

Tapoco Project
Terrestrial Study 2:
Vegetation Management Evaluation and Exotics Survey
Part 3 – Exotic Terrestrial Animals on Tapoco Project Lands

Authors

Dr. David Smith
Dr. B. Eugene Wofford
Dr. Edward E. C. Clebsch
of
The University of Tennessee at Knoxville



Editor

Sally Rollins Palmer
The Nature Conservancy



DRAFT REPORT
MARCH 2001

TABLE OF CONTENTS

EXOTIC TERRESTRIAL ANIMALS ON TAPOCO PROJECT LANDS

INTRODUCTION.....	3
METHODS.....	4
RESULTS AND DISCUSSION.....	4
Species summaries	4
Analysis of threats from exotic animal species.....	7
PRINCIPAL INVESTIGATOR CREDENTIALS.....	8

PART 3 – EXOTIC TERRESTRIAL ANIMALS ON TAPOCO PROJECT LANDS

Author: Dr. Edward E. C. Clebsch, The University of Tennessee

INTRODUCTION

The Tapoco Division of Alcoa Power Generating, Inc. (Tapoco) is in the process of relicensing its 359.0 MW (installed capacity) Tapoco Hydroelectric Project (Tapoco Project or Project) with the Federal Energy Regulatory Commission (FERC). Tapoco is utilizing an alternative approach to the traditional FERC relicensing process, the Applicant Prepared Environmental Assessment (APEA) which has been approved by the FERC. As part of the APEA process Tapoco has engaged agencies, non-governmental organizations (NGOs), and other interested parties (collectively, the Participants) in an open process to identify issues to be addressed through relicensing and to prepare a Scoping Document 1 (SD1), as required under the National Environmental Policy Act (NEPA). This report for Terrestrial Study 2: Vegetation Management Evaluation and Exotics Survey, is based on the issues identified in Scoping Document 1 (SD1), and on the study plan presented to the participants and the resource agencies.

The primary objectives of the Terrestrial Study 2 project are to assess the status of invasive exotic species within the FERC Project boundary and to evaluate the vegetation management practices used on Tapoco Project lands in regard to improvements or modifications that could be made to enhance regional forest and wildlife management goals. The study area for this project includes all lands and waters within the Tapoco Project boundary including lands within 200 feet of reservoir shorelines, 50 feet to each side of transmission lines/pipeline right-of-ways, and within 100 feet of the center line of the Cheoah River. Other lands owned by Tapoco adjacent to the Tapoco Project boundary are not included as part of this study. As well, other private or publicly owned lands were not surveyed or assessed for this project.

The objectives of this study were to identify exotic terrestrial species located within the Project lands and to evaluate their potential impacts on surrounding lands and waters. If any documented species were determined to pose an ongoing threat to habitat management initiatives being undertaken on sites adjoining the Project lands, appropriate measures for managing those exotics in conjunction with adjoining land managers were to be identified and evaluated. Table 1 lists the species which were identified as exotic, potentially occurring on Project lands, and potentially having negative effects on wildlife or other aspects of the environment on Project lands or adjoining lands.

Table 1. Exotic animal species potentially occurring on Tapoco Project lands

MAMMALS	BIRDS	INSECTS
Coyote (<i>Canis latrans</i>)	House finch (<i>Carpodacus mexicanus</i>)	Southern pine beetle (<i>Dendroctonus frontalis</i>)
House mouse (<i>Mus musculus</i>)	Rock dove (pigeon) (<i>Columba livia</i>)	Gypsy moth (<i>Lymantria dispar</i>)
Norway rat (<i>Rattus norvegicus</i>)	Brown-headed cowbird (<i>Melothria ater</i>)	
Roof (brown) rat (<i>Rattus rattus</i>)	House sparrow (<i>Passer domesticus</i>)	
European wild boar (<i>Sus scrofa</i>)	European starling (<i>Sturnella vulgaris</i>)	

METHODS

Sources of information about these exotic animals included personal observations made while engaged in other phases of re-licensing work on the Project, observations of colleagues, interviews with officers of the Tennessee Wildlife Resources Agency and the North Carolina Wildlife Commission, employees of the USDA Forest Service (Nantahala and Cherokee National Forests), employees of Tapoco, local residents, and published information. Judgments were made about the relative severity of threats to wildlife on Project lands combined with negative effects of the animals on other aspects of the biota or environment. Elements which entered into the judgments included possible competitive interactions, predation, direct negative impacts, negative economic effects, population densities, breadth of habitat utilized, difficulty of control, potential health hazards to humans, and dispersal of the species. A relative scale of 1-5 was employed, with 1 representing the lowest combined threat and 5 representing the highest combined threat.

RESULTS AND DISCUSSION

Species summaries

Southern pine beetle

The outbreak of this insect in the Southern Appalachian Region reached epidemic proportions in 1999 and 2000 but was not so severely expressed in the Project area. There are relatively small areas of concentrated pine populations on Project lands, and few of them have been subject to population explosions of the beetle. The one exception was on Project lands surrounding Santeetlah Lake, where damage was severe enough that a contract was let to

evaluate the damage and to practice salvage logging. Control of the insect on a landscape scale would not be feasible. There are many miles of shoreline on Santeetlah Lake on which pines are dominant in the plant communities. There is a very limited amount of pine dominated vegetation on Cheoah Reservoir. There are intermediate extents of pine dominated communities on Chilhowee and Calderwood Lakes in the FERC boundary. To consider a 'worst possible case' scenario, assume that all mature yellow pines (Virginia, shortleaf, Table Mountain, and pitch pine) were killed by beetles in a single year. The pulse of fuel would increase the threat of intense fires. A few bird species would be negatively affected, but others (notably the six species of native woodpeckers) would undergo a virtual population explosion for a decade or less. Erosional problems would probably not develop since the pine dominated communities include hardwood species and herbs and shrubs which would likely flourish with the loss of pines from the overstory. The level of threat this species poses across the Project lands is designated as '2.'

Gypsy moth

Only one individual was reported from traps in the vicinity of Project lands. No outbreaks have been reported on Project lands. There is a long term potential threat, conceivably within the license period, of severe impact on susceptible species. From predictive studies carried out in Great Smoky Mountains National Park there is potential for severe impact to dry site hardwoods on Tapoco's FERC lands, but at present that probability is vanishingly small. Score = 1.

Coyote

Population densities are not known, but the animal is acknowledged to be widespread and common on Project lands. Since it is predatory, it has the potential for having negative impacts on rare, threatened, or endangered species, especially small mammals. There is evidence from elsewhere that coyotes displace the two native species of foxes, and long term observations by Tapoco personnel suggest that population densities of the foxes have declined precipitously over the last few decades. This species is difficult to eradicate. It interbreeds with domestic dogs and the union produces fertile offspring. The species is secretive and is extraordinarily adaptable, even living comfortably in man's domain. It is likely to be present and seldom seen. Score = 3.

House mouse

This species may reach high population densities around dwellings, farm buildings, and garbage dumps. It can also survive and reproduce in the wild. This species is a vector of at least one human disease, the hanta virus, although there are no known cases of hanta virus in the Project area. No infestations of house mice were reported on Tapoco Project lands, though the residences and businesses around Santeetlah Lake are the most likely place for infestations to occur. Given the present situation of few humans and few structures on Project FERC lands and assuming that that situation will not change appreciably during the license period, there are likely to be no problems with the house mouse. Score = 1.

Roof (black) rat

Also widespread in the southeast, this species was not seen on Project lands during field studies. There is appropriate habitat present, with residences around Santeetlah Lake, powerhouses and support buildings, two campgrounds, and some garbage dumps. Fleas that live

on rats may carry several diseases which can be transmitted to humans, but there are no known cases of any of those diseases in the Project area. Score = 1.

Norway rat

See remarks about the roof rat. Score = 1.

European wild boar

Introduced into the North Carolina mountains in 1912, the species has interbred with domestic breeds of the same species and continues to thrive in the region. This species thrives on Project lands. It is heavily dependent on oak mast, with population densities fluctuating in relation to acorn crop. The boar subsists on a variety of other plant species, including several species listed by the natural heritage programs of Tennessee and North Carolina as endangered, threatened, or in need of management (or equivalent categories). This species is destructive to the habitat for several listed salamander species in the region, and it also carries several parasites that are transmissible to man. Wild boars often wallow in the ground near water, resulting in increased silt loads and parasite loads in streams in its habitat. It is very difficult to control and virtually impossible to eradicate. It does not readily infiltrate areas occupied by humans, and is thus unlikely to pose any threat to the burgeoning human community around Santeetlah Lake. Neither does it appear to compete for food with such species as black bear. Score = 3.

House finch

Most abundant in the region in suburban areas, the species can adapt to rural residences. None were seen during field studies, though they are to be expected in the area around Santeetlah Lake as the number of houses increases. Their population densities are probably not high enough to displace other species now or in the license period. It is unlikely to reach significant numbers on Project FERC lands. Score = 1.

Rock dove (pigeon)

One flock of about 50 birds occupies the area around Chilhowee Dam. None have been seen around the other dams, nor have any been seen in other suitable habitat in the Project area (cliffs, dwellings). The species is a potential competitor with cliff swallows, though the two seem to live compatibly at Chilhowee Dam. Score = 1.

Brown-headed cowbird

This obligate brood parasite is present in low numbers on Project lands where there are open fields, such as at the Calderwood reservation and small areas on the periphery of Santeetlah Lake. The species does not infest nests in deep forests to any significant degree, but does penetrate forests bordered by open fields with short grasses. It parasitizes nests of many species, including some in the Project area that are in serious decline. At present, there is no known technology for controlling or eradicating the species. Score = 1.

House sparrow

This species enjoys a close relationship with man and his activities, and is most often found around habitations and farming activities. The species has not been seen during fieldwork in the Project area over the last two years, though it would not be surprising for it to be around residences on the periphery of Santeetlah Lake. Score = 1.

European starling

Starlings form small to very large flocks in winter which may move many miles in a day from feeding areas to densely aggregated roosts. A few solitary nests and a few scattered individuals were observed during the nesting season, and a few flocks have been seen in the Project area. The species is not present in high enough densities nor is it widely enough dispersed in the Project area to represent a threat to other birds. Score = 1.

Analysis of threats from exotic animal species

Of the dozen species identified as exotics, nine are judged to be of very low threat (score = 1) to wildlife or habitat. Only the southern pine beetle was scaled '2'. Its threat to forests on Tapoco Project lands is relatively low because of the low incidence of dense pine forests on reservoir borders and in managed transmission lines or around tunnels or powerhouses. Salvage logging is probably a better approach to this minor problem than would be efforts to control spread of the beetle by spraying of insecticides. The two species that were ranked '3' are the coyote and European wild boar. Their potential negative effects are discussed under the individual animals. Management of these two species is not judged to be of high importance at present, though their importance to other species and to their habitat may change in the future. As stated above, eradication of either species borders on the impossible. Reducing population densities can be accomplished by trapping, shooting, or poisoning. Hunting in open, regulated seasons has not been effective in controlling either species in other places, but full time paid hunters have been effective in limiting population explosions of European wild boars in some areas.

