

Table 3.10. Proposed project areas with archaeological sites present, eligibility status, and management recommendations.

Area	Site	National Register Eligibility	Recommended Management Action
61	01-332	Not Eligible	No protection
17A	01-326	Unevaluated	Avoid
17A	01-320	Unevaluated	Avoid
17A	01-321	Not Eligible	No protection
19A	-	-	-
20A	01-319	Not Eligible	No protection
20B	-	-	-
20C	-	-	-
26A	-	-	-
5B	-	-	-
7A	-	-	-
7B	01-335	Unevaluated	Avoid
8B	-	-	-
8C	01-334	Unevaluated	Avoid
8D	-	-	-
R1	-	-	-
45	-	-	-
WS3	01-333	Not Eligible	No protection
WS5A	01-340	Not Eligible	No protection

## List of preparers

Mary Beth Adams, Project Leader, and Research Soil Scientist, NERS,  
B.S.F. Forestry, Purdue University, 1980  
M.S. Forestry, Purdue University, 1982  
Ph.D. Soil Science and Forestry, North Carolina State University, 1986  
16 years with the Forest Service

Pamela J. Edwards, Research Hydrologist, NERS  
B.S. Forest Science, Penn State University, 1981  
M.S. Forest Hydrology, Penn State University, 1983  
Ph.D. Forest Soils, North Carolina State University, 1994  
23 years with the Forest Service

W. Mark Ford, Research Wildlife Biologist, NERS  
B.S. Wildlife and Fisheries Sciences, University of Tennessee, 1987  
M.S. Wildlife Ecology, Mississippi State University, 1989  
Ph.D. Forest Resources, University of Georgia 1994  
5 year with the Northeastern Research Station  
4 years with Westvaco Forest Resources  
6 months with Southern Research Station  
6 months with University of Georgia School of Forest Resources

James N. Kochenderfer, Research Forester, NERS  
B.S. Forestry, West Virginia University, 1959  
M.S. Forestry, Duke University, 1960  
40+ years with the Forest Service

Jennifer Menzel, Research Wildlife Biologist NERS  
B.S., Forest Resources, University of Georgia, 1999  
Ph.D., Forest Resource Science, West Virginia University, 2003  
3.5 years with the Forest Service

Jane Rodrigue, Biological Technician, NERS  
B.S. Zoology, University of Georgia, 1988  
M.S. Wildlife Biology, University of Georgia, 1994  
3 years with Westvaco Corporation  
2 years with Georgia Department of Wildlife Resources  
4 years with the Forest Service

Thomas M. Schuler, Research Forester, NERS  
B.S.F. Forest Management, Purdue University, 1979  
M.S. Silviculture, Colorado State University 1987  
Ph.D. Forest Biology, Purdue University, 1998  
18 years with the Forest Service

Frederica Wood, Computer Programmer, NERS  
B.S. Natural Resources, University of the South, 1981  
M.F. Forestry, North Carolina State University 1986.  
17 years with the Forest Service

Others also made significant contributions to the EIS. Their assistance is greatly appreciated.

John Calabrese, Forest Archaeologist, Monongahela National Forest

Kyle Hartman, Associate Professor, Wildlife and Fisheries,  
West Virginia University

Andrea Stacey, Air Quality Specialist, Monongahela National Forest

Bill Shields, NEPA Coordinator, Monongahela National Forest

Linda Tracy, Forest Geologist, Monongahela National Forest

## *Glossary*

***Acidification.*** The decrease of acid neutralizing capacity in water or base saturation in soil caused by natural or anthropogenic processes.

***Acid deposition.*** Air pollution produced when acid chemicals are incorporated into rain, snow, fog, or mist, and are deposited on plants, soils and other surfaces.

***Air quality.*** The properties and degree of purity of air to which people and natural and heritage resources are exposed.

***Airshed.*** A geographic area that, because of topography, meteorology, and/or climate, is frequently affected by the same air mass.

***Bankfull.*** Bankfull is the discharge which fills a stream to its banks, and is assumed to control the form of alluvial channels.

***Basal area.*** The cross-sectional area of all or specified trees per unit area of land. It is often given as square feet per acre or square meters per hectare. It is a useful measure of stand characteristics and is related to stand volume and is a measure of stand density.

***Biota.*** A group of animals and places occupying a place together (e.g. terrestrial biota).

***Carbon monoxide.*** A criteria air pollutant that is a colorless, odorless, poisonous gas produced by incomplete combustion; particularly, incomplete burning of carbon-based fuels e.g. gasoline, oil, and wood.

***Clean Air Act.*** Originally passed in 1963, our current national air pollution control program is based on the 1970 version of the law. Substantial revisions were made by the 1990 Clean Air Act Amendments.

***Compartment.*** A compartment is an area of forest generally making up the experimental treatment area. This is the unit of land treated in the various experiments.

***Diameter breast high*** (often abbreviated as **dbh** or **d.b.h.**). The diameter of a tree's main stem 4.5 feet above the ground level. For purposes of standardization, measurements of tree diameters are taken at the same height.

***Diameter-limit.*** In the diameter-limit treatment, all trees 17.0 inches d.b.h (diameter at breast height) and larger are cut and removed from the stand on a recurring basis: every 20 years on SI 60 sites, and every 15 years on SI 70 or 80 sites (See definition of Site Index below). This type of harvest practice is commonly applied on non-industrial private forest lands in the Appalachians because it is easy to apply, and results in a significant immediate monetary gain.

***Dormant season.*** The period of the year when most plant processes are inactive and growth ceases, approximately mid-October through mid-April for the FEF.

***Dry deposition.*** Delivery of air pollutants in the gaseous or particle phase to surfaces.

***Financial rate of return management.*** Financial rate of return management is based on the silviculture-economic guidelines established by Trimble et al. (1974). These economic guidelines are in the form of rates of return for individual trees. Application of these marking guides is limited to saw timber-size trees (stems above 11.0 inches d.b.h.). Trees are designated for cutting or for leaving – with the intention of retaining a residual stand adequately stocked for attainment of specific objectives. Trees expected to exceed minimum acceptable rate of return – because of rapid growth or quality improvement – should be left to grow, while those expected to fall below the minimum acceptable rate are financially mature and should be harvested. Periods between cuts are based largely on growth rates.

***Forest floor.*** The forest floor is a layer of material above the soil surface consisting of organic material in various stages of decomposition, microorganisms, insects and other fauna, as well as living plants.

***Growing season.*** The period of the year when plant processes are active and growth occurs, approximately mid-April through mid-October for the FEF. In temperate regions, this is often characterized by the period of frost-free days during the spring, summer and autumn. The FEF usually experiences about 140 frost-free days per year.

***Haul roads.*** Haul roads are those that form the transportation network over which the logged material is hauled from landings.

***Herpetofauna.*** Amphibians (salamanders, frogs and toads) and reptiles (lizards, snakes, and turtles).

***Home range.*** The area within which an animal normally lives. The boundaries of the range may be marked (e.g. by scent marking), and may or may not be defended, depending on species.

***Humus.*** The soil constituent known as humus is well-decayed organic matter remaining as a dark, incoherent, and heterogeneous colloidal mass.

***Hydrograph.*** A hydrograph is a graph of water discharge or depth versus time.

***Mast.*** Soft, fleshy fruits (e.g. blueberries) or hard, nut-like fruits (e.g. acorns) produced by woody vegetation and consumed by wildlife.

***Nitrogen oxides.*** A criteria air pollutant, compounds NO, NO<sub>2</sub>, NO<sub>3</sub>, N<sub>2</sub>O<sub>5</sub>, alkyl nitrates, etc.

**NTU.** Unit of turbidity measurement.

**Ozone.** A gas composed of 3 oxygen atoms (O<sub>3</sub>) that is a criteria air pollutant and a major constituent of smog.

**Patch clearcutting.** The system of patch clearcutting was designed to replicate conditions needed for regeneration of shade-intolerant tree species, without creating large clearcuts. Each patch clearcut is 150 feet in diameter (0.4 acre). All stems 1.0 inch d.b.h. and larger are felled. On lower site index sites (SI 60), patches are cut on a 15-year cycle, with an estimated rotation of 90 years. On sites with site index 70-80, patches are cut on a 10-year cutting cycle, with an estimated rotation of 70-80 years. The number of patches to be cut is based on rotation length, number of periodic cuts and study area size.

**Peakflow.** The highest instantaneous discharge of a stream over a given period of time is referred to as the peakflow.

**pH.** A pH value is a the measure of acidity/neutrality/alkalinity of a solution. A value of 7 indicates neutrality; less than 7, acidity; greater than, 7 alkalinity.

**Riparian.** The riparian corridor encompasses the stream channel and surrounding land from the high water mark toward the uplands where vegetation may be influenced by elevated water tables or flooding and the ability of the soils to hold water.

**Sere.** A stage in plant succession.

**Shade-intolerant.** Shade-intolerance is the inability of some species to sustain themselves at lower light intensities. Black cherry, yellow-poplar, and black locust are tree species that are classified as shade-intolerant.

**Shade-tolerant.** Shade-tolerance is the ability of some species to survive at low light intensities. Sugar maple, eastern hemlock, American beech, and flowering dogwood are examples of species classified as shade-tolerant. These species can do quite well in the understory of a forest canopy where light intensity is low. Most shade-tolerant trees also do well in full sun conditions.

**Shelterwood method.** This method of regeneration involves the gradual removal of the entire stand in a series of partial cuttings which extend over a fraction of the rotation. Natural reproduction is secured under the shelter of a portion of the old stand, and released when it becomes desirable for the new regeneration to have full use of the growing space.

**Single-tree selection.** Single-tree selection is designed to promote an all-aged forest stand. The practice is based on a concept that such a stand continually yields benefit and regenerates itself steadily. In practice, such stands are created by marking individual trees for harvesting that meet specific criterion, which include specifying a residual basal area,

the ratio of trees in smaller diameter classes (called the “Q” factor), and the largest diameter tree to retain in the stand.

**Site index (SI):** An indicator of site quality. Defined in terms of total height of trees that consistently have been in a dominant position in well-stocked stands at specified age, usually 50 years. For example, SI 70 indicates that dominant trees will average 70 feet in height at 50 years of age. In the central Appalachians, SI 70 and above indicates good site quality, while SI 60 is considered poor site quality.

**Source.** Any place or object from which air pollutants are released. Sources that are fixed in space are stationary sources; sources that move are mobile sources.

**Stable air mass.** An air mass which has little vertical mixing.

**Stage.** Stage is the measure of vertical distance between a fixed datum in a stream, such as a channel bottom, and the water surface.

**Strip clearcutting.** A regeneration method which uses narrow strips where all trees >1 inch d.b.h. are removed. Each strip is 2 ½ chains (165 feet) wide. The amount of area cut at each cutting period is controlled by the size of the compartment area, cutting cycle, and length of rotation.

**Subwatershed.** A subwatershed is a smaller watershed within a larger one.

**Sulfur dioxide.** A gas (SO<sub>2</sub>) consisting of one sulfur and two oxygen atoms. Of interest because sulfur dioxide converts to an aerosol, and is a criteria pollutant of the Clean Air Act.

**Transpiration.** Transpiration is the loss of water from a plant through its stomata.

**Turbidity.** Turbidity is the measure of scattering and absorption of light in water by dissolved or suspended material.

**Watershed.** A watershed is the area above a specific point on a stream from which water drains toward the stream, a basin.

