




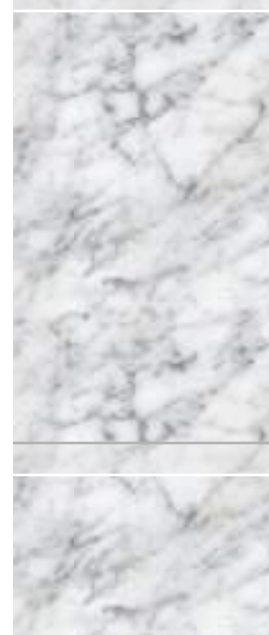
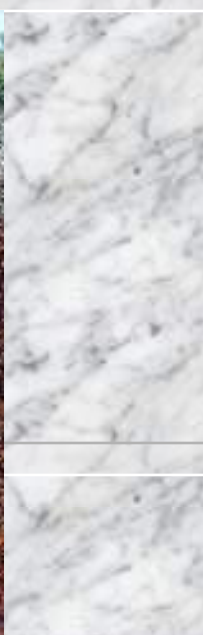
SOIL CLASSIFICATION

 United States
Department of Agriculture

 NRCS
National
Resources
Conservation
Service

Keys to Soil Taxonomy

Eleventh Edition, 2010



INTRODUCTION

□ Classified based on **Uses**

– Black cotton soils

– Rice soils

– Olive soils



INTRODUCTION

- Classified based on **Origin**

- Limestone soil

- Piedmont soil

- Alluvial soil



INTRODUCTION

- Classified based on **profile characteristics**
 - Mollisols
 - Oxisols
 - Gelisols
 - Spodosols



SOIL ORDERS

- World's soils assigned to one of 12 orders
- Order names end in *sols* (Latin *solum*, soil)
- **Example:** Mollisols

SOIL ORDERS AND GENERAL FEATURES

- **Gelisols** □ Permafrost with frost churning
- **Entisols** □ No profile, floodplains, sands, and volcanic deposits (“Other soils”)
- **Inceptisols** □ Humid regions with moderate horizon development with high salts
- **Andisols** □ 60% volcanic ash, cinders, pumice, basalt with low density

SOIL ORDERS AND GENERAL FEATURES

Histosols

- Organic soils in bogs, swamps, and marshes (>20% organic matter)

Alfisols

- Humid and sub-humid climates under forests, wet, and acidic

Oxisols

- Excessively weathered, few original minerals, low fertility, iron and aluminum oxide clays, acidic, tropical and sub-tropical climates

SOIL ORDERS AND GENERAL FEATURES

- **Aridisols** □ Dry climates salty layers
- **Mollisols** □ Grasslands, deep, dark A horizons (base saturation >50%)
- **Vertisols** □ High (>30%) clay content that swell when wet. Tropics with wet and dry seasons

SOIL ORDERS AND GENERAL FEATURES

- **Spodosols** □ Sandy, leached coniferous forest soils, acidic, with iron and aluminum oxides
- **Ultisols** □ Strongly acidic, extensively weathered in tropical and sub-tropical climates (base saturation < 35%)
 - **Base saturation** – the capacity of soil adsorption complex saturated with exchangeable cations (total CEC)

