

## **FOREST-BASED RESEARCH IN THE NEFA STATES**

**Specific projects and areas of interest, November 2002**

### **NEW YORK**

#### **CORNELL**

##### ***Cooperative programs and institutes***

##### **Forest Biology and Management**

*Arnot Teaching and Research Forest*

*Cornell Agroforestry Working Group*: conducts research on herbal medicinal plants American ginseng (*panax quinquefolium*) and golden seal (*hydrastis canadensis*), a variety of mushrooms, and sugar maple (*acer saccharum*) sap.

*Sugar Maple and Extension Program*: current research includes

- Butt fusion and electro-welding of polyethylene pipe mainlines

- Ginseng growth in a sugarbush

- Hydraulic lift and sugar maples

- Planting sugar maples: testing tree guards, weed mats, and fertilizer

- 1998 ice storm damage

- Small spout research

##### **Human-Impacted Ecological Change**

*Biological Control of Non-Indigenous Plant Species*: includes programs on purple loosestrife (*Lythrum salicaria*), garlic mustard (*Alliaria petiolata*), common reed (*Phragmites australis*), Eurasian watermilfoil (*Myriophyllum spicatum*), Waterchestnut (*Trapa natans*), and Japanese knotweed (*Fallopia japonica*). Also involved in release and monitoring programs for spotted knapweed (*Centaurea maculosa*) and leafy spurge (*Euphorbia esula*) at some field sites in northern New York State.

##### *Gap Analysis*

*The New York Natural Heritage Program's Hudson River Biodiversity Inventory*

*Use of a Geographic Information System in the New York Important Bird Area Program*

*Assessment of Reptile and Amphibian Species Richness in New York as Influenced by Mapping Unit*

*New York Amphibian Reptile Atlas Project*

*Development of Maps of Known and Predicted Mammalian Distributions for the New York Gap Analysis Project*

##### **Resource Policy, Management, and Human Dimensions**

*Human Dimensions Research Unit*: this unit is dominated by research that focuses on wildlife, especially white-tailed deer

#### **SUNY- ESF**

##### ***Student/faculty research for 2001-2002***

*Economic analysis of thinning diameter-limit stands*

*Developing automatic methods for preliminary forest stand maps from high-resolution imagery*

*Chestnut-* numerous studies

*Willow-* numerous studies

*The 1998 ice storm: Local government response*

*Early crown rebuilding on ice-damaged trees*

*Development of stump sprouts and root suckers from understory American beech following cutting*

*The 1998 ice storm and its effects on timber and recreational opportunities*  
*Long-term white-tailed deer research at Huntington wildlife forest*  
*Factors affecting the market distribution of hardwood roundwood from harvests in the southern tier of NY*  
*Using CFI plots for remote sensing preference*  
*Ice storm impact and management implications for a pine barrens in northeastern NY*

## **VERMONT**

### **UNIVERSITY OF VERMONT, SCHOOL OF NATURAL RESOURCES Ecology and Environmental Science**

#### ***Titles of current research***

##### **Terrestrial Ecology**

*Evaluation and confirmation of insect vectors of the Butternut canker fungus*  
*Identification of potential insect vectors of the Butternut canker fungus*  
*Forest health monitoring: proposal to evaluate unexplained defoliation of ash and other hardwoods*  
*Ecological impact of the January ice storm on butternut and associated tree species in the Champlain basin of northwestern Vermont*  
*Insects and their relationships with tree diseases: emphasis on the potential insect vectors associated with the Butternut canker fungus*  
*Ambassadors for the environment program*  
*Westford Woods sustainable forestry project*  
*Assessment of fungal flora associated with early stages of decomposition of fallen hardwood debris following the ice storm of 1998*  
*Wildlife monitoring, Green Mountain national forest*  
*Changes in the genetic structure and diversity of forest ecosystems as a result of forest management practices*  
*Mechanism of cold tolerance response of forest trees to environmental stress*  
*Interactive acid mist/global change-induced freezing injury: membrane-associated calcium as a potential mediator*  
*Determining the current state-of-knowledge of fall foliage color development*  
*Genetics of black bear populations in Vermont: application of non-invasive techniques*  
*Population ecology of bobcats at the welder refuge: a genetic analysis*  
*Impacts of roads on the sustainability of northern forest lands*  
*Methane exchange in northern wetlands, Vermont*  
*Estimating carbon exchange in northern ecosystems using ENVISAT*  
*Mapping northern ecosystems with polder: applications for circumpolar methane exchange*  
*NADP/NTN precipitation monitoring at proctor research center*  
*Ultraviolet radiation monitoring for northern Vermont*  
*Burlington EMPACT project-community-based environmental monitoring in the Burlington ecosystem*  
*Quantifying and interpreting "contextual" interaction in forested ecosystems*  
*Nutrient dynamics in experimental forest ecosystems*

