















**Regions and Landscapes** 

Natural Resources Conservation Service

nrcs.usda.gov/

## **Acting Chief's Message**



Leonard Jordan Acting Chief, USDA Natural Resources Conservation Service

The 2018 Soils Planner focuses on block diagrams and the 12 Soil Survey Regions. Block diagrams are useful tools for understanding the threedimensional relationships between soils, parent materials, and landforms. Historically, block diagrams have played an important role in conveying to our customers how soils change from one place to another, even within a farmer's field.

In this planner, each month highlights a block diagram in 1 of the 12 Soil Survey Regions of the Natural Resources Conservation Service (NRCS), giving information on soils, landforms, land use, and other features unique to that region. In the NRCS, delivering science-based technical assistance to clients is the foundation for successfully carrying out our mission of helping people help the land.

We continue to maintain a strong field presence while providing soil and ecological inventories for our agency and partners. Block diagrams have helped us provide this service. Helping People Help the Land

Sandy Outwa

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### **Soil Science Society of America**

### Soils Sustain Life

Limestone

The Soil Science Society of America (SSSA) recognizes at the heart of its mission that soils differ across the Earth's land surface. Block diagrams have been an important tool for displaying such differences. The 2018 Soils Planner highlights block diagrams in the 12 Soil Survey Regions (SSRs). Each SSR uses block diagrams to display how soils are related to topography, hydrology, ecology, and geologic parent material in their region.

Because soil is critical to life on this planet, understanding lateral differences in physical, chemical, and biological soil properties is important. This knowledge will help us sustain soils for food security and environmental health.

SSSA is an educational organization with more than 6,000 scientists and professionals in over 80 countries, and increasing our understanding of soil sustainability is critical to it. We are pleased to continue our partnership with the

USDA Natural Resources Conservation Service in producing educational material, such as the 2018 Soils Planner, for our members, the public, and the science community.

