Forest Stewards Guild
Mountain Cove Forest Management and Conservation in the Central Appalachians
Fall 2021 Learning Exchange

Exploring Cove Forests

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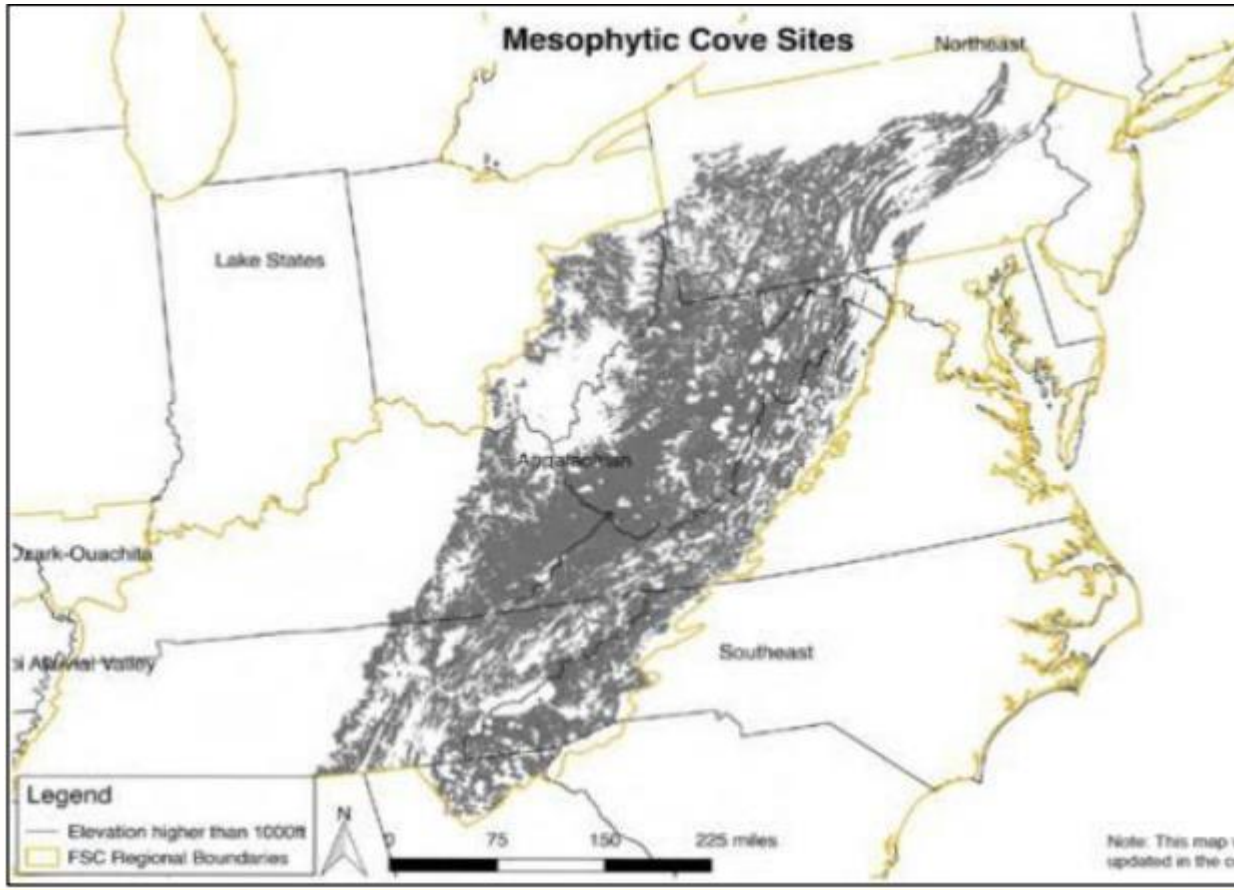
September 10, 2021