##### **Human dimensions**

*Wood drying for value-added products*  
*Character marked wood furniture: opportunities for sustainable rural community development and forestry*  
*Boundaries, institutional arrangements, and protection of the northern forest of New England*

*Special forest products: strategies to integrate sustainable forest management into economic development plans and practices*

### **Spatial analysis and modeling**

A design for conservation of biological diversity based on physical diversity of the landscape

Vermont biodiversity project

*Mapping* conserved lands in Vermont

*Land* conservation planning in Lewis creek watershed

*Mapping* boreal wetlands using synthetic aperture radar satellite data

*Cultural* landscape report/forest management plan for the Marsh-Billings-Rockefeller National Park

### **VERMONT MONITORING COOPERATIVE**

#### ***General Fact Sheets available***

*Biophysical* Regions in Vermont

*Pine* Mountain Biodiversity Project

*Atmospheric* Fact Sheets

*Atmospheric* Integration Research Monitoring Network

*Basic* Meteorological Monitoring

*Clean* Air Status and Trend Network (CASTNet)

*Cloudwater* chemistry on Mount Mansfield

*Vermont* Acid Precipitation Monitoring Program

*Surface* Water Fact Sheets

*Biological* and Chemical Survey of Selected Surface Waters in Lye Brook Wilderness Area

*Terrestrial* Fauna Fact Sheets

*Amphibian* Survey and Monitoring

*Bicknell's* thrush population demographics and ecology

*Forest* Bird Surveys

*Insect* Diversity on Mount Mansfield

*Terrestrial* Flora Fact Sheets

*Evaluating* crown canopy changes in ice damaged forests by image analysis

*Forest* Environmental Monitoring (Canopy Tower)

*Forest* Health Monitoring

*Forest* Pest Monitoring

*Landscape* fall color and leaf drop monitoring

*Ozone* Bioindicator Plant Monitoring

*Tree* Phenology Monitoring

### **NATURAL AREAS CENTER**

The University of Vermont owns and manages a system of nine natural areas. The Natural Areas Center's research activities include: developing strategies for the protection and management of natural areas, specifically those used for research and educational activities; promoting, demonstrating, and communicating low impact field research and teaching techniques to faculty, students, and others; identifying appropriate land protection tools and testing various management approaches for sensitive landscapes; and designing the most effective information and training delivery systems for the diversity of participants in land conservation.

## **NEW HAMPSHIRE**

### **UNIVERSITY OF NEW HAMPSHIRE**

I could not access this information. It is not compiled and they have no intention of doing so in the future. Questions regarding specific research areas should be directed to faculty members in various departments University-wide.

## **MAINE**

### **UNIVERSITY OF MAINE**

#### **COOPERATIVE FORESTRY RESEARCH UNIT- *current research***

##### **Silviculture**

*Maine* Commercial Thinning Research Network

*Austin Pond*: Long-term effects of herbicides and precommercial thinning on the spruce-fir stand development

*Hardwood* Silviculture Research Subcommittee- goal is to develop:

improved vegetation management strategies for understory vegetation (including diseased beech, striped maple, and other interfering plant species) to promote the regeneration and growth of desirable hardwood species,

improved silvicultural strategies to regenerate, rehabilitate, or increase the productivity of stands that have been high-graded or subjected to diameter-limit cutting,

effective intermediate treatments for young, evenaged stands of northern hardwoods to

improved species composition, stem quality, growth, and shorten sawlog rotations,

improved silvicultural strategies for growing and maintaining quality northern hardwoods as an integral component of mixedwood stands.