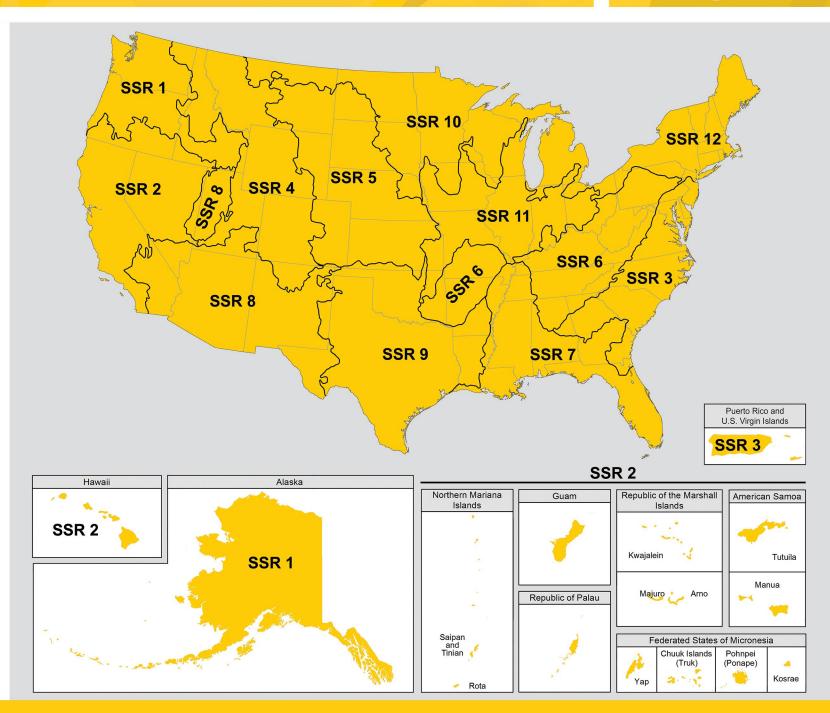


**Richard Dick** President, Soil Science Society of America

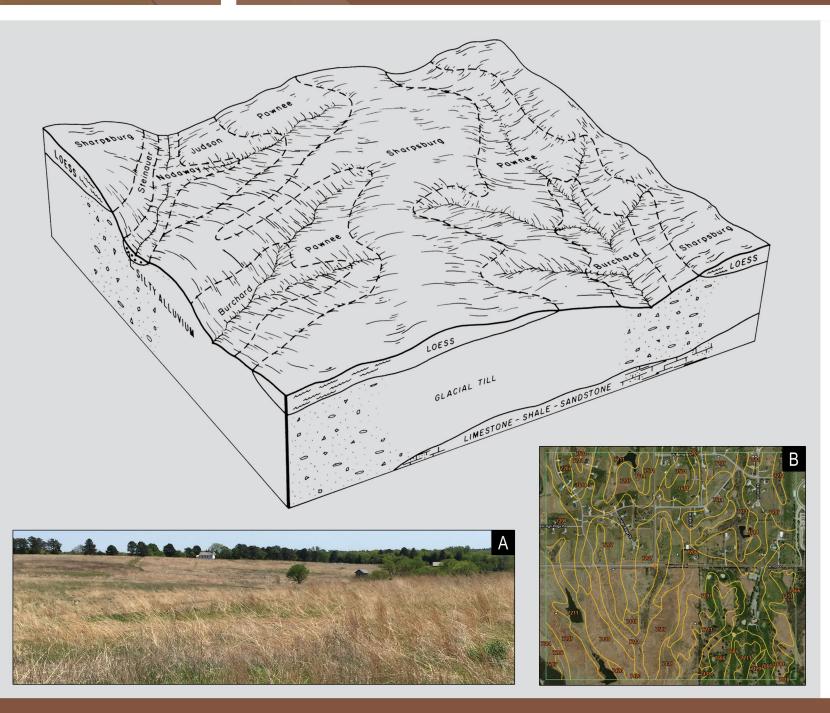
## **Soil Survey Regions**

Maps and Background

USDA soil mapping began in the 1890s and continued throughout the 20th century and into the 21st. Over 20,000 soil scientists have walked the Nation's landscapes, digging soil pits, observing road cuts, augering, and collecting and analyzing samples. Soil survey traditionally had been conducted according to county and State boundaries. In the 1990s, overseeing soil survey activities began shifting from governmental boundaries to natural boundaries. Currently, there are 12 administrative Soil Survey Regions (SSRs) that work together with cooperators in universities, the private sector, and other agencies to oversee soil mapping and to disseminate soil survey information to citizens of the United States and the world.



## Art, Science, or Both?



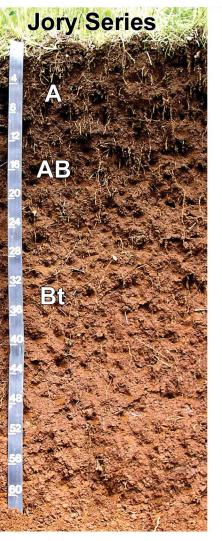
Block

Diagrams

Using relatively few, wellplaced lines, the best block diagrams heighten awareness, enhance significance, and, in some cases, create a sense of aesthetics, thus entering the realm of art. Because block diagrams identify threedimensional associations among geologic parent materials, stream patterns, and soil patterns, they also enter the realm of science. Being both art and science, they provide insight about soils that is not apparent when looking at the landscape from the ground level (image A) or even when looking at soil maps (image B).

## **Pacific Northwest Region**

Soil Survey Region 1



About 17 to 14 million years ago, massive lava flows covered much of Washington and Oregon with basalt as much as 1.8 kilometers (about 5,900 feet) thick. The basalt originated from fissures east of the Cascade Mountains near today's Washington-Idaho border, flowed westward through the Columbia drainage gap in the Cascade Mountains, and spilled into the Willamette Valley. Colluvium derived from this basalt became the parent material for the very deep, well-drained Jory soils. These soils cover more than 121,405 hectares (300,000 acres) in the foothills of the Cascade and Coast Ranges surrounding the Willamette Valley.

Typically, summers are warm and dry and winters are cool and moist in areas of the Jory soils. The soils support orchards; vineyards; production of nursery crops, berries, and grass seeds; timber production; wildlife habitat; and watershed health. The natural vegetation is dominantly Douglas-fir with scattered Oregon white oak and an understory of poison oak and rosebush.



Map showing Jory type location and approximate extent of Columbia River flood basalts. On May 23, 2011, the Jory soil was designated by the Oregon Legislature as the Official State Soil.

BELLPINE

BASALT

Block diagram showing the relationship of the soils, relief, and parent material in the foothills of the Cascade Range.

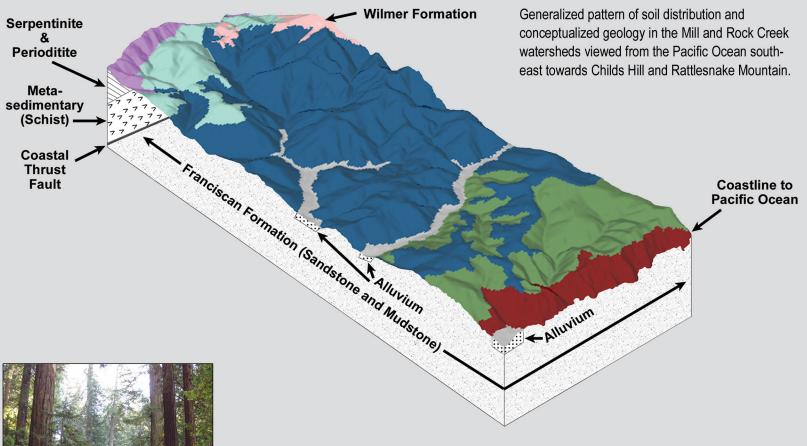
# January 2018

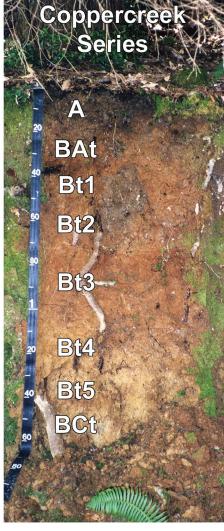
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31													

