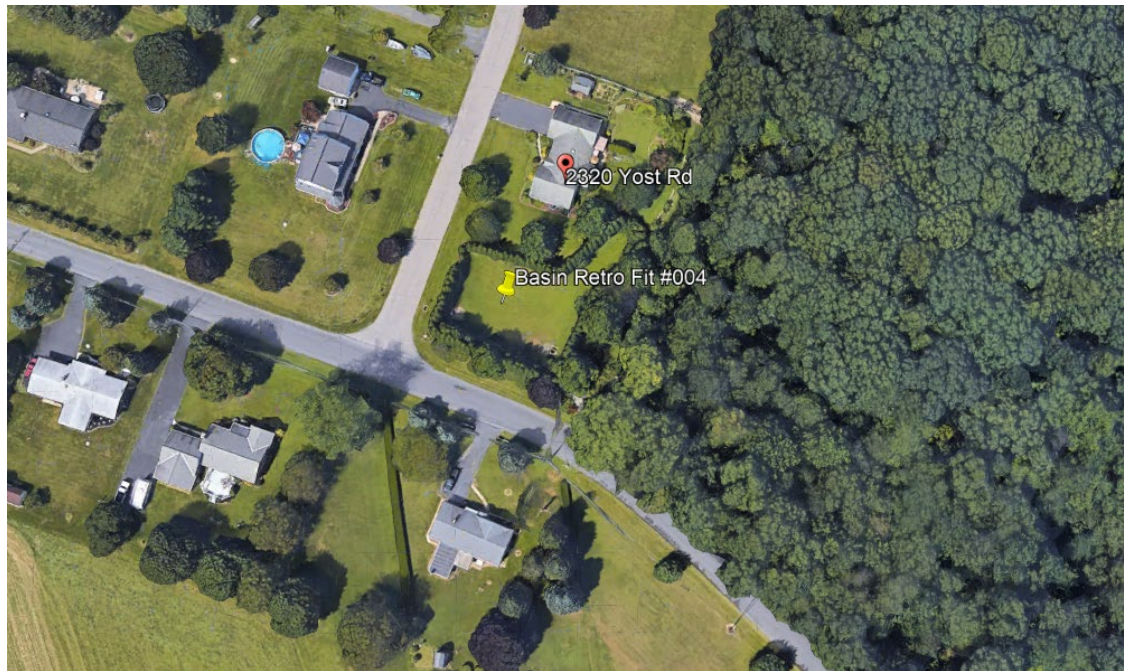
Google Earth image: 3263 W Scenic Drive. (Existing site area for proposed Dry Extended Basin Conversion

Basin Retro Fit #3 - The existing basin located in the sewershed area for Outfall # H031 will be regraded, seeded and one fore bay will be installed in accordance with the recommendations outlined in the December 30, 2006 Pennsylvania Stormwater Best Management Practices manual.



Google Earth image: 705 S Delps Road. (Existing site area for proposed Dry Extended Basin Conversion).

Basin Retro Fit #4 - The existing basin located in the sewershed area for Outfall # EBM017 will be regraded, seeded and two fore bays will be installed in accordance with the recommendations outlined in the December 30, 2006 Pennsylvania Stormwater Best Management Practices manual.



Google Earth image: 2320 Yost Road. (Existing site area for proposed Dry Extended Basin Conversion)

Basin Retro Fit #5 - The existing basin located in the sewershed area for Outfall # H037 will be regraded, seeded and two fore bays will be installed in accordance with the recommendations outlined in the December 30, 2006 Pennsylvania Stormwater Best Management Practices manual.



Google Earth image: 3131 Applebutter Road. (Existing site area for proposed Dry Extended Basin Conversion).

Basin Retro Fit #6 - The existing basin located in the sewershed area for Outfall # H023 will be regraded, seeded and one fore bay will be installed in accordance with the recommendations outlined in the December 30, 2006 Pennsylvania Stormwater Best Management Practices manual.



Google Earth image: 3003 Buck Road. (Existing site area for proposed Dry Extended Basin Conversion)

2. BMP 6.6.4 Water Quality Filters & Hydrodynamic Devices:

General design considerations:

Hydrodynamic Devices should be constructed in accordance with the recommendations outlined in the December 30, 2006 Pennsylvania Stormwater Best Management Practices Manual. A summary of design considerations is as follows:

- Match site considerations with manufacturer's guidelines/specifications (i.e land use will determine specific pollutants to be removed from runoff).
- Prevent re-suspension of particles by small drainage areas and good maintenance.
- Retrofits should be designed to fit existing inlets.
- Placement should accessible to maintenance.
- Overflow should be designed so that storms in excess of the device's hydraulic capacity bypass the treatment and is treated by another quality BMP.

Specific design considerations:

The Township plans to install a Hydrodynamic Device within the existing storm sewer system. The device is to be constructed by Contech Engineered Solutions.

Vortech Stormwater Treatment Unit #1 is to be installed within the water shed area of Outfall EBM018. The structure will be installed within the existing storm sewer system and be designed to adequately handle the existing water flows.



Google Earth image: 420 N Penn Dixie Road. (Approx. location for proposed Vortech Unit)

FUNDING MECHANISMS:

BMPs will be funded by the Townships general fund. Additional resources that may be pursued include grant funding through sources such as PennVEST or DEP Growing Greener.

ESTIMATE OF PROBABLE COSTS:

- Dry Extended Detention Basin Retro Fit #1: Based on an estimated cost of \$60.00 per. Square Yard for construction, design and permitting. The total construction cost for the basin conversion is approximately **\$66,666.67**
- Dry Extended Detention Basin Retro Fit #2: Based on an estimated cost of \$60.00 per. Square Yard for construction, design and permitting. The total construction cost for the basin conversion is approximately **\$80,000.00**
- Dry Extended Detention Basin Retro Fit #3: Based on an estimated cost of \$60.00 per. Square Yard for construction, design and permitting. The total construction cost for the basin conversion is approximately **\$13,333.33**
- Dry Extended Detention Basin Retro Fit #4: Based on an estimated cost of \$60.00 per. Square Yard for construction, design and permitting. The total construction cost for the basin conversion is approximately **\$8,666.67**
- Dry Extended Detention Basin Retro Fit #5: Based on an estimated cost of \$60.00 per. Square Yard for construction, design and permitting. The total construction cost for the basin conversion is approximately **\$16,666.67**
- Dry Extended Detention Basin Retro Fit #6: Based on an estimated cost of \$60.00 per. Square Yard for construction, design and permitting. The total construction cost for the basin conversion is approximately **\$48,095.67**
- Vortech Stormwater Treatment Unit #1: Based on the estimated delivered cost per unit as per Contech **\$63,000.00**.

RESPONSIBLE PARTIES FOR OPERATION AND MAINTENANCE (O&M) OF BMPS:

Moore Township will be responsible for the operation and maintenance of the proposed BMPs in accordance with the following schedule:

Inspection Activity	Frequency	Maintenance Action
Dry Extended Basin		
Inspect for erosion, damage to vegetation, and sediment and debris accumulation	Annually and after every major rainfall event (>2 inches in 24 hours)	Correct erosive conditions and re-stabilize. Remove debris and sediment and dispose of in accordance with all federal, state and local laws.
Inspect vegetation on side slopes for erosion and formation of rill and gullies	Annually and after every major rainfall event (>2 inches in 24 hours)	Correct erosive conditions and re-stabilize as needed.
Inspect for pools of standing water	Annually and after every major rainfall event (>2 inches in 24 hours)	Dewater and discharge to an approved location. Restore and re-stabilize to design grades.
Mow and trim vegetation to ensure safety, aesthetics, proper swale construction or to suppress weeds and invasive vegetation	Annually in early spring	Dispose of cutting in a local composting facility. Mow only when swale is dry to avoid rutting.
Inspect for litter	Annually and prior to mowing	Remove litter and dispose accordingly.
Inspect for uniformity in cross-section and longitudinal slope	Annually and after every major rainfall event (>2 inches in 24 hours)	Correct as needed. Immediately stabilize disturbed areas.
Inspect vegetation for uniform establishment	Annually	Plant alternative grass species as needed. Immediately stabilize disturbed areas.
Inspect basin for bare areas	Annually	Re-seed bare areas. Install appropriate erosion control measures when native soil is exposed or erosion channels are forming.
Inspect for areas of standing water that dewater in greater than 48 hours	Annually and after every major rainfall event (>2 inches in 24 hours)	Rototill and re-plant swale as needed. Restore to design grades.

Inspect basin vegetation	During extreme dry periods	Water, fertilize and/or apply pesticide only when absolutely necessary.
Inspect basin	Immediately after spring melt	Remove residuals (e.g. sand or cinders) and replace damaged vegetation without disturbed remaining vegetation.
Restore soil structure and moisture capacity of the basin	Immediately after spring melt	Mulching and/or soil aeration/manipulation may be required to restore soil structure and moisture capacity and to reduce impacts of deicing agents.
Inspect basin inlet and outlet for signs of erosion or blockage	Annually and after every major rainfall event (>2 inches in 24 hours)	Remove debris and sediment and dispose of in accordance with all federal, state, and local laws.

Vortech Stormwater Treatment
Maintenance shall be conducted in accordance with Contech Engineered Solutions manufacturer's recommendations for all Vortech Units.

SCHEDULE OF THE IMPLEMENTATION OF THE PROPOSED BMPs:

The following schedule will outline the implementation the proposed BMPs:

- During 2020 the Township is planning to complete the following:
 1. Start studies, design and submit for permits for Basin conversions 1-3
 2. Start study, design and installation of Vortech Unit.
- During 2021 the Township is planning to complete the following:
 1. Final design and obtaining required permits for Basin Conversions 1-3
 2. Start construction of Basin Conversions 1-3. Weather permitting and funding available.
- During 2022 the Township is planning to complete the following:
 1. Complete construction of Basin Conversions 1-3 to Dry Extended Basins.
 2. Start studies design and submit for permits for Basin Conversions 4-6
- During 2023 the Township is planning to complete the following:
 1. Final design and obtaining required permits for Basin Conversions 4-6
 2. Start construction of Basin Conversions 4-6. Weather permitting and funding available
- During 2024 the Township is planning to complete the following:
 1. Complete construction of Basin Conversions 4-6 to Dy Extended Basins.

SOILS MAP



United States
Department of
Agriculture

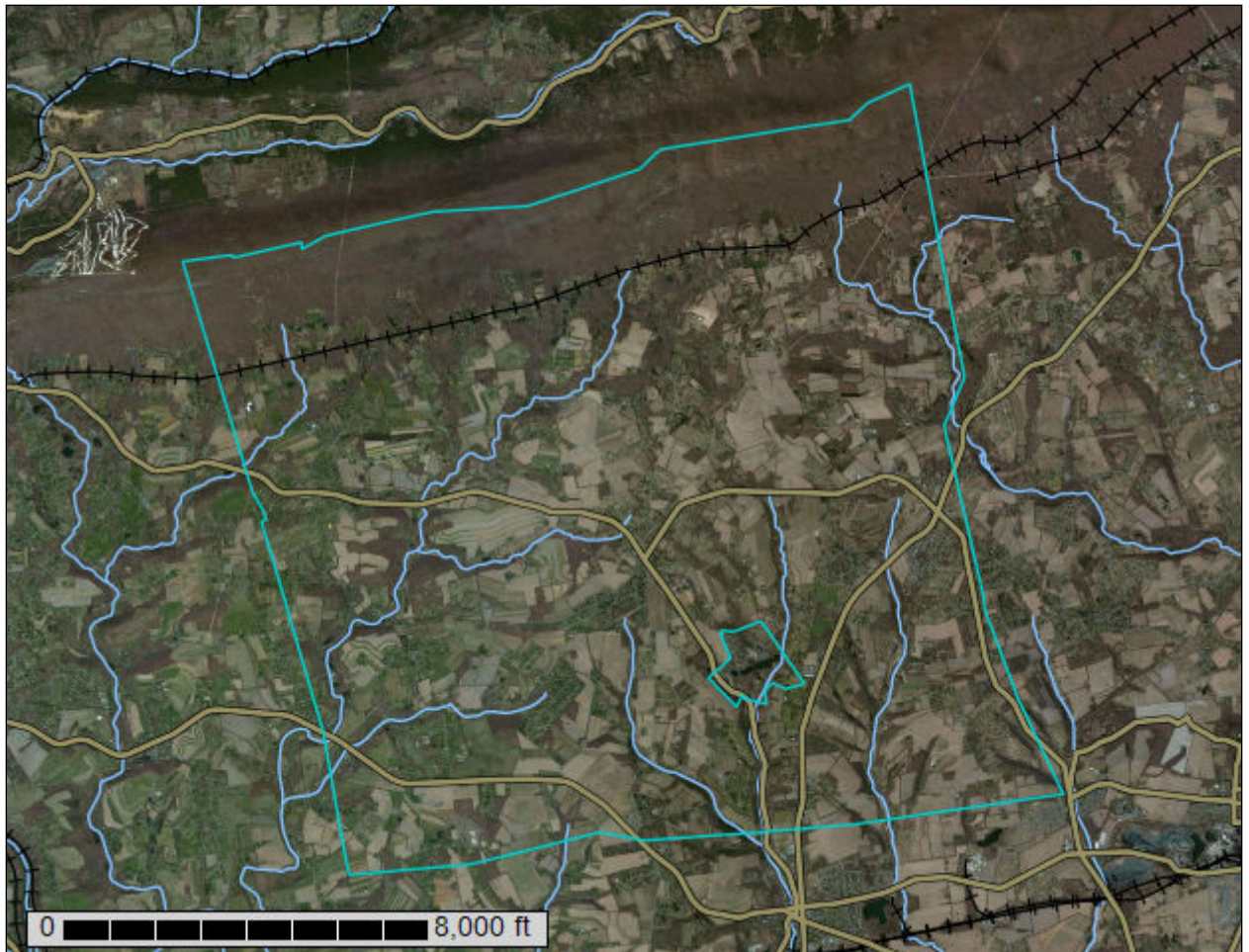
NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Carbon County, Pennsylvania, Monroe County, Pennsylvania, and Northampton County, Pennsylvania

Moore Township



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface	2
Soil Map	6
Soil Map.....	7
Legend.....	8
Map Unit Legend.....	10
Map Unit Descriptions.....	12
Carbon County, Pennsylvania.....	15
DeB—Dekalb very channery loam, 0 to 8 percent slopes, very stony.....	15
HtB—Hazleton loam, 3 to 8 percent slopes.....	16
HvD—Hazleton very stony loam, 8 to 25 percent slopes.....	17
Monroe County, Pennsylvania.....	19
DxB—Dekalb extremely stony loam, 0 to 8 percent slopes.....	19
DxC—Dekalb very channery loam, 8 to 25 percent slopes, extremely stony.....	20
HxB—Hazleton channery sandy loam, 0 to 8 percent slopes, rubbly.....	21
Northampton County, Pennsylvania.....	24
AfA—Allenwood silt loam, 0 to 3 percent slopes.....	24
AfB—Allenwood silt loam, 3 to 8 percent slopes.....	25
AnA—Andover-Buchanan gravelly loams, 0 to 3 percent slopes.....	27
AnB—Andover-Buchanan gravelly loams, 3 to 8 percent slopes.....	29
AoB—Andover-Buchanan gravelly loams, 0 to 8 percent slopes, extremely stony.....	31
BfA—Bedington-Berks complex, 0 to 3 percent slopes.....	33
BfB—Bedington-Berks complex, 3 to 8 percent slopes.....	35
BfC—Bedington-Berks complex, 8 to 15 percent slopes.....	37
BkA—Berks-Weikert complex, 0 to 3 percent slopes.....	39
BkB—Berks-Weikert complex, 3 to 8 percent slopes.....	41
BkC—Berks-Weikert complex, 8 to 15 percent slopes.....	44
BkD—Berks-Weikert complex, 15 to 25 percent slopes.....	46
BkF—Berks-Weikert complex, 25 to 60 percent slopes.....	48
BtA—Brinkerton-Comly silt loams, 0 to 3 percent slopes.....	50
BtB—Brinkerton-Comly silt loams, 3 to 8 percent slopes.....	52
BuB—Buchanan gravelly loam, 3 to 8 percent slopes.....	54
BvB—Buchanan gravelly loam, 0 to 8 percent slopes, extremely stony.....	55
CpA—Comly silt loam, 0 to 3 percent slopes.....	57
CpB—Comly silt loam, 3 to 8 percent slopes.....	58
CrB—Comly silt loam, 0 to 8 percent slopes, extremely stony.....	59
DaA—Delaware fine sandy loam, 0 to 3 percent slopes.....	60
HeB—Hazleton very channery loam, 0 to 8 percent slopes, extremely stony.....	62
HeD—Hazleton very channery loam, 8 to 25 percent slopes, extremely stony.....	63
HeF—Hazleton very channery loam, 25 to 60 percent slopes, extremely stony.....	65

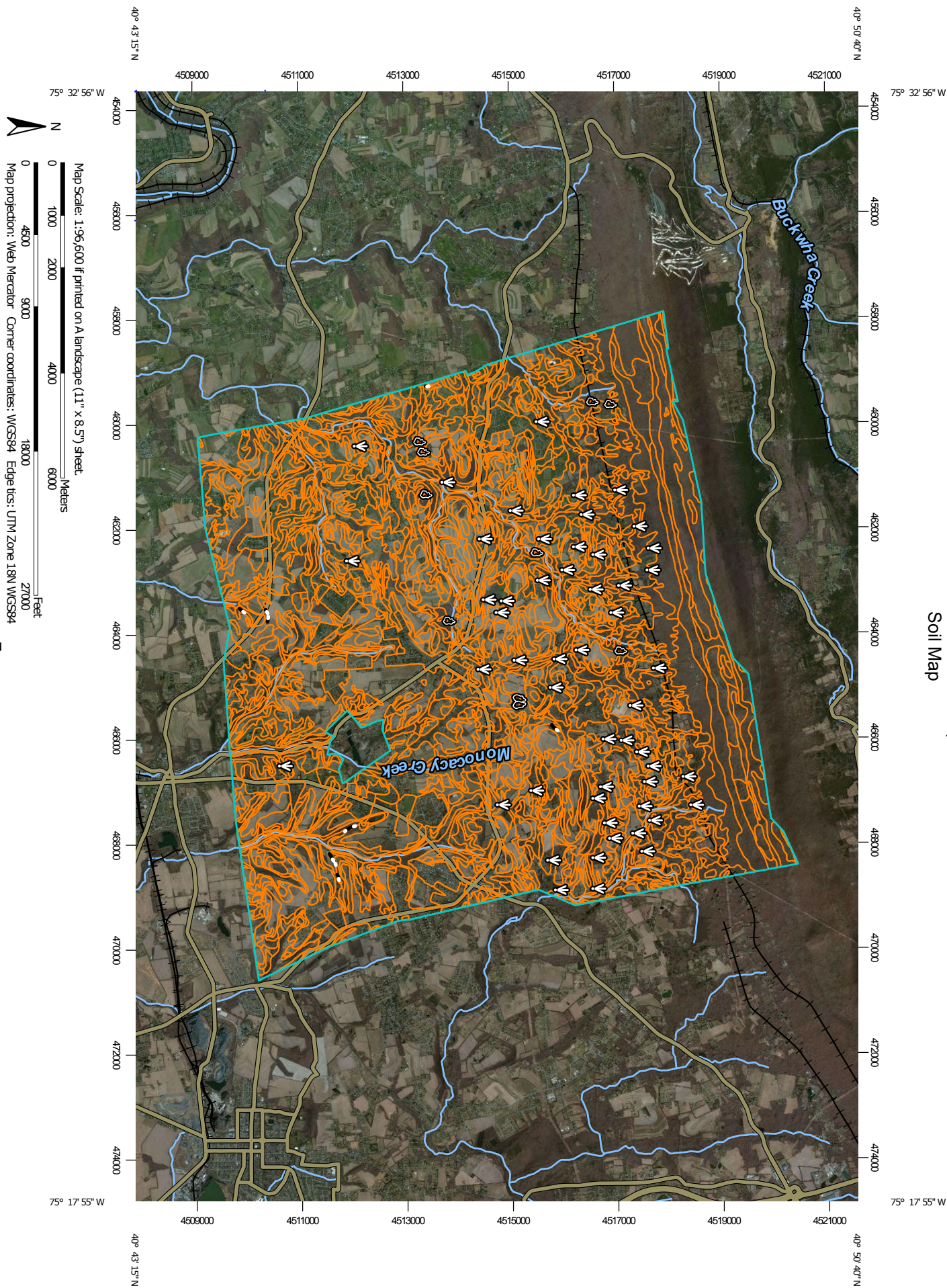
HgF—Hazleton-Rubble land complex, 25 to 60 percent slopes.....	67
Ho—Holly silt loam.....	68
LaB—Laidig gravelly loam, 3 to 8 percent slopes.....	70
LbB—Laidig very gravelly loam, 0 to 8 percent slopes, extremely stony....	71
LbD—Laidig very gravelly loam, 8 to 25 percent slopes, extremely stony..	73
LbF—Laidig very gravelly loam, 25 to 65 percent slopes, extremely stony.....	74
LcD—Laidig very channery loam, 8 to 25 percent slopes, rubbly.....	76
LdF—Laidig-Rubble land complex, 25 to 60 percent slopes.....	77
Mb—Middlebury silt loam.....	79
PhB—Phelps gravelly silt loam, 3 to 8 percent slopes.....	80
PQ—Pits, quarry.....	81
Rh—Red Hook silt loam.....	82
RU—Rubble land.....	83
RyB—Ryder-Duffield silt loams, 3 to 8 percent slopes.....	85
UhB—Udorthents, shale and sandstone, 0 to 8 percent slopes.....	86
UhD—Udorthents, shale and sandstone, 8 to 25 percent slopes.....	88
UkaB—Urban land, 0 to 8 percent slopes.....	90
Ukb—Urban land, occasionally flooded.....	91
UIB—Urban land-Berks complex, 0 to 8 percent slopes.....	91
UID—Urban land-Berks complex, 8 to 25 percent slopes.....	93
UrB—Urban land-Laidig complex, 0 to 8 percent slopes.....	95
UusB—Urban land-Udorthents, shale and sandstone complex, 0 to 8 percent slopes.....	97
W—Water.....	98
WkB—Weikert-Berks complex, 3 to 8 percent slopes.....	99
WkC—Weikert-Berks complex, 8 to 15 percent slopes.....	101
WkD—Weikert-Berks complex, 15 to 25 percent slopes.....	102
References	105

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map

Pollutant Reduction Plan



MAP LEGEND

	Area of Interest (AOI)		Spoil Area
	Area of Interest (AOI)		Stony Spot
Soils			Very Stony Spot
	Soil Map Unit Polygons		Wet Spot
	Soil Map Unit Lines		Other
	Soil Map Unit Points		Special Line Features
Special Point Features		Water Features	
	Blowout		Streams and Canals
	Borrow Pit	Transportation	
	Clay Spot		Rails
	Closed Depression		Interstate Highways
	Gravel Pit		US Routes
	Gravelly Spot		Major Roads
	Landfill		Local Roads
	Lava Flow		Background
	Marsh or swamp		Aerial Photography
	Mine or Quarry		
	Miscellaneous Water		
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Carbon County, Pennsylvania
Survey Area Data: Version 17, Sep 18, 2018

Soil Survey Area: Monroe County, Pennsylvania
Survey Area Data: Version 13, Sep 18, 2018

Soil Survey Area: Northampton County, Pennsylvania
Survey Area Data: Version 11, Sep 19, 2018

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 20, 2011—May 10, 2011

MAP LEGEND

MAP INFORMATION

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DeB	Dekalb very channery loam, 0 to 8 percent slopes, very stony	0.6	0.0%
HtB	Hazleton loam, 3 to 8 percent slopes	4.9	0.0%
HvD	Hazleton very stony loam, 8 to 25 percent slopes	8.6	0.0%
Subtotals for Soil Survey Area		14.1	0.1%
Totals for Area of Interest		24,112.3	100.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DxB	Dekalb extremely stony loam, 0 to 8 percent slopes	1.1	0.0%
DxC	Dekalb very channery loam, 8 to 25 percent slopes, extremely stony	1.0	0.0%
HxB	Hazleton channery sandy loam, 0 to 8 percent slopes, rubbly	0.0	0.0%
Subtotals for Soil Survey Area		2.1	0.0%
Totals for Area of Interest		24,112.3	100.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AfA	Allenwood silt loam, 0 to 3 percent slopes	136.1	0.6%
AfB	Allenwood silt loam, 3 to 8 percent slopes	1,229.8	5.1%
AnA	Andover-Buchanan gravelly loams, 0 to 3 percent slopes	139.3	0.6%
AnB	Andover-Buchanan gravelly loams, 3 to 8 percent slopes	673.7	2.8%
AoB	Andover-Buchanan gravelly loams, 0 to 8 percent slopes, extremely stony	252.9	1.0%
BfA	Bedington-Berks complex, 0 to 3 percent slopes	106.4	0.4%
BfB	Bedington-Berks complex, 3 to 8 percent slopes	676.9	2.8%
BfC	Bedington-Berks complex, 8 to 15 percent slopes	7.6	0.0%
BkA	Berks-Weikert complex, 0 to 3 percent slopes	592.8	2.5%
BkB	Berks-Weikert complex, 3 to 8 percent slopes	5,244.9	21.8%

Custom Soil Resource Report

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BkC	Berks-Weikert complex, 8 to 15 percent slopes	2,779.8	11.5%
BkD	Berks-Weikert complex, 15 to 25 percent slopes	862.1	3.6%
BkF	Berks-Weikert complex, 25 to 60 percent slopes	632.9	2.6%
BtA	Brinkerton-Comly silt loams, 0 to 3 percent slopes	395.8	1.6%
BtB	Brinkerton-Comly silt loams, 3 to 8 percent slopes	456.6	1.9%
BuB	Buchanan gravelly loam, 3 to 8 percent slopes	715.6	3.0%
BvB	Buchanan gravelly loam, 0 to 8 percent slopes, extremely stony	722.2	3.0%
CpA	Comly silt loam, 0 to 3 percent slopes	115.9	0.5%
CpB	Comly silt loam, 3 to 8 percent slopes	2,726.1	11.3%
CrB	Comly silt loam, 0 to 8 percent slopes, extremely stony	215.7	0.9%
DaA	Delaware fine sandy loam, 0 to 3 percent slopes	19.1	0.1%
HeB	Hazleton very channery loam, 0 to 8 percent slopes, extremely stony	165.9	0.7%
HeD	Hazleton very channery loam, 8 to 25 percent slopes, extremely stony	391.8	1.6%
HeF	Hazleton very channery loam, 25 to 60 percent slopes, extremely stony	100.3	0.4%
HgF	Hazleton-Rubble land complex, 25 to 60 percent slopes	358.9	1.5%
Ho	Holly silt loam	291.0	1.2%
LaB	Laidig gravelly loam, 3 to 8 percent slopes	126.4	0.5%
LbB	Laidig very gravelly loam, 0 to 8 percent slopes, extremely stony	760.1	3.2%
LbD	Laidig very gravelly loam, 8 to 25 percent slopes, extremely stony	199.6	0.8%
LbF	Laidig very gravelly loam, 25 to 65 percent slopes, extremely stony	240.5	1.0%
LcD	Laidig very channery loam, 8 to 25 percent slopes, rubbly	471.4	2.0%
LdF	Laidig-Rubble land complex, 25 to 60 percent slopes	159.3	0.7%

Custom Soil Resource Report

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Mb	Middlebury silt loam	1.7	0.0%
PhB	Phelps gravelly silt loam, 3 to 8 percent slopes	0.9	0.0%
PQ	Pits, quarry	3.4	0.0%
Rh	Red Hook silt loam	2.6	0.0%
RU	Rubble land	3.2	0.0%
RyB	Ryder-Duffield silt loams, 3 to 8 percent slopes	0.4	0.0%
UhB	Udorthents, shale and sandstone, 0 to 8 percent slopes	79.4	0.3%
UhD	Udorthents, shale and sandstone, 8 to 25 percent slopes	15.3	0.1%
UkaB	Urban land, 0 to 8 percent slopes	83.0	0.3%
Ukb	Urban land, occasionally flooded	7.9	0.0%
UIB	Urban land-Berks complex, 0 to 8 percent slopes	783.7	3.3%
UID	Urban land-Berks complex, 8 to 25 percent slopes	9.3	0.0%
UrB	Urban land-Laidig complex, 0 to 8 percent slopes	18.1	0.1%
UusB	Urban land-Udorthents, shale and sandstone complex, 0 to 8 percent slopes	234.4	1.0%
W	Water	86.1	0.4%
WkB	Weikert-Berks complex, 3 to 8 percent slopes	123.4	0.5%
WkC	Weikert-Berks complex, 8 to 15 percent slopes	274.1	1.1%
WkD	Weikert-Berks complex, 15 to 25 percent slopes	401.6	1.7%
Subtotals for Soil Survey Area		24,096.0	99.9%
Totals for Area of Interest		24,112.3	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the

landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present

or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Carbon County, Pennsylvania

DeB—Dekalb very channery loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2xd3h

Elevation: 950 to 1,880 feet

Mean annual precipitation: 37 to 50 inches

Mean annual air temperature: 50 to 55 degrees F

Frost-free period: 155 to 177 days

Farmland classification: Not prime farmland

Map Unit Composition

Dekalb and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dekalb

Setting

Landform: Mountain slopes

Landform position (two-dimensional): Backslope, summit, shoulder

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex, linear

Parent material: Residuum weathered from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 12 inches: very channery loam

E - 12 to 18 inches: very channery loam

Bw - 18 to 29 inches: very channery loam

C - 29 to 36 inches: very channery loam

R - 36 to 46 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent

Percent of area covered with surface fragments: 1.6 percent

Depth to restrictive feature: 24 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: A

Hydric soil rating: No

HtB—Hazleton loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 136w
Elevation: 1,100 to 2,500 feet
Mean annual precipitation: 36 to 55 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 110 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Hazleton and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hazleton

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Residuum weathered from sandstone

Typical profile

H1 - 0 to 7 inches: loam
H2 - 7 to 38 inches: very gravelly silt loam
H3 - 38 to 58 inches: very gravelly sandy loam
R - 58 to 69 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 40 to 96 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

HvD—Hazleton very stony loam, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: 1370

Elevation: 1,100 to 2,500 feet

Mean annual precipitation: 36 to 55 inches

Mean annual air temperature: 46 to 55 degrees F

Frost-free period: 110 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Hazleton and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hazleton

Setting

Landform: Mountain slopes

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Upper third of mountainflank

Down-slope shape: Convex, linear

Across-slope shape: Linear, convex

Parent material: Residuum weathered from sandstone

Typical profile

H1 - 0 to 7 inches: very stony loam

H2 - 7 to 38 inches: very gravelly silt loam

H3 - 38 to 65 inches: very gravelly sandy loam

R - 65 to 69 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 25 percent

Percent of area covered with surface fragments: 1.6 percent

Depth to restrictive feature: 40 to 96 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: A

Hydric soil rating: No

Monroe County, Pennsylvania

DxB—Dekalb extremely stony loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9y9y

Elevation: 1,000 to 2,800 feet

Mean annual precipitation: 36 to 60 inches

Mean annual air temperature: 46 to 59 degrees F

Frost-free period: 110 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Dekalb and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dekalb

Setting

Landform: Mountains

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Mountainflank

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 7 inches: very channery loam

H2 - 7 to 24 inches: very channery sandy loam

H3 - 24 to 32 inches: very channery sandy loam

R - 32 to 36 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 8 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A

Hydric soil rating: No

DxC—Dekalb very channery loam, 8 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2x8wh

Elevation: 530 to 2,200 feet

Mean annual precipitation: 37 to 50 inches

Mean annual air temperature: 50 to 55 degrees F

Frost-free period: 155 to 177 days

Farmland classification: Not prime farmland

Map Unit Composition

Dekalb and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dekalb

Setting

Landform: Mountain slopes

Landform position (two-dimensional): Summit, backslope, shoulder

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex, linear

Parent material: Residuum weathered from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 4 inches: very channery loam

E - 4 to 7 inches: very channery loam

Bw - 7 to 26 inches: very channery sandy loam

C - 26 to 34 inches: extremely channery sandy loam

R - 34 to 44 inches: bedrock

Properties and qualities

Slope: 8 to 25 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Hazleton

Percent of map unit: 5 percent
Landform: Mountain slopes on mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Clymer

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

HxB—Hazleton channery sandy loam, 0 to 8 percent slopes, rubbly

Map Unit Setting

National map unit symbol: 2wkc9
Elevation: 410 to 2,270 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 50 to 56 degrees F
Frost-free period: 155 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Hazleton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hazleton

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from quartzite and/or conglomerate and/or sandstone

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
Oe - 2 to 3 inches: moderately decomposed plant material

A - 3 to 6 inches: channery sandy loam
E - 6 to 9 inches: channery sandy loam
Bs - 9 to 11 inches: sandy loam
Bw1 - 11 to 19 inches: channery sandy loam
Bw2 - 19 to 30 inches: very channery sandy loam
C - 30 to 54 inches: very channery sandy loam
R - 54 to 64 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 18.0 percent
Depth to restrictive feature: 40 to 69 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
 (0.06 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Buchanan

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Concave
Across-slope shape: Concave, linear
Hydric soil rating: No

Dekalb

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Upper third of mountainflank, mountaintop
Down-slope shape: Convex
Across-slope shape: Convex, linear
Other vegetative classification: Very Rocky, Acid Soils (RA3)
Hydric soil rating: No

Andover

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: Yes

Northampton County, Pennsylvania

AfA—Allenwood silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1784

Elevation: 300 to 1,600 feet

Mean annual precipitation: 35 to 65 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 120 to 214 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Allenwood and similar soils: 95 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Allenwood

Setting

Landform: Valley sides

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Old till derived from sedimentary rock

Typical profile

Ap - 0 to 10 inches: silt loam

Bt - 10 to 42 inches: gravelly clay loam

C - 42 to 69 inches: very gravelly clay loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 60 to 120 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 1

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Berks

Percent of map unit: 2 percent

Landform: Ridges, valleys

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Weikert

Percent of map unit: 1 percent
Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Brinkerton

Percent of map unit: 1 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Comly

Percent of map unit: 1 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Hydric soil rating: No

AfB—Allenwood silt loam, 3 to 8 percent slopes**Map Unit Setting**

National map unit symbol: 1785
Elevation: 300 to 1,600 feet
Mean annual precipitation: 35 to 65 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 214 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Allenwood and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Allenwood**Setting**

Landform: Valley sides

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Old till derived from sedimentary rock

Typical profile

Ap - 0 to 10 inches: silt loam

Bt - 10 to 42 inches: gravelly clay loam

C - 42 to 69 inches: very gravelly clay loam

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 60 to 120 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Berks

Percent of map unit: 2 percent

Landform: Ridges, valleys

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Hydric soil rating: No

Brinkerton

Percent of map unit: 1 percent

Landform: Depressions

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Head slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Weikert

Percent of map unit: 1 percent

Landform: Hills

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve

Down-slope shape: Linear, convex

Across-slope shape: Convex, linear

Hydric soil rating: No

Comly

Percent of map unit: 1 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Hydric soil rating: No

AnA—Andover-Buchanan gravelly loams, 0 to 3 percent slopes**Map Unit Setting**

National map unit symbol: 1787
Elevation: 400 to 3,800 feet
Mean annual precipitation: 34 to 60 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Andover and similar soils: 55 percent
Buchanan and similar soils: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Andover**Setting**

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Brown fine-loamy colluvium derived from sandstone and siltstone

Typical profile

Ap - 0 to 8 inches: gravelly loam
Btg - 8 to 17 inches: gravelly clay loam
Btx - 17 to 53 inches: gravelly clay loam
C - 53 to 65 inches: very gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 16 to 28 inches to fragipan; 72 to 99 inches to lithic bedrock
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches

Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Hydric soil rating: Yes

Description of Buchanan

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Parent material: Colluvium derived from sandstone and shale

Typical profile

Ap - 0 to 6 inches: gravelly loam
Bt - 6 to 23 inches: gravelly loam
Bx - 23 to 47 inches: gravelly loam
C - 47 to 61 inches: gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 36 inches to fragipan; 60 to 99 inches to lithic bedrock
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 17 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Laidig

Percent of map unit: 3 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hazleton

Percent of map unit: 2 percent

Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountain flank
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

AnB—Andover-Buchanan gravelly loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1788
Elevation: 400 to 3,800 feet
Mean annual precipitation: 34 to 60 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Andover and similar soils: 55 percent
Buchanan and similar soils: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the map unit.