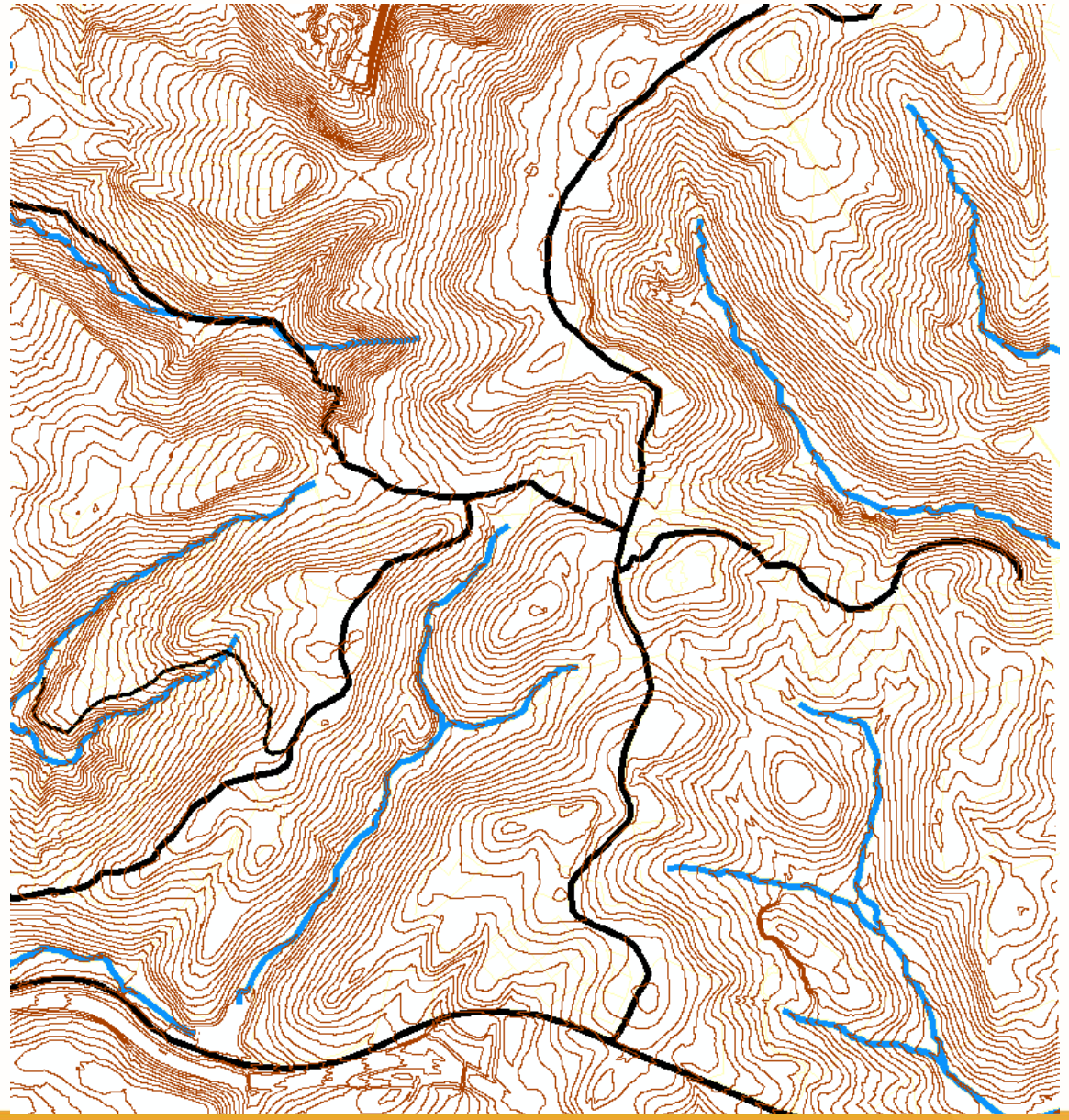
Outline

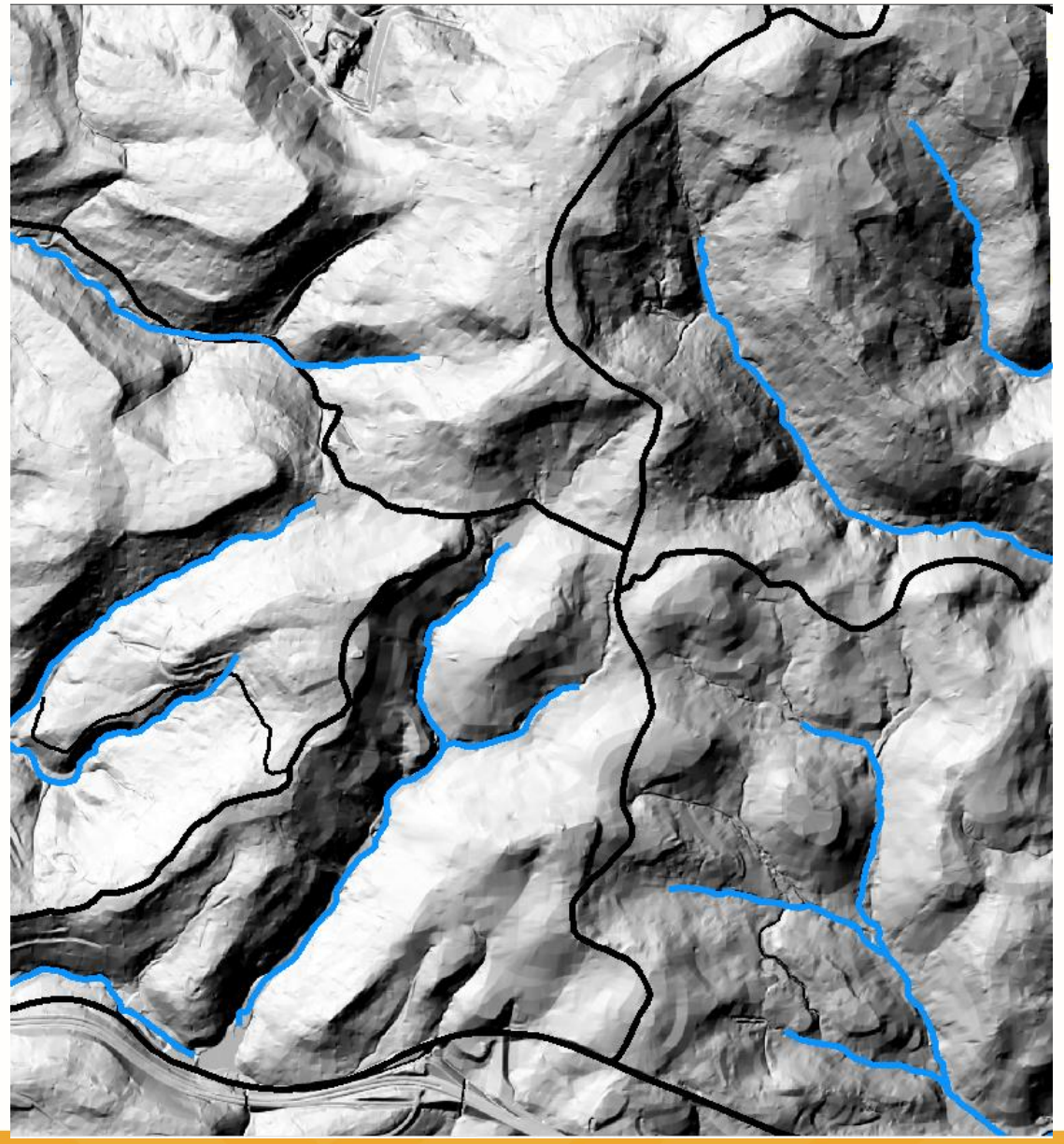
- Mesophytic cove ecology and silviculture
- Values of cove sites
- Threats to coves due to incompatible management

Where Are Coves Sites?

- Hardwood dominated sites that occur in protected landscapes, in low to mid slope valleys and ravines.
- Concave slope shape
- Mesophytic
- 1000 – 3,600 ft msl







Where Are Coves Sites?