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	<b>1</b> New Year's Day	2	3	4	5	6
7	8	9	10	11	12	13
14	<b>15</b> Martin Luther King Day	16	17	18	19	20
21	22	23	24	25	26	27
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### Soil Survey Region 2

## **Pacific Region**







The Coast Redwoods of western California are among the largest living singular organisms in the world, growing up to 379 feet in height and 29 feet in diameter. Soils that support the complex forest ecosystem dominated by the magnificent Coast Redwoods are well drained and very deep and have a loamy surface layer and a gravelly, clay-rich subsoil. These old, deeply weathered soils are derived from schist, sandstone, and colluvium and include the Coppercreek, Slidecreek, and Tecah soils, which occur on steep to very steep side slopes. A constant temperate climate and the moderating effect of seasonal fog during rainless summers create a highly productive environment for the forest.



# February 2018

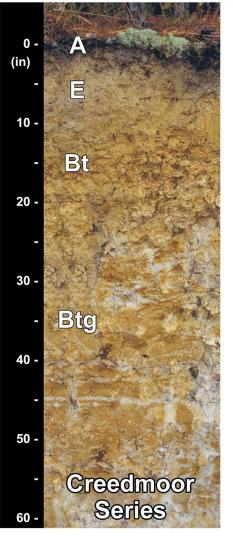


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28	29	30	31				25	26	27	28	29	30	31

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1	2	3
4	5	6	7	8	9	10
11	<b>12</b> Lincoln's Birthday	13	<b>14</b> Valentine's Day	15	<b>16</b> Chinese New Year	17
18	<b>19</b> Presidents Day	20	21	22	23	24
25	26	27	28			***

### **Mid-Atlantic and Caribbean Area**

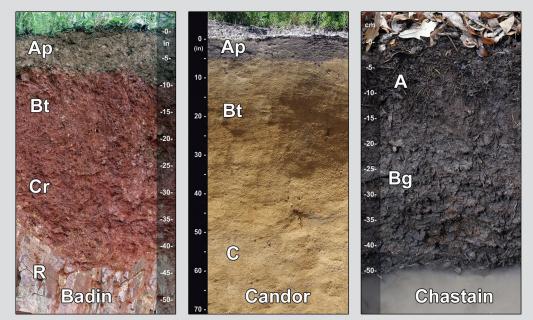
### Soil Survey Region 3

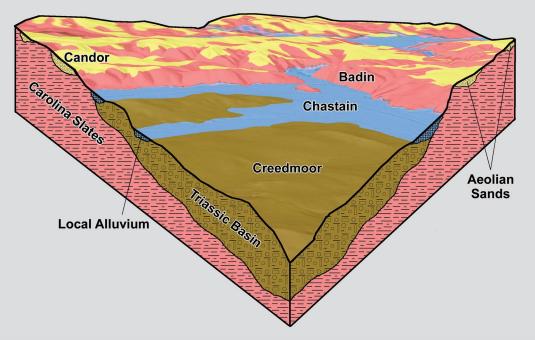




Region 3 has been intensively farmed since early European settlers began slash-and-burn agriculture in the 1600s. Due to the natural infertility of the soils and the susceptibility of bare soils to water erosion, this practice resulted in extensive erosion of topsoil. Nevertheless, soils in the region are still productive when fertilizer and lime are properly managed. The subsoil horizons show how contrasting parent materials give rise to unique soil types in close proximity.

In North Carolina, for example, the Creedmoor soils of the Triassic Basin have heavy clay that causes drainage problems. Badin soils, which are in the Carolina Slate Belt, have a high content of silt in the surface layer and are moderately deep to bedrock. Candor soils formed in deep, dry, windblown sands that cap residual soils. Soils on alluvial flood plains can range from loam to clay and have shallow water tables. The clayey Chastain soils are an example.







