

Classifications using Vegetation Structure

Based on:

1. plant physiognomy (trees vs. no trees)
2. degree of canopy closure
3. may include number of vegetation strata

Example of six types of vegetation:

Forest: Sites dominated by trees and a generally continuous canopy

Woodland: Sites typified by widely spaced trees allowing for substantial areas dominated by shrubs, grasses, or herbs

Shrubland: Sites dominated by a relatively continuous canopy of shrubs

Grassland: Sites dominated by grasses and herbs

Scrub: Sites dominated by widely spaced shrubs

Desert: Sites dominated by sparse xerophytic plant cover with mostly bare ground

Brown and Lomolino, 1998

Biogeography

4

Prof. J. Hicke

What's a forest?

FAO:

Land with tree crown cover (or equivalent stocking level) of more than 10% and area of more than 0.5 ha.

Trees should be able to reach a minimum height of 5 m at maturity in situ.

May consist of closed forest formations where trees of various storeys and undergrowth cover a high proportion of ground or open forest formations with a continuous vegetation cover in which tree crown cover exceeds 10%.

Biogeography

5

Prof. J. Hicke

Merriam life zone classifications

1-mile upward in elevation =
800-mile northward in latitude

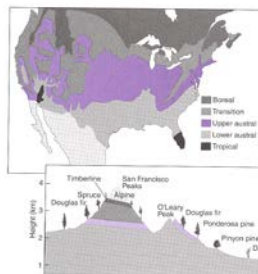


FIGURE 6.4 Merriam's life zones for the classification of North American vegetation based on similarities in structure and climate (based upon Merriam, 1856, 1894; Bailey, 1956; Brown and Lomolino, 1998).

Biogeography

6

Prof. J. Hicke

NCAR Community Land Model

Plant Functional Types

Climate Fluxes

Remote Sensing Data Products	Plant Functional Types
Needleleaf evergreen tree	temperate boreal
Needleleaf deciduous tree	boreal
Broadleaf evergreen tree	tropical
Broadleaf deciduous tree	temperate boreal
Shrub	broadleaf evergreen temperate broadleaf deciduous temperate broadleaf deciduous boreal
Grass	C3 C3 arctic C4
Crop	Crop 1 (e.g., corn) Crop 2 (e.g., wheat)

Trees

- 1-km U. Maryland tree cover
- needleleaf, broadleaf
- evergreen, deciduous

Others

- 1-km IGBP DISCover
- shrub, grass, crop

Monthly Leaf Area

- 1-km AVHRR red and near infrared reflectance
- April 1992 to March 1993
- "Pure PFT" NDVI for 200 km × 200 km grid
- Average NDVI for each 1-km pixel with PFT > 60%

Biogeography 10 www.cgd.ucar.edu/sslcm/pfts/pft-deriv.gif Prof. J. Hicke

NCAR Community Land Model

Mixed Life-Form Biomes

Savanna

within model, PFTs define:

- leaf physiology
- leaf morphology and radiative characteristics
- phenology
- whole-plant carbon allocation
- root distribution

Grassland

Mixed Forest

Biogeography 11 www.cgd.ucar.edu/sslcm/pfts/biome-vs-pft.gif Prof. J. Hicke

Plant Functional Type Geography

NCAR
Community
Land Model

www.cgd.ucar.edu/sslcm/pfts/pft-geography.gif

(1) NEEDLELEAF EVERGREEN TREES

(2) NEEDLELEAF DECIDUOUS TREES

(3) BROADLEAF EVERGREEN TREES

(4) BROADLEAF DECIDUOUS TREES

(5) GRASSES

(6) CROPS

0 20 40 60 80 100 (1/2° grid)

Biogeography .3x0

Comparisons among maps: good or bad?



Comparison among mapping results

Holdridge = climate



Bailey = ecosystem properties

Kuchler = potential veg from local knowledge and temperature



Satellite-derived (actual) land cover

BIOME = modeled seasonal climate and soils (potential vegetation)
