# ADIRONDACK RESEARCH CONSORTIUM
# EIGHTH ANNUAL CONFERENCE ON THE ADIRONDACKS
# HOTEL SARANAC · SARANAC LAKE · NEW YORK
# MAY 23 – 24, 2001

## WEDNESDAY – May 23rd

## Conference Registration

## Concurrent Paper Session I

### Economic Research

*Staking Out Cyberspace: Linking Web Visibility and Local Economic Development in New York's North Country*, Tim Clukey and Jonathan R. Slater (SUNY Plattsburgh)

Some organizations merely use the World Wide Web to announce themselves in cyberspace. However, many business firms and public institutions take advantage of this inexpensive, accessible medium to foster interactive relationships with stakeholders and transact business directly with audiences, without concern for traditional gatekeepers. One of the challenges of measuring organizational visibility on the Web is that Internet usage cannot be gauged in the same way as, for instance, television viewership, radio audiences or circulation of newspapers and magazines. Furthermore, how do we track Web visibility when the object of our concern is neither a Fortune 500 company nor a major institution, but rather a community – a complex system of multiple stakeholders existing and working together within a locality? The present investigation attempts to determine whether community Web visibility can be used as an accurate indicator of conventional local economic development. This research – which focuses on a handful of communities in New York State's North Country -- uses the Internet's own tools to provide communities with a quantitative analysis of their visibility on the Web and to explore possible connections between global presence in cyberspace and conventional local economic development. The investigators propose the formulation of a community visibility index, i.e., a periodic snapshot of a community's positioning in cyberspace.

*What Hikers Spend: A Survey of Nonmotorized Recreational Activities in the Adirondack Park*, John Omohundro, Shane La Gray, and Karen Sauther (SUNY Potsdam)

What do nonmotorized recreationists such as hikers and paddlers spend to visit in the Forest Preserve? Do they contribute much to the Adirondack regional economy? Interviews were conducted with outdoor recreationists on 46occasions at six sites in the central and northern Adirondacks in a random sample of 4% of time periods between late May and late August. The six sites were Ampersand Mt. trailhead, Newcomb Visitor's Center trails, Little Tupper Lake canoe put-in, St. Regis Canoe Area put-ins, Cascade Mt. trailhead, and the Whiteface mountain biking trails. Data from 195 parties, representing 80% of all users at those sites during those times, provided the following results. 74% of users were visitors from outside the blue line. More than half the parties, which averaged 2.9 persons, included individuals over age 40. 78% of the parties were day users. Nonresidents were in the park for an average of 3.6 days. Except for fishing and motorboating, fewer than 6% of the parties engaged in motorized sports in the Adirondacks. Two-thirds of site users participated in outdoor recreation in the Park three or more times a year. The majority also engaged in outdoor recreation in the other seasons. The average party spent $207-323, or $71-110 per capita, during this one visit to the park. Each party was carrying $218-334 in gear purchased in the Adirondacks. We estimate that users at these six sites spent $1 – 2 million during the summer. Because most users visited the park more than once, we estimate they spent $2 - 3 million throughout the park for the year. The estimated value of Adirondack gear carried to these six sites all summer is $1.3 - 2.0 million. The significance of these results is that they counter the commonly expressed opinion that Forest Preserve users spend little money to contribute to the local economy. We will compare our results to some other studies of recreationists' expenditures in state parks and offer some estimates of total Adirondack Forest Preserve users' annual expenditures.

*Adirondack Rustic Furniture Industry: Survey and Prospect*, Jack Elliot (Cornell University)

The last few years have witnessed a marked increase in "rustic design" in North America, particularly in the area of furniture. The Adirondacks has long been known for its rustic furniture production. Today, it still serves as home to most of the rustic furniture manufacturers in the state of New York. This revival of interest in rustic furniture has the potential to be good for the economic development of the predominantly rural Adirondack region, where unemployment and underemployment are persistent problems. The Adirondack economy is closely linked to its natural resource base, especially forestry. However,

this sector of the economy has been slowly declining, both in the primary and secondary wood product industries. There is a need to create greater value from wood resources, thereby improving employment prospects without compromising the ecologies of the region. The rustic furniture industry may be ideally suited to provide such a prospect. It is characterized by forest-based, small-scaled, decentralized handcrafted enterprises, requiring intimate knowledge of local materials and traditions. While praiseworthy in terms of its designs, this important craft-based industry has largely been left unstudied. However, in the fall of 1999, a survey instrument was developed at Cornell University for investigating rustic furniture industries in the Adirondack region to assess their manufacturing technologies and their ecological and economic impacts. This paper presents the findings of this survey. Although these results are derived from a craft-based industry, they suggest how commercially scaled industrial eco-enterprises could enhance the viability and competitiveness of a furniture industry in the state. These results suggest new prospects for rustic furniture production, where industries add value to existing products through environmentally responsible practices and innovative design.

## Wildlife Research

*Immigration of Female White-Tailed Deer into a Low Deer Density Area in the Central Adirondack Park*, Anne M. Oyer & William F. Porter (SUNY College of Environmental Science & Forestry)

Recent advances in the study of the social behavior of white-tailed deer (Odocoileus virginianus) provide an interesting opportunity for developing new management techniques for deer populations. Several studies have shown that female white-tailed deer associate in multigeneration social groups throughout their lives and exhibit a high degree of site fidelity, particularly to summer range. As deer populations have grown in recent decades, so have conflicts with silvicultural practices. High deer densities can severely impede regeneration following timber harvest. Traditional management designed to resolve these conflicts is often socially, logistically, and economically impossible in large geographic areas. Previous studies suggest that localized management of deer populations based on targeting individual social groups to create persistent low deer density areas may be a feasible alternative. To test this idea, a social group was removed from the center of Huntington Wildlife Forest (HWF) in the central Adirondack Park in 1994, creating a low deer density area of approximately 1.4 km2. Specifically, the removal sought to test the hypothesis that the low density area would not be filled by female deer encroaching from surrounding social groups or dispersing from distant areas for at least 5 years. Few untagged deer were trapped in the low density area until 1999, 5 years post-removal, when 8 new females were captured there. My study investigates the repopulation of the low density area by determining home ranges and degree of relatedness of deer captured in and around the low density area. I am investigating how long after social group removal female deer begin to immigrate into the low deer density area and whether they are immigrating from adjacent social groups or dispersing from distant areas. Preliminary results indicate that female deer are establishing summer range on the periphery of the low deer density area within 6 years of social group removal. Results of this research will further the understanding of dispersal, immigration, and establishment of summer range by white-tailed deer and will provide insight into localized management of deer.