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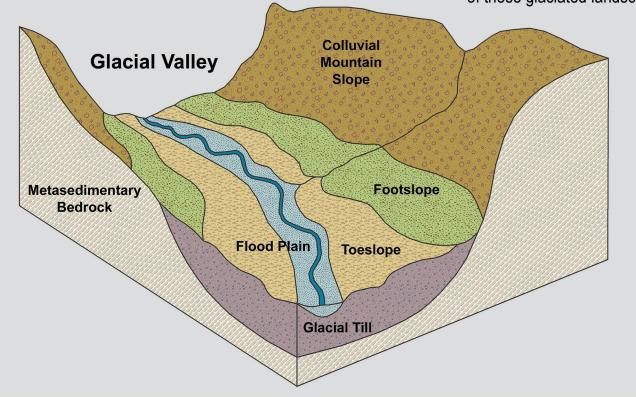
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1	2	3
4	5	6	7	8	9	10
<b>11</b> Daylight Savings Time Begins	12	13	14	15	16	<b>17</b> St. Patrick's Day
18	19	20	21	22	23	24
25	26	27	28	29	30	<b>31</b> Passover

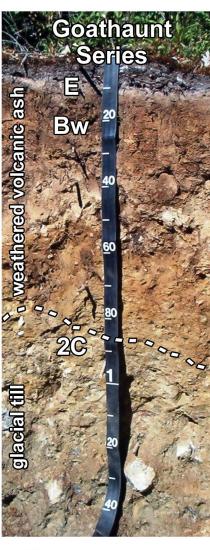
### Soil Survey Region 4

## **Rocky Mountain Region**



Volcanic ash from the eruption of Mount Mazama at Crater Lake, Oregon, and other local tephra can be found throughout the northwest part of Region 4. This weathered volcanic ash (which is red in color) increases the water-holding capacity of soil and positively impacts the productivity of overstory and understory vegetation. Pictured to the right is an ashy soil common in the U-shaped glacial valleys of northwestern Montana. The volcanic ash typically occurs as a surface mantle overlying the glacial till on which it was originally deposited. Ash mantles are mixed to varying degrees with the underlying material but tend to lack the rock fragments commonly found in the more rocky subsoil of these glaciated landscapes.





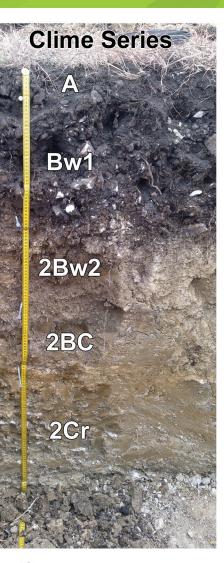




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18	19	20	21	22	23	24	20	21	22	23	24	25	26
25	26	27	28	29	30	31	27	28	29	30	31		

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<b>1</b> Easter	2	3	4	5	6	7
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<b>22</b> Earth Day	23	24	25	26	27	28
29	30					

## **Northern Great Plains**

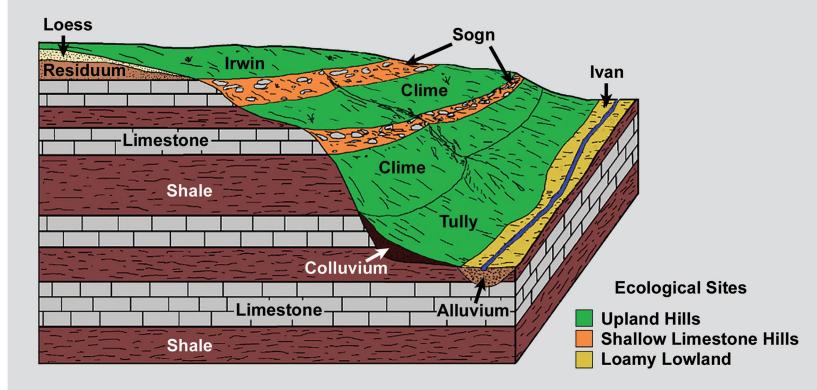




Soils in Region 5 support some of the best dryland agriculture for grain production in the world. Some areas, such as the Flint Hills in eastern Kansas and north-central Oklahoma, are unplowed and include one of the last expanses of intact tallgrass prairie in the United States. The tallgrass prairie supports a diverse mix of native legumes, forbs, and shrubs. Due to the large amounts of chert gravel and the common outcroppings of limestone, row cropping is not practical over much of the area and grazing is the main agricultural activity.

Soil Survey Region 5

The block diagram shows the relationship between ecological sites, geology, landscape position, and soils in the Flint Hills, which are named for the interbedded layers of chert, or flint, in the limestone. Because chert is much less soluble than the surrounding limestone, weathering has left large amounts of chert gravel capping most of the hilltops. The landscape consists of rolling hills that typically have narrow divides and narrow steep-sided valleys.