## **List of abbreviations**

BA	Biological Assessment
BMPs	Best Management Practices
CEQ	Council on Environmental Quality
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FEF	Fernow Experimental Forest
GIS	Geographic Information System
IDT	Interdisciplinary team
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NERS	Northeastern Research Station (USDA Forest Service)
ppm	parts per million concentration
RBC	Running buffalo clover
RWU	Research Work Unit
TES	Threatened, Endangered and Sensitive Species

**Scientific and common names of species found in the Fernow  
Experimental Forest Draft Environmental Impact Statement.**

<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>
<b>Arthropods:</b>	
<i>Adelges piceae</i>	Balsam wooly adelgid
<i>Cryptococcus fagisuga</i>	Beech scale insect
<i>Lymantria dispar</i>	Gypsy moth
<b>Other Invertebrates:</b>	
<i>Baylisascaris procyonis</i>	Baylisascaris roundworm
<i>Stygobromus emarginatus</i>	Greenbrier cave isopod
<b>Fish:</b>	
<i>Cottus bairdi</i>	Mottled sculpin
<i>Catostomus commersonii</i>	White sucker
<i>Onchorynchus mykiss</i>	Rainbow trout
<i>Salmo trutta</i>	Brown trout
<i>Salvelinus fontinalis</i>	Brook trout
<b>Amphibians:</b>	
<i>Aneides aenus</i>	Green salamander
<i>Cryptobranchus alleganiensis</i>	Hellbender
<i>Plethodon nettingi</i>	Cheat mountain salamander
<b>Reptiles:</b>	
<i>Crotalus horridus</i>	Timber rattlesnake
<b>Birds:</b>	
<i>Accipiter gentiles</i>	Northern goshawk
<i>Bonasa umbellus</i>	Ruffed grouse
<i>Bubo virginianus</i>	Great horned owl
<i>Contopus virens</i>	Eastern wood pewee
<i>Dendroica cerulea</i>	Cerulean warbler
<i>Dendroica pensylvanica</i>	Chestnut-sided warbler
<i>Dryocopus pileatus</i>	Pileated woodpecker
<i>Falco peregrinus anatum</i>	Peregrine falcon
<i>Haliaeetus leucocephalus</i>	Bald eagle
<i>Helmitheros verminvorus</i>	Worm-eating warbler
<i>Hylocichla mustelina</i>	Wood thrush
<i>Meleagris gallopavo</i>	Wild turkey
<i>Melospiza melodia</i>	Song sparrow
<i>Otus asio</i>	Screech owl

<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>
<i>Parus atricapillus</i>	Black-capped chickadee
<i>Passerina cyanea</i>	Indigo bunting
<i>Seiurus aurocapillus</i>	Ovenbird
<i>Spizella passerina</i>	Chipping sparrow
<i>Piranga olivacea</i>	Scarlet tanager
<i>Spizella pusilla</i>	Field sparrow
<i>Strix varia</i>	Barred owl

---

**Mammals:**

<i>Canis lupus</i>	Gray wolf
<i>Corynorhinus townsendii virginianus</i>	Virginia big-eared bat
<i>Cryptotis parva</i>	Least shrew
<i>Felis concolor cougar</i>	Eastern cougar
<i>Felis domesticus</i>	House cat
<i>Felis rufus</i>	Bobcat
<i>Glaucomys sabrinus coloratus</i>	Northern flying squirrel
<i>Glaucomys sabrinus fuscus</i>	Virginia northern flying squirrel
<i>Glaucomys volans</i>	Southern flying squirrel
<i>Lasionycteris noctivagans</i>	Silver-haired bats
<i>Lasiurus anereus</i>	Hoary bats
<i>Lepus americanus</i>	Snowshoe hare
<i>Martes pennanti</i>	Fisher
<i>Mephitis mephitis</i>	Striped skunk
<i>Microtus chrotorrhinus carolinensis</i>	Southern rock vole
<i>Myotis leibii</i>	Eastern small-footed myotis
<i>Myotis septentrionalis</i>	Northern Myotis
<i>Myotis sodalis</i>	Indiana bat
<i>Neotoma magister</i>	Allegheny woodrat
<i>Odocoileus virginianus</i>	White-tailed deer
<i>Peromyscus polionotus</i>	Oldfield mouse
<i>Pipistrellis subflavus</i>	Eastern pipistrelle
<i>Procyon lotor</i>	Raccoon
<i>Sorex palustris punctatus</i>	Southern water shrew
<i>Sylvilagus obscurus</i>	Appalachian cottontail
<i>Sylvilagus spp.</i>	Rabbit species
<i>Ursus americanus</i>	Black bear

---

**Fungi:**

<i>Ceratocystis ulmi</i>	Dutch elm disease
<i>Cryphonectria parasitica</i>	Chestnut blight
<i>Nectria coccinea var. figinata</i>	Beech bark disease

---

**Plants:**

<i>Abies balsamea</i>	Balsam fir
<i>Acer pensylvanicum</i>	Striped maple

<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>
<i>Acer rubrum</i>	Red maple
<i>Acer saccharum</i>	Sugar maple
<i>Aconitum reclinatum</i>	White monkshood
<i>Ailanthus altissima</i>	Tree-of-heaven
<i>Amelanchier sanguinea</i>	Serviceberry
<i>Amphicarpaea bracteata</i>	Hog peanut
<i>Arabis serotina</i>	Shale-barren rockcress
<i>Betula alleghaniensis</i>	Yellow birch
<i>Betula lenta</i>	Sweet birch
<i>Bizzania</i> spp.	Clubmoss
<i>Carya cordiformis</i>	Bitternut hickory
<i>Carya glabra</i>	Pignut hickory
<i>Carya ovata</i>	Shagbark hickory
<i>Castanea dentata</i>	American chestnut
<i>Cornus canadensis</i>	Bunchberry
<i>Crataegus</i> spp.	Hawthorn
<i>Dryopteris goldiana</i>	Shield fern
<i>Eleagnus umbellata</i>	Autumn olive
<i>Eupatorium perfoliatum</i>	White snakeroot
<i>Fagus grandifolia</i>	American beech
<i>Fraxinus americana</i>	White ash
<i>Juglans cinerea</i>	Butternut
<i>Kalmia latifolia</i>	Mountain laurel
<i>Laportea canadensis</i>	Wood nettle
<i>Lindera benzoin</i>	Spicebush
<i>Liriodendron tulipifera</i>	Yellow poplar
<i>Lonicera</i> spp.	Honeysuckle
<i>Magnolia acuminata</i>	Cucumbertree
<i>Microstegium vimineum</i>	Japanese stiltgrass
<i>Ostrya virginiana</i>	Eastern hophornbeam
<i>Panicum</i> spp.	Panis grass
<i>Picea abies</i>	Norway spruce
<i>Picea rubens</i>	Red spruce
<i>Pinus strobus</i>	Eastern white pine
<i>Pinus virginianus</i>	Virginia pine
<i>Polystichum acrostichoides</i>	Christmas fern
<i>Populus tremuloides</i>	Aspen
<i>Prunus pennsylvanica</i>	Fire cherry
<i>Prunus serotina</i>	Black cherry
<i>Psuedotsuga menzeisii</i>	Douglas fir
<i>Quercus alba</i>	White oak
<i>Quercus montana</i>	Chestnut oak
<i>Quercus rubra</i>	Northern red oak
<i>Quercus velutina</i>	Black oak
<i>Rhododendron maximum</i>	Great rhododendron

**SCIENTIFIC NAME****COMMON NAME**

---

*Robinia pseudocacia*

Black locust

*Rosa multiflora*

Multi-flora rose

*Rubus* spp.

Blackberry

*Sassafras albidum*

Sassafras

*Smilax* spp.

Greenbrier

*Tilia americana*

Basswood

*Trifolium stoloniferum*

Running buffalo clover

*Tsuga canadensis*

Eastern hemlock

*Ulmus rubra*

Slippery elm

*Urtica dioica*

Stinging nettle

*Vaccinium* spp.

Blueberry

*Viola appalachiensis*

Appalachian blue violet

*Viola* spp.

Violet

*Vitis* spp.

Wild grape

## **Literature Cited**

Abrams, M.D., D.A. Orwig, T.E. DeMeo. 1995. Dendro-ecological analysis of successional dynamics for a presettlement-origin white pine-mixed oak forest in the southern Appalachians, USA. *J. Ecol.* 83:133-143.

Abrams, M.D., G.J. Nowacki. 1992. Historical variation in oak recruitment, and post-logging accelerated succession in Pennsylvania. *Bull. Torrey Botanical Club* 119:19-28.

Abrams, M.D., J.A. Downs. 1990. Successional replacement of old-growth white oak by mixed mesophytic hardwoods in southwestern Pennsylvania. *Can. J. Forest Res.* 20: 1864-1870.

Adams, M.B. 1999. Acidic deposition and sustainable forest management in the central Appalachians. *For. Ecol. Manage.* 122:17-28.

Adams, M.B., C. Eagar. 1992. Impacts of acidic deposition on high-elevation spruce-fir forests: results from the Spruce-Fir Research Cooperative. *For. Ecol. Mgmt.* 51:195-206.

Adams, M.B., D.S. Nichols, C. A. Federer, K.F. Jensen, H. Parrott. 1991. Screening procedure to evaluate effects of air pollution on Eastern Region wildernesses cited as Class I air quality areas. Gen. Tech. Rep. NE-151. Radnor, PA: USDA Forest Service, Northeastern Forest Experiment Station. 33 pp.

Adams, M.B., J. N. Kochenderfer, F. Wood, T.R. Angradi, P. Edwards. 1994. Forty years of hydrometeorological data from the Fernow Experimental Forest, West Virginia. Gen. Tech. Rep. NE-184. Radnor, PA, USDA Forest Service, Northeastern Forest Experiment Station. 24 pp.

Adams, M.B., J.N. Kochenderfer, T.R. Angradi, P.J. Edwards. 1995. Nutrient budgets of two watersheds on the Fernow Experimental Forest. In: K.W. Gottschalk, S.L.C. Fosbroke, eds. Proceedings of the 10<sup>th</sup> Central Hardwood Forest Conference; March 5-8, 1995, Morgantown, WV. Gen. Tech. Rep. NE-197. Radnor, PA: USDA Forest Service, Northeastern Research Station: p. 199-130.

Adams, M.B., P.J. Edwards, F. Wood, J.N. Kochenderfer. 1993. Artificial watershed acidification on the Fernow Experimental Forest, USA. *J. Hydrol.* 150: 505-519

Adams, M.B., T.M. Schuler, W.M. Ford, J.N. Kochenderfer. 2003. Large woody debris in a second-growth central Appalachian hardwood stand: volume, composition, and dynamics. In: Van Sambeek, J.W.; J.O. Dawson, F. Ponder, Jr., E.F. Loewenstein, J.S. Fralish, eds. Proceedings, 13th Central Hardwood Forest conference; 2002 April 1-3; Urbana, IL. Gen. Tech. Rep. NC-234. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station: 237-245.

