

Northeastern Research Station USDA Forest Service

78 Years of Excellence in the Development of
Scientific Information and Innovative Technology



Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey,
New York, Ohio, Pennsylvania, Rhode Island, Vermont and West Virginia

"...We develop and deliver knowledge and innovative technology to improve the health and use of the region's forests."

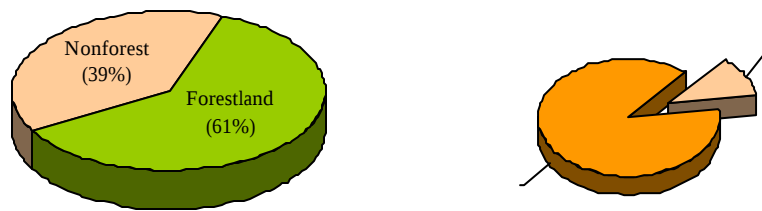
Northeastern Research Station, USDA Forest Service:
78 Years of Excellence in the Development of Scientific Information and Innovative Technology

Introduction. The Northeastern Research Station is a field unit of the USDA Forest Service designed to carry out the goals of the agency's Research and Development mission. The Northeastern Research Station, headquartered at Newtown Square, Pennsylvania (a suburb of Philadelphia), serves the people and lands of the following 13 northeastern states:

- | | | | |
|---------------|-----------------|--------------|-----------------|
| • Connecticut | • Maryland | • New Jersey | • Pennsylvania |
| • Delaware | • Massachusetts | • New York | • Rhode Island |
| • Maine | • New Hampshire | • Ohio | • Vermont |
| | | | • West Virginia |

The states of the northeastern region are both the most densely populated and most densely forested part of our country. This creates a unique situation where stresses of human origin such as pollution and fire join natural stresses such as drought and native pests to potentially overwhelm our forests. With over 90 million acres of forests, most of which are in private ownership, research from the Northeastern Research Station offers a significant way to identify, mitigate, and eliminate the effects of these stresses. In addition, our work extends beyond our boundaries helping solve global land stewardship issues. This year, our scientists produced over 450 publications providing landowners and policy makers with leading-edge information on ways to ensure that people and land productivity develop in harmony. The Northeastern Research Station works with a wide range of partners including our National Forests, state and local governments, professional schools and colleges, and forest industry.

Northeast Forestland Area



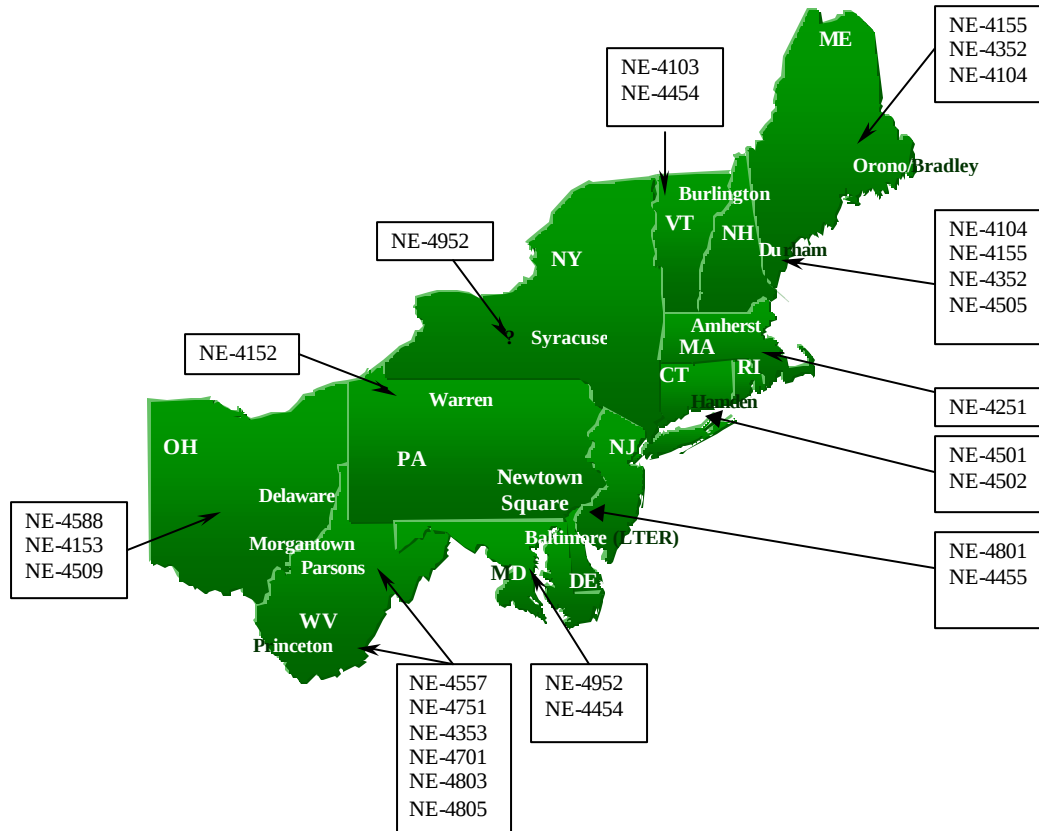
In 2002, the Northeastern Research Station begins its 79th year of operation with a history of excellence in the development of world-class scientific information and innovative technology.