In summary, the twelve exotic species that were the subject of this study do not constitute a significant threat to the wildlife or the wildlife habitat of the Tapoco Project lands at the present time and under present conditions. However, in the future Tapoco may want to evaluate the need for additional monitoring as circumstances warrant.

PRINCIPAL INVESTIGATOR CREDENTIALS

WOFFORD, B. EUGENE

Director of the Herbarium &
Associate Adjunct Professor
Department of Botany
University of Tennessee
Knoxville, Tennessee 37996-1100

HOME: 1300 Edinburgh Place, Knoxville, Tennessee 37919

DATE AND PLACE OF BIRTH: 9 Jun 1943, Paris, Tennessee

MARRIED: 2 children, 29 & 27 yrs. old

SECONDARY EDUCATION: Stewart Co. High School, Dover, Tennessee

UNDERGRADUATE EDUCATION:

Austin Peay State University, Clarksville, TN, 1961-65

Graduated B. S., Major: Biology

Courses: General Biology, Plant Morphology, Plant Physiology, Field Botany, Invertebrate Zoology, Anatomy & Morphology of the Lower Chordates, General Physiology, Comparative Anatomy, Entomology, Field Zoology, General Embryology, Bacteriology, Teaching Biology in High School

GRADUATE EDUCATION:

Austin Peay State University, Clarksville, TN, 1965-67

Graduated M. A., Major: Biology

Courses: General Genetics, Plant Ecology, Advanced Plant Taxonomy, Paleobotany, Herpetology, Mammalogy, Plant Geography, Educational & Psychological Statistics

Thesis: A Preliminary Biosystematic Study of *Erythronium americanum* Ker in the Southeastern United States

The University of Tennessee, Dept. of Botany, Knoxville, TN, 1970-73

Graduated Ph. D.

Courses: Developmental Plant Morphology, Principles of Plant Taxonomy, Bryology, Pteridology, Ecosystems of the World, Biometry, Advanced Topics in Systematic Botany--Botanical Nomenclature, Angiosperm Phylogeny, Biosystematics, Advanced Topics in Cryptogamic Botany

Doctoral Committee: A. Murray Evans (Chairman), A. J. Sharp, M. W. Bierner, D. W. Bunting

Dissertation: A Biosystematic Study of the Genus *Persea* in the Southeastern United States

POSITIONS HELD:

1965-67: Austin Peay State University. Graduate Teaching Assistant.

1967-70: University of South Alabama. Instructor of Biology.

1970-73. University of Tennessee. Graduate Teaching Assistant.

1973-83. University of Tennessee. Curator of the Herbarium.

1983-84. University of Tennessee. Curator/Asst. Professor.

1984- University of Tennessee. Director of the Herbarium & Associate Adjunct Professor.

TEACHING EXPERIENCE:

General Biology

General Botany

Field Botany

Winter Botany

Advanced Field Botany

Great Smoky Mt. Field School: numerous special courses

HONORS AND GRANTS: (also see Consulting & Personal Services Contracts)

M. A. with academic honors

Research Grant: Tennessee Academy of Science, 1967

Faculty Research Grant: University of South Alabama, 1969

NSF Traineeship: University of Tennessee, 1972

Grant-in-Aid of Research: Society of Sigma Xi, 1973

Southern Regional Education Board: Distribution of Tennessee Vascular Plants, 1976-77

Research Grant: American Philosophical Society, 1981

UTK (various sources): Botanical Explorations in Yunnan Province, People's Republic of China, 1983

Research Incentive Fund, UTK, College of Liberal Arts, 1986

Senior Research Fellow, Austin Peay State University, Center of Excellence, 1990-present

National Science Foundation: Collection Improvements for the University of Tennessee Herbarium (TENN), 1996-1999.

Academic Hall of Fame, Austin Peay State University, 1999

PROFESSIONAL SOCIETIES:

Southern Appalachian Botanical Club: President 1988

Association of Southeastern Biologists

Society of Sigma Xi

American Society of Plant Taxonomists

Tennessee Native Plant Society
Southern Appalachian Highlands Conservancy
Tennessee Academy of Science

CONSULTING AND PERSONAL SERVICES CONTRACTS:

Jul, 1976. Battelle Columbus Laboratories, Durham, North Carolina: Assessment of rare plants and/or unique habitats on Milan Army Ammunition Plant Property, Milan, TN.

Jul, 1976. Division of Forestry, Fisheries, and Wildlife Development, Tennessee Valley Authority, Norris, Tennessee: Taxonomic studies for TVA's electric transmission line research studies.

Sep, 1976. Harriman Utility Board: Floristic survey of secondary water treatment plant property, Harriman, TN.

Nov, 1976. Division of Forestry, Fisheries, and Wildlife Development, Tennessee Valley Authority, Norris, Tennessee: Participant in workshop on rare plants in Tennessee held in conjunction with Tennessee Academy of Science meeting.

Apr, 1977. Tennessee Heritage Program, Dept. of Conservation, Nashville, Tennessee: Floristic survey of Savage Gulf Natural Area, Grundy Co., TN.

Dec, 1977. Consoer, Townsend & Associates, Nashville, Tennessee: Floristic and vegetational analysis of Oak Ridge wastewater plant and transmission facilities, Oak Ridge, TN.

Sep, 1978. U. S. Forest Service, Atlanta, Georgia: Inventory of proposed rare and endangered plants of the Cherokee National Forest, TN.

Nov, 1978. Federal Aviation Administration, Atlanta, Georgia: Botanical survey of Black Mountain and access road, Crab Orchard, TN.

Dec, 1978. Tennessee Dept. of Transportation, Nashville, Tennessee: Botanical survey of proposed I-440, Nashville, TN.

Mar, 1979. Tennessee Heritage Program, Dept. of Conservation, Nashville, Tennessee: Inventory of significant botanical areas of the Upper Cumberland River Valley of Tennessee.

Jun, 1979. Consoer, Townsend & Associates, Nashville, Tennessee: Floristic and vegetational analysis of Athens wastewater treatment and transmission facilities, Athens, TN.

Jun, 1979. U. S. Dept. of Agriculture, Animal and Plant Quarantine Program, Brentwood, Tennessee: Survey of exotic and noxious weeds of Tennessee.

Sep, 1979. U. S. Fish & Wildlife Service, Atlanta, Georgia: Endangered and threatened plant status surveys of twelve species in Region IV: Tennessee Area.

Nov, 1979. Consoer, Townsend & Associates, Nashville, Tennessee: Floristic and vegetational analysis of Cookeville wastewater treatment and transmission facilities, Cookeville, TN.

Jun, 1981. Great Smoky Mountains Natural History Association: Bibliography of taxonomic literature to GSMNP flowering plants.

Feb, 1982. J. R. Wauford & Co., Alcoa, Tennessee: Vegetation survey of Rogersville wastewater treatment plant, Rogersville, TN.

Oct, 1983. Tennessee Dept. of Transportation, Nashville, Tennessee: Botanical survey of proposed Pellissippi Parkway Extension, Knox & Blount Co's., TN.

Mar, 1984. Tennessee Valley Authority, Norris, Tennessee: Botanical survey of Watts Bar Reservoir, environmental impacts and land use planning.

Sep, 1984. Great Smoky Mountains National Park, Gatlinburg, Tennessee: Curation of R. H. Whittaker specimens.

Aug, 1985. North Carolina Dept. of Transportation, Raleigh, North Carolina: A botanical survey along proposed routes for Hwy. 25-70, Hot Springs to the Tennessee state line, Madison Co., NC.

Sep, 1986. U. S. Dept. of the Interior, National Park Service, Gatlinburg, Tennessee: Proposal for survey and documentation of exotic plants in Great Smoky Mountains National Park.

Oct, 1987. Trant & Stephens, Attorneys at Law; Identification of botanical evidence in D. Jenkins case.

Feb, 1989. Checklist and ecological studies of Tennessee vascular plants, Tennessee Dept. of Conservation.

Jun, 1990. Status of *Dalea foliosa* in Maury, Marshall, and Bedford Counties, Tennessee. TVA Wildlife and Natural Heritage Program.

Sep, 1990. U. S. Forest Service, Cleveland, TN: Cherokee National Forest inventories and status report of *Acer leucoderme*.

Mar, 1991. Survey of state and federal endangered species for proposed Hwy. 64 project. ERCE Consultants, Oak Ridge, TN.

Jul, 1990-96. Atlas of the Vascular Plants of Tennessee. Austin Peay State University Center for Excellence in Field Biology.

Apr, 1993-95. Inventory of the Rare Plants of the Tennessee Portion of Ft. Campbell Military Reservation, The Nature Conservancy.

May, 1994. Status report for *Eriogonum harperi*, Tennessee Dept. of Environment & Conservation.

Jun, 1994. Identification of Vascular Plants for the Vegetation Structure Indicator of the Forest Health Monitoring Program, U.S.D.A. Forest Service.

Jul-96-Jul 98. Data collection, site management planning and monitoring for *Prenanthes barbata* and *Tomanthera auriculata* at Ft. Campbell, TN-KY. The Nature Conservancy.

Jul-Oct, 1996. Floristic inventory of Turkey Creek wetlands, Knox Co., TN. Breedlove, Dennis & Associates, Orlando, FL.

Mar-Nov, 1997. Vegetation identification for the forest inventory and analysis program, U. S. D. A. Forest Service.

Mar-98-Dec-99. Rare, threatened, and endangered species and communities: Inventory of Tapoco Lands in Tennessee and North Carolina. The Nature Conservancy.

Jun, 1998. A Botanical Survey for the Proposed Pipeline Project, Marion Co., Tennessee. Breedlove, Dennis & Associates, Orlando, FL.

Feb, 1998. A Botanical Survey for RTE species on Lone Mt., Clinch River, Claiborne Co., Tn. BHE Environmental, Inc., Knoxville, TN

TECHNICAL REPORTS:

U. S. Forest Service. 1980. Inventory of proposed threatened and endangered plant species, Cherokee National Forest, TN. Loose leaf n. p.

U. S. Fish & Wildlife Service. 1980. Status reports on endangered species in the Tennessee area: *Arenaria cumberlandensis*, *Arenaria fontinalis*, *Calamovilfa arcuata*, *Conradina verticillata*, *Eriogonum longifolium* var. *harperi*, *Eupatorium luciae-brauniae*, *Heterotheca ruthii*, *Petalostemum foliosum*, *Prenanthes roanensis*, *Sedum nevii*, *Silphium brachiatum* (with D. K. Smith & T. S. Patrick) Loose leaf n. p.

U. S. Fish & Wildlife Service, Office of Endangered Species. 1986. Status report on *Pityopsis ruthii* (Small) Small.

U. S. Dept of the Interior, National Park Service. 1988. Great Smoky Mountains Exotic Plant Survey (with R. Clements & E. E. C. Clebsch) Loose leaf n. p.

U. S. Forest Service. 1994. Identification of Vascular Plants for the Vegetation Structure Indicator of the Forest Health Monitoring Program. n. p.

