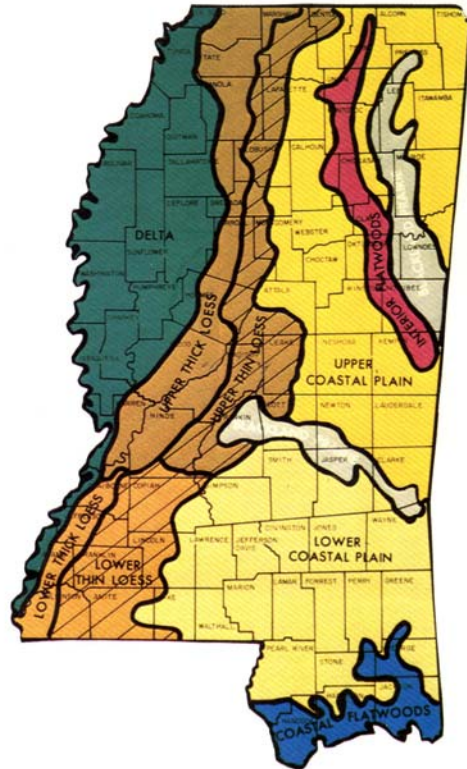


- Soil Resource Areas similar to Physiographic Regions
- Influenced by parent material – origin of parent material
- Soil chemistry may be diagnostic based on parent material, weathering, and detrital inputs
- In general black prairie, loess, and alluvial soils are the most productive in terms of body weights, litter sizes, and general plant food availability



**PHYSICAL FACTORS OF SOILS:**

Percent Coarse Fragment – rocks larger than 2mm – effects water holding potential

Bulk Density – measure of soil compaction and reference to pore spaces

Texture – peds, pore spaces, and water holding capacity, drainage

Color – origin, parent material, metal content, and anoxic conditions (wetland substrates)

**WETLAND SOILS – Coloration is usually a factor used in delineation:**

- Soils are saturated, high moisture content due to hydrological conditions – from seasonal to permanent (mesic to hydric)
- Anoxic conditions yielding reduced (non-oxidized forms) of complexes like iron, sulfur, methane, manganese.
- Coloration – mottled, gray-blue grays, with orange to tan mottling and characteristic smell with saturated soils at the time of sampling

**SOIL CHEMISTRY THAT INFLUENCES WILDLIFE HABITAT:**

**Soil Chemistry**

pH – active soil acidity

Existing concentration of Hydrogen ions in soil solution

**Neutral pH = 7.0 - Best growing conditions for plants – best nutrient uptake  
< 7.0 – more acid; > 7.0 more basic; if over 8.5 can be restrictive to plant growth due to nutrients being “tied up” in unavailable chemical complexes.**

**Most soils have acid conditions if not in Prairie or calcareous parent material areas:  
Acid soils have pH levels of less than 7.0; most may be at pH levels ranging from 5-6.5. If less than 4.5 – high acidity = phytotoxic  
< 4.5 - metal salts (Al & Fe)- phytotoxic – Find these conditions in disturbed sites such as mine sites, disposal areas if parent materials contain high levels of sulfide complexes that oxidize in the presence of water and oxygen to form sulfuric acid and metal salts that cause plant mortality. Must topsoil, lime, and handle with care in terms of post reclamation disturbance.**

**How do pH levels of soils influence wildlife?**

- **At low and high pH levels, nutrients become less available to plants for uptake**
- **Acid Soils (<6.0) – less productive in terms of plant biomass and litter sizes in rabbits**
- **Soils with >6.0 pH levels –**
  - **Rabbits have larger litters – 4 to 6 young/litter**
  - **Deer body weights higher in prairies of Alabama that have more basic soils.**
  - **Plant biomass greater on neutral and slightly basic (7.0) soils**

**Other pH measurements that may be of importance to wildlife and you as a manager....**

**Potential soil acidity: Different from active soil pH; measure of the potential hydrogen that can come into soil solution, including that which is bound in soil particles; Common challenge on reclaimed surface mines – coal, bauxite, lignite and disturbed sites with acidic parent material.**

**Special measurements – extractable acidity or acid base accounting.**

**High potential acidity – most topsoil to cover; liming prescription may be over 14 tons per acre- this is too high – usually apply no more than 2 tons per acre over existing vegetation – usually only one ton per acre; following reclamation, limit deep disking, erosion, or disturbance that may uncover the acid bearing layer – in presence of water and oxygen – acid overburden (the acid producing layer) will oxidize to produce sulfuric acid, other acid complexes, and sometimes metal salts of aluminum, iron, and manganese that will cause loss of vegetative cover and acid mine drain into adjacent wetlands and streams.**

**OTHER SOIL FACTORS INFLUENCING PRODUCTIVITY OF HABITAT:**

**Organic Matter Content (% of soil with oxidizable organic matter - >5% for forestlands; higher for alluvial and old growth hardwood forests)**