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22	23	24	25	26	27	28	17	18	19	20	21	22	23
29	30						24	25	26	27	28	29	30

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1	2	3	4	5
6	7	8	9	10	11	12
<b>13</b> Mother's Day	14	15	<b>16</b> Ramadan	17	18	<b>19</b>
20	21	22	23	24	25	26
27	<b>28</b> Memorial Day	29	30	31		

#### **Central Appalachian** Soil Survey **Interior Mountains and Plateaus Region 6**

Lily-Gilpin

Gilpin-Bouldin-Shelocta

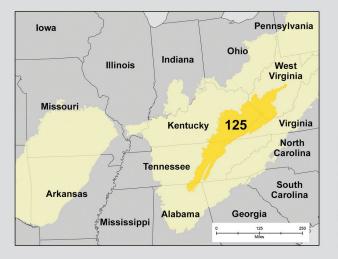
Lily-Ramsey

Lily

Gilpin-Bouldin-

Shelocta

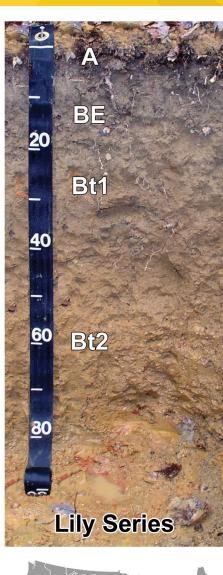
The Cumberland Plateau lies within the southeastern part of Region 6 and contains the world's longest Pope-Philo-Skidmore hardwood-forested plateau. One of the major soil series that coevolved with this hardwood forest is the Lily series. Lily soils are on Lily ridgetops and side slopes. They formed in moderately deep residuum from nearly level-bedded Pennsylvanianage sandstone. They are classified as Ultisols in the mesic temperature regime.



The largest concentration of the Lily series is on the Cumberland Plateau Section of MLRA 125—Cumberland Plateau and Mountains. Much, if not most, of this land was used for saw or pole timber,

Pope-Philo-Skidmore

beans, corn, hay, and pasture in the 19th and 20th centuries. In the last several decades, large portions of this section were acquired by local and State parks and wildlife management agencies. The Lily series now supports forests of mixed hardwood as well as shortleaf pine, Virginia pine, and white pine.

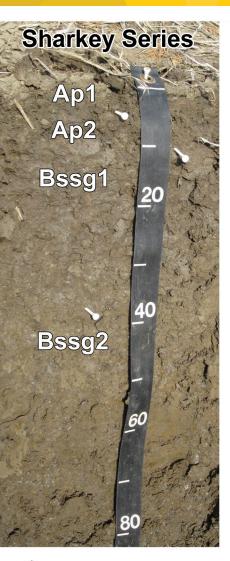


# **June 2018**

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20	21	22	23	24	25	26	22	23	24	25	26	27	28	
27	28	29	30	31			29	30	31					

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
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<b>17</b> Father's Day	18	19	20	21	22	23
24	25	26	27	28	29	30

### Southeast Coastal Plain and Lower Mississippi River Valley

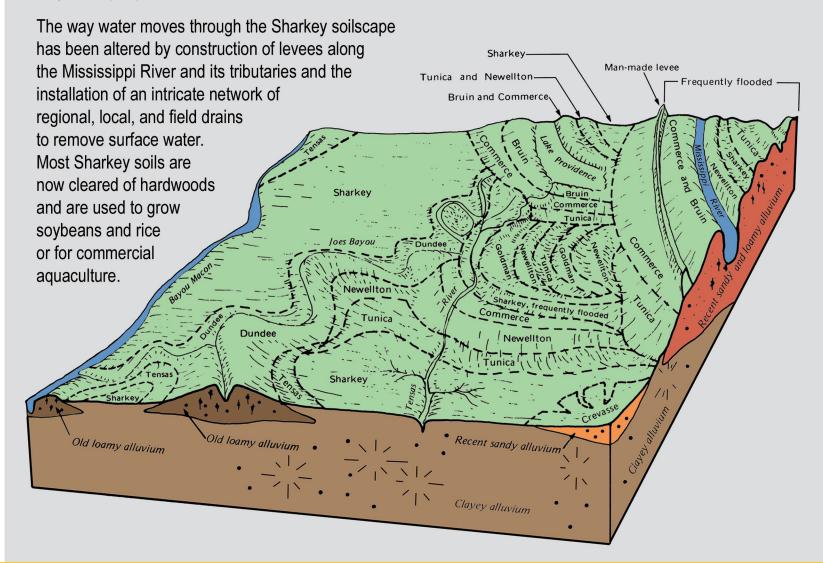




The Lower Mississippi River Valley has more than 3.5 million acres of Sharkey soils. These soils formed in clayey alluvium of the southern Mississippi River in backswamps and swales of Holocene-age meander belts. Bottomland hardwood forests are the native vegetation on these poorly drained soils, which are classified as very-fine Epiaquerts.