The Nature Conservancy. 1994. A Rare and Endangered Species Survey of the Fort Campbell Military Reservation, Kentucky and Tennessee. Vol 1. The Report; Vol 2. Status Reports for: *Carex alata*, *Hieracium longipilum*, *Hydrastis canadensis*, *Juglans cinerea*, *Malus angustifolia*, *Muhlenbergia glabriflora*, *Oenothera linifolia*, *Panax quinquefolius*, *Phacelia ranunculacea*, *Platanthera peramoena*; Vol 3. Status Reports for: *Populus grandidentata*, *Prenanthes aspera*, *Prenanthes barbata*, *Rudbeckia subtomentosa*, *Scleria ciliata*, *Silphium laciniatum*, *Silphium pinnatifidum*, *Tomanthera auriculata* (with E. W. Chester and L. McKinney) 365 p.

The Nature Conservancy. 1998. Studies of populations of *Prenanthes barbata* and *Tomanthera auriculata* occurring on the Fort Campbell Military Reservation, Kentucky and Tennessee. 88 p.

PUBLICATIONS:

Ellis, W. H., E. Wofford, and E. W. Chester. 1971. A preliminary checklist of the flowering plants of the Land Between the Lakes. *Castanea* 36: 229-246.

Wofford, B. E. 1974. The systematic significance of flavonoids in *Persea* in the southeastern United States. *Biochemical Systematics and Ecology* 2: 89-91.

Wofford, B. E., & R. W. Pearman. 1975. An SEM study of leaf pubescence in the southeastern taxa of *Persea*. *Sida* 6: 19-23.

Windler, D. R., B. E. Wofford, & M. W. Bierner. 1976. Evidence of natural hybridization between *Mimulus ringens* and *Mimulus alatus* (Scrophulariaceae). *Rhodora* 78: 641-649.

Wofford, B. E., & W. M. Dennis. 1976. State records and other recent noteworthy collections of Tennessee plants. *Castanea* 41: 119-121.

- Wofford, B. E. 1976. The taxonomic status of *Ageratina luciae-brauniae* (Fern.) King & Robinson. *Phytologia* 33: 369-371.
- Wofford, B. E., D. H. Webb, & W. M. Dennis. 1977. State records and other recent noteworthy collections of Tennessee plants. II. *Castanea* 42: 190-193.
- Biernier, M. W., W. M. Dennis, & B. E. Wofford. 1977. Flavonoid chemistry, chromosome number and phylogenetic relationships of *Helenium chihuahuensis*. *Biochemical Systematics & Ecology* 5: 23-28.
- Committee for Tennessee Rare Plants. 1978. The rare vascular plants of Tennessee. B. E. Wofford, Rapporteur for the Committee; with J. L. Collins, H. R. DeSelm, A. M. Evans, and R. Kral. *J. Tennessee Acad. Sci.* 53: 128-133.
- Wofford, B. E., & A. M. Evans. 1979. Atlas of the vascular plants of Tennessee. I. Pteridophytes and Gymnosperms. *J. Tennessee Acad. Sci.* 54: 32-38.
- Wofford, B. E., T. S. Patrick, L. R. Phillippe, & D. H. Webb. 1979. The vascular flora of Savage Gulf, Tennessee. *Sida* 8: 135-151.
- Wofford, B. E., & A. M. Evans. 1979. Atlas of the vascular plants of Tennessee. II. Magnoliidae: Aristolochiales, Magnoliales, Nymphaeales, Papaverales, Piperales, Ranunculales. *J. Tennessee Acad. Sci.* 54: 75-80.
- Wofford B. E., & R. Kral. 1979. A new *Arenaria* (Caryophyllaceae) from the Cumberlands of Tennessee. *Brittonia* 31: 257-260.
- Dennis, W. M., A. M. Evans, & B. E. Wofford. 1979. Disjunct populations of *Isoetes macrospora* Dur. in southeastern Tennessee. *Amer. Fern J.* 69: 97-99.
- Dennis, W. H., D. H. Webb, B. E. Wofford, & R. Kral. 1980. State records and other recent noteworthy collections of Tennessee plants. III. *Castanea* 45: 237-242.
- Medley, M. E., & B. E. Wofford. 1980. *Thuja occidentalis* L. and other noteworthy collections from the Big South Fork of the Cumberland River in McCreary County, Kentucky. *Castanea* 45: 213-215.
- Smith, D. K., B. E. Wofford, & J. L. Collins. 1980. An unusual *Athyrium* from east Tennessee. *Amer. Fern J.* 70: 31-32.
- Wofford, B. E. 1980. Atlas of the vascular plants of Tennessee. III. Caryophyllidae: Caryophyllales, Polygonales. *J. Tennessee Acad. Sci.* 55: 110-114.
- Wofford, B. E. 1981. Sensitive plants of the Cherokee National Forest. U. S. D. A. Forest Service Southern Region. 31 p.
- Wofford, B. E. 1981. External seed morphology of *Arenaria* (Caryophyllaceae) of the southeastern United States. *Systematic Botany* 6: 126-135.
- Wofford, B. E., & P. S. White. 1981. Systematics and identification of southern Appalachian phanerogams: An indexed bibliography. U. S. D. I., National Park Service, NPS-SER, Research/Resources Management Rep. No. 53. 69 p.
- Patrick, T. S., B. E. Wofford, & D. H. Webb. 1983. State records and other noteworthy collections of Tennessee plants. IV. *Castanea* 48: 109-116.

- Wofford, B. E. 1983. A new *Lindera* (Lauraceae) from North America. Jour. Arnold Arbor. 64: 325-331.
- White, P. S., & B. E. Wofford. 1984. Rare native Tennessee vascular plants in the flora of Great Smoky Mountain National Park. J. Tennessee Acad. Sci. 59: 61-64.
- Murrell, Z. E., & B. E. Wofford. 1987. Floristics and phytogeography of Big Frog Mountain, Polk County, Tennessee. Castanea 52: 262-290.
- Wofford, B. E., & H. R. DeSelm. 1988. Distribution of and first report of *Thymelaea passerina* from the southeastern United States. Castanea 53: 304-305.
- Wofford, B. E., & R. W. Jones. 1988. *Fimbristylis perpusilla* Harper from the Cumberland Plateau of Tennessee. Castanea 53: 299-302.
- Wofford, B. E. 1988. A message from the President. Castanea 53: 303-304.
- Wofford, B. E. 1989. Guide to the Vascular Plants of the Blue Ridge. University of Georgia Press, Athens. 384 pp.
- Clebsch, E. E. C., G. Walker, & B. E. Wofford. 1989. Noteworthy Collections. Castanea 54: 48-50.
- Wofford, B. E. 1989. Floristic elements of the Tennessee Blue Ridge. J. Tennessee Acad. Sci. 64: 205-207.
- Somers, P., & The Tennessee Dept. of Conservation's Rare Plant Scientific Advisory Committee (B. E. Wofford, member). 1989. Revised list of the rare plants of Tennessee. J. Tennessee Acad. Sci. 64: 179-184.
- Clements, R., & B. E. Wofford. 1991. The vascular flora of Wolf Cove, Franklin Co., Tennessee. Castanea 56: 268-286.
- Chester, E. W., & B. E. Wofford. 1992. Distribution and status of *Polytaenia nuttallii* DC., Prairie-parsley, in Tennessee and Kentucky. J. Tennessee Acad. Sci. 67: 51-54.
- Chester, E. W., & B. E. Wofford. 1992. *Scirpus fluviatilis* (Cyperaceae), new to Tennessee and the southeastern United States. Sida 15: 157-159.
- Chester, E. W., B. E. Wofford, R. Kral, H. R. DeSelm, & A. M. Evans. 1993. Atlas of Tennessee Vascular Plants. Vol. I: Pteridophytes, Gymnosperms, Angiosperms: Monocots. Misc. Publ. No. 9. The Center for Field Biology, Austin Peay State University, Clarksville, TN. 120 pp.
- Wofford, B. E., & R. Kral. 1993. Checklist of the vascular plants of Tennessee. Sida, Botanical Miscellany 10. 66 pp.
- DeSelm, H. R., B. E. Wofford, R. Kral, & E. W. Chester. 1994. An annotated list of grasses (Poaceae, Gramineae) of Tennessee. Castanea 59: 338-353.
- Chester, E. W., B. E. Wofford, L. E. McKinney, & D. Campbell. 1996. Rare and noteworthy vascular plants of the Fort Campbell Military Reservation, Kentucky and Tennessee. Sida 17: 269-274.
- Chester, E. W., B. E. Wofford, & R. Kral. 1997. Atlas of the Vascular Plants of Tennessee. Vol. II: Dicots. Misc. Publ. No. 13. The Center for Field Biology, Austin Peay State University. 240 pp.

- Tucker, A. O., M. J. Maciarello, B. E. Wofford, & W. M. Dennis. 1997. Volatile leaf oils of *Persea borbonia* (L.) Spreng., *P. humilis* Nash, and *P. palustris* (Raf.) Sarg. (Lauraceae) of North America. *J. Essential Oil Res.* 9: 209-211.
- Chester, E. W., B. E. Wofford, J. M. Baskin, & C. C. Baskin. 1997. A floristic study of barrens on the southwestern Pennyroyal Plain, Kentucky and Tennessee. *Castanea* 62: 161-172.
- Wofford, B. E. 1997. *Persea & Lindera*. **In:** Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 3+ vols. New York & Oxford. Vol. 3, pp. 27-29 & pp. 34-35.
- DeSelm, H. R., B. E. Wofford, M. E. Medley, & R. R. Haynes. 1997. Western and Central Southeastern elements in the flora of the southern Ridge & Valley. pp. 214-242. **In:** A. F. Scott, S. W. Hamilton, E. W. Chester & D. S. White (eds.). Proceeding of the Seventh Symposium on the Natural History of Lower Tennessee and Cumberland river Valleys. The Center for Field Biology, Austin Peay State University, Clarksville, TN.
- Wofford, B. E. & E. W. Chester. 1998. A comparison and reconciliation of the checklist and atlas of Tennessee vascular plants with published volumes of the Flora of North America. *Castanea* 63: 466-473.
- Wofford, B. E. Lauraceae, p. **In:** J. R. Massey, Jr. (ed.) Vascular flora of the southeastern United States. Vol. II. (accepted for publication)

ABSTRACTS:

- Wofford, B. E., & W. H. Ellis. 1968. A preliminary biosystematic study of *Erythronium americanum* Ker in the southeastern United States. *The ASB Bulletin* 15: 60; *J. Tennessee Acad. Sci.* 43: 45.
- Wofford, B. E., & D. L. Scott. 1970. The spring flora of the Big Creek Lake Biological Station, Mobile, Alabama. *Alabama Acad. Sci.* 41: 135.
- Wofford, B. E. 1974. Flavonoid studies in *Persea* (Lauraceae). *J. Tennessee Acad. Sci.* 49: 48.
- Evans, A. M., B. E. Wofford, & R. W. Pearman. 1974. An atlas of the vascular plants of Tennessee. *J. Tennessee Acad. Sci.* 49: 49.
- Wofford, B. E. 1974. A biosystematic study of *Persea* (Lauraceae) in the southeastern United States. *The ASB Bulletin* 21: 91.
- Dennis, W. M., & B. E. Wofford. 1976. Evidence for the hybrid origin of *Proserpinaca intermedia* Mackenz. (Haloragaceae). *The ASB Bulletin* 23: 54.
- Bierner, M. W., W. M. Dennis, & B. E. Wofford. 1977. Flavonoid chemistry, chromosome number and phylogenetic relationships of *Helenium chihuahuensis* (Asteraceae). *The ASB Bulletin* 24: 37.
- Wofford, B. E. 1978. External seed morphology of selected southeastern U. S. taxa of *Arenaria* (Caryophyllaceae). *The ASB Bulletin* 25: 63.
- Patrick, T. S., L. R. Phillippe, D. H. Webb, & B. E. Wofford. 1978. The vascular flora of the Savage Gulf Natural Area. *The ASB Bulletin* 25: 52.