- Adams, M.B., T.R. Angradi. 1995. Decomposition and nutrient dynamics of hardwood leaf litter in the Fernow Whole-Watershed Acidification Experiment. *For. Ecol. Man.* 83: 61-69.
- Ahlgren, C.E. 1966. Small mammals and reforestation following prescribed burning. *Journal of Forestry.* 64:614-618.
- Alverson, W.S., D.M. Waller, S.L. Solheim. 1988. Forest too deer: edge effects in northern Wisconsin. *Conservation Biology* 2:348-358.
- Ambuel, B., S.A. Temple. 1983. Area-dependent changes in bird communities and vegetation of southern Wisconsin forests. *Ecology.* 64:159-171.
- Angradi, T.R. 1999. Fine sediment and macroinvertebrate assemblages in Appalachian streams: a field experiment with biomonitoring applications. *J.N. Am. Benthol. Soc.* 18(1):49-66.
- Angradi, T. R. 1997. Hydrologic context and macroinvertebrate community response to floods in an Appalachian headwater stream. *Am. Midl. Nat.* 138:371-386.
- Angradi, T. R. 1996. Inter-habitat variation in benthic community structure, function, and organic matter storage in 3 Appalachian headwater streams. *J. N. Am. Benthol. Soc.* 15(1):42-63.
- Angradi, T. R., R. Hood. 1998. An application of the plaster dissolution method for quantifying water velocity in the shallow hyporheic zone of an Appalachian stream system. *Freshwater Biology.* 39:301-315.
- Ash, A.N. 1988. Disappearance of salamanders from clearcut plots. *J. Elisha Mitchell Scientific Society.* 104:116-112.
- Ash, A.N. 1995. Effects of clear-cutting on litter parameters in the southern Blue Ridge Mountains. *Castanea.* 60:89-97.
- Askins, R.A. 1993. Population trends in grassland, shrubland, and forest birds in eastern North America. *Current Ornithology.* 7:1-34.
- Atkinson, T.D., A.S. Johnson. 1979. Succession of small mammals on pine plantations in the Georgia Piedmont. *Am. Midl. Nat.* 101(2):385-392.
- Aubertin, G.M., J.H. Patric. 1972. Quality water from clearcut forest land. *The Northern Logger & Timber Processer:* 20, (8):14-15, 22-23.
- Auchmoody, L.R., H. C. Smith. 1977. Response of yellow-poplar and red oak to fertilization in West Virginia. *Soil Sci. Soc. America J.* 41:803-807.

- Baker, V.R., R.C. Kochel, V.R. Baker, J.E. Laity, and A.D. Howard. 1990. Spring sapping and valley network development. IN Groundwater geomorphology: the role of subsurface water in Earth-surface processes and landforms. C.G. Higgins and D.R. Coates, eds. Special Paper of the Geological Society of America. 252. p. 235-265.
- Barrett, J.W. 1995. Regional Silviculture of the United States. John Wiley and Sons, New York.
- Bartman, C.E. 1998. Migration of southern Appalachian salamanders from a shelterwood cut. MS thesis, University of Georgia, Athens. 54 pp.
- Barton, D.R., W.D. Taylor, R.M. Biette. 1985. Dimensions of riparian buffer strips required to maintain trout habitat in southern Ontario streams. North Am. J. Fish Manage. 5:364-378.
- Bates, N.S. 2000. Hydrological effects of forest harvesting on headwater watersheds in West Virginia. Senior thesis. Princeton University, Princeton, NJ. 122 pp.
- Bergelson, J., J.A. Newman, E.M. Floresroux. 1993. Rates of spread in spatially heterogeneous environments. Ecology 74(4):999-1011.
- Bjornn, T.C., D.W. Reiser. 1991. Habitat requirements of salmonids in streams. American Fisheries Society Special Publication 19: 83-138.
- Blake, J.G., J.R. Karr. 1984. Species composition of bird communities and the conservation benefit of large versus small forests. Biological Conservation. 30:173-187.
- Bormann, F., G. Likens. 1979. Pattern and processes in a forested ecosystem. Springer-Verlag, New York. 254 pp.
- Brashears, M.B., M.A. Fajvan, T.M. Schuler. 2004. An assessment of canopy stratification and tree species diversity following clearcutting in central Appalachian hardwoods. Forest Science 50(1): 54-64.
- Braun, E.L. 1950. Deciduous forests of North America. MacMillian Publ. Co., New York. 596 pp.
- Brooks, A.B. 1911. Forestry and wood industries. West Virginia Geol. And Econ. Survey. Acme Publishing Co., Morgantown, WV. 5:481.
- Brose, P.H., D.H. Van Lear. 1998. Responses of hardwood advanced regeneration to seasonal prescribed fires in oak-dominated shelterwood stands. Can. J. For. Res. 28:331-339.
- Bucklelew, A.R., G.A. Hall. 1994. The West Virginia Breeding Bird Atlas. University of Pittsburgh Press, Pittsburgh, Pennsylvania. 215 pp.

- Burton, T.A. 1997. Effects of basin-scale timber harvest on water yield and peak streamflow. *J. Am. Water Res. Assoc.* 33(6):1187-1196.
- Campbell, T.A., B.R. Laseter, D.A. Osborn, W.M. Ford, P.D. Keyser, K.V. Miller. 2003. Can restricting hunter access reduce the harvest of yearling male white-tail deer? Abstracts of the Southeast Deer Study Group Annual Meeting, Chattanooga, TN 26: 16-17.
- Campbell, T.A., B.R. Laseter, W.M. Ford, K.V. Miller. 2004. Movements of female white-tailed deer (*Odocoileus virginianus*) in relation to timber harvests in the central Appalachians. *Forest Ecology and Management* 199: 371-378.
- Castleberry, N.L. 2000a. Food habits of the Allegheny woodrat (*Neotoma magister*) in West Virginia and Virginia. MS thesis, West Virginia University, Morgantown. 108 p.
- Castleberry, S.B. 2000b. Habitat use and conservation genetics of the Allegheny woodrat (*Neotoma magister*) in managed and unmanaged forests of the central Appalachians. PhD dissertation, West Virginia University, Morgantown. 166pp.
- Castleberry, S. B., P. B. Wood, W. M. Ford, N. L. Castleberry, M. T. Mengak. 2002. Summer microhabitat selection by foraging Allegheny woodrats (*Neotoma magister*) in a managed forest. *American Midland Naturalist* 147:93-101.
- Cederholm, T.W., L.M. Reid. 1987. Impact of forest management on coho salmon (*Oncorhynchus kisutch*) populations of the Clearwater River, Washington: a project summary. Pp. 373-398 in Salo, E.O. and T.W. Cundy (eds.) *Streamside Management: Forestry and Fisheries Interactions*.
- Clark, B.K., J.B. Bowles, and B.S. Clark. 1987. Summer habitat of the endangered Indiana bat in Iowa. *American Midland Naturalist*. 118: 32-39.
- Clark, F.B. 1993. An historical perspective of oak regeneration. IN: Loftis, D., C.E. McGee (Eds). *Oak regeneration: serious problems, practical recommendations*. Symposium Proceedings; 1992 September 8-10; Knoxville, TN. Gen. Tech. Rep. SE-84. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station: 3-13.
- Confer, J. L., S.M. Pascoe. 2003. Avian communities on utility rights-of-ways and other managed shrublands in the northeastern United States. *For. Ecol. Manage.* 185: 193-205.
- Conner, R.N., C.S. Adkisson. 1975. Effects of clearcutting on the diversity of breeding birds. *J. Forestry*. 73:781-785.

Cordone, A.J., D.W. Kelly. 1961. The influences of inorganic sediment on the aquatic life of streams. *Calif. Fish and Game* 47(2):189-228.

Costello, C.A., M. Yamasaki, P.J. Pekins, W.B. Leak, C.D. Neefus. 2000. Songbird response to group selection harvests and clearcuts in a New Hampshire northern hardwood forest. *For. Ecol. Manag.* 127:41-54.

Curry, R.B., G.L. Barker, and Z. Strach. 1965. Interrelation of physical and chemical properties in flow of colloidal suspensions in porous media. *Trans. Am. Soc. Agric. Eng.* 8:259-263.

Della-Bianca, L., F.M. Johnson. 1965. Effect of an intensive cleaning on deer-browse production in the southern Appalachians. *J. Wildlife Manag.* 29:729-733.

Dellinger, R. L., P. B. Wood, P. D. Keyser. 2003. Songbird abundance and nesting success on landscapes of differing harvesting intensities on an industrial forest. Abstracts of the 10<sup>th</sup> Annual Meeting of the Wildlife Society, Burlington, VT, #104.

DeMeo, T., L. Tracy, L. Wright. 1995. Landtype associations of the Monongahela National Forest. 1:250,000; UTM map projection. U.S. Department of Agriculture, Forest Service, Monongahela National Forest.

DeMeo, T.E. 1999. Forest songbird abundance and viability at multiple scales on the Monongahela National Forest, West Virginia. PhD dissertation, West Virginia University, Morgantown. 159 pp.

Dennis, B., P.L. Muholland, J.M. Scott. 1991. Estimation of growth and extinction parameters for endangered species. *Ecological Monographs* 61: 115-143.

DeWalle, D.R., J.S. Tepp, C.J. Pickens, P.J. Edwards, W.E. Sharpe. 1995. Tree ring chemistry response in black cherry to ammonium sulfate fertilization at two West Virginia sites. in: Gottschalk, K.W., S.L. Fosbroke (Eds). *Proceedings 10<sup>th</sup> Central Hardwood Forest Conference; 1995 March 5-8; Morgantown, WV. Gen Tech. Rep. NE-197. Radnor, PA: USDA Forest Service, Northeastern Forest Experiment Station. Pp. 179-187.*

DeWalle, D.R., P.J. Edwards, B.R. Swistock, R. Aravena, R.J. Drimmie. 1997. Seasonal isotope hydrology of three Appalachian forest catchments. *Hydrological Processes*. 11:1895-1906.

DeWalle, D.R., W.E. Sharpe, P.J. Edwards. 1988. Biogeochemistry of two Appalachian deciduous forest sites in relation to episodic stream acidification. *Water, Air and Soil Poll.* 40:143-156.

- Dissmeyer, G.E. 1994. Evaluating the effectiveness of forestry Best Management Practices in meeting water quality goals or standards. USDA Forest Service. Miscellaneous Publication 1520.
- Dissmeyer G.E., A. Stump. 1978. Predicted erosion rates for forest management activities in the Southeast. Unnumb. Rep. Atlanta, GA. USDA Forest Service, State & Private Forestry, Southeast Area. 27 pp.
- Dobony, C.A. 2000. Factors influencing ruffed grouse productivity and chick survival in West Virginia. MS Thesis, West Virginia University, Morgantown, WV. 108 p.
- Donovan, T.M., R.H. Lamberson, A. Kimber, F.R. Thompson, J. Faaborg. 1995. Modeling the effects of habitat fragmentation on source and sink demography of neotropical migrant birds. *Conservation Biology*. 9(6):1396-1407.
- Dost, F.N. 1986. An estimate of carcinogenic risk associated with polyaromatic hydrocarbons in smoke from prescribed burning in forestry. *Pestic. Advis. Memoranda* 402. Washington, D.C.: USDA Forest Service. 16 pp.
- Dredge, L.A. and B.G. Thom. 1976. Development of a gully-flow near Sept-Iles, Quebec. *Can. J. Earth Sci.* 13:1145-1151.
- Duffy, D. C., A. J. Meier. 1992. Do Appalachian herbaceous understories ever recover from clearcutting? *Cons. Biol.* 6(2):196-201.
- Duguay, J.P., P.B. Wood, G.W. Miller. 2000. Effects of timber harvests on invertebrate biomass and avian nest success. *Wildlife Society Bulletin* 28(4):1-9.
- Dunne, T., L.B. Leopold. 1978. *Water in environmental planning*. San Francisco, CA: W.H. Freeman and Co. 818 p.
- Dunne, T. 1990. Hydrology, mechanics, and geomorphic implications of erosion by subsurface flow. IN *Groundwater geomorphology: the role of subsurface water in Earth-surface processes and landforms*. C.G. Higgins and D.R. Coates, eds. Special Paper of the Geological Society of America. 252. p. 1-28.
- Durgin, P. 1984. Subsurface drainage erodes forested granitic terrane. *Physical Geography* 4:24-39.
- Dury, G.H. 1969. Relation of morphology to runoff frequency. In: Chorley, R.J., Ed. *Water, earth, and man*. London: Methuen: 419-430pp.
- Edwards, P.J., F. Wood, J.N. Kochenderfer. 2002. Baseflow and peakflow chemical responses to induced watershed acidification. *Hydrological Processes*. 16: 2287-2310.