SOIL TAXONOMY CRITERIA

Moisture

Temperature

Color

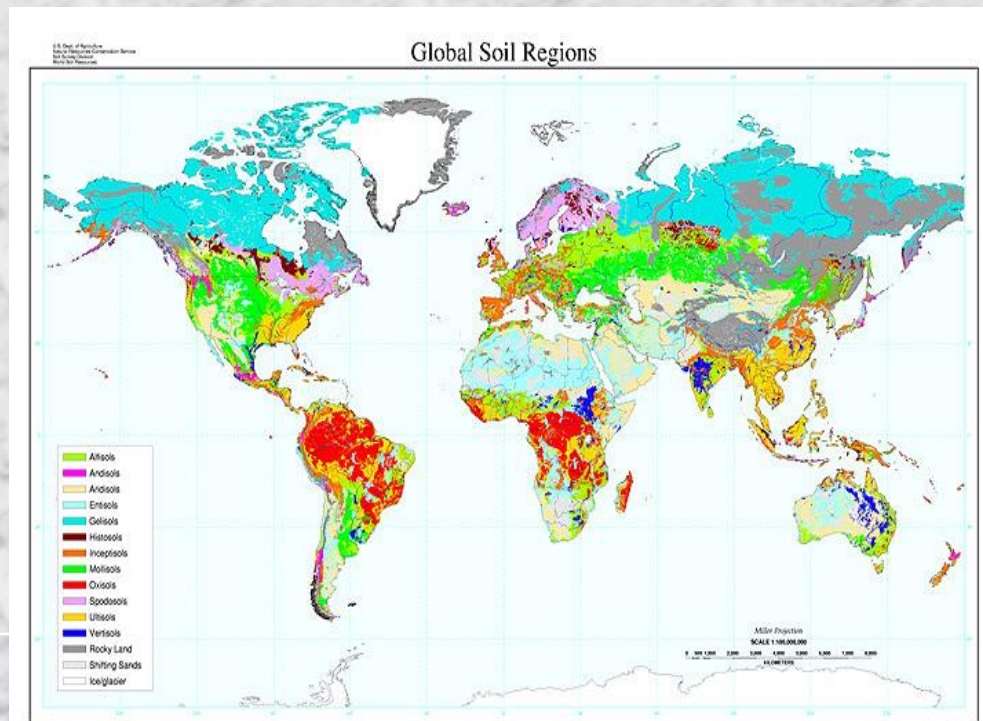
Texture

Structure

Chemical properties

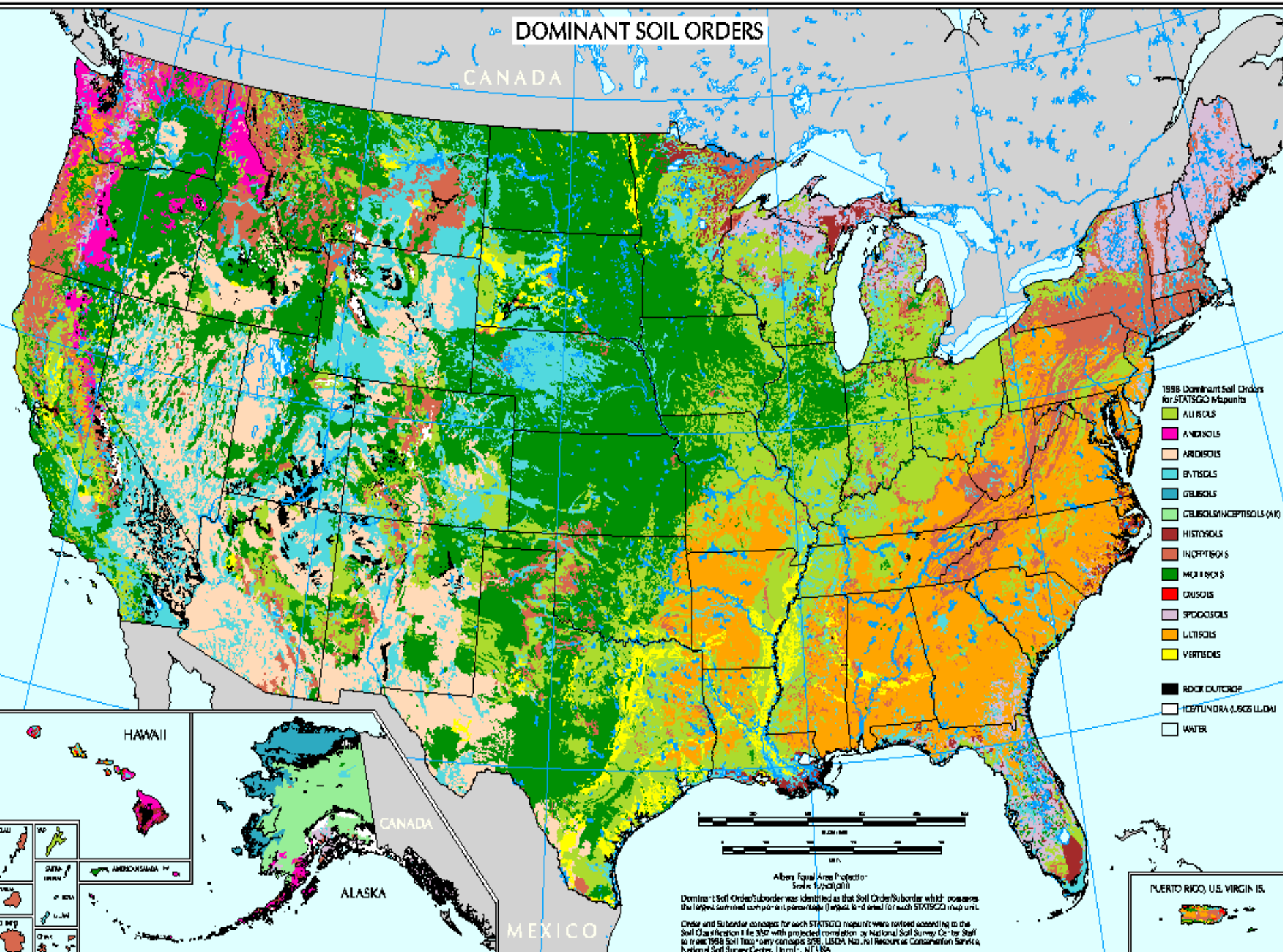
Minerals

Depth

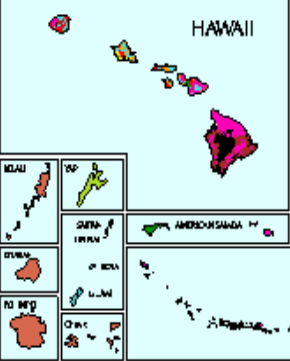


DOMINANT SOIL ORDERS

CANADA



- 1988 Dominant Soil Orders for STATSGO Mapunits