- Wofford, B. E. 1983. A new *Lindera* (Lauraceae) from North America. The ASB Bulletin 30: 92-93.
- Wofford, B. E. 1983. Taxonomic studies of the southeastern United States species of spicebush (*Lindera*). Amer. Philosophical Soc. Yearbook. pp. 141-142.
- Wofford, B. E., & R. L. Jones. 1988. *Fimbristylis perpusilla* Harper from the Cumberland Plateau of Tennessee. The ASB Bulletin 35: 89.
- Clements, R. K., E. E. C. Clebsch, B. E. Wofford, K. R. Langdon. 1989. An exotic plant survey of the Great Smoky Mountains National Park. Poster Session, 16th Annual Natural Areas Conference.
- Wofford, B. E. 1989. Floristic elements of the Tennessee Blue Ridge. The 2nd Annual Symposium of the Natural History of the Lower Tennessee and Cumberland River Valley, Land Between the Lakes.
- Small, V., & B. E. Wofford. 1993. Vascular Flora of Pickett St. Park & Forest, Pickett Co. Tennessee. J. Tennessee Acad. Sci. 68: 41.
- Wyrick, D., & B. E. Wofford. 1993. The Vascular Flora of Gee Creek Wilderness. J. Tennessee Acad. Sci. 68:41.
- Chester, E. W., & B. E. Wofford. 1993. *Scirpus fluviatilis* (River bulrush) in Tennessee and Southeastern United States. J. Tennessee Acad. Sci. 68: 42.
- Small, V., & B. E. Wofford. 1993. Vascular flora of Pickett State Park & Forest, Pickett and Fentress counties, Tennessee. The ASB Bulletin 40: 20.
- Wyrick, D., & B. E. Wofford. 1993. Vascular flora of Gee Creek Wilderness, Tennessee. The ASB Bulletin 40: 120.
- Chester, E. W., B. E. Wofford, & R. Kral. 1994. An atlas of Tennessee Vascular Plants--Another initiative. J. Tennessee Acad. Sci. 69: 40.

GRADUATE STUDENT COMMITTEES:

- Mescall, Y. M. 1979. The bryophyte flora of Savage Gulf, Grundy Co., TN. (D. K. Smith, chm.)
- Boom, B. M. 1979. Systematic studies of the genus *Isoetes* in the southeastern United States. (A. M. Evans, chm.)
- Cunningham, M. 1983. The relationship of *Helianthus atrorubens* L. and *H. silphioides* Nutt. in Tennessee. (E. E. Schilling, chm.)
- Fusiak, F. 1983. A systematic study of the *Prenanthes roanensis* complex in the southern Appalachians. (E. E. Schilling, chm.)
- DePriest, P. T. 1983. Macrolichen flora of Unaka Mountain. (D. K. Smith, chm.)
- Feldkamp, S. 1984. Revegetation of upper elevation debris slide scars on Mt. LeConte in the GSMNP. (H. R. DeSelm, chm.)
- Huntzinger, G. 1985. The aspectual distribution of epiphytic bryophytes on yellow buckeye (*Aesculus octandra* Marsh.) along an elevational gradient. (D. K. Smith, chm.)

- Murrell, Z. 1985. The vascular flora of Big Frog Mt., Polk Co., TN. (B. E. Wofford, chm.) Ph.D., Duke University.
- Christy, C. M. 1986. A biosystematic study of the relationships of *Hieracium gronovii* L., *H. venosum* L. and *H. trallii* Greene (Compositae: Lactuceae) (E. E. Schilling, chm.)
- Panero, J. 1986. The systematics of *Viguiera* sect. *Eriophorae* (E. E. Schilling, chm.)
- Clements, R. 1987. The vascular flora of Wolf Cove, Franklin County, Tennessee (B. E. Wofford, chm.) Ph.D., University of Kentucky.
- Panero, J. 1989. A monograph of the Andean genus *Pappobolus* (Asteraceae: Heliantheae) (E. E. Schilling, chm.)
- Bhandary, H. R. 1993. White-spored Pleurotiod Fungi (Basidiomycotina) of Central Nepal (R. H. Petersen, chm.)
- Parks, D. 1993. The use of *Lemna minor* L. as assessor of water quality in the Big South Fork River, Cumberland Plateau, Tennessee and Kentucky. (C. Amundsen, chm.)
- Allawos, J. G. 1994. The vascular flora of North White Oak Creek Gorge, Scott & Fentress Cos., Tennessee (B. E. Wofford, chm.)
- Raulston, T. 1994. The reproductive ecology of *Conradina verticillata* Jennison, a rare, endemic mint of the Cumberland Plateau. (E. E. C. Clebsch, chm.)
- Hart, J. M. 1994. Impacts of nonpoint source agricultural pollution on a riparian forest community of Herrings Marsh Run watershed in Duplin County, North Carolina. (J. F. McCormick, chm.)
- Small, V. L. 1995. The Vascular flora of Pickett St. Park and Forest, Pickett Co., Tennessee (B. E. Wofford, chm.)
- Hammons, S. L. 1996. Reservoir riparian island habitats and representative arboreal species importance in Watts Bar, Tennessee. (C. Amundsen, chm.)
- Wyrick, D. L. 1996. Vascular flora of Gee Creek Wilderness, Cherokee National Forest, Tennessee. (B. E. Wofford, chm.)
- Awl, D. J. 1996. Native, vegetated wetlands in East Tennessee; priorities for preservation. (J. Frank McCormick, chm.)
- Bullington, B. C. 1997. The vascular flora of the upper Clinch River in Claiborne, Grainger, and Hancock Counties, Tennessee. (B. E. Wofford, chm.)
- Schmidt, G. J. 1998. Phylogenetic reconstruction in *Eupatorium* (Asteraceae: Eupatorieae) using ITS DNA sequences. (E. E. Schilling, chm.)

CONSULTING AND RESEARCH VITA

1989-2000

David K. Smith

David K. Smith, Associate Professor of Botany. Curator of the Bryophyte/Lichen Herbarium, Dept. of Botany, University of Tennessee, Knoxville, TN. 37996-1100
e-mail: dsmith22@utk.edu
(423) 974-2256

DEGREES:

B.A., Biology. cum laude, Humboldt State (College) University, Arcata, CA. 1969
M.A., Biology - Biology, Humboldt State (College) University, Arcata, CA. 1970
Ph.D., Botany. The University of Tennessee, Knoxville. 1974

POSITIONS HELD:

1993-2000. Associate Director. Academy for Teachers of Science and Mathematics, Office of Summer Programs, University of Tennessee, Knoxville.

1985-2000. Associate Professor of Botany, The University of Tennessee
1974-1985. Assistant Professor of Botany, The University of Tennessee
1974-1984. Associate Curator, Bryophytes and Lichens, The University of Tennessee

GRANTS AND CONTRACTS:

- 1999 RTE Bryophyte Survey of Southern Appalachian Fraser Fir Forests, North Carolina, Tennessee, and Virginia. Natural Heritage Programs, North Carolina & Tennessee. David K. Smith, Paul G. Davison, and Kenneth D. McFarland, Principal Investigators.
- 1998-1999 Arnold Engineering Development Center. Rare, Threatened, and Endangered (RTE) Nonvascular Flora and Lichen Survey for Arnold Air Force Base, Tullahoma, TN. CH2MHill, Atlanta, GA. David K. Smith, University of Tennessee, Knoxville and Paul G. Davison, University of North Alabama, Florence Principal Investigators.
- 1998-2000 Survey of Rare & Endangered Plants and Animals of Tapoco Lands. Division of Alcoa Company of America. The Nature Conservancy. Edward E. Clebsch, David K. Smith, B. Eugene Wofford, Principal Investigators.
- 1996-1997 Status of Endangered and Threatened Bryophytes of Great Smoky Mountains National Park. NBS Procurement Services Contract.
- 1996 Herbarium Proposal for Collections Improvements to TENN: Renovation, Compactors, Relocation. [Co-PI w/ B.E. Wofford and R.H. Petersen] National Science Foundation.

- 1994-1995 Bryophyte and Lichen Survey of Foothills Parkway 8B - Pittman Center to Cosby, Tennessee. Oak Ridge National Laboratory, Environmental Sciences Division, Martin Marietta Energy Systems.
- 1993-1994 Bryophyte Survey of Russell Cave National Monument, Alabama. The Nature Conservancy.
- 1993 Bryophyte Survey and Impact Assessment of Sinks/Little River, Great Smoky Mountains National Park. National Park Service.
- 1991 Bryophyte and Lichen Survey of Foothills Parkway Extension 8D - Wear Valley to Gatlinburg Spur, Tennessee. Oak Ridge National Laboratory, Environmental Sciences Division, Martin Marietta Energy Systems.
- 1990 U. S. Fish and Wildlife Service. Anchorage Fish and Wildlife Enhancement. Field Reconnaissance of Polystichum aleuticum Chr. on Atka Island, Alaska.
- 1988-1991 Development of a Taxonomic/Ecological Data Base: Report of the Floristic Richness of Bryophytes, Great Smoky Mountains National Park. Subagreement No. 14 to Cooperative Agreement CA-5460-5-8004 between United States Department of the Interior, National Park Service and The University of Tennessee.
- 1988 U. S. Fish and Wildlife Service. Anchorage Fish and Wildlife Enhancement. Field Reconnaissance of Polystichum aleuticum Chr. on Atka Island, Alaska. (Principal Investigator; contract to D. K. Smith, Field Assistant Paul G. Davison.)
- 1987-1988 U. S. Fish & Wildlife Service. Endangered Species Information System Species Workbooks, I., II. for Polystichum aleuticum Chr. in Hultén. (Compiler; contract to D. K. Smith.)
- 1987 U. S. Fish & Wildlife Service. Office of Endangered Species. Field Reconnaissance of Polystichum aleuticum Chr. on Adak Island, Alaska. (Principal Investigator; contract to D. K. Smith.)
- 1986 U. S. Fish & Wildlife Service. Endangered Species Information System Species Workbooks, I., II. for Pityopsis ruthii (Small) Small. (Co-compiler; contract to B. E. Wofford.)
- 1983-1984 Tennessee Department of Transportation; botanical survey of proposed Pellissippi Parkway Extension, Knox and Bount counties, Tennessee. (Senior staff investigator; contract to B. E. Wofford.)