*Silviculture* research priorities for enhancing Maine's wood supply

*Seasonal* tolerance of red spruce and balsam fir to herbicides

##### **Water Quality**

*Effect* of buffer and filter strips on water quality and aquatic biodiversity

##### **Wildlife & Biodiversity**

*Patch* retention as a tool for maintaining biodiversity in a northeastern industrial forest (see Manomet)

*Marten* habitat supply assessment

### **COLLEGE OF NATURAL SCIENCES, FORESTRY, AND AGRICULTURE**

#### ***Areas of Study***

Marine Invertebrates

Gulf of Maine

Extrusion technology

Super Larch

Managing the Lynx in Maine

Long-term look at Maine's forests

Remote Sensing

Wildlife Forensics

Wood Science

***Forest Ecosystem Research Program***

*Vegetation Diversity in Gap Environments*

*Interactions Among Vegetation, Salamanders and Arthropods*

*Downed Woody Material Dynamics*

*Spatial Distribution of DWD*

*Forest Stand Structure*

**MAINE AGRICULTURE AND FOREST EXPERIMENT STATION**

***Research papers published after 1998***

*Wood properties of red pine (Pinus resinosa Ait.)*

*Public preferences for timber harvesting on private forest land purchased for public ownership in Maine*

*Designing effective environmental labels for forest products: Results of focus group research*

*Cooperative Forestry Research Unit 2000 Annual Rep*

*Investigations into the potential of measuring biodiversity in Maine's forests with Forest Inventory and Analysis data*

*Methods for evaluating carbon fractions in forest soils: A review*

*Maine's forest area, 1600-1995: Review of available estimates*

*Farm Tractors in the Woods: A Handbook Detailing the Requirements of the Occupational Safety and Health Administration*

*4th Annual Munsungan Conference Proceedings: Forest Health*

*A long-term study of an oak pine forest ecosystem: A brief overview of the Holt Research Forest*

*Northeastern paper mill towns economic trends and economic development responses*

**YALE SCHOOL OF FORESTRY AND ENVIRONMENTAL STUDIES**

***Yale Forests Research Abstracts 2002***

*Examining the effects of different kinds of timber harvesting on stem growth and financial productivity in southern New England mixed hardwood forests. Using destructive sampling and chronosequence techniques to examine changes in stand developmental pathways.*

*Seedling leaf morphological and physiological plasticity in response to shade. A study of within genera comparisons of understory and canopy tree species for southern New England.*

*Recruitment dynamics of canopy tree seedling cohorts in understory environments of a topographic catena.*

*Response of six canopy tree species to microsites across a range of Southern New England soils.*

*Pattern and process of floristic diversity in relation to microsite and disturbance.*

*Monitoring long term trends in floristics across forest landscapes in Southern New England.*

*Regeneration dynamics across various shelterwood treatments*

*Change in floristics with fire in a savannah woodland system.*

*Location and site classification of old-growth stands in southern New England*

*Do intercohort mycorrhizal networks influence seedling performance?*

*Investigating the response of white-footed mice (Peromyscus leucopus) to habitat loss: Insights from a behavioral approach.*

*Explaining the causes of animal aggregation using movement analysis of a forest fungivore.*

*Blood is Thicker than Water: The Importance of Kin Structure and Variation on the Population Dynamics of Wood Frogs. (Rana sylvatica)*

*Oviposition choice by a chrysomelid beetle in common garden enclosures*

*Land-use* history of Yale-Myers Forest, with an emphasis on the agricultural period ca. 1730-1930 and its effects on the structure and composition of the forest to the present day.  
A field experiment to test whether herbivore body size and associated predation risk can affect the strength of food web interactions.  
*Annual* monitoring of amphibian populations at Yale-Myers Forest.  
Wetland urbanization gradients and vector borne diseases, aka "Disease Survey".  
*Amphibian* population response to whole-pond manipulations of canopy, nutrient concentration, and parasite density.  
*Adaptive* behavior and pathogen transmission dynamics.  
*Predicting* species interactions at large spatial scales. Measurement of reaction norms in populations of pond-breeding spotted salamander larvae, (*Ambystoma maculatum*), in response to a latitudinal gradient in predation risk by marbled salamanders, (*Ambystoma opacum*).  
*Archeological* survey of Native American sites on the Ashuelot River, Swanzey, NH.  
Photo-documentation of long-term stand development processes.

