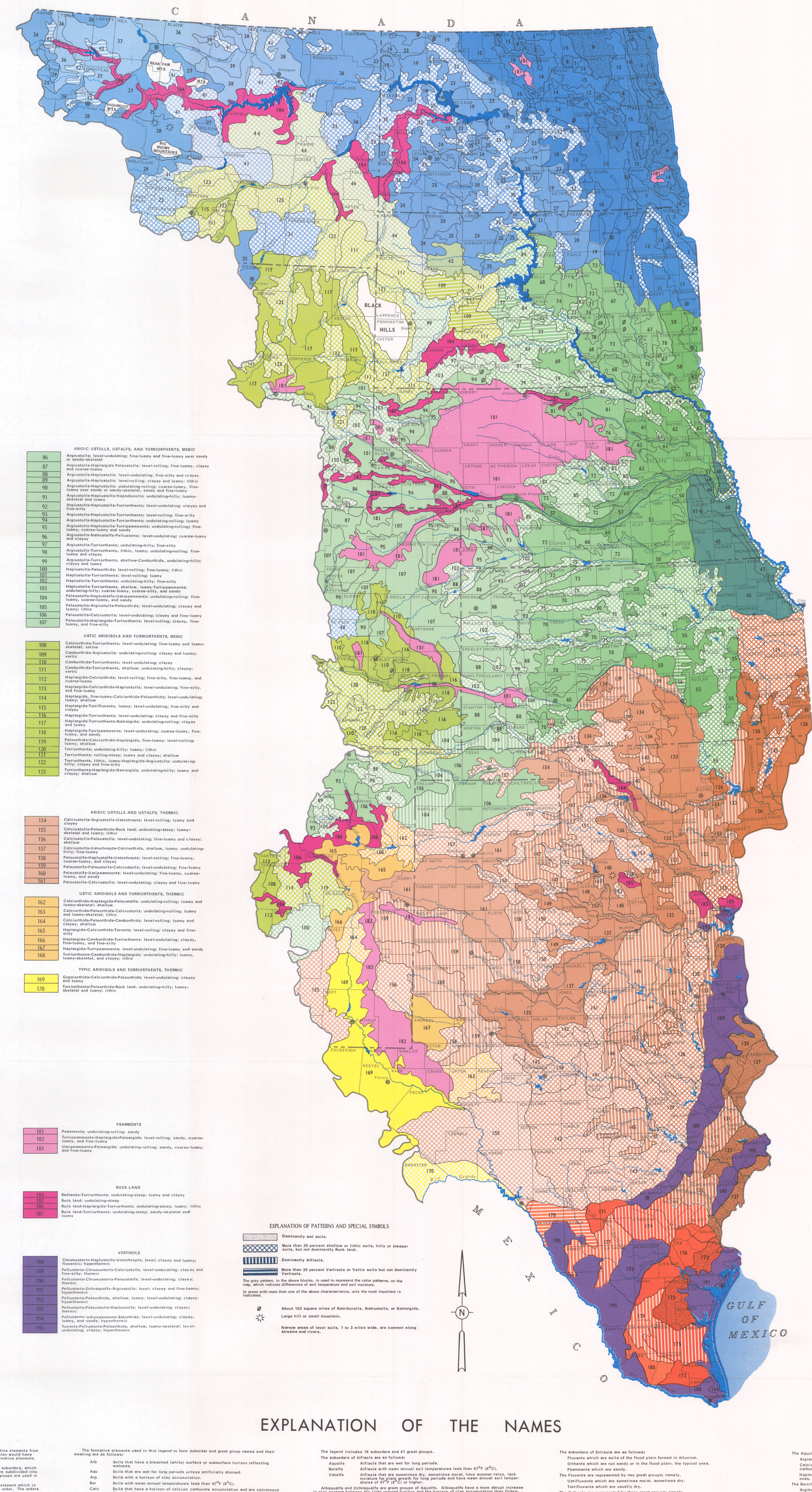
SOILS OF THE GREAT PLAINS



SOIL LEGEND

UDIC BOROLLS AND AQUOLLS

No.	Description
1	Argiborolls-Eutroboralfs; undulating-rolling; fine-loamy and clayey
2	Argiborolls-Haplaquolls; level-undulating; clayey, fine-loamy and fine-silty
3	Argiborolls-Haploborolls; level-undulating; fine-loamy
4	Argiborolls-Haploborolls; undulating-hilly; fine-loamy
5	Argiborolls-Haploborolls-Natriborolls; level; clayey and fine-silty
6	Calciaquolls; level; fine-silty; saline
7	Calciaquolls-Haploborolls; level; coarse-silty and fine-silty
8	Calciaquolls-Haploborolls-Argialbolls; level; fine-loamy and clayey
9	Haplaquolls-Calciaquolls; level; clayey and fine-silty; vertic
10	Haploborolls; level; fine-loamy over sandy or sandy-skeletal and fine-loamy
11	Haploborolls; level-undulating; fine-silty
12	Haploborolls; undulating-rolling; fine-loamy
13	Haploborolls-Argiborolls; level-undulating; fine-silty and fine-loamy
14	Haploborolls-Calciaquolls; level-undulating; coarse-loamy
15	Haploborolls-Calciaquolls; level-undulating; fine-loamy
16	Haploborolls-Calciaquolls-Haplaquolls; level; coarse-loamy and sandy
17	Haploborolls-Haplaquolls; level-undulating; fine-silty and fine-loamy
18	Natriborolls; level-undulating; clayey and fine-loamy

