

Replacement Pages for Errata

Periodically, changes/corrections are made to Rainwater and Land Development manual text or to figures, and then are present in subsequent printings or files posted to the ODNR Rainwater and Land Development manual web page.

This page is intended for manuals printed between 11-29-07 and 6-22-09.

On **June 23, 2009**, the following pages were changed or corrected:

Chapter 2 pages 44 (equation rewritten but effectively unchanged);
Chapter 5 page 29 (practice numbering corrected);
Chapter 6 page 21 (practice numbering);
Chapter 7 pages 3, 7, 10, 17 (practice numbering);
Appendix 6 pages 1-18 (new text-pg 1, removed extra tables & a typo).

This manual was printed on _____ and had replacement
pages printed & inserted on the following dates: _____

Sizing the Pretreatment Facility – The size of the pretreatment facility is based on the infiltration rate of the soil in which the infiltration trench is built. For soils with infiltration rates of 2.0 inches per hour or less, the pretreatment facility shall be sized to contain 25% of the WQ_v. For infiltration rates greater than 2.0 inches per hour, the pretreatment facility shall be sized to contain 50% of the WQ_v.

Exit Velocity from Pretreatment Facility – The velocity of runoff as it exits from the pretreatment device must be non-erosive.

Drain Time Requirements – The practice is to be designed to infiltrate the Water Quality Volume (WQ_v, see page 30 of this chapt.) through the bottom floor of the structure in 24 to 48 hours. Drain times in excess of 72 hours should be avoided to prevent mosquito-breeding habitat from forming. Flows in excess of the WQ_v are to be diverted around the trench.

Dimensions – The dimensions of the storage reservoir (infiltration trench) are made by fitting the length, width and depth into a configuration, which satisfies drain time and storage volume requirements. The trench dimensions shall be sized by accepted engineering methods such as those outlined below:

1. **Determine Initial Storage Depth** – The bottom of the infiltration trench must be deeper than 2 feet to avoid freezing and shallow enough to leave at least 3 feet between the seasonal high-water table or bedrock and the trench bottom. Soil morphology also must be considered in determining the dimensions of the storage reservoir to utilize the optimum horizons or strata. The presence of a thin, slowly permeable soil horizon may require a trench depth which completely penetrates it to more permeable underlying material. Long trenches may need to be curved parallel to the topographic contour in order to keep the trench bottom elevation within the optimum depth in the soil profile.

2. **Determine Area of Trench Bottom** – The bottom of the trench is to be completely flat so as to allow runoff to infiltrate through the entire surface.

$$A_{min} = \frac{WQ_v}{Porosity * (E * T)}$$

Where: A_{min} = Minimum area of the bottom of the trench (ft²);

WQ_v = Water Quality Volume (ft³); (Trench volume less stone volume).

E = Exfiltration Rate (ft/hr); (Soil infiltration rate at trench bottom)

T = Drain Time (hr) (Must be 24 to 48 hrs per Ohio EPA requirements)

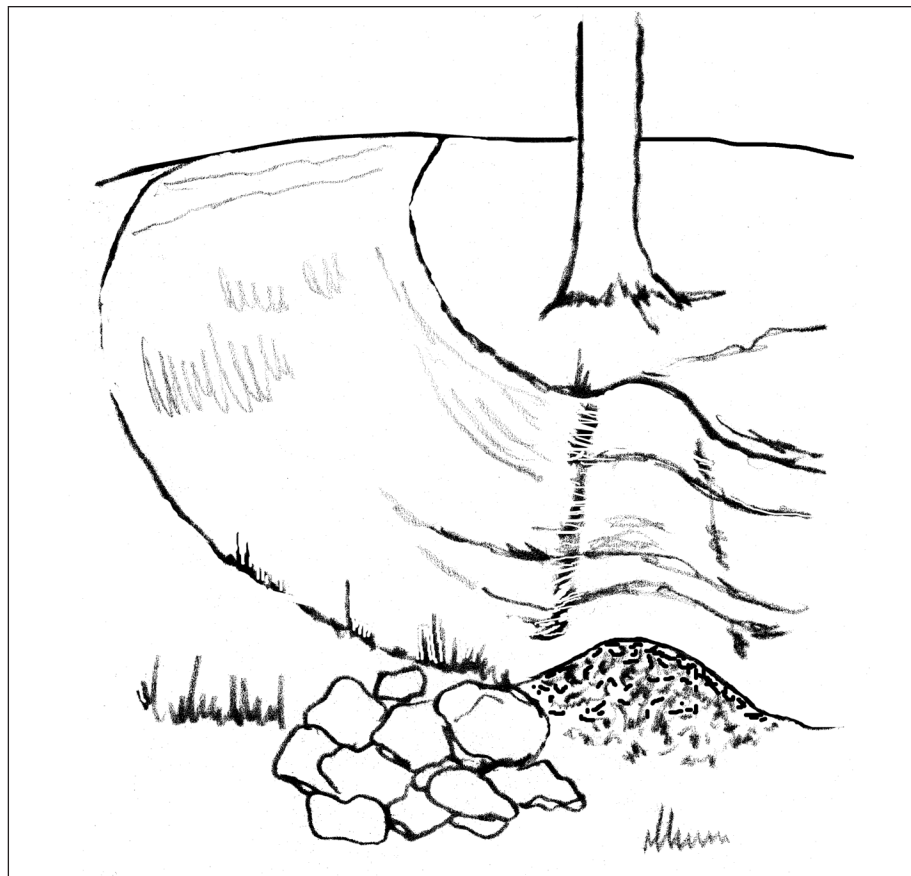
The excavated volume of the trench is the WQ_v divided by porosity or the void space of the stone.

Determine Length and Width – A long, narrow trench is less affected by water table mounding. If depth to seasonal high-water table or bedrock is within 5 feet of the trench bottom, it is advisable to design the trench as long and narrow as possible. Otherwise, the configuration of the trench is not restricted and is only limited by site design constraints.