*The Wait & See Approach: Over 30 Years of Surveying Beaver Populations at the Huntington Wildlife Forest*, G. Scott Haulton & Stacy M. Haulton (SUNY College of Environ'l Science & Forestry)

Beaver were nearly extirpated from the Adirondacks by the late 1800's. Soon after reintroductions in the early 1900's, beaver populations quickly increased and spread throughout the Adirondack region. Today, beaver inhabit most available waterways in the Adirondacks, impacting both natural and human communities. To fully appreciate the impact beaver have on these communities, we must have a better understanding of the long-term changes in beaver populations and their habitat. We reviewed beaver colony survey data that were collected from 1950-1959 and 1979-2000 at the Huntington Wildlife Forest (HWF), a 15,000 acre research forest located in the central Adirondacks. Each year, during late fall, sites (ponds, streams, lakes, etc.) on HWF are revisited and considered occupied if at least one beaver lodge with an associated cached food pile was found. The mean percentage of occupied sites was 56.9% (range 47-72%). The mean annual rate of site abandonment was 17% (range 0-38.1%). The mean number of active lodges per site surveyed was 0.67 (range 0.47-0.85). We found a considerable difference between the mean rate of site abandonment during 1950-1959 (9.7%) and 1979-2000 (20.2%). Furthermore, throughout the entire survey we found variation in the duration of occupancy between sites (range 8-100%). We used a geographic information system to investigate whether the duration of site occupancy was associated with several site-specific factors, including general forest type, forest management history, trapping of beavers, and wildfire history. We suggest changes in site conditions over time and differences in conditions between sites may explain variation in site occupancy.

*Linking Spatial Patterns in Maple Regeneration and White-Tailed Deer Densities in Northern N.Y. State*, Karl A. Didier and William F. Porter (SUNY College of Environmental Science & Forestry)

We are mapping and relating spatial patterns in maple regeneration and deer densities in northern New York State. Data sources include 1993 forest inventory information from the Forest Service's Eastwide Forest Database, a 1998 survey of ice-storm disturbed forests, and NYSDEC buck harvest data from the 1990's. We are using moving average and spatial autocorrelation procedures to map patterns in maple regeneration and deer densities. Preliminary observations indicate that maple regeneration is low in northwest Adirondacks (St. Lawrence county) as compared to the northeast, but spatial patterns at the regional scale of northern New York are highly variable. Preliminary assessment of maps suggests that buck harvest may correspond with relatively low maple regeneration in some broad areas, but many factors probably contribute to the degree of regeneration at any one site. Using multivariate statistical models, we will investigate the role of these multiple factors, including deer density, soil factors, elevation and slope characteristics, and the presence of competing vegetation (e.g., hayscented fern, beech) in explaining spatial variability in maple regeneration.

## Panel Discussion I

### Wilderness and the Underrepresented

Chair: Carl J. George (Union College)
Participants: Louis Curth (NYS Forest Rangers)
Alice Green (Center for Law and Justice)
Mokhtar Maghraoui (Albany Islamic Community)
Laurel Remus (Division of Public Affairs and Education, NYS DEC)
Twitty Styles (Union College)
Advisors: Yusuf Abdul-Wasi (Boy's and Girl's Clubs of Albany)
Francisca Rosa (African-American Research Foundation)

American demography informs us that the underrepresented, so-called minority, sector(s) of America, will exceed today's predominance of the white - and that this strengthening center of power will be essentially urban and estranged from the major parklands of the country. Evidence for this exists in the significant absence of people of color in our parklands and the discomfort of many of those who do make the effort to visit. An ironic aspect of this emerging world, well reflected in the Adirondack region, is that often the first contact of the underrepresented with wilderness regions is as inmates in correctional facilities. And, in turn, the travel of relatives and friends of inmates through and into crucial parklands is a painful and, at best, a sullen experience quite contrary to building positive sentiments regarding wilderness preservation among urban populations. How threatening to the existing legal safeguards is this growing problem? What is being done to engage the underrepresented in wilderness activity and concern? What more needs to be done? An experienced panel discusses this important issue.

## Welcome

Jon D. Erickson (Adirondack Research Consortium)
Thomas Catillaz (Village of Saranac Lake)
George Miller (Paul Smiths College)

## 8th Annual Keynote Address

"The Commission on the Adirondacks for the 21st Century: a Decade Later"

Ross Whaley, Professor and former President
State University of New York
College of Environmental Science and Forestry

## Concurrent Paper Session II

### Forest Research

*Application and Effectiveness of Forestry Best Management Practices in the Adirondacks*, Russell D. Briggs (SUNY College of Environ'l Sci. & Forestry) & Jamie L. Schuler (N. Carolina State Univ.)

An important function of forest lands is to provide high quality water as well as forest products. Harvesting operations, when done correctly, have no negative impact on water quality. The practices used to minimize harvesting impacts on water quality are collectively referred to as forestry best management practices (BMPs). During the past five years, there has been renewed interest at the state level in documenting BMP use and effectiveness. Forty-two forestry BMPs were assessed to determine the extent of voluntary application and associated effectiveness in maintaining water quality in the Adirondack region of New York. These BMPs were evaluated during the summer of 1997 on 53 sites randomly selected from a list of sites that had been harvested within the past 18 months. The overall application of suggested BMPs was 78% for haul roads, 87% for landings, 59% for skid trails, 88% for equipment maintenance/operation, and 73% for buffer strips. Departures were common for BMPs concerned with draining water off haul roads and skid trails, and for stream crossings; more attention must be devoted to those practices. Effectiveness of BMPs was apparent when they were applied. Non-parametric statistical tests showed a strong relationship between BMP application and prevention of sediment movement. Limiting sediment movement protects surface water. Imperfect application of BMPs reduced effectiveness. Road drainage structures, for example, generally failed to adequately control erosion when spacing between drainage structures was excessive.