TYPIC BOROLLS AND USTROTHENTS

No.	Description
19	Argiborolls; level-undulating; fine-loamy
20	Argiborolls-Argialbolls-Haploborolls; level-undulating; fine-loamy and clayey
21	Argiborolls-Haploborolls; level-rolling; fine-silty and fine-loamy
22	Argiborolls-Haploborolls; level-hilly; clayey and clayey-skeletal; lithic
23	Argiborolls-Haploborolls-Ustorthents; level-rolling; fine-loamy
24	Argiborolls-Natriborolls-Ustorthents; level-rolling; loamy and clayey
25	Argiborolls-Ustorthents; level-rolling; loamy
26	Argiborolls-Ustorthents; level-rolling; fine-loamy
27	Argiborolls-Ustorthents; level-rolling; clayey and fine-loamy
28	Calciborolls-Argiborolls; undulating-rolling; fine-loamy, clayey and loamy-skeletal
29	Calciborolls-Calciorthids; level-rolling; fine-loamy and loamy-skeletal
30	Haploborolls-Argiborolls-Ustipsamments; level-rolling; loamy and sandy
31	Haploborolls-Ustorthents-Argiborolls; undulating-hilly; fine-loamy and loamy-skeletal; lithic
32	Haploborolls-Ustorthents-Argiborolls; undulating-hilly; fine-loamy
33	Haploborolls-Ustorthents-Ustochrepts; undulating-hilly; fine-silty and fine-loamy
34	Ustorthents-Argiborolls; undulating-hilly; fine-loamy
35	Ustorthents-Argiborolls; undulating-steep; loamy; shallow

ARIDIC BOROLLS AND TORRIORTHENTS

No.	Description
36	Argiborolls; level-undulating; clayey
37	Argiborolls-Haploborolls-Paleargids; level-undulating; clayey and loamy
38	Argiborolls-Paleargids-Natrargids; level-undulating; clayey
39	Argiborolls-Torriorthents; undulating-rolling; clayey and fine-loamy
40	Haploborolls-Eutroboralfs-Argiborolls; undulating-hilly; coarse-loamy and fine-loamy
41	Torriorthents; undulating-steep; clayey, vertic; shallow
42	Torriorthents-Argiborolls; level-undulating; clayey; vertic

BOROLLIC ARIDISOLS AND TORRIORTHENTS

No.	Description
43	Natrargids; level; clayey
44	Torriorthents-Camborthids-Natrargids; undulating-hilly; loamy and clayey; shallow

UDOLLS, MESIC

No.	Description
45	Argiudolls; level-rolling; clayey and fine-loamy
46	Argiudolls-Argiaquolls-Argialbolls; level; clayey
47	Argiudolls-Hapludolls; level-rolling; clayey, fine-silty and fine-loamy
48	Argiudolls-Hapludolls; level-rolling; clayey and fine-silty
49	Hapludolls-Udorthents-Hapludalfs; undulating-hilly; fine-silty

UDIC USTOLLS AND AQUOLLS, MESIC

No.	Description
50	Argiustolls; level-rolling; clayey and fine-silty
51	Argiustolls-Argiaquolls-Argialbolls; level-undulating; clayey
52	Argiustolls-Haplustolls; level-rolling; clayey and fine-silty
53	Argiustolls-Haplustolls; level-steep; clayey-skeletal, clayey and loamy; lithic
54	Argiustolls-Haplustolls, lithic, loamy; undulating-hilly; clayey, fine-loamy and fine-silty
55	Argiustolls-Natrustolls; level-undulating; clayey
56	Argiustolls-Pellusterts-Haplustolls; level-undulating; clayey
57	Haplaquolls-Argiustolls-Ustifluvents; level; clayey and loamy
58	Haplustolls; level-undulating; fine-silty and fine-loamy
59	Haplustolls; level-rolling; fine-silty
60	Haplustolls-Ustipsamments; level-rolling; coarse-silty, coarse-loamy and sandy
61	Haplustolls-Ustipsamments; undulating-rolling; sandy and coarse-loamy
62	Haplustolls-Ustorthents; level-rolling; fine-silty
63	Haplustolls-Ustorthents; level-hilly; loamy and sandy
64	Haplustolls-Ustorthents; undulating-hilly; fine-silty