Stone – The infiltration trench is filled with clean, washed aggregate. Stone with a diameter of between 1 and 3 inches should be used.

Geotextile – The sides and top of the trench must be lined with a non-woven geotextile to restrict the amount of sediment entering the structure. The top layer of the geotextile should be covered by 6-to-12 inches of smaller sized gravel (0.75-inch diameter). This top layer

5.6 Water Bar



Description

A water bar is a diversion constructed across the slope of an access road or utility right-of-way. Water bars are used to reduce concentrated runoff on unpaved road surfaces, thus reducing water accumulation and erosion gullies from occurring. Water bars divert runoff to road side swales, vegetated areas or settling ponds.

Conditions Where Practice Applies

Water bars are used at construction site ingress/egress points, on long sloping access roads, on temporary construction roads, or at utility right-of-ways which do not have a stable surface or where runoff would otherwise collect and cause erosion.

Planning Considerations

If the contributing area is disturbed, this practice should be associated with sediment traps that will receive and treat the runoff.

The outlet of each water bar must be resistant to erosion. For small contributing areas, spreading the flow into an undisturbed vegetated area may be sufficient. For larger areas or higher velocities flow may need rock outlet protection to prevent gully erosion.

6.2 Sediment Trap



Description

A sediment trap is a temporary settling pond formed by construction of an embankment and/or excavated basin and having a simple outlet structure that is typically stabilized with geotextile and rip-rap. Sediment traps are constructed to detain sediment-laden runoff from small, disturbed areas for a sufficient period of time to allow the majority of the sediment to settle out. They are established early in the construction process using natural drainage patterns and favorable topography where possible to minimize grading.

Conditions Where Practice Applies

Sediment traps are used:

1. At the outlets of diversions, channels, slope drains, or other runoff conveyances that discharge sediment-laden water.
2. Below disturbed areas where the total contributing drainage area is **5 acres or less**. If the contributing drainage area is greater than 5 acres, the use of a Sediment Basin is recommended.
3. Where access can be maintained for removal and proper disposal of sediment.
4. In drainage swales or areas, where sediment control is needed upstream of a drainage pattern leading to a storm drain inlet.
5. Where the required life of the structure will be 18 months or less.

7.1 Minimized Phased Disturbance



Description

Phased disturbance limits the total amount of grading at any one time and sequences operations so that at least half the site is either left as undisturbed vegetation or re-stabilized prior to additional grading operations. This approach actively monitors and manages exposed areas, so that erosion is minimized and sediment controls can be more effective in protecting aquatic resources and downstream landowners.

Condition Where Practice Applies

This practice can be applied anywhere development occurs and is well suited to protect critical areas on and off site, such as wetlands, streams, ponds and highly erodible areas subject to high erosion rates. The practice is applicable where natural vegetation can act as a soil stabilizer during development and perhaps as a water quality feature after construction.

Planning Considerations

Two planning principles should be applied for phased disturbance. First, developments should be fit around the natural site conditions (e.g. topography, drainage, vegetation and setting) and thus involve less grading and fewer offsite impacts than conventional development patterns. Practically this means retaining undisturbed green space around water resources and on critical areas like steep slopes.

The second planning principle is focused on managing active construction, so that at least 50% of the land area is maintained in vegetation. By anticipating the timing and extent each grading and construction operation, along with erosion and sediment controls, exposed ground does not sit idle. This management principle is applied by developing phases of a project that can be brought to completion quicker than the entire parcel; and by utilizing

7.2 Clearing and Grubbing



Description

Clearing and grubbing is the removal of trees, brush and other unwanted material in order to develop land for other uses or provide access for site work. Clearing generally describes the cutting and removal of above ground material while grubbing is the removal of roots, stumps, and other unwanted material below existing grade.

Clearing and grubbing includes the proper disposal of materials and the implementation of best management practices in order to minimize exposure of soil to erosion and causing downstream sedimentation.

Condition Where Practice Applies

This practice may be applied anywhere existing trees and other material must be removed for development to occur. The potential for erosion and sedimentation increases as: the vegetation removed; area disturbed or watercourses encountered increases.

Planning Considerations

Site assessment, selection and marking

Sites should be assessed to determine areas to be left undisturbed as well as trees or vegetated areas to be saved (see tree preservation area). These areas need to be clearly marked on plans and in the field. Land clearing activities should not begin until the site assessment and the field marking is concluded.

Timing and Phasing

Large-scale sites should be cleared in phases, with initiation of each phase delayed until actual construction is scheduled for that area of the site.

7.3 Tree and Natural Area Reservation



Description

Tree and natural area preservation insures that important vegetated areas existing on-site prior to development will survive the construction process. Tree protection areas prevent the losses and damages to trees that are common as a result of construction. This practice is useful to protect individual trees, and areas of forest or natural vegetation in stream corridors, or open space.

Conditions Where Practice Applies

This practice is applicable to any tree, forested or naturally vegetated area planned for long-term survival and subject to construction impacts. Existing trees provide valuable benefits during and after construction including: reduced erosion, reduced runoff rates and volume, reduced cooling costs, sound and visual barriers and higher property values.

Planning Considerations

Preservation of important natural areas must begin before the location of buildings, roads and utilities is determined. Early site planning should include delineating forested areas and significant trees and creating an inventory of the existing trees on-site. These should influence the placement of roads, buildings, and parking areas in the same manner as topography, streams and wetlands.

Tree Stand Delineation – Useful information for the delineation may include:

- Stands of trees to be preserved
- Individual trees of significance due to age, size, history, or aesthetic value

7.4 Construction Entrance



Description

A construction entrance is a stabilized pad of stone underlain with a geotextile and is used to reduce the amount of mud tracked off-site with construction traffic. Located at points of ingress/egress, the practice is used to reduce the amount of mud tracked off-site with construction traffic.