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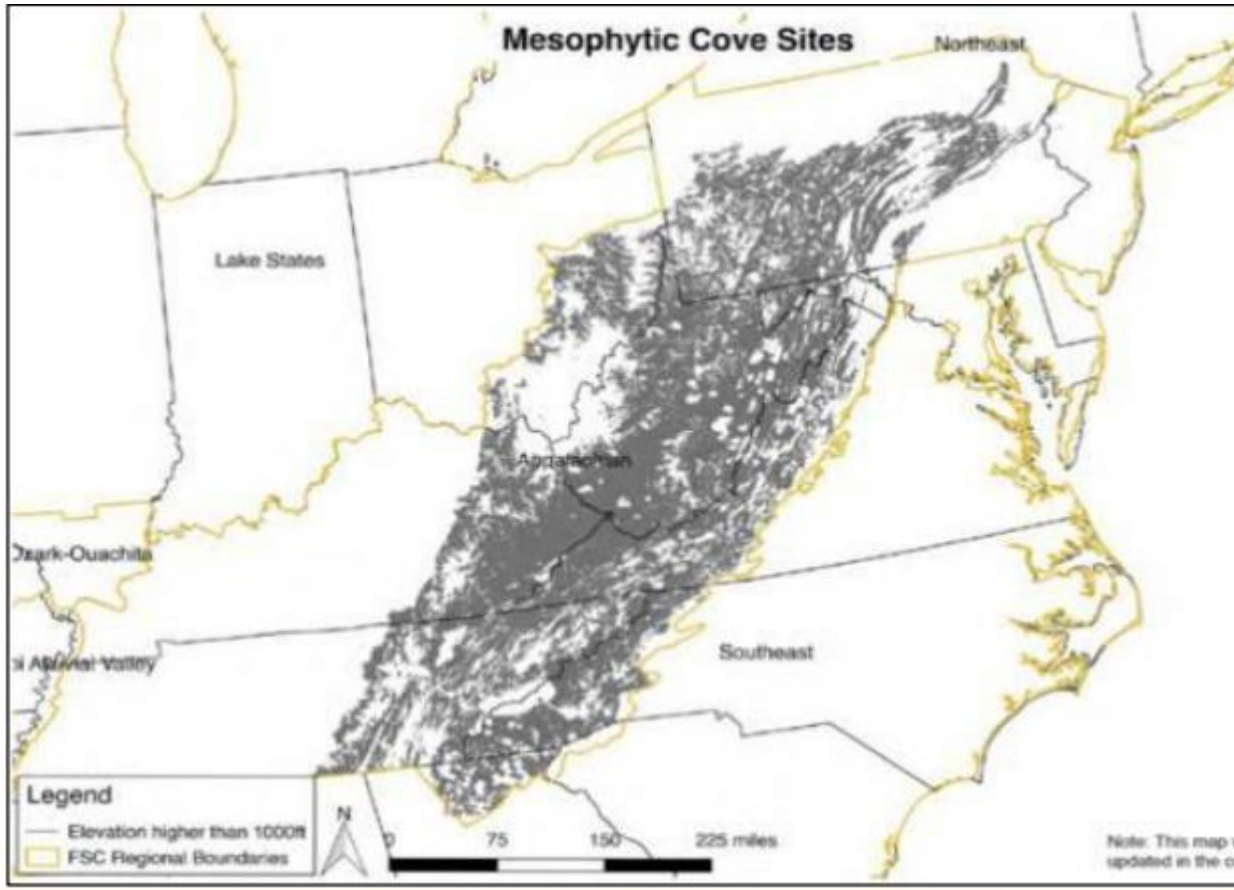
- 1000 – 3,600 ft msl
- **High species richness in overstory and understory layers**



Overstory Trees

Common associates include:

- yellow-poplar *
- sugar and red maple*
- cucumbertree
- white ash
- basswood
- black cherry
- black walnut
- northern red
- white oak
- American beech
- sweet and yellow birches
- hickories

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Understory Plants

Common associates include:

Species	
Scientific name	Common name
Adiantum pedatum	Maiden-hair fern
Ageratina altissima	White snakeroot
Arisaema triphyllum	Jack-in-the-pulpit
Aster divaricatus [Eurybia divaricata]	White wood aster
Athyrium asplenoides [A. felix-femina]	Lady-fern
Botrychium virginianum	Rattlesnake fern
Caulophyllum thalictroides	Blue cohosh
Cimicifuga racemosa	Black cohosh
Collinsonia canadensis	Richweed
Deparia acrostichoides	Silver false spleenwort
Dioscorea quaternata [D. villosa]	Wild yam
Disporum lanuginosum [Prosartes lanuginosum]	Mandarin/Fairy-bells
Dryopteris intermedia	Fancy wood-fern
Dryopteris marginalis	Marginal wood-fern
Galium triflorum	Sweet scented bedstraw
Goodyera pubescens	Downy rattlesnake plantain
Hydrophyllum canadense and *H. virginianum*	Eastern waterleaf
Impatiens capensis	Orange jewel-weed
Laportea canadensis	Canadian woodnettle
Medeola virginiana	Cucumber root
Osmorhiza claytonii	Sweet cicely
Panax quinquefolius	Ginseng
Polygonatum biflorum	Solomon's seal
Polystichum acrostichoides	Christmas fern
Prenanthes sp.	Rattlesnake-root
Sanguinaria canadensis	Bloodroot
Smilacina racemosa [Maianthemum racemosum]	False Solomon's seal
Solidago curtisii	Goldenrod
Thelypteris noveboracensis	New York fern
Tiarella cordifolia	Foamflower
Trillum erectum	Purple trillium
Viola canadensis	Tall white violet
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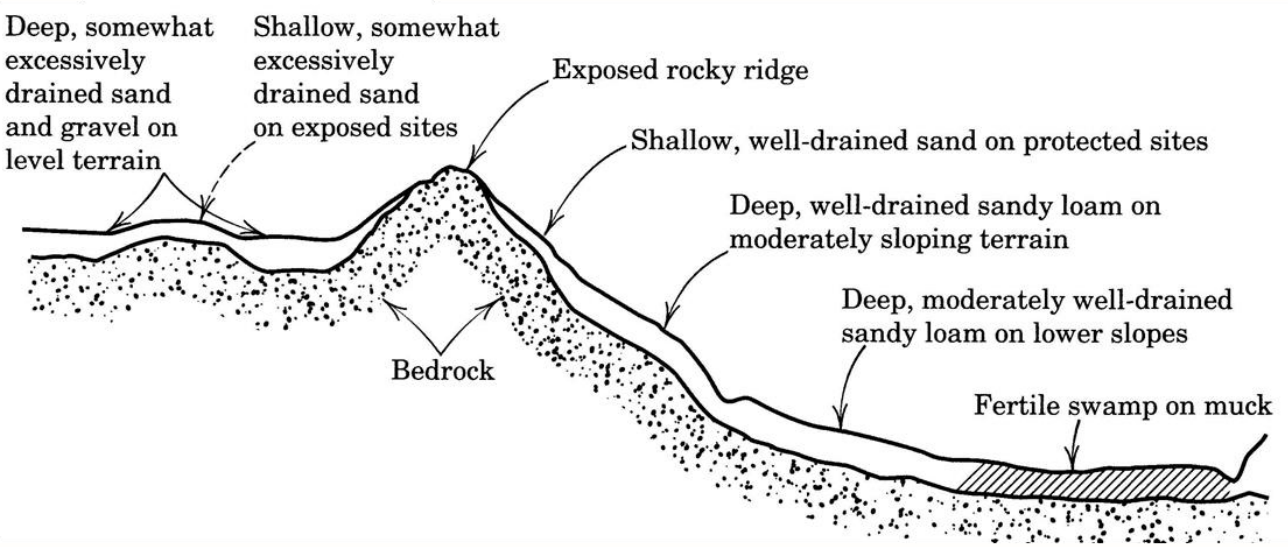
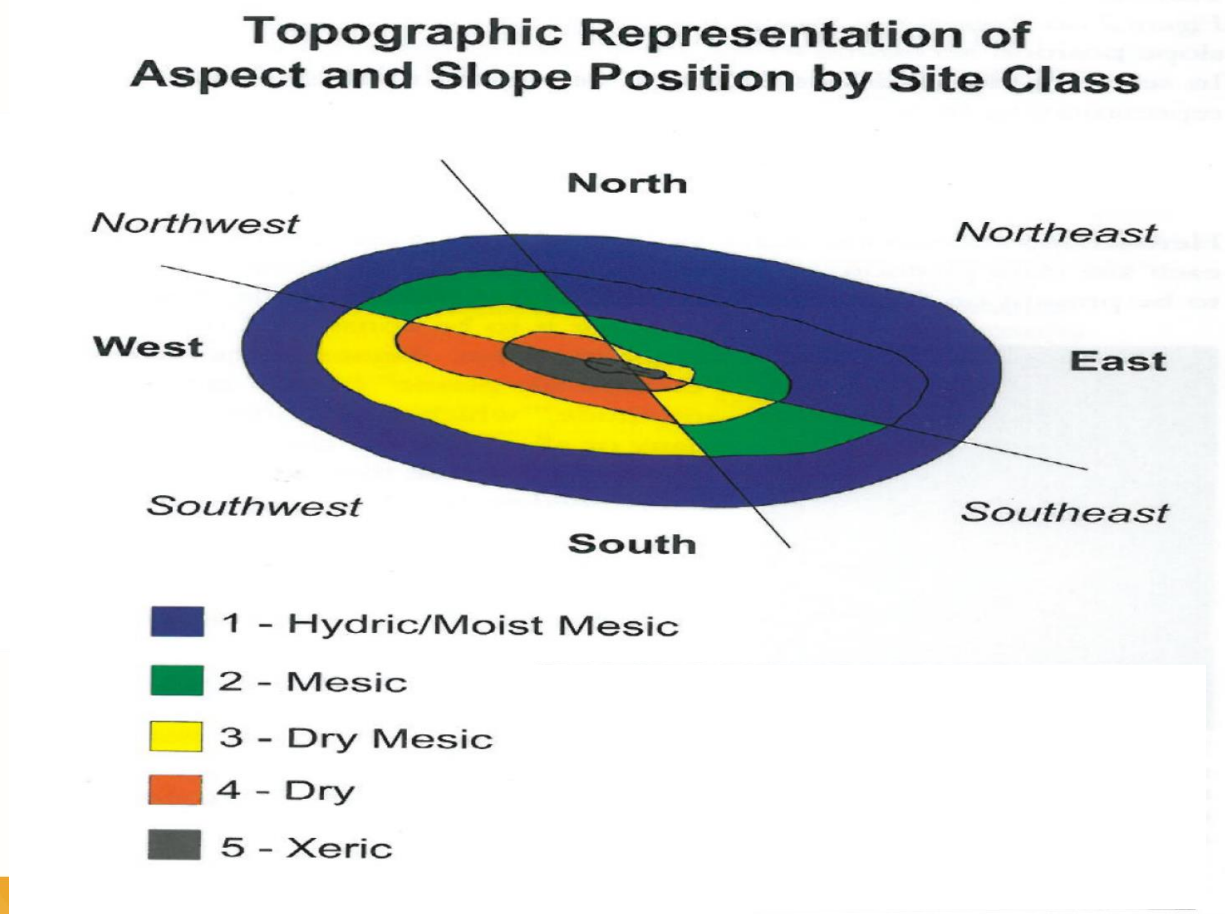
Excellent Site Quality