- ALLISOLS
 - ANDISOLS
 - ARIDISOLS
 - ENTISOLS
 - GELISOLS
 - GELISOLS/MICROPSOLS (M)
 - HISTOSOLS
 - INCEPTISOLS
 - MOLLISSOLS
 - OXISOLS
 - SPodosOLS
 - ULTISOLS
 - VERTISOLS
 - ROCK OUTCROP
 - ICE/TUNDRA (USGS ULOM)
 - WATER



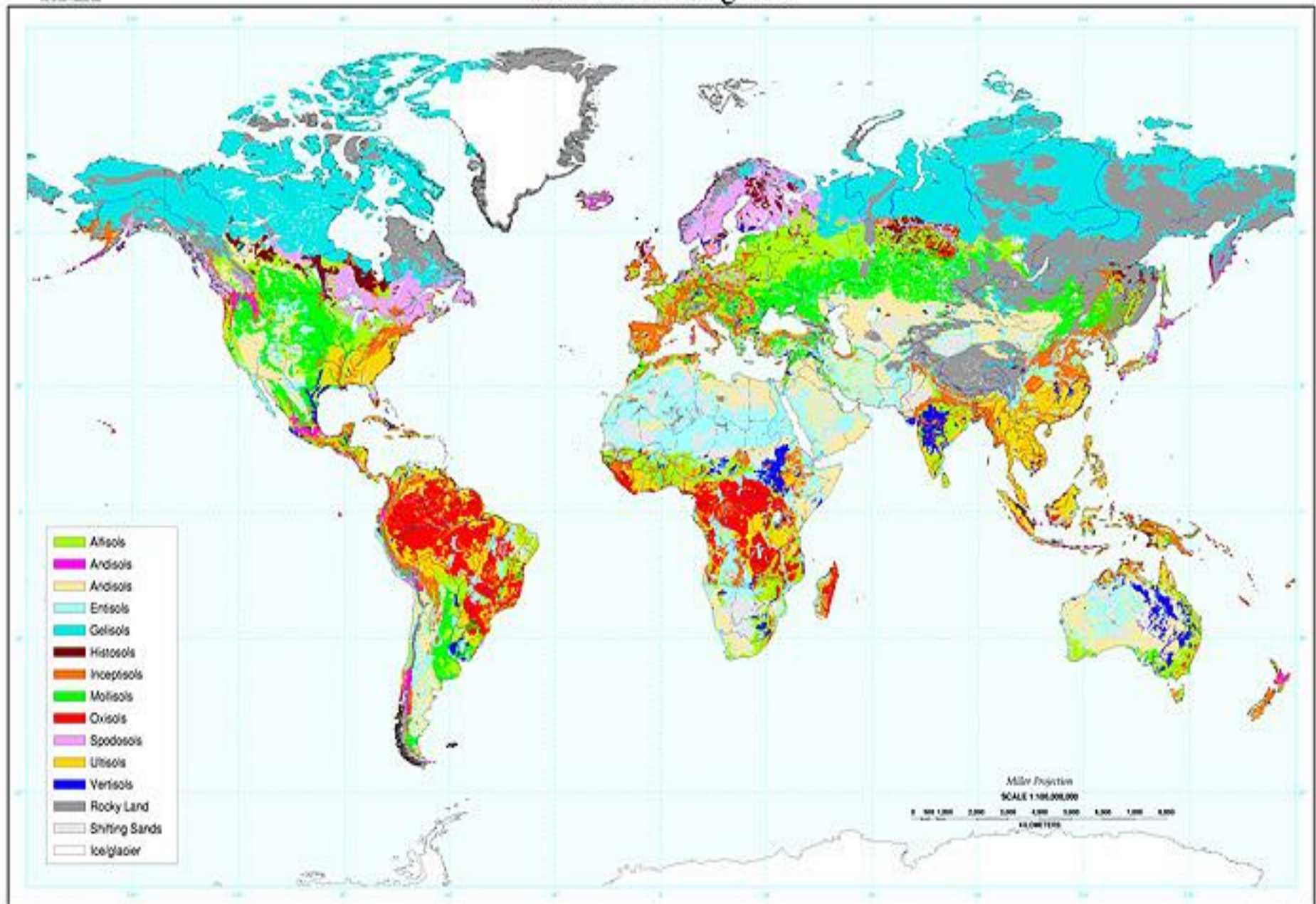
Albers Equal Area Projection
Scale: 1:250,000,000