Soil Survey

**Region 7** 



# **July 2018**

June 2018									August 2018							
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24	25	26	27	28	29	30		26	27	28	29	30	31			

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	2	3	<b>4</b> Independence Day	5	6	7
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22	23	24	25	26	27	28
29	30	31				$\bigcirc$

### Soil Survey **Region 8**

## **Southwest Region**

Volcanic parent materials are extensive throughout Region 8. They include intrusive igneous rock, such as granite that solidified from magna below ground, and extrusive material, such as lava flows and volcanic ash. Lava flows in this region are geologically young—some as young as 1,000 years. Younger still are a few volcanic ash deposits, such as the ash from the eruption of Sunset Crater in Arizona in 1064 A.D.

The Wauneta series formed on an ancient paleoterrace in addition to having been covered by volcanic ash. These soils are classified as Cambidic Haplodurids. They are very hard below a depth of 44 centimeters due to silica cementation. Despite the shallow soil, this area was once home to a thriving indigenous civilization and now supports abundant wildlife. The volcanic ash acts as a mulch, retaining water for seed germination. Because of the high water-holding capacity and the underlying dense silica-cemented material, Wauneta soils can support black grama grass and oneseed juniper in this desert climate.



aleoterrace

Miburn

Wauneta

Lava Flows

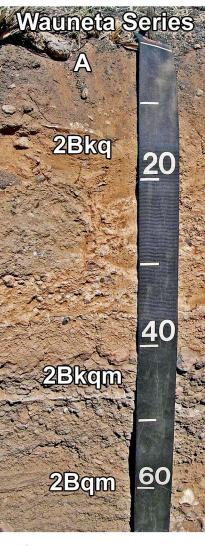
Bighawk

Outerop Meriwhitica

Peshlaki

Rock

Wupatki National Monument - Wupatki Basin Soils (5x vertical exaggeration)





# August 2018

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29	30	31					23	24	25	26	27	28	29
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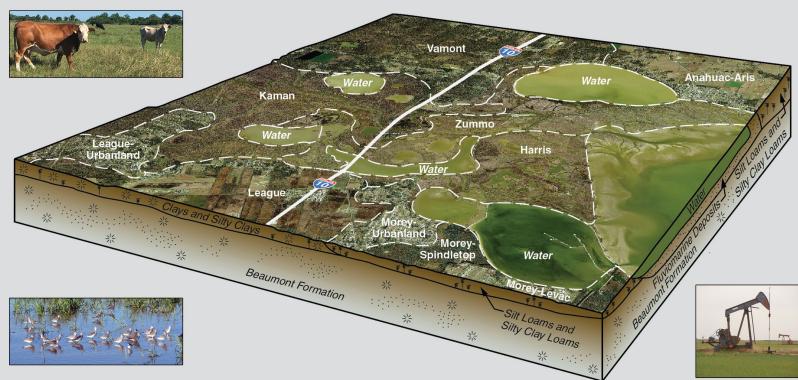
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
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## **Southern Great Plains**

### Soil Survey Region 9







Region 9 has vast expanses of plains and prairies with complex soil patterns. The Coastal Plain of Texas, represented in the block diagram, is an example. It is a nearly level, coastward sloping area ranging from sea level to 50 feet in elevation. The soils in this area formed in clayey and loamy fluviodeltaic deposits derived from the Beaumont Formation of Pleistocene age. The Trinity River delta and Gulf Coast marsh are the most recent deposits. They were laid down within the last 4,500 years. The uplands outside of the Trinity River delta were deposited about 14,000 years ago, when the sea level reached its present position.

All soils in the area are very deep, moderately well drained to very poorly drained, and slowly permeable or very slowly permeable. The Anahuac soils are Oxyaquic Glossudalfs on uplands in a complex of relict stream-meander ridges. The Coastal Plain of Texas has large urban and industrial areas, as well as areas of agriculture, recreation, and wildlife habitat. Oilfields can be seen throughout the area. Waterfowl use flooded rice fields for feeding, resting, and roosting. Cattle graze bahiagrass and Bermudagrass.

## September

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	( <b>0</b> )

	August 2018							October 2018						
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SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
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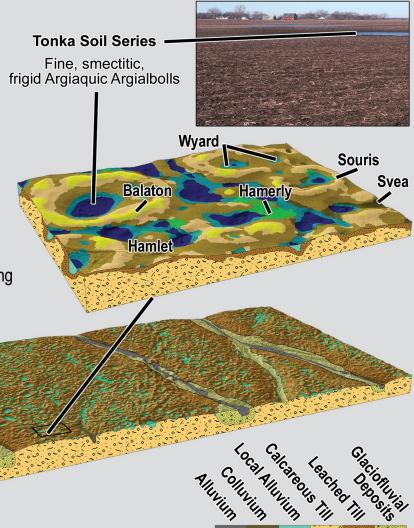
### Soil Survey Region 10

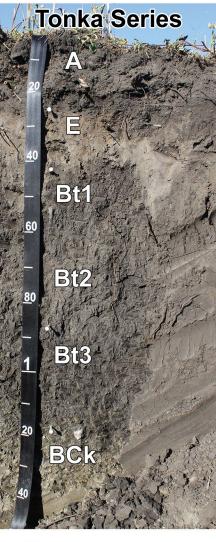
subtle landscape.