Conditions Where Practice Applies

A construction entrance is applicable where:

- Construction traffic leaves active construction areas and enters public roadways or areas unchecked by effective sediment controls;
- Areas where frequent vehicle and equipment access is expected and likely to contribute sediment to runoff, such as at the entrance to individual building lots.

Planning Considerations

Construction entrances address areas that contribute significant amounts of mud to runoff by providing a stable area for traffic. Although they allow some mud to be removed from construction vehicle tires before they enter a public road, they should not be the only practice relied upon to manage off-site tracking. Since most mud is flung from tires as they reach higher speeds, restricting traffic to stabilized construction roads, entrances and away from muddy areas is necessary.

Appendix 6: Soils with Greatest Potential Use for Infiltration

The following is a list of Ohio soil map units that have the optimum soil characteristics for infiltration. These soils have a natural drainage class that is well drained, depths to bedrock over 100 inches and an appropriate saturated hydraulic conductivity between the depths of 20-60 inches.

Saturated hydraulic conductivity is the amount of water that would move vertically through a unit of saturated soil per unit time under hydraulic gradient, described in the National Soil Survey Handbook (<http://soils.usda.gov/technical/handbook/contents/part618p3.html#50>).

Of course, site designers must realize that soil map units are not enough information for design. For example, soil map units may have inclusions of other soils types. Some soil map units not listed here, such as the urban soil complex, are too disturbed to characterize consistently in this format. Also note that some of the following soils may have other limitations such as steep slopes and although they may receive water well, these may limit the potential of siting an infiltration practice at the particular area. Therefore on-site measures of soil and site characteristics are always recommended.

The following tables are listed by county, showing the soil map units that meet the 3 criteria for 'greatest potential use' for infiltration. If a county is not listed, that county does not have soil map units that meet all of the criteria. Assistance to identify the potential for infiltration of soils not included in this table can be obtained by contacting soil scientists with the ODNR-Division of Soil & Water Conservation or USDA-Natural Resources Conservation Service.

Adams County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
EkB	Elkinsville silt loam, 1 to 6 percent slopes	4,642	1.2
Ge	Gessie loam, frequently flooded	2,762	0.7
	Total	7,404	2.0

Allen County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
KnA	Knoxdale silt loam, 0 to 2 percent slopes, occasionally flooded	2,750	1.1
	Total	2,750	1.1

Ashland County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
WuB	Wooster-Riddles silt loams, 2 to 6 percent slopes	---	*
WuC	Wooster-Riddles silt loams, 6 to 12 percent slopes	---	*
WuD2	Wooster-Riddles silt loams, 12 to 18 percent slopes, eroded	---	*
	Total	0	0.0

* Less than 0.1 percent.

Ashtabula County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ch	Chagrin silt loam	2,319	0.5
Sm	Steep land, loamy	6,428	1.4
	Total	8,747	1.9

Athens County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Cd	Chagrin loam, rarely flooded	2,090	0.6
Cg	Chagrin silt loam, frequently flooded	14,250	4.4
CmC	Clymer loam, 8 to 15 percent slopes	1,000	0.3
HcA	Hackers silt loam, 0 to 3 percent slopes	820	0.3
Mp	Moshannon silt loam, frequently flooded	470	0.1
PaB	Parke silt loam, 2 to 6 percent slopes	450	0.1
RcC	Richland loam, 8 to 15 percent slopes	310	*
RcD	Richland loam, 15 to 25 percent slopes	3,640	1.1
	Total	23,030	7.1

* Less than 0.1 percent.

Auglaize County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam, occasionally flooded	2,890	1.1
	Total	2,890	1.1

Belmont County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
As	Ashton silt loam, occasionally flooded	319	*
Cf	Chagrin loam, occasionally flooded	2	*
Cg	Chagrin silt loam, occasionally flooded	2,240	0.6
DuB	Duncannon-Urban land complex, 0 to 15 percent slopes	514	0.1
No	Nolin variant silt loam, occasionally flooded	1,813	0.5
Nu	Nolin variant-Urban land complex	291	*
RcC	Richland loam, 8 to 15 percent slopes	684	0.2
RcD	Richland loam, 15 to 25 percent slopes	2,658	0.8
RcE	Richland moderately stony loam, 25 to 40 percent slopes	788	0.2
RkC	Richland channery loam, 8 to 15 percent slopes	39	*
RkD	Richland channery loam, 15 to 25 percent slopes	292	*
	Total	9,640	2.8

* Less than 0.1 percent.

WhC	Westmoreland silt loam, 6 to 15 percent slopes	3,142	0.9
WhD	Westmoreland silt loam, 15 to 25 percent slopes	13,234	3.6
WhE	Westmoreland silt loam, 25 to 35 percent slopes	13,957	3.8
	Total	37,298	10.3

* Less than 0.1 percent.

Crawford County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AdB	Alexandria silt loam, 2 to 6 percent slopes	1,038	0.4
AdC2	Alexandria silt loam, 6 to 12 percent slopes, moderately eroded	2,066	0.8
AdD2	Alexandria silt loam, 12 to 18 percent slopes, moderately eroded	573	0.2
HpE	Hennepin-Alexandria silt loams, 18 to 50 percent slopes	775	0.3
	Total	4,452	1.7

* Less than 0.1 percent.

Cuyahoga County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ch	Chagrin silt loam, occasionally flooded	4,252	1.4
GeF	Geeburg-Mentor silt loams, 25 to 70 percent slopes	5,194	1.8
	Total	9,446	3.2

Defiance County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ge	Genesee loam, occasionally flooded	3,299	1.2
	Total	3,299	1.2

Delaware County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
MaB	Martinsville loam, 2 to 6 percent slopes	24	*
MbB	Martinsville loam, till substratum, 2 to 6 percent slopes	959	0.3
McD2	Mentor silt loam, 12 to 18 percent slopes, eroded	63	*
RoA	Rosburg silt loam, 0 to 2 percent slopes, occasionally flooded	1,464	0.5
	Total	2,510	0.9

* Less than 0.1 percent.