TYPIC USTOLLS AND AQUOLLS, MESIC

No.	Description
65	Argiustolls; level-undulating; clayey
66	Argiustolls-Argiaquolls; level-undulating; fine-silty and clayey
67	Argiustolls-Haplustolls; level-undulating; fine-loamy and fine-loamy over sandy or sandy-skeletal
68	Argiustolls-Haplustolls; level-rolling; fine-silty and fine-loamy
69	Argiustolls-Haplustolls; level-rolling; clayey; vertic
70	Argiustolls-Haplustolls-Calciustolls; level-rolling; clayey, fine-silty and fine-loamy
71	Argiustolls-Haplustolls-Natrustolls; level-rolling; fine-loamy and clayey
72	Argiustolls-Haplustolls-Ustorthents; level-rolling; fine-silty
73	Argiustolls-Natrustolls; level-undulating; clayey and fine-loamy
74	Argiustolls-Natrustolls; level-rolling; clayey and fine-silty
75	Calciustolls-Argiustolls-Haplustolls; level-undulating; loamy and clayey; shallow
76	Haplaquolls-Haplustolls-Ustipsamments; level-undulating; sandy
77	Haplustolls; level-rolling; clayey; vertic
78	Haplustolls-Argiustolls-Ustorthents; undulating-rolling; fine-loamy
79	Haplustolls-Argiustolls-Ustorthents; shallow, loamy; level-hilly; coarse-loamy, sandy, fine-loamy over sandy or sandy-skeletal
80	Haplustolls, shallow-Argiustolls; undulating-steep; clayey and loamy
81	Haplustolls-Ustipsamments; undulating-rolling; sandy, coarse-loamy, and fine-loamy over sandy or sandy-skeletal
82	Haplustolls-Ustorthents; level-hilly; loamy and sandy
83	Haplustolls-Ustorthents; undulating-hilly; fine-loamy
84	Haplustolls-Ustorthents, shallow; undulating-steep; clayey; vertic
85	Haplustolls-Ustorthents-Argiustolls; undulating-hilly; fine-silty

ARIDIC USTOLLS, USTALFS, AND TORRIORTHENTS, MESIC

No.	Description
86	Argiustolls; level-undulating; fine-loamy and fine-loamy over sandy or sandy-skeletal
87	Argiustolls-Haplargids Paleustolls; level-rolling; fine-loamy, clayey and coarse-loamy
88	Argiustolls-Haplustolls; level-undulating; fine-silty and clayey
89	Argiustolls-Haplustolls; level-rolling; clayey and loamy; lithic
90	Argiustolls-Haplustolls; undulating-rolling; coarse-loamy, fine-loamy over sandy or sandy-skeletal, sandy and fine-loamy
91	Argiustolls-Haplustolls-Haploborolls; undulating-hilly; loamy-skeletal and loamy
92	Argiustolls-Haplustolls-Torriorthents; level-undulating; clayey and fine-silty
93	Argiustolls-Haplustolls-Torriorthents; level-rolling; fine-silty
94	Argiustolls-Haplustolls-Torriorthents; undulating-rolling; loamy
95	Argiustolls-Haplustolls-Torripsamments; undulating-rolling; fine-loamy, coarse-loamy and sandy
96	Argiustolls-Natrustalfs-Pellusterts; level-undulating; coarse-loamy and clayey
97	Argiustolls-Torriorthents; undulating-hilly; fine-silty
98	Argiustolls-Torriorthents, lithic, loamy; undulating-rolling; fine-loamy and clayey
99	Argiustolls-Torriorthents, shallow-Camborthids, undulating-hilly; clayey and loamy
100	Haplustolls-Paleorthids; level-rolling; fine-loamy; lithic
101	Haplustolls-Torriorthents; level-rolling; loamy
102	Haplustolls-Torriorthents; undulating-hilly; fine-silty
103	Haplustolls-Torriorthents, shallow, loamy-Torripsamments; undulating-hilly; coarse-loamy, coarse-silty, and sandy
104	Paleustalfs-Haplustalfs-Ustipsamments; undulating-rolling; fine-loamy, coarse-loamy, and sandy
105	Paleustolls-Argiustolls-Paleorthids; level-undulating; clayey and loamy; lithic
106	Paleustolls-Calciustolls; level-undulating; clayey and fine-loamy
107	Paleustolls-Haplargids-Torriorthents; level-rolling; clayey, fine-loamy, and fine-silty

USTIC ARIDISOLS AND TORRIORTHENTS, MESIC

No.	Description
108	Calciorthids-Torriorthents; level-undulating; fine-loamy and loamy-skeletal; saline
109	Camborthids-Argiustolls; undulating-rolling; clayey and loamy; vertic
110	Camborthids-Torriorthents; level-undulating; clayey
111	Camborthids-Torriorthents, shallow; undulating-hilly; clayey; vertic
112	Haplargids-Calciorthids; level-rolling; fine-silty, fine-loamy, and coarse-loamy
113	Haplargids-Calciorthids-Haplustolls; level-undulating; fine-silty, and fine-loamy
114	Haplargids, fine-loamy-Calciorthids-Paleorthids; level-undulating; loamy; shallow
115	Haplargids-Torrifluvents, loamy; level-undulating; fine-silty and clayey
116	Haplargids-Torriorthents; level-undulating; clayey and fine-silty
117	Haplargids-Torriorthents-Natrargids; undulating-rolling; clayey and loamy
118	Haplargids-Torripsamments; level-undulating; coarse-loamy, fine-loamy, and sandy
119	Paleorthids-Calciorthids-Haplargids, fine-loamy; level-rolling; loamy; shallow
120	Torriorthents; undulating-hilly; loamy; lithic
121	Torriorthents; rolling-steep; loamy and clayey; shallow
122	Torriorthents, lithic, loamy-Haplargids-Argiustolls; undulating-hilly; clayey and fine-silty
123	Torriorthents-Haplargids-Natrargids; undulating-hilly; loamy and clayey; shallow