## **North Central Glaciated Region**

The vastness of the continental glaciation during the Pleistocene challenges the imagination. Even so, many soil patterns in Region 10 can be clearly related to the effects of advancing and retreating ice. The diagrams below depict landscapes in the Northern Black Glaciated Plains of North Dakota. Ring-shaped rises (locally known as "doughnuts") formed through the collection of debris in sinkholes in stagnant glacial ice. A sequence of these small disintegration ridges and depressions dot the till plain of collapsed ice, and shallow meltwater channels dissect this otherwise

The Tonka series formed in leached pockets of alluvium over glacial till in closed depressions. "Tonka" is a Dakota Sioux word meaning big or great. The seasonal ponding and related leaching are expressed as a sequence of clay eluviation and illuviation in the E to Bt horizons. The Tonka soils occur extensively and are economically important for agriculture and wildlife. Of the millions of depressions, about 80 percent are basins less than 1 acre in size. These small wetlands are important for waterfowl feeding and pairing. The depressions also perform the critical hydrologic functions of ground-water recharge and surface-water storage.







## October 2018

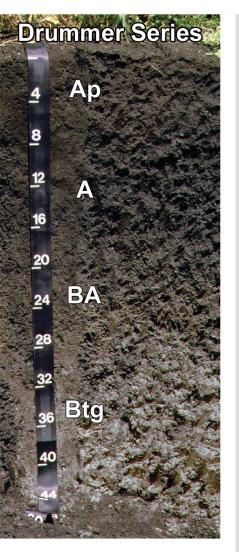


	September 2018									November 2018						
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9	10	11	12	13	14	15	1	1	12	13	14	15	16	17		
16	17	18	19	20	21	22	1	8	19	20	21	22	23	24		
23	24	25	26	27	28	29	2	25	26	27	28	29	30			
30																

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1	2	3	4	5	6
7	<b>8</b> Columbus Day	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	<b>31</b> Halloween			

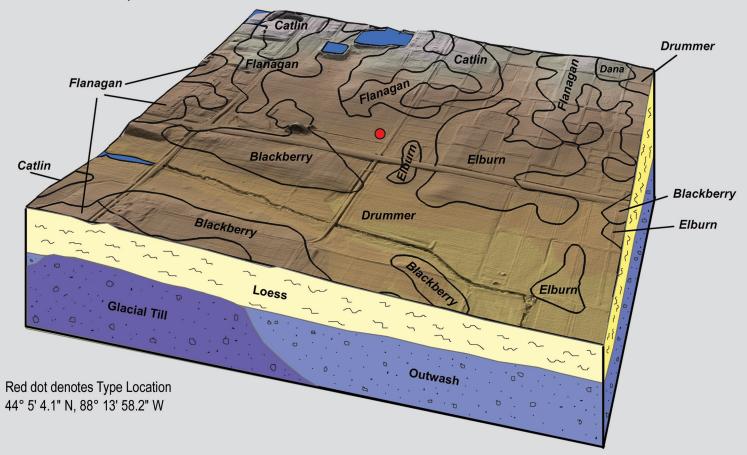
## **East Central Glaciated Region**

### Soil Survey Region 11





Some of the most agriculturally productive soils in the world are mapped as prime farmland in Region 11. A good example is the Drummer series when tile drained. These soils formed under wet prairie vegetation in loess parent material over loamy stratified outwash on nearly level or depressional parts of outwash plains. They are very deep but are poorly drained and have seasonal high water tables and ponding during brief periods in the spring. They are classified as Endoaquolls.



The Drummer series was established in 1929. These soils have a high content of organic matter in the topsoil. Because of the large extent of the Drummer soils (more than 1.5 million acres), Region 11 has the reputation of being "flat and black" and having "black dirt." The principal crops in areas of Drummer soils are corn and soybeans.

## November

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	0	cto	ber	20 <sup>-</sup>	18			December 2018						
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SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
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<b>4</b> Daylight Savings Time Ends	5	6	7	8	9	10
<b>11</b> Veterans Day	12	13	14	15	16	17
18	19	20	21	<b>22</b> Thanksgiving Day	23	24
25	26	27	28	29	30	

### Soil Survey Region 12

Tunbridge

Peru

Granite, Gneiss, and Schist Bedrock

Monadnock

Supraglacial Meltout Till .