Goal. The goal of the Northeastern Research Station is to develop and deliver knowledge and innovative technology to improve the health and use of the region's forests.

Strategic Direction. The scientific work of the Northeastern Research Station includes developing and delivering information to help rural and urban landowners address issues associated with forest stress, use and sustainability, social and economic drivers and impacts, and status and trends of natural resources. Our work is cooperative in its approach as we strive to be a respected partner with many clients, especially academic institutions and state forestry agencies.

Workforce, Projects, and Programs. The Northeastern Research Station has 323 permanent employees (about 484 total employees including permanent, temporary, and term appointments) located throughout the 13-state region. There are 20 Research Work Units (RWUs); each with work plans that address objectives specific to varied ecosystems and landscapes. In addition, two major programs address forest resource inventory and global climate change throughout the region. The following graphic and Table 1 illustrate the RWUs and Programs of the Northeastern Research Station.

**Northeastern Research Station
USDA Forest Service
Laboratories and Work Units ¹**



The Northeastern Research Station also is responsible for managing two Long-Term Ecological Research (LTER) sites, one internationally renowned at Hubbard Brook in New Hampshire, and the other in Baltimore, Maryland metropolitan area – one of only two urban LTERs in the world.

¹ See Table 1 for more detailed descriptions of Research Work Units and Programs

Table 1. Workforce, Projects, and Programs of the Northeastern Research Station, USDA Forest Service.