UDOLLS, THERMIC

No.	Description
124	Argiudolls-Argiaquolls-Haplustolls, lithic, loamy; level-hilly; clayey and fine-silty
125	Argiudolls-Haplustolls, lithic, loamy-Paleudolls; undulating-hilly; fine-silty, clayey, clayey-skeletal
126	Paleudolls-Albaqualfs-Argiudolls; level-rolling; clayey and fine-loamy

UDIC USTOLLS, USTALFS, AND AQUALFS, THERMIC

No.	Description
127	Albaqualfs-Paleustalfs; level-undulating; clayey
128	Haplustolls-Ustochrepts; undulating-hilly; clayey and loamy; lithic
129	Haplustolls-Ustochrepts; level-rolling; clayey-skeletal, loamy, and clayey; lithic
130	Ochraqualfs-Paleustalfs-Pellusterts; level-undulating; clayey
131	Paleustalfs-Albaqualfs-Pellusterts; level-undulating; clayey and loamy
132	Paleustalfs-Haplustalfs-Ustochrepts, shallow; undulating-rolling; clayey, loamy, and sandy
133	Paleustolls-Argiustolls-Ustochrepts; level-rolling; clayey, fine-silty, and fine-loamy

TYPIC USTOLLS, USTALFS, AND USTOCHREPTS, THERMIC

No.	Description
134	Argiustolls-Argiaquolls, clayey; level-undulating; fine-loamy and coarse-loamy
135	Argiustolls-Calciustolls-Paleustalfs; level-undulating; clayey and fine-loamy
136	Argiustolls-Haplustolls; level-undulating; fine-silty and coarse-silty
137	Argiustolls-Paleustolls-Ustochrepts; level-undulating; clayey
138	Calciustolls-Paleustolls; level-undulating; clayey; lithic
139	Haplustalfs-Argiaquolls, clayey-Ustipsamments; level-undulating; sandy and coarse-loamy
140	Haplustalfs-Ustipsamments-Ustorthents; level-rolling; sandy and coarse-loamy
141	Haplustolls-Calciustolls-Argiustolls; level-hilly; clayey-skeletal and clayey; lithic
142	Haplustolls-Calciustolls-Chromusterts; undulating-hilly; clayey-skeletal and clayey; lithic
143	Haplustolls-Ustochrepts-Haplustalfs; undulating-hilly; clayey-skeletal, loamy, and clayey; lithic
144	Paleustalfs-Haplustalfs; undulating-rolling; clayey and fine-loamy
145	Paleustalfs-Rhodustalfs, shallow-Haplustalfs; undulating-hilly; clayey and loamy
146	Paleustalfs-Ustochrepts, shallow-Argialbolls; level-rolling; clayey
147	Paleustalfs-Ustochrepts-Ustipsamments; undulating-rolling; loamy and sandy
148	Paleustolls-Natrustolls-Ustochrepts; level-rolling; clayey
149	Paleustolls-Paleustalfs; level-undulating; clayey, fine-loamy and coarse-loamy
150	Ustochrepts; undulating-hilly; loamy and clayey; shallow
151	Ustochrepts-Argiustolls-Haplustalfs; level-rolling; loamy and clayey; shallow
152	Ustochrepts-Argiustolls-Paleustolls; level-hilly; clayey and loamy; shallow
153	Ustochrepts-Argiustolls-Ustifluvents; level; loamy and sandy

ARIDIC USTOLLS AND USTALFS, THERMIC

No.	Description
154	Calciustolls-Argiustolls-Ustochrepts; level-rolling; loamy and clayey
155	Calciustolls-Paleorthids-Rock land; undulating-steep; loamy-skeletal and loamy; lithic
156	Calciustolls-Paleustolls; level-undulating; fine-loamy and clayey; shallow
157	Calciustolls-Ustochrepts-Calciorthids, shallow, loamy; undulating-hilly; fine-loamy
158	Paleustalfs-Haplustalfs-Ustochrepts; level-rolling; fine-loamy, coarse-loamy, and clayey
159	Paleustalfs-Paleustolls-Calciustolls; level-undulating; fine-loamy
160	Paleustalfs-Ustipsamments; level-undulating; fine-loamy, coarse-loamy, and sandy
161	Paleustolls-Calciustolls; level-undulating; clayey and fine-loamy

USTIC ARIDISOLS AND TORRIORTHENTS, THERMIC

No.	Description
162	Calciorthids-Haplargids-Paleustalfs; undulating-rolling; loamy and loamy-skeletal; shallow
163	Calciorthids-Paleorthids-Calciustolls; undulating-rolling; loamy and loamy-skeletal; lithic
164	Calciorthids-Paleorthids-Camborthids; level-rolling; loamy and clayey; shallow
165	Haplargids-Calciorthids-Torrerts; level-rolling; clayey and fine-silty
166	Haplargids-Camborthids-Torriorthents; level-undulating; clayey, fine-loamy, and fine-silty
167	Haplargids-Torripsamments; level-undulating; fine-loamy and sandy
168	Torriorthents-Camborthids-Haplargids; undulating-hilly; loamy, loamy-skeletal, and clayey; lithic