*Adirondack Hemlock-Hardwood Forests: Forever Wild, or a Wilderness in the Making?*, Susy Svatek Ziegler (University of Minnesota)

Twelve old-growth and 6 post-fire second-growth hemlock-hardwood forests in northern Adirondack Park, New York, were studied to pursue the following objectives: (1) an identification of the species composition and structure of old-growth and second-growth hemlock-hardwood forests; (2) an analysis of the spatial and temporal patterns of the natural disturbance regime of this forest type, as reconstructed from increment cores of canopy trees; and (3) a comparison of the ground flora and disturbance regime between old growth and second growth. Structural attributes are related to stand age, which ranges from 88 to 390 years. In comparison with the second-growth forests of this study, older stands are characterized by: (a) a greater basal area of trees; (b) a lower density of trees; (c) a higher density of eastern hemlock (*Tsuga canadensis* (L.) Carrière); (d) larger canopy gaps; and (e) a greater volume of coarse woody debris. The average rate of natural disturbance for all plots and decades of the 130-year period from 1850-1979 is 4.4–5.2% of the canopy per decade. This implies an average canopy-tree residence time of 192 to 225 years. The rotation period for heavy disturbance (40–59.9% canopy removal) is approximately 780 years. Species richness of the summer ground-flora is statistically similar in old growth and second growth, but species composition is not the same. Moreover, the decadal rate of canopy turnover for the 50-year period from 1930 to 1979 is statistically comparable in old growth (3.1–4.5%) and second growth (3.6–4.2%). Considering all characteristics, then, the impact of logging-related fires is still evident to the trained eye, but these Adirondack forests are wild to the casual observer because they appear to be characterized primarily by processes of nature.

*Surf's Up!? Will Climate Change Bring a Tsunami of Tree Species to the Adirondack Region?*, Neil Pederson (Tree-Ring Laboratory, Lamont-Doherty Earth Observatory)

The Adirondack region is an important transition zone for boreal (white spruce, balsam fir, eastern larch) and southern temperate (black tupelo, yellow-poplar, chestnut oak) tree species. Adjacent regions [the Lake Ontario Plain and Hudson Valley-Lake Champlain Corridor (HV/LC)] contain many range limit southern temperate tree species. Vegetation models predict that global warming under a greenhouse gas scenario will cause mortality, rapid changes in forest composition and species migration at such an ecotone. These models predict that increased temperatures will induce a band of boreal tree mortality and provide establishment opportunities for southern trees. A new hypothesis suggests that southern range limit boreal trees may not be limited by high temperature. A study using this hypothesis predicts lower mortality and a less rapid change in species composition (Loehle, 2000). Paleoecological techniques like sediment (plant macrofossil, charcoal, pollen, etc.) and tree-ring analysis in the Hudson Valley can be used to help anticipate impacts on Adirondack forests. Holocene length sediment studies have shown that: 1) the HV/LC has been an important corridor for species migration and 2) there have been rapid changes in species composition in region. Tree-ring analysis of southern temperate and boreal tree species in the Hudson Valley can elucidate what climatic factors drive tree growth and test Loehle's hypothesis. Besides trees growing on extremely dry sites, there is a limited amount of information about the climate response of trees in the eastern US. These

studies may indicate regional ecotone sensitivity to help anticipate climate change impacts on forested Adirondack ecosystems.

## Aquatic Research

Chair: Michael Martin (F.X. Browne, Inc.)

*Restoration of Two Adirondack Brook Trout Populations Lost to Acidification*, William H. Gordon (NYS Department of Environmental Conservation)

Acid precipitation continues to exert negative impacts on New York State's Adirondack Mountain Region. Brook trout (*Salvelinus fontinalis*), the principal Adirondack sportfish and an important component of the region's aquatic fauna, have declined substantially. Stocking has helped maintain their distribution and the region's sport fishery, while the occurrence of naturally spawning populations has become very limited. Two Adirondack waters, Evergreen and Hidden Lakes, were treated with agricultural lime to restore their long-standing acid-degraded ecosystems. These treatments have paved the way for the reestablishment of brook trout populations. Prior to treatment these fishless lakes looked to be very suitable brook trout habitats, except for evidence of severe acidification, such as low pH and low acid neutralizing capacity. Post treatment water chemistry improvements have been considerable. Excellent survival of stocked brook trout has been confirmed in both lakes. A popular sportfishery has developed. Stocked brook trout populations are expected to be augmented by naturally spawned fish within the next few years. To achieve the natural spawning goal, management strategies may need to be enhanced with habitat improvement, and a combination of restrictive angling regulations and fall outlet blocking tactics to increase the number of mature adults in the populations.

*Fish response to debris dam removal in ice storm-impacted streams of the Adirondack Mountains*, Dana Warren and Clifford Kraft (Cornell University)

In 1998, a severe ice storm damaged the forest canopy and increased the amount of wood in eastern Adirondack streams. In many stream systems, wood forms debris dams that dissipate stream energy and provide habitat for fish and invertebrates. This research investigates the role of debris dams in small, high gradient streams of the Adirondacks. Fish abundance, invertebrate community composition and stream geomorphology were assessed during summer 2000 five small streams within the same drainage basin. Study reaches were established with equal numbers of habitat units (pools/riffles) both upstream and downstream from prominent debris dams, and reaches were paired based on similar debris dam function. In August 2000, all woody debris less than 30-cm diameter was removed from the downstream reach of each pair. Debris removal had a pronounced effect in two of the streams, where brook trout (*Salvelinus fontinalis*) populations – one of two fish species present -- dropped significantly in removal reaches by comparison with reference reaches ($p<0.05$). In study reaches on the largest stream, trout abundance did not change following dam removal, and in the smaller tributaries, trout response to debris removal was mixed. Although generally considered important fish habitat, debris dams may have a limited habitat function for fish in streams with high habitat complexity, such as small Adirondack streams where boulders are the dominant pool-forming elements.