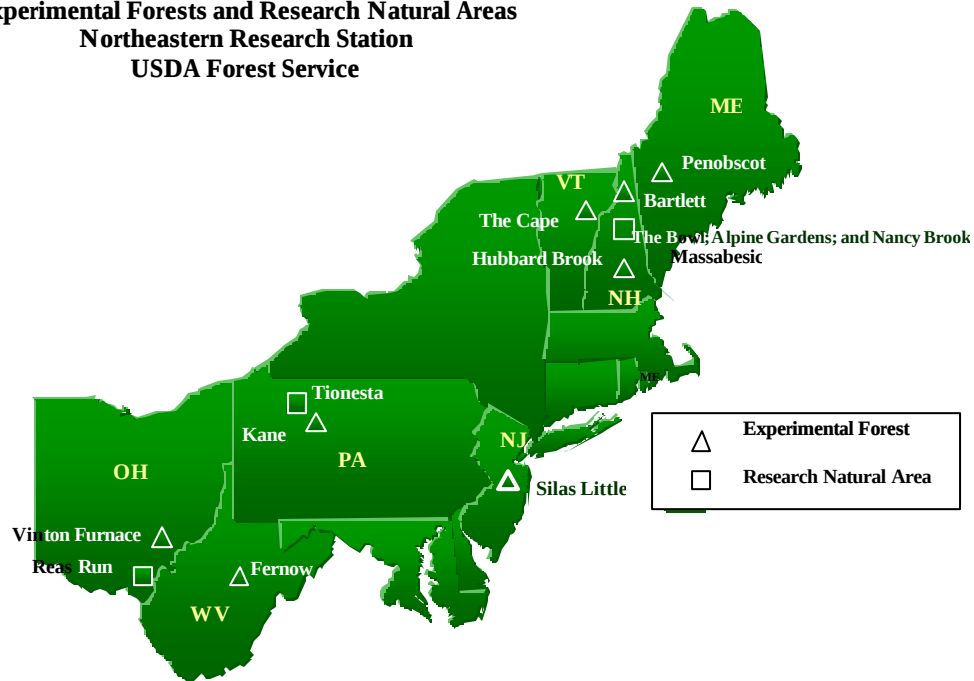
State	Location	RWU or Program No.	RWU or Program Focus	RWU or Program Leader	Telephone No.
CT	Hamden (<i>and Ansonia</i>)	NE-4501 NE-4502	- Forest insect biology and biocontrol - Pathology and microbial control of insects	Kathleen S. Shields Michael L. McManus	203-230-4330 203-230-4322
DE	State-wide:	Various RWUs NE-4455	- Forest health monitoring; research in invasive species, and forest stewardship decision tools - Forest fragmentation and water quality of mid-Atlantic watersheds	Charles T. Scott Michael L. McManus Mark J. Twery Richard A. Birdsey	610-557-4020 203-230-4322 802-951-6771 610-557-4092
MA	Amherst:	NE-4251	Wildlife and fish habitat relationships and recreation opportunities	Richard M. DeGraaf	413-545-0357
	State-wide	NE-4501	Invasive species research	Kathleen S. Shields	203-230-4330
MD	Baltimore (<i>Long-Term Ecological Research Project</i>)	NE-4952 NE-4454	- Urban forests and human health - Social dynamics of urban communities and ecosystems	David J. Nowak Mark J. Twery	315-448-3212 802-951-6771
ME	Bradley Orono:	NE-4155 NE-4352 NE-4104	- Ecology and management - Ecological Processes - Forest Management Research Cooperative (MOU, as part of NE-4104)	John C. Brissette Christopher Eagar Linda S. Heath	603-868-7632 603-868-7636 603-868-7612
NH	Durham:	NE-4104 NE-4155 NE-4352 NE-4505	- Measurement and modeling of forests and carbon - Ecology and management - Ecological Processes - Forest stressor interactions	Linda S. Heath John C. Brissette Christopher Eagar Kevin T. Smith	603-868-7612 603-868-7632 603-868-7636 603-868-7624
NJ	State-wide:	NE-4455: NE-4501 NE-4952	- Regional climate and fire danger modeling specific to the Pine Barrens - Forest fragmentation and water quality of mid-Atlantic watersheds - Invasive species research - Urban forests and human health	Richard A. Birdsey Kathleen S. Shields David J. Nowak	610-557-4092 203-230-4330 315-448-3212
NY	Syracuse State-wide	NE-4952 NE-4501	- Urban forests and human health - Invasive species research	David J. Nowak Kathleen S. Shields	315-448-3212 203-230-4330
OH	Delaware:	NE-4558 NE-4153 NE-4509	- Multiple stresses and forest health - Forest ecosystem modeling - Biologically based forest pest controls	Robert P. Long Daniel A. Yaussy James M. Slavicek	740-368-0050 740-368-0101 740-368-0033
PA	Newtown Square: Warren State-wide	NE-4801 NE-4455 NE-4152 NE-4501	- Forest inventory and analysis (Program) - Global change (Program) (<i>and NC-4455</i>) - Managing forest ecosystems - Invasive species research	Charles T. Scott Richard A. Birdsey Susan L. Stout Kathleen S. Shields	610-557-4020 610-557-4092 814-563-1040 203-230-4330
RI	State-wide:	Various RWUs NE-4952	- Forest health monitoring; research in invasive species, and forest stewardship decision tools - Urban forest stewardship	Charles T. Scott Michael L. McManus Mark J. Twery David J. Nowak	610-557-4020 203-230-4322 802-951-6771 315-448-3212
VT	Burlington:	NE-4103 NE-4454	- Environmental stress on tree growth - Integrating social and biophysical sciences for natural resource management	Mel T. Tyree Mark J. Twery	802-951-6771 802-951-6771
WV	Morgantown:	NE-4557	Disturbance ecology and management of oak forests	Kurt W. Gottschalk	304-285-1598
	Parsons Princeton:	NE-4751 NE-4353 NE-4701 NE-4803 NE-4805	- Alternative harvesting strategies - Sustainable forest ecosystems - Efficient resource utilization - Economics of forest use - Hardwood forests and markets	Chris B. LeDoux Mary Beth Adams John G. Baumgras Bruce G. Hansen William G. Luppold	304-285-1572 304-478-2000 304-431-2701 304-431-2739 304-431-2770