TYPIC ARIDISOLS AND TORRIORTHENTS, THERMIC

No.	Description
169	Gypsiorthids-Calciorthids-Paleorthids; level-undulating; clayey and loamy
170	Torriorthents-Paleorthids-Rock land; undulating-hilly; loamy-skeletal and loamy; lithic

TYPIC USTOLLS, USTALFS, AND AQUALFS, HYPERTHERMIC

No.	Description
171	Calciustolls-Haplustolls-Ustochrepts; level-undulating; clayey and coarse-loamy
172	Haplustolls-Argiustolls-Haplustalfs; level-undulating; fine-loamy
173	Ochraqualfs-Paleustolls-Argiustolls; level-undulating; clayey and fine-loamy
174	Paleustalfs-Haplustalfs; level-undulating; clayey, sandy and fine-loamy
175	Paleustalfs, arenic, loamy-Ustipsamments; level-undulating; sandy
176	Paleustolls-Pellusterts-Paleorthids, shallow, loamy; level-undulating; clayey

ARIDIC USTOLLS, USTALFS, AND USTOCHREPTS, HYPERTHERMIC

No.	Description
177	Haplustalfs-Paleorthids, shallow, loamy; level-undulating; fine-loamy and clayey
178	Haplustolls-Pellusterts-Paleorthids, shallow, loamy; level-undulating; clayey
179	Paleustalfs-Paleorthids, shallow, loamy; level-undulating; fine-loamy
180	Ustochrepts-Haplustalfs; level-undulating; fine-loamy

PSAMMENTS

No.	Description
181	Psamments; undulating-rolling; sandy
182	Torripsamments-Haplargids-Paleargids; level-rolling; sandy, coarse-loamy, and fine-loamy
183	Ustipsamments-Paleargids; undulating-rolling; sandy, coarse-loamy, and fine-loamy

ROCK LAND

No.	Description
184	Badlands-Torriorthents; undulating-steep; loamy and clayey
185	Rock land; undulating-steep
186	Rock land-Haplargids-Torriorthents; undulating-steep; loamy; lithic
187	Rock land-Torriorthents; undulating-steep; sandy-skeletal and loamy

VERTISOLS

No.	Description
188	Chromusterts-Haplustolls-Ustochrepts; level; clayey and loamy; fluventic; hyperthermic
189	Pellusterts-Chromusterts-Calciustolls; level-undulating; clayey and fine-silty; thermic
190	Pellusterts-Chromusterts-Paleustalfs; level-undulating; clayey; thermic
191	Pellusterts-Ochraqualfs-Argiustolls; level; clayey and fine-loamy; hyperthermic
192	Pellusterts-Paleorthids, shallow, loamy; level-undulating; clayey; hyperthermic
193	Pellusterts-Paleustolls-Haplustolls; level-undulating; clayey; thermic
194	Pellusterts- Udipsamments-Salorthids; level-undulating; clayey, loamy, and sandy; hyperthermic
195	Torrerts-Pellusterts-Paleorthids, shallow, loamy-skeletal; level-undulating; clayey; hyperthermic

country : USA
subject : Soils
scale : 1:2.500.000
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EXPLANATION OF PATTERNS AND SPECIAL SYMBOLS

- Dominantly wet soils.
- More than 20 percent shallow or lithic soils, hilly or steeper soils, but not dominantly Rock land.
- Dominantly Alfisols.
- More than 20 percent Vertisols or Vertic soils but not dominantly Vertisols.

The gray pattern, in the above blocks, is used to represent the color patterns, on the map, which indicate differences of soil temperature and soil moisture.

In areas with more than one of the above characteristics, only the most important is indicated.

- Ø About 100 square miles of Natriborolls, Natrustolls, or Natrargids.
- Large hill or small mountain.
- Narrow areas of level soils, 1 to 3 miles wide, are common along streams and rivers.

USE OF SOIL MAPS

WISE DECISIONS OF THE USE OF LAND REQUIRE FULL USE OF SOILS INFORMATION. THIS MAP IS USEFUL FOR GENERAL PLANNING AND EDUCATION. MORE SPECIFIC DECISIONS REQUIRE THE USE OF MAPS WHICH SHOW MORE DETAIL SUCH AS STATE OR COUNTY MAPS. SOME DECISIONS, SUCH AS LOCATION AND CONSTRUCTION OF BUILDINGS, DAMS, AND HIGHWAYS, REQUIRE ON-SITE INVESTIGATIONS.

EXPLANATION OF THE LEGEND

The legend is based upon the soil classification system adopted by the National Cooperative Soil Survey, January 1965. Soil temperature and soil moisture are important characteristics used in the system and they are given major emphasis in the legend. The colors on the map, except pink, red, and purple, show differences in soil temperature or soil moisture. Areas on the map dominated by Psamments - sandy soils - are shown in pink; areas dominated by Vertisols - clayey soils are purple; and areas dominated by rocks are red.

The names used in the soil classification system are explained below the map.

Yellow indicates areas dominated by Typic Aridisols, usually dry soils low in organic matter but with pedogenic horizons. These horizons or layers resulted from the changes which occurred as the soils formed. Typic Aridisols are the driest Aridisols and in the Great Plains all of them have thermic temperatures.