Dominant Soil Order/suborder was identified as that Soil Order/suborder which possesses the largest soil area in percentage (largest land area) for each STATSGO map unit.

Order and Suborder names for each STATSGO mapunit were revised according to the Soil Classification 1 to 332 with projected correlation by National Soil Survey Center Staff to their 1988 Soil Taxonomy concepts (SSE, USDA, National Resource Conservation Service, National Soil Survey Center, 1991, NUS, USA).



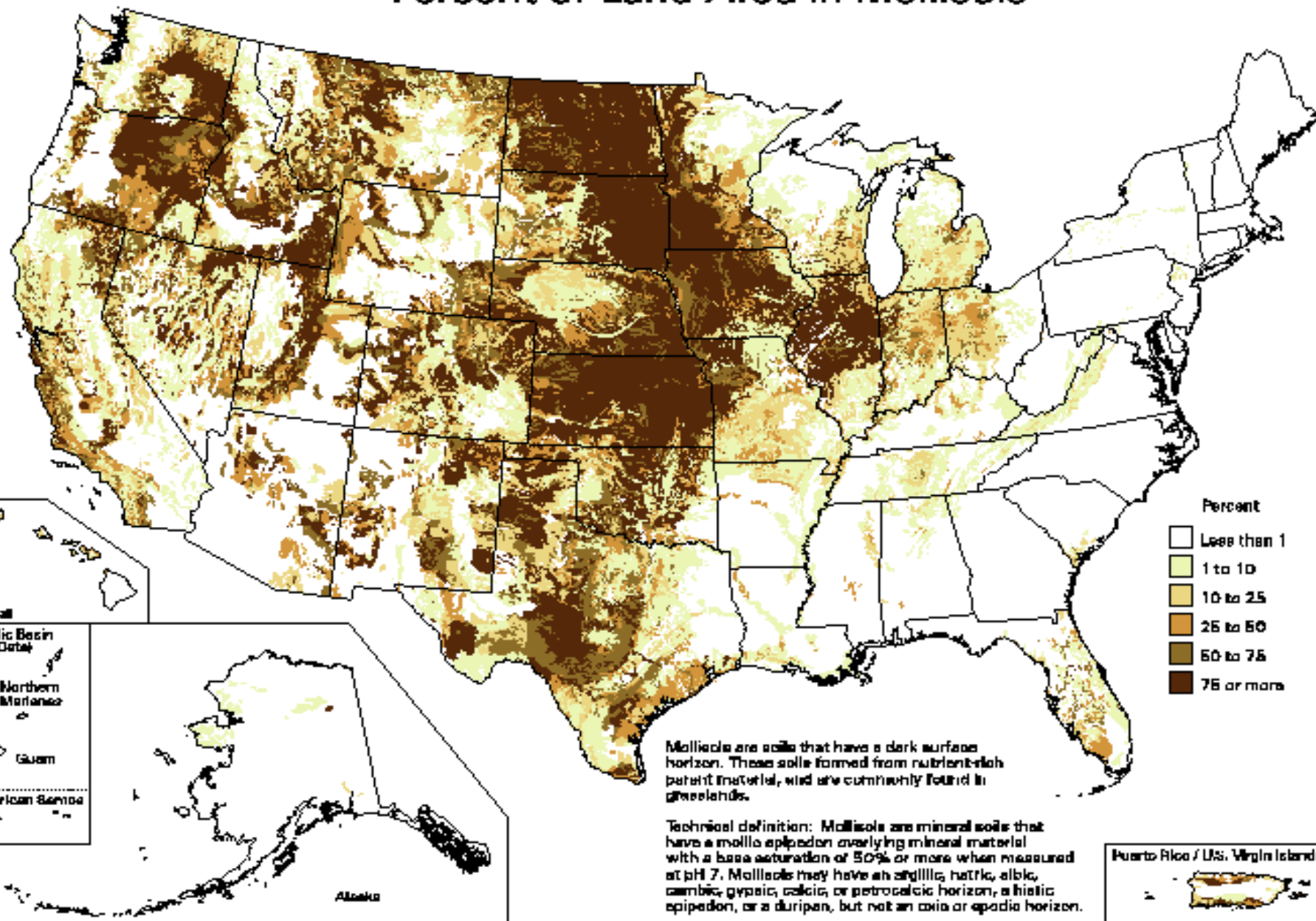
Global Soil Regions



MOLLISOLS

- Cover 22% of U.S. land area
- Dominate Great Plains region and **Illinois**
- Among the world's most productive soils
 - Kazakhstan, Ukraine, and Russia