Description of Andover

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Parent material: Brown fine-loamy colluvium derived from sandstone and siltstone

Typical profile

Ap - 0 to 8 inches: gravelly loam
Btg - 8 to 17 inches: gravelly clay loam
Btx - 17 to 53 inches: gravelly clay loam
C - 53 to 65 inches: very gravelly loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 16 to 28 inches to fragipan; 72 to 99 inches to lithic bedrock
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: D

Hydric soil rating: Yes

Description of Buchanan

Setting

Landform: Hillslopes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear, concave

Across-slope shape: Concave, linear

Parent material: Colluvium derived from sandstone and shale

Typical profile

A - 0 to 6 inches: gravelly loam

Bt - 6 to 23 inches: gravelly loam

Bx - 23 to 47 inches: gravelly loam

C - 47 to 61 inches: gravelly loam

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 20 to 36 inches to fragipan; 60 to 99 inches to lithic bedrock

Natural drainage class: Moderately well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 17 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Laidig

Percent of map unit: 3 percent

Landform: Mountain slopes

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Mountaintop

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Hazleton

Percent of map unit: 2 percent

Landform: Mountain slopes

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Upper third of mountain flank

Down-slope shape: Convex, linear

Across-slope shape: Linear, convex

Hydric soil rating: No

AoB—Andover-Buchanan gravelly loams, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 1789

Elevation: 400 to 3,800 feet

Mean annual precipitation: 34 to 55 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 110 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Andover, extremely stony, and similar soils: 55 percent

Buchanan, extremely stony, and similar soils: 40 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the map unit.

Description of Andover, Extremely Stony

Setting

Landform: Hillslopes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear, concave

Across-slope shape: Concave, linear

Parent material: Brown fine-loamy colluvium derived from sandstone and siltstone

Typical profile

A - 0 to 8 inches: gravelly loam

Btg - 8 to 17 inches: gravelly clay loam

Btx - 17 to 53 inches: gravelly clay loam

C - 53 to 65 inches: very gravelly loam

Properties and qualities

Slope: 0 to 8 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: 16 to 28 inches to fragipan; 72 to 99 inches to lithic bedrock

Natural drainage class: Poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: Yes

Description of Buchanan, Extremely Stony

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Parent material: Colluvium derived from sandstone and shale

Typical profile

Ap - 0 to 6 inches: gravelly loam
Bt - 6 to 23 inches: gravelly loam
Bx - 23 to 47 inches: gravelly loam
C - 47 to 61 inches: gravelly loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 20 to 36 inches to fragipan; 60 to 99 inches to lithic bedrock
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 17 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Laidig

Percent of map unit: 3 percent
Landform: Mountain slopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hazleton*Percent of map unit:* 2 percent*Landform:* Mountain slopes*Landform position (two-dimensional):* Backslope, shoulder*Landform position (three-dimensional):* Upper third of mountainflank*Down-slope shape:* Convex, linear*Across-slope shape:* Linear, convex*Hydric soil rating:* No**BfA—Bedington-Berks complex, 0 to 3 percent slopes****Map Unit Setting***National map unit symbol:* 178q*Elevation:* 300 to 1,600 feet*Mean annual precipitation:* 35 to 50 inches*Mean annual air temperature:* 45 to 57 degrees F*Frost-free period:* 120 to 214 days*Farmland classification:* All areas are prime farmland**Map Unit Composition***Bedington and similar soils:* 60 percent*Berks and similar soils:* 30 percent*Minor components:* 9 percent*Estimates are based on observations, descriptions, and transects of the mapunit.***Description of Bedington****Setting***Landform:* Hillslopes*Landform position (two-dimensional):* Summit*Landform position (three-dimensional):* Interfluv*Down-slope shape:* Convex, linear*Across-slope shape:* Linear, convex*Parent material:* Acid residuum weathered from shale and siltstone**Typical profile***Ap - 0 to 10 inches:* channery silt loam*Bt - 10 to 43 inches:* channery silt loam*C - 43 to 63 inches:* extremely channery silt loam*R - 63 to 73 inches:* bedrock**Properties and qualities***Slope:* 0 to 3 percent*Depth to restrictive feature:* 60 to 99 inches to lithic bedrock*Natural drainage class:* Well drained*Runoff class:* Very low*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.20 to 6.00 in/hr)*Depth to water table:* More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Berks

Setting

Landform: Ridges, valleys
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: channery loam
Bw - 10 to 26 inches: very channery silt loam
C - 26 to 33 inches: very channery loam
R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 6 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Hydric soil rating: No

Brinkerton

Percent of map unit: 2 percent
Landform: Depressions

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Weikert

Percent of map unit: 1 percent
Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

BfB—Bedington-Berks complex, 3 to 8 percent slopes**Map Unit Setting**

National map unit symbol: 178r
Elevation: 300 to 1,600 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 214 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Bedington and similar soils: 55 percent
Berks and similar soils: 35 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bedington**Setting**

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Acid brown residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: channery silt loam
Bt - 10 to 43 inches: channery silt loam
C - 43 to 63 inches: extremely channery silt loam
R - 63 to 73 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 60 to 99 inches to lithic bedrock

Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Berks

Setting

Landform: Ridges, valleys
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Acid brown residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: channery loam
Bw - 10 to 26 inches: very channery silt loam
C - 26 to 33 inches: extremely channery loam
R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave

Across-slope shape: Concave, linear

Hydric soil rating: No

Brinkerton

Percent of map unit: 3 percent

Landform: Depressions

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Head slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Weikert

Percent of map unit: 3 percent

Landform: Hillslopes

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve

Down-slope shape: Linear, convex

Across-slope shape: Convex, linear

Hydric soil rating: No

BfC—Bedington-Berks complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 178s

Elevation: 300 to 1,600 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 45 to 57 degrees F

Frost-free period: 120 to 214 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Bedington and similar soils: 50 percent

Berks and similar soils: 40 percent

Minor components: 9 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bedington

Setting

Landform: Hillslopes

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Linear, convex

Across-slope shape: Convex, linear

Parent material: Acid brown residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: channery silt loam

Bt - 10 to 43 inches: channery silt loam

C - 43 to 63 inches: extremely channery silt loam

R - 63 to 73 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 60 to 99 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: A

Hydric soil rating: No

Description of Berks**Setting**

Landform: Ridges, valleys

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Parent material: Acid brown residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: channery loam

Bw - 10 to 26 inches: very channery silt loam

C - 26 to 33 inches: extremely channery loam

R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components**Brinkerton**

Percent of map unit: 3 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Weikert

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Comly

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Hydric soil rating: No

BkA—Berks-Weikert complex, 0 to 3 percent slopes**Map Unit Setting**

National map unit symbol: 2sgbf
Elevation: 310 to 960 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 47 to 56 degrees F
Frost-free period: 148 to 192 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Berks and similar soils: 70 percent
Weikert and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks**Setting**

Landform: Ridges

Landform position (two-dimensional): Shoulder, backslope, summit

Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery loam

Bw1 - 7 to 14 inches: very channery loam

Bw2 - 14 to 21 inches: very channery silt loam

C - 21 to 30 inches: extremely channery loam

R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 1 percent

Gypsum, maximum in profile: 1 percent

Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 1.0

Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3s

Hydrologic Soil Group: B

Other vegetative classification: Very Rocky, Acid Soils (RA2), Very Rocky, Acid Soils (RA3)

Hydric soil rating: No

Description of Weikert

Setting

Landform: Ridges

Landform position (two-dimensional): Shoulder, backslope, summit

Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 8 inches: channery silt loam

Bw - 8 to 15 inches: very channery silt loam

C - 15 to 18 inches: extremely channery silt loam

R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)

Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3s

Hydrologic Soil Group: D

Other vegetative classification: Droughty Shales (SD2)

Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 5 percent

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Brinkerton

Percent of map unit: 5 percent

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: Yes

BkB—Berks-Weikert complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2sgbh

Elevation: 250 to 1,740 feet

Mean annual precipitation: 37 to 50 inches

Mean annual air temperature: 47 to 56 degrees F

Frost-free period: 148 to 192 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Berks and similar soils: 65 percent

Weikert and similar soils: 25 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks**Setting**

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery loam

Bw1 - 7 to 14 inches: channery silt loam

Bw2 - 14 to 21 inches: very channery silt loam

C - 21 to 30 inches: extremely channery loam

R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 1 percent

Gypsum, maximum in profile: 1 percent

Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 1.0

Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B

Other vegetative classification: Very Rocky, Acid Soils (RA2), Very Rocky, Acid Soils (RA3)

Hydric soil rating: No

Description of Weikert**Setting**

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 8 inches: channery silt loam
Bw - 8 to 15 inches: very channery silt loam
C - 15 to 18 inches: extremely channery silt loam
R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to very high (0.00 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Other vegetative classification: Droughty Shales (SD2)
Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 6 percent
Landform: Ridges
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Brinkerton

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: Yes

BkC—Berks-Weikert complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2sgbj

Elevation: 210 to 3,270 feet

Mean annual precipitation: 37 to 50 inches

Mean annual air temperature: 47 to 56 degrees F

Frost-free period: 148 to 192 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Berks and similar soils: 65 percent

Weikert and similar soils: 25 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks

Setting

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery loam

Bw1 - 7 to 14 inches: channery loam

Bw2 - 14 to 21 inches: very channery silt loam

C - 21 to 30 inches: extremely channery loam

R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 1 percent

Gypsum, maximum in profile: 1 percent

Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 1.0

Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Other vegetative classification: Very Rocky, Acid Soils (RA2), Very Rocky, Acid Soils (RA3)

Hydric soil rating: No

Description of Weikert

Setting

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Convex, linear

Parent material: Gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 8 inches: channery silt loam

Bw - 8 to 15 inches: very channery silt loam

C - 15 to 18 inches: extremely channery silt loam

R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.28 to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)

Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: D

Other vegetative classification: Droughty Shales (SD2)

Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 6 percent

Landform: Ridges

Landform position (two-dimensional): Footslope, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Brinkerton

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

BkD—Berks-Weikert complex, 15 to 25 percent slopes**Map Unit Setting**

National map unit symbol: 2wkdr
Elevation: 230 to 1,240 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 155 to 177 days
Farmland classification: Not prime farmland

Map Unit Composition

Berks and similar soils: 65 percent
Weikert and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks**Setting**

Landform: Ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, concave
Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery loam
Bw1 - 7 to 15 inches: very channery silt loam
Bw2 - 15 to 22 inches: very channery silt loam
C - 22 to 37 inches: extremely channery silt loam
R - 37 to 47 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Weikert

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, concave
Parent material: Gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery silt loam
Bw - 7 to 14 inches: very channery silt loam
C - 14 to 18 inches: extremely channery silt loam
R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water storage in profile: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Other vegetative classification: Droughty Shales (SD2)
Hydric soil rating: No

Minor Components**Comly***Percent of map unit:* 6 percent*Landform:* Ridges*Landform position (two-dimensional):* Backslope, footslope*Landform position (three-dimensional):* Side slope*Down-slope shape:* Linear, concave*Across-slope shape:* Concave*Hydric soil rating:* No**Brinkerton***Percent of map unit:* 4 percent*Landform:* Ridges*Landform position (two-dimensional):* Backslope, footslope*Landform position (three-dimensional):* Side slope*Down-slope shape:* Linear, concave*Across-slope shape:* Concave*Hydric soil rating:* Yes**BkF—Berks-Weikert complex, 25 to 60 percent slopes****Map Unit Setting***National map unit symbol:* 2sgcr*Elevation:* 220 to 1,300 feet*Mean annual precipitation:* 29 to 50 inches*Mean annual air temperature:* 47 to 56 degrees F*Frost-free period:* 148 to 192 days*Farmland classification:* Not prime farmland**Map Unit Composition***Berks and similar soils:* 65 percent*Weikert and similar soils:* 25 percent*Minor components:* 10 percent*Estimates are based on observations, descriptions, and transects of the mapunit.***Description of Berks****Setting***Landform:* Hillslopes*Landform position (two-dimensional):* Backslope*Landform position (three-dimensional):* Side slope*Down-slope shape:* Convex*Across-slope shape:* Linear*Parent material:* Acid brown residuum weathered from shale and siltstone and/or fine grained sandstone**Typical profile***Oi - 0 to 1 inches:* slightly decomposed plant material

A - 1 to 5 inches: channery loam
Bw1 - 5 to 15 inches: very channery silt loam
Bw2 - 15 to 22 inches: very channery silt loam
C - 22 to 37 inches: extremely channery silt loam
R - 37 to 47 inches: bedrock

Properties and qualities

Slope: 25 to 60 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Other vegetative classification: Very Rocky, Acid Soils (RA3)
Hydric soil rating: No

Description of Weikert

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Acid brown residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 5 inches: channery silt loam
Bw - 5 to 18 inches: very channery loam
R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 25 to 60 percent
Depth to restrictive feature: 8 to 19 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)

Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: D

Other vegetative classification: Not Suited (NS)

Hydric soil rating: No

Minor Components

Bedington

Percent of map unit: 5 percent

Landform: Hillslopes

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Comly

Percent of map unit: 3 percent

Landform: Hillslopes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Brinkerton

Percent of map unit: 2 percent

Landform: Hillslopes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

BtA—Brinkerton-Comly silt loams, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1790

Elevation: 300 to 1,400 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 46 to 55 degrees F

Frost-free period: 120 to 214 days

Farmland classification: Not prime farmland

Map Unit Composition

Brinkerton and similar soils: 75 percent

Comly and similar soils: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brinkerton

Setting

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave, linear

Across-slope shape: Linear, concave

Parent material: Fine-silty colluvium derived from shale and siltstone

Typical profile

Ap - 0 to 9 inches: silt loam

Bt - 9 to 16 inches: silty clay loam

Bx - 16 to 42 inches: channery clay loam

C - 42 to 61 inches: channery loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 11 to 30 inches to fragipan; 60 to 99 inches to lithic bedrock

Natural drainage class: Poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: D

Hydric soil rating: Yes

Description of Comly

Setting

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear, concave

Across-slope shape: Concave, linear

Parent material: Acid fine-loamy colluvium derived from shale and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam

Bt - 10 to 25 inches: channery silty clay loam

Btx - 25 to 52 inches: channery loam

C - 52 to 61 inches: very channery silt loam

R - 61 to 72 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 20 to 35 inches to fragipan; 60 to 96 inches to lithic bedrock

Natural drainage class: Moderately well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: About 12 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C

Hydric soil rating: No

BtB—Brinkerton-Comly silt loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1791

Elevation: 300 to 1,400 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 46 to 55 degrees F

Frost-free period: 120 to 214 days

Farmland classification: Not prime farmland

Map Unit Composition

Brinkerton and similar soils: 75 percent

Comly and similar soils: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brinkerton

Setting

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear, concave

Across-slope shape: Concave, linear

Parent material: Fine-silty colluvium derived from shale and siltstone

Typical profile

Ap - 0 to 9 inches: silt loam

Bt - 9 to 16 inches: silty clay loam

Bx - 16 to 42 inches: channery clay loam

C - 42 to 61 inches: channery loam

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 11 to 30 inches to fragipan; 60 to 99 inches to lithic bedrock

Natural drainage class: Poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: D

Hydric soil rating: Yes

Description of Comly

Setting

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear, concave

Across-slope shape: Concave, linear

Parent material: Acid fine-loamy colluvium derived from shale and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam

Bt - 10 to 25 inches: channery silty clay loam

Btx - 25 to 52 inches: channery loam

C - 52 to 61 inches: very channery silt loam

R - 61 to 72 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 20 to 36 inches to fragipan; 60 to 96 inches to lithic bedrock

Natural drainage class: Moderately well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: About 12 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C

Hydric soil rating: No

BuB—Buchanan gravelly loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1792

Elevation: 400 to 3,800 feet

Mean annual precipitation: 34 to 60 inches

Mean annual air temperature: 46 to 59 degrees F

Frost-free period: 110 to 180 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Buchanan and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Buchanan

Setting

Landform: Valley sides, mountain slopes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Lower third of mountainflank

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Parent material: Colluvium derived from sandstone and shale

Typical profile

Ap - 0 to 7 inches: gravelly loam

Bt - 7 to 21 inches: gravelly loam

Btx - 21 to 65 inches: cobbly clay loam

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 20 to 36 inches to fragipan; 60 to 99 inches to lithic bedrock

Natural drainage class: Moderately well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 14 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components**Andover**

Percent of map unit: 10 percent
Landform: Depressions
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Wharton

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluvium, side slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Laidig

Percent of map unit: 5 percent
Landform: Mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountain flank
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

BvB—Buchanan gravelly loam, 0 to 8 percent slopes, extremely stony**Map Unit Setting**

National map unit symbol: 1793
Elevation: 300 to 3,800 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 101 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Buchanan, extremely stony, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the map unit.

Description of Buchanan, Extremely Stony**Setting**

Landform: Mountain slopes, valley sides
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountain flank

Down-slope shape: Linear, concave

Across-slope shape: Concave, linear

Parent material: Stony colluvium derived from sandstone and shale

Typical profile

A - 0 to 3 inches: gravelly loam

Bt - 3 to 21 inches: gravelly loam

Btx - 21 to 65 inches: cobbly clay loam

Properties and qualities

Slope: 0 to 8 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: 20 to 36 inches to fragipan; 60 to 99 inches to lithic bedrock

Natural drainage class: Moderately well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 14 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Cookport

Percent of map unit: 5 percent

Landform: Plateaus, ridges

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Upper third of mountainflank

Down-slope shape: Concave, linear

Across-slope shape: Concave

Hydric soil rating: No

Murrill

Percent of map unit: 5 percent

Landform: Valley sides

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: No

Laidig

Percent of map unit: 5 percent

Landform: Mountains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Lower third of mountainflank

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: No

Andover, extremely stony*Percent of map unit:* 5 percent*Landform:* Depressions*Landform position (two-dimensional):* Footslope, toeslope*Landform position (three-dimensional):* Base slope*Down-slope shape:* Concave*Across-slope shape:* Concave*Hydric soil rating:* Yes**CpA—Comly silt loam, 0 to 3 percent slopes****Map Unit Setting***National map unit symbol:* 179I*Elevation:* 300 to 1,400 feet*Mean annual precipitation:* 35 to 50 inches*Mean annual air temperature:* 46 to 55 degrees F*Frost-free period:* 120 to 214 days*Farmland classification:* All areas are prime farmland**Map Unit Composition***Comly and similar soils:* 90 percent*Minor components:* 5 percent*Estimates are based on observations, descriptions, and transects of the mapunit.***Description of Comly****Setting***Landform:* Valleys*Landform position (two-dimensional):* Footslope*Landform position (three-dimensional):* Base slope*Down-slope shape:* Concave, linear*Across-slope shape:* Linear, concave*Parent material:* Acid fine-loamy colluvium derived from shale and siltstone**Typical profile***Ap - 0 to 10 inches:* silt loam*Bt - 10 to 25 inches:* channery silty clay loam*Btx - 25 to 52 inches:* channery loam*C - 52 to 61 inches:* very channery silt loam*R - 61 to 80 inches:* bedrock**Properties and qualities***Slope:* 0 to 3 percent*Depth to restrictive feature:* 20 to 35 inches to fragipan; 60 to 96 inches to lithic bedrock*Natural drainage class:* Moderately well drained*Runoff class:* Low*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.60 in/hr)*Depth to water table:* About 12 to 36 inches

Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Brinkerton

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

CpB—Comly silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 179m
Elevation: 300 to 1,400 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 120 to 214 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Comly and similar soils: 90 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Comly

Setting

Landform: Valleys
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Parent material: Acid fine-loamy colluvium derived from shale and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam
Bt - 10 to 25 inches: channery silty clay loam
Btx - 25 to 52 inches: channery loam
C - 52 to 61 inches: very channery silt loam

R - 61 to 80 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 20 to 35 inches to fragipan; 60 to 96 inches to lithic bedrock

Natural drainage class: Moderately well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: About 12 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Brinkerton

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Head slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

CrB—Comly silt loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 179n

Elevation: 300 to 1,500 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 46 to 55 degrees F

Frost-free period: 120 to 214 days

Farmland classification: Not prime farmland

Map Unit Composition

Comly, extremely stony, and similar soils: 95 percent

Minor components: 1 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Comly, Extremely Stony

Setting

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear, concave

Across-slope shape: Concave, linear

Parent material: Acid fine-loamy colluvium derived from shale and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam

Bt - 10 to 25 inches: silty clay loam

Btx - 25 to 61 inches: channery silt loam

R - 61 to 71 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: 20 to 35 inches to fragipan; 52 to 96 inches to lithic bedrock

Natural drainage class: Moderately well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: About 12 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Brinkerton

Percent of map unit: 1 percent

Landform: Depressions

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Head slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

DaA—Delaware fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 179w

Elevation: 0 to 910 feet

Mean annual precipitation: 28 to 50 inches

Mean annual air temperature: 45 to 57 degrees F

Frost-free period: 110 to 210 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Delaware and similar soils: 90 percent

Minor components: 9 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delaware

Setting

Landform: Terraces

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

Parent material: Postglacial alluvium derived from sandstone and shale

Typical profile

Ap - 0 to 10 inches: fine sandy loam

Bw - 10 to 40 inches: very fine sandy loam

C - 40 to 87 inches: loamy fine sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 72 to 99 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: Rare

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 1

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Alton

Percent of map unit: 5 percent

Landform: Alluvial fans, terraces

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Hydric soil rating: No

Conotton

Percent of map unit: 2 percent

Landform: Stream terraces

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread, riser

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Hatboro

Percent of map unit: 1 percent

Landform: Flood plains

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Hydric soil rating: Yes

Nanticoke

Percent of map unit: 1 percent

Landform: Tidal flats

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: Yes

HeB—Hazleton very channery loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 17bj

Elevation: 600 to 2,500 feet

Mean annual precipitation: 36 to 55 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 110 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Hazleton, extremely stony, and similar soils: 90 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hazleton, Extremely Stony

Setting

Landform: Mountain slopes

Landform position (two-dimensional): Summit, backslope, shoulder

Landform position (three-dimensional): Mountaintop

Down-slope shape: Convex, linear

Across-slope shape: Linear, convex

Parent material: Loamy residuum weathered from sandstone

Typical profile

A - 0 to 6 inches: very channery loam

Bw - 6 to 43 inches: very channery loam

C - 43 to 55 inches: extremely channery loam

R - 55 to 80 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: 40 to 80 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Buchanan

Percent of map unit: 5 percent

Landform: Hillslopes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear, concave

Across-slope shape: Concave, linear

Hydric soil rating: No

HeD—Hazleton very channery loam, 8 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2wkcc

Elevation: 410 to 1,690 feet

Mean annual precipitation: 37 to 43 inches

Mean annual air temperature: 50 to 53 degrees F

Frost-free period: 155 to 177 days

Farmland classification: Not prime farmland

Map Unit Composition

Hazleton and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hazleton

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Residuum weathered from sandstone

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
Oe - 2 to 3 inches: moderately decomposed plant material
A - 3 to 6 inches: very channery loam
E - 6 to 9 inches: very channery sandy loam
Bs - 9 to 11 inches: very channery sandy loam
Bw1 - 11 to 19 inches: very channery sandy loam
Bw2 - 19 to 30 inches: very channery sandy loam
C - 30 to 54 inches: extremely channery sandy loam
R - 54 to 64 inches: bedrock

Properties and qualities

Slope: 8 to 25 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 40 to 69 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Calvin

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Laidig

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Buchanan

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope, interfluvium, nose slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Rubble land

Percent of map unit: 0 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountain flank
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex

HeF—Hazleton very channery loam, 25 to 60 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2wkcd
Elevation: 380 to 1,650 feet
Mean annual precipitation: 37 to 43 inches
Mean annual air temperature: 50 to 53 degrees F
Frost-free period: 155 to 177 days
Farmland classification: Not prime farmland

Map Unit Composition

Hazleton and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hazleton**Setting**

Landform: Mountain slopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Upper third of mountain flank
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Residuum weathered from sandstone

Typical profile

O_i - 0 to 2 inches: slightly decomposed plant material
O_e - 2 to 3 inches: moderately decomposed plant material
A - 3 to 6 inches: very channery loam

E - 6 to 9 inches: very channery sandy loam
Bs - 9 to 11 inches: very channery sandy loam
Bw1 - 11 to 19 inches: very channery sandy loam
Bw2 - 19 to 30 inches: very channery sandy loam
C - 30 to 60 inches: very channery sandy loam
R - 60 to 70 inches: bedrock

Properties and qualities

Slope: 25 to 60 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 40 to 69 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
 (0.06 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Laidig

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Buchanan

Percent of map unit: 3 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex, linear, concave
Across-slope shape: Convex, concave
Hydric soil rating: No

Calvin

Percent of map unit: 2 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Rubble land

Percent of map unit: 0 percent

Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountain flank
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex

HgF—Hazleton-Rubble land complex, 25 to 60 percent slopes

Map Unit Setting

National map unit symbol: 17bm
Elevation: 800 to 3,000 feet
Mean annual precipitation: 36 to 55 inches
Mean annual air temperature: 45 to 59 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Hazleton and similar soils: 70 percent
Rubble land: 20 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hazleton

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Upper third of mountain flank
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loamy residuum weathered from sandstone

Typical profile

A - 0 to 6 inches: very channery loam
Bw - 6 to 43 inches: very channery loam
C - 43 to 60 inches: extremely channery loam
R - 60 to 80 inches: bedrock

Properties and qualities

Slope: 25 to 60 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 40 to 80 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 6.0 inches)

Interpretive groups*Land capability classification (irrigated):* None specified*Land capability classification (nonirrigated):* 7s*Hydrologic Soil Group:* A*Hydric soil rating:* No**Description of Rubble Land****Setting***Landform:* Mountain slopes*Landform position (two-dimensional):* Backslope*Landform position (three-dimensional):* Upper third of mountainflank*Down-slope shape:* Convex, linear*Across-slope shape:* Convex, linear*Parent material:* Stones and boulder fields of sandstone**Typical profile***C - 0 to 60 inches:* fragmental material**Properties and qualities***Slope:* 25 to 60 percent*Percent of area covered with surface fragments:* 90.0 percent*Depth to restrictive feature:* 40 to 72 inches to lithic bedrock*Natural drainage class:* Excessively drained*Runoff class:* Low*Capacity of the most limiting layer to transmit water (Ksat):* Very high (20.00 in/hr)*Available water storage in profile:* Very low (about 3.0 inches)**Interpretive groups***Land capability classification (irrigated):* None specified*Land capability classification (nonirrigated):* 8s*Hydric soil rating:* No**Minor Components****Buchanan***Percent of map unit:* 5 percent*Landform:* Hillslopes*Landform position (two-dimensional):* Footslope*Landform position (three-dimensional):* Base slope*Down-slope shape:* Linear, concave*Across-slope shape:* Concave, linear*Hydric soil rating:* No**Ho—Holly silt loam****Map Unit Setting***National map unit symbol:* 17bn*Elevation:* 100 to 1,300 feet*Mean annual precipitation:* 30 to 50 inches

Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Holly and similar soils: 94 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holly**Setting**

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium derived from sandstone and shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bg - 7 to 26 inches: silty clay loam
Cg - 26 to 44 inches: silty clay loam
2Cg - 44 to 62 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: Occasional
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components**Brinkerton**

Percent of map unit: 2 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Linden

Percent of map unit: 2 percent

Landform: Flood plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Gibraltar

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

LaB—Laidig gravelly loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 17br
Elevation: 400 to 3,800 feet
Mean annual precipitation: 34 to 60 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 120 to 190 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Laidig and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laidig

Setting

Landform: Mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Colluvium derived from sandstone and siltstone

Typical profile

Ap - 0 to 4 inches: gravelly loam
Bt - 4 to 33 inches: channery loam
Btx - 33 to 65 inches: very channery loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 30 to 50 inches to fragipan
Natural drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: About 28 to 48 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Buchanan

Percent of map unit: 10 percent

Landform: Mountain slopes, valley sides

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Lower third of mountainflank

Down-slope shape: Concave, linear

Across-slope shape: Linear, concave

Hydric soil rating: No

Meckesville

Percent of map unit: 10 percent

Landform: Mountain valleys

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Lower third of mountainflank

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

LbB—Laidig very gravelly loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 17bs

Elevation: 400 to 3,800 feet

Mean annual precipitation: 34 to 55 inches

Mean annual air temperature: 46 to 59 degrees F

Frost-free period: 110 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Laidig, extremely stony, and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laidig, Extremely Stony**Setting***Landform:* Mountain slopes*Landform position (two-dimensional):* Summit*Landform position (three-dimensional):* Mountaintop*Down-slope shape:* Linear*Across-slope shape:* Linear*Parent material:* Brown fine-loamy colluvium derived from sandstone and siltstone**Typical profile***A - 0 to 3 inches:* very gravelly loam*Bt - 3 to 38 inches:* gravelly loam*Bx - 38 to 62 inches:* very channery loam**Properties and qualities***Slope:* 0 to 8 percent*Percent of area covered with surface fragments:* 9.0 percent*Depth to restrictive feature:* 30 to 50 inches to fragipan*Natural drainage class:* Well drained*Runoff class:* Low*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.60 in/hr)*Depth to water table:* About 30 to 48 inches*Frequency of flooding:* None*Frequency of ponding:* None*Available water storage in profile:* Low (about 3.8 inches)**Interpretive groups***Land capability classification (irrigated):* None specified*Land capability classification (nonirrigated):* 7s*Hydrologic Soil Group:* B*Hydric soil rating:* No**Minor Components****Andover***Percent of map unit:* 4 percent*Landform:* Hillslopes*Landform position (two-dimensional):* Footslope*Landform position (three-dimensional):* Base slope*Down-slope shape:* Concave, linear*Across-slope shape:* Linear, concave*Hydric soil rating:* Yes**Buchanan***Percent of map unit:* 4 percent*Landform:* Hillslopes*Landform position (two-dimensional):* Footslope*Landform position (three-dimensional):* Base slope*Down-slope shape:* Linear, concave*Across-slope shape:* Concave, linear*Hydric soil rating:* No**Hazleton***Percent of map unit:* 2 percent*Landform:* Mountain slopes

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Upper third of mountain flank

Down-slope shape: Convex, linear

Across-slope shape: Linear, convex

Hydric soil rating: No

LbD—Laidig very gravelly loam, 8 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 17bt

Elevation: 400 to 3,800 feet

Mean annual precipitation: 34 to 55 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 110 to 180 days

Farmland classification: Not prime farmland

Map Unit Composition

Laidig, extremely stony, and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laidig, Extremely Stony

Setting

Landform: Mountain slopes

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Upper third of mountain flank

Down-slope shape: Linear, convex

Across-slope shape: Convex, linear

Parent material: Brown fine-loamy colluvium derived from sandstone and siltstone

Typical profile

A - 0 to 3 inches: very gravelly loam

Bt - 3 to 38 inches: gravelly loam

Bx - 38 to 62 inches: very channery loam

Properties and qualities

Slope: 8 to 25 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: 30 to 50 inches to fragipan

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: About 30 to 48 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Buchanan

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Hydric soil rating: No

Andover, extremely stony

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Hazleton

Percent of map unit: 2 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex

LbF—Laidig very gravelly loam, 25 to 65 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 17bv
Elevation: 400 to 3,800 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Laidig, extremely stony, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laidig, Extremely Stony**Setting**

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Brown fine-loamy colluvium derived from sandstone and siltstone

Typical profile

A - 0 to 3 inches: very gravelly loam
Bt - 3 to 38 inches: gravelly loam
Bx - 38 to 62 inches: very channery loam

Properties and qualities

Slope: 25 to 65 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 30 to 50 inches to fragipan
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components**Buchanan**

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Hydric soil rating: No

Andover, extremely stony

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

LcD—Laidig very channery loam, 8 to 25 percent slopes, rubbly

Map Unit Setting

National map unit symbol: 17bw

Elevation: 400 to 3,800 feet

Mean annual precipitation: 34 to 40 inches

Mean annual air temperature: 50 to 57 degrees F

Frost-free period: 120 to 175 days

Farmland classification: Not prime farmland

Map Unit Composition

Laidig, rubbly, and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laidig, Rubbly

Setting

Landform: Mountains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Lower third of mountainflank

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Colluvium derived from sandstone and siltstone

Typical profile

Ap - 0 to 3 inches: very channery loam

Bt - 3 to 38 inches: channery sandy clay loam

Btx - 38 to 62 inches: very channery loam

Properties and qualities

Slope: 8 to 25 percent

Percent of area covered with surface fragments: 32.0 percent

Depth to restrictive feature: 30 to 50 inches to fragipan

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: About 30 to 48 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Hydric soil rating: No

LdF—Laidig-Rubble land complex, 25 to 60 percent slopes

Map Unit Setting

National map unit symbol: 17by
Elevation: 400 to 3,800 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Laidig and similar soils: 50 percent
Rubble land: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laidig

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Brown fine-loamy colluvium derived from sandstone and siltstone

Typical profile

A - 0 to 3 inches: very gravelly loam
Bt - 3 to 38 inches: gravelly loam
Bx - 38 to 62 inches: very channery loam

Properties and qualities

Slope: 25 to 60 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 30 to 50 inches to fragipan
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Rubble Land**Setting**

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Upper third of mountain flank
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Stones and boulder fields of sandstone

Typical profile

C - 0 to 60 inches: fragmental material

Properties and qualities

Slope: 25 to 60 percent
Percent of area covered with surface fragments: 90.0 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Natural drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very high (20.00 to 99.90 in/hr)
Available water storage in profile: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components**Andover**

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Buchanan

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Hydric soil rating: No

Mb—Middlebury silt loam

Map Unit Setting

National map unit symbol: 23dvy

Elevation: 800 to 840 feet

Mean annual precipitation: 30 to 40 inches

Mean annual air temperature: 45 to 54 degrees F

Frost-free period: 120 to 187 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Middlebury and similar soils: 95 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Middlebury

Setting

Landform: Flood plains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear, concave

Across-slope shape: Concave, linear

Parent material: Post glacial alluvium derived from sandstone and shale

Typical profile

Ap - 0 to 8 inches: silt loam

Bw - 8 to 26 inches: silt loam

C - 26 to 63 inches: stratified sand to gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 60 to 99 inches to lithic bedrock

Natural drainage class: Moderately well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: About 6 to 24 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: B/D

Hydric soil rating: No

Minor Components**Holly**

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

PhB—Phelps gravelly silt loam, 3 to 8 percent slopes**Map Unit Setting**

National map unit symbol: 23dy0
Elevation: 1,000 to 1,800 feet
Mean annual precipitation: 30 to 48 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Phelps and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Phelps**Setting**

Landform: Terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Silty or loamy over glacial outwash

Typical profile

Ap - 0 to 10 inches: gravelly silt loam
Bt - 10 to 22 inches: gravelly loam
BC - 22 to 30 inches: gravelly clay loam
2C - 30 to 79 inches: stratified very gravelly sand to loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 18 to 24 inches

Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Swartswood

Percent of map unit: 4 percent
Landform: Hills
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Halsey

Percent of map unit: 4 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Wurtsboro

Percent of map unit: 2 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

PQ—Pits, quarry

Map Unit Setting

National map unit symbol: 17c6
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 161 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, quarries: 90 percent
Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Quarries

Setting

Landform: Hills

Down-slope shape: Linear, convex

Across-slope shape: Convex, linear

Parent material: Pits

Minor Components

Waste areas

Percent of map unit: 10 percent

Hydric soil rating: No

Rh—Red Hook silt loam

Map Unit Setting

National map unit symbol: 23dy7

Elevation: 250 to 1,800 feet

Mean annual precipitation: 29 to 45 inches

Mean annual air temperature: 45 to 52 degrees F

Frost-free period: 110 to 198 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Red hook and similar soils: 90 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Red Hook

Setting

Landform: Outwash terraces

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Glaciofluvial deposits

Typical profile

Ap - 0 to 10 inches: silt loam

Bw - 10 to 35 inches: gravelly loam

Cg - 35 to 68 inches: gravelly clay loam

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Somewhat poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: Rare

Frequency of ponding: None

Available water storage in profile: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: B/D

Hydric soil rating: No

Minor Components

Chippewa

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

RU—Rubble land

Map Unit Setting

National map unit symbol: 17cd

Elevation: 400 to 3,800 feet

Mean annual precipitation: 34 to 55 inches

Mean annual air temperature: 45 to 57 degrees F

Frost-free period: 110 to 175 days

Farmland classification: Not prime farmland

Map Unit Composition

Rubble land: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rubble Land

Setting

Landform: Mountain slopes

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Mountainflank

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

Parent material: Stones and boulder fields of sandstone

Typical profile

C - 0 to 60 inches: fragmental material

Properties and qualities

Slope: 0 to 90 percent

Percent of area covered with surface fragments: 90.0 percent

Depth to restrictive feature: 40 to 72 inches to lithic bedrock

Natural drainage class: Excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Very high (20.00 to 99.90 in/hr)