PUBLICATIONS and TECHNICAL REPORTS:

- 1999 RTE Bryophyte Survey of Southern Appalachian Fraser Fir Forests, North Carolina, Tennessee, and Virginia. FINAL REPORT. Natural Heritage Programs, North Carolina & Tennessee. David K. Smith, Paul G. Davison, and Kenneth D. McFarland, Principal Investigators. 114 pp.
- 1999 Wofford, B. E., D. K. Smith, and E. E. C. Clebsch. FINAL REPORT of RT&E vascular plants and bryophytes of Tapoco Lands. Division of Alcoa Company of America.

- 1999 Davison, P. D., D. K. Smith, A. Ciegler, and Steve Layman. FINAL REPORT. A Survey for Rare, Threatened, and Endangered Nonvascular Flora and Lichens on Arnold Air Force Base, Tennessee. CH2Mhill, Atlanta, GA.
- 1998 Wofford, B. E., D. K. Smith, and E. E. C. Clebsch. Interim report of RT&E Vascular Plants and Bryophytes of Tapoco Lands. Division of Alcoa Company of America. 164 pp. in parte.
- 1998 Davison, P. D., D. K. Smith, A. Ciegler, and Steve Layman. Interim report of Rare, Threatened, and Endangered (RTE) Nonvascular Flora and Lichen Survey for Arnold Air Force Base, Tullahoma, TN.
- 1997 Renzaglia, K., K.D. McFarland, and D.K. Smith. "Anatomy and Ultrastructure of the Sporophyte of Takakia ceratophylla (Bryophyta). American Journal Botany 84(10): 1337-1350.
1995. Smith, D. K., K. D. McFarland, A. C. Risk and P. G. Davison. 1995. Bryophyte and Lichens Survey of Foothills Parkway, Segment 8B, Cosby - Pittman Center, Great Smoky Mountains National Park. Final Report of Subcontract No. 11X-SR982V. 49 pp.
1994. Smith, D. K. 1994. Funariaceae. In *The Moss Flora of Mexico*. [Eds.] A. J. Sharp, H. A. Crum, and P. Eckel. Mem. New York Bot. Garden 69: 427-442.
1994. Smith, D. K. 1994. Neckeraceae. In *The Moss Flora of Mexico*. [Eds.] A. J. Sharp, H. A. Crum, and P. Eckel. Mem. New York Bot. Garden 69: 741-766.
1993. Smith, D. K. and P. G. Davison. 1993. Antheridia and sporophytes in Takakia ceratophylla (Mitt.) Grolle: evidence for reclassification among the mosses. J. Hattori Bot. Lab. 73: 263-271.
1993. Smith, D.K. and A.C. Risk. Bryophytes of Sinks Area, Great Smoky Mountains National Park. GRSM PKG. 347; PRA-FOOT 3B16. Final Report, 15 pp.
1992. Davison, P. G. and D. K. Smith. 1992. Calycularia crispula (Hepaticae) in the Aleutian Islands and Pacific Northwest of North America. The Bryologist 95(3): 266-269.
1992. Smith, D.K. and P.G. Davison. 1992. Survey of Bryophytes and Lichens along Foothills Parkway Right-of-Way 8D. Final Report of Subcontract No. 11X-SJ208V. 15 pp. + Appendix A (5 Maps: Habitats of Special Interest 1-11) and Appendix B (Site Lists for 18 right-of-way sectors).
1991. Smith, D.K., K.D. McFarland and P.G. Davison. 1991. Development of a Taxonomic/Ecological Database: Report of the Floristic Richness of Bryophytes, Great Smoky Mountains National Park. 104 pp.
1990. Smith, D. K. 1990. Takakia, nanjamonja-goke: A reply to Dr. Hattori. The Bryological Times. Dec. 1990.
1990. Data base of Historical Floristics of Bryophytes of Great Smoky Mountains National Park: Specimen Record of TENN and DUKE and selected literature. Compiled by D. K. Smith, K. D. McFarland, P. G. Davison, M. L. Hicks. The University of Tennessee Herbarium. 5000 records (2 megabytes) on disk, plus introduction and operations documents. 1990.
1989. Smith, D. K. 1989. A Historical Sketch and Catalogue of Tennessee Mosses. Tenn. Acad. Sci. 64(3): 171-178.

Edward Ernst Cooper Clebsch, B.A., M.S., Ph.D.

CURRICULUM VITAE

PERSONAL

Professional Title and Address: Professor of Botany and Ecology, Emeritus
The University of Tennessee, Knoxville 37996-1100

Office Phone: (423) 974-2256 or 974-6209

Home Address: 5737 Fisher Lane, Greenback, Tennessee 37742-2749

Home Phone/Fax: (423) 856-3350; -0220

Born: June 6, 1929, Clarksville, Montgomery County, TN

Citizenship: U.S.A.

Social Security Number: 415-30-3397

RESEARCH INTERESTS

Appalachian floristics, communities, and ecosystems
Mountain climatology
Plant niches
Aleutian Islands floristics and biogeography
Phytoliths in paleoenvironmental reconstruction
Growth decline in forest trees
Ecology and population genetics of herbaceous perennials
Wetlands evaluation
Life history of plants
Threatened and endangered species surveys

EDUCATION

The University of Tennessee, 1947-50; 1953-55. B.A., Botany major, Geology minor.
The University of Tennessee, 1955-57. M.S., Botany major, Zoology minor.
Thesis Title: The summer season climatic and vegetational gradient between Point Barrow and Meade River, Alaska.
Duke University, 1957-60. Ph.D., Botany Major, Soils minor (N. C. State).
Dissertation Title: Comparative morphological and physiological variation in Arctic and alpine populations of *Trisetum spicatum*.

Postdoctoral Training and Employment:

Research Associate, Department of Botany, University of Tennessee, 1960-63.
Participant, NSF-ORINS Summer Institute in Radiation Ecology, 1962.
Director for ORINS, Summer Institute in Radiation Ecology, 1963, 1964.
Assistant Professor of Botany, The University of Tennessee, 1963-66.
Associate Professor of Botany, The University of Tennessee, 1966-75.
Participant, NSF Summer Institute in Mathematics for College Biology Teachers, University of Montana, Summer 1970.
Visiting Associate Professor of Botany, University of Montana, Summer 1971.
Professor of Botany and Ecology, The University of Tennessee, 1975-94.
Professor of Botany and Ecology, Emeritus, The University of Tennessee, 1994-present
Participant in a 5-day wetlands delineation course, May 1996.

SPONSORED RESEARCH PROJECTS

External:

1. AEC Contract: Vegetation Studies Related to Movement of Radioactive Wastes, 1962-63.
2. National Park Service: Factors Related to the Formation and Maintenance of Balds of the Great Smoky Mountains National Park, 1965-68.
3. Union Carbide Nuclear Corporation: Service subcontract for the collection, preservation, and processing of plant and soil samples, 1965-75.
4. Tennessee Game and Fish Commission: The Present and Potential Use of Grasses by Tennessee Game Animals, 1969.
5. Battelle Memorial Institute: The Plant Ecology of Amchitka Island Supplementary Test Site, 1967-68.
6. NSF: Equations of Chemical Cycles in Southern Appalachian Forests and Contrasting Ecosystems, 1967-69.
7. AEC Contract (co-investigator): Re-vegetation Processes on Amchitka Island, Alaska, 1971-74.
8. USFS: Characteristics, Preferences, and Attitudes of Users of the Appalachian Trail, 1968-70.
9. Union Carbide Nuclear Corporation: Collection and synthesis of primary and secondary data for basic ecosystem research, 1972-76.
10. US Forest Service: A critique of unit planning activities in the Southern Region, 1972-73.

11. Rahenkamp, Sachs, Wells and Associates: A study of the terrestrial ecology of the Paintsville and Lake projects, eastern Kentucky, for purposes of environmental planning, 1973-75. Yate
12. US Forest Service: Plant Communities in Relation to Topographic Factors, Forest Vegetation and Site Relations in the Unaka Range, 1981-87. \$54,000. Cooperative Agreements.
13. US EPA: Effects of gaseous pollutants acid moisture, and balsam woolly aphids on Fraser fir in the Southern Appalachians, 1984-87. \$100,236. Grant.
14. National Park Service: A Survey of Exotic Plants in the Great Smoky Mountains National Park, 1986-88. With B. E. Wofford. \$34,600. Contract.
15. Tennessee Department of Conservation: Field Surveys of Tennessee coneflower habitats and populations, 1987-88. \$10,420. Contract.
16. Southern Regional Education Board: Was *Thuja occidentalis* L. native to North Carolina? 1987-88. \$750. Grant.
17. Great Smoky Mountains National Park: Re-survey of wild hog impacts on Great Smoky Mountains National Park, 1988. \$9,250. Contract.
18. Tennessee Department of Conservation: Tennessee Coneflower Population Studies, 1989. \$2,000. Contract.
19. Tennessee Department of Conservation: Tennessee Coneflower in the Central Basin of Tennessee. 1990-91. \$7617. Contract.
20. Tennessee Department of Conservation: The quantitative natural history of Ruth's Golden-aster, 1990-91. \$5176. Contract.
21. Hesler Foundation: The floristics of northern white cedar stands in Tennessee, 1990-91. \$4600.
22. Tennessee Department of Environment and Conservation: Implementing Recovery Plans for Tennessee Coneflower and Ruth's Golden Aster, 1/1/92-3/31/93. \$23,267. Contract.
23. The Nature Conservancy. Botanical and Ecological Studies at Arnold Air Force Base, Tennessee. 4/15/93-4/14/95. \$33,815. Contract.
24. USDA Forest Service. Phytoliths in soils of the Daniel Boone National Forest, Kentucky, 10/1/94-9/30/95. \$5,000. Matching Challenge Grant. Contract.
25. The Nature Conservancy. Endangered species survey on Tapoco lands in Tennessee and North Carolina. 1/1/98-12/31/99. \$56,703. Contract. Supplements through Dec. 2000. ca. \$60,000.

University of Tennessee, Knoxville, Research Incentive Awards and Faculty Development Awards:

1. 1983 Carter, Rehder, Clebsch. For the purchase and installation of a computer graphics workstation to support research in digital cartography and remote sensing of the environment. \$10,000.
2. 1983 Clebsch. For equipment and supplies with which to initiate phytolith research. \$3,700.
3. 1988 Clebsch. To attend the 3rd North American phytolith workshop and to attend a 5-day training course in phytolith analysis. \$2,000.

HONORS

- 1978 Shared Association of Southeastern Biologists' Research Award with graduate student Robert E. Gant.
- 1989 Faculty Research Award, Association of Southeastern Biologists.
- 1990 Community Outreach Service Award, College of Liberal Arts, The University of Tennessee, Knoxville.
- 1992 Bartholomew Service Award, Southern Appalachian Botanical Society.
- 1998 Meritorious Teaching Award, Association of Southeastern Biologists.