## **Northeast Glaciated Region**

/mar

Tunbridge,

Greiss, and Schist Bedrock

Lodgment Till

Region 12 is the most populous soil survey region and therefore has the greatest number of citizens affected by natural resources, including soil. Soils in forested areas, such as the Monadnock series, contribute to the essential ecosystem service of supplying high-quality water. In fact, many forested areas throughout the Northeast are managed solely or in part to supply billions of gallons of water per day for public use.

Monadnock

Peru

Peru

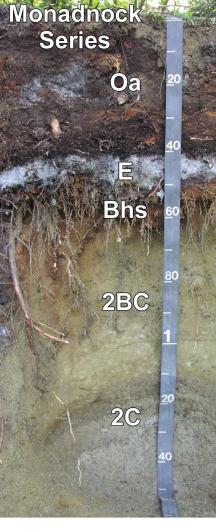
Alluvium

Granite,

Rumney

° Lodgment Till

Soils in Region 12 show the typical effects of Pleistocene glaciation, such as transported parent materials, sculpted landforms, and formation of densic layers. An additional effect was the formation of the Great Lakes. These lakes are so large that they produce their own microclimate and modify soils near shorelines.





## December

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	( <b>0</b> )

	November 2018							Ja	anu	ary	20 <sup>-</sup>	19		
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SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
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2	<b>3</b> Hanukkah	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23 30	24 Christmas Eve New Year's 31 Eve	25 Christmas Day	<b>26</b> Kwanzaa	27	28	29

## Events

## 2018

### January 2018

**January 27-31:** National Association of Conservation Districts (NACD) Annual Meeting; Nashville, Tennessee

January 28-February 2: Society of Range Management Annual Meeting, Technical Training and Trade Show 2018; Sparks, Nevada

### February 2018

**February 15-19:** American Association for the Advancement of Science (AAAS) 2018 Annual Meeting, "Advancing Science: Discovery to Application"; Austin, Texas

#### **March 2018**

**March 19-22:** 28th Annual International Conference on Soil, Water, Energy, and Air; Marriott Mission Valley, San Diego, California

March 27-29: International Conference-Exhibition on Soils, Sediments, and Water, "Polluted Sites and Soils: A Challenge for Major Urban Projects!"; Paris, France

#### **April 2018**

**April 8-13:** European Geosciences Union (EGU) General Assembly 2018; Vienna, Austria

**April 21-24:** American Planning Association; New Orleans, Louisiana

### May 2018

May 21-25: West Regional NCSS Conference; Tucson, Arizona

#### June 2018

**June 10-14:** North American Forest Soils Conference - International Symposium on Forest Soils; Quebec, Canada

**June 25-29:** Northeast/South Joint NCSS Regional Conference; Summersville, West Virginia

#### July 2018

**July 8-12:** North Central Regional NCSS Conference; Brookings, South Dakota

#### August 2018

August 3-5: The 7th International Conference on Unsaturated Soils; The Hong Kong University of Science and Technology (HKUST), Hong Kong

**August 5-10:** 103rd Ecological Society of America (ESA) Annual Meeting; New Orleans, Louisiana

**August 12-17:** 21st World Congress of Soil Science (WCSS), "Soils to Feed and Fuel the World"; Rio de Janeiro, Brazil

#### November 2018

**November 4-7:** American Society of Agronomy (ASA) and Crop Science Society of America (CSSA) International Annual Meeting; Baltimore, Maryland

**November 4-7:** The Geological Society of America (GSA) Annual Meeting and Exhibition; Indianapolis, Indiana

#### December 2018

**December 10-14:** American Geophysical Union Annual Meeting; Washington, DC

## Calendar

January 2019								
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May 2019

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#### **April 2019** Sun Mon Tue Wed Thu Fri Sat 10 11 12

#### July 2019

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August	2019

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December 2019											
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	22	23	24	25	26	27	28				
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## **More Information**



### **Mission**

#### Helping People Help the Land

Natural Resources Conservation Service improves the health of our Nation's natural resources while sustaining and enhancing the productivity of American agriculture. We achieve this by providing voluntary assistance through strong partnerships with private landowners, managers, and communities to conserve, protect, restore, and enhance the lands and waters upon which people and the environment depend.

### Vision

Productive working lands in harmony with a healthy environment.

### Websites

www.nrcs.usda.gov

www.soils.usda.gov

www.soils.org

### **Conservation Process**

Resource Inventory and Assessment

Productive Lands and Healthy Environment



USDA is an equal opportunity provider, employer, and lender.

PA-2219 • July 2017

### Contributors

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