Erie County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
NoA	Nolin silt loam, 0 to 2 percent slopes, occasionally flooded	576	0.3
	Total	576	0.3

Fairfield County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AfB	Alford silt loam, 2 to 6 percent slopes	2,163	0.7
AfC2	Alford silt loam, 6 to 12 percent slopes, eroded	1,860	0.6

Cg	Chagrin silt loam, frequently flooded	625	0.2
Gf	Gessie silt loam, occasionally flooded	1,748	0.5
Gg	Gessie silt loam, frequently flooded	1,841	0.6
HhC2	Hickory silt loam, 6 to 12 percent slopes, eroded	810	0.2
HkE	Hickory-Germano complex, 20 to 35 percent slopes	583	0.2
HmD2	Hickory-Gilpin complex, 12 to 20 percent slopes, eroded	2,889	0.9
PkB	Pike silt loam, 2 to 6 percent slopes	432	0.1
PkC2	Pike silt loam, 6 to 12 percent slopes, eroded	559	0.2
	Total	13,510	4.2

Fayette County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam	826	0.3
Rs	Ross silt loam	1,393	0.5
	Total	2,219	0.9

Franklin County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam, occasionally flooded	2,424	0.7
Uw	Urban land-Genesee complex, occasionally flooded	1,370	0.4
	Total	3,794	1.1

Gallia County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AkB	Allegheny loam, 3 to 8 percent slopes	550	0.2
AkC	Allegheny loam, 8 to 15 percent slopes	652	0.2
AkD	Allegheny loam, 15 to 25 percent slopes	587	0.2
Cg	Chagrin silt loam, frequently flooded	6,780	2.2
Cu	Cuba silt loam, occasionally flooded	1,226	0.4
EkB	Elkinsville silt loam, 1 to 6 percent slopes	2,129	0.7
	Total	11,924	4.0

Greene County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee loam	1,831	0.7
Rs	Ross loam	3,601	1.4
RtA	Rush silt loam, 0 to 2 percent slopes	2,036	0.8
RtB	Rush silt loam, 2 to 6 percent slopes	1,932	0.7
	Total	9,400	3.5

Guernsey County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AgC	Allegheny loam, 8 to 15 percent slopes	407	0.1
MeB	Mentor silt loam, 2 to 8 percent slopes	2,595	0.8

MeC	Mentor silt loam, 8 to 15 percent slopes	1,863	0.6
MeD	Mentor silt loam, 15 to 25 percent slopes	1,567	0.5
MfB	Mentor-Urban land complex, 2 to 8 percent slopes	152	*
MgB	Mentor silt loam, 2 to 6 percent slopes	8	*
RcC	Richland channery loam, 8 to 15 percent slopes	19	*
RcD	Richland channery loam, 15 to 25 percent slopes	471	0.1
	Total	7,082	2.1

* Less than 0.1 percent.

Hamilton County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee loam, occasionally flooded	3,912	1.5
Go	Genesee-Urban land complex, occasionally flooded	1,888	0.7
Hu	Huntington silt loam, occasionally flooded	875	0.3
Ju	Jules silt loam, occasionally flooded	5,635	2.1
McA	Martinsville silt loam, 0 to 2 percent slopes	2,073	0.8
McB	Martinsville silt loam, 2 to 6 percent slopes	616	0.2
PbB2	Parke silt loam, 3 to 8 percent slopes, eroded	575	0.2
PbC2	Parke silt loam, 8 to 15 percent slopes, eroded	914	0.3
PbD	Parke silt loam, 15 to 25 percent slopes	381	0.1
PbE	Parke silt loam, 25 to 35 percent slopes	381	0.1
PcB	Parke-Urban land complex, 3 to 8 percent slopes	519	0.2
PcC	Parke-Urban land complex, 8 to 15 percent slopes	320	0.1
RwB2	Russell silt loam, 3 to 8 percent slopes, eroded	1,621	0.6
RxB	Russell-Urban land complex, 3 to 8 percent slopes	8,304	3.1
UgB	Urban land-Elkinsville complex, 3 to 8 percent slopes	1,117	0.4
UgC	Urban land-Elkinsville complex, 8 to 15 percent slopes	722	0.3
Uh	Urban land-Huntington complex, frequently flooded	4,627	1.8
UmB	Urban land-Martinsville complex, 3 to 8 percent slopes	5,253	2.0
UmC	Urban land-Martinsville complex, 8 to 15 percent slopes	431	0.2
	Total	40,164	15.2

Hardin County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam	14	*
MaB	Martinsville loam, 1 to 4 percent slopes	397	0.1
No	Nolin silt loam, occasionally flooded	810	0.3
	Total	1,221	0.4

* Less than 0.1 percent.

Henry County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gm	Genesee loam	372	0.1
Rs	Ross loam	547	0.2
	Total	919	0.3

Highland County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
EKB	Elkinsville silt loam, 1 to 6 percent slopes	14	*
Gd	Gessie loam, frequently flooded	77	*
Ge	Gessie silt loam, occasionally flooded	8	*
Gn	Genesee silt loam	5,829	1.6
HkC2	Hickory silt loam, 6 to 12 percent slopes, moderately eroded	1,741	0.5
HkD2	Hickory silt loam, 12 to 18 percent slopes, moderately eroded	4,538	1.3
HkE2	Hickory silt loam, 18 to 25 percent slopes, moderately eroded	2,235	0.6
HkF2	Hickory silt loam, 25 to 35 percent slopes, moderately eroded	758	0.2
HyC3	Hickory clay loam, 6 to 12 percent slopes, severely eroded	352	*
HyD3	Hickory clay loam, 12 to 18 percent slopes, severely eroded	2,016	0.6
HyE3	Hickory clay loam, 18 to 25 percent slopes, severely eroded	201	*
OcA	Ockley silt loam, 0 to 2 percent slopes	141	*
OcB	Ockley silt loam, 2 to 6 percent slopes	566	0.2
OcC2	Ockley silt loam, 6 to 12 percent slopes, moderately eroded	444	0.1
OdB	Ockley-Urban land complex, gently sloping	40	*
Rn	Ross silt loam	2,944	0.8
RuB	Russell silt loam, 2 to 6 percent slopes	210	*
WvA	Williamsburg silt loam, 0 to 2 percent slopes	91	*
WvB	Williamsburg silt loam, 2 to 6 percent slopes	350	*
WvC	Williamsburg silt loam, 6 to 12 percent slopes	256	*
	Total	22,811	6.4

* Less than 0.1 percent.