MEMBER OF THE FOLLOWING ORGANIZATIONS

- American Association for the Advancement of Science (Fellow since 1963)
- American Institute of Biological Sciences

Association of Southeastern Biologists
Ecological Society of America
Southern Appalachian Botanical Society
Tennessee Citizens for Wilderness Planning (Life)
Tennessee Native Plant Society
The Wilderness Society
Georgia Botanical Society
Georgia Native Plant Society
Tennessee Nursery and Landscape Association
American Nursery and Landscape Association

SERVICE

Professional Organizations:

Member, Conservation Committee, Smoky Mountain Hiking Club, 1964-81
Member, Education Committee, Botanical Society of America, 1965-68
Member, State Parks Committee, Tennessee Citizens for Wilderness Planning, 1968-75
Chairman, Natural Areas Committee, Tennessee Citizens for Wilderness Planning, 1969-72
Member, Climatic Studies Committee, Southern Regional Forest Environment Research Committee, 1968-70
Chairman, Conservation Committee, Association of Southeastern Biologists, 1967-72
Chairman, Activities Committee, Southeastern Section, Botanical Society of America, 1967-70
Chairman, Natural Areas Committee, Kentucky-Tennessee Section, Society of American Foresters, 1966-70
Member, Conservation Committee, Botanical Society of America, 1973
Chairman, Conservation Committee, Botanical Society of America, 1974
Member, Executive Committee, Association of Southeastern Biologists, 1972-75
Chairman, Ecological Section, Botanical Society of America, 1979
Chairman, Outreach Committee, Southern Appalachian Botanical Club, (*nee* Society), 1985-92
Chairman, Nominations Committee, Southeastern Chapter, Ecological Society of America, 1988
Chairman, Odum Award Committee, Southeastern Chapter, Ecological Society of America, 1988
Member, Resolutions Committee, Association of Southeastern Biologists, 1987-88
Member, Conservation Committee, Botanical Society of America, 1990-92.
Member, Faculty Research Award Committee, Association of Southeastern Biologists, 1990-91.
Member, Tennessee Protection Planning Committee, 1990-91.
Member, Steering Committee, The Cullowhee Conference on Landscaping with Native Plants, 1987-present.
Vice-chairperson, Historical Section, Botanical Society of America, 1990.
Chairperson, Historical Section, Botanical Society of America, 1991.

University of Tennessee:

Liberal Arts College, A.B.-B.S. Curriculum Committee, 1968-71
Liberal Arts College, Committee on Committees, 1971-74
Liberal Arts College, Honors Committee, 1975-78
Liberal Arts College Scholarship Committee, 1980-83
Faculty Senate University Curriculum Committee, 1966-69
Member, University Senate, 1971-74
University Senate Phi Kappa Phi Lectureship Committee, 1972
Numerous Departmental committees, including curriculum, admissions, and graduate committees
Numerous graduate student committees
Chair, Admissions Committee, Graduate Program in Ecology, 1975-1986
Member, Admissions Committee, Graduate Program in Ecology, 1986-1994
Member and Chair Pro-Tem, Botany Department Development Committee through 1994

Other department and program committee service--notably, UT's representative on the Wildflower Pilgrimage Committee for 25 years and chair of Botany Department Wildflower Pilgrimage Committee through 1994

Botany Department Graduate Coordinator, 1984-85

Member, Steering Committee, UT Cooperative Park Studies Unit, 1991-1992

Frequent guest lecturer in courses in architecture, planning, and forestry in other departments

Community:

Episcopal Church of Ascension, Vestryman, 1963-66

Episcopal Chapel of St. Michael and All Angels, Vestryman, 1966-70

Episcopal Chapel of St. Michael and All Angels, Senior Warden, 1968-70

Member, Department of College Work, Episcopal Diocese of Tennessee, 1965-75

Knoxville Region Planning Commission, Episcopal Church, 1969

Danforth Foundation Faculty Associate, 1967-90

Member, Greater Knoxville Chamber of Commerce Committee on Environment, 1970

Member, Rural Preservation Work Group, Nine Counties-One Vision, 2000

Alternate member, Advisory Board, U.S. Forest Service's Land Between The Lakes

Consultantships:

U.S. Geological Survey, 1964

Battelle Memorial Institute, 1967

Union Carbide Nuclear Corporation, 1965-75

National Science Foundation, 1968, 1994

Oliphant and Kersey, Landscape Architects, 1966-70

U.S. Forest Service, 1972

National Park Service, 1972, 1980, 1981

Rahenkamp, Sachs, Well and Associates, 1973-75

Westinghouse Corp., 1974-75

Energy Research and Development Administration, 1976

David H. Adams Consulting Engineers, 1976

Bowaters Paper Co., 1976

Copper Division Southwire Company, 1981-1992

Lyons/Zaremba Inc., 1988-1993

Clinch River Environmental Studies Organization, 1988-present

ERCE Environmental and Energy Services, Inc., 1990-91

Ogden Environmental and Energy Services, Inc., 1991-1997

McCaren Designs of Minneapolis, 1991

Citizens Alliance to Protect the Environment, April 1992

Pennington and Associates, Inc., 1993-present.

The McDonald Company, 1995-present

The Charleston Aquarium, 1998-present

EMPE, Inc., 1999

STEP, Inc., 2000

Normandeau and Associates, Inc., 2000

TETRA TECH, INC., 2000

Projects Carried out for ERCE:

Wetlands Assessment and Evaluation:

Carter Valley (Kingsport), Tennessee, November 1990

Fort McClellan, Alabama, November 1991

Threatened and Endangered Species Surveys:

Tennessee River Pulp and Paper Company, Landfill Extension, Hardin County, Tennessee, October 1990
Carter Valley (Kingsport), Tennessee, Landfill Extension, November 1990
Spicewood Hollow Landfill, Davidson County, Tennessee, November 1990 and April 1991
U. S. Highway 64 Right of Way Re-alignment, Polk County, Tennessee, March-November 1991
Middle Point Landfill Extension, Rutherford County, Tennessee, April 1991
Mill Creek Sewer Line, Nashville, Tennessee, May 1996
Carter Community Landfill, Knox County, Tennessee, May 1991
Metal Resources Company Landfill, Loudon County, Tennessee, July 1991
Holston Army Ammunition Plant Landfill, Hawkins County, Tennessee, July 1991
Cocke County, Tennessee, Landfill Extension, August 1991

Projects carried out for Ogden Environmental and Energy Services, Inc.

Wetland survey and endangered species survey, Redstone Arsenal, AL, January 1992

Endangered species survey and vegetation mapping, Ferrell Cooper Mining Co., Webb Co., Texas, August 1992, March 1993

Endangered species survey, U.S. Army Tank Training Base, Schweinfurt, Germany, May 1994

Wetland survey and endangered species survey, Owens-Corning Glass Co., Jackson, TN, June 1992

Endangered species survey, Proposed Beville Dam Project, Forsyth Co., AL, July 1992

Endangered species survey, Scepter Aluminum Recycling Co., Knox Co., Indiana, April 1994

Endangered species survey, three highway projects in Louisville and one in Powell and Montgomery counties, Kentucky, July 1994

Wetland survey, Sequatchie Valley Coal Co., Cumberland Plateau lands in Tennessee, September-November 1994

Endangered species survey, U.S. surface mine control agency, Cumberland Plateau abandoned mine lands, northwest Georgia, February 1995

Co-taught a 2 ½-day Wetlands Awareness course to TVA personnel 6 times

Projects carried out for The McDonald Company:

Adaptation of a hydrogeomorphic model for riverine wetlands in western KY to Ft. Campbell, KY

Numerous endangered species surveys

Vegetation sampling for development of a habitat suitability model for greater prairie chicken, Ft. Campbell, KY

Projects carried out for STEP, Inc.

An endangered species survey and a plant community survey at Ft. Campbell, KY

Projects carried out for Normandeau, Inc.

Recruitment of specialists for appraising priority habitats on four river impoundments as part of relicensing of hydro power projects for a division of Alcoa and plant community classification of those habitats

Projects carried out for TETRA TECH, INC.

Endangered species survey of the Holston Army Ammunition Plant, Kingsport, TN, 2000

Outside Reviewer of Research Proposals for:

National Science Foundation

Atomic Energy Commission

U.S. Environmental Protection Agency

Kentucky State Government

Manuscripts Reviewed for:

American Journal of Botany

Castanea

Ecology

Forest Science

Science

Bulletin, Torrey Botanical Club

Ecological Monographs

Holt, Rinehart and Winston Company

American Naturalist

Journal of the Tennessee Academy of Science

Prentice-Hall, Inc.

Systematic Botany

Natural Areas Journal
Advances in Archaeology and Museum Science
Worth Publishers, Inc.
The University of Tennessee Press

Officer in the Following Organizations:

University of Tennessee Arboretum Society, Vice-President, 1966
University of Tennessee Arboretum Society, President, 1967
Knoxville Science Club, Secretary-Treasurer, 1963
Tennessee Citizens for Wilderness Planning, Vice-President, 1971
Southern Appalachian Botanical Club, President, 1974
Tennessee Citizens for Wilderness Planning, President, 1977, 1978
Tennessee Native Plant Society, Vice-President, 1981
Big South Fork Foundation, Interim President, 1990

COURSES TAUGHT

Undergraduate:

Freshman: Botany
Honors: Freshman Botany
Sophomore: General Ecology
Junior: Field Botany (Local Flora), Winter Field Botany, General Ecology
Senior: Plant Ecology, Field Identification of Woody Plants

Graduate:

Field Methods in Plant Ecology, Community Ecology

Graduate Seminars:

Theoretical Ecology	Resource Economics and Ecology
Production and Mineral Cycling	Multivariate Methods in Ecology
Principles of Ecology	Ecology and Population Genetics of Rare Plants

University Honors:

Courses in environmental science and in land use decisions

Smoky Mountains Field School:

Helped organize it in 1977, and have taught in it every year--one-day, two-day and five-day intensive workshops on various aspects of Smoky Mountains natural history

PUBLIC SPEAKING

Much! Includes talks to lay groups, conservation organizations, and professional societies; testimony before state and federal legislative committees, and court testimonies as an expert witness.

AWARDS

- 1972, 1979, 1989. Research Award, Association of Southeastern Biologists.
1990. Community Outreach Service Award, College of Liberal Arts, University of Tennessee.
1992. Bartholemew Service Award, Southern Appalachian Botanical Society.

OTHER

- Seasonal Naturalist, Great Smoky Mountains National Park, Summer 1955
Several seasons as in-service training resource person, NPS naturalists and Tennessee park naturalists
Resident naturalist, Snowbird Mt. Lodge, one week in each of five years since 1993

THESES, DISSERTATIONS, AND POSTDOCTORALS

- Mary Ellen Bruhn MacDonald (M.S. 1964). "Vegetational succession on three grassy balds in the Great Smoky Mountains." Deceased.
- James B. Kring, Jr. (M.S. 1966). "Vegetational succession at Craggy Gardens, North Carolina." Now teaching at Roane State Community College.
- A. Leon Bates (M.S. 1967). "Stand characteristics, growth, and wood properties associated with soil-site characteristics of mixed species plantations on the Central Peninsula, Tennessee." Now retired from the Office of Natural Resources, TVA.
- James A. Wolfe (Ph.D. 1967). "Forest soils characteristics as related to vegetation and bedrock in the spruce-fir zone of the Great Smoky Mountains." Retired from USDA, Agricultural Research Service.
- Dr. Clifford Amundsen (Ph.D., Univ. of Colorado, 1967). Postdoctoral research associate, studying the terrestrial ecology of Amchitka Island, Alaska. Now Associate Professor of Botany and Ecology, University of Tennessee, Knoxville.
- Stephen W. Radford (M.S. 1968). "Factors involved in the maintenance of the grassy balds of the Great Smoky Mountains National Park." Location unknown.
- Caroline Wingfield (M.S. 1968). "The ecology of *Pieris floribunda* Benth. & Hook., an ericad, in a pine-heath community in the Great Smoky Mountains." Location unknown.
- H. L. Ragsdale (M.S. 1964). "The effects of varying temperatures and light intensities on the growth rate and morphological characteristics of *Dictyosphaerium pulchellum* wood."