*The restructuring of Adirondack aquatic ecosystems: The detrimental aspects of exotic plant species*, Charles W. Boylen, Lawrence W. Eichler, Eric A. Howe, and Jeffrey Bartkowski (Rensselaer Polytechnic Institute)

At every level of the aquatic food chain, the long-standing checks and balances that exist in native ecosystems have become dramatically eroded in recent decades by the introduction of exotic, non-native species. Some of the potentially most pervasive of invaders of Adirondack lakes and ponds are aquatic plant species such as Eurasian watermilfoil, Waterchestnut and Curly-leaf Pondweed. Once introduced, their overall ecological impact upon native species and aquatic community structure is often poorly understood. Exotic species have been shown to exhibit a profound effect on native plant populations, generally excluding all but the most hardy native species. These effects are further echoed through the food web, affecting phytoplankton, invertebrates, fish and humans. Moreover, nuisance aquatic plant growth frequently results in decreased lake water quality, interference with recreational access to lakes, reduced property values, degraded flood control structures, and impacts to the aesthetic quality of lakes and ponds. Exotic species often severely impact tourism-based economies, which depend on high quality water resources. While there is general public awareness of the modes of introduction of the exotic species currently in the Adirondack Region, new exotic aquatic plant species are also close at hand, namely European Frogbit and Parrot Feather. Furthermore, as exotic species common to the southern US become cold-adapted, their northern range will undoubtedly extend into New York, for example Hydrilla and Giant Salvinia. The ability to recognize exotic infestations early and quickly initiate management programs offers the best chance of slowing their spread. Educational programs are critical to provide the vigilance necessary to contain exotic species.

## Panel Discussion II

### Adirondack Research Consortium Working Group on Invasive Aquatic SpeciesBALL

Chair: David Allee (Cornell University)
Participants: Mary-Arthur Beebe (Lake George Association)
Jay Bloomfield (NYS Department of Environmental Conservation)
Chuck Boylen (Darrin Freshwater Institute, Rensselaer Polytechnic Institute)
David Decker (NYS Department of State)
Bob Johnson (Cornell University Research Ponds)
Michael Martin (F.X. Browne, Inc. – now of Cedar Eden Environmental, LLC)
Jim Skaley (Cornell Local Government Program)

## Conference Dinner

## An Evening of Adirondack Stories

featuring

Maurice Kenny, Fran Yardley, and Joe Bruchac

## THURSDAY – May 24th

## Concurrent Paper Session III

### Sustainable Communities

*What do we Mean by a Sustainable Community Economy in the Northern Forest? An approach developed by the Northern Forest Alliance*, Graham Cox (National Audubon of New York State)

The Northern Forest Alliance is a coalition of more than 40 land conservation groups concerned with the ecological and economic future of this 26-million-acre four-state region which includes the Adirondack Park. The Alliance has prepared a publication describing its approach for developing a sustainable economy for the region. This presentation will outline the major themes and ideas of this publication. The publication describes the Alliance's vision for the region's economic future and shows that conservation is one important method to establish an ecologically based economy for the future of this predominantly forested region covering major parts of New York, Vermont, New Hampshire and Maine. The publication, the third in a series by the Alliance, enumerates ways to take advantage of economic trends without harming the environment of the Northern Forest. It provides a historical perspective on forest trends in the region and the nation as well as globally. It describes the major changes that have taken place in the forest products industry and in forest management and harvesting techniques. It then goes on to describe a vision for a sustainable ecological economy supporting vibrant rural communities, including steps to make this difficult transition. It includes a discussion of the changes taking place in the two major components of the region's economy: first, the move to a sustainable forest management base and the principles behind this new paradigm; and secondly, the need to encourage and support an amenity-based economic development pattern, that is, a recreation and tourist industry based on the attraction of the forests, rivers, lakes and mountains as well as the rural communities themselves. In a separate publication, A Business Development Toolkit, the Alliance offers specific examples and tactics from throughout the region that can help communities work toward an ecological economy. The two previous Alliance publications described the wilderness/wild forest core concepts that are necessary to conserve the ecological heart of the region, and then described what a sustainable forest industry would look like for the region, with the intent of protecting extensive areas of commercial working forest as the basis for businesses for generations to come, both as a base for the regional economy and as a protective buffer to the core wildlands identified in the first publication.

*Input-Output Modeling of Protected Landscapes: the Adirondack Park*, Klaus Hubacek and Jon D. Erickson (Rensselaer Polytechnic Institute)

Change in ownership of large land resources in the northeastern United States is reshaping the economic and cultural landscape. The Adirondack Park of New York State has taken the most aggressive steps toward land conservation through public land acquisition and private land comprehensive planning. The State's current decisions to acquire more open space, negotiate conservation easements, or embrace development will influence the region's economic structure for decades. These alternative scenarios are explored with an input-output model including land as a factor of production. Conservation easements are found to have the most potential to meet target objectives.

*A Structural Analysis of Tourism Impact in the Lake George Watershed*, Jose Vazquez (RPI)

## Landscape Change

*The Effects of Land Use Management on Biodiversity in the Adirondack Park – Year 1 Results*, Michale J. Glennon and William F. Porter (SUNY College of Environmental Science & Forestry)

The Adirondack Park provides habitat for numerous unique species and ecological communities. With its highly interspersed mix of public and privately owned lands, the Park is often cited as an example of asuccessful application of sustainable development principles. However, the true effects of land use management on wildlife populations in the Adirondacks are unknown. Assessing biodiversity in this region has been established as an important research goal. Our research is investigating the effects of two management types which represent two of the largest impacts to this landscape: timber harvesting and development. We are using small mammals and songbirds (Passeriformes) as biological indicators to explore the impacts of land management at both the stand and landscape levels. We are evaluating how structures of songbird and small mammal communities change along a gradient of human impact, and how surrounding landscape context affects differences between points along the gradient. Results from 1998-2000 show that significant differences exist between management types in the Adirondack Park for both birds and small mammals. Our research will help forest managers who are interested in enhancing or maintaining biodiversity on their lands, as well as provide a landscape perspective on the Adirondack Park and how different components of the landscape are related to distributions of two of its important fauna.