Edwards, P.J., F. Wood, J.N. Kochenderfer, D.W. Coble, M.B. Adams. 2002. Soil leachate responses during 10 years of induced whole-watershed acidification. *Water, Air, Soil pollut.* 140: 99-118.

Edwards, P.J., D.L. Carnahan, Z. Henderson. 1999. Channel cross-section and substrate comparisons among four small watersheds with different land-disturbance histories. In: Olsen, D.S., J.P. Potyondy, Eds. *AWRA Symposium Proceedings Specialty Conference Wildland Hydrology*. 1999 June 30-Jul 2; Bozeman, MT: TPS-99-3; Herndon, VA: AWRA:217-218. (abstract)

Edwards, P.J., J.D. Helvey. 1991. Long-term ionic increases from a central Appalachian forested watershed. *J. Env. Qual.* 20:250-255.

Edwards, P.J., C. Huber, F. Wood. 2004. Ozone exposures and implications for vegetation in rural areas of the central Appalachian Mountains, USA. *Env. Monitor. Assessment* 98:157-174.

Edwards, P.J., F. Wood. 1994. Centroid lag time changes resulting from harvesting, herbiciding, and stand conversion. IN Marston, R.A., V.R. Hasfurther (Eds). *Proceedings Annual Summer Symposium of the American Water Resources Association, Effects of human-induced changes on hydrological systems*; 1994 June 26-29; Jackson, WY. TPS-94-3. Bethesda, MD: AWRA: 727-734.

Edwards, P.J., F. Wood, J.N. Kochenderfer. 1991. Characterization of Ozone During Consecutive Drought and Wet Years at a Rural West Virginia Site. *J. Air Waste Manage. Assoc.* 1450-1453.

Elliott, K.J., D.L. Loftis. 1993. Vegetation diversity after logging in the southern Appalachians. *Cons. Biol.* 7:220-221.

Everest, F.H., R.D. Harr. 1982. Influence of forest and rangeland management on anadromous fish habitat in Western North America – *Silvicultural Treatments*. Gen. Tech. Rep. PNW 134.

Fajvan, M.A., S.T. Grushecky, C. C. Hasseler. 1998. The effects of harvesting practices on West Virginia's wood supply. *J. Forestry* 96:33-39.

Fansler, H. F. 1962. *History of Tucker County West Virginia*. McClain Printing Company, Parsons, WV. 737 pp.

Filipek, S.P. 1993. The impact of forest practices on warmwater and coldwater fisheries: similarities and differences. Arkansas Game and Fish Commission. *Fisheries Tech. Rep.* FR-93-1.

Fisher, R.F., D. Binkley. 2000. *Ecology and management of forest soils*. John Wiley and Sons, Inc. New York. 489pp.

Ford, W.M., A.S. Johnson, P.E. Hale, J.M. Wentworth. 1993. Availability and use of spring and summer woody browse by deer in cut and uncut forests of the southern Appalachians. *South. J. Applied Forestry*. 17:116-119.

Ford, W.M., A.S. Johnson, P.E. Hale. 1994. Nutritional quality of deer browse in southern Appalachian clearcuts and mature forests. *Forest Ecology and Management*. 67:149-157.

Ford, W.M., B.R. Chapman, M.A. Menzel, R.H. Odom. 2000. Stand-age and habitat influences on salamanders in Appalachian cove hardwood forests. *For. Ecol. Manag.* 93:237-246.

Ford, W. M., C. A. Dobony, J. W. Edwards. 2002. Shrews in managed northern hardwood stands in the Allegheny Mountains of West Virginia. *Proceedings of the Annual Conference of Southeastern Fish and Wildlife Agencies*. 56:374-384.

Ford, W.M., D. Madarish, T.M. Schuler, S.B. Castleberry. 2003. Influence of white-tailed deer digestion on running buffalo clover (*Trifolium stoloniferum*: Fabaceae Muhl. ex A. Eaton) germination. *American Midland Naturalist* 142: 425-428.

Ford, W.M., J. Laerm, K.G. Barker. 1997. Soricid response to stand-age in cove hardwood communities in the southern Appalachians. *For. Ecol. Manag.* 91:175-181.

Ford, W. M., J. L. Rodrigue. 2001. Soricid abundance in partial overstory removal harvests and riparian areas in an industrial forest landscape of the central Appalachians. *Forest Ecology and Management* 152:159-168.

Ford, W.M., M.A. Menzel, D.W. McGill, J. Laerm, T.S. McCay. 1999a. Effects of a community restoration fire on small mammals and herpetofauna in the southern Appalachians. *For. Ecol. Manag.* 114:223-243.

Ford, W.M., P.B. Wood, J.E. Edwards. 1999b. Mammalian and avian predator response to intensive forest management in the central Appalachians. *USDA Forest Service Northeastern Research Station Project Proposal*. 3 pp.

Ford, W.M., R.H. Odum, P.E. Hale, B.R. Chapman. 2000. Stand-age, stand characteristics, and landform effects on understory herbaceous communities in southern Appalachian cove-hardwoods. *Biol. Conserv.* 93:237-246.

Ford, W. M., S. L. Stephenson, J. M. Menzel, D. R. Black, J. W. Edwards. 2004. Habitat characteristics of the endangered Virginia northern flying squirrel (*Glaucomys sabrinus fuscus*) in the central Appalachian Mountains. *American Midland Naturalist* 152:430-438.

- Forman, R.T.T., M. Gordon. 1986. *Landscape Ecology*. John Wiley & Sons, New York. 619 pp.
- Foster, M., R. Fell, and M. Spannagle. 2002. A method for assessing the relative likelihood of failure of embankment dams by piping: Reply. *Can. Geotech. J.* 39:497-500.
- Franklin, J.F., R.T.T. Forman. 1987. Creating landscape patterns by forest cutting: ecological consequences and principles. *Landscape Ecology*. 1:5-18.
- Galone, D.G. 1989. Temporal trends in water quality, determined by time series and regression analysis from streams on undisturbed, cut and herbicide-treated watersheds in the Appalachian Mountains. M.S Thesis. Pennsylvania State University.
- Gehring, J.L. 1997. Wildlife habitat quality in central Appalachian hardwood forests following three different timber harvest techniques. MS thesis, West Virginia University, Morgantown. 113 pp.
- Gillespie, A.R., R. Rathfon, R.K. Myers. 1996. Rehabilitating a young northern red oak planting with tree shelters. *Northern J. Appl. Forestry* 13:24-29.
- Gilliam, F.S., M.B. Adams. 1996. Wetfall deposition and precipitation chemistry for a Central Appalachian forest. *J. of the Air and Waste Manage. Assoc.* 46:978-984.
- Gilliam, F.S., N.L. Turrill. 1993. Herbaceous layer cover and biomass in a young versus a mature stand of a central Appalachian hardwood forest. *Bull. Torrey Botanical Club* 120 (4):445-450.
- Gilliam, F.S., N.L. Turrill, M.B. Adams. 1995. Herbaceous-layer and overstory species in clear-cut and mature Central Appalachian hardwood forests. *Ecol. Appl.* 5(4):947-955.
- Gove, J.H., C.W. Martin, G.P. Datil, D.S. Solomon, J.W. Hornbeck. 1992. Plant species diversity in even-aged harvests at the Hubbard Brook Experimental Forest: 10-year results. *Can. J. For. Res.* 22(11):1800-1806.
- Greenberg, C.H., D.E. McLeod, D.L. Loftis. 1997. An old-growth definition for western and mixed mesophytic forests. USDA Forest Service General Technical Report SRS-16. 16 pp.
- Groeschl, D.A., J.E. Johnson, D.W. Smith. 1990. Forest soil characteristics following wildfire in the Shenandoah National Park, Virginia. In: S.C. Nodvin, T.A. Waldrop, (Eds). *Fire and environment: ecological and cultural perspectives*. USDA Forest Service Gen. Tech. Rep. SE-69. p.129-137.
- Hadley, G.L., K.R. Wilson. 2004. Patterns of density and survival in small

mammals in ski runs and adjacent forest patches. *Journal of Wildlife Management* 68: 288-298.

Hadley, G.L., K.R. Wilson. 2004b. Patterns of small mammal density and survival following ski-run development. *Journal of Mammalogy* 85: 97-104.

Hagerty, D.J. 1991. Piping/sapping erosion. II: Identification-Diagnosis. *Journal of Hydraulic Engineering*. 117:1009-1025.

Hakala, J. 2000. Factors influencing brook trout (*Salvelinus fontinalis*) abundance in forested headwater streams with emphasis on fine sediment. MS Thesis. West Virginia University, Morgantown. 166 pp.

Hall, J.D., R.L. Lantz. 1969. Effects of logging on the habitat of coho salmon and cutthroat trout in coastal streams. In: T.G. Northcote (Ed.). *Symposium on salmon and trout in streams, 1968*. University B.C., Vancouver. p. 355-375.

Hardt, R.A., W.T. Swank. 1997. A comparison of structural and compositional characteristics of southern Appalachian young second-growth, maturing second-growth, and old-growth stands. *Natural Areas J.* 17:42-52.

Harman, P.J. 1996. Running buffalo clover—conservation strategy. (Unpublished document.) Elkins, WV: West Virginia Division of Natural Resources, Natural Heritage Program. 27 p.

Harper, C.A., D.C. Guynn. 1999. Factors affecting salamander density and distribution within four forest types in the southern Appalachian Mountains. *For. Ecol. Manag.* 114:245-252.

Harr, R.D., W.C. Harper, J.T. Krygier. 1975. Changes in storm hydrographs after road building and clear-cutting in the Oregon Coast Range. *Water Resour. Res.* 15(1):436-444.

Harr, R.D., F.M. McCorison. 1979. Initial effects of clearcut logging on size and timing of peak flows in a small watershed in western Oregon. *Water Resour. Res.* 15(1):90-94.

Harris, D.D. 1973. Hydrologic changes after clear-cut logging in a small Oregon coastal watershed. *J. of Res. USGS* 1(4):487-491.

Harris, L. D. 1984. *The fragmented forest, island biogeography theory and the preservation of biotic diversity*. University of Chicago Press, Chicago, Illinois. 211 pp.

Hartman, K. J., M. K. Cox. 2001. Fish survey and trout habitat assessment for the Fernow Experimental Forest. Progress Report to the USFS-NERS. May 2001. 14 pp.

Healy, W.M. 1997. Thinning New England oak stands to enhance acorn production. *Northern J. Appl. For.* 14(3):152-156.

Healy, W.M., R.T. Brooks. 1988. Small mammal abundance in northern hardwood stands in West Virginia. *J. Wildlife Manag.* 52:491-496.

Helvey, J.D., P.J. Edwards. 1987. Time trend of precipitation and streamflow chemistry at the Fernow Experimental Forest. In: *Proceedings, Aquatic Effects Task Group VI, peer review summaries: 1987 May 17-23; New Orleans, LA Task Group Project FS 6C-01.8 Volume II.* Raleigh, NC: North Carolina State University, Atmospheric Impacts Research Program: 413-420, 465.

Helvey, J.D., S.H. Kunkle. 1986. Input-output budgets of selected nutrients on an experimental watershed near Parsons, West Virginia. Res. Pap. NE-584. Broomall, PA: USDA Forest Service, Northeastern Forest Experiment Station. 7 pp.

Hewlett, J.D., J.D. Helvey. 1970. Effects of forest clearfelling on the storm hydrograph. *Water Resour. Res.* 6(3):768-782.

Hewlett, J.D., R.A. Hibbert. 1967. Factors affecting the response of small watersheds to precipitation in humid areas. In: *Sopper, W., H.W. Lull, Eds. Proceedings, Forest Hydrology.* Oxford: Pergamon Press: 275-290.