(Ph.D. 1968). "The effects of biotic complexity and fast neutron radiation on cesium-137 and cobalt-60 kinetics in aquatic microcosms." Now Professor of Biology, Brevard College, North Carolina.
- Robert Rusk (M.S. 1968). "Interception of precipitation by forest stands." Now self-employed as a consulting forester.
- Gary R. Sandberg (M.S. 1969). "Internal distribution and loss from roots by leaching of cesium-137 inoculated into *Liriodendron tulipifera* L. seedlings grown in sand culture." Now employed in industry.
- Robert Beihn (M.S. 1969). "Sources and environmental influence for polonium concentration in tobacco, *Nicotiana glutinosa*." Location unknown.
- Luther A. Stephens (M.S. 1969). "A comparison of climatic elements at four elevations in the Great Smoky Mountains." Engineer with Martin Marietta Co., Oak Ridge, TN.
- Robert E. Gant (M.S. 1971). "The allelopathic influences of *Sassafras albidum* in old field succession in Tennessee."

(Ph.D. 1978). "The role of allelopathic influences in the maintenance of southern Appalachian heath balds." Self-employed environmental consultant.

- Judith B. Murray (M.S. 1972). "The Appalachian Trail users in the southern national forests--their characteristics, attitudes and management preferences." Director, Southern Appalachian Highlands Conservancy.
- Curtis J. Richardson (Ph.D. 1972). "The use of stomatal resistance, photopigments, nitrogen, water potential, and radiation to estimate net photosynthesis in *Liriodendron tulipifera* L.--a physiological index." Now Professor, School of the Environment, Duke University.
- Tracy Cox (Ph.D. 1972). "Seasonal dynamics of root production, turnover, and nutrient cycles in *Liriodendron* seedlings grown on three soil types." Now Scientist, University of Tennessee Environmental Center.
- John Reynolds (Ph.D. 1973). "The Lumbricidae (Annelida, Oligochaeta) of Tennessee." Now self-employed.
- Mike Kelly (Ph.D. 1973). "The effect of urea and triple-superphosphate fertilizers on the decomposition and mineralization of deciduous forest litter." Now with University of Kansas.
- Elizabeth E. Howard (M.S. 1973). "Interactions between white-tailed deer and habitat on the Ft. Rucker Army Aviation Center Reservation, Alabama." Now Regional Forester, U.S.D.A. Forest Service, Atlanta, GA.
- Tom Grizzard (M.S. 1975). "Seasonal nutrient dynamics of foliage and litterfall on the Walker Branch Watershed, a deciduous forest ecosystems." Now with Energy Division, Oak Ridge National Laboratory.
- Dennis McCarthy (Ph.D. 1976). "Numerical techniques for classifying the forest vegetation of the Tennessee Valley." Now with The University of Tennessee.
- Raymond McCord (M.S. 1976). "The application of r- and k-selection concepts to herbaceous plants." (Ph.D. 1980). "Biogeography of the vascular flora on islands in the Bering Sea Region." Now Scientist, Environmental Sciences Division, Oak Ridge National Laboratory.
- Robert D. Fuller (M.S. 1977). "Why does spruce not invade the high elevation beech forests of the Great Smoky Mountains?" Now Professor of Biology, SUNY, Plattsburg.
- Clinton V. Kellner (M.S. 1978). "Are pollinators exerting selection pressure on the azalea hybrids on Gregory Bald?" Now Ecologist with environmental consulting firm, California.
- Mark Whitten (M.S. 1979). "Pollination ecology of *Monarda didyma* L., *M. clinopodia* L. and hybrids in the Southern Appalachian Mountains." Location unknown.
- Mark E. Harmon (M.S. 1980). "Influence of fire and site factors on vegetative pattern and process: A case study of the western portion of Great Smoky Mountains National Park." Now Forest Science Laboratory, Oregon State University.
- Timothy Wayne Sipe (M.S. 1980). "Indices of forest compositional change based on linear regressions of species size class distributions." Now Professor of Biology, Gustavus Adolphus College, Minnesota.

- Anne Smith Stocum (M.S. 1980). "Natural vegetation and its relationship to the environment of selected abandoned coal surface mines in the Cumberland Mountains of Tennessee." Now employed with Cornell University Laboratory of Ecology.
- Noel Bruce Pavlovic (M.S. 1981). "An examination of the seed rain and seed bank for evidence of seed exchange between a beech gap and a spruce forest in the Great Smoky Mountains." Location unknown.
- Kevin Horst (M.S. 1981). Non-thesis option. Location unknown.
- F. Owen Hoffman (Ph.D. 1981). "Environmental behavior of technetium in soil and vegetation: Implications for radiological impact assessment." Now Self-employed Consultant in Risk Assessment.
- Richard T. Busing (M.S. 1981). "Regeneration strategies of plants colonizing annually disturbed soil in northern Florida."

(Ph.D. 1985). "Gap and stand dynamics of a Southern Appalachian spruce-fir forest." Now USDA Forest Service, Forest Science Lab, Oregon State University.
- John R. Shutt (M.S. 1982). Non-thesis option. Location unknown.
- Ragan M. Callaway (M.S. 1983). "Prediction of growth in classified forest stands in the western Great Smoky Mountains National Park. Now Associate Professor of Botany, University of Montana.
- Rufus Morison (Ph.D. 1984). "The acute sublethal effects of the pesticides, carbaryl and malathion on partial ethograms of the yellow bullhead (*Ictalurus natalis* Lesueur)." Presently with Office of Toxic Substances, USEPA, Washington, D.C.
- Jerry L. Faulkner (M.S. 1987). "The use of prescribed burning for managing natural and historic resources in the Chickamauga and Chattanooga National Military Park."

(Ph.D. 1994). "Chlorophyll Fluorescence as a measure of ozone-induced stress." Now Associate Professor of Biology, Chattanooga State Technical Community College, Chattanooga, TN.
- Gary L. Walker (Ph.D. 1987). "The ecology and population biology of *Thuja occidentalis* L. in its southern disjunct range." Now Professor of Biology, Appalachian State University, Boone, North Carolina.
- Eric F. Pauley (M.S. 1989). "Does *Rubus canadensis* interfere with the growth of Fraser fir seedlings?"

(Ph.D. 1993). "The influence of episodic reproduction by red spruce on long-term forest dynamics in the Cranberry Wilderness, West Virginia." Now Assistant Professor of Biology, Carolina Coastal University.
- Mark Drew (M.S. 1991). "The role of Tennessee coneflower, *Echinacea tennesseensis*, in its native habitat: the vegetation and a demographic analysis. Now Director, GAP Project, Commonwealth of KY.

Rebecca Ann Cook (Ph.D. 1993). "The population biology and demography of *Cimicifuga rubifolia* Kearney and the genetic relationships among North American *Cimicifuga* species." Now Assistant Professor of Biology, Lambuth College, Jackson, TN.

John C. Rodgers, III (M.S. 1994). "Modern pollen rain in Costa Rica." Location unknown.

T'ai Honda Roulston (M.S. 1994). "Reproductive ecology of (*Conradina vesticillata* Jennison, a rare, endemic mint of the Cumberland Plateau." Now postdoctoral research associate, North Carolina State University.

Edward Maclin (M.S. 1994). "Responses of the Tennessee coneflower, *Echinacea tennesseensis* (Small) Beadle to various management treatments." Now Brooklyn Botanical Garden, NY City.

Steven Alex Sloan (M.S. 1994). "Allozyme variation within and between populations of Ruth's Golden Aster, *Pityopsis ruthii* (Small)." Now Ph.D. Student, University of Puerto Rico.

John M. Young (M.S. 1995). "The cliff side ecology and genetic structure of northern white cedar (*Thuja occidentalis* L.) in its southern disjunct range." Now employed in industry.

Totals: M.S.--32; Ph.D.--17; Postdoctoral Trainees—2.

REFERENCES

Dr. David Reichle, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Dr. Edward E. Schilling, Department of Botany, The University of Tennessee, Knoxville

Mr. R. W. Wicker, Principal, eCATS, 6317 Glendale Community Rd., Greenback, TN 37742-2815
(865) 986-6397. wicker.env@worldnet.att.net

EDWARD E. C. CLEBSCH

BIBLIOGRAPHY

- 1954 Clebsch, Edward E. C. Geobotanical prospecting in southeastern Utah. *J. Tenn. Acad. Sci.* 29(3): 131. (Abstract)
- 1956 Clebsch, Edward E. C. and V. C. Gilbert. Observations on drought damage to woody species on a selected site in the Great Smoky Mountains National Park. *J. Tenn. Acad. Sci.* 32(2): 129. (Abstract)
- 1957 Clebsch, Edward E. C. Variation in spore size in three selected species of mosses. *J. Tenn. Acad. Sci.* 32(3): 126. (Abstract)
- 1957 Clebsch, Edward E. C. The summer season climatic and vegetational gradient between Point Barrow and Meade River, Alaska. M.S. thesis, University of Tennessee.
- 1960 Clebsch, Edward E. C. Comparative morphological and physiological variation in arctic and alpine populations of *Trisetum spicatum*. Ph.D. dissertation, Duke University.
- 1960 Clebsch, Edward E. C., H. A. Mooney and W. D. Billings. Photosynthesis and respiration measurements on alpine plants under field conditions. *Bull. Ecol. Soc. America* 41(3): 77. (Abstract)
- 1960 Clebsch, Edward E. C. and W. D. Billings. Physiological and morphological variation in the *Trisetum spicatum* complex. *Bull. Ecol. Soc. America* 41(3): 77. (Abstract)
- 1961 Clebsch, Edward E. C. Physiological and morphological variation in the grass *Trisetum spicatum*. *J. Tenn. Acad. Sci.* 36(2). (Abstract)
- 1961 Clebsch, Edward E. C. Weight and volume characteristics of selected species of southeastern trees. *Assoc. Southeastern Biol. Bull.* 8(2): 22. (Abstract)
- 1961 Billings, W. D., H. A. Mooney and Edward E. C. Clebsch. Effect of low carbon dioxide concentrations on apparent photosynthesis of alpine and sea-level races of *Oxyria digyna*. *Science* 133(3467): 1834.
- 1962 Shanks, R. E. and Edward E. C. Clebsch. Computer programs for the estimation of forest stand weight and mineral pool. *Assoc. Southeastern Biol. Bull.* 9(2): 31. (Abstract)
- 1962 Shanks, R. E., Edward E. C. Clebsch and H. R. DeSelm. Estimates of weight, mineral pool, and flux of material in Appalachian ecosystems. *Assoc. Southeastern Biol. Bull.* 9(2): 31. (Abstract)
- 1962 Clebsch, Edward E. C. Biogeochemical cycling in regional ecosystems. I. Approach and methodology. *J. Tenn. Acad. Sci.* 37(2). (Abstract)
- 1962 Shanks, R. E. and Edward E. C. Clebsch. Computer programs for the estimation of forest stand weight and mineral pool. *Ecology* 43(2): 339-341.