- Major component of vast and diverse **prairie ecosystem**

Percent of Land Area in Mollisols



Percent

- Less than 1
- 1 to 10
- 10 to 25
- 25 to 50
- 50 to 75
- 75 or more

Mollisols are soils that have a dark surface horizon. These soils formed from nutrient-rich parent material, and are commonly found in grasslands.

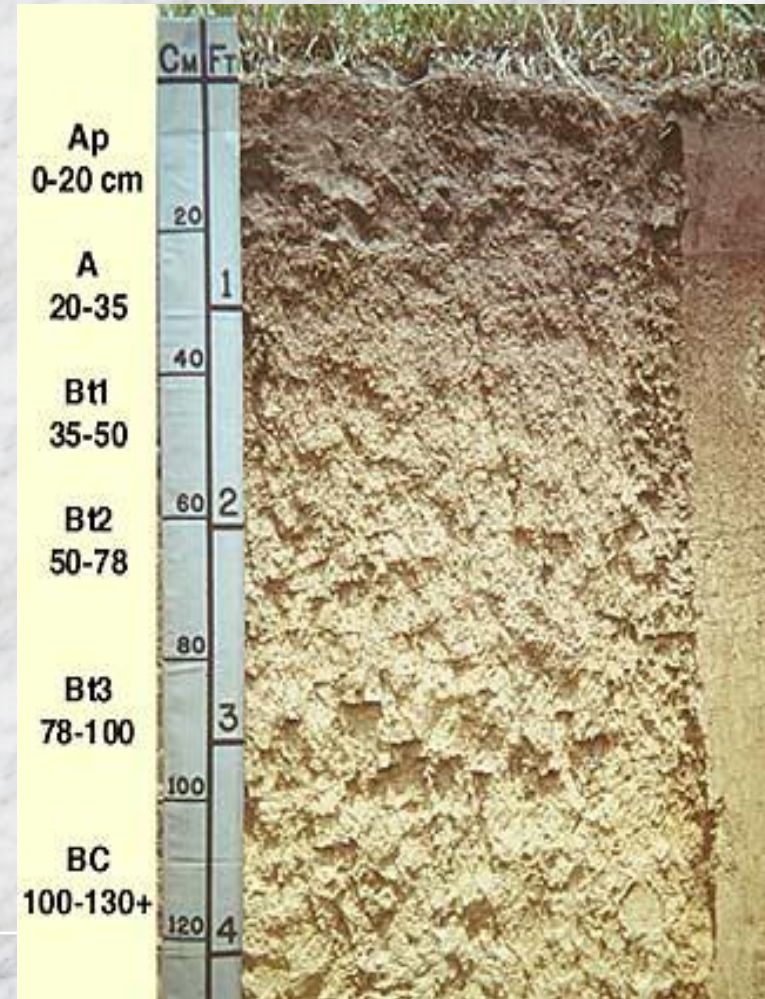
Technical definition: Mollisols are mineral soils that have a mollic epipedon overlying mineral material with a base saturation of 50% or more when measured at pH 7. Mollisols may have an argillic, natric, albic, cambic, gypsic, calcic, or petrocalcic horizon, a histic epipedon, or a duripan, but not an oxis or oxisol horizon.