Hocking County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AfB	Alford silt loam, 2 to 6 percent slopes	269	*
AfC	Alford silt loam, 6 to 12 percent slopes	638	0.2
AgB	Allegheny loam, 2 to 6 percent slopes	235	*
AgC	Allegheny loam, 6 to 12 percent slopes	242	*
Cg	Chagrin silt loam, frequently flooded	13,498	5.0
HcD2	Hickory-Gilpin complex, 12 to 20 percent slopes, eroded	62	*
HkD2	Hickory silt loam, 12 to 20 percent slopes, eroded	2	*
HkE2	Hickory silt loam, 20 to 35 percent slopes, eroded	46	*
HmC2	Hickory silt loam, 6 to 12 percent slopes, eroded	1	*
HmD2	Hickory silt loam, 12 to 18 percent slopes, eroded	1,380	0.5
HmE	Hickory silt loam, 20 to 35 percent slopes, eroded	746	0.3
HmF	Hickory silt loam, 25 to 40 percent slopes	464	0.2
HrE	Hickory-Germano complex, 20 to 35 percent slopes	13	*
PkC2	Pike silt loam, 6 to 12 percent slopes, eroded	2	*
Po	Pope loam, occasionally flooded	2,169	0.8
RcD	Richland loam, 15 to 25 percent slopes	5	*
	Total	19,772	7.3

* Less than 0.1 percent.

Jackson County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AkB	Allegheny loam, 3 to 8 percent slopes	319	0.1
AkC	Allegheny loam, 8 to 15 percent slopes	766	0.3
AkD	Allegheny loam, 15 to 25 percent slopes	2,166	0.8
Cu	Cuba silt loam, occasionally flooded	752	0.3
Ha	Haymond silt loam, occasionally flooded	10	*
	Total	4,013	1.5

* Less than 0.1 percent.

Jefferson County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
RaB	Richland silt loam, 2 to 6 percent slopes	68	*
RcB	Richland silt loam, 1 to 7 percent slopes	3,975	1.5
RcC	Richland silt loam, 7 to 15 percent slopes	200	*
	Total	4,243	1.6

* Less than 0.1 percent.

Lawrence County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Cg	Chagrin loam, frequently flooded	3,863	1.3
Ch	Chagrin silt loam, frequently flooded	63	*
Cu	Cuba silt loam, occasionally flooded	3,570	1.2
EkB	Elkinsville silt loam, 1 to 6 percent slopes	3,050	1.0
EKE	Elkinsville silt loam, 15 to 40 percent slopes	366	0.1
EmB	Elkinsville-Urban land complex, 1 to 8 percent slopes	3,657	1.3
	Total	14,569	5.0

* Less than 0.1 percent.

Licking County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AcB	Alford silt loam, 2 to 8 percent slopes	35	*
AcC2	Alford silt loam, 8 to 15 percent slopes, eroded	5	*
AfA	Alford silt loam, 0 to 2 percent slopes	610	0.1
AfB	Alford silt loam, 2 to 6 percent slopes	3,105	0.7
AfC2	Alford silt loam, 6 to 12 percent slopes, eroded	705	0.2
AhB	Alford-Urban land complex, 2 to 6 percent slopes	500	0.1
HkC2	Hickory silt loam, 6 to 12 percent slopes, eroded	490	0.1
HkD2	Hickory silt loam, 12 to 18 percent slopes, eroded	265	*
MnA	Mentor silt loam, 0 to 2 percent slopes	520	0.1
MnB	Mentor silt loam, 2 to 6 percent slopes	3,405	0.8
MnC2	Mentor silt loam, 6 to 12 percent slopes, eroded	4,080	0.9
MnD2	Mentor silt loam, 12 to 18 percent slopes, eroded	370	*
PaC2	Parke silt loam, 6 to 12 percent slopes, eroded	2,250	0.5
RsA	Rush silt loam, 0 to 2 percent slopes	975	0.2
	Total	17,315	3.9

* Less than 0.1 percent.

Logan County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam	1,371	0.5
	Total	1,371	0.5

Lorain County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
MnB	Mentor silt loam, 2 to 6 percent slopes	434	0.1
MnC	Mentor silt loam, 6 to 12 percent slopes	127	*
MnE	Mentor silt loam, 12 to 25 percent slopes	104	*
	Total	665	0.2

* Less than 0.1 percent.

Lucas County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
SmB	Sisson loam, 2 to 6 percent slopes	451	0.2
SmC	Sisson loam, 6 to 12 percent slopes	614	0.3
SmD	Sisson loam, 12 to 18 percent slopes	826	0.4
SnB	Sisson-Urban land complex, 2 to 12 percent slopes	1,546	0.7
	Total	3,437	1.5

Madison County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Rs	Ross silt loam, occasionally flooded	987	0.3
	Total	987	0.3

Mahoning County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
WrF2	Wooster loam, 25 to 50 percent slopes, moderately eroded	247	*
WsB	Wooster silt loam, 2 to 6 percent slopes	2,068	0.8
WsC2	Wooster silt loam, 6 to 12 percent slopes, moderately eroded	3,837	1.4
WsD2	Wooster silt loam, 12 to 18 percent slopes, moderately eroded	571	0.2
WsE2	Wooster silt loam, 18 to 25 percent slopes, moderately eroded	88	*
	Total	6,811	2.5

* Less than 0.1 percent.