Available water storage in profile: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: No

Minor Components**Hazleton**

Percent of map unit: 10 percent

Landform: Mountain slopes, mountains

Landform position (two-dimensional): Backslope, summit

Landform position (three-dimensional): Mountainflank, mountaintop, upper third of mountainflank

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

Hydric soil rating: No

Clymer

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex, linear

Across-slope shape: Linear, convex

Hydric soil rating: No

Buchanan

Percent of map unit: 5 percent

Landform: Mountain slopes, valley sides

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Lower third of mountainflank

Down-slope shape: Concave, linear

Across-slope shape: Linear, concave

Hydric soil rating: No

Laidig

Percent of map unit: 5 percent

Landform: Mountains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Lower third of mountainflank

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: No

RyB—Ryder-Duffield silt loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 17cl
Elevation: 300 to 1,000 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 140 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Ryder and similar soils: 65 percent
Duffield and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ryder

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, interfluvium
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Residuum weathered from shaly limestone

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 34 inches: channery silt loam
C - 34 to 38 inches: very channery silt loam
R - 38 to 48 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 24 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
 (0.06 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Duffield**Setting***Landform:* Hills*Landform position (two-dimensional):* Summit*Landform position (three-dimensional):* Interfluve*Down-slope shape:* Linear*Across-slope shape:* Linear*Parent material:* Fine-loamy residuum weathered from impure limestone and calcareous siltstone**Typical profile***Ap - 0 to 10 inches:* silt loam*Bt - 10 to 53 inches:* silt loam*C - 53 to 72 inches:* channery silt loam**Properties and qualities***Slope:* 3 to 8 percent*Depth to restrictive feature:* 48 to 99 inches to lithic bedrock*Natural drainage class:* Well drained*Runoff class:* Medium*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 in/hr)*Depth to water table:* More than 80 inches*Frequency of flooding:* None*Frequency of ponding:* None*Available water storage in profile:* High (about 10.4 inches)**Interpretive groups***Land capability classification (irrigated):* None specified*Land capability classification (nonirrigated):* 2e*Hydrologic Soil Group:* B*Hydric soil rating:* No**UhB—Udorthents, shale and sandstone, 0 to 8 percent slopes****Map Unit Setting***National map unit symbol:* 23dys*Elevation:* 200 to 1,500 feet*Mean annual precipitation:* 36 to 55 inches*Mean annual air temperature:* 45 to 57 degrees F*Frost-free period:* 160 to 214 days*Farmland classification:* Not prime farmland**Map Unit Composition***Udorthents, shale and sandstone, and similar soils:* 85 percent*Minor components:* 15 percent*Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Udorthents, Shale And Sandstone

Setting

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Interfluve, side slope, nose slope

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Parent material: Graded areas of shale and siltstone; graded areas of sandstone and shale

Typical profile

Ap - 0 to 6 inches: silt loam

C - 6 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: 20 to 99 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 6.00 in/hr)

Depth to water table: About 60 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Penn

Percent of map unit: 5 percent

Landform: Hillslopes

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Linear, convex

Across-slope shape: Convex, linear

Hydric soil rating: No

Abbottstown

Percent of map unit: 2 percent

Landform: Hillslopes

Landform position (two-dimensional): Footslope, toeslope

Landform position (three-dimensional): Base slope, head slope

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Hydric soil rating: No

Bowmansville

Percent of map unit: 2 percent

Landform: Flood plains

Landform position (two-dimensional): Footslope, toeslope

Landform position (three-dimensional): Head slope

Down-slope shape: Concave, linear

Across-slope shape: Linear, concave

Hydric soil rating: No

Readington

Percent of map unit: 2 percent

Landform: Hillslopes

Landform position (two-dimensional): Footslope, backslope

Landform position (three-dimensional): Base slope, head slope, side slope

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Hydric soil rating: No

Reaville

Percent of map unit: 2 percent

Landform: Hillslopes

Landform position (two-dimensional): Footslope, summit

Landform position (three-dimensional): Interfluvium, base slope

Down-slope shape: Concave, linear

Across-slope shape: Concave, linear

Hydric soil rating: No

Croton

Percent of map unit: 1 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave, linear

Across-slope shape: Linear, concave

Hydric soil rating: Yes

Berks

Percent of map unit: 1 percent

Landform: Ridges, valleys

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Hydric soil rating: No

UdH—Udorthents, shale and sandstone, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: 23dzp

Elevation: 200 to 1,000 feet

Mean annual precipitation: 38 to 48 inches

Mean annual air temperature: 45 to 57 degrees F

Frost-free period: 160 to 210 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, shale and sandstone, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Shale And Sandstone**Setting**

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Interfluvial, side slope, nose slope

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Parent material: Graded areas of sandstone and shale

Typical profile

A - 0 to 6 inches: silt loam

C - 6 to 60 inches: very channery silt loam

Properties and qualities

Slope: 8 to 25 percent

Depth to restrictive feature: 20 to 99 inches to lithic bedrock

Natural drainage class: Moderately well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 6.00 in/hr)

Depth to water table: About 12 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: A/D

Hydric soil rating: No

Minor Components**Croton**

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave, linear

Across-slope shape: Linear, concave

Hydric soil rating: Yes

Penn

Percent of map unit: 4 percent

Landform: Hillslopes

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Nose slope, side slope

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

Hydric soil rating: No

Abbottstown*Percent of map unit:* 3 percent*Landform:* Hillslopes*Landform position (two-dimensional):* Footslope, toeslope*Landform position (three-dimensional):* Base slope, head slope*Down-slope shape:* Concave, linear*Across-slope shape:* Concave, linear*Hydric soil rating:* No**Bowmansville***Percent of map unit:* 3 percent*Landform:* Flood plains*Landform position (two-dimensional):* Footslope, toeslope*Landform position (three-dimensional):* Head slope*Down-slope shape:* Concave, linear*Across-slope shape:* Linear, concave*Hydric soil rating:* No**UkaB—Urban land, 0 to 8 percent slopes****Map Unit Setting***National map unit symbol:* 23f0k*Elevation:* 800 to 1,500 feet*Mean annual precipitation:* 36 to 46 inches*Mean annual air temperature:* 41 to 62 degrees F*Frost-free period:* 130 to 170 days*Farmland classification:* Not prime farmland**Map Unit Composition***Urban land:* 90 percent*Minor components:* 10 percent*Estimates are based on observations, descriptions, and transects of the mapunit.***Description of Urban Land****Setting***Parent material:* Pavement, buildings and other artificially covered areas human transported material**Interpretive groups***Land capability classification (irrigated):* None specified*Land capability classification (nonirrigated):* 8s*Hydric soil rating:* No**Minor Components****Udorthents, unstable fill***Percent of map unit:* 10 percent*Down-slope shape:* Linear*Across-slope shape:* Linear

Hydric soil rating: No

Ukb—Urban land, occasionally flooded

Map Unit Setting

National map unit symbol: 23f25

Mean annual precipitation: 40 to 46 inches

Mean annual air temperature: 48 to 57 degrees F

Frost-free period: 161 to 215 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land, occasionally flooded: 99 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Occasionally Flooded

Setting

Landform: Flood plains

Parent material: Pavement, buildings and other artificially covered areas

Typical profile

C - 0 to 6 inches: variable

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 10 to 98 inches to lithic bedrock

Natural drainage class: Excessively drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)

Frequency of flooding: Occasional

Available water storage in profile: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: No

UIB—Urban land-Berks complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 17d7

Elevation: 300 to 1,500 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 44 to 57 degrees F

Frost-free period: 120 to 214 days

Farmland classification: Not prime farmland

Map Unit Composition*Urban land: 65 percent**Berks and similar soils: 25 percent**Minor components: 10 percent**Estimates are based on observations, descriptions, and transects of the mapunit.***Description of Urban Land****Setting***Landform: Hills, ridges, valleys**Landform position (two-dimensional): Footslope, summit**Down-slope shape: Linear**Across-slope shape: Linear**Parent material: Pavement, buildings and other artificially covered areas***Properties and qualities***Slope: 0 to 8 percent**Depth to restrictive feature: 10 to 100 inches to lithic bedrock**Runoff class: Very high***Interpretive groups***Land capability classification (irrigated): None specified**Land capability classification (nonirrigated): 8s**Hydric soil rating: No***Description of Berks****Setting***Landform: Ridges, valleys**Landform position (two-dimensional): Backslope**Landform position (three-dimensional): Side slope**Down-slope shape: Convex, linear**Across-slope shape: Convex, linear**Parent material: Acid brown residuum weathered from shale and siltstone***Typical profile***Ap - 0 to 10 inches: channery loam**Bw - 10 to 26 inches: very channery silt loam**C - 26 to 33 inches: extremely channery loam**R - 33 to 43 inches: bedrock***Properties and qualities***Slope: 0 to 8 percent**Depth to restrictive feature: 20 to 40 inches to lithic bedrock**Natural drainage class: Well drained**Runoff class: Very low**Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)**Depth to water table: More than 80 inches**Frequency of flooding: None**Frequency of ponding: None**Available water storage in profile: Very low (about 2.6 inches)***Interpretive groups***Land capability classification (irrigated): None specified**Land capability classification (nonirrigated): 2e**Hydrologic Soil Group: B*

Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear, concave

Across-slope shape: Concave, linear

Hydric soil rating: No

Brinkerton

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Head slope

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

UID—Urban land-Berks complex, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: 17d6

Elevation: 300 to 1,500 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 44 to 57 degrees F

Frost-free period: 120 to 214 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 65 percent

Berks and similar soils: 25 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Hills, ridges, valleys

Landform position (two-dimensional): Footslope, summit

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Pavement, buildings and other artificially covered areas

Typical profile

C - 0 to 6 inches: variable

Properties and qualities*Slope:* 8 to 25 percent*Depth to restrictive feature:* 10 to 100 inches to lithic bedrock*Runoff class:* Very high*Available water storage in profile:* Very low (about 0.0 inches)**Interpretive groups***Land capability classification (irrigated):* None specified*Land capability classification (nonirrigated):* 8s*Hydric soil rating:* No**Description of Berks****Setting***Landform:* Ridges, valleys*Landform position (two-dimensional):* Backslope*Landform position (three-dimensional):* Side slope*Down-slope shape:* Convex, linear*Across-slope shape:* Convex, linear*Parent material:* Acid brown residuum weathered from shale and siltstone**Typical profile***Ap - 0 to 10 inches:* channery loam*Bw - 10 to 26 inches:* very channery silt loam*C - 26 to 33 inches:* extremely channery loam*R - 33 to 43 inches:* bedrock**Properties and qualities***Slope:* 8 to 25 percent*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock*Natural drainage class:* Well drained*Runoff class:* Low*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.20 to 6.00 in/hr)*Depth to water table:* More than 80 inches*Frequency of flooding:* None*Frequency of ponding:* None*Available water storage in profile:* Very low (about 2.6 inches)**Interpretive groups***Land capability classification (irrigated):* None specified*Land capability classification (nonirrigated):* 4e*Hydrologic Soil Group:* B*Hydric soil rating:* No**Minor Components****Comly***Percent of map unit:* 5 percent*Landform:* Hills*Landform position (two-dimensional):* Footslope*Landform position (three-dimensional):* Base slope*Down-slope shape:* Linear, concave*Across-slope shape:* Concave, linear*Hydric soil rating:* No

Brinkerton

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

UrB—Urban land-Laidig complex, 0 to 8 percent slopes**Map Unit Setting**

National map unit symbol: 23f26
Elevation: 400 to 3,800 feet
Mean annual precipitation: 34 to 60 inches
Mean annual air temperature: 44 to 59 degrees F
Frost-free period: 120 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 65 percent
Laidig and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land**Setting**

Landform: Valleys, hills, ridges
Landform position (two-dimensional): Summit, footslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pavement, buildings and other artificially covered areas

Typical profile

C - 0 to 6 inches: variable

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 10 to 100 inches to lithic bedrock
Runoff class: Very high
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Laidig**Setting**

Landform: Hills

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve

Down-slope shape: Linear, convex

Across-slope shape: Convex, linear

Parent material: Brown fine-loamy colluvium derived from sandstone and siltstone

Typical profile

Ap - 0 to 3 inches: very gravelly loam

Bt - 3 to 38 inches: gravelly loam

Bx - 38 to 62 inches: very channery loam

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: 30 to 50 inches to fragipan

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: About 30 to 48 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components**Buchanan**

Percent of map unit: 5 percent

Landform: Hillslopes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear, concave

Across-slope shape: Concave, linear

Hydric soil rating: No

Andover

Percent of map unit: 5 percent

Landform: Hillslopes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave, linear

Across-slope shape: Linear, concave

Hydric soil rating: Yes

UusB—Urban land-Udorthents, shale and sandstone complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 227xb

Elevation: 250 to 950 feet

Mean annual precipitation: 38 to 48 inches

Mean annual air temperature: 48 to 57 degrees F

Frost-free period: 161 to 215 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 80 percent

Udorthents, shale and sandstone, and similar soils: 15 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Hills

Parent material: Pavement, buildings and other artificially covered areas

Typical profile

C - 0 to 6 inches: variable

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: 10 to 99 inches to lithic bedrock

Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: No

Description of Udorthents, Shale And Sandstone

Setting

Landform: Ridges

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Side slope, nose slope, interfluvium

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

Parent material: Graded areas of sandstone and shale

Typical profile

A - 0 to 6 inches: very channery loam

C - 6 to 60 inches: very channery silt loam

Properties and qualities*Slope:* 0 to 8 percent*Depth to restrictive feature:* 20 to 99 inches to lithic bedrock*Natural drainage class:* Well drained*Runoff class:* Very low*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high
(0.06 to 6.00 in/hr)*Depth to water table:* More than 80 inches*Frequency of flooding:* None*Frequency of ponding:* None*Available water storage in profile:* Very low (about 2.9 inches)**Interpretive groups***Land capability classification (irrigated):* None specified*Land capability classification (nonirrigated):* 7s*Hydrologic Soil Group:* A*Hydric soil rating:* No**Minor Components****Penn***Percent of map unit:* 5 percent*Landform:* Hillslopes*Landform position (two-dimensional):* Shoulder, backslope*Landform position (three-dimensional):* Side slope, nose slope*Down-slope shape:* Linear, convex*Across-slope shape:* Convex, linear*Hydric soil rating:* No**W—Water****Map Unit Setting***National map unit symbol:* 17ds*Mean annual precipitation:* 36 to 50 inches*Mean annual air temperature:* 46 to 59 degrees F*Frost-free period:* 120 to 214 days*Farmland classification:* Not prime farmland**Map Unit Composition***Water:* 100 percent*Estimates are based on observations, descriptions, and transects of the mapunit.***Description of Water****Setting***Parent material:* Rivers streams ponds**Properties and qualities***Runoff class:* Negligible

Frequency of ponding: Frequent

WkB—Weikert-Berks complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2v4w4

Elevation: 230 to 980 feet

Mean annual precipitation: 37 to 50 inches

Mean annual air temperature: 47 to 56 degrees F

Frost-free period: 148 to 192 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Weikert and similar soils: 50 percent

Berks and similar soils: 40 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert

Setting

Landform: Ridges

Landform position (two-dimensional): Shoulder, backslope, summit

Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Convex, linear

Parent material: Gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 8 inches: channery silt loam

Bw - 8 to 15 inches: very channery silt loam

C - 15 to 18 inches: extremely channery silt loam

R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.28 to 19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)

Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: D

Other vegetative classification: Droughty Shales (SD2)

Hydric soil rating: No

Description of Berks

Setting

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Convex

Across-slope shape: Convex, linear

Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery loam

Bw1 - 7 to 14 inches: very channery loam

Bw2 - 14 to 21 inches: very channery silt loam

C - 21 to 30 inches: extremely channery loam

R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 1 percent

Gypsum, maximum in profile: 1 percent

Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 1.0

Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: B

Other vegetative classification: Very Rocky, Acid Soils (RA2), Very Rocky, Acid Soils (RA3)

Hydric soil rating: No

Minor Components

Brinkerton

Percent of map unit: 5 percent

Landform: Ridges

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Side slope, head slope

Down-slope shape: Concave, linear

Across-slope shape: Concave

Hydric soil rating: Yes

Comly*Percent of map unit: 5 percent**Landform: Ridges**Landform position (two-dimensional): Shoulder, backslope**Landform position (three-dimensional): Side slope, head slope**Down-slope shape: Concave, linear**Across-slope shape: Concave**Hydric soil rating: No***WkC—Weikert-Berks complex, 8 to 15 percent slopes****Map Unit Setting***National map unit symbol: 23f2j**Elevation: 500 to 1,600 feet**Mean annual precipitation: 35 to 50 inches**Mean annual air temperature: 46 to 57 degrees F**Frost-free period: 120 to 214 days**Farmland classification: Not prime farmland***Map Unit Composition***Weikert and similar soils: 70 percent**Berks and similar soils: 20 percent**Estimates are based on observations, descriptions, and transects of the mapunit.***Description of Weikert****Setting***Landform: Hills**Landform position (two-dimensional): Backslope, shoulder**Landform position (three-dimensional): Side slope, crest**Down-slope shape: Convex**Across-slope shape: Convex**Parent material: Residuum weathered from shale and siltstone***Typical profile***Ap - 0 to 8 inches: channery silt loam**Bw - 8 to 15 inches: very channery silt loam**R - 15 to 25 inches: bedrock***Properties and qualities***Slope: 8 to 15 percent**Depth to restrictive feature: 10 to 20 inches to lithic bedrock**Natural drainage class: Somewhat excessively drained**Runoff class: Low**Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)**Depth to water table: More than 80 inches**Frequency of flooding: None**Frequency of ponding: None*

Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: D

Hydric soil rating: No

Description of Berks

Setting

Landform: Ridges, valleys

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Parent material: Acid brown residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: channery loam

Bt - 10 to 26 inches: very channery loam

C - 26 to 33 inches: very channery loam

R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Hydric soil rating: No

WkD—Weikert-Berks complex, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2v4w3

Elevation: 210 to 1,090 feet

Mean annual precipitation: 37 to 50 inches

Mean annual air temperature: 47 to 56 degrees F

Frost-free period: 148 to 192 days

Farmland classification: Not prime farmland

Map Unit Composition

Weikert and similar soils: 50 percent

Berks and similar soils: 40 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert**Setting**

Landform: Ridges

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery silt loam

Bw - 7 to 12 inches: very channery silt loam

C - 12 to 15 inches: extremely channery silt loam

R - 15 to 25 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Natural drainage class: Somewhat excessively drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)

Available water storage in profile: Very low (about 1.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: D

Other vegetative classification: Droughty Shales (SD3)

Hydric soil rating: No

Description of Berks**Setting**

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery loam

Bw1 - 7 to 14 inches: very channery loam
Bw2 - 14 to 21 inches: very channery silt loam
C - 21 to 30 inches: extremely channery loam
R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.16 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Very Rocky, Acid Soils (RA2), Very Rocky, Acid Soils (RA3)
Hydric soil rating: No

Minor Components

Brinkerton

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Comly

Percent of map unit: 5 percent
Landform: Ridges on hills
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Hydric soil rating: No

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

EXISTING SEDIMENT LOADING CALCULATIONS

MOORE TOWNSHIP - EXISTING SEDIMENT LOADING																												
STORM SEWER SHED NUMBER	DEVELOPED, OPEN SPACE (SQ. METERS)	DEVELOPED, OPEN SPACE (ACRES)	DEVELOPED, OPEN SPACE (IMPERVIOUS SURFACES) (19% OF TOTAL AREA) (A)	DEVELOPED, OPEN SPACE (PERVIOUS SURFACES) (81% OF TOTAL AREA) (B)	DEVELOPED, OPEN SPACE (IMPERVIOUS SURFACE - SEDIMENT LOADING)(A*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, OPEN SPACE (PERVIOUS SURFACE - SEDIMENT LOADING) (B*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, LOW INTENSITY (SQ. METERS)	DEVELOPED, LOW INTENSITY (ACRES)	DEVELOPED, LOW INTENSITY (IMPERVIOUS SURFACES) (49% OF TOTAL AREA) (C)	DEVELOPED, LOW INTENSITY (PERVIOUS SURFACES) (51% OF TOTAL AREA) (D)	DEVELOPED, LOW INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (C*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, LOW INTENSITY (PERVIOUS SURFACE - SEDIMENT LOADING) (D*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, MEDIUM INTENSITY (SQ. METERS)	DEVELOPED, MEDIUM INTENSITY (ACRES)	DEVELOPED, MEDIUM INTENSITY (IMPERVIOUS SURFACES) (79% OF TOTAL AREA) (E)	DEVELOPED, MEDIUM INTENSITY (PERVIOUS SURFACES) (21% OF TOTAL AREA) (F)	DEVELOPED, MEDIUM INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (E*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, MEDIUM INTENSITY (PERVIOUS SURFACE - SEDIMENT LOADING) (F*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, HIGH INTENSITY (SQ. METERS)	DEVELOPED, HIGH INTENSITY (ACRES)	DEVELOPED, HIGH INTENSITY (IMPERVIOUS SURFACES) (100% OF TOTAL AREA) (G)	DEVELOPED, HIGH INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (G*1893 LBS/ACRE/YR) (LBS/YR)	UNDEVELOPED LANDS (SQ. METERS)	UNDEVELOPED LANDS (ACRES) (H)	UNDEVELOPED LANDS - SEDIMENT LOADING (H*234.6 LBS/ACRE/YR) (LBS/YR)	TOTAL SEDIMENT LOADING (LBS/YR)	TOTAL STORM SEWERSHED AREA (ACRES)	
M001	54725.85	13.52	2.57	10.95	4725.07	2902.27	7177.16	1.77	0.87	0.90	1598.13	239.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	279012.11	68.95	16174.52	25639.65	84.24	
M002	25120.05	6.21	1.18	5.03	2168.88	1332.19	897.14	0.22	0.11	0.11	199.76	29.96	897.14	0.22	0.18	0.05	322.07	12.34	0.00	0.00	0.00	0.00	72668.70	17.96	4212.65	8277.85	24.61	
M003	3588.58	0.89	0.17	0.72	309.84	190.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	148028.76	36.58	8581.33	9081.48	37.47	
M004	109451.50	27.05	5.14	21.91	9450.12	5804.54	17942.87	4.43	2.17	2.26	3995.31	599.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	218903.00	54.09	12689.96	32539.06	85.57	
M005	72668.59	17.96	3.41	14.54	6274.26	3853.83	28708.58	7.09	3.48	3.62	6392.49	958.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	142645.74	35.25	8269.27	25748.46	60.30	
M006	45754.39	11.31	2.15	9.16	3950.47	2426.49	2691.43	0.67	0.33	0.34	599.30	89.87	897.14	0.22	0.18	0.05	322.07	12.34	0.00	0.00	0.00	0.00	41268.67	10.20	2392.37	9792.90	22.39	
M007	56520.02	13.97	2.65	11.31	4879.98	2997.42	897.14	0.22	0.11	0.11	199.76	29.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8107.13	14.19
M008	20634.28	5.10	0.97	4.13	1781.58	1094.30	6280.00	1.55	0.76	0.79	1398.36	209.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	127394.26	31.48	7385.13	11869.06	38.13	
M009	1794.28	0.44	0.08	0.36	154.92	95.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45754.24	11.31	2652.40	2902.48	11.75	
M010	3588.57	0.89	0.17	0.72	309.84	190.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	114834.16	28.38	6657.02	7157.17	29.26	
M011	8074.27	2.00	0.38	1.62	697.14	428.20	3588.57	0.89	0.43	0.45	799.06	119.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	64594.18	15.96	3744.57	5788.80	18.84	
EBM012	51137.27	12.64	2.40	10.24	4415.23	2711.96	1794.29	0.44	0.22	0.23	399.53	59.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7586.64	13.08
EBM013	43960.10	10.86	2.06	8.80	3795.55	2331.33	4485.72	1.11	0.54	0.57	998.83	149.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9868.59	2.44	572.09	7847.58	14.41	
EBM014	78948.73	19.51	3.71	15.80	6816.49	4186.88	7177.16	1.77	0.87	0.90	1598.13	239.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	167766.05	41.46	9725.51	22566.67	62.74	
EBM015	86125.82	21.28	4.04	17.24	7436.17	4567.51	17045.74	4.21	2.06	2.15	3795.54	569.18	9868.58	2.44	1.93	0.51	3542.78	135.69	2691.43	0.67	0.67	1223.05	57417.22	14.19	3328.52	24598.43	42.79	
EBM016	62800.04	15.52	2.95	12.57	5422.20	3330.47	35885.74	8.87	4.35	4.52	7990.61	1198.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	454851.17	112.40	26368.04	44309.59	136.78	
EBM017	26017.15	6.43	1.22	5.21	2246.34	1379.77	5382.86	1.33	0.65	0.68	1198.59	179.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	148925.75	36.80	8633.33	13637.77	44.56	
EBM018	95097.13	23.50	4.46	19.03	8210.76	5043.28	70874.28	17.51	8.58	8.93	15781.45	2366.57	897.14	0.22	0.18	0.05	322.07	12.34	0.00	0.00	0.00	0.00	276319.97	68.28	16018.46	47754.93	109.51	
EBM019	122908.47	30.37	5.77	24.60	10612.01	6518.20	58314.24	14.41	7.06	7.35	12984.73	1947.18	5382.85	1.33	1.05	0.28	1932.42	74.01	0.00	0.00	0.00	0.00	102274.20	25.27	5928.91	39997.45	71.38	
EBM020	124702.77	30.81	5.85	24.96	10766.93	6613.36	33194.26	8.20	4.02	4.18	7391.31	1108.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	897.14	0.22	52.01	25931.99	39.24	
EBM021	10765.70	2.66	0.51	2.15	929.52	570.94	14354.27	3.55	1.74	1.81	3196.24	479.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	897.14	0.22	52.01	5228.01	6.43	
H022	25120.04	6.21	1.18	5.03	2168.88	1332.19	897.14	0.22	0.11	0.11	199.76	29.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	38577.20	9.53	2236.35	5967.14	15.96	
H023	79845.83	19.73	3.75	15.98	6893.95	4234.46	8074.30	2.00	0.98	1.02	1797.89	269.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	345400.49	85.35	20023.10	33219.01	107.08	
H024	8074.30	2.00	0.38	1.62	697.14	428.20	897.14	0.22	0.11	0.11	199.76	29.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37680.06	9.31	2184.34	3539.41	11.53	
H025	80743.06	19.95	3.79	16.16	6971.42	4282.04	16148.61	3.99	1.96	2.04	3595.78	539.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	153411.82	37.91	8893.39	24281.85	61.85	
H026	51137.26	12.64	2.40	10.24	4415.23	2711.96	10765.74	2.66	1.30	1.36	2397.19	359.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	780551.61	192.88	45249.12	55132.97	208.17	
H027	28708.61	7.09	1.35	5.75	2478.72	1522.50	5382.87	1.33	0.65	0.68	1198.59	179.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	87920.12	21.73	5096.79	10476.35	30.15	
H028	214417.43	52.98	10.07	42.92	18512.96	11371.19	19737.17	4.88	2.39	2.49	4394.84	659.05	897.14	0.22	0.18	0.05	322.07	12.34	0.00	0.00	0.00	0.00	252994.63	62.52	14666.27	49938.72	120.60	
H029	9868.58	2.44	0.46	1.98	852.06	523.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	203651.53	50.32	11805.82	13181.24	52.76	
H030	44857.08	11.08	2.11	8.98	3872.99	2378.90	41268.52	10.20	5.00	5.20	9189.19	1378.00	17045.69	4.21	3.33	0.88	6119.33	234.37	0.00	0.00	0.00	0.00	70874.20	17.51	4108.63	27281.41	43.01	
H031	70874.16	17.51	3.33	14.19	6119.33	3758.67	16148.54	3.99	1.96	2.04	3595.77	539.22	1794.28	0.44	0.35	0.09	644.14	24.67	0.00	0.00	0.00	0.00	497016.24	122.81	28812.37	43494.16	144.76	
H032	42165.56	10.42	1.98	8.44	3640.61	2236.16	6279.98	1.55	0.76	0.79	1398.35	209.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	663883.30	164.05	38485.77	45970.59	176.02	
H033	1794.28	0.44	0.08	0.36	154.92	95.16	2691.42	0.67	0.33	0.34	599.29	89.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	53828.35	13.30	3120.47	4059.71	14.41	
H034	10765.67	2.66	0.51	2.15	929.52	570.94	897.14	0.22	0.11	0.11	199.76	29.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	203650.58	50.32	11805.76	13535.94	53.20	
H035	202753.87	50.10	9.52	40.58	17505.92	10752.64	24222.81	5.99	2.93	3.05	5393.65	808.83	3588.56	0.89	0.70	0.19	1288.28	49.34	0.00	0.00	0.00	0.00	300542.24	74.27	17422.64	53221.29	131.24	
H036	124702.51	30.81	5.85	24.96	10766.91	6613.34	11662.82	2.88	1.41	1.47	2596.94	389.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	139953.89	34.58	8113.22	28479.85	68.28	
H037	26914.19	6.65	1.26	5.39	2323.79	1427.34	4485.70	1.11	0.54	0.57	998.82	149.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	374107.27	92.44	21687.26	26586.99	100.20	
CP001	69977.26	17.29	3.29	14.01	6041.89	3711.10	15251.45	3.77	1.85	1.92	3396.01	509.26	897.14	0.22	0.18	0.05	322.07	12.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13992.67	21.28
CP002	6280.01	1.55	0.29	1.26	542.22	333.05	3588.58	0.89	0.43	0.45	799.06	119.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14354.30	3.55	832.13	2626.29	5.99	
CP003	37680.02	9.31	1.77	7.54	3253.3																							



Model My Watershed* About Help Projects MSchallock

Outfall# M002-Moore T... Details Analyze Monitor Model Share New Project

Selected Area 101,689 m² Download

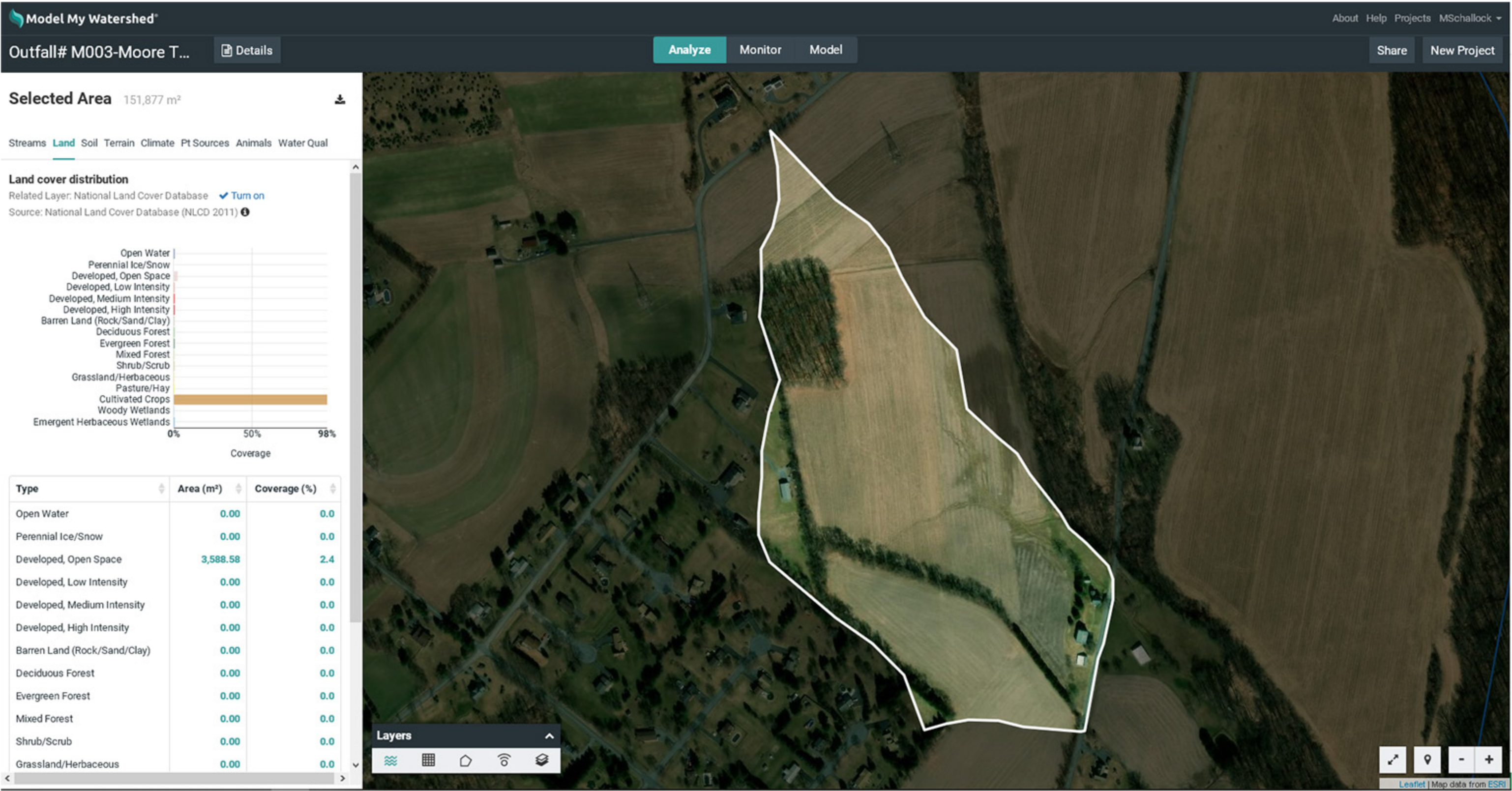
Streams **Land** Soil Terrain Climate Pt Sources Animals Water Qual

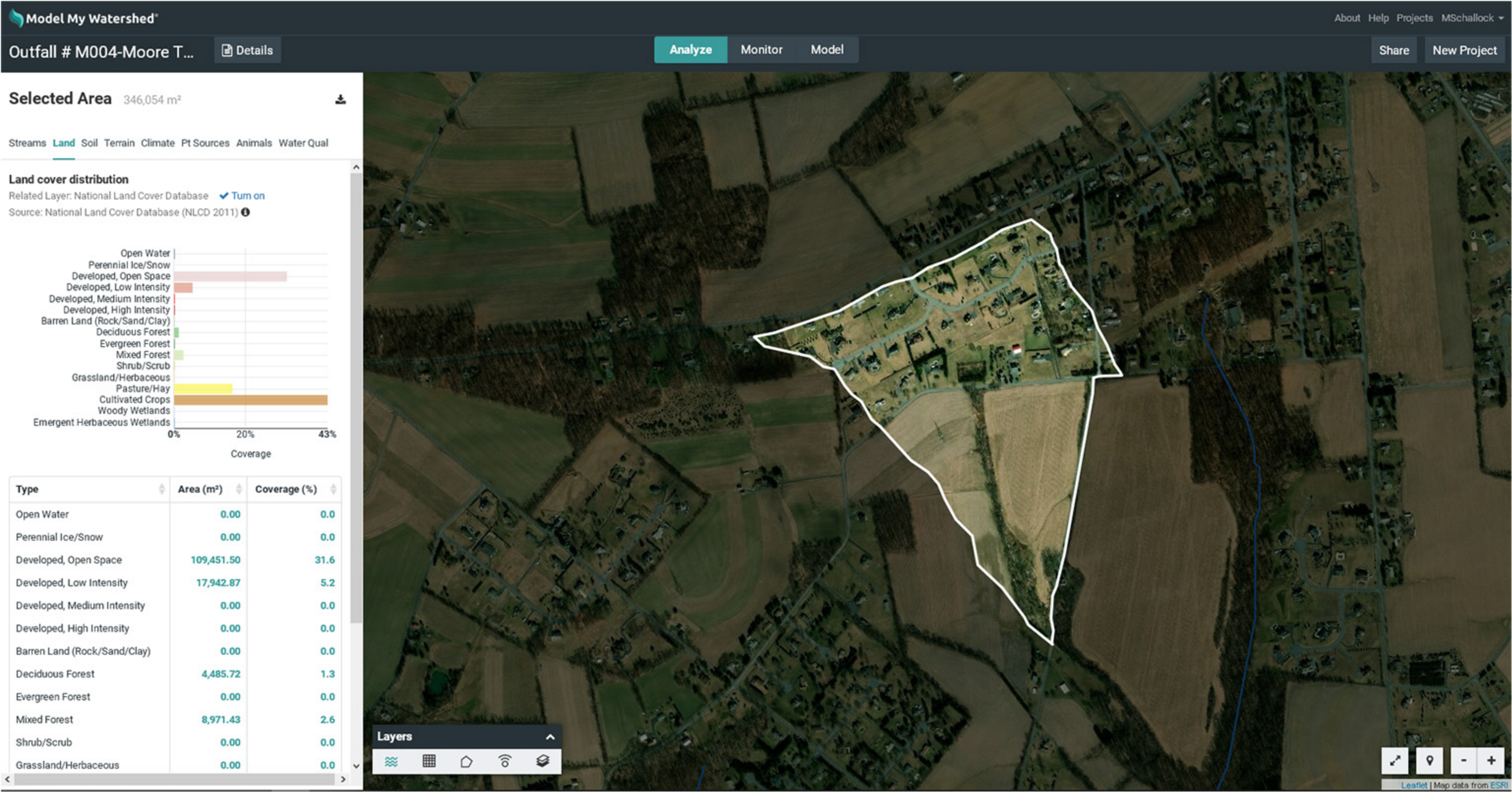
Land cover distribution
Related Layer: National Land Cover Database Turn on
Source: National Land Cover Database (NLCD 2011) ⓘ