Field Research Sites. Experimental Forests and Research Natural Areas, designed to tackle high priority regional forestry problems through long-term research, are critical to the development of scientific information and innovative technology needed to improve the stewardship of the region's forests. Further, research information from Experimental Forests provides a substantial foundation for regional assessments to help target natural resource management direction. The Experimental Forests illustrated in Table 2 are the responsibility of the Northeastern Research Station. The Northeastern Research Station and the Eastern Region of the National Forest System mission area administer the Research Natural Areas jointly.

Table 2. Field Research Sites, Northeastern Research Station, USDA Forest Service.

State	Experimental Forests	Research Natural Areas
MD	Baltimore area (<i>Long Term Ecological Research Project</i>)	
ME	- Massabesic - Penobscot	
NH	- Bartlett - Hubbard Brook (<i>Long Term Ecological Research Project</i>)	- The Bowl (White Mountain National Forest) - Alpine Gardens (White Mountain National Forest) - Nancy Brook (White Mountain National Forest)
NJ	Silas Little	
OH	Vinton Furnace	Reas Run (Wayne National Forest)
PA	Kane	Tionesta (Allegheny National Forest)
VT		The Cape (Green Mountain National Forest)
WV	Fernow	

**Experimental Forests and Research Natural Areas
Northeastern Research Station
USDA Forest Service**



The Northeastern Research Stations also manages the Quarantine Laboratory in Ansonia, Connecticut. As the USDA Forest Service's only primary quarantine facility in the continental United States, this Quarantine Laboratory is certified for research on exotic forest pests and their natural enemies and represents an integral part of our ability to better control non-native invasive forest pests.

Outcomes. The following are significant outcomes resulting from the development of scientific information and innovative technology at the Northeastern Research Station. The five strategic program directions of the Station categorize these outcomes.

Natural Resource Sustainability:

- Developed new ways to predict forest quality and productivity by tree species, thereby providing managers with detailed knowledge on how forests respond to a variety of disturbances.
- Developed standard silviculture guides and techniques for the management of northeastern forests.
- Developed regeneration guides for mix hardwoods, emphasizing oak, allowing nonfederal forest landowners to manage sustainably.
- Analyzed the impacts of forest management policies on carbon sequestration, enabling management actions to become an effective way to manage greenhouse gases.
- Significantly improved the management of fish and wildlife habitats on public and private land throughout the northeast region and specifically in New England.
- Showed managers where and how to protect sugar maple trees made vulnerable to insect attacks by nutrient conditions.
- Developed information from research on the Fernow Experimental Forest for management techniques and practices to protect water quality and ensure tree species diversity in mixed hardwood forests.
- Helped thousands of forest landowners better understand their options for multiple use management through the development of computer software.