Marion County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
MaA	Martinsville loam, 0 to 2 percent slopes	880	0.3
MaB	Martinsville loam, 2 to 6 percent slopes	477	0.2
No	Nolin silt loam, occasionally flooded	3,773	1.5
Ro	Rosburg silt loam, 0 to 2 percent slopes, occasionally flooded	4	*
	Total	5,134	2.0

* Less than 0.1 percent.

Medina County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Cr	Chagrin silt loam, occasionally flooded	59	*
MoB	Mentor silt loam, 2 to 6 percent slopes	4	*
WvB	Wooster-Riddles silt loams, 2 to 6 percent slopes	49	*
WvC2	Wooster-Riddles silt loams, 6 to 12 percent slopes, eroded	188	*
WvD2	Wooster-Riddles silt loams, 12 to 18 percent slopes, eroded	11	*
	Total	311	0.1

* Less than 0.1 percent.

Meigs County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Cg	Chagrin silt loam, frequently flooded	10,689	3.9
DuC	Duncannon silt loam, 6 to 12 percent slopes	227	*
EKA	Elkinsville silt loam, 0 to 2 percent slopes	261	*
GaC	Gallia loam, 6 to 12 percent slopes	802	0.3
GaD	Gallia loam, 12 to 18 percent slopes	255	*
Mo	Moshannon silt loam, frequently flooded	1,264	0.5
RcB	Richland silt loam, 2 to 6 percent slopes	1,071	0.4
RdD	Richland loam, 15 to 25 percent slopes	3	*
RdE	Richland loam, 25 to 40 percent slopes	1	*
	Total	14,573	5.3

* Less than 0.1 percent.

Mercer County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam	1,816	0.6
	Total	1,816	0.6

Miami County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Rs	Ross silt loam	2,876	1.1
	Total	2,876	1.1

Monroe County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AID	Allegheny silt loam, 12 to 18 percent slopes	1	*
AsA	Ashton silt loam, 0 to 3 percent slopes	192	*
Cg	Chagrin silt loam	5,942	2.0
Hu	Huntington silt loam	737	0.3
	Total	6,872	2.3

* Less than 0.1 percent.

Montgomery County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Rs	Ross silt loam	10,731	3.6
Rt	Ross-Urban land complex	3,786	1.3
	Total	14,517	4.9

Morgan County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ca	Chagrin silt loam, frequently flooded	327	0.1
RvE	Richland-Vandalia complex, 20 to 35 percent slopes	53	*
	Total	380	0.1

* Less than 0.1 percent.

Morrow County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
ObA	Ockley loam, 0 to 2 percent slopes	3	*
ObB	Ockley loam, 2 to 6 percent slopes	69	*
	Total	72	0.0

* Less than 0.1 percent.

Muskingum County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AfB	Alford silt loam, 2 to 8 percent slopes	5,395	1.3
AfC2	Alford silt loam, 8 to 15 percent slopes, eroded	5,545	1.3
Cb	Chagrin loam, rarely flooded	2,277	0.5
LcD	Lakin-Alford complex, 15 to 25 percent slopes	541	0.1
No	Nolin silt loam, occasionally flooded	4,638	1.1
UtA	Urban land-Nolin complex, rarely flooded	593	0.1
	Total	18,989	4.4

Noble County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AID	Allegheny silt loam, 12 to 18 percent slopes	9	*
Ch	Chagrin silt loam, occasionally flooded	1,990	0.8
RcD	Richland channery loam, 15 to 25 percent slopes	16	*
	Total	2,015	0.8

* Less than 0.1 percent.

Ottawa County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam, frequently flooded	1,041	0.6
	Total	1,041	0.6

Perry County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AfB	Alford silt loam, 1 to 8 percent slopes	6,773	2.6
AfC	Alford silt loam, 8 to 15 percent slopes	1,862	0.7
AfC2	Alford silt loam, 8 to 15 percent slopes, eroded	107	*
AfD	Alford silt loam, 15 to 25 percent slopes	282	0.1
AgB	Alford silt loam, 2 to 8 percent slopes	3	*
MeB	Mentor silt loam, gravelly substratum, 1 to 8 percent slopes	836	0.3
MeC	Mentor silt loam, gravelly substratum, 8 to 15 percent slopes	1,137	0.4
No	Nolin silt loam, occasionally flooded	3,510	1.3
SfD	Shelocta-Cruze complex, 15 to 25 percent slopes	1	*
SfE	Shelocta-Cruze complex, 25 to 40 percent slopes	26	*
	Total	14,537	5.5

* Less than 0.1 percent.

Pickaway County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam, occasionally flooded	9,332	2.9
Gs	Gessie silt loam, occasionally flooded	47	*
Rt	Ross silt loam, overwash, frequently flooded	801	0.2
WeA	Wea silt loam, 0 to 2 percent slopes	1,965	0.6
WeB	Wea silt loam, 2 to 6 percent slopes	476	0.1
	Total	12,621	3.9

* Less than 0.1 percent.

Pike County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
En	Elkinsville silt loam, rarely flooded	2,182	0.8
Ge	Genesee silt loam, occasionally flooded	6,699	2.4
Gf	Gessie silt loam, occasionally flooded	72	*
Ha	Haymond silt loam, occasionally flooded	2,705	1.0
Hu	Huntington silt loam, occasionally flooded	3,637	1.3
Mh	Martinsville loam, rarely flooded	727	0.3
Mt	Mentor silt loam, rarely flooded	117	*
PaA	Parke silt loam, 0 to 3 percent slopes	639	0.2
PaB	Parke silt loam, 3 to 8 percent slopes	212	*
SuB	Spargus channery silt loam, 2 to 6 percent slopes	7	*
	Total	16,997	6.0

* Less than 0.1 percent.