## **USDA FOREST SERVICE NORTHEASTERN RESEARCH STATION**

### ***Selected publications***

Communicating the role of silviculture in managing the national forests, 1997.  
Applied ecosystem management on nonindustrial forest land, 1997  
Proceedings, USDA interagency gypsy moth research forum 1997

### ***Research themes***

The Role of Environmental Stress on Tree Growth and Development  
Methods for Measurement, Analysis, and Modeling of Forest Growth and Structure  
Quantitative Methods for Modeling Forest Ecosystems  
Ecology and Management of Northern Forest Ecosystems  
Wildlife and Fish Habitat Relationships in New England Forests  
Ecological Processes: A Basis for Managing Forests and Protecting Water Quality in New England  
Sustainable Forest Ecosystems in the Central Appalachians  
Integrating the Ecological and Social Dimensions of Forest Ecosystem Management  
Role of Forest Insect Biology and Biocontrol in Maintaining Forest Health  
Pathology and Microbial Control of Insects that Impact the Health of Eastern Forests  
Disturbance of Eastern Forest Ecosystems by Stressor/Host/Pathogen Interactions  
Genetics and management of invasive forest insect pests, diseases, and beneficial fungi  
Disturbance Ecology and Management of Oak-Dominated Forests  
Multiple Stress Interactions and their Effects on Forest Health and Sustainability  
Efficient Use of the Northern Forest Resource  
Systems Analysis to Evaluate Alternative Harvesting Strategies  
Forest Inventory and Analysis Forest Health Monitoring  
Economics for Eastern Forest Use  
The influence of markets on the sustainability of eastern hardwood forests  
Effects of Urban Forests and their Management on Human Health and Environmental Quality

## **HUBBARD BROOK RESEARCH FOREST AND FOUNDATION**

The *Futures Assessment Project* seeks to improve communication and information exchange between Hubbard Brook scientists and policy makers, land managers and the environmental community and to promote public awareness of HBES research and resources, and their societal implications. Science Links™ is the vehicle to do this- the first project addresses the ecological

effects of acid rain in the northeastern United States. Results from this will include: a peer-reviewed scientific paper, a general audience report that translates the findings for policy makers, a one to two-page statement of findings (if the results are amenable to this approach) to be endorsed by a larger group of scientists, a media/public communications training workshop for scientists in preparation for meetings and briefings with policy makers, media and the public, and a series of public briefings that will be held to disseminate the findings directly to policy makers, including presentations to the Northeastern U.S. governors, Congressional delegation and leaders in conservation and industry.

**Current Research at Hubbard Brook** (major projects)

*Calcium* watershed addition  
*Animal* population and community studies  
*Ice* storm effects on forest and aquatic ecosystems  
*Hubbard Brook* sandbox studies  
*Snow* depth, soil frost and nutrient loss  
*Stream* ecosystem research  
*Watershed 5* - whole tree harvest  
*Transport* and fate of trifluoroacetate

Research by Discipline

*Vegetation*

Long-term changes in the calcium concentration of wood fern fronds  
Regional Sugar Maple Study  
Spatial patterns of tree species abundance

*Soil*

A Spatial Model of Soil Parent Material  
Accumulation and Depletion of Base Cations in Forest Floors  
Forest Floor Organic Matter following Logging in Northern Hardwoods  
Is there missing S at the HBEF?

*Hydrology*

Increasing Atmospheric CO<sub>2</sub> and Forest Water Use

*Geology*

The bedrock geology of the Hubbard Brook Experimental Forest: Results of new 1:10,000 mapping  
Characterizing fractured rock hydrology in the Mirror Lake Watershed

**MANOMET CENTER FOR CONSERVATION STUDIES**

*Northern Forest project:*

The influence of buffer and filter strip width on water quality and aquatic biodiversity  
Patch retention as a tool for maintaining biodiversity in a northeastern industrial forest