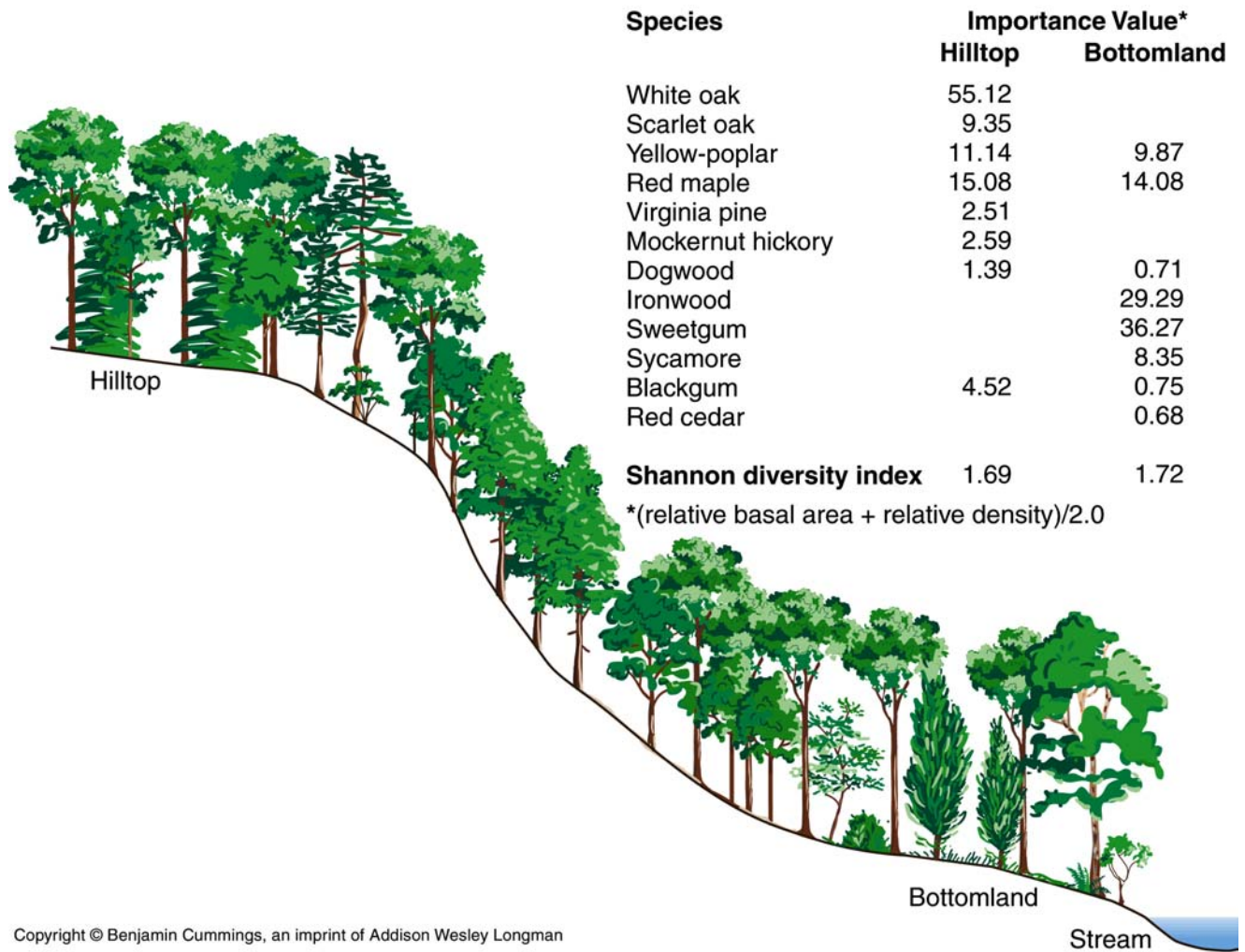
**Macronutrients – Some include N, P, K, S, Mg**

**Micronutrients – some include Bo, Se**

**Electrical Conductivity – salt content – high metal salts (AL, Fe, Mn, Na, Ca, Sulfates)**

**Cation Exchange Capacity – exchange potential for cations like Ca, Mg**

**Topography influences biocommunities and soil conditions, such as soil moisture, hydrology, soil temperature**



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Topographic features that influence habitat types include elevation, aspect, slope, landscape position.

For example, southerly southwesterly exposures are drier and warmer in this hemisphere; whereas, northerly and northeasterly exposures are cooler and more moist. Several feet in elevation can influence tree composition in floodplain forests of the southeast – for example, sloughs and flats of floodplains are generally saturated most of the year and support aquatic and semi aquatic species – bald cypress, tupelo gum, button bush, willow; whereas floodplain terraces which are the original fronts of the former stream meander have well drained, coarser texture soils that produce better habitat for cherry bark oak.