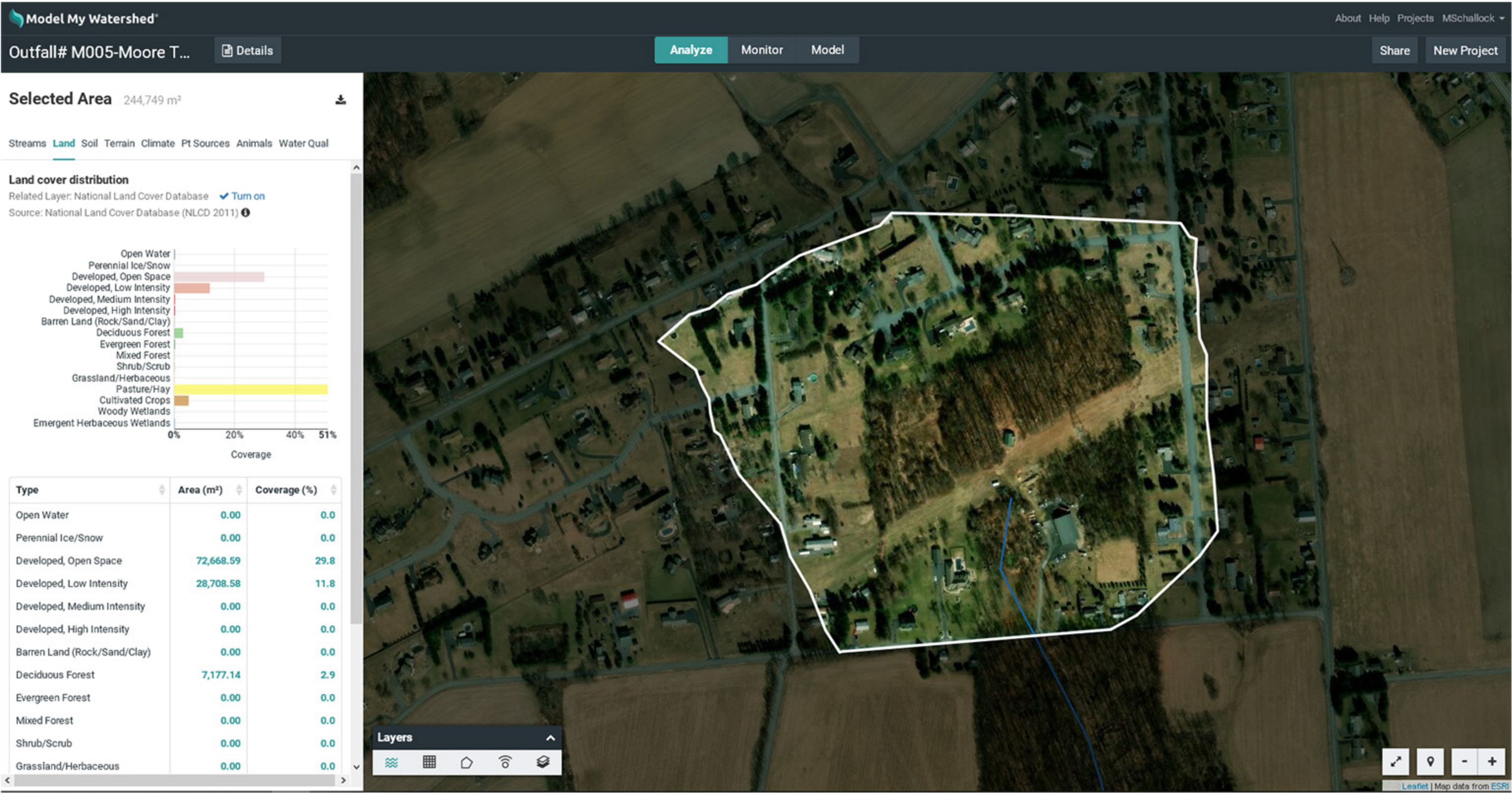
Type	Area (m ²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	25,120.05	25.2
Developed, Low Intensity	897.14	0.9
Developed, Medium Intensity	897.14	0.9
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0
Shrub/Scrub	0.00	0.0
Grassland/Herbaceous	0.00	0.0
Pasture/Hay	0.00	0.0
Cultivated Crops	73,671.81	73.0
Woody Wetlands	0.00	0.0
Emergent Herbaceous Wetlands	0.00	0.0

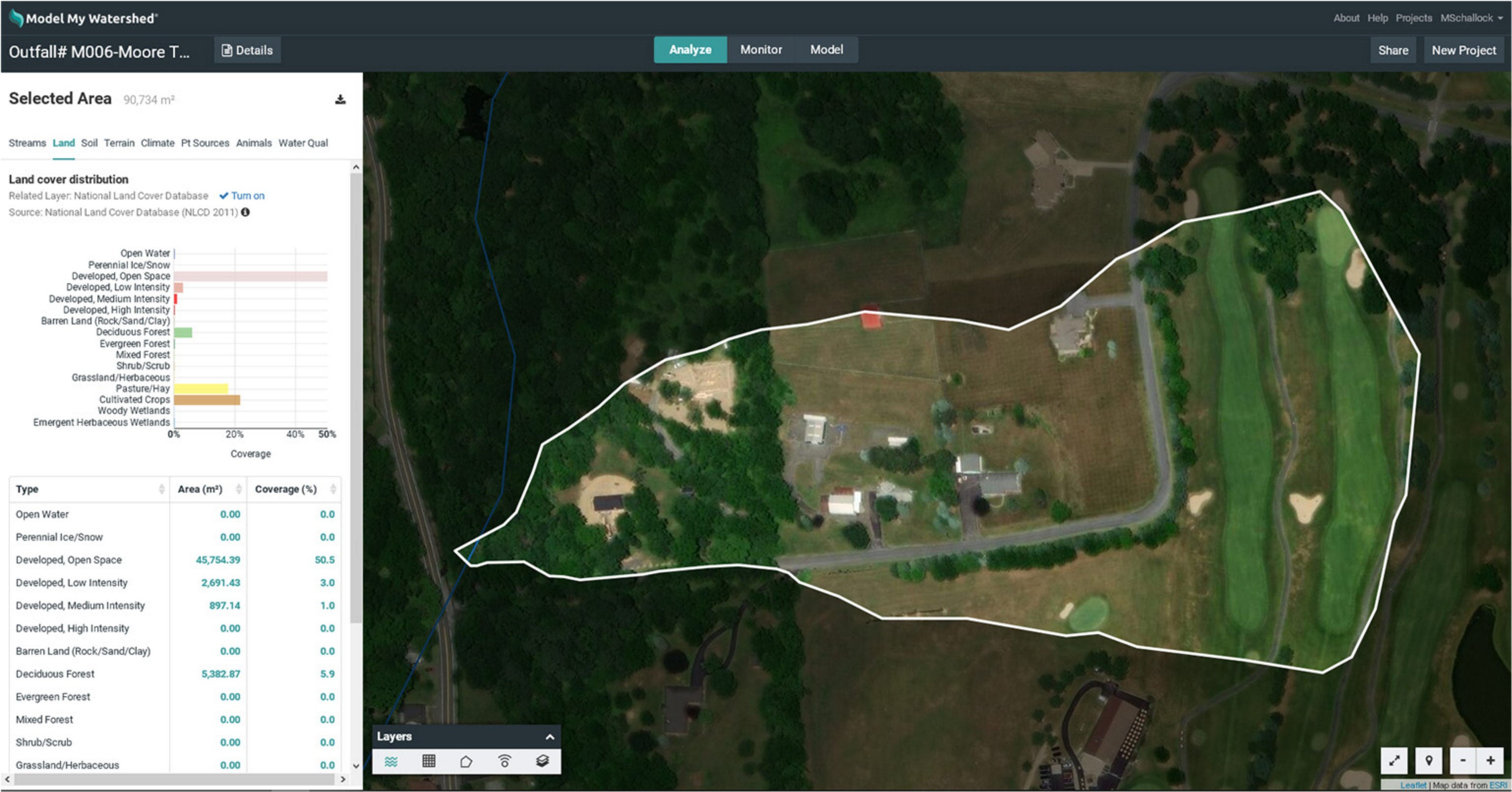
Layers Map Grid Home Wi-Fi Layers

Leaflet | Map data from ESRI









Model My Watershed* About Help Projects MSchallock

Outfall# M007-Moore T... Details Analyze Monitor Model Share New Project

Selected Area 57,905 m² Download

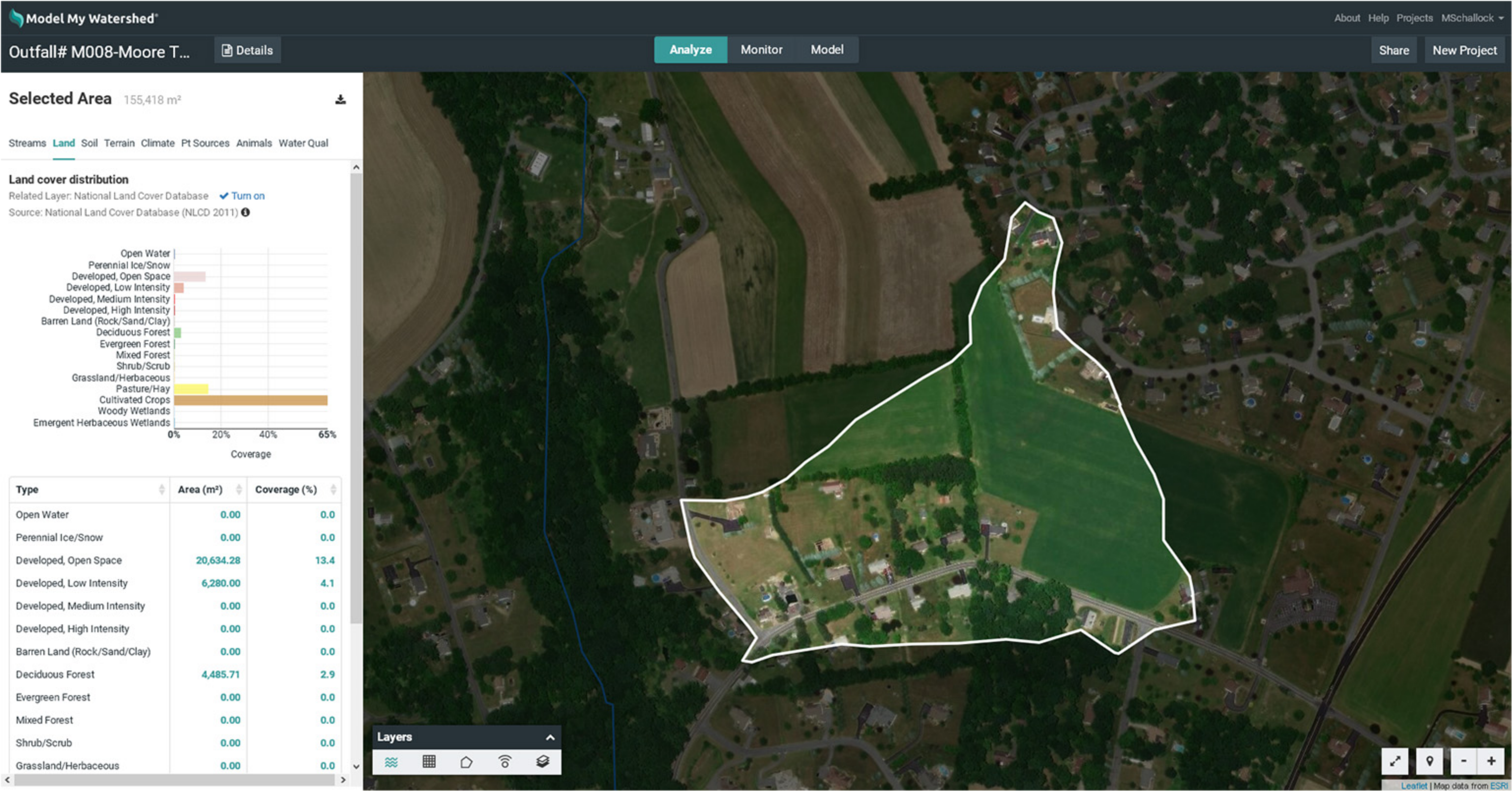
Streams **Land** Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution
Related Layer: National Land Cover Database Turn on
Source: National Land Cover Database (NLCD 2011) ⓘ

Type	Area (m ²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	56,520.02	98.4
Developed, Low Intensity	897.14	1.6
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0
Shrub/Scrub	0.00	0.0
Grassland/Herbaceous	0.00	0.0

Layers Map Grid Home Layers Full Screen

Leaflet | Map data from ESRI



Model My Watershed About Help Projects MSchallock

Outfall# M009-Moore T... Details Analyze Monitor Model Share New Project

Selected Area 48,835 m² Download

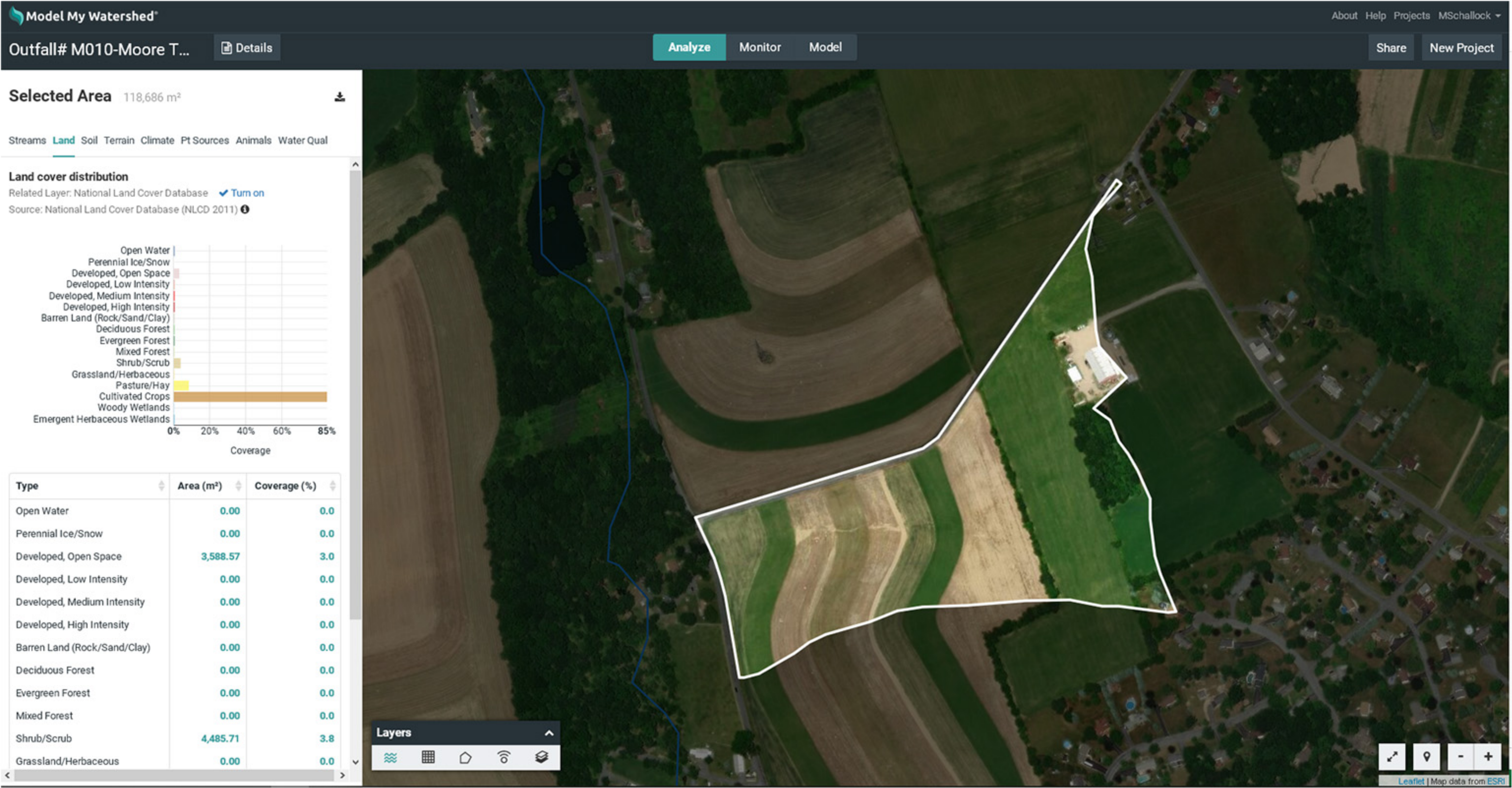
Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution
Related Layer: National Land Cover Database Turn on
Source: National Land Cover Database (NLCD 2011) Info

Type	Area (m ²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	1,794.28	3.8
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0
Shrub/Scrub	0.00	0.0
Grassland/Herbaceous	0.00	0.0
Pasture/Hay	0.00	0.0
Cultivated Crops	46,040.72	94.2
Woody Wetlands	0.00	0.0
Emergent Herbaceous Wetlands	0.00	0.0

Layers Map Grid Home Layers Full Screen

Leaflet | Map data from ESRI



Model My Watershed* About Help Projects MSchallock

Outfall# M011-Moore T... Details Analyze Monitor Model Share New Project

Selected Area 77,579 m² Download

Streams **Land** Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

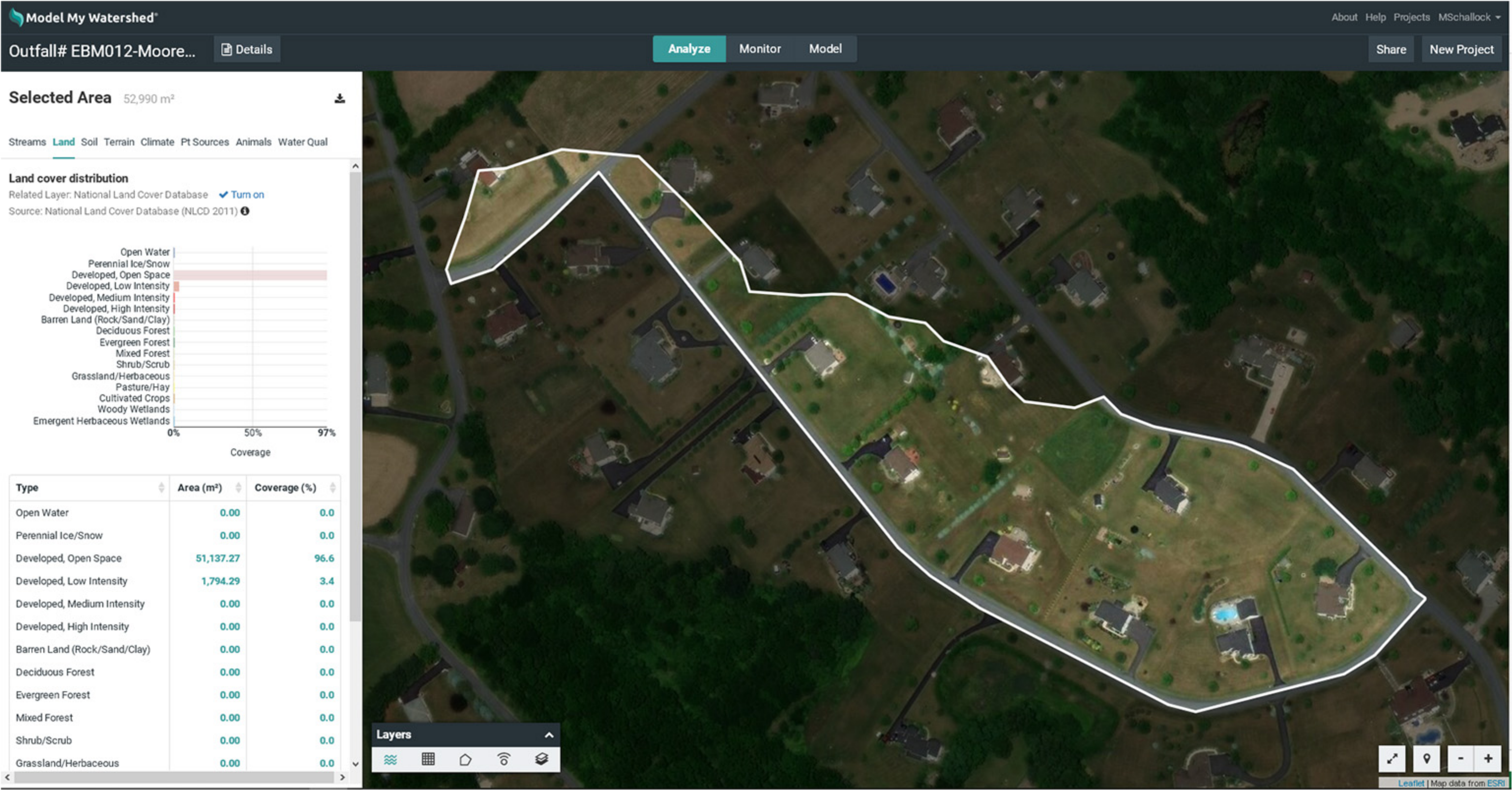
Related Layer: National Land Cover Database Turn on

Source: National Land Cover Database (NLCD 2011) ⓘ

Type	Area (m ²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	8,074.27	10.6
Developed, Low Intensity	3,588.57	4.7
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0
Shrub/Scrub	1,794.28	2.4
Grassland/Herbaceous	0.00	0.0

Layers Map Grid Home Layers Full Screen

Leaflet | Map data from ESRI



Model My Watershed About Help Projects MSchallock

Outfall# EBM013-Moore... Details Analyze Monitor Model Share New Project

Selected Area 56,859 m² Download

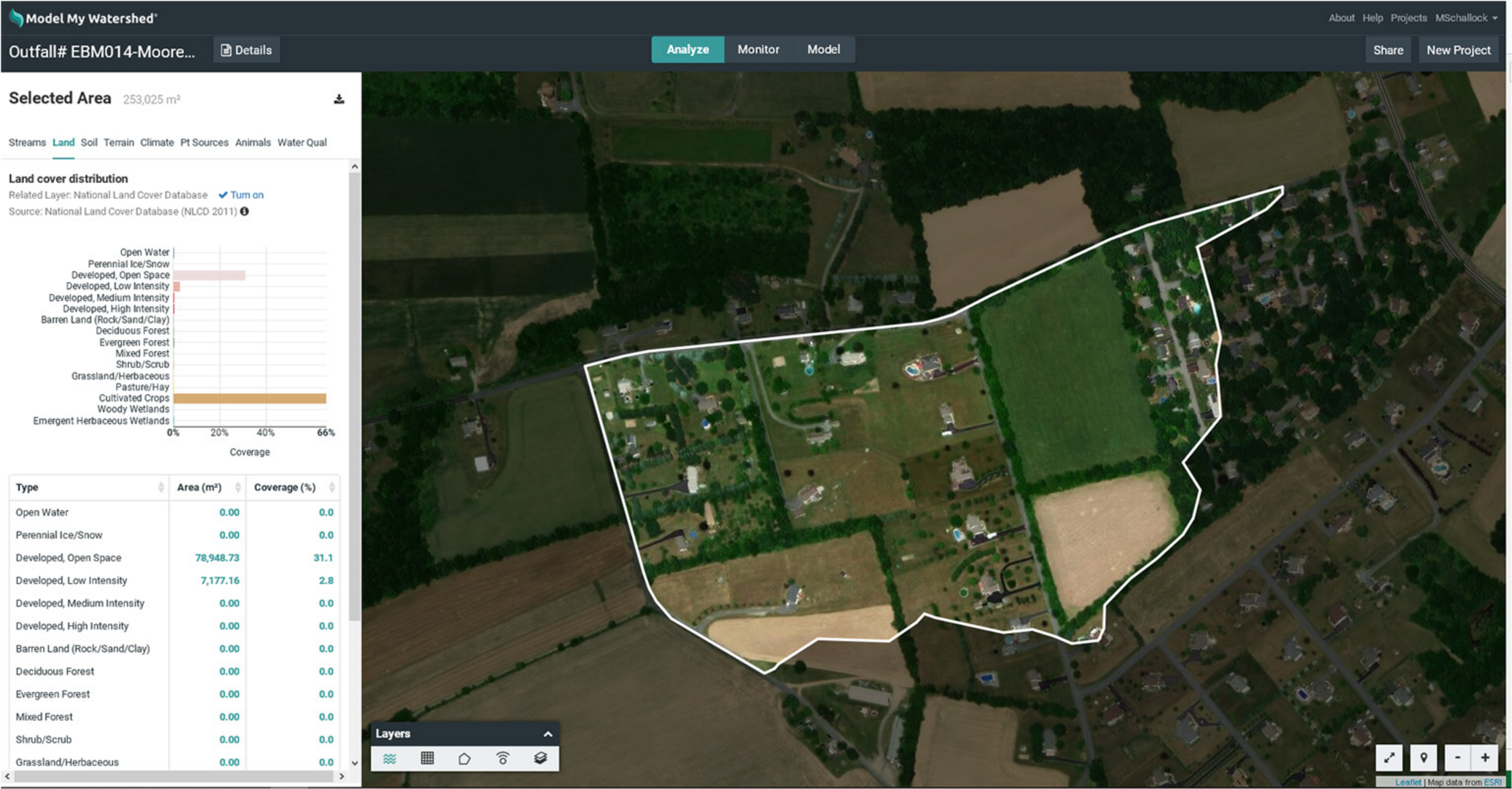
Streams **Land** Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution
Related Layer: National Land Cover Database Turn on
Source: National Land Cover Database (NLCD 2011) Info

Type	Area (m ²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	43,960.10	75.4
Developed, Low Intensity	4,485.72	7.7
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0
Shrub/Scrub	0.00	0.0
Grassland/Herbaceous	0.00	0.0

Layers Map Style Home Full Screen Layers

Leaflet | Map data from ESRI



Model My Watershed* About Help Projects MSchallock

Outfall# EBM015-Moore... Details Analyze Monitor Model Share New Project

Selected Area 175,117 m² Download

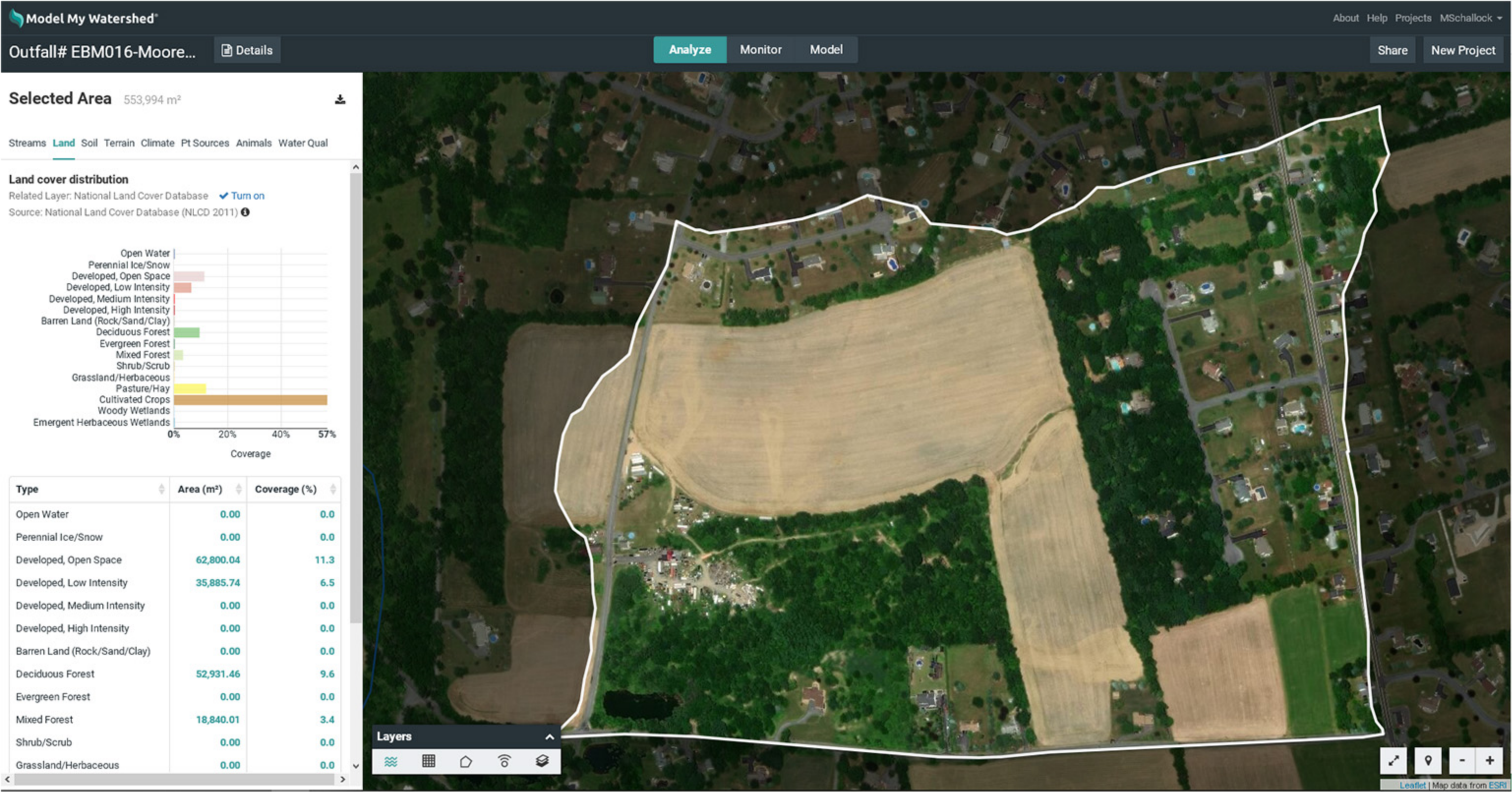
Streams **Land** Soil Terrain Climate Pt Sources Animals Water Qual

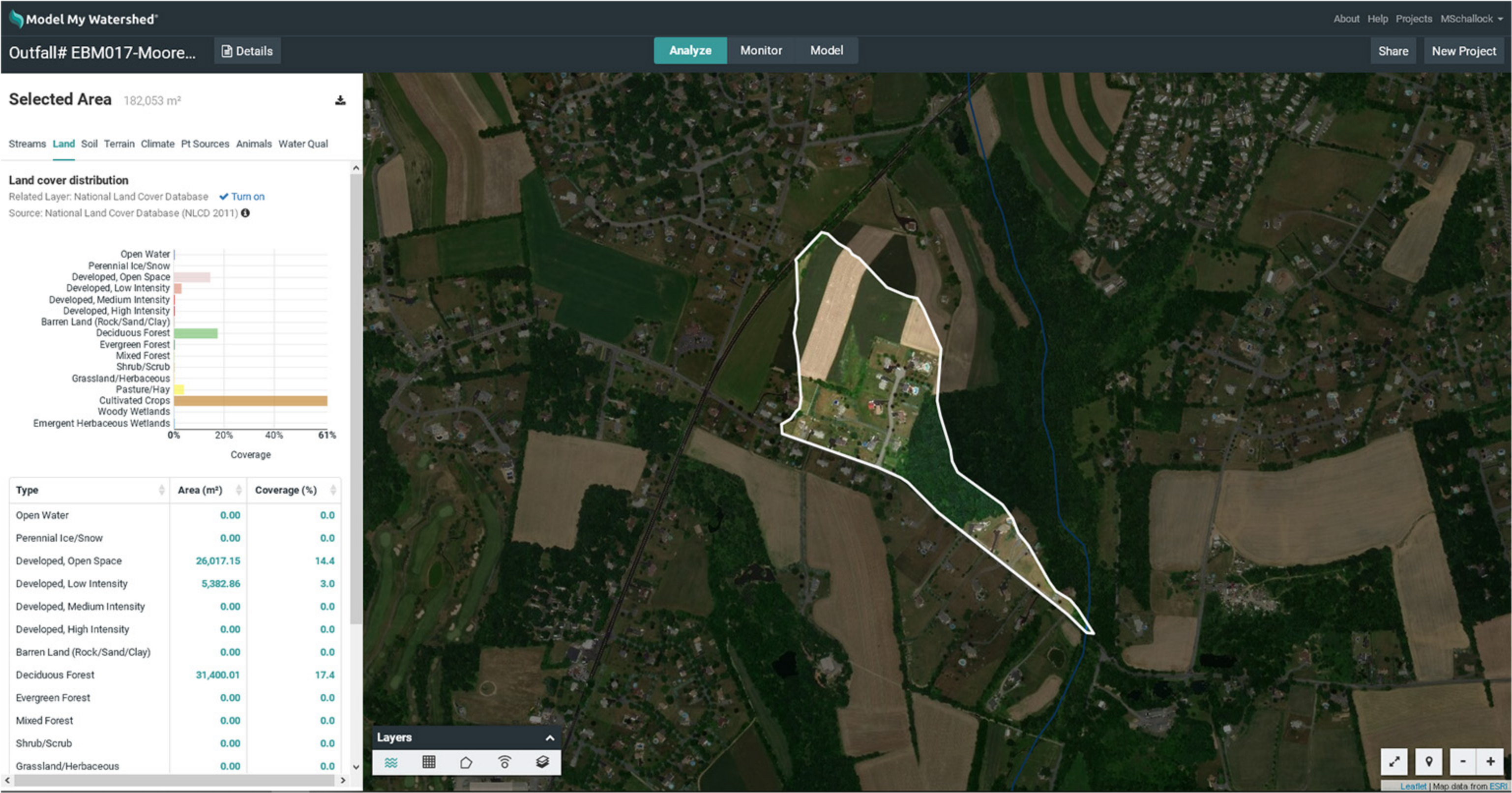
Land cover distribution
Related Layer: National Land Cover Database Turn on
Source: National Land Cover Database (NLCD 2011) ⓘ

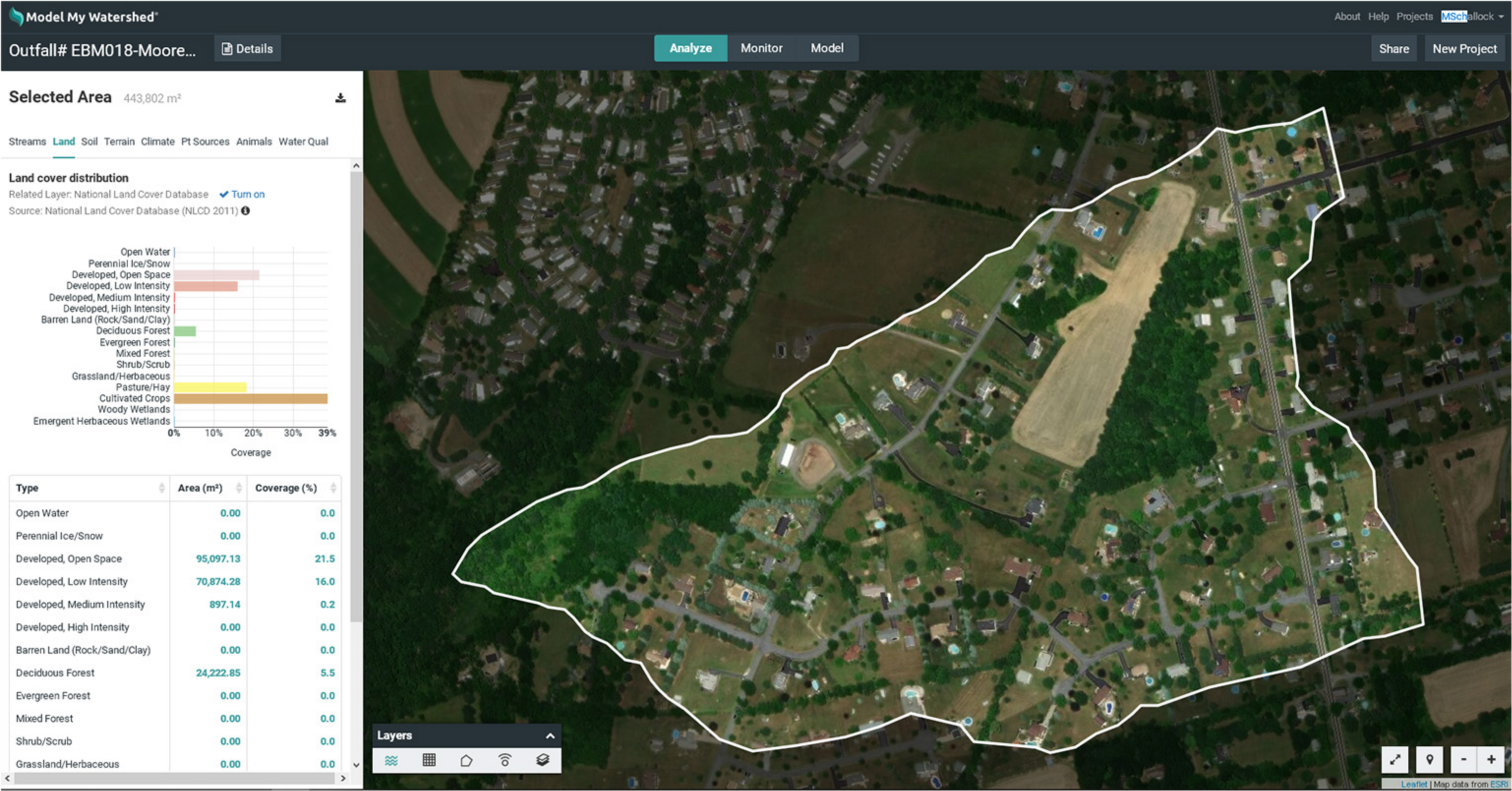
Type	Area (m ²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	86,125.82	49.7
Developed, Low Intensity	17,045.74	9.8
Developed, Medium Intensity	9,868.58	5.7
Developed, High Intensity	2,691.43	1.6
Barren Land (Rock/Sand/Clay)	12,560.02	7.3
Deciduous Forest	1,794.29	1.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0
Shrub/Scrub	0.00	0.0
Grassland/Herbaceous	0.00	0.0
Pasture/Hay	0.00	0.0
Cultivated Crops	0.00	0.0
Woody Wetlands	0.00	0.0
Emergent Herbaceous Wetlands	0.00	0.0