*101 Years of Forest History at the William C. Whitney Wilderness: 1898-1999*, Sunita S. Halasz (NYS Adirondack Park Agency) and Thomas H. Whitlow (Cornell University)

The William C. Whitney Wilderness, added to the Adirondack Forest Preserve in June 1998, is located in Hamilton County, NY. The landscape, which was highly disturbed throughout the 20$^{th}$ Century by fire, blowdown and logging, was the site of the first scientific forestry studies in the U.S. conducted from 1897-1899 by Gifford Pinchot, first head of the U.S. Forest Service. Using overstory data collected by Pinchot and subsequent researchers, we assembled a forest *chronosequence* to provide the Department of Environmental Conservation with a long-term perspective of how the forest has changed over time. The work of Pinchot and his colleagues bring the former forest and the men who worked in it to life, providing insight into the way human activity interacted with natural systems to determine the current vegetation. Past and present overstory data show that the remnant old-growth forest buffering the lakes has shifted over the past century from a spruce-dominated (*Picea rubens* Sarg.) community, to a hemlock (*Tsuga canadensis* (L.) Carr) - northern hardwoods community. The forest outside the old-growth buffers, also spruce-dominated before logging began in the late 1800s, is now a young beech (*Fagus grandifolia* Ehrh.) - yellow birch (*Betula alleghaniensis* Britt.) community. Continuing to monitor recovery trends in the overstory of this forest will help determine if succession is being affected by the new recreational land use. Awareness of the ecological and cultural history of the William C. Whitney Wilderness adds a new dimension to landscape management and should help to guide management decisions.

*The Race for Reservoirs: Adirondack Dams and the Land Ethic*, Jeffrey B. Flagg (Sagamore Institute)

Throughout the first half of the Twentieth Century, numerous proposals were put forward to construct large-scale hydroelectric dams in the Adirondack Park. Following in the footsteps of the Tennessee Valley Authority, itself an offspring of Franklin Roosevelt's New Deal, several water regulating districts were formed throughout New York State for the expressed purpose of harnessing Adirondack waterways for multiple use. The ensuing conflict over the role and purpose of the Adirondack Forest Preserve pitted hand-offs preservationists against Progressive conservationists. This paper will argue that the defeated attempt to build dams on the upper branches of the Moose River, most notably the proposed Panther and

Higley Mountain dams, represent the first solid repudiation of the notion that hydroelectric dams were the great panacea for the nation's environmental and economic troubles. Further, it will suggest that the defeat of the Moose River dams was essentially a crucible of understanding in American environmental thinking, and may well have created the difference in outcomes between the unsuccessful attempts to stop the construction of the Hetch Hetchy dam in Yosemite Park, and the successful defeat of the Echo Park dam in the Dinosaur National Monument. Finally, this paper will contend that the defeat of large-scale hydroelectric projects inside the Blue Line represents a clear evolutionary step toward the establishment of a Leopoldian land ethic.

## Poster Session

*Tree-Ring Analysis of a Montane White Oak/Shagbark Hickory Stand in the Southeastern Adirondacks*, Erika Mashig & Neil Pederson (Tree Ring Laboratory, Lamont-Doherty Earth Observatory)

Tree-ring analysis uses tree rings to study and reconstruct past climate and ecological history of an area. Extracting tree cores using an increment borer is a nondestructive method used to learn about past air temperatures, cycles of draughts and floods, fire, logging, earthquakes and volcanoes. This information aids scientists in understanding historical environmental conditions and to help anticipate future impacts on forests. It also teaches ecologists about natural stand dynamics and helps natural resource managers develop ecologically sound management plans. Trees of white oak and shagbark hickory were cored on Prospect Mountain in the southeastern Adirondacks. This site was selected because it is a northern range limit for these species in the Hudson Valley watershed. Tree growth at treeline is predominantly limited by one climatic factor. Fluctuating ring widths are a function of that limiting factor (ie. temperature or precipitation). Therefore, it was hypothesized that these trees growing at a relatively high elevation (~360m) toward a northern range limit would have growth limited by temperature. Unexpectedly, both species were very sensitive to drought (limited precipitation). The results suggest that the forest is old growth. The white oak is uneven-aged and range from 200 to 340 years old while the even-aged shagbark hickory dates back to the early 19th century. The samples of white oak show suppressed growth followed by a release (dramatic increase in growth) which coincides with the establishment of shagbark hickory.

*The Huntington Wildlife Forest: From Adirondack Great Camp to Premier Research Station*, Ray Masters (SUNY College of Environmental Science & Forestry)

The Huntington Wildlife Forest, operated by the College of Environmental Science and Forestry at Syracuse evolved from a small camp built by William West Durant in 1898-99 on the shore of Arbutus Lake near Newcomb. It was sold to Archer Huntington in 1900 who continued to improve and expand the property, which at it's peak, contained many miles of roads and trails, a fish hatchery, a farm, and some 18 major and 16 minor buildings, all on 15,000 acres. Archer and Anna Huntington were pioneer ecologists of sort, with interests that spanned from Anna's acclaimed sculptures of wild and domestic animals to Archer's study of Adirondack beaver populations. After several years when the couple did not visit the property, the Huntington's decided to give up the estate. It was their fascination with animals and wildlife that led them to create a reserve to be used for wildlife research and education, and donate it to the then College of Forestry, (Now College of Environmental Science and Forestry). The property was donated in two parcels; one in 1932 and one in 1939. In 1932 the College began biological surveys which are the basis for continued and expanded monitoring and research programs today. Huntington's gift of their former retreat has become a place where students of Adirondack ecology can come to question and learn.