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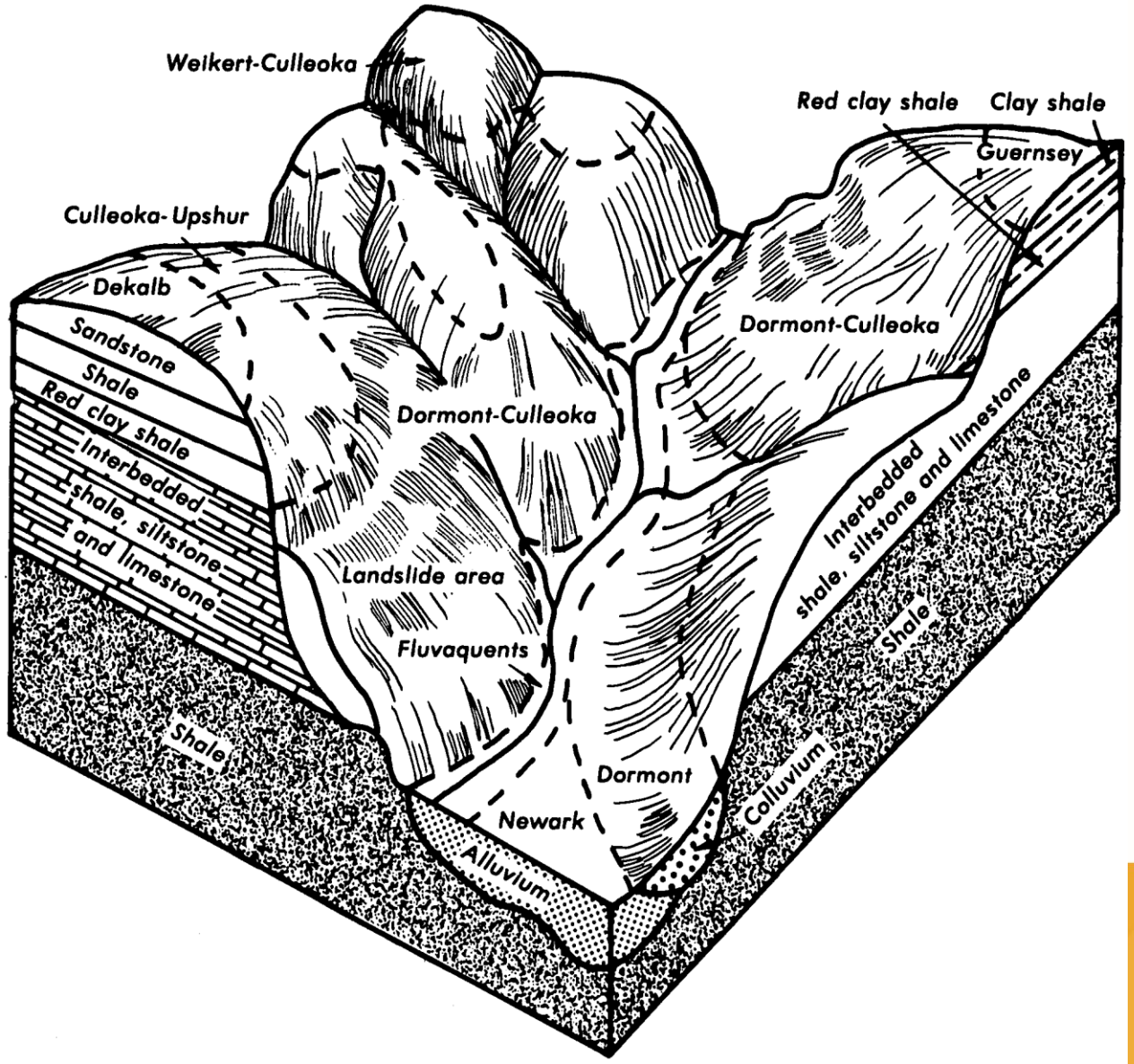