Higgins, C.G. 1984. Piping and sapping: development of landforms by groundwater outflow. IN *Groundwater as a Geomorphic Agent.* R.A. LaFleur, ed. Allen and Unwin, Boston, MA. p. 18-58.

Hornbeck, J.W., C.W. Martin, C. Eagar. 1997. A summary of water yield experiments at Hubbard Brook Experimental Forest, New Hampshire. *Can. J. For. Res.* 27:2043-2052.

Hornbeck, J.W. 1973. Storm flow from hardwood-forested and cleared watersheds in New Hampshire. *Water Resour. Res.* 9:346-354.

Hornbeck, J.W., M.B. Adams, E.S. Corbett, E.S. Verry, J.A. Lynch. 1993. Long-term impacts of forest treatments on water yield; a summary for northeastern USA. *J. Hydrol.* 150:323-344.

Houghton, R.A. 1995. Changes in the Storage of Terrestrial Carbon Since 1850. In: *Lal, R., J. Kimble, E. Levine, B.A. Steward Eds. Soils and Climate Change.* Lewis Publishers. pp. 45-66.

Hughes, J. W., T.J. Fahey. 1991. Availability, quality, and selection of browse by white-tailed deer after clearcutting. *Forest Science.* 37:261-270.

Iverson, L.R., A.M. Prasad, B.J. Hale, E.K. Sutherland. 1999. Atlas of current and potential future distributions of common trees of the eastern United States. Radnor, PA: USDA Forest Service, Northeastern Research Station, GTR NE-265.

Jackson, W.A., L. Arbucci. 1989. Ozone symptoms were present on bioindicator plants at the Otter Creek Wilderness and Dolly Sods Wilderness, Monongahela National Forest, 1989. USDA Forest Service, Forest Pest Management, Morgantown, WV. Unpublished Report.

Jacobson, R.B., J.P. McGeehin, E.D. Cron, C.E. Carr, J.M. Harper, A.D. Howard. 1993. Landslides triggered by the storm of November 3-5, 1985, Wills Mountain Anticline, West Virginia and Virginia. U.S. Geological Survey Bulletin 1981. pp. c1-c33.

Jenkins, M.A., G.R. Parker. 1998. Composition and diversity of woody vegetation in silvicultural openings of southern Indiana forests. *For. Ecol. Manag.* 109(1):57-74.

Jenkins, M.A., G.R. Parker. 1999. Composition and diversity of ground layer vegetation in silvicultural openings of southern Indiana forests. *Am. Midl. Nat.* 142(1):1-16.

Johnson, A. N. 2002. Determining the genetic distances between sub-populations of *Aneides aeneus* in the Westvaco Wildlife and Ecosystem Research Forest. M.S. Thesis, Marshall University, Huntington, WV. 62 pp.

Johnson, A.S., P.E. Hale, W.M. Ford, J.M. Wentworth, J.R. French, O.F. Anderson, G.B. Pullen. 1995. White-tailed deer foraging in relation to successional stage, overstory type and management of southern Appalachian forests. *Am. Mid. Nat.* 133:18-35.

Johnson, A.S., P.E. Hale, W.M. Ford, J.M. Wentworth, J.R. French, O.F. Anderson, G.B. Pullen. 1995. White-tailed deer foraging in relation to successional stage, overstory type and management of southern Appalachian forests. *Am. Midl. Nat.* 133:18-35.

Johnson, A.S., W.M. Ford, P.E Hale. 1993. The effects of clearcutting on herbaceous understories are still not fully known. *Conservation Biology* 7:433-435.

Johnson, D.W. and D.W. Cole. 1980. Anion mobility in soils: relevance to nutrient transport from forest ecosystems. *Environment International* 3: 79-90.

Johnson, P.S. 1984. Responses of planted northern red oak to three overstory treatments. *Can. J. For. Res.* 14:536-542.

Johnson, P.S. 1992. Underplanting northern red oak in Missouri without herbicides. St. Paul, MN: USDA Forest Service, North Central Forest Experiment Station. Gen. Tech. Rep. NC-152. 4pp.

Jones, J.A.A. 2004. Implications of natural soil piping for basin management in upland

Britain. *Land Degrad. Develop.* 15:325-349.

Judge, C.A., Neal, J.C., Derr, J.F. 2001. Postemergence control of *Microstegium vimineum*. *Weed Science of America Annual Meeting Proceedings*. 41: 47.

Jules, E.S. 1998. Habitat fragmentation and demographic change for a common plant: trillium in old-growth forest. *Ecology*. 79:748-762.

Kaller, M., K.J. Hartman. 2004. Evidence of a threshold level of fine sediment for altering benthic macroinvertebrate communities. *Hydrobiol.* 518: 95-104.

Ketchie, D.O. and W. Lopushinsky. 1981. Composition of root pressure exudate from conifers. *USDA Forest Service Research Note PNW-395*. 6 p.

Kirkland, G.L., H.W. Snoddy, T.L. Amsler. 1996. Impact of fire on small mammals and amphibians in a central Appalachian deciduous forest. *Am. Mid. Nat.* 135:253-260.

Klock, G.O., J.D. Helvey. 1976. Soil-water trends following wildfire on the Entiat Experimental Forest. *Proc. Tall Timbers Fire Ecol. Conf.* 15:193-200.

Knapp, S.M. 1999. Effects of timber harvesting on terrestrial salamander abundance and behavior. MS thesis, Virginia Polytechnic Institute and State University, Blacksburg. 122 pp.

Knapp, S. M., C. A. Haas, D. N. Harpole, R. L. Kirkpatrick. 2003. Initial effects of clearcutting and alternative silvicultural practices on terrestrial salamander abundance. *Conservation Biology* 17:752-762.

Knoepp, J.D., W.T. Swank. 1993. Site preparation burning to improve southern Appalachian pine-hardwood stands: nitrogen responses in soil, soil water, and streams. *Can. J. For. Res.* 23:2263-2270.

Kochenderfer, J.N. 1970. Erosion control on logging roads in the Appalachians. *Res. Pap. NE-158*. Upper Darby, PA: USDA Forest Service, Northeastern Forest Experiment Station. 28 p.

Kochenderfer, J. N., G. W. Wendel. 1980. Costs and environmental impacts of harvesting timber in Appalachia with a truck-mounted crane. Broomall, PA. USDA Forest Service, Northeastern Forest Experiment Station, *Res. Pap. NE-456*, 9 p.

Kochenderfer, J. N., J. D. Helvey. 1987. Using gravel to reduce soil losses from minimum-standard forest roads. *J. Soil Water Conserv.* 42(1):46-50.

Kochenderfer, J. N., J. D. Helvey. 1989. Hydrologic impacts of mechanized site preparation in the central Appalachians. In: *Proceedings, 7th Central Hardwood Forest Conference; March 5-8, 1989, Southern Illinois University, Carbondale, IL.* pp 283-289.

Kochenderfer, J. N., J. D. Helvey, G. W. Wendel. 1987. Sediment yield as a function of land use in central Appalachian forests. In: Hay, R. L., F. W. Woods, H. DeSelm. (Eds.). Proceedings, 6th Central Hardwood Forest Conference; February 24-26, 1987, University of Tennessee, Knoxville, TN. pp 497-502.

Kochenderfer, J.N., G.M. Aubertin. 1975. Effects of management practices on water quality and quantity: Fernow Experimental Forest, West Virginia. In: Municipal Water Management Symposium Proceedings., Upper Darby, PA: USDA Forest Service, Northeastern Forest Experiment Station. Gen. Tech. Rep. NE-13 14-24.

Kochenderfer, J.N., P.J. Edwards. 1991. Effectiveness of three streamside management practices in the Central Appalachian. In: Sixth Biennial Southern Silvicultural Res. Conf. Proc.: Gen. Tech. Rep. SE-70, Asheville, NC: USDA Forest Service, Southeastern Forest Experiment Station. P. 688-700.

Kochenderfer, J.N., P.J. Edwards, F. Wood. 1997. Hydrologic impacts of logging an Appalachian watershed using West Virginia's best management practices. North. J. Appl. For. 14:207-218.

Kochenderfer, J.N., P.J. Edwards, J.D. Helvey. 1990. Land management and water yield in the Appalachians. In: Riggins, R.E., E.B. Jones, R. Singh, P.A. Rechard, eds. Proceedings, IR conference, watershed management, IR DIV/ACE, watershed planning and analysis in action symposium; 1990 July 9-11; Durango, CO. New York: American Society of Civil Engineers: 523-532.

Koger, J.L., E.C. Burt, A.C. Trowse, Jr. 1985. Multiple pass effects of skidder tires on soil compaction. Transactions of the ASAE. 28(1):11-16.

Kovenya, S.V., M.K. Mel'nikova, and A.S. Frid. 1972. Study of the role of mechanical forces and geometric conditions in the movement of highly dispersed particles in soil columns. Soviet Soil Sci. 4:605-612.

Langley, Paula. 1989. Unpublished "Natural Gas Classification Study for the Monongahela National Forest." US Department of the Interior, Bureau of Land Management, Milwaukee District Office, 16 pp.

Lantagne, D.O. 1995. Effects of tree shelters on planted red oaks after six growing seasons. In: Proceedings--10th Central Hardwood Conference, March 5-8 1995, Morgantown, WV. In: K.W. Gottschalk, S.L.C. Fosbroke Eds. General Technical Report NE-197. U.S.D.A. Forest Service, Northeastern Forest Experiment Station, 215-221.

Lantagne, D.O., C.W. Ramm, D.I. Dickman. 1990. Tree shelters increase heights of planted oaks in a Michigan clearcut. Northern J. Appl. For. 7: 24-26.

- Larabee, P.A. 1986. Late-Quaternary vegetational and geomorphic history of the Allegheny Plateau at Big Run Bog, Tucker County, West Virginia. MS Thesis, University of Tennessee, Knoxville.
- Laseter, B.R., T.A. Campbell, D.A. Osborn, K.V. Miller, W.M. Ford. 2003. White-tailed deer browse preferences in clearcuts in the central Appalachians of West Virginia. Abstracts of the Southeastern Deer Study Group Meeting. 26:23-24.
- Laseter, B.R., T.A. Campbell, B.F. Miller, D.A. Osborn, K.V. Miller, W. M. Ford. 2004. Female white-tailed deer: are there really social groups in the central Appalachians? Southeast Deer Study Group Meeting. 27:33.
- Laury, J.D., M.E. Hale, Jr. 1988. Lichens as Indicators of atmospheric quality in the Dolly Sods and Otter Creek Wildernesses of the Monongahela National Forest, West Virginia. Final report submitted to the Forest Supervisor, Monongahela National Forest, USDA Forest Service.
- Lefohn, A.S., P.J. Edwards, M.B. Adams. 1994. The characterization of ozone exposures in rural West Virginia and Virginia. *J. Air Waste Manage. Assoc.* 44:1276-1283.
- Litvaitis, J.A. 1993. Response of early successional vertebrates to historic changes in land use. *Cons. Biol.* 7:866-873.
- Loeb, S.C. 1993. The role of coarse woody debris in the ecology of Southeastern mammals. In: J.W. McMinn, D.A. Crossley Eds. *Biodiversity and coarse woody debris in southern forests*. USDA Forest Service, Southeastern Research Station. Gen. Tech. Rep. SE-94. pp 108-118.
- Loftis, D.L. 1990. A shelterwood method for regenerating red oak in the southern Appalachians. *For. Sci.* 36:917-929.
- Losche, C.K., W.W. Beverage. 1967. Soil survey of Tucker County and part of northern Randolph County, West Virginia. US Soil Conservation Service, Forest Service, and West Virginia Agricultural Experiment Station. Washington, DC.
- Lu, Shiagn-Yue. 1994. Forest harvesting effects on streamflow and flood frequency in the northern Lake States. Ph.D. thesis. University of Minnesota, St. Paul, MN. 112 p.
- Lyford, W.H. 1973. Forest soil micro-topography. IN D.L. Dindal (Ed.) *Proc. 1st Soil Micro-communities Conf.* U.S. Atomic Energy Comm., Syracuse. p. 47-58.
- Lynch, J.A., W.E. Sopper, D.B. Partridge. 1972. Changes in streamflow following partial clearcutting on a forested watershed. IN *Proceedings, Watershed in transition*. Am. Water Resour. Assoc. Proc. Series No. 14:313-320.