Puerto Rico / U.S. Virgin Islands



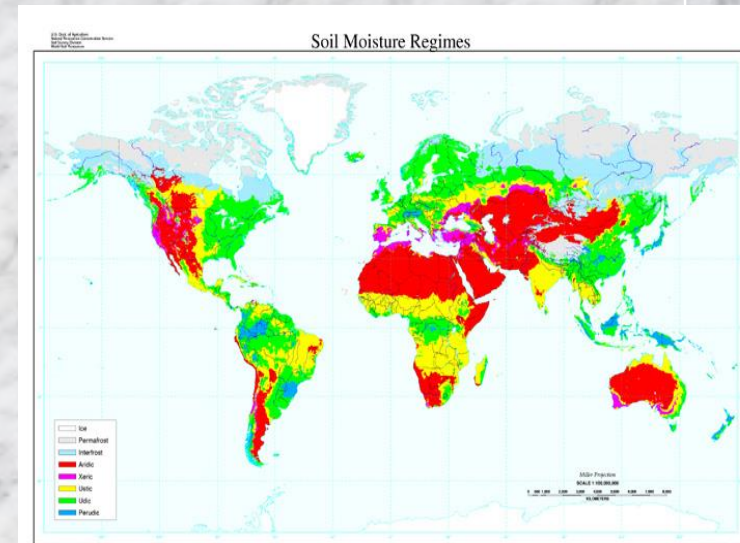
MOLLISOLS

- Formed by accumulation of calcium-rich organic matter from dense root systems of prairie grasses
- 60-80 cm (24-32 in.) depth
- High in Ca and Mg
- Organic matter thickness (>25 cm.)
- Soft and crumbly when dry
- Good CEC



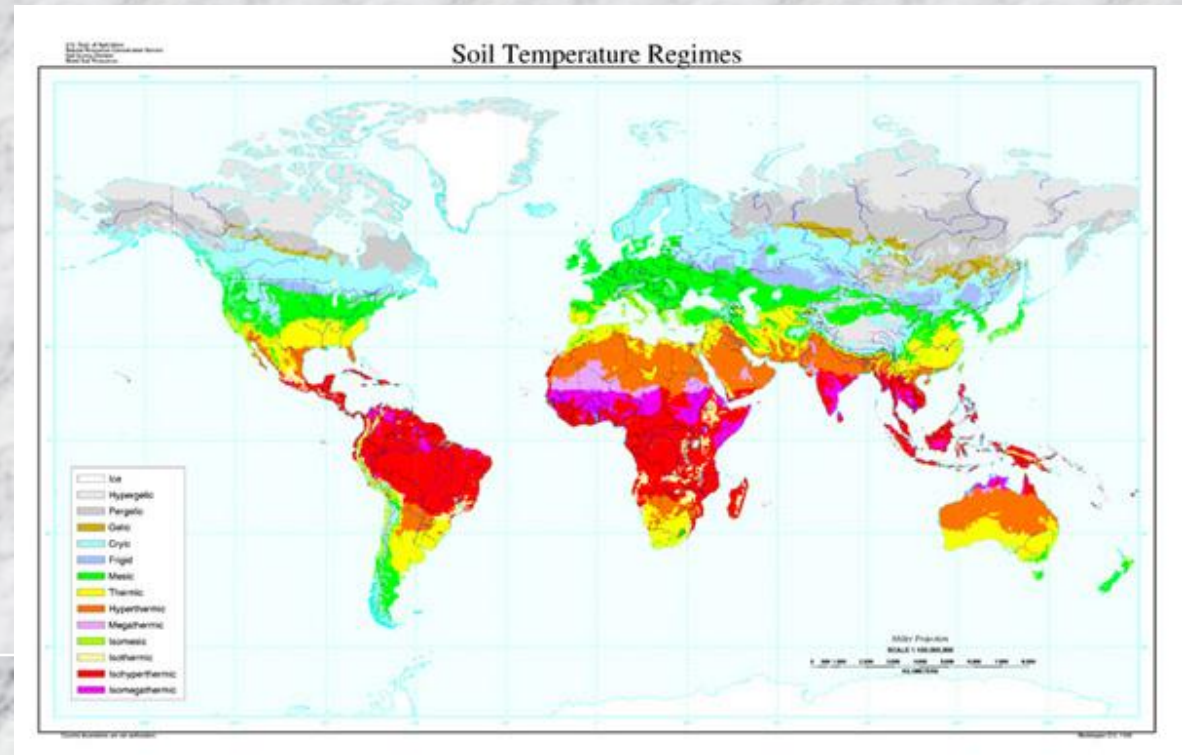
SOIL MOISTURE REGIMES

- **Aquic** - saturated with water
- **Udic** - moisture is high year-round
- **Ustic** - intermediate between udic and aridic
- **Aridic** - dry for at least 1/2 growing season
- **Xeric** - long periods of drought



