

**Sixth Annual Conference on the Adirondacks**  
**May 26 - 27, 1999**  
**Hotel Saranac, Saranac Lake, New York**  
**Conference Abstracts**

**Wednesday, May 26**

**9:00 to 10:30 Culture and Society, Academy Room**

**What Floats Your Boat?, Graduate Thesis on "Open-Water" Environmental Education**

*Matthew Witten, Graduate Student and EPA Fellow University of Vermont School of Natural Resources*

As a graduate student at the University of Vermont, I have conducted research on an array of programs that routinely take middle- and high-school students onto the open water for educational purposes. Before I began my formal research, I had worked on large sailing vessels (on the Hudson River and elsewhere) and also as a kayak-trip leader (for the Lake Champlain Maritime Museum), both involving environmental education with teenagers. For my study, I have observed a half-dozen programs, interviewed several program directors, and received over 25 responses from around the nation to a mail survey of Open-Water Environmental Education programs.

The focus of my study has been the practicalities of starting and running these programs, rather than their curricula or philosophies (although I researched these to some extent). The goal of my research is to produce "nuts-and-bolts" information that will be useful to those who wish to start an open-water program on their local lake, bay, or river. To that end, the thesis (which will be completed in March) discusses insurance, partnerships, boat maintenance and equipment, among other logistical and administrative issues. During my research, I observed a few things that may be of interest. Firstly, open-water programs need not be very capital-intensive. There are some wonderful and ambitious programs that build large sailing vessels for open-water education programs, but there are also fleets of canoes and pulling boats (large rowboats) that cost a fraction of the larger boats. Secondly, an emphasis on hands-on involvement instead of high-tech equipment is what seems to work best to keep students' attention. Thirdly, usually an affiliation with a larger institution such as a university, a museum/aquarium, or school district helps get programs off the ground and also cover issues such as insurance. This takes more leg work and consensus-building, but probably pays off in the long run.

**Bewildered: Defining Adirondack Great Camps As National Historic Landmarks**

*Michael Wilson, Sagamore Institute*

Adirondack Great Camps, the woodsy, waterside retreats of the monied urban elite, are the architecture for which this region is best known. Their design styles are so eclectic as to defy categorization, except for one dominant characteristic—the 'rustic' (or haut rustic, in a popular oxymoron). On the strength of their rather recent recognition as prototypes of National Park Service rustic design, Adirondack Great Camps are likely to achieve National Historic Landmark status this year, inviting a re-evaluation of regional history in more comprehensive themes of American culture.

Using slides as illustration throughout, the argument of this presentation will outline some national thematic contexts that Great Camps invoke for regional culture by 1. tracing the historic origins of the Adirondack haut rustic; 2. regarding their significance as rooted primarily in relation to a naive, pictorial ideal of "wilderness"; and 3. concluding that Adirondack Great Camps represent an immature stage, a still-incomplete transition, in the evolution of our culture's attitudes toward wild nature.

**Balancing Curation and Access: An Assessment of the Lake Champlain Underwater Preserve Management Plan 1998 – 2008**

*Todd Hannahs*

Currently the States of Vermont and New York are taking a renewed interest in the submerged cultural resources in Lake Champlain. One result of that interest has been the creation of a ten year management plan for the expansion of the current Vermont Underwater Historic Preserve system to include New York as a partner. The plan also envisions the expenditure of over a million dollars in the next ten years and a significant increase in usage of Lake Champlain's underwater cultural resources. This paper will assess the proposed plan from the archaeological, economic, social and historic preservation perspectives.

**9:00 to 10:30 Atmospheric, Berkeley Room**

**Preliminary Investigation of Possible Atmospheric Contributions to Lake Champlain**

*Ning Gao, Douglas Barber and Brian Moore, Department of Chemistry, Plattsburgh State University*

Atmospheric deposition pathways are thought to account for input of many pollutants found in aquatic systems in general. Therefore, air quality study based on available air toxics monitoring data is essential for the investigation of possible impact of air pollutants on the aquatic environment of Lake Champlain. A preliminary statistical study has been initiated using the fine particulate data from Underhill, Vermont, one of the seven sites belonging to the Northeast Regional Particle Monitoring Network (NEPART). This data set, made available by Richard Poirot of DEC, Vermont, includes ambient concentrations

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determined from analyses for mass, light absorption (elemental carbon), and elemental composition (hydrogen and elements between sodium and lead).