Blue indicates areas dominated by Borolls which have mean annual soil temperatures less than 47°F (8°C), frigid. Dark blue indicates Udic Borolls which are more moist than average for Borolls. Medium blue indicates Typic Borolls with average moisture. Light blue indicates Aridic Borolls which are less moist than average. Bluish yellow indicates areas dominated by Borollic Aridisols which also have frigid temperatures but are lighter colored and lower in organic matter than Borolls.

Green indicates areas dominated by Ustolls or Udolls with mesic soil temperatures, those with mean annual soil temperatures between 47°F (8°C) and 59°F (15°C). Dark green indicates Udolls which are usually moist. Ustolls are less moist than Udolls. Moderately dark green indicates Udic Ustolls which are more moist than average for Ustolls. Moderately light green indicates Typic Ustolls with average moisture. Light green indicates Aridic Ustolls which are less moist than average. Greenish yellow indicates areas dominated by Ustic Aridisols with mesic soil temperatures.

Reddish brown indicates areas dominated by Ustolls, Ustalfs, or Udolls with thermic soil temperatures, those with mean annual soil temperatures between 59°F (15°C) and 72°F (22°C). Dark reddish brown indicates Udolls. Moderately dark reddish brown indicates Udic Ustolls and Ustalfs which are more moist than average. Moderately light reddish brown indicates Typic Ustolls and Ustalfs with average moisture. Light reddish brown indicates Aridic Ustolls and Ustalfs which are less moist than average. Light brownish yellow indicates areas dominated by Ustic Aridisols with thermic temperatures.

Orange indicates areas dominated by Ustolls and Ustalfs with hyperthermic soil temperatures, those with mean annual soil temperatures of 72°F (22°C) or higher. Dark orange indicates Typic Ustolls and Ustalfs and light orange indicates Aridic Ustolls and Ustalfs.

Mapping units (areas shown on the soil map) are further defined on the bases of great groups, slope gradients, and particle-size classes. Other properties such as depth to bedrock, excess salt, and active clays also are used where important. The great groups used are briefly described below the map where the names used in the soil classification system are explained.

If one great group includes more than 70 percent of an area, only that one is used. If two great groups include more than 70 percent, only two are used. If three or more great groups are needed to include more than 70 percent, only three great groups are used. A miscellaneous land type - Rock land - is used with great groups of mapping units which include portions dominated by rocks. Badlands with areas of barren soft shales are an example.

The slope range which includes more than 70 percent of the area of a mapping unit is given using one or more of the following terms:

Level	0-3 percent slope
Undulating	3-8 percent slope
Rolling	8-16 percent slope
Hilly	16-30 percent slope
Steep	more than 30 percent slope

As an example "level-undulating" means that more than 70 percent of the area has slope gradients of 0-8 percent. "Undulating-rolling" means that the slope gradients of more than 70 percent of the area are between 3 and 16 percent.

The particle-size classes are listed in the order of their extent until their combined acreage exceeds 70 percent of the mapping unit.

The particle-size classes are those used in the definition of soil families and they apply to the whole soil which includes both the rock fragments and the fine earth. Rock fragments include those mineral particles and loose rocks (not bedrocks) larger than 2 millimeters (1 millimeter equals .04 inch), and the fine earth includes those smaller than 2 millimeters (mm). Soil texture classes apply only to the fine earth and they are not used in this legend.

The particle-size class generally is that of the 10 to 40-inch layer. The particle-size classes used in this legend are as follows:

Sandy	Fine earth includes mainly fine sand (0.25 - 0.1 mm) and coarser, some very fine sand (0.1 - 0.05 mm) but very little silt (0.05 - 0.002 mm) and clay (less than 0.002 mm). Rock fragments are less than 35 percent by volume.
Loamy	Fine earth includes less than 35 percent clay, variable amounts of silt and sands and usually less than 70 percent fine sands and coarser. Rock fragments are less than 35 percent by volume.
Coarse-loamy	A loamy particle-size with less than 18 percent clay and more than 15 percent fine sand and coarser in the fine earth.
Fine-loamy	A loamy particle-size with 18-35 percent clay and more than 15 percent fine sand and coarser in the fine earth.
Coarse-silty	A loamy particle-size with less than 18 percent clay and less than 15 percent fine sand and coarser in the fine earth.
Fine-silty	A loamy particle-size with 18-35 percent clay and less than 15 percent fine sand and coarser in the fine earth.
Clayey	Fine earth contains more than 35 percent clay. Rock fragments are less than 35 percent by volume.
Sandy-skeletal	Rock fragments are 35 percent or more by volume and fine earth is sandy.
Loamy-skeletal	Rock fragments are 35 percent or more by volume and fine earth is loamy.
Clayey-skeletal	Rock fragments are 35 percent or more by volume and fine earth is clayey.
Fine-loamy over sandy or sandy-skeletal	Contrasting particle-sizes with the upper part of the 10 to 40-inch layer fine-loamy and the lower part sandy or sandy-skeletal.