Forest Stress Impacts:

- Improved ability to predict how multiple stresses associated with human activity threaten long-term sustainability of forest resources.
- Described clearly how acid rain causes decline of red spruce trees.
- Developed expansion models for the “Gypsy Moth Slow-the-Spread” program that has reduced the spread of this major forest pest into uninfested forests by over 50 percent .
- Developed and enhanced the use of environmentally safe microbial pesticides as an effective alternative to chemicals for the control of the gypsy moth and other tree-defoliating insects.
- Developed forest management techniques and guidelines that reduce the mortality of trees resulting from gypsy moth defoliation.
- Developed biologically based tools to assist with eradication and control of exotic forest insect pests, including gypsy moth, hemlock woolly adelgid, and the Asian longhorned beetle.
- Developed patented strains of economically produced virus pesticides for the control of the gypsy moth.
- Developed basic knowledge of how air pollutants affect the productivity and physiology of important eastern trees.
- Illustrated to resource managers how chemical signals in wood and foliage show environmental stress.

Livability and Urban Forests:

- Improved human health and environmental quality in and near cities through better landscape designs and more urban trees.
- Improved management of drinking water supply through use of decision support systems.
- Improved Smart Growth Assessments through modeling of land use change.

Social and Economic Impacts:

- Provide economic stimulus through leading-edge information and scientific expertise about hardwood management and use to a wide range of industry clients and associations.
- Developed information on how forest product markets influence long-term forest sustainability.

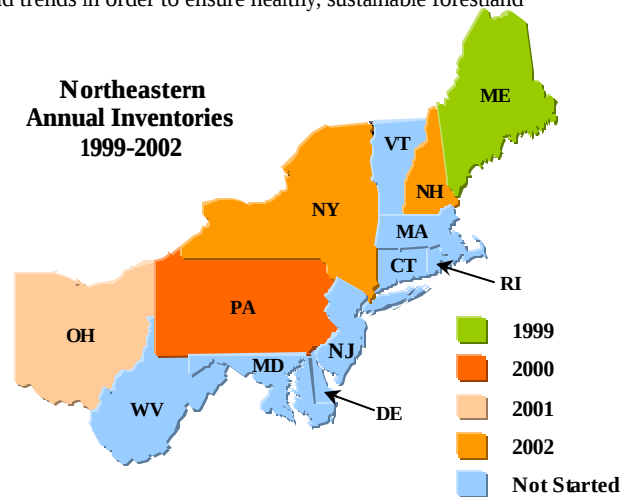
- Reduced the cost of product production and the volume of wood harvested to meet consumer demands through computer software developed at Princeton, West Virginia and widely adopted by hardwood furniture and cabinet manufacturers.
- Developed eastern hardwood log-to-mill costs estimators through computer modeling.
- Developed the first comprehensive list of nontimber forest products and their uses in northeastern North America.
- Developed improved understanding of environmental equity through spatial and long-term techniques.
- Improved forest stewardship region-wide through social assessments and network analyses.
- Developed information about the forest resource and its utilization to improve industry decision-making.
- Track production and consumption of forest products and analyze factors that affect future wood use patterns.

Inventory and Monitoring of Forests:

- Evaluate trends in growth, mortality, and harvests to ensure healthy, sustainable forestland conditions as part of a continuing census of the northeastern forests.
- Using forest inventory data, illustrated that paper birch and other tree species may cease to exist if climate warms as expected in the United States.
- Developed state-of-the-art monitoring techniques to show how forests respond to environmental changes.