Madarish, D.M., B.B. Hunter, T.M. Schuler, M.B. Adams. 1999. Examination of Selected Environmental Conditions Necessary for Reproduction and Growth of Running Buffalo Clover. Progress Report, Northeastern Research Station, Parsons, WV (unpublished report).

Madarish, D.M., J.L. Rodrigue, M.B. Adams. 2002. Vascular flora and macroscopic fauna on the Fernow Experimental Forest. Gen. Tech. Rep. NE-291. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 37 p.

Madarish, D., T.M. Schuler. 2002. Effects of forest management practices on the federally endangered running buffalo clover (*Trifolium stoloniferum* Muhl. ex. A. Eaton). Nat. Areas J. 22(2): 120-128.

Marcum, C. 1994. Ecology and natural history of four Plethodontid species in the Fernow Experimental Forest, Tucker County, West Virginia. MS thesis, Marshall University, Huntington, West Virginia. 254 pp.

Marini, M.A, S.K. Robinson, E.J. Heske. 1995. Edge effects on nest predation in the Shawnee National Forest, southern Illinois. Biol. Cons. 74:203-213.

McCull, J.G. 1978. Ionic composition of forest soil solutions and effects of clear-cutting. Soil Sci. Soc. Am. J. 42:358-363.

McMinn, J.W. 1992. Diversity of woody species 10 years after four harvesting treatments in the oak-pine type. Can. J. For. Res. 22:1179-1183.

McNab, W.H., P.E. Avers. 1994. Ecological subregions of the United States: Section descriptions. USDA Forest Service Publication WO-WSA5.

Meegan, S.K., S.A. Perry. 1996. Periphyton communities in headwater streams of different water chemistry in the central Appalachian mountains. J. Freshwater Ecol. 11(3):247-255.

Meffe, G. K., Carroll, C.R., Pimm, S.L. 1994. Community-level conservation: species interactions, disturbance regimes, and invading species. In: Principles of Conservation Biology. Sinauer Associates, Sunderland, MA: 209-236.

Megahan, W.F. 1972. Logging, erosion, sedimentation—are they dirty words? J. For. 70:403-407.

Menzel, M. A., S. F. Owen, W. M. Ford, J. W. Edwards, P. B. Wood, B. R. Chapman, K. V. Miller. 2002. Roost tree selection by northern long-eared bat (*Myotis septentrionalis*) maternity colonies in an industrial forest of the central Appalachian Mountains. For. Ecol. and Manage. 155:107-114.

Menzel, J. M. 2003. An examination of the habitat requirements of the endangered Virginia northern flying squirrel (*Glaucomys sabrinus fuscus*) by assessing nesting sites, habitat use and the development of a habitat model. Ph.D. Dissertation, West Virginia University, Morgantown, WV. 122 pp.

Menzel, J. M., W. M. Ford, J. W. Edwards, M. A. Menzel. 2004. Nest tree use by the endangered Virginia northern flying squirrel in the central Appalachian Mountains. *Am. Midl. Nat.* 151:355-368.

Menzel, J. M., W. M. Ford, M. A. Menzel, T. C. Carter, J. E. Gardner, J. D. Garner, J. E. Hofmann. In Press. Summer home range and habitat use analysis of the endangered Indiana bat. *Journal of Wildlife Management*. Due 2005.

Menzel, M. A., S. F. Owen, W. M. Ford, J. W. Edwards, P. B. Wood, B. R. Chapman, K. V. Miller. 2002. Roost tree selection by northern long-eared bat (*Myotis septentrionalis*) maternity colonies in an industrial forest of the central Appalachian Mountains. *Forest Ecology and Management*, 155:107-114.

Meyer, J.L. and C.M. Tate. 1983. The effects of watershed disturbance on dissolved organic carbon dynamics of a stream. *Ecology* 64:33-44.

Michael, E.D., B.L. Hahn, H.J. Hansen. 1982. Response of deer, hare, and grouse to whole-tree harvesting in central Appalachia. *Proceedings of the Annual Conference of Southeastern Fish and Wildlife Agencies*. 36:627-633.

Mikan, C.J., D.A Orwig, M.D. Abrams. 1994. Age structure and successional dynamics of a presettlement-origin chestnut oak forest in the Pennsylvania Piedmont. *Bull. Torrey Botanical Club* 121(1):13-23.

Miller, G.W., P.B. Wood, J.V. Nichols. 1995. Two-aged silviculture – an innovative tool for enhancing species diversity and vertical structure in Appalachian hardwoods. In: L.G. Eskew (Ed.). *Forest health through silviculture*. USDA Forest Service Gen. Tech. Rep. RM-267. p 175-182 .

Miller, J.H. 2003. Nonnative invasive plants of southern forests: a field guide for identification and control. Revised. GTR SRS-62. Asheville, NC: US Department of Agriculture, Forest Service, Southern Research Station. 93 pp.

Miller, K.V., W.M. Ford, T.A. Campbell. 1999. Minimizing the impacts of herbivory in forest regeneration: a test of localized management. *USDA NRI Proposal*. 25 pp.

Moeyersons, J. 1991. Ravine formation on steep slopes: forward versus regressive erosion. Some studies from Rwanda. *Catena* 18:309-324.

Moore, I.D., G.J. Burch, R.L. Wallbrink. 1986. Preferential flow and hydraulic conductivity of forest soils. *Soil Science Society of America Journal*. 50: 876-881.

Morris, D.R., V.C. Baligar, T.M. Schuler, Harmon, P.J. 2002. Nitrogen fixation and running buffalo clover habitat. *Journal of Plant Nutrition* 25: 735-746.

Muller, R.N., Y. Liu. 1991. Coarse woody debris in an old-growth deciduous forest on the Cumberland Plateau, southeastern Kentucky. *Can. J. For. Res.* 21:1567-1572.

Naiman, R.J., H. Decamps, M. Pollock. 1993. The role of riparian area corridors in maintaining regional diversity. *Ecol. Appl.* 3:209-212.

NAPAP. 2001. National Acid Precipitation Assessment Program Biennial Report to Congress: An integrated assessment. [www.nni.noaa.gov/CENTR/NAPAP/NAPAP – 96 htm](http://www.nni.noaa.gov/CENTR/NAPAP/NAPAP-96.htm)

National Atmospheric Deposition Program. 2000. National Atmospheric Deposition Program 1998 wet deposition. NADP Data Report 2000-01. Illinois State Water Survey, Champaign, IL. 15 p.

National Wildfire Coordinating Group, 1985. Prescribed Fire Smoke Management Guide. USDA Forest Service, USDI.

Nowacki, G.J. 1995. Historical development, disturbance dynamics, and community ecology of oak-dominated forests of central Pennsylvania. PhD Thesis. Pennsylvania State University.

Odom, R.H., W.M. Ford, J.W. Edwards, C.W. Stihler, J.M. Menzel. 2000. Developing potential habitat models for the endangered Virginia northern flying squirrel (*Glaucomys sabrinus fuscus*) in the Allegheny Mountains of West Virginia. *Biol. Cons.* 99:245-252.

Oliver, C.D., B.C. Larson. 1996. *Forest Stand Dynamics*. John Wiley and Sons, New York.

Ottmar, R.D., G.K. Anderson, P.J. DeHerrera, T.E. Reinhardt. 2000. Consumer User's Guide. Version 2.1. USDA Forest Service, Pacific Northwest Research Station. 156 pp.

Owen, S.F. 2000. Impacts of timber harvest in the central Appalachians hardwood region on bat foraging and roosting behavior. M.S. Thesis, University of Georgia, Athens, GA. 52 pp.

Owen, S. F. 2003. Ecology and management of raccoons within an intensively managed forest in the central Appalachians. Ph.D. Dissertation, West Virginia University, Morgantown, WV. 93 pp.

Owen, S. F., M. A. Menzel, W. M. Ford, J. W. Edwards, B. R. Chapman, K. V. Miller, P. B. Wood. 2002. Roost tree selection by maternal colonies of northern long-eared

myotis in an intensively managed forest. USDA Forest Service Northeastern Research Station General Technical Report NE-292. 6 pp.

Owen, S. F., M. A. Menzel, J. W. Edwards, W. M. Ford, J. M. Menzel, B. R. Chapman, P. B. Wood, K.V. Miller. 2004. Bat activity in harvested and intact forest stands in the Allegheny Mountains. North. J. App. For. 21:54-159.

Owen, S. F., M. A. Menzel, W. M. Ford, B. R. Chapman, K. V. Miller, J. W. Edwards, P. B. Wood. 2003. Home-range size and habitat use of the northern myotis (*Myotis septentrionalis*). Am. Midl. Nat. 150:352-359.

Owen, S. F., J. W. Edwards, W. M. Ford, J. M. Crum, P. B. Wood. 2004a. Raccoon roundworm in raccoons in central West Virginia. Northeast. Nat. 11:137-142.

Parker, G.R., D.J. Leopold, J.K. Eichenberger. 1985. Tree dynamics in an old-growth, deciduous forest. For. Ecol. Manag. 11: 31-57.

Patric, J.H. 1976. Soil erosion in the eastern forest. J. For. 74(10):671-677.

Patric, J.H. 1976. Effects of wood products harvest on forest soil and water resources with emphasis on clearcutting in moist climates. In: The scientific base for silviculture and management decisions in the National Forest System: selected papers. Washington, DC: USDA Forest Service: 39-51.

Patric, J.H. 1977. Soil erosion and its control in eastern woodlands. North. Logger. 25(11):4-5,22-23,31,51.

Patric, J.H. 1978. Harvesting effects on soil and water in the eastern hardwood forest. South. J. Appl. For. 2:66-73.

Patric, J.H. 1980. Effect of wood products harvest on forest soil and water relations: J. Environ. Qual. 9(1):73-80.

Patric, J.H., D.W. Smith. 1975. Forest Management and Nutrient Cycling in Eastern Hardwoods; USDA Forest Service Research Paper NE-324.

Patton, P.C. and S.A. Schumm. 1975. Gully erosion, northwestern Colorado: a threshold phenomena. Geology 3:88-90.

Pauley, T.K. 1995a. Aquatic salamanders. In: R.C. Reardon (Ed.), Effects of diflubenzuron on non-target organisms in broadleaf forested watersheds in the Northeast. USDA Forest Service FHM-NC-05-95. p 14-22.

Pauley, T.K. 1995b. Terrestrial salamanders. In: R.C. Reardon (Ed.), Effects of diflubenzuron on non-target organisms in broadleaf forested watersheds in the Northeast. USDA Forest Service FHM-NC-05-95. p. 42-52.

Pauley, T.K., A.M. Rodgers. 1998. Baseline survey for amphibians and reptiles on the Westvaco Wildlife and Ecosystem Research Forest. Final Report submitted to the Westvaco Wildlife and Ecosystem Research Forest Steering Committee, Rupert, West Virginia. 127 pp.