Additional properties used in some mapping units are as follows:

Lithic	Soils with hard bedrock within 20 inches of the surface occupy more than 20 percent of the area.
Shallow	Soils with soft bedrock within 20 inches of the surface occupy more than 20 percent of the area.
Saline	Soils with excess salts dominate these areas.
Vertic	Soils with very active or swelling clays occupy more than 20 percent of the area.
Fluventic	Soils of the flood plains formed in alluvium occupy more than 20 percent of the area.
Arenic	Soils with a 20 to 40-inch surface horizon that is sandy throughout.

If any of the above properties apply to only one great group, they are shown immediately after that great group. For example, in mapping unit 122 only the Torriorthents are lithic and loamy.

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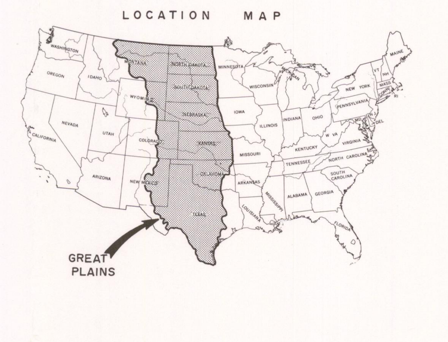
SCALE: 1/2,500,000

SCALE 25 0 25 50 75 100 MILES

ALBERS EQUAL-AREA PROJECTION
NORTH AMERICAN DATUM



EXPLANATION OF THE NAMES

The names used in the soil classification system are combinations of formative elements from Latin and Greek. If the formative elements had been taken from English, confusion would have resulted because English words commonly have more than one meaning. The formative elements have specific meaning in the system as shown in the table.

The soil classification system consists of orders which are subdivided into suborders, which are subdivided into great groups, which are subdivided into subgroups, which are subdivided into families which are subdivided into series. Only names of suborders and great groups are used in the legend.

The names of orders end in "sol" and each order name contains a formative element which is the final syllable of the names of suborders, great groups, and subgroups of the order. The orders with their formative element and a brief description are as follows:

Alfisols	alf	Soils with gray to brown surface horizons, subsurface horizons of clay accumulation, medium to high in bases.
Aridisols	id	Soils that are low in organic matter, usually dry, and have pedogenic horizons.
Entisols	ent	Soils without pedogenic horizons.
Histosols	ist	Organic soils formed from plant residues.
Inceptisols	ept	Soils with faint or indistinct pedogenic horizons and are usually moist.
Mollisols	oll	Soils with nearly black surface horizons high in organic matter and bases.
Oxisols	ox	Soils that are mixtures principally of kaolin, hydrated oxides, and quartz.
Spodosols	od	Soils that have amorphous materials consisting of organic matter plus compounds of aluminum and usually iron accumulated in a subsurface horizon.
Ultisols	ult	Soils that have subsurface horizons of clay accumulation and are low in bases.
Vertisols	ert	Soils that are clayey and have wide deep cracks when dry.

Pedogenic horizons result from the changes that occur in the soils as they form. The more common bases are calcium, magnesium, potassium, and sodium.

Histosols, Oxisols, Spodosols, and Ultisols are not in this legend.

The names of suborders consist of two syllables, the formative element of the order plus another formative element used as a prefix. Aquolls, for example, are wet Mollisols.

The names of great groups consist of the suborder names with another formative element added as a prefix. The letter "o" or "i" is sometimes added between the formative element and the suborder name to make the great group name easier to pronounce.

The formative elements used in this legend to form suborder and great group names and their meaning are as follows:

Alb	Soils that have a bleached (white) surface or subsurface horizon reflecting wetness.
Aqu	Soils that are wet for long periods unless artificially drained.
Arg	Soils with a horizon of clay accumulation.
Bor	Soils with mean annual temperatures less than 47°F (8°C).
Calc	Soils that have a horizon of calcium carbonate accumulation and are calcareous throughout.
Camb	Soils with minor or slight changes or alterations.
Chrom	Soils with a brownish or reddish surface horizon.
Eutro	Fertile soils high in bases.
Fluv	Soils in flood plains formed in alluvium.
Gyps	Soils that have a horizon of gypsum, calcium sulfate.
Hapl	The typical ones used in the names of great groups.
Natr	Soils with an accumulation of clay high in sodium.
Ochr	Soils with a light-colored surface horizon low in organic matter.
Orth	The typical ones used in the names of suborders.
Pale	Soils that are old and on stable landscapes, which have not been disturbed by recent geologic erosion or depositions.
Pell	Soils that have a black or dark gray surface horizon.
Psamm	Soils that are sandy with very little silt and clay.
Rhod	Soils with a dark red color.
Sal	Soils with an accumulation of easily soluble salts.
Torr	Soils that are usually dry.
Ud	Soils that are usually moist and have long periods with enough moisture for plant growth.
Ust	Soils that are sometimes dry, sometimes moist, and have summer rains but lack moisture for plant growth for long periods.

The legend includes 16 suborders and 41 great groups.

The suborders of alfisols are as follows:

Aqualfs	Alfisols that are wet for long periods.
Boralfs	Alfisols with mean annual soil temperatures less than 47°F (8°C).
Ustalfs	Alfisols that are sometimes dry, sometimes moist, have summer rains, lack moisture for plant growth for long periods and have mean annual soil temperatures of 47°F (8°C) or higher.