*Distribution of Spruce Grouse Populations in New York's Adirondack Mountains*, Jonathan L. Foster (SUNY College of Environmental Science and Forestry), Glenn Johnson and Nicholas Coppola (SUNY Potsdam), and John Ozard (NYS Department of Environmental Conservation)

The spruce grouse (Falcipennis canadensis), a New York State Endangered Species, is mostly associated with black spruce-tamarack peatlands in northern New York. The distribution of spruce grouse populations was surveyed in the Adirondack lowlands in Franklin, Hamilton and St. Lawrence counties from early May through late July 2000 to determine their status in the region. Twenty historical sites first identified during studies conducted from 1977-1980 and 1985-1987 were visited and monitored for spruce grouse activity. Efforts made in May- June (113 person-hours) focused on male spruce grouse response to broadcasts of female aggressive calls. In July, chick distress calls were used to elicit response by female spruce grouse with broods (43person-hours). Twelve adult spruce grouse, (5 males, 7 females), and 18 chicks in 3 broods were observed. Spruce grouse were present in 10 historical locations surveyed based upon presence or sign (scat or feathers). Of 15 sites shared with the 1985-1987 survey, 14 had signs of occupancy in 1985-1987 while only 7 had signs of occupancy in 2000.

While an actual decline cannot be documented conclusively and is only suggested by our surveys, we found no evidence that this species is increasing or expanding into previously occupied habitat. It is possible that fragmentation of habitat due to logging and other practices, stochastic weather events, increased ATV use and accidental hunting may be potential factors leading to decline. Further surveys will be conducted in 2001 to continue to assess the distribution and status and of this threatened bird and determine if populations in occupied sites are stable.

*A Picture is Worth a Thousand Words*, Jaime A. Ethier (Paul Smiths College)

Providing a photographic database of Adirondack images to the public has innumerable benefits in the fields of education, ecology, and preservation. It is with this ambition that I am working in cooperation with the Adirondack Park Agency to develop a cataloging system to organize the slides of Dr. Edwin Ketchledge, Professor Emeritus of SUNY College of Environmental Science and Forestry. We have established a Microsoft Access form with an array of fields (subject, location, date, landscape position and other notes) to compile the information contained within Dr. Ketchledge's slide compendium, which spans approximately thirty years. Information from the slides has been gathered by closely inspecting each slide and combining Dr. Ketchledge's notes with information obtained from interviews. Through a series of standardization techniques, we are also ensuring that the information contained in each slide entry is congruent and retrievable. To date, I have entered 2198 slide entries of a variety of subjects ranging from alpine flora to public participation in restoration activities. Some of Dr. Ketchledge's other photographs show mountain summits throughout the years. Valuable photographs like these illustrate the positive changes occurring on many summits from a state of severe erosion and environmental degradation to one where the vegetation is beginning to return due in part to Dr. Ketchledge's revegetation efforts. These images will hopefully be the beginning of a comprehensive database of Adirondack photographs available to the public. With the cataloging system established, additional photographs can be entered into the database easily and in a format that will make them accessible. Once the Adirondack photographic database is created, it is hoped that any individual with a PC will be able to access the images for educational purposes, self-interest, or merely to see what life is like above the timberline.

*Ecological Requirements and Harvesting Impacts of Goldthread (Coptis trifolia (L.) Salisb.), an Iroquois Medicinal Plant*, Marcy J Balunas & Robin W. Kimmerer (SUNY College of Environmental Science and Forestry)

The Cranberry Lake region of the Adirondacks is home to abundant populations of goldthread (*Coptis trifolia* (L.) Salisb.). The Cranberry Lake Biological Station was thus an ideal setting to conduct research relating to the ecological requirements and harvesting impacts of goldthread. Due to increased urbanization, increased interest in herbal medicine by Western society, as well as increased Native American harvesting pressures on natural populations, goldthread faces the potential for overexploitation. The objective of this study was to gather ecological data to support assessment of sustainable harvesting practices of goldthread. Transects were set up in nine locations to determine how tree, shrub, and herbaceous species, canopy cover, soil moisture, and soil pH co-vary with goldthread abundance. Harvesting impacts were measured and compared between a coniferous site and a deciduous site by mimicking harvesting of goldthread and measuring re-growth over a two year period. As part of this experiment, the relationship between leaf area and root biomass was analyzed to help determine if a goldthread harvester can approximate root biomass (the part used for medicinal purposes) by observing leaf area. The common herbaceous associates of goldthread were also compared between the coniferous and deciduous sites. From these results, the ecological requirements for goldthread population success and the impacts of harvesting on goldthread populations will be assessed. In addition, this methodology can also, perhaps, be used for other culturally significant plants that may be threatened by increased harvesting pressures.

*Impacts of the 1998 Ice Storm on Streamsides and Streams of the Adirondacks*, Rebecca Schneider and Cliff Kraft (Cornell University)

Ice storms are a recurring disturbance in temperate landscapes and can have major impacts on forest systems, as well as on human communities. However, little research has evaluated the impact of ice storms on associated aquatic systems. In 1999, we began examining the impacts of the January 1998 ice storm on the streamsides and streams of the eastern Adirondacks. The objectives were: 1) to inventory canopy damage within the streamsides, 2) to assess impacts on woody debris and in-stream habitat, and 3) to evaluate the contribution of landscape position to ice storm impacts. 43 sites, including 32 -1$^{st}$ order sites and 11 associated 3$^{rd}$ order sites, distributed across five watersheds were inventoried. There were significant differences in the amount and type of canopy damage experienced by different tree species. The degree of canopy damage was strongly influenced by landscape position, with greater damage occurring directly along the stream edge than further away, and a trend towards more damage in 1$^{st}$ than 3$^{rd}$ order stream sites. Increased canopy damage was significantly associated with

several in-stream parameters, including increased availability of woody debris dams and changes in stream geomorphology. These findings suggest that ice storms have important impacts on stream systems and have implications for management of ice storm damaged landscapes.

*National Community Forestry Center – Northern Forest Region*, Shanna Ratner (Yellow Wood Associate)

The National Community Forestry Center supports community-based forestry and research in rural areas. The NCFC operates as a decentralized network of regional centers located in the Pacific Northwest, the Southwest, the Appalachians, and the Northeast. The Northeastern, or Northern Forest regional center helps rural people conduct and use research to make more informed decisions about forest resources. The National Community Forestry Center is a project of the National Network of Forest Practitioners. The Northern Forest regional center is administered by Yellow Wood Associates, Inc. of St. Albans, Vermont.