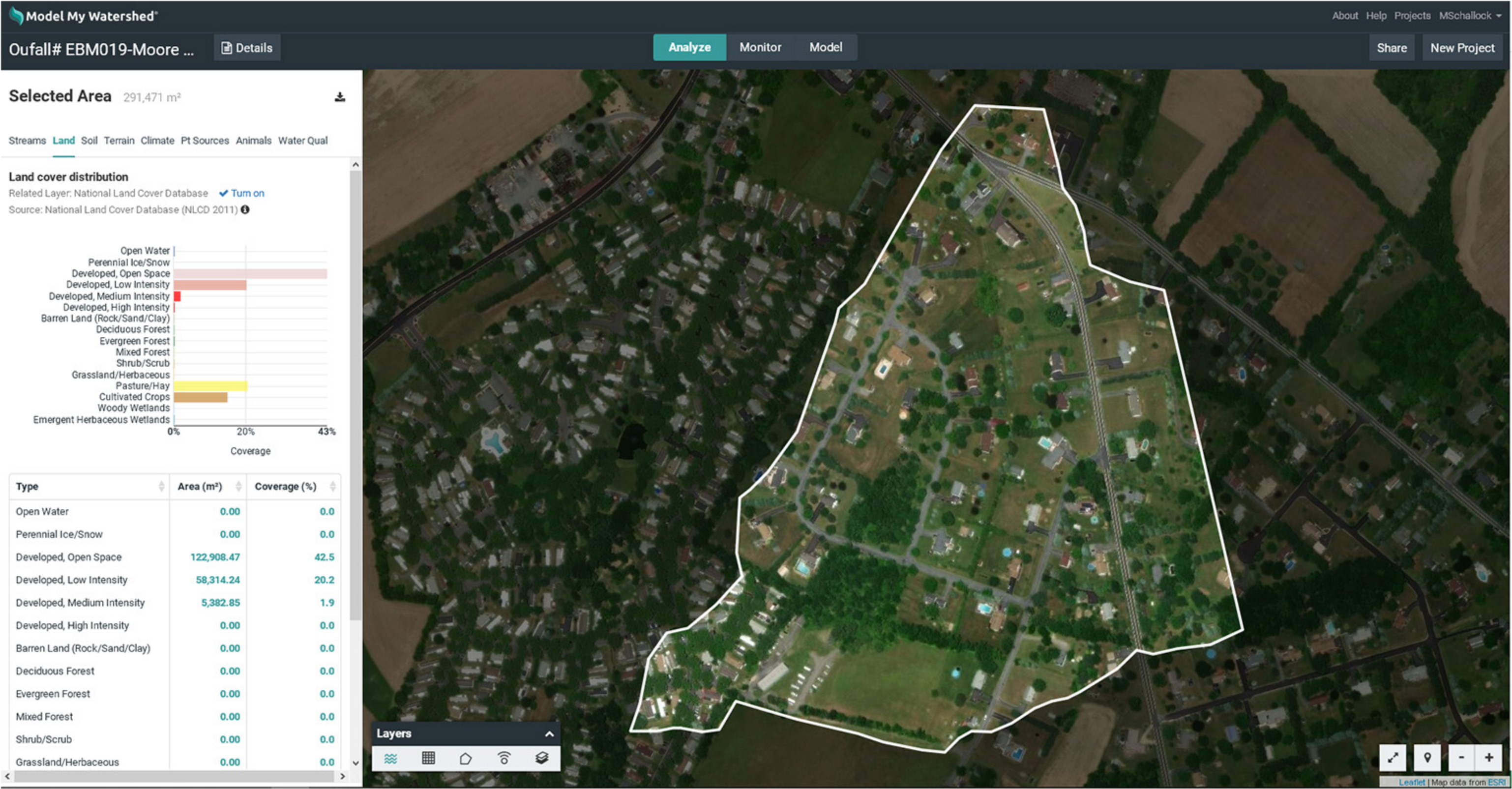
Layers Map Grid Home Layers Full Screen

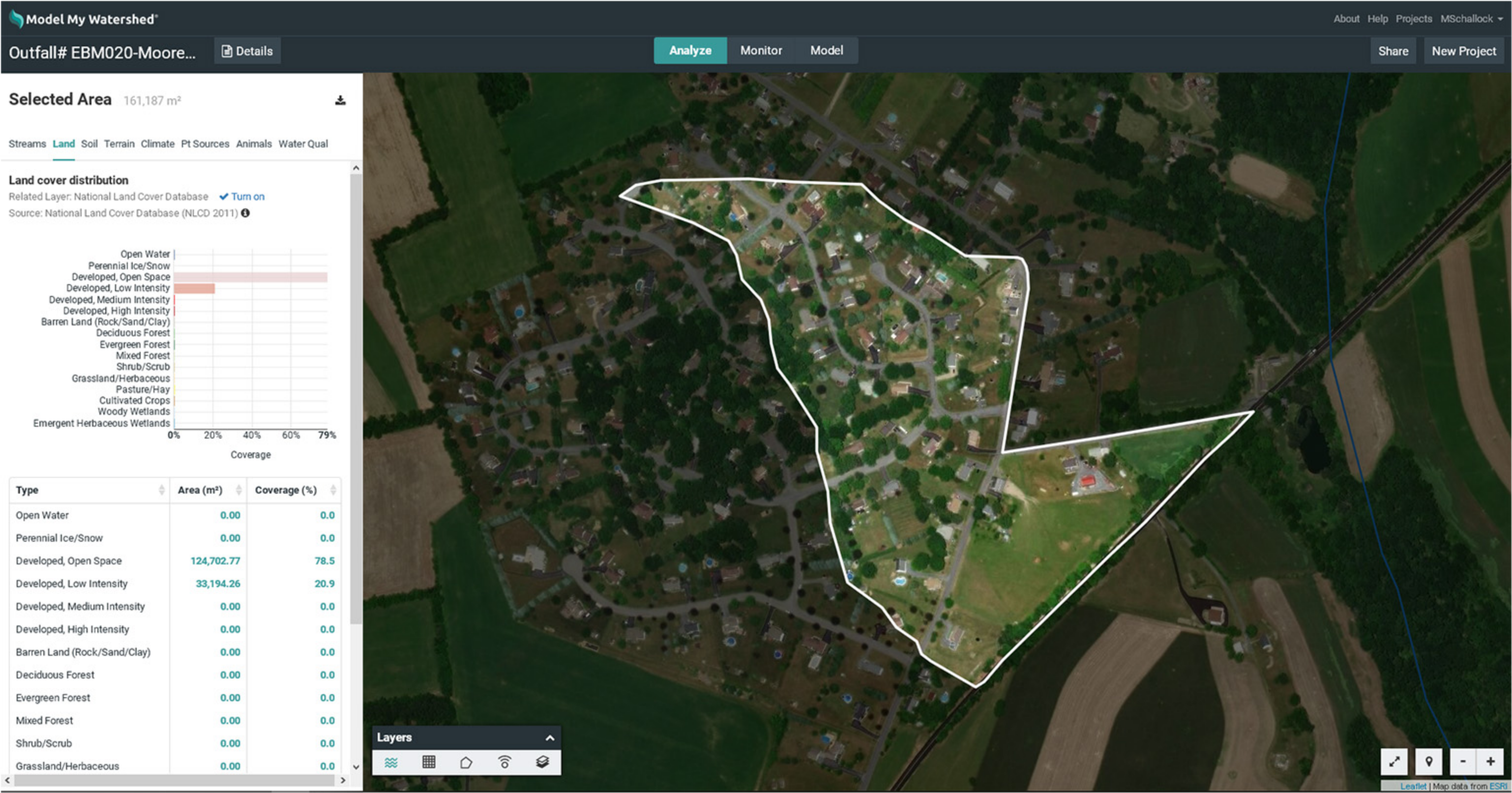
Leaflet | Map data from ESRI

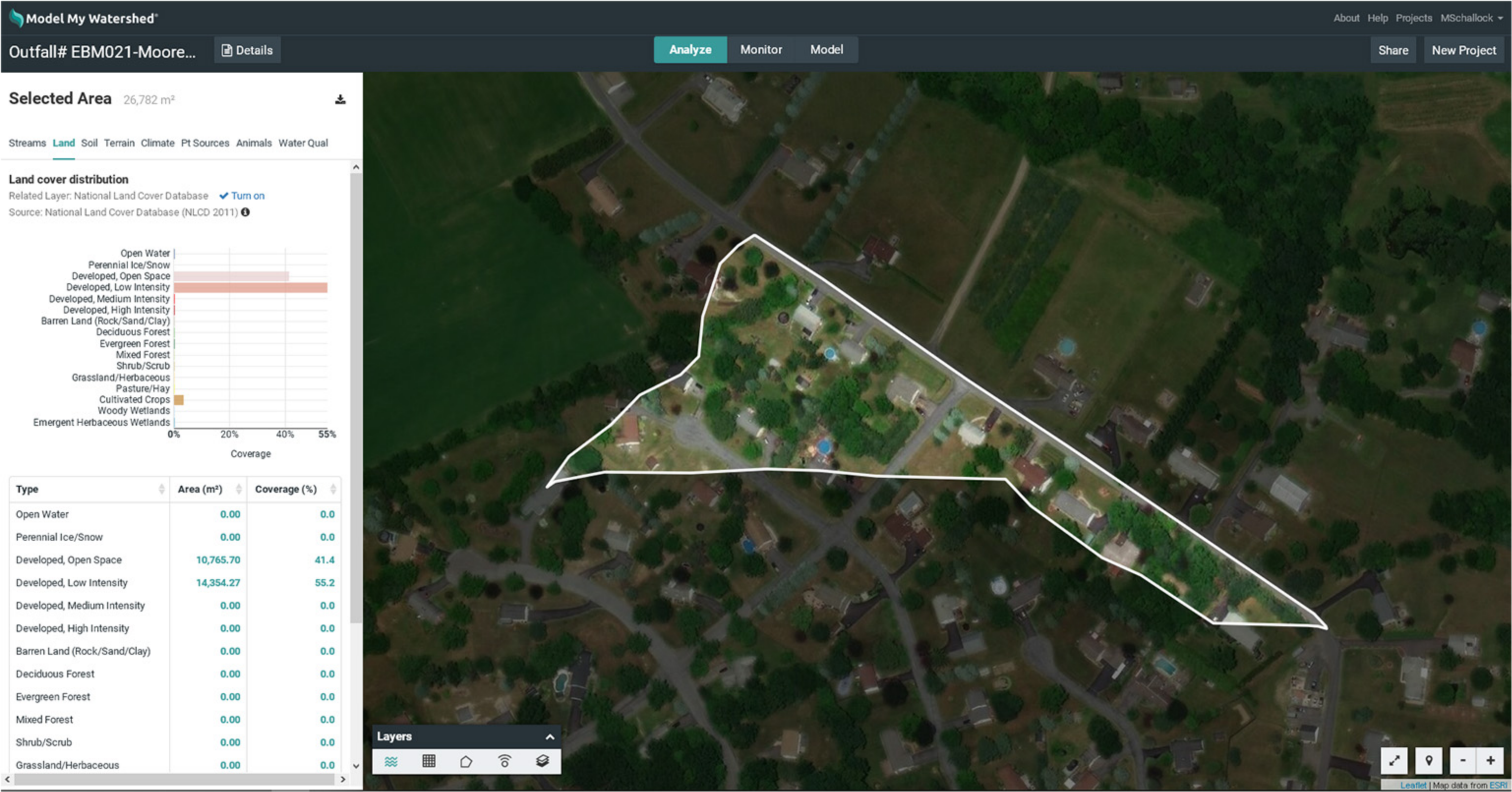












Model My Watershed About Help Projects MSchallock

Oufall# H022-Moore Tw... Details Analyze Monitor Model Share New Project

Selected Area 64,290 m² Download

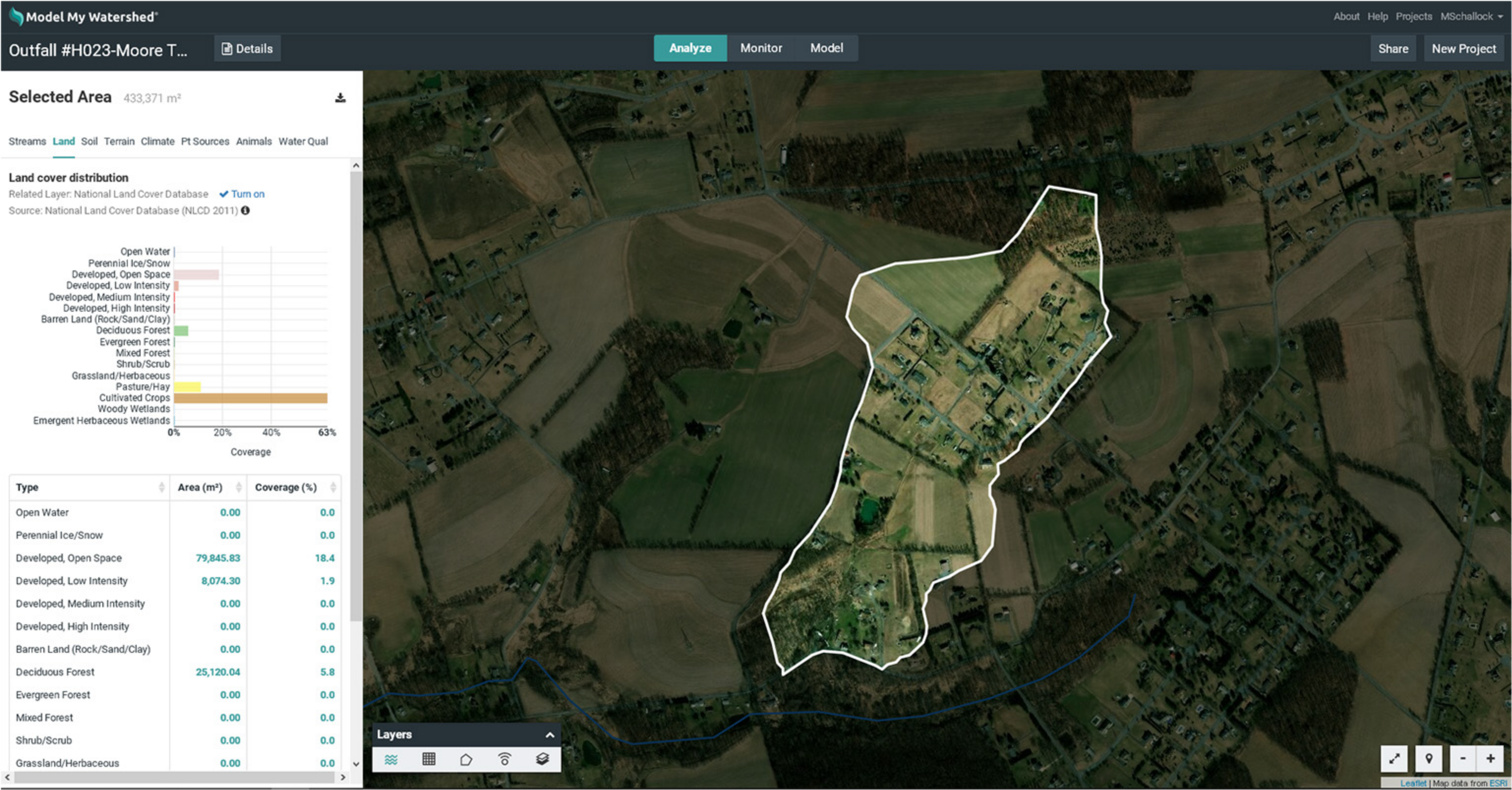
Streams **Land** Soil Terrain Climate Pt Sources Animals Water Qual

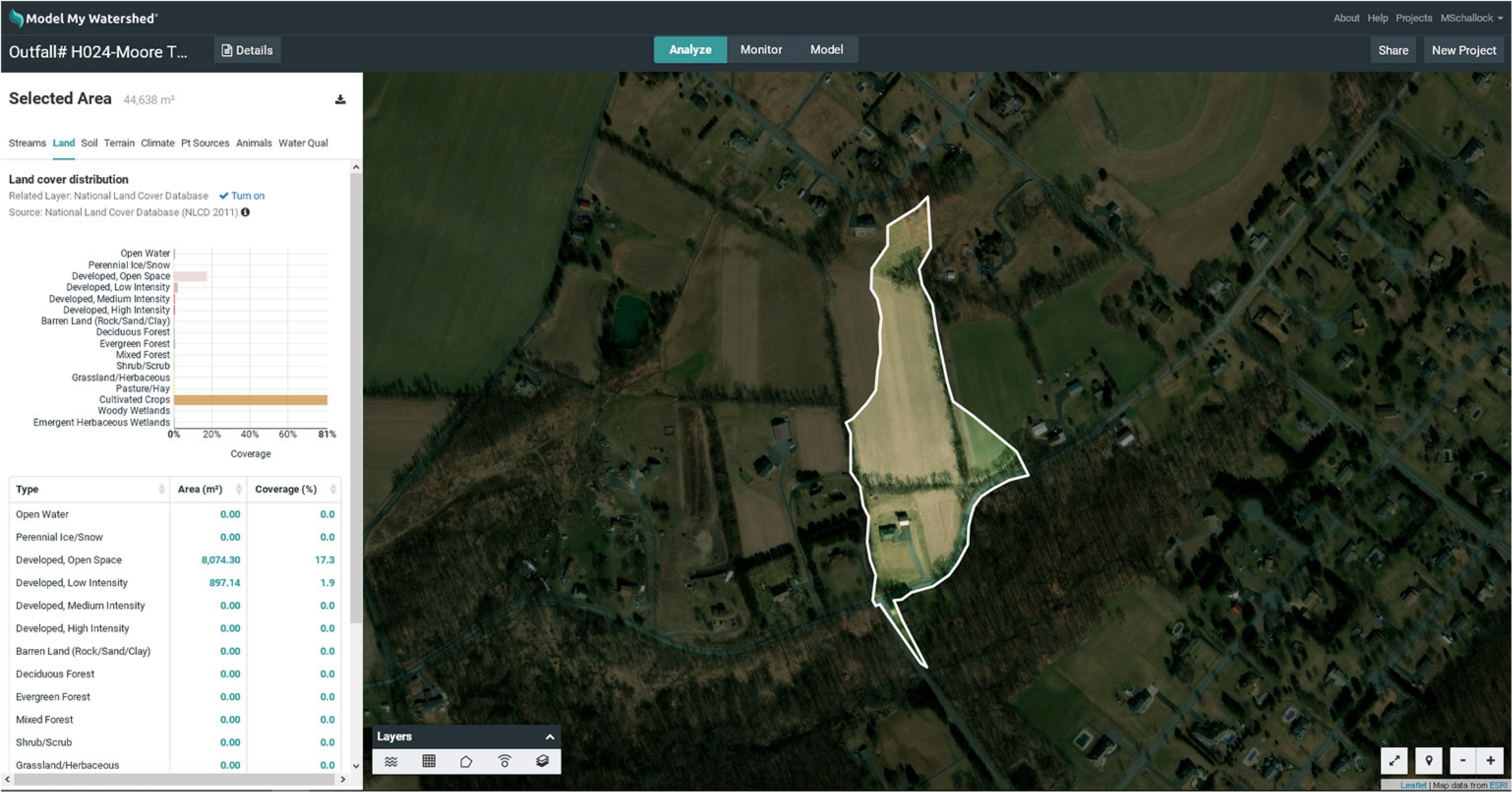
Land cover distribution
Related Layer: National Land Cover Database Turn on
Source: National Land Cover Database (NLCD 2011) ⓘ

Type	Area (m ²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	25,120.04	38.9
Developed, Low Intensity	897.14	1.4
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0
Shrub/Scrub	0.00	0.0
Grassland/Herbaceous	0.00	0.0

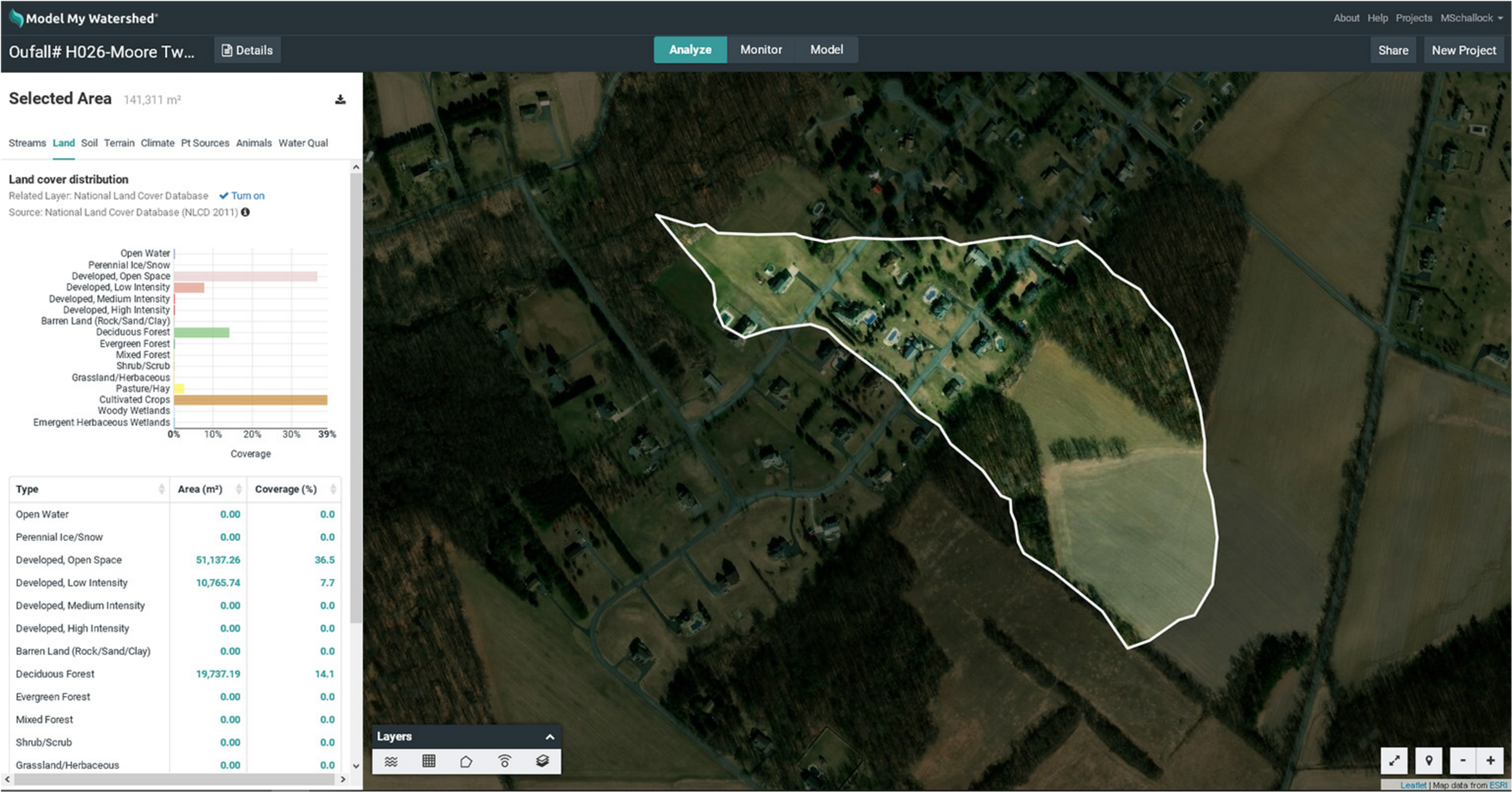
Layers Map Grid Home Full Screen Layers

Leaflet | Map data from ESRI

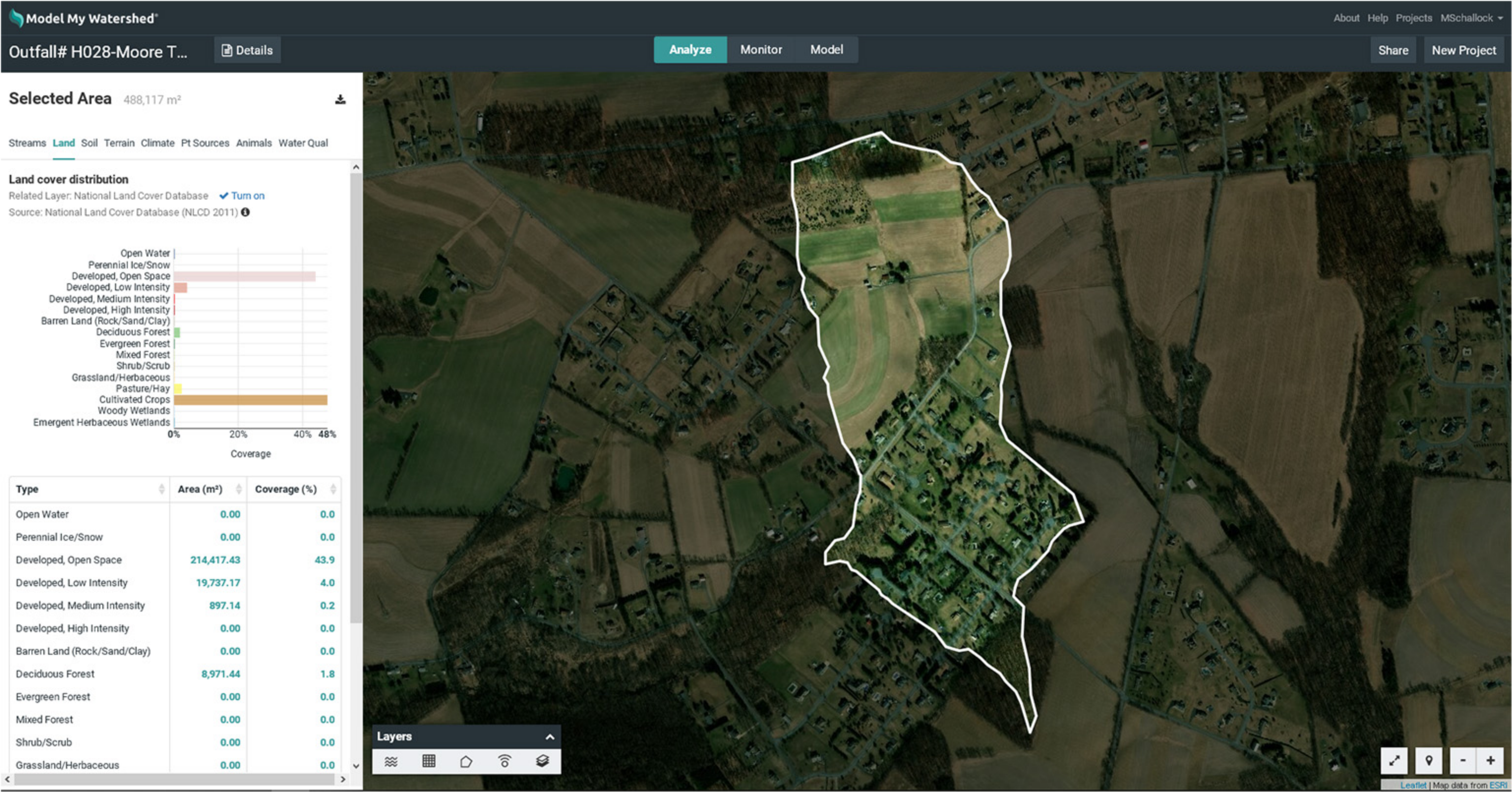












Model My Watershed* About Help Projects MSchallock

Oufall# H029-Moore Tw... Details Analyze Monitor Model Share New Project

Selected Area 220,286 m² Download

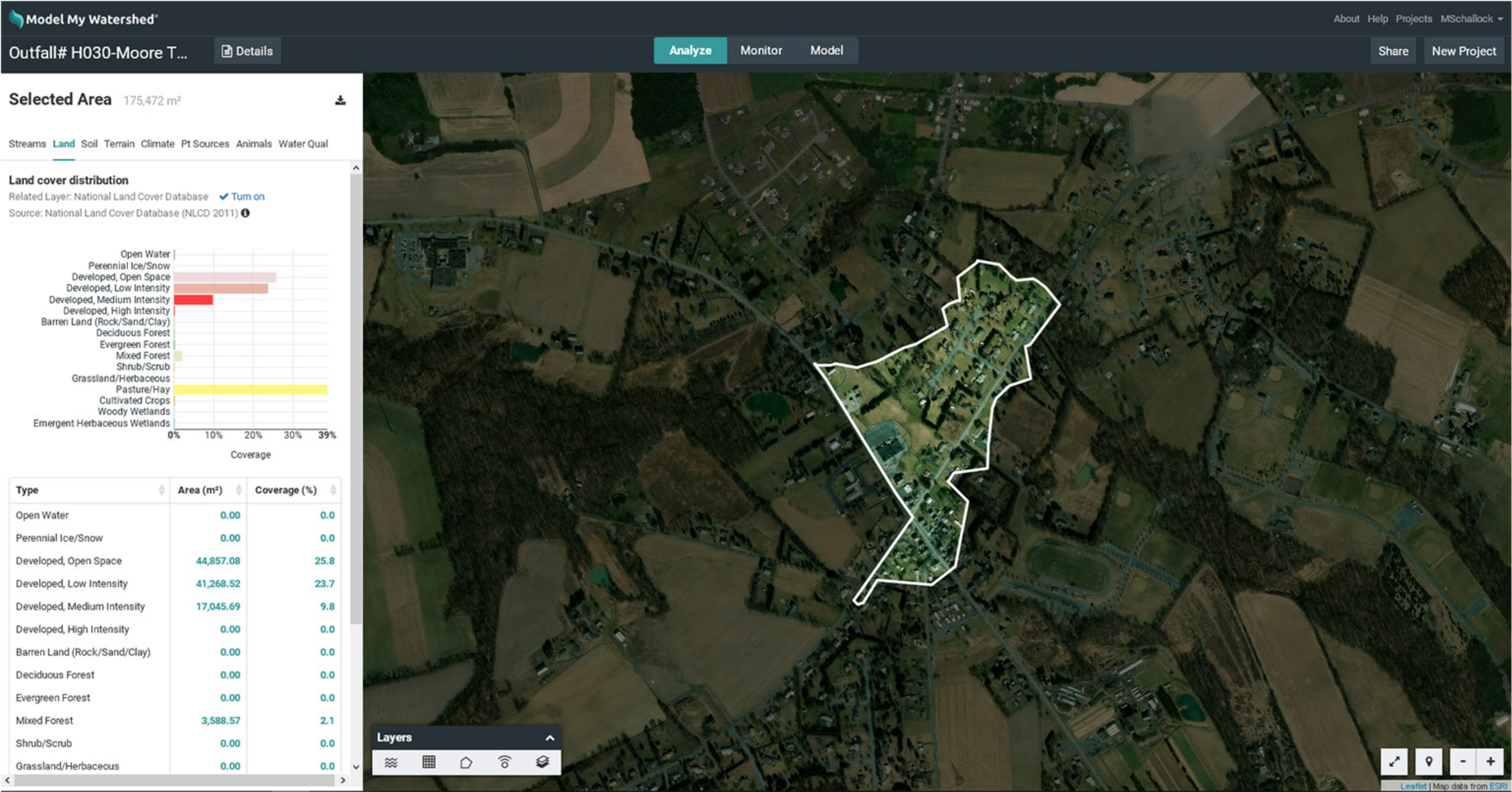
Streams **Land** Soil Terrain Climate Pt Sources Animals Water Qual

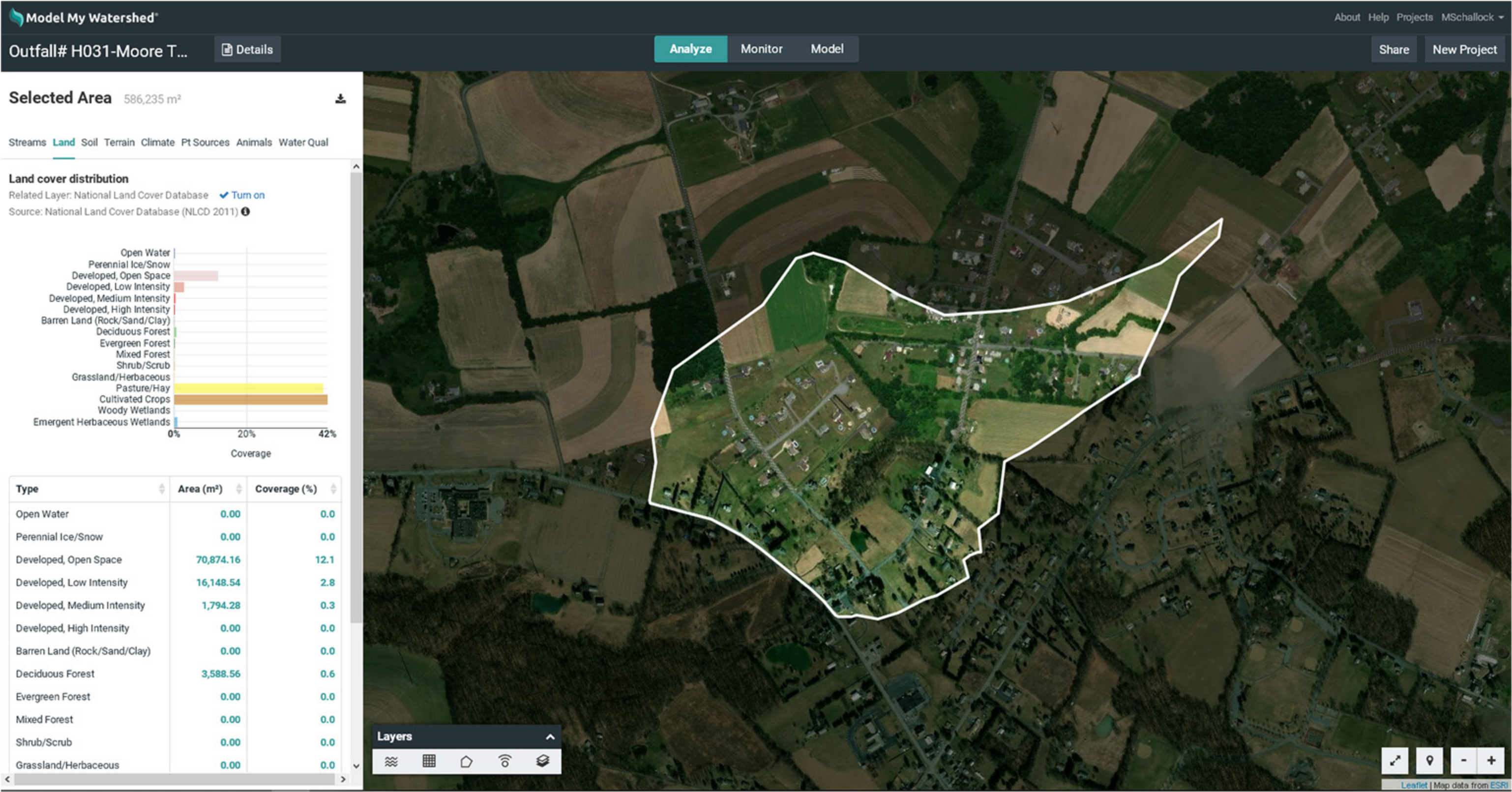
Land cover distribution
Related Layer: National Land Cover Database Turn on
Source: National Land Cover Database (NLCD 2011) ⓘ