Albaqualfs and Ochraqualfs are great groups of Aqualfs. Albaqualfs have a more abrupt increase in clay content between the light colored horizon and the horizon of clay accumulation than Ochraqualfs.

Eutroboralfs are the only great group of Boralfs represented and they are fertile soils high in bases.

The Ustalfs are represented by four great groups; namely,

- Haplustalfs which are the typical Ustalfs which are free or nearly free of sodium, not red or old.
- Natrustalfs which have much sodium on the clays.
- Rhodustalfs which have thin dark red horizons of clay accumulation.
- Paleustalfs which are old soils with thick red horizons of clay accumulation, and occur on old stable landscapes.

The suborders of Aridsols are as follows:

- Orthids - The Aridisols without a horizon of clay accumulation.
- Argids - The Aridisols with a horizon of clay accumulations.

The Orthids are represented by five great groups; namely,

- Calciorthids which are calcareous throughout and have a distinct horizon of calcium carbonate.
- Camborthids which have had only slight changes during their formation and no large accumulations of calcium carbonates or soluble salts.
- Gypsiorthids which have a distinct horizon of calcium sulfate, gypsum.
- Paleorthids which are old soils with a very hard, usually thick horizon cemented by calcium carbonates.
- Salorthids which have large amounts of easily soluble salts and the ground water is high enough for long enough period to maintain their salt content.

The Argids are represented by three great groups; namely,

- Haplargids which have little or no sodium on the clays and are not old, the typical ones.
- Natrargids which have much sodium on the clays.
- Paleargids which are old soils with either a very hard horizon cemented by calcium carbonates or an abrupt increase in clay content in the upper 3 inches of the horizon of clay accumulation.

The suborders of Entisols are as follows:

- Fluvents which are soils of the flood plain formed in alluvium.
- Orthents which are not sandy or in the flood plain, the typical ones.
- Psamments which are sandy.

The Fluvents are represented by two great groups; namely,

- Ustifluvents which are sometimes moist, sometimes dry.
- Torrifluvents which are usually dry.

The Orthents are represented by three great groups; namely,

- Udorthents which are of humid climates.
- Ustorthents which are sometimes moist, sometimes dry.
- Torriorthents which are of dry climates.

The Psamments are represented by three great groups; namely,

- Udipsamments which are of humid climates.
- Ustipsamments which are sometimes moist, sometimes dry.
- Torripsamments which are of dry climates.

The only suborder of Inceptisol used in the legend is Ochrepts which have a light-colored, low-organic matter surface horizon. Ustochrepts is the only great group of Ochrepts and these are sometimes dry, sometimes moist.

The suborders of Mollisols are as follows:

- Albolls which have a mottled, bleached, or whitish subsurface horizon over a mottled or gray horizon of clay accumulation. Mottles are small spots of contrasting colors usually evidence of wetness.
- Aquolls which are wet, usually for long periods.
- Borolls which have mean annual soil temperatures less than 47°F (8°C).
- Udolls which are usually moist and have long periods with enough moisture for plant growth and have a mean annual soil temperature of 47°F (8°C) or higher.
- Ustolls which are sometimes dry, sometimes moist, have long periods without enough water for plant growth, summer rains, mean annual soil temperatures of 47°F (8°C) or higher and usually some accumulation of calcium carbonate in the lower part of the profile.

Albolls are represented by only one great group, Argialbolls which have a clay accumulation nearly free of sodium.

The Aquolls are represented by three great groups; namely,

- Argiaquolls which have a horizon of clay accumulation.
- Calciaquolls which are calcareous throughout and have a large accumulation of calcium carbonate near the surface.
- Haplaquolls which lack a large accumulation of clay or calcium carbonate, the typical ones.

The Borolls are represented by four great groups; namely,

- Argiborolls which have a horizon of clay accumulation.
- Calciborolls which are calcareous throughout and have large accumulations of calcium carbonate.
- Haploborolls which lack a distinct accumulation of calcium carbonate, clay or sodium, the typical ones.
- Natriborolls which have a horizon of clay accumulation with much sodium on the clays.

The Udolls are represented by three great groups; namely,

- Argiudolls which have a horizon of clay accumulation.
- Hapludolls which are the typical ones and lack a horizon of clay accumulation or age.
- Paleudolls which are old soils with thick reddish horizons of clay accumulation.

The Ustolls are represented by five great groups; namely,

- Argiustolls which have a horizon of clay accumulation.
- Calciustolls which are calcareous throughout and have a large accumulation of calcium carbonate.
- Haplustolls which lack a distinct accumulation of calcium carbonate, clay or sodium, the typical ones.
- Natrustolls which have a horizon of clay accumulation with much sodium on the clays.
- Paleustolls which are old soils of stable landscapes with thick reddish horizons of clay accumulation, a very hard horizon cemented by calcium carbonate or an abrupt increase in clay content in the upper 3 inches of the horizon of clay accumulation.

The suborder of Vertisols are as follows:

- Usterts which are sometimes dry, sometimes moist, and have summer rains.
- Torrerts which are usually dry.

The Usterts are represented by two great groups; namely,

- Pellusterts which are black or dark gray.
- Chromusterts which are brownish.

All Torrerts are so similar that they are not divided into great groups.