SOIL TEMPERATURE REGIMES

- Mean annual soil temperature
- Mean summer temperature
- Difference between mean summer and winter temperatures



SOIL TEMPERATURE REGIMES

- **Frigid** – mean annual soil temperatures of $>0^{\circ}\text{C}$, but $<8^{\circ}\text{C}$ with warm summer temperatures
- **Mesic** – mean annual soil temperatures of 8°C or more but $<15^{\circ}\text{C}$



SOIL TEMPERATURE REGIMES

- **Thermic** – mean annual soil temperatures of 15C or more but <22C
- **Cryic (Gr. “icy cold”)** – mean annual soil temperatures of >0C but <8C with cold summer temperatures



SOIL SURVEY AND MAPS

- **Soil map** - map that shows different soils
 - Define each soil unit
 - Information on nature of each soil
 - Delineate boundaries between soil units

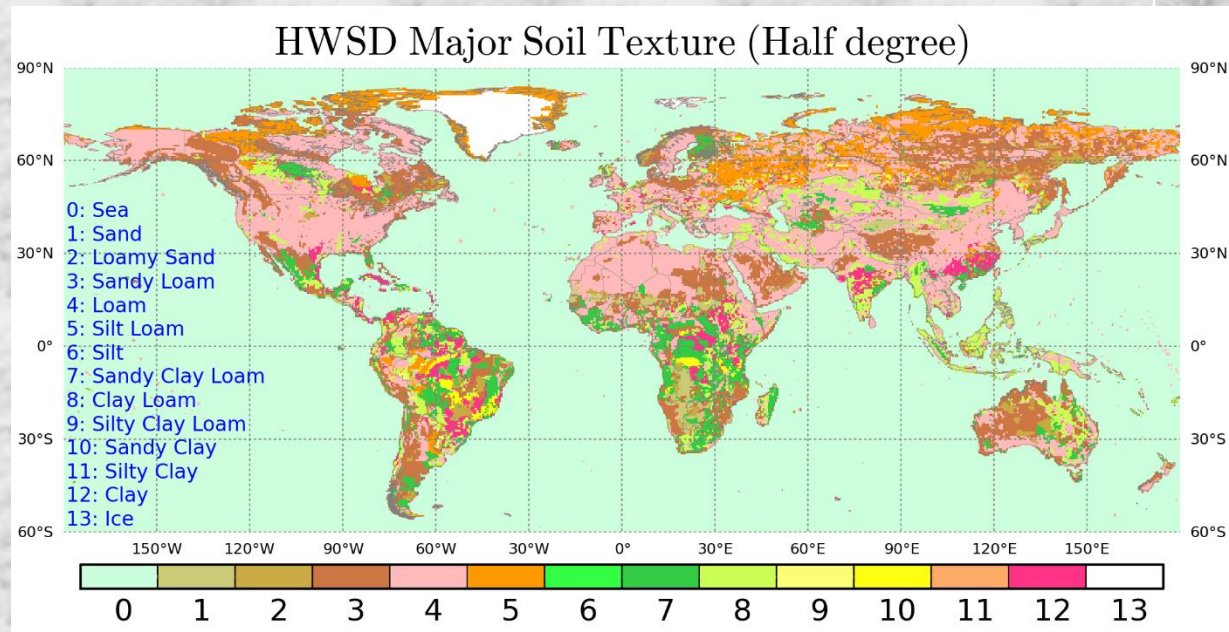
SOIL SURVEY AND MAPS

□ **Soil description** is written and includes:

– Texture

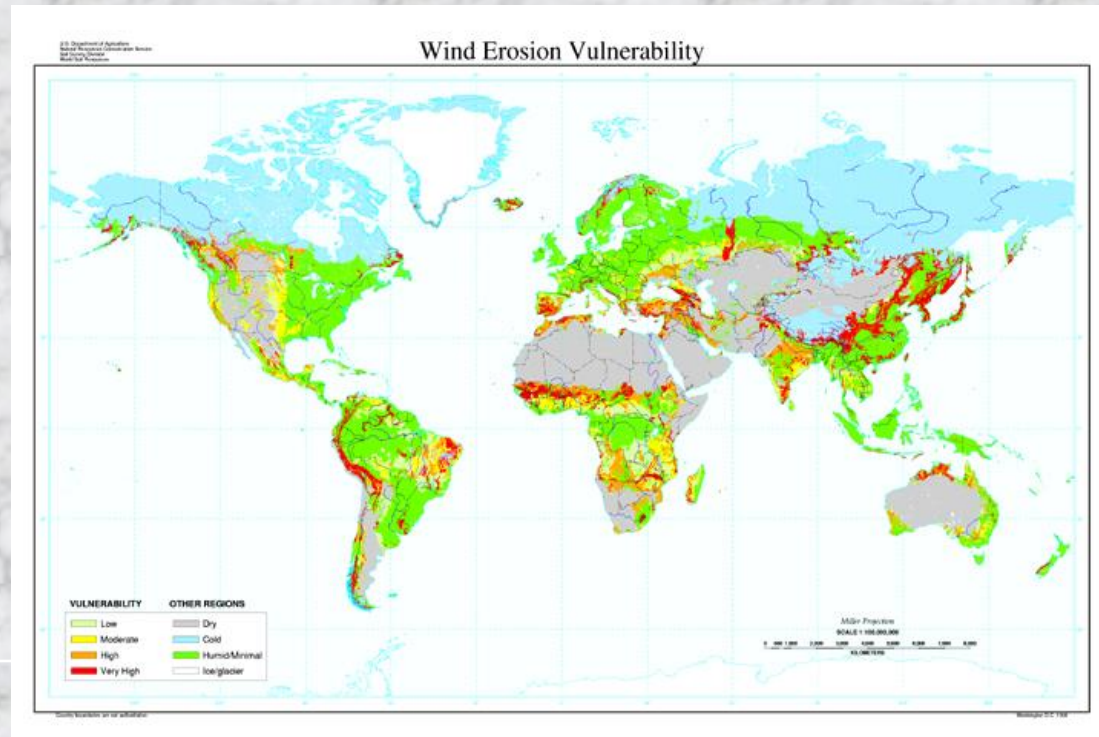
– Color

– Structure



SOIL SURVEY AND MAPS

- **Soil survey** - contains descriptive information on the mapping units and suitability for various land uses

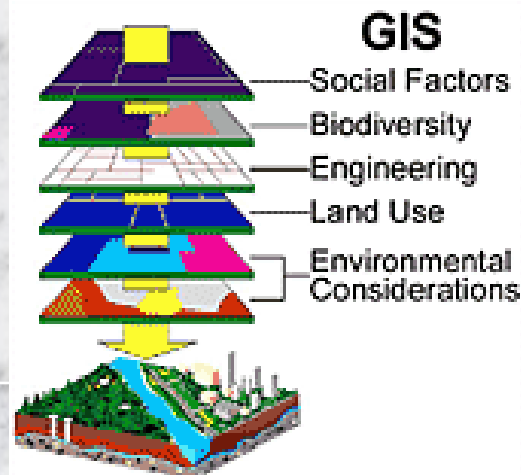
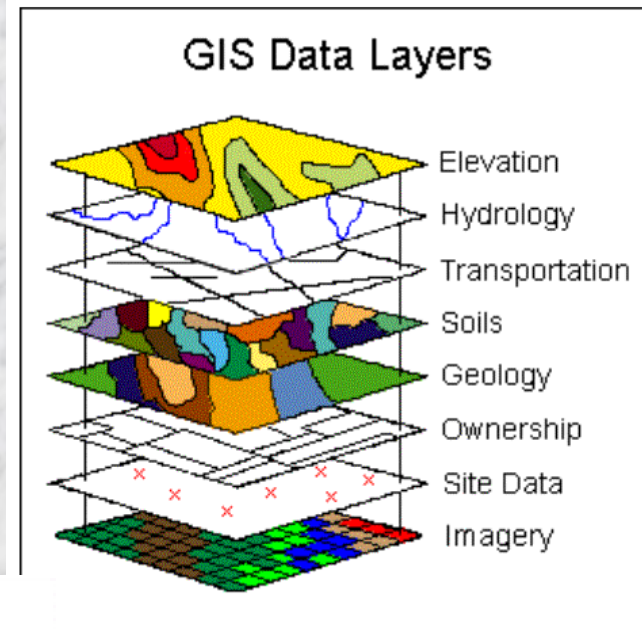


SOIL SURVEY AND MAPS

- **Geographic information system (GIS)** - computerized system that helps store and analyze soil survey information
- Assists in the generation of electronic versions of county-level soil survey maps

GEOGRAPHICAL SURVEY SYSTEM (GIS)

- ❑ **Combines layers of information about a place**
- ❑ Customers
- ❑ Structures
- ❑ Infrastructure
- ❑ Real estate



END OF PRESENTATION