Forest Inventory and Analysis (and Forest Health Monitoring). As part of the national Forest Inventory and Analysis Program, the Northeastern Research Station has been collecting resource information and evaluating trends in growth, mortality, and harvests since the 1940s. The periodic snapshots of the forest resources of each state are being replaced with an annual survey of all 13 states to provide more timely and accurate information on forest resource status and trends in order to ensure healthy, sustainable forestland conditions.

State	Last Periodic Survey
Connecticut	1998
Delaware	1999
Massachusetts	1998
Maryland	1999
Maine	1995
New Hampshire	1997
New Jersey	1999
New York	1993
Ohio	1991
Pennsylvania	1989
Rhode Island	1998
Vermont	1997
West Virginia	2001



Northern Global Change Research Program. Global change research opens a window into the future of our forests. It may take decades for climate change, air pollution, and land use change to affect forests, but actions taken now can prevent future loss of valuable services such as timber production and watershed protection. This is a wise insurance policy for sustaining healthy, productive forests for future generations.

The Northern Global Change Research Program addresses local, regional, national, and global environmental concerns. Participating scientists are developing and testing technology to offset the buildup of greenhouse gases in the atmosphere by capturing carbon in forests, identifying forest areas at high risk from the effects of climate change and other disturbances, and monitoring forests to detect damage or loss of productivity at the earliest possible time so that remedial actions can be taken.

The Budget. In FY 2001, total national funding for the Research and Development mission was \$229,111,000. The Northeastern Research Station received \$29,228,524 or 12.7 percent, of this amount. In addition, the Northeastern Research Station received about \$7,821,310 in other funds for facilities improvement and maintenance, implementation of the National Fire Plan, and funds from other mission areas within and outside the agency to help carry out planned research activities. In FY 2002, the appropriation for Research and Development in the USDA Forest Service is \$241,304,000. The Northeastern Research Station will receive \$30,709,000 of this total – the same percentage as in FY 2001. Table 3 illustrates the FY 2001 summary budget for the Northeastern Research Station. Table 4 illustrates the FY 2001 budget for the Northeastern Research Station in detail by state, projects, and programs.

Table 3. FY 2001 Budget, Northeastern Research Station, USDA Forest Service.

Program	Amount
Forest and Rangeland Research	\$29,228,524
Other:	
State, Private, and International Forestry	1,017,850
National Forest System	128,233
Capital Improvement and Maintenance	2,693,093
Animal and Plant Health Inspection Service	905,478
Hazardous Waste	98,000
National Fire Plan Implementation	500,000
Other Internal Funds, including Title IV	1,304,238
Other External Funds, including Interagency Agreements	1,174,418
Subtotal	7,821,310
Total	\$37,049,834

Future Research Opportunities. There are many additional high priority research and development opportunities for the management, protection, and wise use of the northeastern forest resource. The Northeastern Research Station, in concert with our partners, seeks ways to develop and implement these program directions to better serve the people and land in our region. Immediate opportunities include:

- An expanded role in surface mine reclamation and mountain top removal research and technology development.
- A renewed role for studying the impacts of urban natural resources on improved livability in large cities.
- An expanded role in carbon storage capability to mitigate effects of global climate change through stewardship practices.
- Protecting communities from fires in the wildland-urban interface.
- Using wood for cost-effective energy production.
- Market development and expansion for traditionally underutilized wood products.
- Developing new tools to manage non-native invasive forest pests and prevent the establishment of new pest species.
- Threatened and endangered species habitat management.
- Improved linkages between environmental stresses and sustainability of forest resources.

How to Seek Assistance. For more information about the Northeastern Research Station and the contributions we make toward goods and services for a growing America, or how to receive our assistance, please contact the Project and Program leaders listed in Table 1 or the:

Director, Northeastern Research Station
 USDA Forest Service
 11 Campus Boulevard, Suite 200
 Newtown Square, PA 19073
 (610) 557-4017, (610) 557-4041 (FAX)

Table 4. Funding Trends for Projects and Programs, Research and Development Appropriated Funds, Northeastern Research Station, USDA Forest Service.