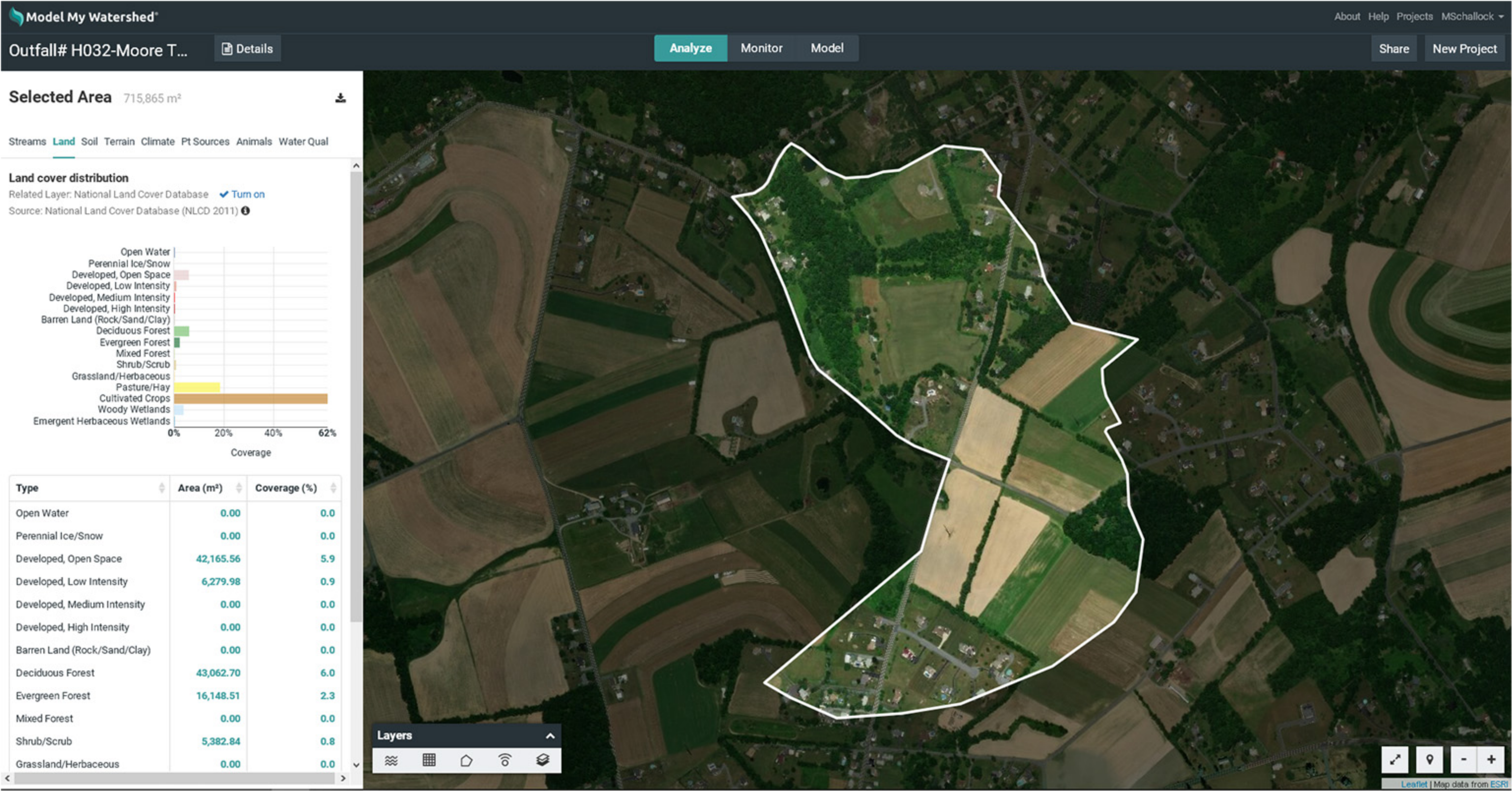
Type	Area (m ²)	Coverage (%)
Open Water	6,280.00	2.9
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	9,868.58	4.5
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	105,862.91	48.2
Evergreen Forest	0.00	0.0
Mixed Forest	4,485.72	2.0
Shrub/Scrub	8,074.29	3.7
Grassland/Herbaceous	0.00	0.0
Pasture/Hay	0.00	0.0
Cultivated Crops	77,138.00	35.0
Woody Wetlands	0.00	0.0
Emergent Herbaceous Wetlands	0.00	0.0

Layers Layers

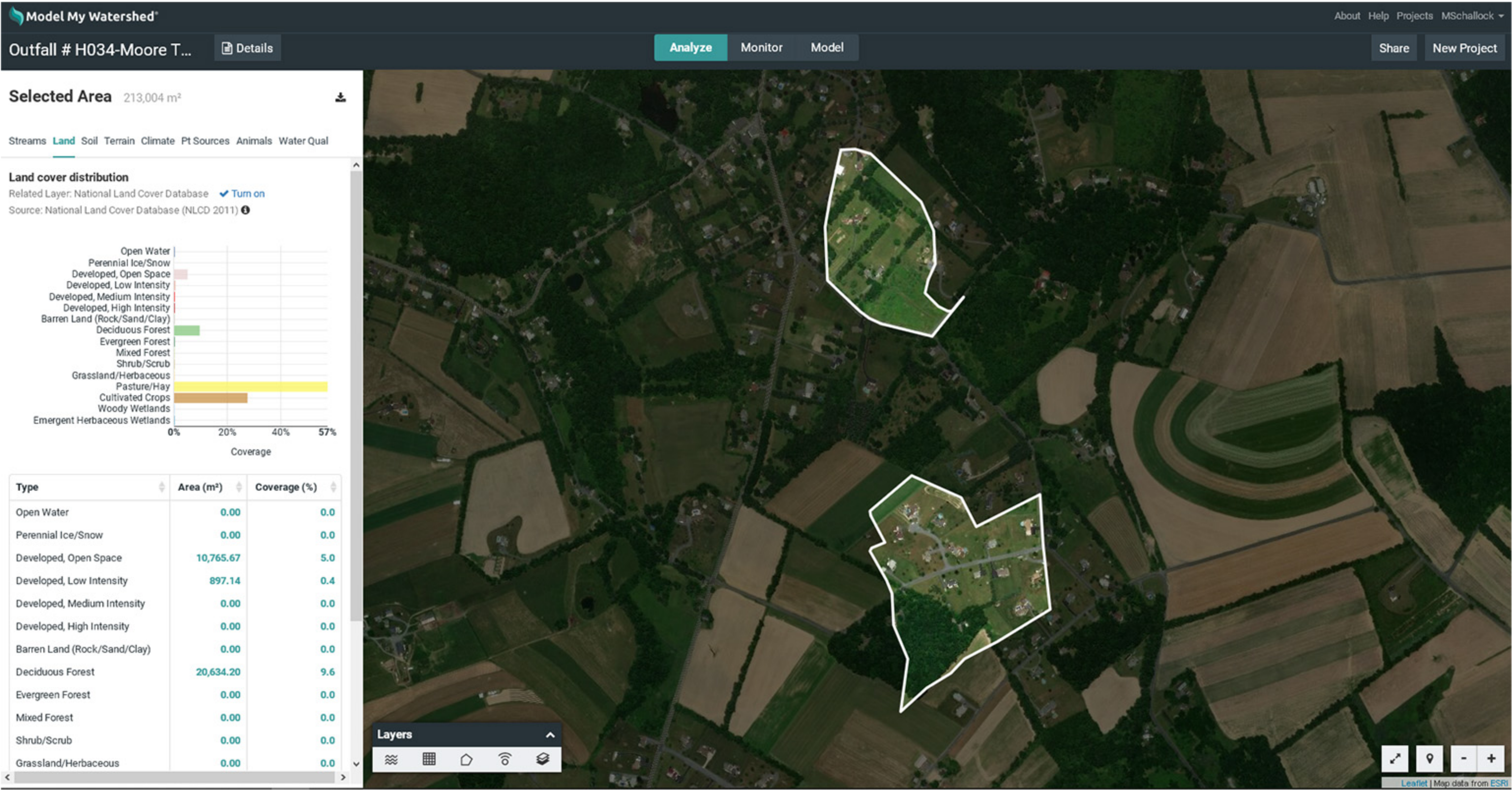
Map data from ESRI

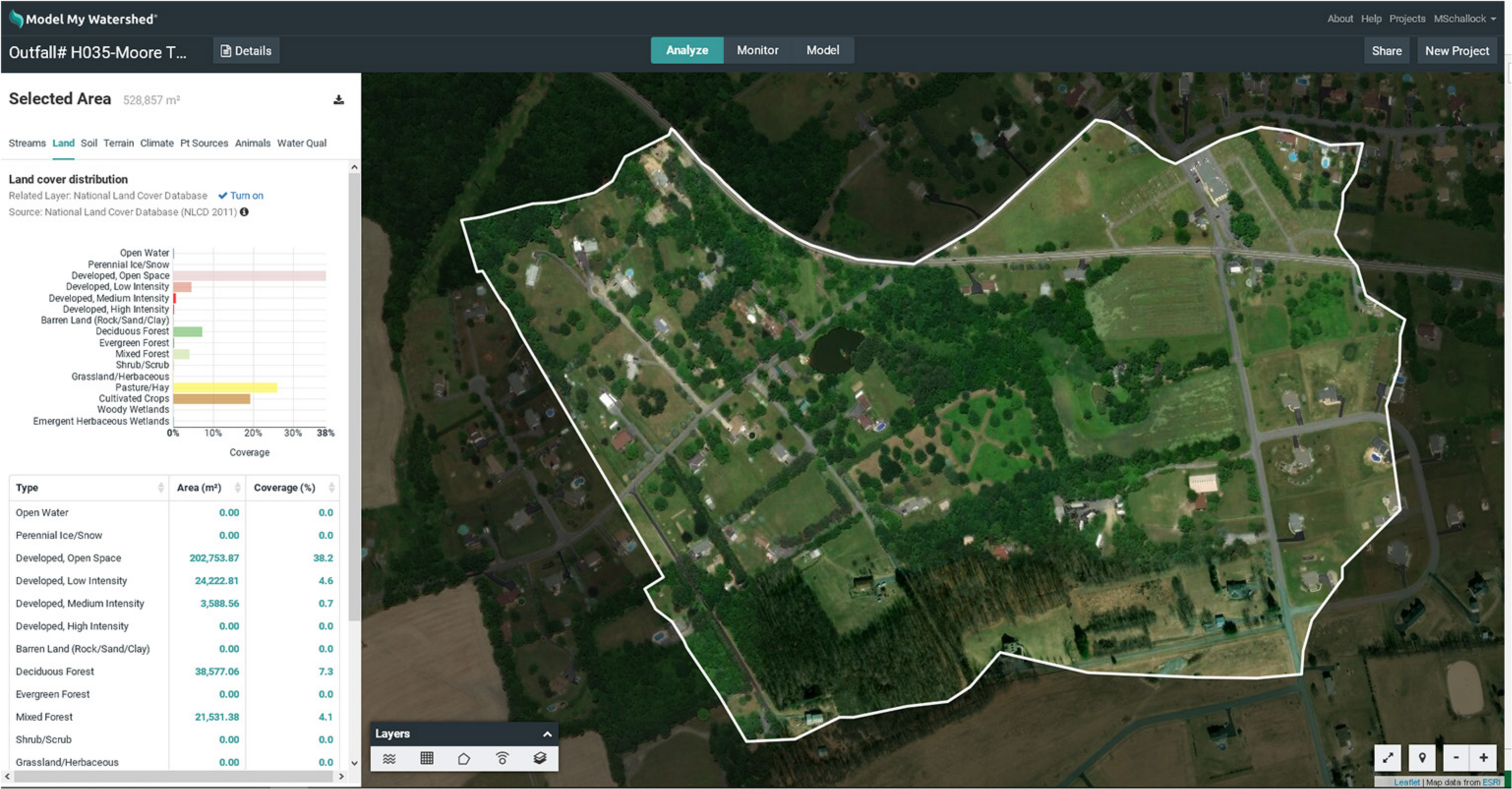




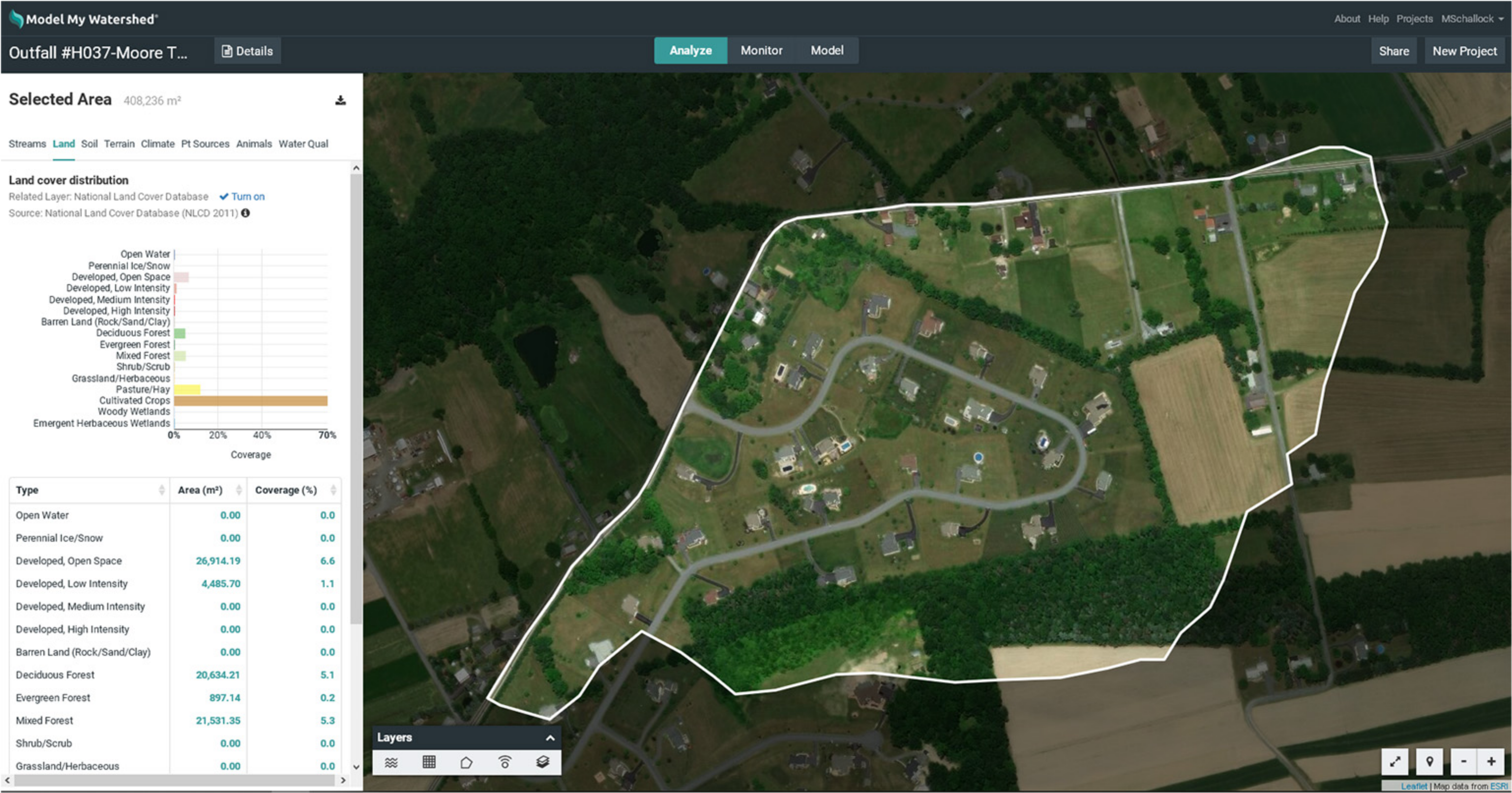


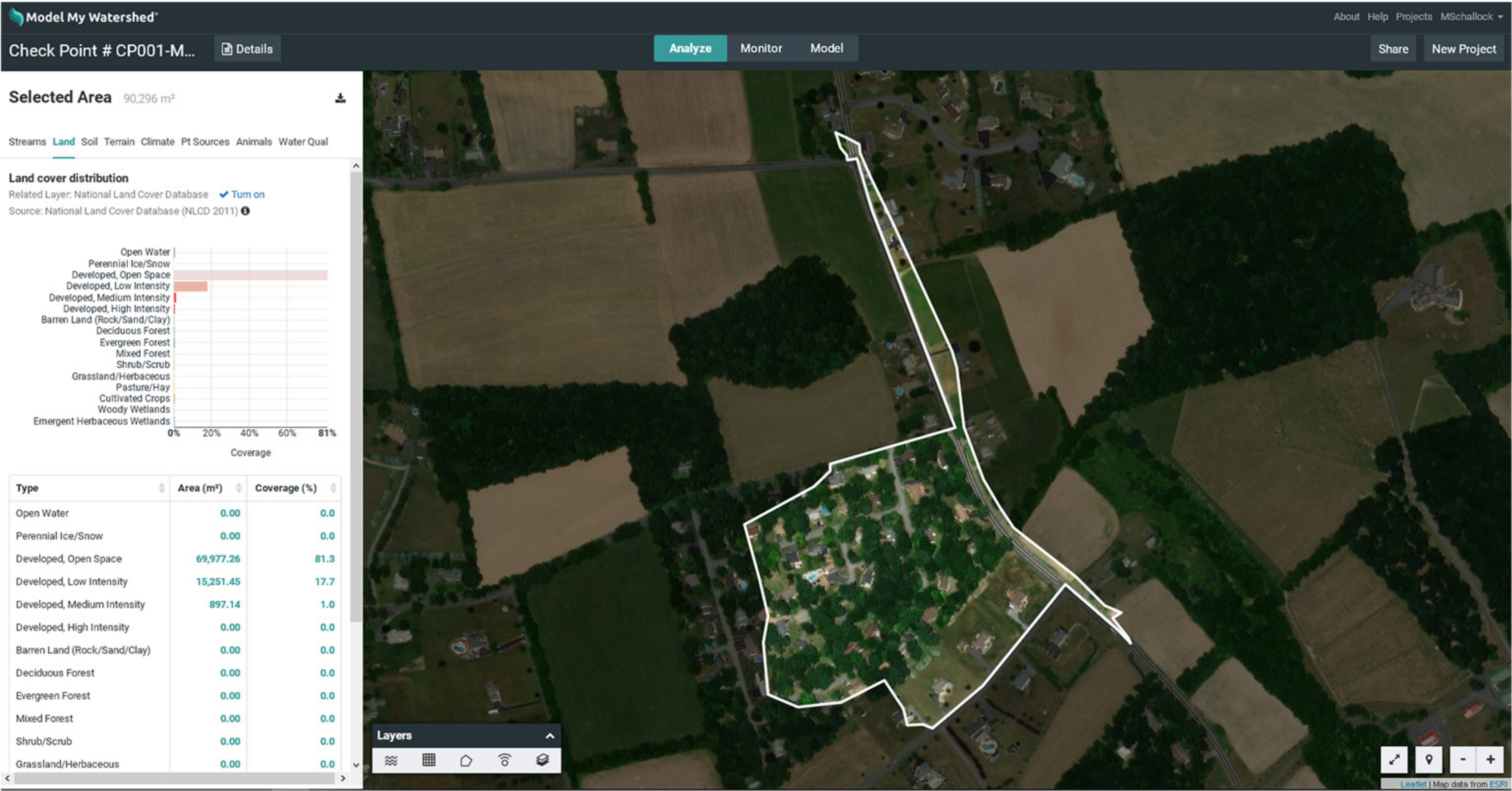


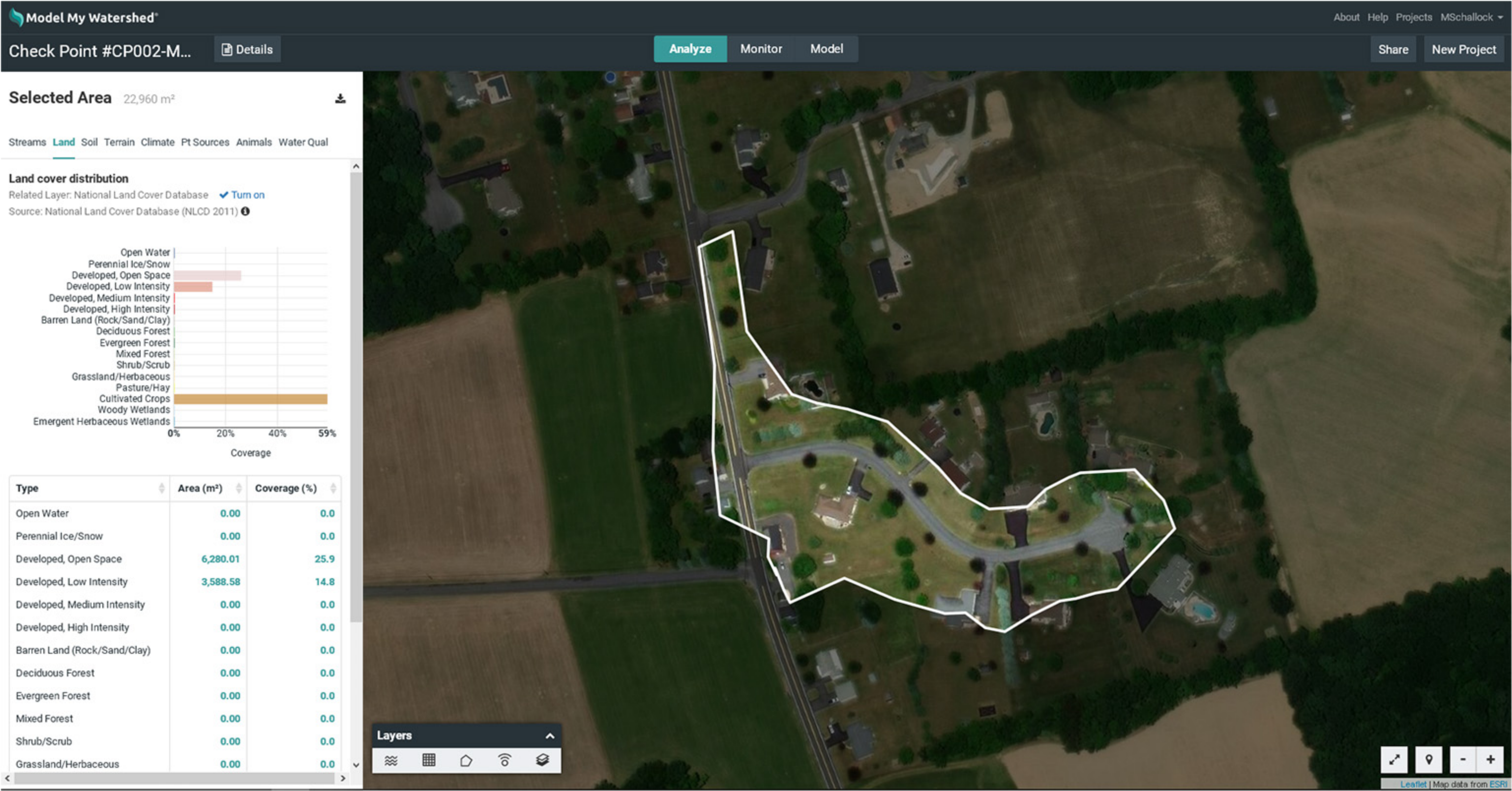


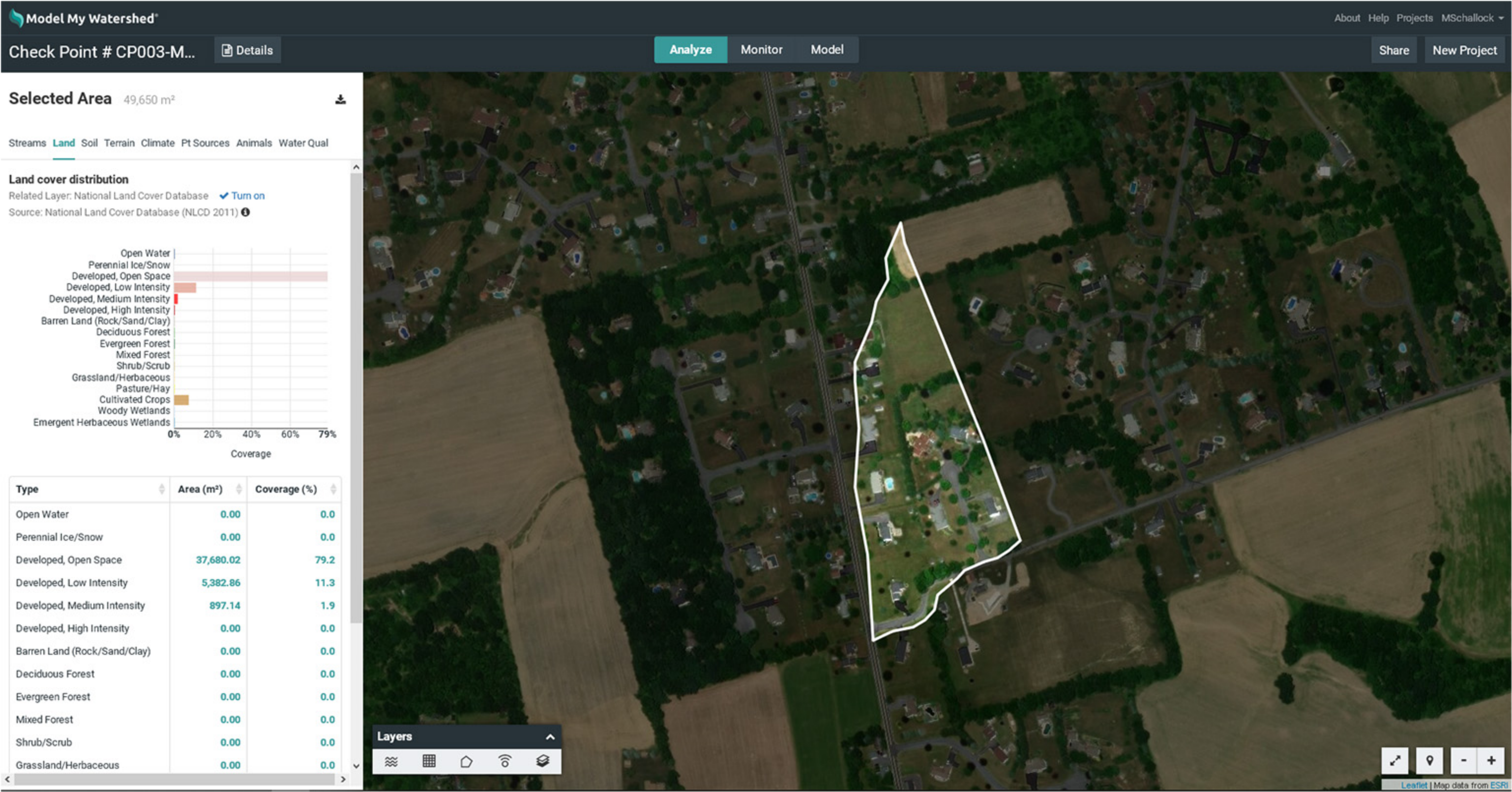












REQUIRED SEDIMENT LOAD REDUCTION CALCULATIONS

MOORE TOWNSHIP - REQUIRED SEDIMENT LOAD CALCULATIONS

EXISTING SEDIMENT LOAD 848521.05 LBS/YR

EXISTING BEST MANAGEMENT PRACTICE (BMP) REDUCTIONS:

EXISTING SEDIMENT LOAD WITH EXISTING BMP BENEFITS: 848521.05 LBS/YR
(EXISTING SEDIMENT LOAD - EXISTING BEST MANAGEMENT PRACTICE REDUCTIONS)

REQUIRED SEDIMENT LOAD REDUCTION: 84852.10 LBS/YR
(10% OF EXISTING SEDIMENT LOAD WITH EXISTING BMP BENEFITS)

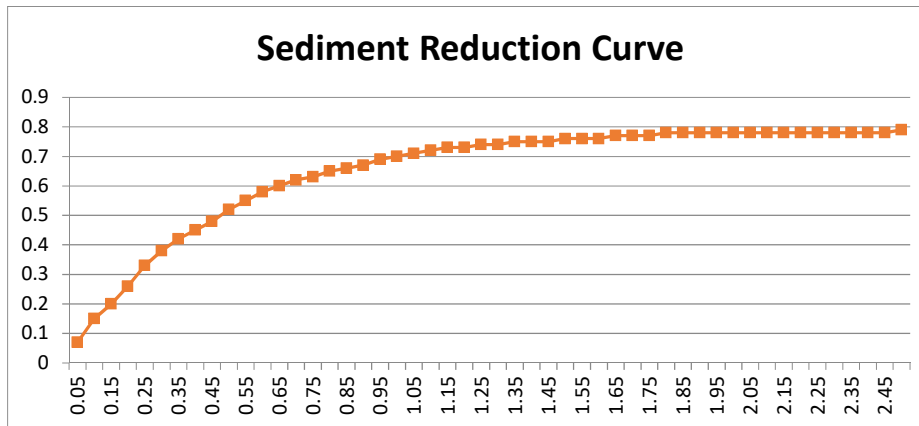
PROPOSED BMP REDUCTION CALCULATIONS

MOORE TOWNSHIP - PROPOSED BMP REDUCTION CALCULATIONS						
STORM SEWER SHED NUMBER	EXISTING SEDIMENT LOADING (LBS/YR)	EXISTING BMP REDUCTION (LBS/YR)	EXISTING SEDIMENT LOADING WITH EXISTING BMP REDUCTION CREDIT (LBS/YR)	TOTAL SEDIMENT LOAD TREATED BY BASIN CONVERSION*	TOTAL SEDIMENT LOAD TREATED BY VORTECH UNIT **	PROPOSED SEDIMENT REDUCTION (A*B) (LBS/YR)
M001	25639.65	0.00	25639.65	0.00	0.00	0.00
M002	8277.85	0.00	8277.85	0.00	0.00	0.00
M003	9081.48	0.00	9081.48	0.00	0.00	0.00
M004	32539.06	0.00	32539.06	11263.31	0.00	11263.31
M005	25748.46	0.00	25748.46	0.00	0.00	0.00
M006	9792.90	0.00	9792.90	0.00	0.00	0.00
M007	8107.13	0.00	8107.13	0.00	0.00	0.00
M008	11869.06	0.00	11869.06	0.00	0.00	0.00
M009	2902.48	0.00	2902.48	0.00	0.00	0.00
M010	7157.17	0.00	7157.17	0.00	0.00	0.00
M011	5788.80	0.00	5788.80	0.00	0.00	0.00
EBM012	7586.64	0.00	7586.64	0.00	0.00	0.00
EBM013	7847.58	0.00	7847.58	0.00	0.00	0.00
EBM014	22566.67	0.00	22566.67	0.00	0.00	0.00
EBM015	24598.43	0.00	24598.43	0.00	0.00	0.00
EBM016	44309.59	0.00	44309.59	0.00	0.00	0.00
EBM017	13637.77	0.00	13637.77	6049.54	0.00	6049.54
EBM018	47754.93	0.00	47754.93	0.00	20606.33	20606.33
EBM019	39997.45	0.00	39997.45	0.00	0.00	0.00
EBM020	25931.99	0.00	25931.99	0.00	0.00	0.00
EBM021	5228.01	0.00	5228.01	0.00	0.00	0.00
H022	5967.14	0.00	5967.14	0.00	0.00	0.00
H023	33219.01	0.00	33219.01	14101.15	0.00	14101.15
H024	3539.41	0.00	3539.41	0.00	0.00	0.00
H025	24281.85	0.00	24281.85	0.00	0.00	0.00
H026	55132.97	0.00	55132.97	0.00	0.00	0.00
H027	10476.35	0.00	10476.35	0.00	0.00	0.00
H028	49938.72	0.00	49938.72	0.00	0.00	0.00
H029	13181.24	0.00	13181.24	0.00	0.00	0.00
H030	27281.41	0.00	27281.41	0.00	0.00	0.00
H031	43494.16	0.00	43494.16	4917.52	0.00	4917.52
H032	45970.59	0.00	45970.59	0.00	0.00	0.00
H033	4059.71	0.00	4059.71	0.00	0.00	0.00
H034	13535.94	0.00	13535.94	0.00	0.00	0.00
H035	53221.29	0.00	53221.29	0.00	0.00	0.00
H036	28479.85	0.00	28479.85	13414.31	0.00	13414.31
H037	26586.99	0.00	26586.99	14715.24	0.00	14715.24
CP 001	13992.67	0.00	13992.67	0.00	0.00	0.00
CP 002	2626.29	0.00	2626.29	0.00	0.00	0.00
CP 003	7172.37	0.00	7172.37	0.00	0.00	0.00
TOTALS	848521.05	0.00	848521.05	TOTAL PROPOSED SEDIMENT REDUCTION 85067.40		
REQUIRED SEDIMENT REDUCTION 84852.105						

MOORE TOWNSHIP - SEDIMENT LOADING TO PROPOSED BMP'S																											
BMP	DEVELOPED, OPEN SPACE (SQ. METERS)	DEVELOPED, OPEN SPACE (ACRES)	DEVELOPED, OPEN SPACE (IMPERVIOUS SURFACES) (19% OF TOTAL AREA) (A)	DEVELOPED, OPEN SPACE (PERVIOUS SURFACES) (81% OF TOTAL AREA) (B)	DEVELOPED, OPEN SPACE (IMPERVIOUS SURFACE - SEDIMENT LOADING)(A*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, OPEN SPACE (PERVIOUS SURFACE - SEDIMENT LOADING) (B*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, LOW INTENSITY (SQ. METERS)	DEVELOPED, LOW INTENSITY (ACRES)	DEVELOPED, LOW INTENSITY (IMPERVIOUS SURFACES) (49% OF TOTAL AREA) (C)	DEVELOPED, LOW INTENSITY (PERVIOUS SURFACES) (51% OF TOTAL AREA) (D)	DEVELOPED, LOW INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (C*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, LOW INTENSITY (PERVIOUS SURFACE - SEDIMENT LOADING) (D*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, MEDIUM INTENSITY (SQ. METERS)	DEVELOPED, MEDIUM INTENSITY (ACRES)	DEVELOPED, MEDIUM INTENSITY (IMPERVIOUS SURFACES) (79% OF TOTAL AREA) (E)	DEVELOPED, MEDIUM INTENSITY (PERVIOUS SURFACES) (21% OF TOTAL AREA) (F)	DEVELOPED, MEDIUM INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (E*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, MEDIUM INTENSITY (PERVIOUS SURFACE - SEDIMENT LOADING) (F*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, HIGH INTENSITY (SQ. METERS)	DEVELOPED, HIGH INTENSITY (ACRES)	DEVELOPED, HIGH INTENSITY (IMPERVIOUS SURFACES) (100% OF TOTAL AREA) (G)	DEVELOPED, HIGH INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (G*1893 LBS/ACRE/YR) (LBS/YR)	UNDEVELOPED LANDS (SQ. METERS)	UNDEVELOPED LANDS (ACRES) (H)	UNDEVELOPED LANDS - SEDIMENT LOADING (H*234.6 LBS/ACRE/YR) (LBS/YR)	TOTAL SEDIMENT LOADING (LBS/YR)	TOTAL TRIBUTARY AREA (ACRES)
Outfall M004 - Basin Conversion	64594.31	15.96	3.03	12.93	5577.12	3425.63	12560.00	3.10	1.52	1.58	2796.71	419.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	51137.16	12.64	2964.46	15,183.31	31.70
Outfall H036 - Basin Conversion	66388.38	16.40	3.12	13.29	5732.02	3520.77	897.14	0.22	0.11	0.11	199.76	29.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	130085.34	32.14	7541.14	17,023.65	48.77
Outfall H031 - Basin Conversion	5382.85	1.33	0.25	1.08	464.76	285.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	94199.81	23.28	5460.83	6,211.06	24.61
Outfall EBM017-Basin Conversion	4485.71	1.11	0.21	0.90	387.30	237.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	121114.30	29.93	7021.08	7,646.27	31.04
Outfall H037 - Basin Conversion	5382.84	1.33	0.25	1.08	464.76	285.47	1794.28	0.44	0.22	0.23	399.53	59.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	304130.35	75.15	17630.65	18,840.31	76.93
Outfall H023 - Basin Conversion	65491.49	16.18	3.07	13.11	5654.58	3473.21	5382.86	1.33	0.65	0.68	1198.59	179.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	157897.30	39.02	9153.42	19,659.54	56.53
Outfall EBM018 - Vortech Unit 007	55622.84	13.74	2.61	11.13	4802.52	2949.84	42165.70	10.42	5.11	5.31	9388.96	1407.96	897.14	0.22	0.18	0.05	322.07	12.34	0.00	0.00	0.00	0.00	140851.14	34.80	8165.24	27,048.93	59.19

