







Common silviculture methods

- **Selection systems:** partial removal of trees based on silvicultural objectives of the landowner
- **Seed tree cuts:** Allow the harvest of all trees except 2 to 10 trees per acre.
- **Clearcutting:** Most or all trees in an area are uniformly cut down.
 - Most popular and economically profitable silvicultural practice.

Clearcutting in the U.S.

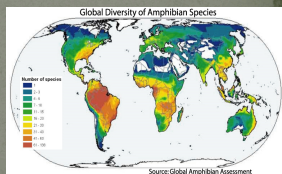
- The Forest Inventory and Analysis Program estimated in 1995 that roughly 4 million hectares of forest were harvested annually
 - Roughly 40% of that total is through clearcutting
 - Over half of the 4 million is harvested from the South/Southeast
 - Today the number has decreased significantly, but the land is still recovering
- The Multiple-Use Sustained-Yield Act of 1960: Directs national forest management for "outdoor recreation, range, timber, watershed, and wildlife and fish purposes . . . with consideration being given to the relative values of the various resources . . ."
 - Critics argue that priority has been given to timber companies
 - Between 1984 and 1991, clearcutting accounted for 63 percent of the area harvested in the national forests.

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 Congressional Research Service
 July 29, 1992 92-607 ENR
<http://www.fsa.fs.fed.us/>

Clearcutting in the tropics

- Since 1970, over 600,000 square kilometers (230,000 sq mi) of the Amazon rainforest have been destroyed.
- "Slash and burn" clearcutting
- Logging is economically driven by timber export and demand for charcoal.
- Government policies have little influence
 - Illegal loggers fake documents
- Private landowners interested in forest preservation receive death threats.

- Amphibian diversity is highest in Brazil
 - 932 species



<http://www.bbc.com/news/world-latin-america-090609>


Amphibian susceptibility

- Amphibians are ectotherms
- Limited capacity for activity
- Highly permeable skin
- Dependence on moist/aquatic habitats

Wells 798-799

Consequences of Silviculture on Amphibian populations: Longleaf pine

- Coastal Plain stretches from NY to Mexico, all of Florida
- Contains highest species denseness for frogs, second for amphibians (77 species)
- Of the 77, 21 species (27%) are dependent on longleaf pine
- 15 are ranked as critically endangered
- By 2000, 2% of original longleaf pine savanna remains.
- Industrial logging is primary reason for longleaf pine removal.



Consequences of Silviculture on Amphibian populations: Longleaf pine

- Enge and Marion et al. (1986) compared three sites in north FL.
 - 40 year old regenerated forest
 - Two 3 year old clearcut areas (preparation/no preparation)
 - Clearcutting reduced abundance ten-fold
- Grant et al. (1994) compared 1,3,8, and 26 year old pine forest.
 - 8 year old stand had highest abundance and diversity
 - Had most dense foliage and highest forest structure.
 - Was not subject to prescribed burning/thinning

Amphibian Declines: The Conservation Status of United States Species.
Michael Lammoo

Consequences of Silviculture on Amphibian populations

- Studies done by P.G. deMaynadier and M.L. Hunter in 1995 compared amphibian pops. in 2-20 year old clearcuts and mature forest
- Found up to 9.3 times greater abundance in mature forest
- Plethodontids suffer most



<http://www.clemson.edu/extfor/publications/fortpog/vegetation.htm>

Conclusion

- Elimination of buffer zones
- Reduced floral diversity
- Duffy and Meir et al. observed 45-87 year old clear cut forests in Southern Appalachia
 - Found even the 87 years was insufficient recovery time for forest
- Reduced forest litter depth
- Reduced wetland hydroperiod
- Soil disturbance
 - logging roads
 - Soil erosion
 - Raises pH/temperature of streams

<http://www.clemson.edu/extfor/publications/fortpog/repiles.htm>

Conclusion

- Disrupts dispersal corridors
- Reduced canopy cover
- Site preparation:
 - Herbicides/pesticides
- Silviculture is the most critical, widespread yet least controlled factor contributing to worldwide amphibian decline