Cove Types

Rich

- Higher levels of base cations
- Greater herbaceous understory
- Typically lacking evergreen components

Acid

- Lower pH
- Lower base saturation
- Shrubby
- Hemlock
- Rhododendron

Mesophytic Cove Forests

- Sites are common throughout Appalachia

- MCF are less common.
  - Loss of structural and floral attributes-- closed canopies, high species diversity in overstory and understory species

High Species Richness

Forest Composition and Stand Structures

Older-aged, Undisturbed stands

- Many age classes
- More shade tolerant species
- Gaps common

Second & Third Growth

- Often dominated by yellow-poplar
- Few gaps
- Structurally less complex

Disturbances

- Wind
- Lightning
- Ice & snow damage
- Pests
- Fire?
- Logging
- Other anthropogenic influences

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5-10% canopy gaps

- Fire?
- Logging
- Other anthropogenic influences

Fire-Proof?

Silvicultural Systems

- The complexity keeps it challenging ☺

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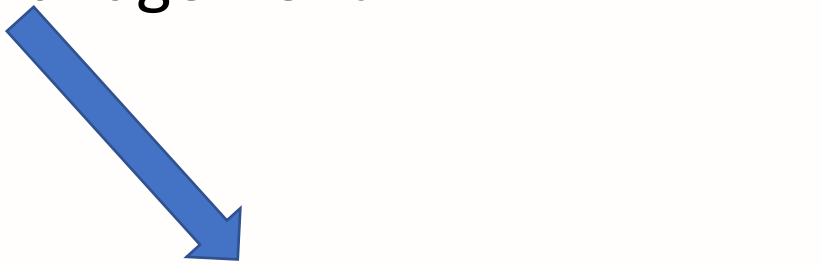
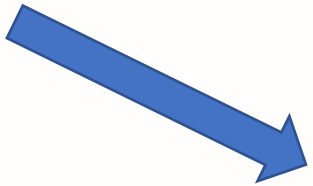
Uneven-aged management



Shelterwoods



Clearcuts

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Uneven-aged Management

- Gap-phase regeneration
- Leads to increase in shade-tolerant species
- Shift thinking from STS to the various group selection options

- Limited seed dispersal
- Limited exposed mineral soil
- Limited light & varying light

Even-age Reproduction Methods

- Probably won't retain the structural and species diversity of MCF
- Simplifies management
- Still maintains high likelihood of "good" species composition
- Yellow-poplar becomes more dominant with increasing openness
- Consider legacy trees

- Maximum seed dispersal
- Maximum exposed mineral soil
- Maximum light
- Increased clonal stems

Major Threats to MCF

- Conversion to yellow-poplar
- Exploitation
- Deer over abundance
- Over-harvesting of ground flora
- Encroachment of non-native species
- Landuse changes?

Conservation values of cove sites

- Source of headwater streams
- Carbon sequestration
- Endemic species—amphibians, mussels, herbaceous plants
- Nutrient cycling

Interesting Challenges

- Conversion of second growth YP stands to mimic undisturbed MCF species and structural characteristics
- Can we passively restore degraded ecosystem services through forest management?
- Limited understanding of ecology associated with understory plants

Questions?