MOORE TOWNSHIP - SEDIMENT LOADING TO PROPOSED BMP'S

BMP NAME: Outfall M004 - Basin Retrofit



TOTAL DRAINAGE AREA (Acres):	31.70
TOTAL IMPERVIOUS AREA (Acres):	4.55

BMP SEDIMENT LOAD (lbs/yr):	15,429.20
------------------------------------	------------------

EXISTING SEDIMENT REMOVAL REDUCTIONS

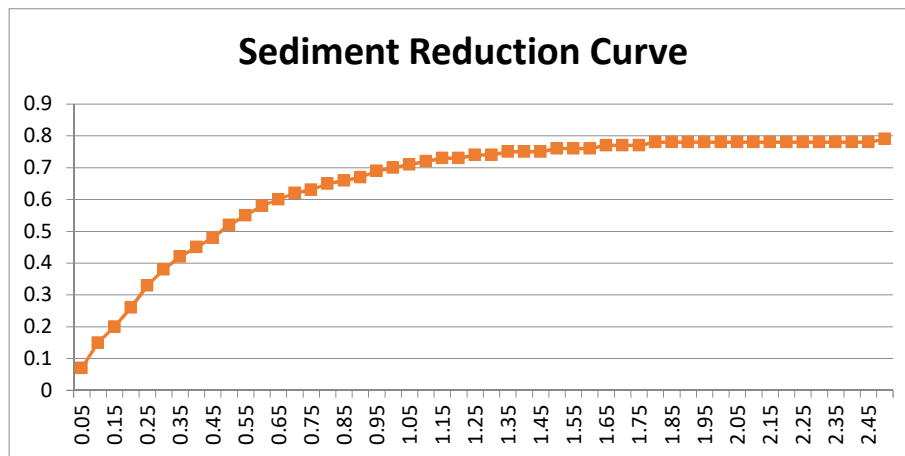
PROPOSED SEDIMENT REMOVAL REDUCTIONS

Volume Treated (ac-ft.)	0.459
Inches of Impervious Area Treated:	1.21
Percent Reduction:	73%
Removed Sediment:	11,263.31



MOORE TOWNSHIP - SEDIMENT LOADING TO PROPOSED BMP'S

BMP NAME: Outfall H036 - Basin Retrofit



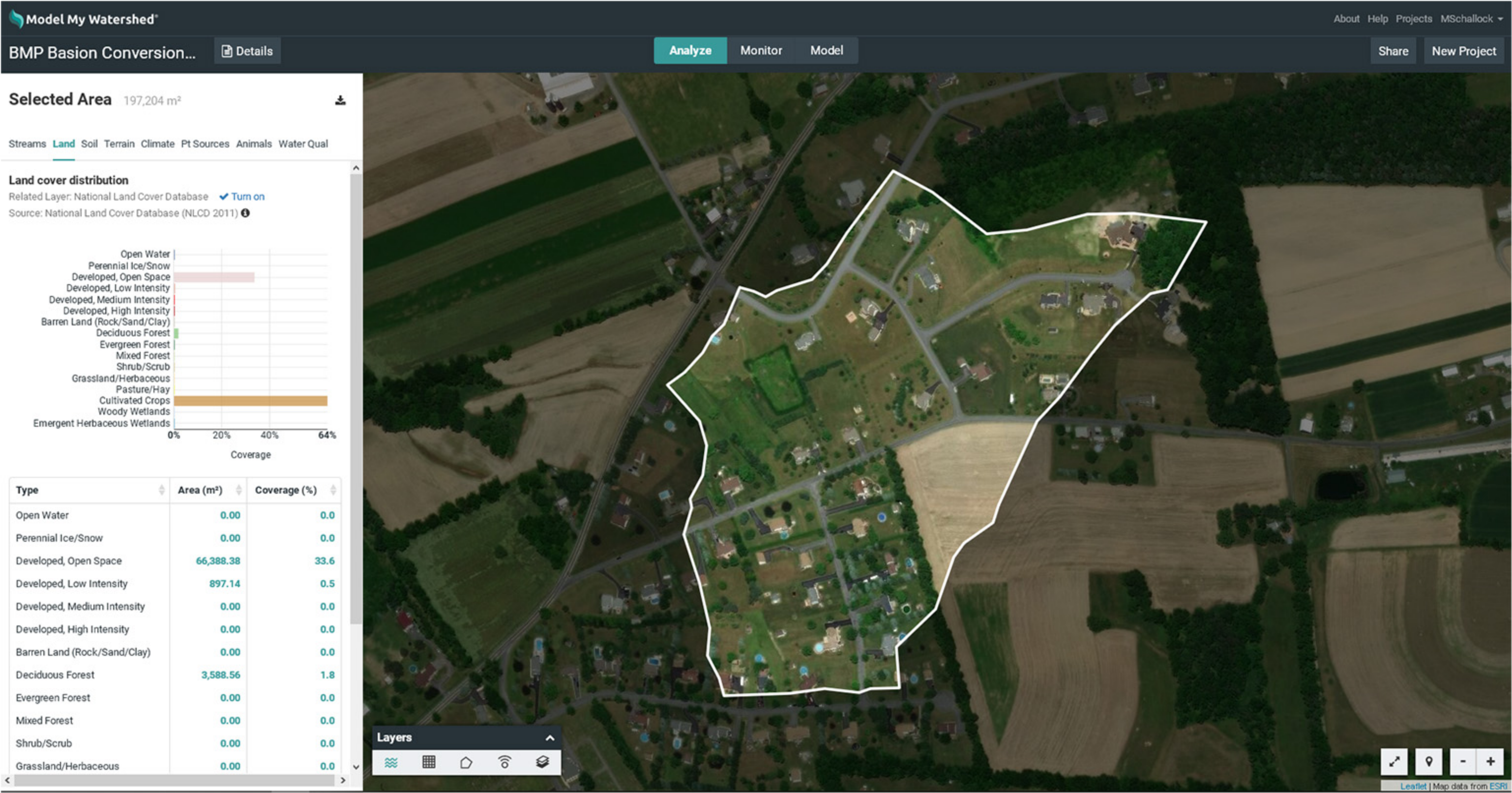
TOTAL DRAINAGE AREA (Acres):	48.77
TOTAL IMPERVIOUS AREA (Acres):	3.23

BMP SEDIMENT LOAD (lbs/yr):	17,197.83
------------------------------------	------------------

EXISTING SEDIMENT REMOVAL REDUCTIONS

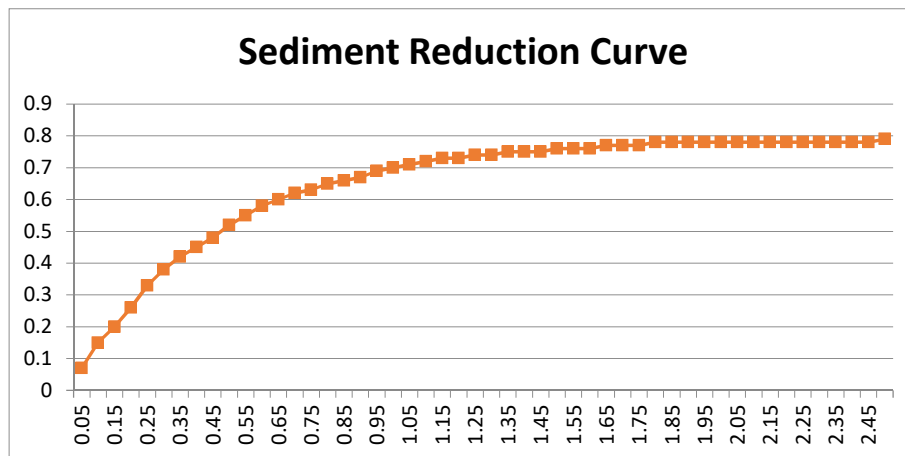
PROPOSED SEDIMENT REMOVAL REDUCTIONS

Volume Treated (ac-ft.)	0.551
Inches of Impervious Area Treated:	2.05
Percent Reduction:	78%
Removed Sediment:	13,414.31



MOORE TOWNSHIP - SEDIMENT LOADING TO PROPOSED BMP'S

BMP NAME: Outfall H031 - Basin Retrofit



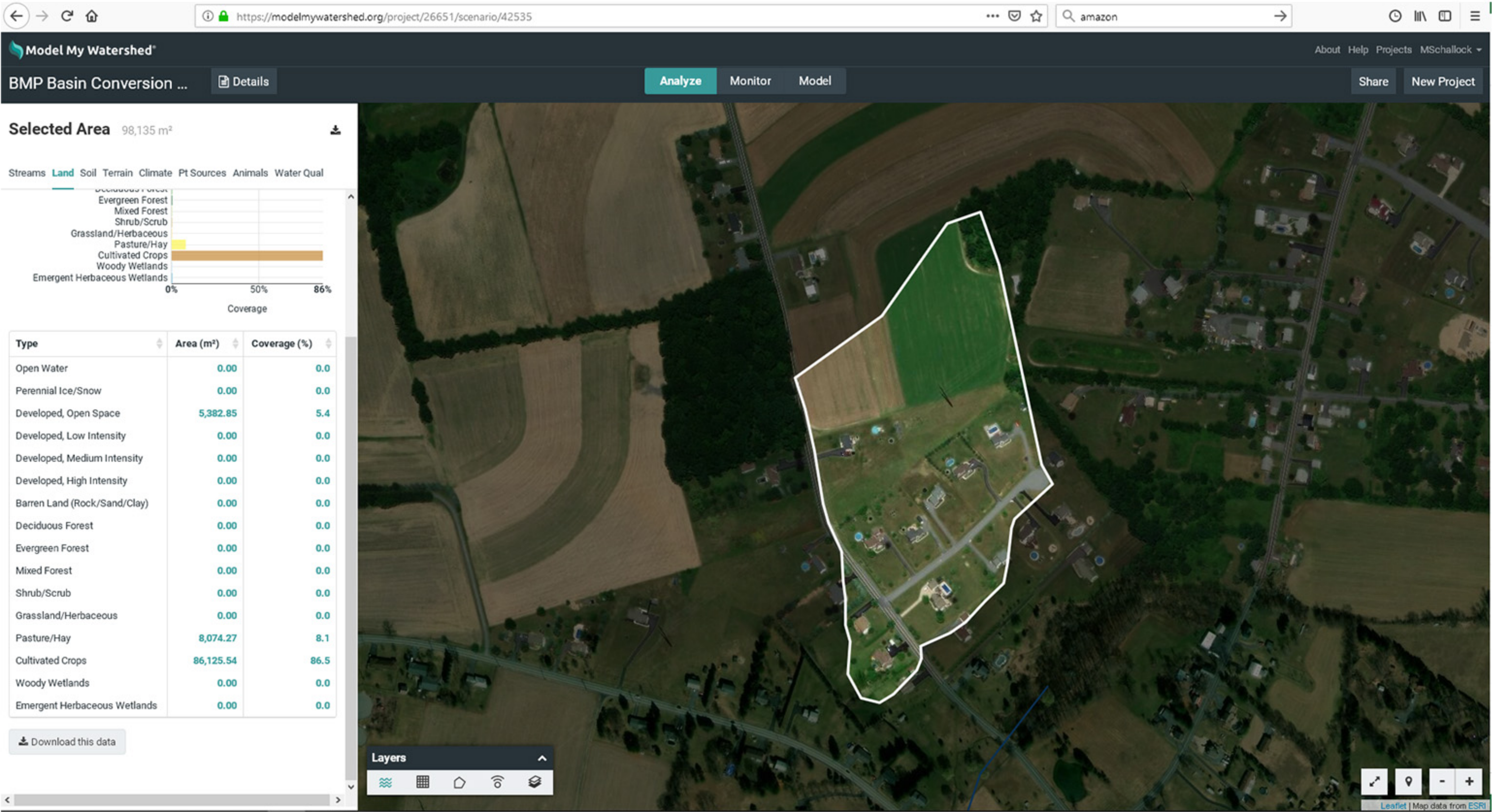
TOTAL DRAINAGE AREA (Acres):	24.61
TOTAL IMPERVIOUS AREA (Acres):	0.25

BMP SEDIMENT LOAD (lbs/yr):	6,224.70
------------------------------------	-----------------

EXISTING SEDIMENT REMOVAL REDUCTIONS

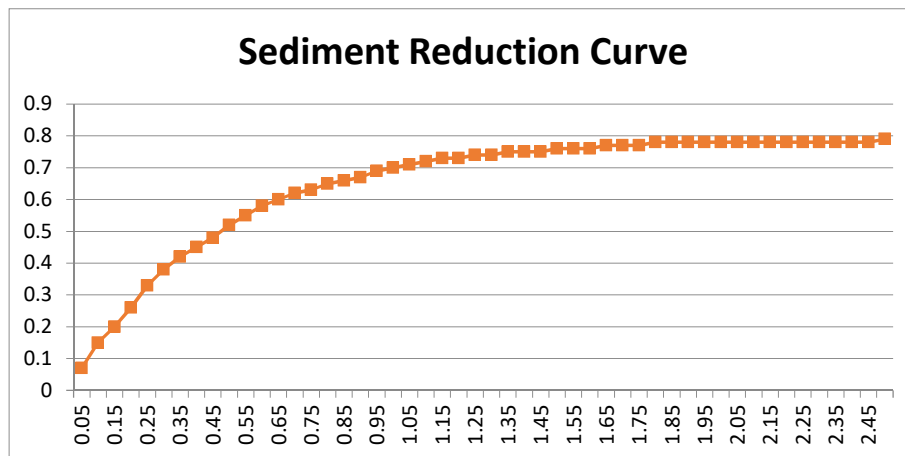
PROPOSED SEDIMENT REMOVAL REDUCTIONS

Volume Treated (ac-ft.)	0.069
Inches of Impervious Area Treated:	3.27
Percent Reduction:	79%
Removed Sediment:	4,917.52



MOORE TOWNSHIP - SEDIMENT LOADING TO PROPOSED BMP'S

BMP NAME: Outfall EBM017 - Basin Retrofit



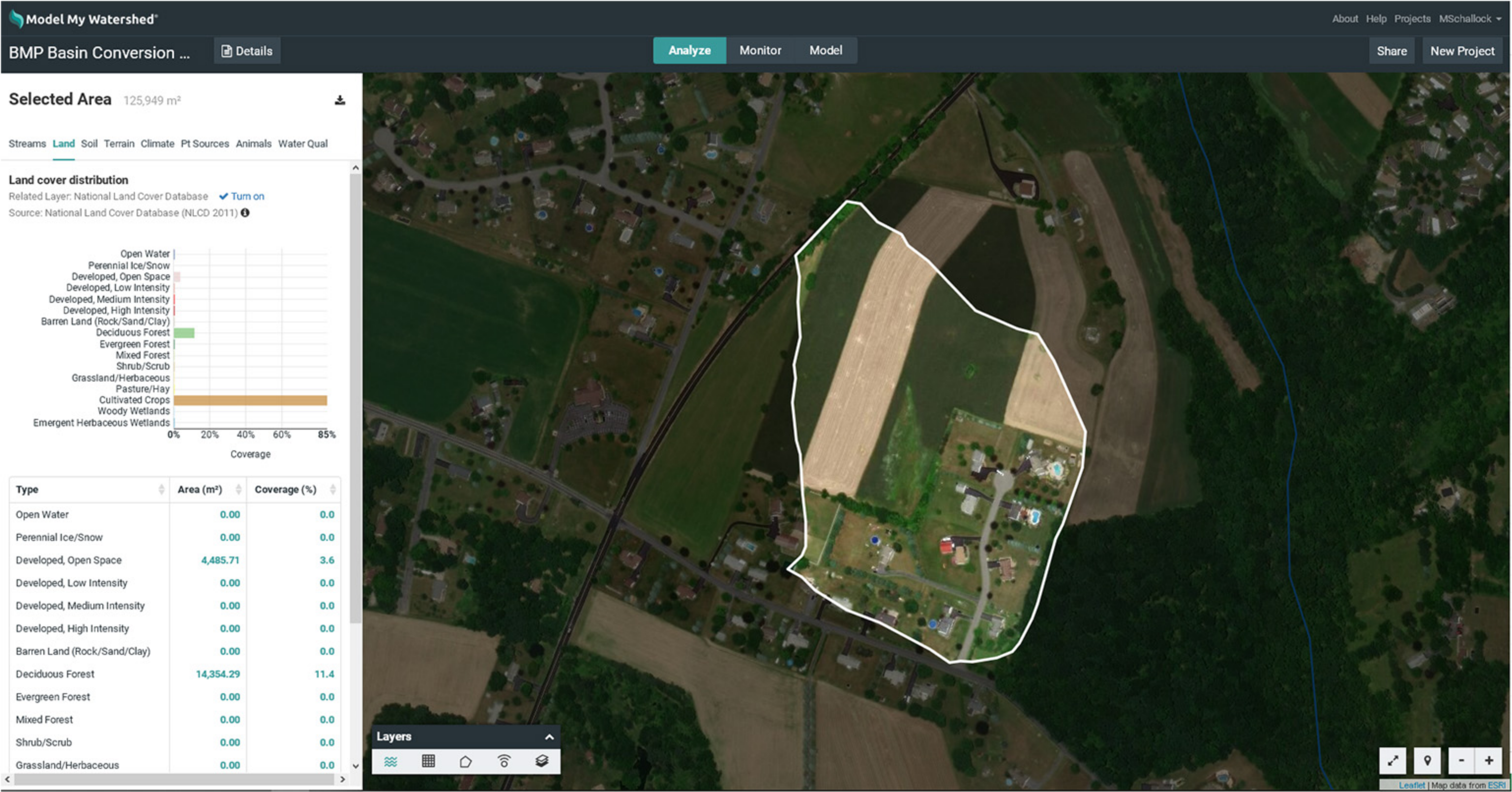
TOTAL DRAINAGE AREA (Acres):	31.04
TOTAL IMPERVIOUS AREA (Acres):	0.21

BMP SEDIMENT LOAD (lbs/yr):	7,657.64
------------------------------------	-----------------

EXISTING SEDIMENT REMOVAL REDUCTIONS

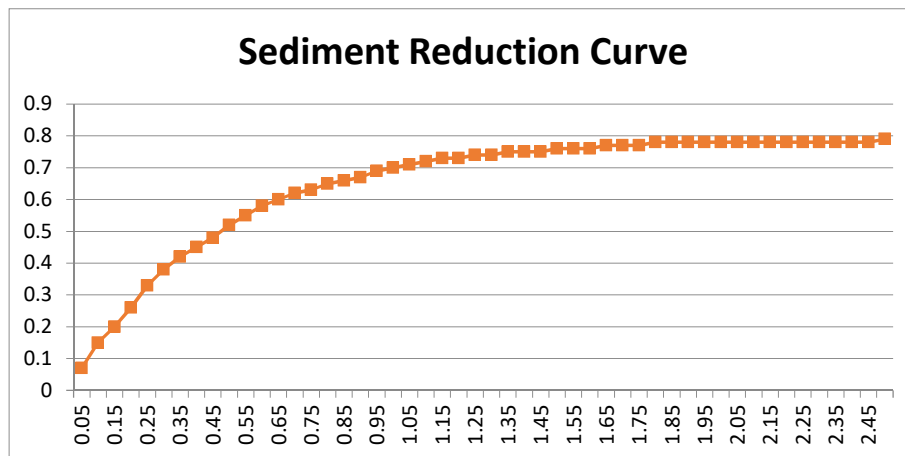
PROPOSED SEDIMENT REMOVAL REDUCTIONS

Volume Treated (ac-ft.)	0.045
Inches of Impervious Area Treated:	2.55
Percent Reduction:	79%
Removed Sediment:	6,049.54



MOORE TOWNSHIP - SEDIMENT LOADING TO PROPOSED BMP'S

BMP NAME: Outfall H037 - Basin Retrofit



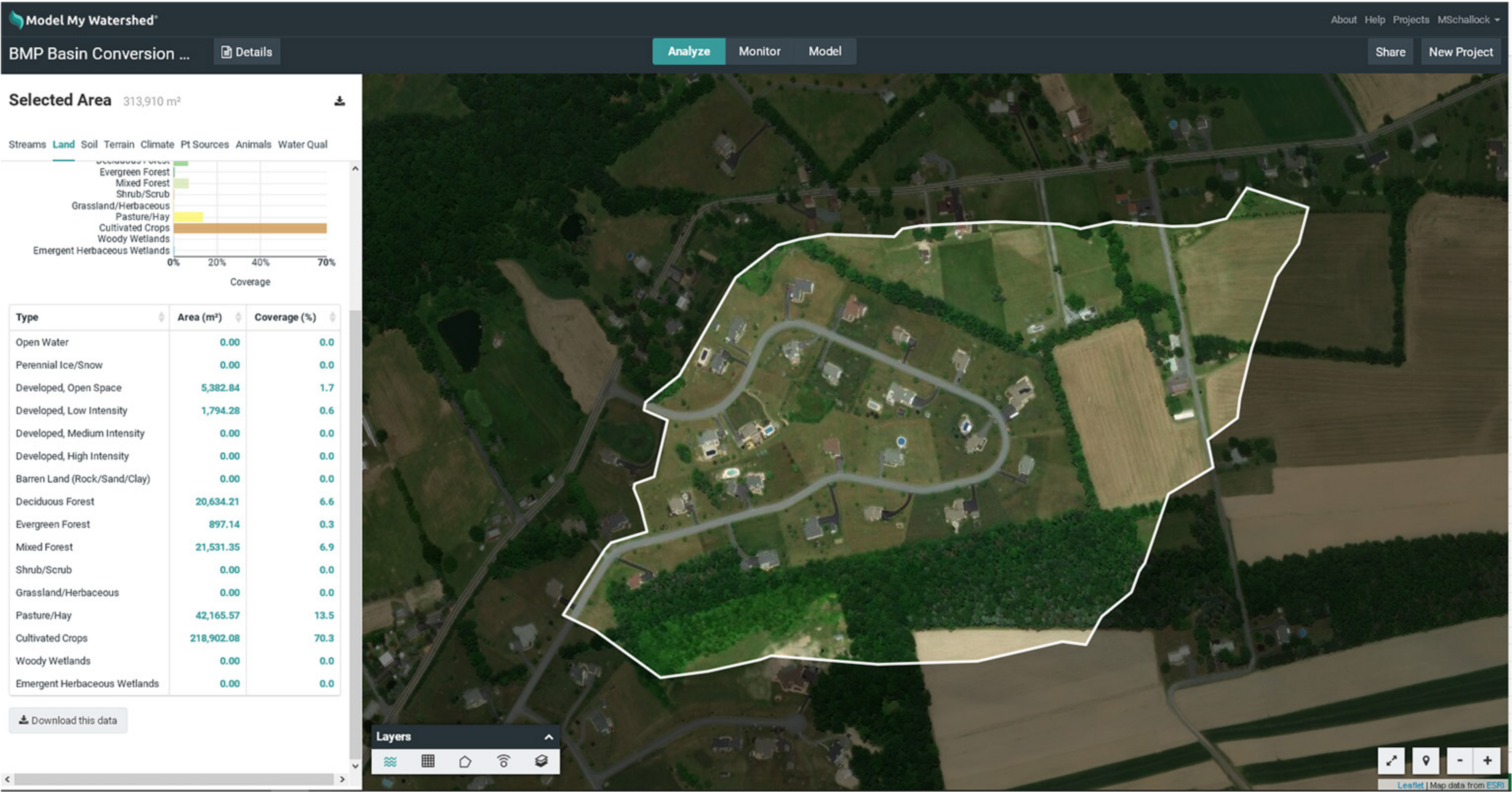
TOTAL DRAINAGE AREA (Acres):	76.93
TOTAL IMPERVIOUS AREA (Acres):	0.47

BMP SEDIMENT LOAD (lbs/yr):	18,865.69
------------------------------------	------------------

EXISTING SEDIMENT REMOVAL REDUCTIONS

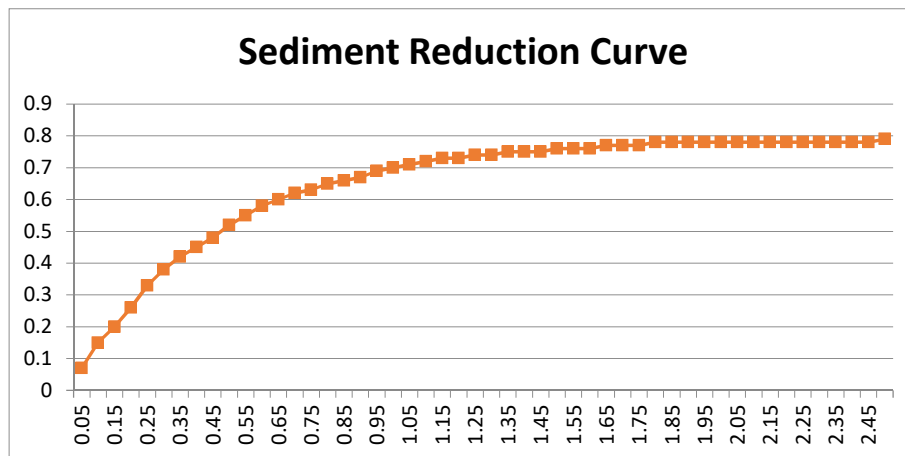
PROPOSED SEDIMENT REMOVAL REDUCTIONS

Volume Treated (ac-ft.)	0.086
Inches of Impervious Area Treated:	2.20
Percent Reduction:	78%
Removed Sediment:	14,715.24



MOORE TOWNSHIP - SEDIMENT LOADING TO PROPOSED BMP'S

BMP NAME: Outfall H023 - Basin Retrofit



TOTAL DRAINAGE AREA (Acres):	56.53
TOTAL IMPERVIOUS AREA (Acres):	3.73

BMP SEDIMENT LOAD (lbs/yr):	19,860.77
------------------------------------	------------------

EXISTING SEDIMENT REMOVAL REDUCTIONS

PROPOSED SEDIMENT REMOVAL REDUCTIONS

Volume Treated (ac-ft.)	0.331
Inches of Impervious Area Treated:	1.07
Percent Reduction:	71%
Removed Sediment:	14,101.15



MS4 OUTFALL AND STORM SEWER MAP



Legend

Proposed BMP's

- Basin Conversion 001
- Basin Conversion 002
- Basin Conversion 003
- Basin Conversion 005
- Basin Conversion 006
- Basin Conversion 007
- VTU 007

Stormwater Discharge Points

- Outfall/Check Point

Stormwater Structures

- "M" Top
- "S" Top
- "C" Top
- Manhole
- Endwall
- Headwall
- Fes
- Pipe

Stormwater Lines

- Collector
- Culvert
- OpenChannel

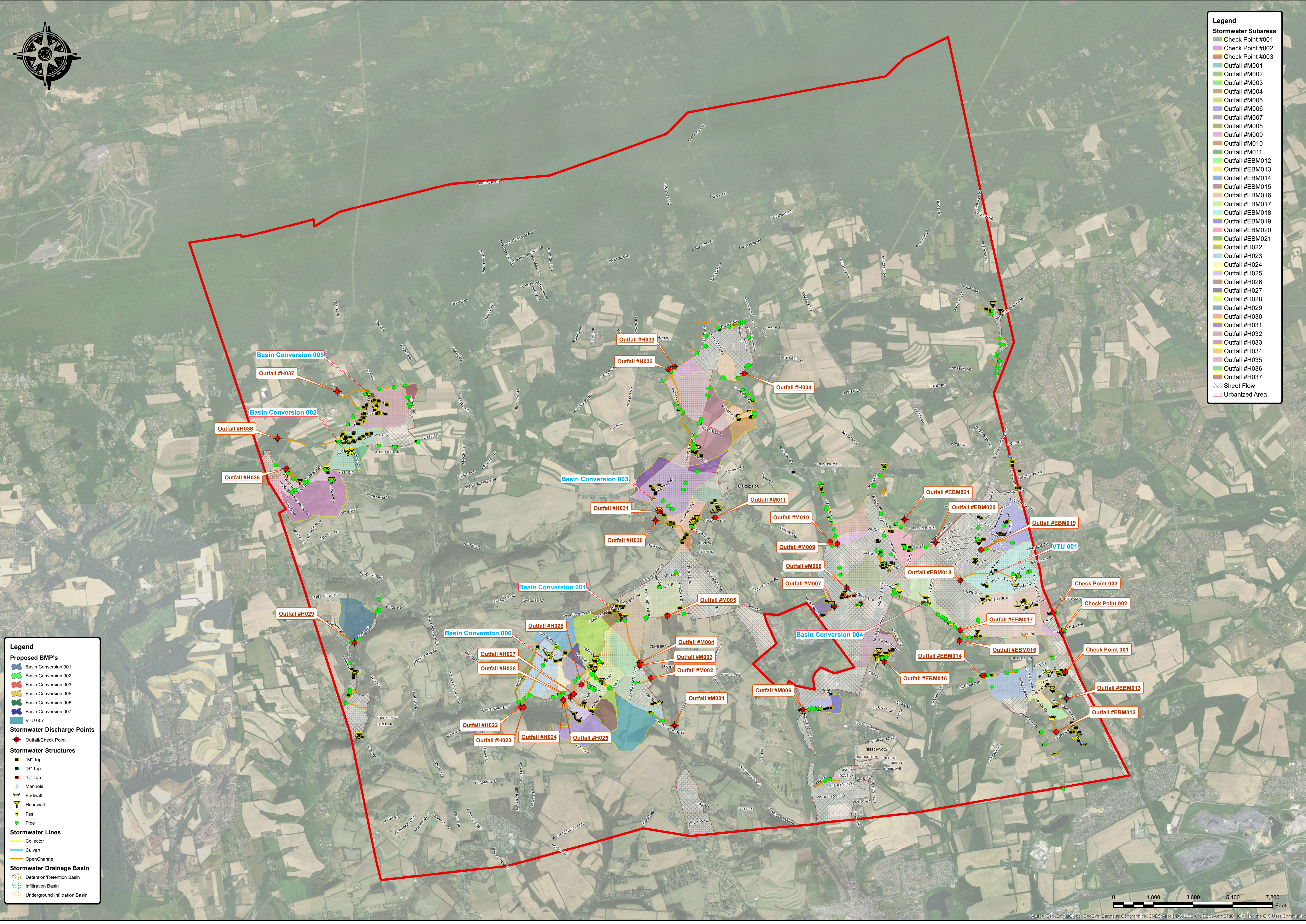
Stormwater Drainage Basin

- Detention/Retention Basin
- Infiltration Basin
- Underground Infiltration Basin

Legend

Stormwater Subareas

- Check Point #001
- Check Point #002
- Check Point #003
- Outfall #M001
- Outfall #M002
- Outfall #M003
- Outfall #M004
- Outfall #M005
- Outfall #M006
- Outfall #M007
- Outfall #M008
- Outfall #M009
- Outfall #M010
- Outfall #M011
- Outfall #EBM012
- Outfall #EBM013
- Outfall #EBM014
- Outfall #EBM015
- Outfall #EBM016
- Outfall #EBM017
- Outfall #EBM018
- Outfall #EBM019
- Outfall #EBM020
- Outfall #EBM021
- Outfall #H022
- Outfall #H023
- Outfall #H024
- Outfall #H025
- Outfall #H026
- Outfall #H027
- Outfall #H028
- Outfall #H029
- Outfall #H030
- Outfall #H031
- Outfall #H032
- Outfall #H033
- Outfall #H034
- Outfall #H035
- Outfall #H036
- Outfall #H037
- Sheet Flow
- Urbanized Area



KEYSTONE CONSULTING ENGINEERS, Inc.
2870 EMRICK BOULEVARD, BETHLEHEM, PA 18020 - 610-865-4555
6235 HAMILTON BOULEVARD, WESCOVILLE, PA 18106 - 610-395-0971
865 INTERCHANGE ROAD, KRESSEVILLE, PA 18333 - 610-681-5233
www.KCEInc.com

KEYSTONE CONSULTING ENGINEERS

STORMWATER SUBAREAS AND PROPOSED BMP 'S

MOORE TOWNSHIP
STORM SEWER LOCATION MAP
MOORE TOWNSHIP, NORTHAMPTON COUNTY PENNSYLVANIA

MT-08-026

DESIGNED: MPS

DRAWN: MPS

CHECKED BY: KJH

DATE: 1-31-2019

SCALE: 1" = 1,800'

SHEET: 1 OF 1

REVISIONS

DATE

DRAWN

PUBLIC NOTICE ADVERTISEMENT

THIS PAGE
INTENTIONALLY
LEFT BLANK

PUBLIC COMMENTS AND RESPONSES

THIS PAGE
INTENTIONALLY
LEFT BLANK

MCM 3:
Illit Discharge Detection and Elimination

MCM 3: Illicit Discharge Detection and Elimination

Importance of Illicit Discharge, Detection and Elimination (IDD&E)

Discharges into surface waters such as rivers, streams, lakes, and ponds from municipal separate storm sewer systems (MS4s) often include wastes and wastewater from non-stormwater sources. A study conducted in 1987 in Sacramento, California, found that almost one-half of the water discharged from a local MS4 was not directly attributable to precipitation runoff. A significant portion of the dry weather flows were from illicit and/or inappropriate discharges and connections to the system. Pollutant levels from these illicit discharges have been shown in EPA studies to be high enough to significantly degrade receiving water quality and threaten aquatic, wildlife, and human health.

The objective of the illicit discharge detection and elimination minimum control measure is for the Township to gain a thorough awareness of its storm sewer system. This awareness will allow the Township to determine the types and sources of illicit discharges entering its system and establish the legal, technical, and educational means needed to eliminate these discharges.

Definition of “Illicit Discharge”

Federal regulations define an illicit discharge as “... any discharge to an MS4 that is not composed entirely of stormwater ...”. Illicit discharges include the following non-stormwater wastes:

- Sanitary wastewater;
- Effluent from septic tanks;
- Carwash wastewater;
- Improper disposal of automobile and household toxins;
- Improper disposal of oil;
- Laundry wastewater; and
- Spills from roadway accidents.

The following non-stormwater wastes are not considered illicit discharges:

- Discharges from fire-fighting activities;
- Runoff from irrigation practices;
- Diverted stream flows;
- Uncontaminated ground water infiltration;
- Uncontaminated pumped ground water;
- Discharges from potable water sources;
- Foundation drains;
- Air conditioning condensate;
- Springs;
- Water from crawl space pumps; and
- Discharges from NPDES-permitted industrial sources.

Illicit discharges enter the system through either direct connections (e.g., wastewater piping either mistakenly or deliberately connected to the storm drains) or indirect connections (e.g., infiltration into the storm sewer system from cracked sanitary sewer systems, spills or toxins collected by or dumped directly into storm sewer inlets). The result is untreated discharges that

contribute high levels of pollutants, including heavy metals, toxins, oil and grease, solvents, nutrients, viruses, and bacteria to receiving waterbodies.

Program Development Requirements

In order to reduce to the maximum extent practicable the adverse impacts of illicit discharges on surface water quality, the IDD&E Program must address the following minimum requirements.

- Establish written practices and procedures to identify and eliminate illicit discharges to surface waters and screen storm sewer outfalls;
- Prepare a storm sewer system map showing the location of all outfalls and the names and locations of all waters of the United States that receive discharges from those outfalls;
- Prohibit, through ordinance or other regulatory mechanism to the extent allowable under State or local law, non-stormwater discharges into the MS4 and enact appropriate enforcement procedures and penalties;
- Devise a plan to detect and address non-stormwater discharges, including illegal dumping, into the MS4; and
- Educate Township employees, businesses, and the general public about the hazards associated with illegal discharges and improper disposal of waste.