- 1962 McCracken, R. J., R. E. Shanks and Edward E. C. Clebsch. Soil morphology and genesis at higher elevations of the Great Smoky Mountains. *Soil Science Soc. America Proc.* 26(4): 384-388.
- 1963 Clebsch, Edward E. C. and H. R. DeSelm. Vegetation studies related to movement of radioactive wastes. Complete Scientific Report, Contract AT 40-1-(2077)AEC.
- 1966 Billings, W. D., H. A. Mooney and Edward E. C. Clebsch. Photosynthesis and respiration rates of Rocky Mountain alpine plants under field conditions. *American Midland Naturalist* 75(1): 34-44.
- 1968 Clebsch, Edward E. C. Recent vegetation studies in eastern Tennessee. *Assoc. S. E. Biol. Bull.* 15(3): 72. (Abstract)
- 1968 Clebsch, Edward E. C. and R. E. Shanks. Summer climatic gradients and vegetation near Barrow, Alaska. *Arctic* 21(3): 161-171.
- 1969 Clebsch, Edward E. C., Ann W. Freeman, A. M. Craig, Jr. and H. Vardis. FORSTAN: A computer program for estimating forest stand dry weight and mineral content. pp. 156-158. *In: Progress in Terrestrial and Freshwater Ecology*, reprinted from *Health Physics Division Annual Progress Report for Period Ending July 31, 1968*. Publication No. 250, Radiation Ecology Section. ORNL-4316-Excerpt. January 1969.
- 1969 Clebsch, Edward E. C. Make a pilgrimage to the Smokies. *Tennessee Conservationist* 35(4): 23-24.
- 1969 Clebsch, Edward E. C. and C. A. Amundsen. Vegetation and landscape processes on Amchitka Island, Alaska. *Assoc. S. E. Biol. Bull.* 16(2): 73.
- 1970 Ragsdale, H. L. and Edward E. C. Clebsch. Temperature and light intensity effects on growth of *Dictyosphaerium pulchellum*. *Amer. Jour. of Bot.* 57(2): 234-238.
- 1970 Clebsch, Edward E. C. The campus teach-in on the environmental crisis-1970. *The Living Wilderness* 34(109): 10-12.
- 1970 Wingfield, Caroline T. and Edward E. C. Clebsch. The ecology of *Pieris floribunda* Benth. and Hook., in a pine-heath community in the Great Smoky Mountains. *A. S. B. Bull.* 17(2): 71. (Abstract)
- 1970 Ritchie, J. C., W. K. Rudolph and Edward E. C. Clebsch. Distribution of fallout and natural gamma radionuclides in litter, humus and surface mineral soil layers under natural vegetation in the Great Smoky Mountains, North Carolina-Tennessee. *Health Physics* 18(May): 479-489.
- 1970 Clebsch, Edward E. C. and R. Kriess. Give earth a chance. *The Tennessee Alumnus* 50(3): 5-6.
- 1971 Clebsch, Edward E. C. and A. M. Evans. A need for floristic and vegetation studies in the gorges of the Cumberland Plateau. *A.S.B. Bull.* 18(2): 33. (Abstract)
- 1971 Amundsen, C. C. and Edward E. C. Clebsch. Dynamics of the terrestrial ecosystem vegetation of Amchitka Island, Alaska. *BioScience* 21(12): 619-623.

- 1973 Beavers, J. R., C. W. Hensley, J. G. Byrne, J. H. Jenkins and Edward E. C. Clebsch. Opportunities for resource management . . . an ecological analysis. A report from the U. S. Forest Service to the U. S. Atomic Energy Commission, Savannah River Plant. 28 p.
- 1974 DeSelm, H. R., G. M. Nichols, E. Thor and Edward E. C. Clebsch. Response of herbs, shrubs and tree sprouts in prescribed-burn hardwoods in Tennessee. Proc. Tall Timbers Fire Ecology Conference 13: 331-344.
- 1974 Reynolds, J. W., Edward E. C. Clebsch and W. M. Reynolds. Contributions to North American earthworms (Oligochaeta) No. 13: The earthworms of Tennessee (Oligochaeta). I. Lumbricidae. Bulletin No. 17, Tall Timbers Research Stations. 133 p.
- 1975 Gant, R. E. and Edward E. C. Clebsch. The allelopathic influences of *Sassafras albidum* in old field succession in Tennessee. Ecology 56(3): 604-615.
- 1976 Billings, W. D. and Edward E. C. Clebsch. Seed germination and vivipary from a latitudinal series of populations of the arctic-alpine grass *Trisetum spicatum*. Arctic and Alpine Research 8(3): 255-262.
- 1976 Grizzard, T., Edward E. C. Clebsch, G. S. Henderson and D. E. Reichle. Seasonal nutrient dynamics of foliage and litterfall on Walker Branch Watershed, a deciduous forest ecosystem, ORNL/TM-5254. National Technical Information Service, Springfield, VA. 140 p.
- 1976 Clebsch, Edward E. C. Preliminary estimates of bird population densities in Johnson, Lawrence, and Morgan counties, Kentucky. The Kentucky Warbler 52: 23-30.
- 1978 Gist, C. S., R. McCord, D. Wilkin, D. Dietz and Edward E. C. Clebsch. A handbook for the development of terrestrial monitoring programs for coal mine reclamation. ORAU 144. Oak Ridge Associated Universities, Oak Ridge, Tennessee. 207 pp.
- 1982 Singer, F. J., Wayne T. Swank and Edward E. C. Clebsch. Some ecosystem responses to European wild boar rooting in a deciduous forest. Research/Resources Management Report No. 54. USDI National Park Service. Atlanta, GA. 31 pp.
- 1983 Busing, Richard T. and Edward E. C. Clebsch. Species composition and species richness in first-year old fields: Responses to season of soil disturbance. Bulletin of the Torrey Botanical Club 110(3): 304--310.
- 1984 Singer, F. J., Wayne T. Swank and Edward E. C. Clebsch. Some ecosystem responses to European wild boar rooting in a deciduous forest. Journal of Wildlife Management 48(2): 464-473.
- 1986 Crites, G. and Edward E. C. Clebsch. Analysis of some forest communities of the Inner Nashville Basin, Maury County, Tennessee. Association of Southeastern Biologists Bulletin 33(4): 167-177.
- 1987 Callaway, R. M., Edward E. C. Clebsch and P. S. White. A multivariate analysis of forest communities in the western Great Smoky Mountains National Park. American Midland Naturalist 118(1): 107-120.

- 1987 Busing, R. and Edward E. C. Clebsch. Development and application of a spruce-fir forest succession model. *Forest Ecology and Management* 20: 151-169.
- 1988 Busing, R. and Edward E. C. Clebsch. Fraser fir mortality and dynamics of a Great Smoky Mountains fir-spruce stand. *Castanea* 53: 177-182.
- 1988 Busing, R., Edward E. C. Clebsch, C. C. Eagar and E. F. Pauley. Two decades of change in a Great Smoky Mountains spruce-fir forest. *Bulletin Torrey Botanical Club* 115: 25-31.
- 1989 Clebsch, Edward E. C., Gary L. Walker and B. Eugene Wofford. Noteworthy Collections. *Castanea* 54: 48-50.
- 1989 Clebsch, Edward E. C. and Richard T. Busing. Secondary succession and community structure in a Southern Appalachian mesic cove forest. *Ecology* 70(3): 728-735.
- 1989 Callaway, R. M., Edward E. C. Clebsch and P. S. White. Prediction of wood production in canopy trees in forest communities in the western Great Smoky Mountains National Park. *Forest Science* 35(2): 338-348.
- 1989 Clebsch, Edward E. C. Renascent phytoliths, a review of Piperno, Dolores. 1988. *Phytolith Analysis: A geological and archaeological perspective*. *Ecology* 70(3): 792.
- 1989 Clebsch, Edward E. C. Vegetation of the Appalachian Mountains east of the Great Valley, pp. 79-83. In: Chester, E. W., Ed. *The vegetation and flora of Tennessee*. Proceedings of a symposium sponsored by the Austin Peay State University Center of Excellence for Field Biology of Land Between The Lakes, The Tenn. Acad. of Science, and TVA-LBL, held at Brandon Springs, Tennessee, 3 March 1989. *J. Tenn. Acad. Sci.* 64, No. 3.
- 1989 Faulkner, Jerry, William L. Sanders, and Edward E. C. Clebsch. Use of prescribed burning for managing natural and historic resources in the Chickamauga and Chattanooga National Military Park, USA. *Environmental Management* 13(5): 603-612.
- 1989 Book review. W. H. and M. B. Duncan. 1988. *Trees of the Southeastern United States*. University of Georgia Press, Athens. xi + 322 p. *Tennessee Librarian* 41(3): 27-28. Summer 1989.
- 1990 Book review. Smith, Richard M. 1989. *Wild Plants of America*. John Wiley & Sons, NY. 267 p. *ASB Bulletin* 37(2): 38.
- 1990 Pauley, Eric F. and Edward E. C. Clebsch. Patterns of *Abies fraseri* regeneration in a Great Smoky Mountains spruce-fir forest. *Bulletin of the Torrey Botanical Club* 117: 375-381.
- 1991 DeSelm, H. R. and Edward E. C. Clebsch. Response types to prescribed fire in oak forest understory. In: Nodvin, Stephen C. and Thomas A. Waldrop, eds. *Fire and the environment: ecological and cultural perspectives*. Proceedings of an international symposium, 1990 March 20-24, Knoxville, TN. Gen. Tech. Rep. SE-69. Asheville, NC, U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station. 429 pp.

- 1991 DeSelm, H. R., E. E. C. Clebsch, and J. C. Rennie. Effects of 27 years of prescribed fire on an oak forest and its soils in Middle Tennessee, pp. 409-417. In: Coleman, Sandra S. and Daniel G. Neary, eds. Proceedings of the Sixth Southern Silvicultural Research Conference, Memphis, TN, October 30-November 1, 1990. Southeastern Forest Experiment Station Gen. Tech. Report SE-70.
- 1993 Busing, R. T., E. E. C. Clebsch, and P. A. White. Biomass and production of southern Appalachian cove forests re-examined. *Canadian Journal of Forest Research* 23: 760-765.
- 1995 Drew, M. B. and E. E. C. Clebsch. Studies on the endangered *Echinacea tennesseensis* (Asteraceae): Plant community and demographic analysis. *Castanea* 60(1): 60-69.