Two statistical approaches have been employed, the time series analysis and the principal component factor analysis (PCA). PCA is a form of eigenvector modeling that has been widely used in air quality studies. It can compress ambient air data into fewer dimensions and identify contributing sources with a chosen number of factors. In this study, PCA was performed for the sub-sets, each of which contains a single year of data for Underhill from 1989 to 1993. The modeling analysis has revealed several possible types of emission sources that contributed to the ambient environment. These possible sources include soil, sea spray, coal-fired power plants, oil-fired power plants, automobiles, and smelters. This preliminary study will provide directions for future modeling work that will incorporate VOCs and meteorological information to pinpoint locations of the possible contributing sources.

#### **Cloud Water Chemistry in a High Elevation Spruce-Fir Forest**

*Sean T. Lawson and T.D. Scherbatskoy, University of Vermont School of Natural Resources*

*E. Malcolm and G.J. Keeler, University of Michigan Air Quality Laboratory*

As part of the Lake Champlain Basin watershed study of mercury (Hg) deposition, cloud water and canopy throughfall collections were initiated in August 1998 near the summit (4063') of Mt. Mansfield, Vermont. A passive Teflon string-filter collector was used to sample cloud/fog water at timberline and 3 paired glass and polypropylene funnels collected cloud drip throughfall under the red spruce-balsam fir canopy. Samples were analyzed for pH, conductivity, and concentrations of Hg, major ions (NO<sub>3</sub><sup>-</sup>, SO<sub>4</sub><sup>-</sup>, NH<sub>4</sub><sup>+</sup>, Ca<sup>+</sup>, Na<sup>+</sup>, Cl<sup>-</sup>, K<sup>+</sup>), and 28 trace elements. Ultra-clean sampling techniques were utilized throughout the study. Hg and trace element analysis were conducted in a Class 100 air quality laboratory at the University of Michigan. Nine cloud events were sampled from 10 August to 16 October for cloud water (n=21) and four events for cloud throughfall (n=16). Cloud water pH values were highly acidic, ranging from 2.11 to 4.08. In six of the nine cloud events, pH was less than 3.0. Hg concentrations in cloud water were similar to precipitation with a range of 4 to 48 mg/L. Cloud throughfall chemistry showed significant increases over cloud water in Hg concentrations, pH, and base cations (Ca<sup>+</sup>, K<sup>+</sup>, Mg<sup>2+</sup>). These results suggest that highly acidic cloud events may be leaching important nutrients from tree foliage and washing dry deposited Hg from tree surfaces. Cloud water may deposit significant fluxes (previously underestimated) of mercury and other pollutants to high elevation ecosystems and the Lake Champlain watershed as a whole.

**11:00 to 12:30 Community-Based Research in the Adirondacks, Academy Room**

#### **Construction of Community in the Clifton-Fine area of the Adirondack Park**

*Todd Thomas and Valerie Luzadis*

"Sense of place" and "community attachment" are terms that have long been used in urban and rural sociology. They attempt to detail how and why people connect to certain geographic areas. An area that has had little published research of this sort until recently, however, is the Adirondack Park of New York State. The previously mentioned sociological terms, and the thought behind them, are of growing importance in the fields of natural resource management and conservation. Nationally, there is a movement toward local-based decision making or inclusion of local people and interests in the administration process. Before this can be considered in the Adirondacks, more information gaps must be filled. Much statistical data exists on the people of the Adirondack Park, but there has been little focus on how they envision "community" and which communities they most feel a part of.

This study is a first step in providing some information about construction of community within the towns of the Adirondacks. The research focuses on Clifton and Fine, two economically and politically-linked towns wholly within both the Adirondack Park and St. Lawrence County. Qualitative interviews were conducted with 51 members of the community, of varying residential and socioeconomic status. From these interviews, six primary factors residents used to identify themselves and their community were revealed. Implications of these factors for natural resource managers and other decision-making bodies are discussed.