Portage County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Tg	Tioga loam	1,055	0.3
	Total	1,055	0.3

Preble County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
RuB	Russell silt loam, 2 to 6 percent slopes	2,857	1.0
	Total	2,857	1.0

Putnam County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam	1,807	0.6
Kw	Knoxdale silt loam, occasionally flooded	10	*
Rw	Roszburg silt loam, occasionally flooded	33	*
	Total	1,850	0.6

* Less than 0.1 percent.

Richland County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
MeB	Mentor silt loam, 2 to 6 percent slopes	267	*
MeC	Mentor silt loam, 6 to 12 percent slopes	198	*
WeD	Westmoreland silt loam, 12 to 18 percent slopes	102	*
WmD	Wheeling and Mentor silt loams, 12 to 18 percent slopes	301	*
	Total	868	0.3

* Less than 0.1 percent

Ross County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ge	Gessie silt loam, occasionally flooded	17,914	4.0
Gf	Gessie silt loam, frequently flooded	5,601	1.3
Hd	Haymond silt loam, occasionally flooded	2,911	0.7
HkD2	Hickory silt loam, 12 to 20 percent slopes, eroded	131	*
HkE2	Hickory silt loam, 20 to 35 percent slopes, eroded	329	*
Ht	Huntington silt loam, occasionally flooded	245	*
McA	Martinsville loam, rarely flooded	166	*
MeC2	Mentor silt loam, 6 to 12 percent slopes, eroded	702	0.2
MeD2	Mentor silt loam, 12 to 20 percent slopes, eroded	512	0.1
MfA	Mentor silt loam, rarely flooded	561	0.1
MgA	Mentor silt loam, gravelly substratum, 0 to 2 percent slopes	2,914	0.7
MgB	Mentor silt loam, gravelly substratum, 2 to 6 percent slopes	657	0.1
PkA	Pike silt loam, 0 to 2 percent slopes	1,873	0.4
PkB	Pike silt loam, 2 to 6 percent slopes	1,355	0.3
SuB	Spargus channery silt loam, 2 to 6 percent slopes	1,259	0.3
	Total	37,130	8.4

* Less than 0.1 percent.

Sandusky County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
MeB	Mentor silt loam, 1 to 4 percent slopes	1,277	0.5
MeF	Mentor silt loam, 25 to 50 percent slopes	756	0.3

	Total	2,033	0.8
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Scioto County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AfD	Alford silt loam, 10 to 25 percent slopes	660	0.2
Cu	Cuba silt loam, occasionally flooded	1,280	0.3
EhB	Elkinsville silt loam, 1 to 6 percent slopes	12	*
EkB	Elkinsville silt loam, 1 to 8 percent slopes	2,768	0.7
EKE	Elkinsville silt loam, 25 to 40 percent slopes	1,679	0.4
EmB	Elkinsville-Urban land complex, 1 to 8 percent slopes	1,541	0.4
Ge	Genesee silt loam, occasionally flooded	2,365	0.6
Ha	Haymond silt loam, occasionally flooded	3,054	0.8
Hu	Huntington silt loam, occasionally flooded	522	0.1
No	Nolin silt loam, occasionally flooded	12,086	3.1
SbB	Shelocta silt loam, 3 to 8 percent slopes	10,880	2.8
SbC	Shelocta silt loam, 8 to 15 percent slopes	2,119	0.5
SbD	Shelocta silt loam, 15 to 25 percent slopes	3,584	0.9
WmB	Wheeling silt loam, 1 to 8 percent slopes	1,450	0.4
	Total	44,000	11.2

* Less than 0.1 percent.

Seneca County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ch	Chagrin silt loam, occasionally flooded	5,427	1.5
Ge	Genesee silt loam, occasionally flooded	157	*
Ru	Ross silt loam, occasionally flooded	1,170	0.3
	Total	6,754	1.9

* Less than 0.1 percent.

Shelby County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ge	Genesee silt loam, occasionally flooded	1,108	0.4
	Total	1,108	0.4

Stark County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
MeA	Mentor silt loam, 0 to 2 percent slopes	270	*
MeB	Mentor silt loam, 2 to 6 percent slopes	447	0.1
MeC	Mentor silt loam, 6 to 12 percent slopes	237	*
MeD	Mentor silt loam, 12 to 18 percent slopes	176	*
RuA	Rush silt loam, 0 to 3 percent slopes	---	*
WuB	Wooster silt loam, 2 to 6 percent slopes	6,487	1.7
WuC	Wooster silt loam, 6 to 12 percent slopes	3,816	1.0

WuC2	Wooster silt loam, 6 to 12 percent slopes, moderately eroded	10,791	2.9
WuD2	Wooster silt loam, 12 to 18 percent slopes, moderately eroded	6,137	1.7
WuE2	Wooster silt loam, 18 to 25 percent slopes, moderately eroded	1,538	0.4
WuF2	Wooster silt loam, 25 to 50 percent slopes, moderately eroded	143	*
WvD	Wooster-Urban land complex, steep	305	*
WxB	Wooster-Riddles silt loams, 2 to 6 percent slopes	---	*
WxC	Wooster-Riddles silt loams, 6 to 12 percent slopes	---	*
WxC2	Wooster-Riddles silt loams, 6 to 12 percent slopes, eroded	---	*
WxD2	Wooster-Riddles silt loams, 12 to 18 percent slopes, eroded	---	*
	Total	30,347	8.2

* Less than 0.1 percent.

Summit County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
CwC2	Chili-Wooster complex 6 to 12 percent slopes, moderately eroded	449	0.2
CwD2	Chili-Wooster complex, 12 to 18 percent slopes, moderately eroded	275	0.1
CwE2	Chili-Wooster complex, 18 to 25 percent slopes, moderately eroded	232	*
WwD	Wooster-Urban land complex, hilly	300	0.1
WyC2	Wooster-Riddles silt loams, 6 to 12 percent slopes, eroded	4	*
	Total	1,260	0.5

* Less than 0.1 percent.