	FY 2001 Final	FY 2002 Enacted	FY 2002 (+) or (-) FY 2001
State, Projects, and Programs			
Connecticut: Column No. >	1	2	3 = (2-1)
Hamden:			
NE-4501 Forest Insect Biology and Biocontrol	\$1,095,000	\$1,095,000	\$0
NE-4502 Pathology and Microbial Control of Insects	840,000	841,000	1,000
NE-4505 Stress-Related Host-Pest Protection ¹	(1,125,000)	(1,110,000)	(15,000)
Subtotal, Connecticut	1,935,000	1,936,000	1,000
Massachusetts:			
Amherst:			
NE-4251 Wildlife and Fish Habitat in New England Forests	1,052,000	1,042,000	(10,000)
New Hampshire:			
Durham:			
NE-4104 Measurement, Analysis, and Modeling of Forest Ecosystems	594,000	578,000	(16,000)
NE-4155 Ecology and Management of Northern Forest Ecosystems	1,326,000	1,296,000	(30,000)
NE-4352 Ecological Processes: A Basis for Managing Forests	2,601,000	3,271,000	670,000
NE-4505 Disturbance of Eastern Forest Ecosystems	1,125,000	1,110,000	(15,000)
Subtotal, New Hampshire	5,646,000	6,255,000	609,000
New York:			
Syracuse:			
NE-4952 Effects of Urban Forests on Human Health	951,024	1,081,000	129,976
Ohio:			
Delaware:			
NE-4153 Modeling Forest Response to Stresses	865,000	865,000	0
NE-4509 Biological control of Forest Pests	1,250,000	1,250,000	0
NE-4558 Multiple Stress Interactions on Forest Health	837,000	807,000	(30,000)
Subtotal, Ohio	2,952,000	2,922,000	(30,000)
Pennsylvania:			
Warren:			
NE-4152 Managing Forest Ecosystems of the Allegheny Plateau	1,047,000	1,022,000	(25,000)
Newtown Square:			
NE-4801 Forest Inventory and Analysis Program	5,089,000	6,099,000	1,010,000
NE-4455 Northern Global Change Research Program	2,186,500	1,829,000	(357,500)
NE-XXX Director's Office ²	--	171,000	171,000
Headquarters Office	(7,981,828)	(8,080,462)	(98,634)
Subtotal, Newtown Square	7,275,500	8,099,000	823,500
Subtotal, Pennsylvania	8,322,500	9,121,000	798,500
Vermont:			
Burlington:			
NE-4103 Environmental Stress on Tree Growth and Development	909,000	909,000	0
NE-4454 Social and Biophysical Sciences in Resource Management	1,214,000	1,213,000	(1,000)
Subtotal, Vermont	2,123,000	2,122,000	(1,000)
West Virginia:			
Morgantown:			
NE-4557 Management of Oak Dominated Forests	1,836,000	1,834,000	(2,000)
NE-4751 Evaluating Alternative Harvesting Strategies	232,000	232,000	0
Subtotal, Morgantown	2,068,000	2,066,000	(2,000)
Parsons:			
NE-4353 Sustainable Forest Ecosystems in the Central Appalachians	1,730,000	1,715,000	(15,000)
Princeton:			
NE-4701 Efficient Use of the Northern Forest Resources	1,137,000	1,137,000	0
NE-4803 Economics of Eastern Forest Use	1,157,000	1,157,000	0
NE-4805 Influence of Markets on Hardwood Forest Sustainability	155,000	155,000	0
Subtotal, Princeton	2,449,000	2,449,000	0
Subtotal, West Virginia	6,247,000	6,230,000	(17,000)
Total, Research and Development ³	\$29,228,524	\$30,709,000	\$1,480,476

¹ Project Leader located in Durham, New Hampshire² Allocated directly to the Station to implement "Agenda 2020"³ Includes initial allocation and any supplemental funds provided during the Fiscal Year 2001