Peterjohn, W.T., M.B. Adams; F.S. Gilliam. 1996. Symptoms of nitrogen saturation in two central Appalachian hardwood forest ecosystems. *Biogeochem.* 35:507-522.

Pfister, R.D. 1969. Effects of roads on growth of western white pine plantations in Northern Idaho: USDA Forest Service, Res. Pap. INT-65. 8pp.

Plaughter, G.F. 1998. Seasonal habitat, foods, and movements of ruffed grouse in the central Appalachian Mountains of West Virginia. MS thesis, West Virginia University, Morgantown. 159 pp.

Pritchett, W.L., R.F. Fisher. 1987. Properties and Management of Forest Soils. Second Edition. New York: JohnWiley and Sons. 500pp.

Reinhart, K.G., A. Eschner. 1962. Effect on streamflow of four different forest practices in the Allegheny Mountains. *J. Geophysical Res.* 67:2433-2445.

Reinhart, K.G., A. Eschner, G.R. Trimble, Jr. 1963. Effect on streamflow for four forest practices in the mountains of West Virginia. Res. Pap. NE-1. Upper Darby, PA: USDA Forest Service, Northeastern Forest Experiment Station. 79 p.

Reinhart, K.G., G.R. Trimble, Jr. 1962. Forest cutting and increased water yield. *J. Am. Water Works Assoc.* 54(12):1464-1472.

Rich, A.C., D.S. Dobkin, L.J. Niles. 1994. Defining forest fragmentation by corridor width: the influence of narrow forest-dividing corridors on forest-nesting birds in southern New Jersey. *Cons. Biol.* 8:1109-1121.

Rieffenberger, J.C., J.C. Pack, W.K. Igo, C.W. Ryan. 2000. Influence of mast production on black bear harvests in West Virginia. In: Abstracts of the 56<sup>th</sup> Annual Northeast Fish and Wildlife Conference, Charleston, West Virginia. p 8-9.

Robbins, C.S. 1988. Forest fragmentation and its effects on birds. In: J.E. Johnson (Ed.). *Managing north central forests for non-timber values.* Society of American Foresters Publication 88-04, Bethesda, Maryland. p 61-65.

Robinson, S.K., F.R. Thompson, T.M. Donovan, D.R. Whitehead, J. Faaborg. 1995. Regional forest fragmentation and the nesting success of migratory birds. *Science* 267:1987-1990.

- Römken, M. and S.N. Prasad. 2003. Subsurface flow effects on soil erosion in watersheds. IN K.G. Renard, S.A. McElroy, W.J. Gburek, H.E. Canfield, and R.L. Scott, eds. First Interagency Conference on Research in Watersheds. Oct. 27-30, 2003. USDA Agricultural Research Service. p. 435.
- Rosenblatt, D.L., E.J. Heske, S.L. Nelson, D.M. Barber, M.A. Miller, B. MacAllister. 1999. Forest fragments in east-central Illinois: islands of habitat patches for mammals? *Am. Mid. Nat.* 141:115-123.
- Rothacher, J.S. 1973. Does harvest in west slope Douglas-fir increase peak flow in small forest streams? Res. Pap. PNW-163. Portland, OR: USDA Forest Service, Pacific Northwest Forest Experiment Station. 13 pp.
- Rowan, E. 2004. Effects of spring prescribed fire on chipmunk home ranges and a woodland salamander community in a central Appalachian hardwood forest. M. S. Thesis. University of Georgia, Athens. 96 pp.
- Ruxton, B.P. 1958. Weathering and subsurface erosion in granite at the Piedmont Angle, Balos Sudan. *Geol. Mag.* 95:353-377.
- Ruxton, B.P. and L. Berry. 1957. Weathering of granite and associated erosional features in Hong Kong. *Bull. Geol. Soc. Am.* 68:1263-1292.
- Schlesinger, R.C., I.L. Sander, K.R. Davidson. 1993. Oak regeneration potential increased by shelterwood treatments. *North. J. Appl. For.* 10:149-153.
- Schuler, T. M., G.W. Miller. 1995. Shelterwood treatments fail to establish oak reproduction on mesic forest sites in West Virginia. IN: K.W. Gottschalk, S.L.C. In: Fosbroke Eds. Proceedings:10th Central Hardwood Conference, March 5-8 1995, Morgantown, WV. General Technical Report NE-197. USDA Forest Service, Northeastern Forest Experiment Station, USFS p. 375 - 388.
- Schuler, T.M. 2004. Fifty years of partial harvesting in a mixed mesophytic forest: composition and productivity. *Can. J. For. Res.* 34: 985-997.
- Schuler, T.M. 1998. Patterns of oak regeneration in a Central Appalachian Forest. PhD Thesis. Purdue University, West Lafayette, Indiana. 121pp.
- Schuler, T.M., M.A. Fajvan. 1999. Understory tree characteristics and disturbance history of a central Appalachian forest prior to old-growth harvesting. USDA Forest Service, Northeastern Research Station, Res. Pap. NE-710. 12 pp.
- Schuler, T.M., Gillespie, A.R. 2000. Temporal patterns of woody species diversity in a central Appalachian forest from 1856 to 1997. *J. Torrey Bot. Soc.* 127:149-161.

Schuler, T.M., McClain, W.R. 2003. Fire history of a Ridge and Valley oak forest. Research Paper NE-274. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 9 pp.

Schuler, T.M., Miller, G.W. 1996. Guidelines for using tree shelters to regenerate northern red oak. In: J. Brisette ed. Proceedings: Tree Shelter Conference, June 20-22 1995, Harrisburg, PA. General Technical Report NE-221. USDA Forest Service, Northeastern Forest Experiment Station. p.37-45.

Settergren, C.D., R.M. Nugent, G.S. Henderson. 1980. Timber harvest and water yield in the Ozarks. In: Symposium on watershed management. New York: American Society of Civil Engineers. 2:661-668.

Shetron, S. G., J.A. Sturos, E. Padley, C. Trettin. 1988. Forest soil compaction: Effect of multiple passes and loadings on wheel track surface soil bulk density. North. J. Appl. For. 5:120-123.

Shumway, D.L., M.D. Abrams, C.M. Ruffner. 2001. A 400-year history of fire and oak recruitment in an old-growth oak forest in western Maryland, U.S.A. Can. J. For. Res. 29: 166-171.

Simpson, T.W., R.L. Cunningham. 1982. The occurrence of flow channels in soils. J. Environ. Qual. 11:29-30.

Skopp, J. 1981. Comment on "Micro-, meso-, and macroporosity of soil." Soil Sci. Soc. Am. J. 45: 1246.

Smith, C.R., D.M. Pence, R.J. O'Conner. 1993. Status of neotropical birds in the Northeast: a preliminary assessment. In: Status and management of neotropical migratory birds. USDA Forest Service, Rocky Mtn. Res. Stn., Gen. Tech. Rep. RM-229. pp. 172-184.

Smith, D.W. 1993. Oak regeneration: the scope of the problem. In: Loftis, D.L.; C.E. McGee, (Eds.) Oak regeneration: serious problems, practical recommendations. Symposium Proceedings; 1992 September 8-10; Knoxville, TN: 40-52.

Smith, R. D. M. 2003. Raptor Assemblage, Abundance, Nesting Ecology, and Habitat Characteristics under Intensive Forest Management in the Central Appalachian Mountains. M.S. Thesis, West Virginia University, Morgantown, WV. 106 pp.

Stark, N.M. 1977. Fire and nutrient cycling in a Douglas-fir/larch forest. Ecology. 58: 16-30.

Stihler, C.W., J.L. Wallace, E.D. Michael, H. Pawelczyk. 1995. Range of *Glaucomys sabrinus fuscus*, a Federally endangered subspecies of the northern flying squirrel in West Virginia. Proc. West Virginia Acad. Sci. 67:13-20.

Stihler, C.W. 1994. Radio telemetry studies of the endangered Virginia big-eared bat (*Plecotus townsendii virginianus*) at Cave Mountain Cave, Pendleton County, West Virginia. Final Report to USDA Forest Service, Monongahela National Forest. 18 pp.

Stihler, C.W. 1995. A radio telemetry study of female Virginia big-eared bats (*Corynorhinus townsendii virginianus*) at a maternity colony in Cave Mountain Cave, Pendleton County, West Virginia. Final Report to USDA Forest Service, Monongahela National Forest. 11 pp.

Stihler, C.W. 1996. A summer bat survey near Big Springs Cave on the Fernow Experimental Forest, Tucker County, West Virginia. Final Report to USDA Forest Service Northeastern Research Station. 18 pp.

Stromayer, K.A.K., R.J. Warren. 1997. Are overabundant deer herds in the eastern United States creating alternate stable states in forest plant communities? *Wild. Soc. Bull.* 25:227-234.

Sullivan, T.P., J.O. Boateng. 1996. Comparison of small-mammal community responses to broadcast burning and herbicide application in cutover forest habitats. *Can. J. For. Res.* 26:462-473.

Sweka, J. A., K. J. Hartman. 2001. Effects of turbidity on prey consumption and growth in brook trout and implications for bioenergetics modeling. *Can. J. Fish. And Aquatic Sci.* 58:386-393.

Swift, L.W. 1983. Duration of stream temperature increases following forest cutting in the Southern Appalachian Mountains. In: Johnson, A.I., R.A. Clark, (Eds.) *Proceedings, International symposium on hydrometeorology.* Am. Water Resour. Assoc.: 273-275.

Swift, L.W., K.J. Elliott Jr., R.D. Ottmar, R.E. Vihnanek. 1993. Site preparation burning to improve southern Appalachian pine-hardwood stands: fire characteristics and soil erosion, moisture and temperature. *Can. J. For. Res.* 23:2242-2254.

Swindel, B.F., Grosenbaugh, L.R. 1988. Species diversity in young Douglas-fir plantations compared to old-growth. *For. Ecol. Manag.* 23:227-231.

Sykes, D.J. 1971. Effects of fire and fire control on soil and water relations in northern forests. In: C.W. Slaughter et al. Eds. *Fire in the northern environment.* USDA Forest Service, Pacific Northeast Forest and Range Experiment Station. Portland, OR. P.37-44.

Tanaka, T. 1982. The role of subsurface water exfiltration in soil erosion processes. IN *Recent developments in the explanation and prediction of erosion and sediment yield.* D.E. Walling, ed. IAHS Publication No. 137. p. 73-80.

Taylor, S.B., J.S. Kite. 1998. Surficial and bedrock geology of the Fernow Experimental Forest, Monongahela National Forest, Tucker County, West Virginia. Final Technical Report, Contract No. 23-023. West Virginia University, Morgantown, WV. 25 pp.

Thomas, G.W., R.E. Phillips. 1979. Consequences of water movement in macropores. *J. Environ. Qual.* 8:149-152.

Tiedemann, A.R., J.D. Helvey, T.D. Anderson. 1978. Stream chemistry and watershed nutrient economy following wildfire and fertilization in eastern Washington. *J. Environ. Qual.* 7:580-588.

Tilghman, N.G. 1989. Impacts of white-tailed deer on forest regeneration in northwestern Pennsylvania. *Journal of Wild. Manage.* 53:524-532.

Trimble, G.R., Jr. 1977. A history of the Fernow Experimental Forest and the Parsons Timber and Watershed Laboratory. USDA Forest Service Gen. Tech. Rep. NE-28. 46 pp.

Trimble, G. R., Jr., E. H. Tryon. 1969. Survival and growth of yellow-poplar seedlings depend on date of germination. USDA Forest Service, Research Note NE-101. Northeastern Forest Experiment Station, Broomall, PA. 6 pp.