*Groundwater Seepage in a Headwater Adirondack Lake*, Stephen D. Sebestyen (SUNY College of Environmental Science and Forestry) and Rebecca L. Schneider (Cornell University)

Seepage, the movement of water through lakebeds, occurs in most lakes. Water can either enter or leave a lake with seepage, but little is known about daily and weekly patterns of seepage or how seepage responds to precipitation and climatic factors. An understanding of seepage during snowmelt is especially important because little is known about seepage during this time. In this study, seepage meters were used to determine how seepage changes with time and location, and to determine if seepage responds to individual rainfall events and spring snowmelt. Seepage usually discharged at low rates along one segment of the shoreline throughout the study. In contrast, seepage along another portion of the shoreline showed a distinct fluctuation from discharge to recharge over time. Rapid increases of seepage coincided with high rainfall and snowmelt. This work shows that dynamic seepage patterns can occur along Adirondack lake shorelines and that seepage can vary considerably within seasons.

*Groundwater Seepage and Relationships to Aquatic Plants*, Stephen D. Sebestyen (SUNY College of Environmental Science and Forestry) and Rebecca L. Schneider (Cornell University)

Seepage of water through lakebeds is an important environmental factor that can influence plants growing in lake sediments. Seepage can either enter (discharge) or leave (recharge) a lake. Dissolved ions, gases, and other compounds are transported by seepage, but little is known about how this process affects aquatic plant communities that grow in lake sediments. The objectives of this study were to determine 1) if the abundance of aquatic plants was related to seepage in Adirondack lakes, and 2) if patterns of pore water and leaf chemistry were related to patterns of groundwater seepage. We found that aquatic plant abundance increased with decreasing seepage and plant abundance was greatest at sites having highly variable seepage. Additionally, the direction, magnitude, and variability of seepage influenced pore water and leaf tissue chemistry. Seepage also influenced aquatic plants because the trace metal content of water lily leaves was elevated under low seepage conditions. Overall, seepage may play an important role in the nutrition and health of plants that grow lakes.

## Lunch and Adirondack Research Consortium Business Meeting

## Panel Discussion III

## Adirondack Research Consortium Working Group on Unit Management Planning

Chair: Graham Cox (National Audubon Society of New York State)
Participants: John Banta (Adirondack Park Agency)
William F. Porter (SUNY College of Environmental Science and Forestry)
Karyn Richards (NYS Department of Environmental Conservation)

## Concurrent Paper Session IV

### Economy and Society

*Growth in the Adirondack Park: Analysis of Rates and Patterns of Development*, Todd Thomas (Residents Committee to Protect the Adirondacks)

Throughout the history of the Adirondack Park, and especially since the formation of the Adirondack Park Agency (APA), there has been a running controversy over the amount of development that is occurring annually in the Adirondack Park as well as debate over what level should occur. This debate, however, has suffered from a lack of factual information. Over 1999 and 2000, the Residents' Committee to Protect the Adirondacks (RPCA) collected and analyzed three sources of information from the 1990s. These sources were building permits issued by the 103 towns and villages of the Adirondack Park, project application/permit data information from the Adirondack Park Agency and tax roll information from the Office of Real Property Services. The RCPA found that over 8,000 new residential structures were constructed in the 1990s, and that 43% were regulated by the APA and 57% were under the sole jurisdiction of local government. Overall, 80% of all building permits issued were seen only by local government and 20% were reviewed by the APA. Further analysis shows that these structures continue to be built mostly on lakeshores and roadsides. While in some highly populated areas, the Resource Management-classed "backcountry" is being developed, 1.2 million acres of this land remains in the hands of 30 large industrial or family landowners who have exhibited stable ownership patterns with little development. Based on the findings of rates and patterns of development and construction, the RCPA makes recommendations for enhancing local oversight capability and calls for an APA cumulative impact policy, among others.

*Where's the Model Now? An Inventory and Assessment of Natural Resource, Social, and Economic Concerns Facing the Adirondack Region*, Jennifer A. Cairo (SUNY College of Environmental Science and Forestry)

The Adirondack Park is often identified as a model for natural resource management across adjacent publicly and privately owned lands. Over the past few decades notable attempts have been made to identify and articulate issues, and create policy for the region (i.e. The Future of the Adirondack Park, The Adirondack Park in the Twenty-First Century, The Northern Forest Lands Report). Our goal is to compile and prioritize a contemporary inventory of issues incorporating natural resource, social, and economic concerns in the Adirondack region. The objective of this inventory is to increase and direct future State University of New York College of Environmental Science and Forestry (ESF) research in the Adirondack Park with regards to long-term maintenance of forested landscapes. We conducted open-ended, focused interviews with seventy-two opinion leaders in the region during the summer and fall of 2000 and analyzed these as well as literature sources to derive our inventory. Prioritization of the inventory will be according to efficiency, equity, and frequency criteria relative to ESF's institutional strengths. Preliminary results indicate research needs related to: natural and political science data inventories; economic viability of Adirondack communities within an open space protection context; regional cohesion, leadership and communication; political power differentials and public participation among local and regional regulating bodies and citizens.

*Windfalls For Wilderness: Land Protection and Land Value in the Green Mountains*, Spencer Phillips (The Wilderness Society)

Opposition to proposals for additional public land ownership and conservation-oriented management stems from, in part, fear that such management will harm private land values. It is reasonable to speculate however, that rising private land prices reflect proximity to open space, and to scenic, recreational, and other amenities associated with publicly protected land. This hypothesis that land protection enhances land rent is developed and tested in an econometric model of land markets in the region surrounding the Green Mountain National Forest. The results indicate that protected public land - namely federally designated wilderness - is associated with higher land prices for nearby private land. While addressing the concern that land protection is detrimental to property values, this result does raise the question of how communities blessed with public land amenities can address the challenges of accelerated growth, affordable housing and economic development that may result. The latter section of the study considers these challenges as part of the same system that bestows higher prices on private property. That consideration suggests several options for tapping enhancement value to finance efforts to address the challenges of amenity-based development. The presentation will also include an outline of a similar study planned for the western Adirondack region.