BMP 3-1: Develop, Implement, and Maintain a Written Program for the Detection, Elimination, and Prevention of Illicit Discharges (Including Illegal Dumping)

A. Implementation

1. Detection and Reporting of Illicit Discharges

a. Public

- i. The Township should educate the public about the hazards of illicit discharges (including illegal dumping), how to identify a suspected illicit discharge, and what to do if one identifies a suspected illicit discharge using best practices contained in BMP 1-4 and BMP 3-6 herein.
- ii. The Township should implement the following procedures to facilitate the public reporting of suspected illicit discharges.
 - Include as a part of the forthcoming Township MS4 website prominently displayed information regarding illicit discharges including a telephone number and an email address for public reporting purposes.
 - Designate one or more Township employees (e.g. Township secretary, Township Zoning Officer, etc.) to receive, document, process, and manage public reports of suspected illicit discharges (the Manager).
 - Provide initial and ongoing education and training as needed to ensure that the Manager is familiar with established policies and procedures and is able to

properly perform tasks related to the receipt and management of public reports of suspected illicit discharges.

- The Manager should complete Section 1 of the Suspected Illicit Discharge – Report Form contained in Appendix A1 of this Manual for each report received.
- The Manager should make a copy of the partially completed Report Form, maintain the original in a designated location, and forward the copy to the Investigator described below.
- Following the investigation, the Manager should obtain the completed Report Form from the Investigator along with any photographs, test results, or other documentation related to the investigation of the suspected illicit discharge.
- The Manager should contact the complainant by telephone and provide the complainant with a summary of the investigation into the suspected illicit discharge, actions taken, if any, to resolve the issue, and planned future action, if any, on the part of the Township (unless pending or possible future litigation involving the source of the suspected illicit discharge prevents such follow-up with complainant).
- The Manager should complete the 'Follow-Up with Complainant' section of the Report Form.
- The Manager should file the completed Report Form along with any photographs, test results, or other documentation related to the investigation of the suspected illicit discharge in the designated location.
- At the end of each permit year (September 30), the Manager should make copies of all completed Report Forms and furnish same to the Township Engineer for inclusion in the MS4 Annual Report.

b. Township Employees

- i. The Township should educate its employees about the hazards of illicit discharges (including illegal dumping), how to identify a suspected illicit discharge, and what to do if one identifies a suspected illicit discharge.
- ii. The Township should reinforce in its employees their responsibility to look out for suspected illicit discharges while performing their primary job responsibilities.
- iii. The Township should implement the following procedures for the reporting of suspected illicit discharges by its employees.
 - Employees should verbally report suspected illicit discharges to their department head who will then convey the information to the Manager described above or advise the employee to convey the information to the Manager directly.

- The Manager will process the suspected illicit discharge according to the procedure outlined above.
- c. Outfall Screening
 - i. The Township should regularly screen identified outfalls in Urbanized Areas.
 - ii. Refer to BMP 3-4 herein for guidance related to outfall screening practices.
- 2. Investigation and Elimination of Illicit Discharges
 - a. Designate one or more qualified person or persons (e.g. Township Engineer, Sewage Enforcement Officer, Zoning Officer, etc.) to investigate reports of suspected illicit discharges (the Investigator).
 - b. Provide initial and ongoing education and training as needed to ensure that the Investigator is familiar with established policies and procedures and is able to properly perform tasks related to the investigation of suspected illicit discharges.
 - c. The Investigator should assess the reported suspected illicit discharge in accordance with the procedures described in "Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessment" (the IDD&E Guidance Manual) which is included as an attachment to this Manual.
 - d. If deemed illicit, the Investigator should attempt to identify the source of the discharge in accordance with the procedures described in the IDD&E Guidance Manual.
 - e. If the source is able to be identified, the Township should take any and all reasonable and legal actions it deems appropriate to correct or eliminate the illicit discharge.
 - f. The Investigator should document the findings of the investigation, actions taken, if any, to resolve the issue, and planned future action, if any, on the part of the Township in Sections 2 and 3 of the Suspected Illicit Discharge – Report Form contained in Appendix A1 of this Manual.
 - g. Following the investigation, the Investigator should return the completed Report Form to the Manager along with any photographs or other documentation related to the investigation of the suspected illicit discharge.
- 3. Gaining Access to Private Property
 - a. The Investigator should not enter private property to investigate a suspected illicit discharge without prior authorization from the department head.
 - b. The Investigator should conduct any authorized investigations or other activities on private property in a respectful and unintrusive manner to the extent practicable.
 - c. The Township, with assistance from the Township Solicitor and Township Engineer, should review the suitability of existing Township ordinances to permit access by the

Township to private property for the purposes of investigating and correcting illicit discharges and enact new or amended ordinances as necessary.

- d. Upon adoption of any new or amended ordinances to permit access to private property as described above, the Township should amend this section of the Program to include any specific policies or protocol from the ordinance.

B. Measurable Goals

1. Develop the IDD&E Program during the first year of permit coverage (completed during permit year ending September 30, 2014).
2. Establish a dedicated telephone number and email address to accept public reports of suspected illicit discharges (permit year ending September 30, 2015).
3. Maintain records of all reports of suspected illicit discharges including the report form, any photographs or other documentation, the findings of the investigation, actions taken, if any, to resolve the issue, and planned future action, if any, on the part of the Township.
4. Review the suitability of existing Township ordinances to permit access by the Township to private property for the purposes of investigating and correcting illicit discharges and enact new or amended ordinances as necessary.
5. Document any new or amended ordinances related to the IDD&E Program adopted during each reporting period.
6. Review and update the IDD&E Program annually and implement improvements as appropriate.

BMP 3-2: Develop and Maintain a Map of the Regulated MS4 Watershed Area

A. Implementation

1. The Township Engineer should locate by field survey using a hand-held GPS device or other appropriate equipment and document any new or altered outfalls within Urbanized Areas of the Township.
2. Location information should include both horizontal and vertical positioning data reflecting the North American Datum of 1983 (NAD83) State Plane Coordinate System, Pennsylvania South Zone and North American Vertical Datum of 1988 (NAVD88), respectively.
3. The Township should consider expanding its mapping program to include outfalls in Non-Urbanized Areas of the Township.

B. Measurable Goals

1. Update the MS4 Watershed Map to identify all outfalls within Urbanized Areas of the Township during the first year of permit coverage (completed during permit year ending September 30, 2014).

2. Review the MS4 Watershed Map annually and update as necessary.

BMP 3-3: Develop and Maintain a Map of the Storm Sewer Collection System within the Regulated MS4 Watershed Area

A. Implementation

1. The Township Engineer should locate by field survey using a hand-held GPS device or other appropriate equipment all Township-owned storm sewer system components, including inlets and catch basins, oil-debris separators, piping, culverts, open channels, basins, infiltration practices, and outfalls within Urbanized Areas of the Township.
2. Location information should include both horizontal and vertical positioning data reflecting the North American Datum of 1983 (NAD83) State Plane Coordinate System, Pennsylvania South Zone and North American Vertical Datum of 1988 (NAVD88), respectively.
3. The Township should consider documenting additional parameters for storm sewer system components including the following:
 - a. Inlet size, type, and grate elevation;
 - b. Endwall size and type;
 - c. Pipe size, type, and invert elevations;
 - d. Approximate volume, geometry, and type of basins and infiltration practices; and
 - e. Approximate geometry and longitudinal slopes for open channels.
4. The Township should consider authorizing the Township Engineer or other qualified professional to compile location information and additional parameters for storm sewer system components using ESRI ArcMap graphical information system (GIS) software which can serve as a valuable reference tool to assist the Township in the operation and maintenance of its storm sewer system.
5. The Township should consider expanding its mapping program to include storm sewer system components in Non-Urbanized Areas of the Township and privately-owned PCSM BMPs referenced in BMP 5-6 herein.

B. Measurable Goals

1. Update the MS4 Watershed Map to identify all storm sewer system components within Urbanized Areas of the Township during the first year of permit coverage (complete mapping of the remaining portion of the storm sewer system prior to the permit year ending September 30, 2017).
2. Review the MS4 Watershed Map annually and update as necessary.

BMP 3-4: Conduct Outfall Field Screenings

- A. Intent: Develop and implement a program to systematically screen identified outfalls within Urbanized Areas of the Township for the purposes of detecting and eliminating illicit discharges.
- B. Implementation
 - 1. Perform outfall field screenings according to the following general schedule.
 - a. Screen each identified outfall during dry weather conditions at least once during each five-year permit coverage term;
 - b. Screen outfalls annually in areas where past problems have been detected or known sources of dry weather flows occur on a regular basis; and
 - c. Screen outfalls in high impact areas such as those with high ratios of impervious cover or high levels of industrial activity more frequently and during varying seasonal and meteorological conditions.
 - 2. The Investigator defined in BMP 3-1 above or other designated, qualified person should screen outfalls to ensure accuracy and consistency.
 - 3. Document the findings of each outfall field screening using the Outfall Inventory and Screening Field Sheet contained in Appendix A1 of this Manual.
 - 4. Maintain copies of records of all outfall field screenings including the completed field sheet, photographs, other documentation, and test results, as applicable, in a designated location.
 - 5. Furnish original records of all outfall field screenings to the Manager defined in BMP 3-1 herein.
 - 6. At the end of each permit year (September 30), the Manager should make copies of records of all outfall field screenings performed during the past permit year and furnish same to the Township Engineer for inclusion in the MS4 Annual Report.
 - 7. Investigate suspected illicit discharges detected during field screenings in accordance with the procedures described in "Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessment" (the IDD&E Guidance Manual) which is included as an attachment to this Manual.
 - 8. Refer to the IDD&E Program in BMP 3-1 herein for guidance related to the investigation of suspected illicit discharges.
 - 9. The Township should consider expanding its screening program to include outfalls in Non-Urbanized Areas of the Township.
- C. Measurable Goals

1. Develop and implement an outfall field screening program during the first year of permit coverage (completed during permit year ending September 30, 2014).
2. Develop a written outfall screening schedule (permit year ending September 30, 2015).
3. Review the screening program annually and update as necessary.
4. Maintain records of all outfall field screenings including the completed field sheet, photographs, other documentation, and test results, as applicable.

BMP 3-5: Enact a Stormwater Management Ordinance (SWMO) that Includes a Prohibition of Non-Stormwater Discharges

A. Implementation

1. The Township, with assistance from the Township Solicitor and Township Engineer, should review the suitability of its current SWMO to prohibit non-stormwater discharges into its storm sewer system and take enforcement action (including imposing sanctions and penalties) against property owners in the event that a non-stormwater discharge is discovered.
2. Enact amendments to the SWMO as necessary.
3. Advertise any proposed amendments to the SWMO in accordance with Pennsylvania Municipalities Planning Code minimum requirements.
4. Provide opportunities for and actively solicit public involvement in the process of developing amendments to the SWMO.
5. Refer to BMP 2-2 herein for guidance related to advertising proposed amendments to the SWMO and soliciting public involvement in the process of developing those amendments.

B. Measurable Goals

1. Review the SWMO annually and update as necessary.
2. Properly advertise any proposed amendments to the SWMO using at least one alternate advertising channel in addition to the local newspaper.
3. Document any amendments to the SWMO adopted during each reporting period.

BMP 3-6: Provide Educational Outreach related to the IDD&E Program

A. Implementation

1. The Township should engage in educational outreach efforts to generate public awareness of and interest in its IDD&E Program and inform the public of the following:
 - a. What is an illicit discharge;
 - b. The hazards of illicit discharges, including illegal dumping;

- c. How to identify a suspected illicit discharge;
- d. What to do and how to report a suspected illicit discharge; and
- e. How to participate in programs and activities designed to identify and eliminate illicit discharges.

Refer to BMP 1-4 herein for suggested communication channels and best practices for devising effective public education and outreach initiatives.

- 2. The Township should organize or sponsor the following programs or other similar activities to involve the public in the implementation of its IDD&E Program.
 - a. Label outfalls and other storm drainage features to facilitate identification and public reporting of illicit discharges;
 - b. Volunteer efforts for locating, labeling, and visually inspecting outfalls and storm drains;
 - c. Recycling programs for commonly dumped wastes such as motor oil, antifreeze, paint, and pesticides; and
 - d. Specific initiatives to reach high-impact segments of the target audience such as commercial, industrial, and institutional entities that are likely to have a significant impact on stormwater (e.g. carpet cleaning businesses, gas stations, etc.).

Refer to BMP 2-3 herein for suggested methods to promote public involvement and participation.

- 3. Upon request by the Township, the Township Engineer will furnish educational materials and guidance resources and provide consulting services to assist with the administration of the IDD&E Program.

B. Measurable Goals

- 1. Upon establishing protocol for public reporting of suspected illicit discharges, publish promotional and educational information related to the IDD&E Program on the forthcoming Township MS4 website and in the Township newsletter.
- 2. Conduct at least one of the above or similar public outreach initiatives, activities, or programs related to the IDD&E Program annually.

MCM 6:
Pollution Prevention/Good Housekeeping
for Municipal Operations

Pollution Prevention /

MCM 6: Good Housekeeping for Municipal Operations

Importance of Pollution Prevention and Good Housekeeping for Municipal Operations

The Pollution Prevention / Good Housekeeping Program for municipal operations is a key element of the Small MS4 Stormwater Program (the Program). Due to the broad scope and extensive scale of its operational and maintenance responsibilities, the Township and its employees possess significant potential to impact stormwater runoff quality. For example, the Township routinely conducts activities such as lawn and landscaping maintenance, building and facilities maintenance, regular and winter road maintenance and repair work, and automobile and equipment fleet maintenance that can pose a threat to water quality. Additionally, the Township performs work intended to reduce the amount of pollutants that reach the storm sewer system such as parking lot and street sweeping and storm drain system cleaning. Finally, the Township is responsible to contain spills, manage trash and yard waste, and regulate non-stormwater discharges. Through thoughtful evaluation of these and other similar activities and the development and implementation of sound practices and procedures the Township can ensure it limits the amount of pollutants introduced into its storm sewer systems thereby improving stormwater runoff quality to the maximum extent practicable.

Program Development Considerations

The Township should consider the following general guidelines as it continues to implement and further develop its Pollution Prevention / Good Housekeeping Program for municipal operations:

- Practices and procedures to ensure the proper regular and long-term inspection and maintenance of structural and non-structural stormwater best management practices (BMPs) to reduce floatables and other pollutants that are discharged from storm sewer systems;
- Practices and procedures that will reduce or eliminate the discharge of pollutants from areas such as public roads and parking lots, Township maintenance and storage yards (including salt storage and snow disposal areas), and other Township facilities;
- Practices and procedures for the proper disposal of waste such as dredge spoil, accumulated sediments, floatables, and other debris removed from storm sewer systems and areas listed above; and
- Policies and regulations to require the evaluation of existing flood management projects for possible incorporation of additional water quality protection devices and to ensure that new flood management projects are assessed relative to their potential to impact water quality.

BMP 6-1: Identify and Document all Facilities and Activities Owned and/or Operated by the Township that have the Potential to Generate or Impact Stormwater Runoff

- A. The Township identified the following Township facilities and activities with the potential to generate or impact stormwater runoff:

1. Maintenance of storm sewer system components such as inlets and catch basins, oil-debris separators, piping, culverts, open channels, basins, infiltration practices, and outfalls including inspection and cleaning of storm drains and piping, controlling illicit discharges and connections, and controlling illegal dumping;
2. Maintenance of roads, parking areas, and loading areas including sweeping and cleaning, repair and maintenance, striping, application of salt or other deicing agents, and bridge and structure maintenance;
3. Maintenance and repair of buildings including Administrative offices, public works buildings, police and fire departments, garages and storage buildings, and others;
4. Maintenance of grounds and landscaping including mowing, trimming, planting, application of fertilizers or pesticide, erosion control, and managing landscape wastes;
5. Maintenance, repair, fueling, and washing of vehicles and equipment;
6. Handling and disposal of waste including debris removed from stormwater management BMPs, solid waste collection, waste reduction and recycling, household hazardous waste collection; landscaping wastes from municipal operations, and controlling litter and illegal dumping;
7. Material handling and storage including liquid containers and raw (e.g. salt, soil, etc.), and hazardous materials; and
8. Spill prevention and response.

B. Measurable Goals

1. Develop an inventory of Township facilities and activities with the potential to generate or impact stormwater runoff (completed during permit year ending September 30, 2014).
2. Review and update the inventory of Township facilities and activities on an annual basis.

BMP 6-2: Develop, Implement, and Maintain a Written Operation and Maintenance (O&M) Program for all Facilities and Activities Owned and/or Operated by the Township that have the Potential to Generate or Impact Stormwater Runoff

A. The Township should follow the practices and procedures outlined below when performing each of the following operation and maintenance activities.

1. Storm Sewer System Components
 - a. Inspect system components including inlets and catch basins, oil-debris separators, piping, culverts, open channels, basins, infiltration practices, and outfalls at least once per year. For the sake of efficiency, this could be done in conjunction with the annual street sweeping program.
 - b. Remove and collect debris.
 - c. Flush pipes to remove clogs or accumulated sediment and debris as necessary.

- d. Repair or replace damaged structures as necessary.
 - e. Repair and restabilize eroded and bare areas in vegetated channels.
 - f. Follow all Federal and state regulations related to the proper storage and disposal of waste removed from the storm sewer system.
 - g. Prior to disposal store waste in a contained covered location outside of 100-year flood plains.
2. Road and Parking Area Maintenance
- a. Resurfacing
 - Perform paving operations involving concrete asphalt or other sealers only during dry weather conditions.
 - Employ proper staging techniques such as covering storm drain inlets and manholes during paving operations, using erosion and sediment controls to decrease runoff from repair sites, and using drip pans, absorbent materials and other pollution prevention materials to limit leaks of paving materials and fluids from paving machines.
 - b. Salt Application and Storage
 - Store salt or alternative deicing materials in a contained covered location outside of 100-year flood plains.
 - Avoid over-application of deicing materials.
 - Calibrate equipment to apply deicing materials at a rate and spread width as appropriate based on site specific characteristics (e.g. road width, traffic volume, proximity to surface waters, etc.).
 - Use gravel rather than chemical deicers in environmentally sensitive areas when practicable.
 - c. Roadside Vegetation
 - Apply chemical fertilizers and pesticides sparingly.
 - Use natural fertilizers and pesticides as opposed to chemical equivalents whenever practicable.
 - Apply chemical fertilizers and pesticides during ideal weather conditions (e.g. low wind, no rain in near forecast).
 - When establishing roadside vegetation, select a type of grass that is both salt and drought-tolerant.
 - d. Cleaning
 - Sweep or vacuum Township streets in Urbanized Areas and parking areas at Township facilities at least once per year to remove pollutants such as trash, sediment buildup, and debris from curb gutters and storm sewer inlets.

- Sweep or vacuum streets in high impact areas such as those with high ratios of impervious cover or high levels of industrial activity more frequently.
- Maintain accurate logs of the number of curb-miles swept and the amount of waste collected.
- Evaluate the above logs and devise a sweeping schedule that will maximize pollutant removal.
- Follow all Federal and state regulations related to the proper storage, disposal, and reuse of sweepings.
- Prior to disposal or reuse, store sweepings in a contained covered location outside of 100-year flood plains.

3. Grounds Maintenance

- a. Plant locally or regionally native species whenever practicable.
- b. Plant non-turf grass areas wherever practicable. Alternative ground cover such as meadow grass, wild flowers, and shrubs require less water and maintenance than turf grass.
- c. Where turf is used, select a type of grass that can withstand drought and become dormant during prolonged hot, dry weather.
- d. Water plants and lawns sparingly. Use low-volume water application approaches such as drip or sprinkler irrigation systems wherever practicable.
- e. Cut grass to a minimum height of three to four inches.
- f. Leave mulched clipping on the lawn as a natural fertilizer.
- g. Apply mulch to planting beds to prevent weeds and retain soil moisture.
- h. Apply chemical fertilizers and pesticides sparingly.
- i. Use natural fertilizers and pesticides as opposed to chemical equivalents whenever practicable.
- j. Apply chemical fertilizers and pesticides during ideal weather conditions (e.g. low wind, no rain in near forecast).
- k. Follow application and safety instructions on the label when using chemical pesticides. Wear the appropriate protective equipment when working with organophosphate insecticides or concentrated sprays or dusts. Read and follow all safety precautions listed on pesticide labels and wash hands and face before smoking or eating.
- l. Rinse tools or equipment that were used to apply or incorporate pesticides in a bucket and apply the rinse water as if it were full-strength pesticide.

- m. Safely store for later use or dispose of any unused pesticides at a hazardous waste collection location.

4. Vehicle and Equipment Maintenance

a. Waste Reduction

- Minimize the number of solvents used. This makes recycling easier and it reduces hazardous waste management cost.
- Perform all liquid cleaning at a centralized station to ensure that solvents and residues stay in one area.
- Locate drip pans and draining boards to direct solvents back into a solvent sink or holding tank for reuse.

b. Use of Safer Alternative Chemical Products

- Use non-hazardous cleaners whenever practicable.
- Replace chlorinated organic solvents with non-chlorinated ones such as kerosene or mineral spirits.
- Purchase recycled products, such as engines, oil, transmission fluid, antifreeze, and hydraulic fluid, to help support the recycled products market.

c. Spill Containment and Cleanup

- Perform all maintenance activities inside or under cover to contain spills and prevent work surface runoff from entering storm drains.
- Clean up spills immediately without water whenever possible and properly dispose of clean up materials. Where necessary, use water sparingly.
- Seal floor drains.
- Consider hiring a service to collect spent solvents and other hazardous substances.
- Implement a spill prevention plan and maintain necessary spill kits nearby maintenance areas.

d. Good Housekeeping

- Update facility schematics to accurately reflect all plumbing connections.
- Closely monitor parked vehicles for leaks and place pans under any leaks to collect the fluids for proper disposal or recycling.
- Promptly transfer used fluids to recycling drums or hazardous waste containers.
- Dispose of liquid waste properly.
- In the event of a spill, cover drains with drain mats.
- Store cracked batteries in leak-proof secondary containers.

e. Parts Cleaning

- Use detergent-based or water-based cleaning systems instead of organic solvent degreasers.
- Steam clean or pressure wash parts instead of using solvents. Water discharged into the sanitary sewer may require treatment prior to release. Wastewater generated from steam cleaning can be discharged to an on-site oil/water separator.

5. Vehicle and Equipment Fueling

- a. Ensure vehicle fueling areas are properly paved with cement, concrete, or an equivalent impervious surface, with a two to four percent slope to prevent ponding, and separated from the rest of the site by a grade break or berm to prevent run-on of stormwater.
- b. Ensure vehicle fueling areas are properly covered. The cover should have minimum dimensions equal to or greater than the area within the grade break and should not drain onto the fuel dispensing area. Install a perimeter drain or slope the pavement inward so that runoff drains to a blind sump. It might be necessary to install and maintain an oil control device in catch basins that might receive runoff from the fueling area.
- c. Implement a spill prevention plan and maintain necessary spill kits nearby fueling areas.
- d. Inspect vehicle fueling areas and equipment regularly.
 - Check for external corrosion and structural failure in aboveground tanks.
 - Check for evidence of spills and overfills due to operator error.
 - Check for failure of any piping systems.
 - Inspect tank foundations, connections, coatings, tank walls, and piping systems.
 - Test above-ground tanks periodically for integrity using a qualified professional.
- e. Maintain vehicle fueling areas and equipment in good working condition.

6. Vehicle and Equipment Washing

- a. Use a commercial car wash whenever practicable.
- b. Avoid the use of detergents whenever possible. If detergents are necessary, use a phosphate-free, non-toxic, biodegradable soap. Using a commercial car wash.
- c. Wash vehicles and equipment in an area designed to collect and hold the wash water effluent generated. Recycle the wash water effluent or pump effluent onto grass or landscaped areas to provide filtration.
- d. If installation of a containment area is not feasible, wash vehicles and equipment on gravel, grass, or other permeable surfaces.

- e. Select location for wash area that does not drain to storm inlets to avoid discharges to the storm sewer system.
 - f. Avoid on-site pressure cleaning and steam cleaning whenever possible. If done on-site, do not pressure or steam clean in an area designated as a wellhead protection area of a public water supply.
 - g. Immediately contain and clean up spills.
7. Materials Handling and Storage
- a. General
 - Maintain an accurate inventory of materials to reduce the occurrence of overstocking hazardous materials.
 - Identify all hazardous and nonhazardous substances present at a facility.
 - Obtain a Material Safety Data Sheet (MSDS) for each material.
 - b. Hazardous Materials Storage
 - Note on the inventory of materials described above any special handling, storage, and/or disposal requirements for hazardous chemicals.
 - Label all containers with the name of the chemical, unit number, expiration date, handling instructions, and health or environmental hazards. Ensuring sufficient aisle space to provide access for inspections and to improve the ease of material transport.
 - Store materials in a contained covered location outside of 100-year flood plains.
 - Store materials away from high-traffic areas to reduce the likelihood of accidents that might cause spills or damage to drums, bags, or containers.
 - Stack containers in accordance with the manufacturers' directions to avoid damaging the container or the product itself.
 - Store containers on pallets or equivalent structures to facilitate inspection for leaks and prevent the containers from coming into contact with wet floors, which can cause corrosion. This consideration also reduces the incidence of damage by pests (insects, rodents, etc.).
 - Delegate the responsibility for management of hazardous materials to personnel trained and experienced in hazardous substance management.
 - Implement a spill prevention plan and maintain necessary spill kits nearby materials storage areas.
8. Spill Prevention and Response
- a. Identify the individual(s) responsible for implementing the Spill Prevention and Response Plan.

- b. Define safety measures associated with each potential type of waste (e.g. gasoline, fuel oil or other petroleum products; residential or industrial waste; etc.).
- c. Define the protocol for notification of appropriate authorities, such as police and fire departments, hospitals, or publicly-owned treatment works for assistance.
- d. Define procedures for containing, diverting, isolating, and cleaning up spills.
- e. Describe spill response equipment to be used, including safety and cleanup equipment.

B. Measurable Goals

1. Develop, implement, and maintain a written Operation and Maintenance (O&M) Program for all facilities and activities owned and/or operated by the Township that have the potential to generate or impact stormwater runoff (completed during permit year ending September 30, 2014).
2. Review and update the O&M Program on an annual basis.

BMP #6-3: Develop and Implement an Employee Training Program Designed to Further the Goal of Reducing or Preventing the Discharge of Pollutants from Municipal Operations

A. Applicability

1. All municipal employees, regardless of job description, should receive training designed to educate staff about potential sources of stormwater contamination and methods to minimize the impact of municipal operations on stormwater runoff quality.
2. Municipal employees who are directly involved in activities that have the potential to cause or prevent pollution should receive training tailored to their specific activities in addition to general training.

B. Approved Topics

1. General stormwater awareness
2. Detection, reporting, and elimination of illicit discharges
3. Operation and maintenance of stormwater management BMPs
4. Pollution prevention through good housekeeping procedures
5. Spill prevention and response

C. Instructional Methods and Resources

1. In-house classroom format
2. In-house "tailgate" meetings
3. On-the-job reinforcement

4. Workshops and conferences
5. Display or distribution of educational materials

D. Cost Savings Considerations

1. Incorporate initiatives into existing employee training programs.
2. Utilize free educational materials and training tools available through various online resources.
3. Select free or low-cost workshops or conferences presented by government agencies, outside organizations, and companies.

E. Implementation

1. The Township should provide at least four formal training sessions annually (one per quarter) to each employee.
2. At the beginning of each permit year, the Township Manager in cooperation with each department head should select general and job-specific training topics, select appropriate training methods, and set training schedules for the year for each respective department.
3. The Township should cover a variety of topics from year to year from the categories outlined above.
4. Department heads should strive to provide additional in-field training whenever possible to reinforce lessons taught during formal training sessions.
5. Department heads should post informational resources such as placards, posters, and stickers at appropriate locations around the work place to raise awareness of stormwater pollution prevention and remind employees of proper procedures.
6. Department heads should maintain records of training sessions using the Municipal Employee Training – Annual Report Form contained in Appendix A2 of this Manual.
7. At the end of each permit year (September 30), department heads should make copies of all completed Report Forms and furnish same to the Township Engineer for inclusion in the MS4 Annual Report.
8. Upon request by the Township, the Township Engineer will furnish educational materials and guidance resources and provide consulting services to assist with the administration of the municipal employee training program.

F. Measurable Goals

1. Develop a municipal employee training program during the first year of permit coverage (completed during permit year ending September 30, 2014).

2. Provide at least four formal training sessions annually (one per quarter) to each employee.
3. Maintain records of training sessions using the form contained in Appendix A2 of this Manual.
4. Implement and review the training program annually and update as necessary.

Outfall Inventory and Screening Field Sheet

Section 1: Background Data

Watershed Name:		Outfall ID:	
Date:		Time (Military):	
Investigator Name:		Rainfall (In.) in Last 24 Hrs.:	
Air Temperature:		Rainfall (In.) in Last 48 Hrs.:	
Latitude:	Longitude:	GPS Unit:	GPS LMK:
Camera:		Photo #s:	
Land Use(s) in Drainage Area ☐ Industrial ☐ Open Space Known Businesses/Industries: ☐ Urban Residential ☐ Institutional _____ ☐ Suburban Residential ☐ Other: _____ _____ ☐ Commercial ☐ Other: _____ _____			
Notes: (e.g. Origin of outfall, if known)			

Section 2: Outfall Description

Type	Material	Geometry	Dimensions	Submerged	
☐ Pipe	☐ RCP ☐ HDPE ☐ PVC ☐ CMP ☐ Steel ☐ Other: _____	☐ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☐ Single ☐ Double ☐ Triple ☐ Other: _____	Dia./Dims. _____ _____ _____ Depth: _____ Top Width: _____ Bot. Width: _____	Water: ☐ Yes ☐ No ☐ Part Sedmnt.: ☐ Yes ☐ No ☐ Part
☐ Channel	☐ Concrete ☐ Earthen ☐ Rip-rap ☐ Other: _____	☐ Trapazoidal ☐ Parabolic ☐ Other: _____			
☐ In Stream		(Applicable when collecting samples)			
Flow Present		☐ Yes ☐ No (If no, skip to Section 5)			
Flow Description		☐ Trickle ☐ Moderate ☐ Substantial			

Section 3: Quantitative Characterization

Field Data for Flowing Outfalls				
Parameter		Result	Unit	Equipment
☐ Flow #1	Volume		Liter	Bottle
	Time to Fill		Second	Stop Watch
☐ Flow #2	Flow Depth		Inches	Tape Measure
	Flow Width	_____ ' - _____ "	Ft.-In.	Tape Measure
	Traveled Length	_____ ' - _____ "	Ft.-In.	Tape Measure
	Travel Time		Seconds	Stop Watch
Water Temperature			F°	Thermometer
pH			pH	Test Strip/Probe
Ammonia			Miligrams/Liter	Test Strip

Outfall Inventory and Screening Field Sheet

Section 4: Physical Indicators for Flowing Outfalls Only

Are any physical indicators present in the flow? ☐ Yes ☐ No (If no, skip to Section 5)

Type	Description	Relative Severity Index		
☐ Odor	☐ Sewage ☐ Petrol./Gas ☐ Sulfide ☐ Other: _____ ☐ Rancid/Sour	☐ 1 Faint	☐ 2 Easily Detectible	☐ 3 Noticeable from Distance
☐ Color	☐ Clear ☐ Grey ☐ Green ☐ Red ☐ Brown ☐ Yellow ☐ Orange ☐ Other: _____	☐ 1 Faint color in bottle	☐ 2 Clearly visible in bottle	☐ 3 Clearly visible in flow
☐ Turbidity	See Severity	☐ 1 Slight Cloudy	☐ 2 Cloudy	☐ 3 Opaque
☐ Floatables (Excludes Trash)	☐ Sewage (Toilet paper, etc.) ☐ Petroleum (Oil sheen) ☐ Sewage ☐ Other: _____	☐ 1 Few/Slight Origin not Obvious	☐ 2 Some Indications of Origin	☐ 3 Some Origin Obvious

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are any physical indicators present that are not related to flow? ☐ Yes ☐ No (If no, skip to Section 6)

Indicator	Description	Comments
☐ Outfall Damage	☐ Peeling Paint ☐ Spalling or ☐ Corrosion Cracking	
☐ Deposits/Stains	☐ Oily ☐ Flow Line ☐ Paint ☐ Other: _____	
☐ Abnormal Vegetation	☐ Excessive ☐ Inhibited	
☐ Poor Pool Quality	☐ Odors ☐ Suds ☐ Colors ☐ Excess Algae ☐ Floatables ☐ Other: _____ ☐ Oil Sheen	
☐ Pipe Benthic Growth	☐ Brown ☐ Green ☐ Orange ☐ Other: _____	

Section 6: Overall Outfall Characterization

☐ Unlikely	☐ Potential (presence of 2 or more indicators)	☐ Suspect (1 or more indicators severity >3)	☐ Obvious
-----------------------------------	---	---	----------------------------------

Section 7: Data Collection

Sample for Lab Analysis	☐ Yes ☐ No	
If Yes, Collected from	☐ Flow ☐ Pool	
Intermittent Flow Trap Set	☐ Yes ☐ No	If yes, type? ☐ OBM ☐ Caulk Dam

Section 8: Any Non-Illicit Discharge Concerns (trash or needed infrastructure repairs)

Description:

Suspected Illicit Discharge - Report Form

Section 1: General Information

Responder Information	
Call Received by:	Call Date:
Precipitation Depth (In.) in Past 24-48 Hrs.:	Call Time (Military):
Reporter Information	
Name:	Incident Date:
Address:	Incident Time (Military):
Telephone Number:	Email Address:

Section 2: Incident Location

Latitude/Longitude:	Outfall Number:
Location of Discharge (nearest street intersection, address, nearby landmarks, etc.): _____ _____ _____	
Description	☐ Stream Corridor (In or Adjacent to Stream)
	☐ Outfall ☐ In-Stream ☐ Along Banks
	☐ Upland Area (Land not Adjacent to Stream)
	☐ Near Inlet ☐ Near Other Water Source (Detention Basin, Wetland, etc.)

Section 3: Upland Problem Indicator Description

☐ Dumping	☐ Soap Suds	☐ Oil, Solvents, Chemicals	☐ Other: _____
----------------------------------	------------------------------------	---	---------------------------------------

Section 4: Stream Corridor Problem Indicator Description

Flow Present	☐ Yes ☐ No
Flow Description	☐ Trickle ☐ Moderate ☐ Substantial ☐ Intermittant
Photo Provided	☐ Yes ☐ No (If yes, attach to form)
Odor	☐ None ☐ Musty ☐ Sewage ☐ Rotten Eggs ☐ Sour Milk ☐ Petroleum ☐ Other: _____
Color	☐ None ☐ Red ☐ Yellow ☐ Brown ☐ Green ☐ Grey ☐ Other: _____
Clarity	☐ Clear ☐ Cloudy ☐ Opaque
Floatables	☐ None ☐ Garbage ☐ Algae ☐ Dead Fish ☐ Oily Sheen ☐ Sewage (Toilet Paper, etc.) ☐ Other: _____
Additional Information: _____ _____ _____	
Suspected Violator or Source (Name, Address, Personal or Vehicle Description, License Plate Number, etc.): _____ _____ _____	

Suspected Illicit Discharge - Report Form

Section 5: Follow-Up Investigation

Investigator Name:	Date:
	Time (Military):
Date of Last Rainfall:	Approx. Rainfall Depth (In.):
☐ No Investigation Made	Reason:
☐ Referred to Outside Agency	Agency Name:
☐ Investigated: No Action Necessary	Reason:
☐ Investigated: Required Action	Reason:
Description of Action(s) Taken: _____ _____ _____ _____	
Hours between Call and Investigation:	Date Incident Closed:
Additional Information: _____ _____ _____ _____	

Municipal Employee Training - Annual Report Form

Session 1: January - March

Proctor Name:	Employee Attendee Names: _____ _____ _____ _____ _____ _____ _____	
Date:		
Topic:		
Duration:		
Training Session / Resource Type: ☐ Video ☐ General Discussion ☐ On-Job Reinforcement ☐ Conference ☐ Vendor Presentation ☐ Other: _____		

Session 2: April - June

Proctor Name:	Employee Attendee Names: _____ _____ _____ _____ _____ _____ _____	
Date:		
Topic:		
Duration:		
Training Session / Resource Type: ☐ Video ☐ General Discussion ☐ On-Job Reinforcement ☐ Conference ☐ Vendor Presentation ☐ Other: _____		

Session 3: July - September

Proctor Name:	Employee Attendee Names: _____ _____ _____ _____ _____ _____ _____	
Date:		
Topic:		
Duration:		
Training Session / Resource Type: ☐ Video ☐ General Discussion ☐ On-Job Reinforcement ☐ Conference ☐ Vendor Presentation ☐ Other: _____		

Session 4: October - December

Proctor Name:	Employee Attendee Names: _____ _____ _____ _____ _____ _____ _____	
Date:		
Topic:		
Duration:		
Training Session / Resource Type: ☐ Video ☐ General Discussion ☐ On-Job Reinforcement ☐ Conference ☐ Vendor Presentation ☐ Other: _____		