Tuscarawas County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
EKA	Elkinsville silt loam, 0 to 3 percent slopes	600	0.2
MeB	Mentor silt loam, 2 to 6 percent slopes	2	*
RuA	Rush silt loam, 0 to 3 percent slopes	3,322	0.9
	Total	3,924	1.1

* Less than 0.1 percent.

Union County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam	3,006	1.1
No	Nolin silt loam, 0 to 2 percent slopes, occasionally flooded	35	*
RpA	Rosburg silt loam, 0 to 2 percent slopes, occasionally flooded	2	*
	Total	3,043	1.1

* Less than 0.1 percent.

Vinton County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Cg	Chagrin silt loam, 0 to 2 percent slopes, frequently flooded	4,434	1.7
RcD	Richland loam, 15 to 25 percent slopes	29	*
RcE	Richland loam, 25 to 40 percent slopes	48	*
	Total	4,511	1.7

* Less than 0.1 percent.

Warren County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
CqC2	Crouse-Miamian silt loams, 6 to 12 percent slopes, eroded	94	*
CrB	Crider silt loam, 2 to 6 percent slopes	333	0.1
Gd	Genesee fine sandy loam	4,515	1.7
Gn	Genesee loam	4,612	1.8
HiD2	Hickory silt loam, 12 to 18 percent slopes, eroded	220	*
HiE2	Hickory silt loam, 18 to 25 percent slopes, eroded	7	*
HiF2	Hickory silt loam, 25 to 35 percent slopes, eroded	279	0.1
HmE	Hennepin-Miamian silt loams, 18 to 25 percent slopes	240	*
HmE2	Hennepin-Miamian silt loams, 18 to 25 percent slopes, moderately eroded	1,654	0.6
HnD3	Hennepin-Miamian complex, 12 to 18 percent slopes, severely eroded	399	0.2
HuE2	Hickory-Morrisville silt loams, 18 to 25 percent slopes, eroded	27	*
PaB	Parke silt loam, 2 to 6 percent slopes	224	*
PaD2	Parke silt loam, 6 to 18 percent slopes, moderately eroded	183	*
Rn	Ross loam	3,598	1.4
WIA	Williamsburg silt loam, 0 to 2 percent slopes	156	*
WIB	Williamsburg silt loam, 2 to 6 percent slopes	529	0.2
WIC2	Williamsburg silt loam, 6 to 12 percent slopes, moderately eroded	166	*
	Total	17,236	6.6

* Less than 0.1 percent.

Washington County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AIB	Allegheny silt loam, 2 to 6 percent slopes	536	0.1
AIC	Allegheny silt loam, 6 to 12 percent slopes	1,801	0.4
AID	Allegheny silt loam, 12 to 18 percent slopes	1,479	0.4
AIG	Allegheny silt loam, 18 to 50 percent slopes	497	0.1
AsA	Ashton silt loam, 0 to 2 percent slopes	631	0.2
AsB	Ashton silt loam, 2 to 6 percent slopes	101	*
Cg	Chagrin silt loam	7,284	1.8
DtB	Duncannon silt loam, 2 to 6 percent slopes	156	*
DtC	Duncannon silt loam, 6 to 12 percent slopes	147	*
DuD	Duncannon-Lakin complex, 12 to 18 percent slopes	205	*
DuE	Duncannon-Lakin complex, 18 to 25 percent slopes	373	*
GaB	Gallia silt loam, 2 to 6 percent slopes	441	0.1
GaC	Gallia silt loam, 6 to 12 percent slopes	1,433	0.4
GaD	Gallia silt loam, 12 to 18 percent slopes	341	*
HcA	Hackers silt loam, 0 to 2 percent slopes	948	0.2
HcB	Hackers silt loam, 2 to 6 percent slopes	1,758	0.4
HcC	Hackers silt loam, 6 to 12 percent slopes	198	*
Hu	Huntington silt loam	852	0.2
MeA	Mentor silt loam, 0 to 2 percent slopes	2,182	0.5
MeB	Mentor silt loam, 2 to 6 percent slopes	1,991	0.5
MeC	Mentor silt loam, 6 to 12 percent slopes	611	0.1
Mp	Moshannon silt loam	6,621	1.6
No	Nolin silt loam	2,891	0.7
	Total	33,477	8.2

* Less than 0.1 percent.

Wayne County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
RhB	Riddles silt loam, 2 to 6 percent slopes	2,444	0.7
RhC	Riddles silt loam, 6 to 12 percent slopes	2,359	0.7
RhD2	Riddles silt loam, 12 to 18 percent, eroded	1,069	0.3
RhE	Riddles silt loam, 18 to 25 percent slopes	2,500	0.7
WuB	Wooster-Riddles silt loams, 2 to 6 percent slopes	23,623	6.6
WuC	Wooster-Riddles silt loams, 6 to 12 percent slopes	6,927	1.9
WuC2	Wooster-Riddles silt loams, 6 to 12 percent slopes, eroded	15,191	4.3
WuD2	Wooster-Riddles silt loams, 12 to 18 percent slopes, eroded	6,816	1.9
	Total	60,929	17.1

Williams County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ge	Genesee loam	1,396	0.5
	Total	1,396	0.5

Wood County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gm	Genesee loam	385	*
Gn	Genesee silt loam	777	0.2
	Total	1,162	0.3

* Less than 0.1 percent.

Wyandot County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AdC2	Alexandria silt loam, 6 to 12 percent slopes, moderately eroded	1	*
Cm	Chagrin silt loam, rarely flooded	871	0.3
Ge	Genesee silt loam, occasionally flooded	4,143	1.6
HpE	Hennepin-Alexandria silt loams, 18 to 50 percent slopes	1	*
MaB	Martinsville fine sandy loam, 2 to 6 percent slopes	591	0.2
SfC2	Shinrock-Martinsville complex, 6 to 12 percent slopes, eroded	1,638	0.6
SfD2	Shinrock-Martinsville complex, 12 to 18 percent slopes, eroded	246	*
	Total	7,501	2.9

* Less than 0.1 percent.