## Ecological Dynamics

*Pine and Hardwood Soil Invertebrate Communities in the Altona Flat Rock Formation of the Adirondack Foothills: Ice Storm and Restoration Logging Impacts*, Paul Sokolowski (University of Massachusetts at Lowell), Matt Charles (Colby College), Wendy Freed (Case Western Reserve University), Timothy B. Mihuc (Lake Champlain Research Institute, SUNY Plattsburgh)

This research was conducted as part of an interdisciplinary investigation of the effects of the 1998 ice storm disturbance on ecosystem-level processes in the Altona Flat Rock formation in northeastern New York. The project, jointly sponsored by the National Science Foundation, Plattsburgh State University (PSU) and the W. H. Miner Agricultural Research Institute, was conducted at the Ecosystem Studies Field Laboratory (ESFL), an instrumented sub-basin within the Little Chazy River watershed. The extensive ice storm that affected much of northern New York and New England in January 1998 severely impacted large portions of the Pine Barrens and Hardwood forests located intermittently within this region. After the ice storm, some forest plots underwent restoration logging. The remaining parts of the Altona Flat Rock environment were left uncut and allowed to regenerate independent of human interaction. The objective of this study was to compare invertebrate community structure between: 1) Hardwood and Pine Barren Forests, 2) Uncut and Restoration Cut Hardwoods, and 3) Uncut and Restoration Cut Pine Barrens. Along with the above parameters, we investigated how the physical conditions, such as soil moisture, temperature, pH, and percent sunlight, associated with the different environments could affect soil invertebrate communities. The creation of these two recovering environments (cut and uncut forest) produced conditions which altered soil and litter invertebrate community structure, particularly in the hardwood forest sites. Invertebrate community structures within the Pine Barrens cut and uncut sites were very similar while community structures within the Hardwood cut and uncut sites were not similar. Following the restoration logging, the physical characteristics changed dramatically in the hardwood sites, causing the invertebrate community structure to resemble that of the Pine Barrens environment.

*A Comparison of Study Techniques for Evaluating Plant Species Richness in Adirondack Northern Hardwood Forests*, Mark J. Twery, Gary L. Wade, Jonathan Myers, Kathie Detmar, and William Mator, III (USDA Forest Service)

Species richness is an important measure of biodiversity but varying measurement techniques can result in widely varying estimates. We compared the results of sample plot inventories with extensive inventory searches on a set of 14 2-hectare study blocks located on two secondary northern hardwoods forest sites in the Adirondack region near the Visitor Interpretive Center at Paul Smith's, New York. The two sites do not differ significantly in complete inventory richness, all plot richness, overstory plot richness, understory (herbs + shrubs) plot richness, or plot capture percentage. Plot sampling consistently and significantly undercaptured the total species richness on all study blocks. The sample plots captured 33 to 57 percent (mean = 45%) of the species richness found by the extensive inventories. Inventory richness was significantly correlated with herb and shrub richness but not at all with overstory richness. Higher percentages of total species richness were captured in the plots on the richer study blocks, possibly indicating greater species evenness in distribution in richer blocks. However, there was no correlation between plot capture percentage and complete inventory richness.

*Streamside Root Systems of the Adirondack Mountains: Responses to Season, Disturbance and Landscape Position,* Darby Kiley and Rebecca Schneider (Cornell University)

Streamsides are recognized as important landscape features in reducing erosion and filtering groundwater before it enters associated streams. However, few studies have directly investigated rooting dynamics of streamsides or other wetlands. The overall goal of this study was to examine the rooting dynamics of riparian areas in the Adirondack Mountains. Three specific objectives were: 1) to determine how rooting dynamics of a reference site vary throughout the year, 2) to compare rooting patterns at a suite of riparian areas damaged by an ice storm in 1998, and 3) to investigate the landscape-scale differences in rooting patterns by comparing first-order and third-order streamsides. From June 2000 through spring 2001, replicate root cores and in-growth cores were collected from a reference site consisting of a third-order streamside area with minimal ice storm damage. Root cores were also collected at five first-order and four third-order sites characterized by varying amounts of ice storm damage. Cores, at least 50-cm in depth, were segmented into 10-cm increments and hand sorted. Root biomass increased from June through late August and then decreased. The biomass peaked consistently at 20-30 cm belowground. At the landscape level, first-order streams tended to have more root biomass than did third-order streams. Ice storm-damaged areas had significantly less root biomass as compared to undamaged sites. This study indicates that streamside root systems are highly variable through time and across space. Such variability needs to be considered when assessing the streamside functions associated with improved water quality.

*Watersheds of Large Peatlands in the Northern Adirondacks,* Sunita S. Halasz, Raymond P. Curran, and Daniel M. Spada (NYS Adirondack Park Agency)

The purpose of this project was to map the watershed area influencing the ericaceous and graminoid portions of four large peatlands in the northern Adirondacks in a manner consistent with the traditional mapping of watersheds of surface waterbodies. Wetland watersheds are not usually mapped due to topographic complexity; thus the development of appropriate mapping criteria was needed. We chose the Osgood River Muskeg (55 ha) and Joe Indian Bog (69 ha), both associated with river systems, and Spring Pond Bog (223 ha) and Waverly Bog (120 ha), which are headwater peat mats. Wetland watersheds were delineated using stereo pairs of leaf-off USGS 1:40,000-scale NAPP color infrared air photos from early spring 1994-1997. Using the patterns of vegetation and surface features observed on the photography, we inferred the pour point(s) of the bog mat as the origin of each watershed boundary. Unlike most surface waterbodies there were many pour points for each of the peatlands, and one had as many as six. Watersheds were mapped independently by two people, compared and resolved by a third, transferred to a 1:24,000-scale basemap and digitized. The ratio of peat mat area to watershed area was calculated to describe the hydrologic relationship between the wetland and the surrounding landscape. The concept that there is usually very little upland area influencing bog hydrology is reflected in the low mat:watershed ratios (about 1:2) of three of the wetlands. The fourth, however, the Osgood River Muskeg, had a ratio of 1:7.