Trimble, G.R., J.J. Mendel, R.A. Kennell. 1974. A procedure for selection marking in hardwoods combining silvicultural considerations with economic guidelines. U.S. Department of Agriculture, For. Serv., Northeastern Forest Experiment Station. Res. Pap. NE-292. 13 pp.

Trombulak, S.C., C.A. Frissell. 2000. Review of ecological effects of roads on terrestrial and aquatic communities. *Conservation Biology.* 14:18-30.

Tsukamoto, Y, T. Ohta, and H. Noguchi. 1982. Hydrological and geomorphological studies of debris slides of forested hillslopes in Japan. IN Recent developments in the explanation and prediction of erosion and sediment yield. D.E. Walling, ed. IAHS Publication No. 137. p. 89-98.

Tuley, G. 1983. Shelters improve the growth of young trees in the forest. *Quarterly J. For.* 77: 77-87.

United States Fish and Wildlife Service. 1999. *Trifolium stoloniferum* recovery plan. Twin Cities, MN: U.S. Department of Interior, U.S. Fish and Wildlife Service. 26 p.

Urban, V. 1988. Home range, habitat utilization, and activity of the endangered northern flying squirrel in West Virginia. MS thesis, West Virginia University, Morgantown, 59 pp.

USDA Forest Service. 1989. Position statement on national forest old-growth values. Memorandum to Regional Foresters, Station Directors, and WO staff, October 11, 1989. Washington, D.C.

Van Lear, D.H., Waldrop, T.A. 1989. History, uses, and effects of fire in the Appalachians. USDA For. Serv. Gen. Tech. Rep. SE-54. 20 pp.

Verry, E.S., J.R. Lewis, K.N. Brooks. 1983. Aspen clearcutting increase snowmelt and storm flow peaks in north central Minnesota. *Water Resour. Bull.* 19(1):59-67.

Verry, E.S. 1997. Hydrologic processes of natural, northern forested wetlands. In: Trettin, C.C. et al. (Eds.) *Northern forested wetlands, ecology and management*. New York: Lewis Publishers: 163-188.

Verry, E.S. 2000. Water flow in soils and streams: sustaining hydrologic function. In: Verry, E.S., J.W. Hornbeck, C.A. Doloff, (eds). *Riparian management in forests of the continental Eastern United States*. Boca Raton, FL: Lewis Publishers: 99-124.

Vose, J.M., B.D. Clinton, T. Swank. 1993. Fire, drought, and forest management influences on pine/hardwood ecosystems in the Southern Appalachians. In: *Proceedings, 12<sup>th</sup> International Conference on Fire and Forest Meteorology*. October 26-28, 1993. Jekyll Island, Georgia. Society of American Foresters, Bethesda, MD: pp. 232-238.

Watson, K.W., R.J. Luxmoore. 1986. Estimating macroporosity in a forest watershed by use of a tension infiltrometer. *Soil Sci. Soc. Am. J.* 50:578-582.

Weakland, C.A. 2000. Songbird response to diameter-limit and two-aged timber harvesting on an industrial forest in central West Virginia. PhD dissertation, West Virginia University, Morgantown. 161 pp.

Weakland, C.A., P. B. Wood, W. M. Ford. 2002. Response of songbirds to diameter-limit cutting in the central Appalachians of West Virginia, USA. *For. Eco. and Manage.* 155:115-129.

Weitzman, S. 1949. The Fernow Experimental Forest Parsons, West Virginia. Misc. Publ. Upper Darby, PA. USDA Forest Service. 16 pp.

Wendel, G.W., Smith, H.C. 1986. Effects of prescribed fire in a central Appalachian oak-hickory stand. NE-RP-594. Broomall, PA: USDA Forest Service, Northeastern Forest Experiment Station. 8pp.

Wentworth, J.M., A.S. Johnson, P.E. Hale, K.E. Kammermeyer. 1990. Seasonal use of clearcuts and food plots by white-tailed deer in the southern Appalachians. *Proceedings of the Annual Conf. Southeast. Assoc. of Fish and Wildlife Agencies.* 44:215-223.

Wiemann, M.C., T.M.Schuler, J.E. Baumgras. 2004. Effects of uneven-aged and diameter-limit management on West Virginia tree and wood quality. Res. Pap. FPL-RP-621. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 16 pp.

Williams, G.E., P.B. Wood. 2000. The utility of miniature video cameras for monitoring wood thrush nests in the Monongahela National Forest, West Virginia: results of pilot work in 1998. In: Abstracts of the 56<sup>th</sup> Annual Northeast Fish and Wildlife Conference, Charleston, West Virginia. p. 42.

Williard, K.W.J., D.R. DeWalle, P.J. Sharpe, P.J. Edwards, M.B. Adams. 1999. Spatial variations in stream nitrate concentrations in a region exhibiting symptoms of nitrogen saturation. In: W.E. Sharpe, J.R. Drohan Eds. The Effects of Acidic Deposition on Aquatic Ecosystems in Pennsylvania. Proceedings of the 1998 PA Acidic Deposition Conference, Vol. II. Environmental Resources Research Institute, University Park, PA. p. 23-30.

Whitaker, D. M. 2003. Ruffed Grouse (*Bonasa umbellus*) Habitat ecology in the central and southern Appalachians. Ph.D. Dissertation, Virginia Polytechnic Institute and State University, Blacksburg, VA. 205 pp.

Wunz, G.A., J.C. Pack. 1992. Eastern turkey in eastern oak-hickory and northern hardwood forests. IN: J.G. Dickson (Ed.). The wild turkey: biology and management. Stackpole Books, Harrisburg, Pennsylvania. pp. 232-264

Yates, M.D., S.C. Loeb, D.C. Guynn. 1997. The effect of habitat patch size on small mammal populations. Proc. Ann. Conf. Southeast. Fish and Wildlife Agencies. 51:501-510.

Youngberg, C.T., A.G. Wollum, II. 1970. Non-leguminous symbiotic nitrogen fixation. IN: Youngberg, C.T., C.B. Davey, (Eds.). Tree Growth and Forest Soils. Oregon State University Press, Corvallis. p. 383-395.

Ziemer, R.R. and J. S. Albright. 1987. Subsurface pipeflow dynamics of north-coastal California swale systems. R.L. Beschta et al., eds. IN Erosion and sedimentation in the Pacific Rim. IAHS Publication No. 165. p. 71-80.

## **List of agencies, persons and organizations to whom the EIS was sent**

### **Federal:**

U.S. Fish and Wildlife Service  
USDA-FS, Cheat District Ranger, Monongahela National Forest  
USDA-FS, WO, Ecosystem Management Staff  
USDA-FS, WO, Deputy Chief for Research Staff  
USDA-FS, Region 9, Natural Resources Staff  
USDI, Office of Environmental Policy and Compliance  
U.S. EPA, Region III  
Senator Robert C. Byrd  
Senator John D. Rockefeller  
Representative Alan Mollohan  
Representative Shelly Moore Capito

### **State:**

West Virginia Division of Forestry, Barbara Breshock

### **Organizations/Individuals:**

Heartwood, Jim Bensman  
West Virginia University, John Brooks  
West Virginia University, Dave McGill  
West Virginia Highlands' Conservancy, Don Gasper  
West Virginia Division, Society of American Foresters  
West Virginia Forestry Association  
MeadWestvaco Corporation, Roger Sherman  
Miles Lumber Company, June Myles  
Plum Creek, Bob Radspinner  
B. Sachau

## Index

Acidic deposition	3-45, 3-50, 3-56
Air quality	2-11, 3-45 through 3-50
Bankfull	3-6, 3-7
Best Management Practices (BMPs)	1-4, 2-2, 2-8, 3-9, 3-60
Black bear	3-74, 3-75, 3-100, 3-101
Butternut	2-1, 3-96
Caves	3-66 through 3-68,
Clean Air Act	3-45, 3-46
Clearcut	2-3, 2-4, 3-4, 3-76, 3-83, 3-89
Climate	1-2, 3-84
Comparison of Alternatives	2-7 through 2-10
Cowbirds	3-77
Cumulative effects	3-1, 3-30, 3-40, 3-42, 3-43, 3-44, 3-49, 3-57, 3-63, 3-65, 3-67, 3-72, 3-76, 3-80, 3-82, 3- 85, 3-91, 3-94, 3-98, 3-100, 3-108
Deer	3-74, 3-75, 3-77, 3-88, 3-99, 3-101
Diameter-limit harvest	2-4, 3-18, 3-34, 3-78, 3-83
Early-succession	3-73, 3-78
Ecological landype	1-1, 3-86
Economic	3-105
Fertilization	2-3, 3-67, 3-94
Financial maturity treatment	2-3,2-5, 3-12, 3-16, 3-23, 3-31, 3-33, 3-60, 3-92
Fish	3-70 through 3-72
Fragmentation	3-83 through 3-85
Herbicide	1-5, 2-2, 2-6, 3-43, 3-65, 3-68
Heritage Resources	2-2, 3-102 through 3-104, 3-109
History	1-2, 3-73, 3-102
Hunting	3-78, 3-93, 3-99 through 3-101
Indiana bat	1-6, 2-6, 2-9, 2-11, 3-66, 3-75, 3-77, 3-79, 3- 108
Japanese stiltgrass	1-5, 2-6, 3-82, 3-91, 3-97

Long-term research	1-3, 1-4, 3-107 through 3-109
Mitigation measures	2-8, 2-9, 2-10, 3-9, 3-45, 3-93, 3-106
Monitoring	2-10, 2-11
Nitrogen	3-46, 3-49, 3-50, 3-55, 3-59, 3-62
Old growth	3-81 through 3-84, 3-87, 3-92
Otter Creek Wilderness	3-46, 3-47, 3-76, 3-80, 3-90, 3-99
Prescribed burning	2-3, 2-5, 2-10, 3-6, 3-25, 3-27, 3-40, 3-48, 3-49, 3-60 through 3-62, 3-68, 3-76, 3-79, 3-85, 3-93, 3-108,
Proposed action	2-3, 2-8 through 2-10
Purpose and need	1-4
Recreation	3-99 through 3-101
Riparian	3-2 through 3-46, 3-97, 3-109
Roads	2-8, 3-4, 3-5, 3-34, 3-37, 3-53, 3-63, 3-64, 3-72, 3-75, 3-76, 3-91
Running buffalo clover	2-6, 2-11, 3-75, 3-79, 3-89 through 3-93, 3-95, 3-104
Scoping	1-5
Sediment	1-6, 2-6, 2-8, 3-4, 3-5, 3-8 through 3-44, 3-57, 3-63, 3-67, 3-96, 3-109
Shelterwood	2-3, 2-4, 2-5, 3-29, 3-71, 3-74
Silviculture	2-3, 2-4, 3-92
Single-tree selection	2-3, 2-4, 3-19, 3-34, 3-78, 3-83, 3-88
Skidroads	2-5, 2-9, 2-11, 3-9, 3-12, through 3-40, 3-53, 3-74, 3-92, 3-101
Smoke	3-48, 3-49, 3-79
Songbirds	3-74, 3-77, 3-81, 3-83, 3-88
Soil compaction	2-9, 3-53, 3-56, 3-58, 3-62, 3-64
Soil disturbance	3-54, 3-57, 3-64, 3-96
Soils	1-2, 3-2, 3-51 through 3-65, 3-67
Threatened, endangered and sensitive species	1-6, 2-6, 2-9, 2-12, 3-75, 3-79, 3-101, 3-110
Tree-of-Heaven	3-3, 3-17, 3-18, 3-27
	1-5, 2-6, 3-82, 3-91, 3-97
Understory	3-87 through 3-90, 3-92
Watershed Acidification	2-3, 2-5, 3-62, 3-64, 3-94
Wildlife Habitat	2-1, 3-73 through 3-80, 3-83, 3-105