#### **Community Development in the Adirondacks, Bridging Healthy Towns to Healthy Environments: A Case Study of Tupper Lake, New York**

*Heidi E. Kretser*

Tupper Lake is the crossroads of the Adirondack Park. Over the years, the community has maintained its own unique characteristics, yet the shared geography enhances attributes comparable to those of other Adirondack towns. As most Adirondack communities, Tupper Lake struggles for economic prosperity within the legal and environmental confines of the Adirondack Park. The Adirondack Communities and Conservation Program's research on community development in Tupper Lake aims to clarify an understanding of residents viewpoints and to identify relationships between the community and the surrounding environment. This information will be used as a tool for generating and prioritizing ideas for future community development projects in Tupper Lake.

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The research was divided into four sections: literature and newspaper reviews, a written survey, interviews of community members, and interviews of regional organizations. The following objectives were addressed.

- 1) Define community in the context of the Adirondack Park.
- 2) Describe the community development strategies with respect to local and regional initiatives.
- 3) Assess how the community integrates the natural surroundings in development plans.
- 4) Understand the visions of various stakeholders involved with community development.
- 5) Determine acceptable community changes on the local, regional, and state level.

The resulting definition of community is based on three levels: core community, secondary community, and peripheral community. Several themes emerged from the interviews with key core community members. Interviews with members of the secondary and peripheral communities consistently raised similar issues. This suggests the potential for collaborative work among the various leaders from Tupper Lake and elsewhere to address some key issues of concern for the future of the community. Recommendations to advance the on-going dialogue among community members include adapting strategies committed to:

- Mobilizing the community from within
- Focusing on common interests
- Using existing assets
- Identifying the community's niche
- Maintaining consistency among different initiatives
- Working at the local level with a regional perspective
- Facilitating inter-community and stakeholder collaboration

The recommendations are the important first steps to establishing a link between healthy communities and healthy environments in the Adirondack Park.

#### **"Highlighting Johnsbury's Assets": A Resident-based Community Profile; A project supported by the Johnsbury Town Board and The Adirondack Communities & Conservation Program**

*Cali Brooks, The Adirondack Project*

The methodology for the research is based on the belief that the people of Johnsbury are looking for more than just economic development. They want to create wealth, build community and improve the quality of life by building capacity based on the desires of residents and the communities' natural resources. Due to Johnsbury's geographical location, they realize that it would be impractical to limit all their efforts to compete with Glens Falls in importing industry. They are instead seeking to utilize the unique features that Johnsbury offers as an attractive, desirable community. The research began by highlighting Johnsbury's existing assets and creating a community profile of the seven hamlets using facts, data, anecdotes and maps. It also includes a qualitative study using both a survey and personal interviews with Johnsbury residents based on their perspective regarding current and future development for the town. The end product will be an updated version of the 1987 Town of Johnsbury: Inventory and Analysis, which includes existing land-use, population demographics, community facilities, soil and biological characteristics, sign and regional landscapes, updated GIS maps and the resident-based opinion information.

**11:00 to 12:30 Atmospheric, Berkeley Room**

#### **Air Pollution Patterns and Trends in the Lake Champlain Basin**

*Timothy D. Scherbatskoy, University of Vermont School of Natural Resources*

*Richard L. Poirot, Vermont Agency of Natural Resources*

*Barbara J. B. Stunder and Richard S. Artz, National Oceanic and Atmospheric Administration*

The Lake Champlain basin, although predominantly rural, is exposed to a variety of atmospheric pollutants and related environmental stressors, largely originating outside the basin. These include acid rain, dry deposition of sulfur and nitrogen compounds, organic and inorganic toxic substances in gaseous and particulate forms, tropospheric ozone, ultraviolet radiation, and climate change. The relatively large land area of the basin (18:1 land:lake area) is about 62% forested and 27% agricultural, facilitating the capture of air pollutants and complex interactions and direct and indirect effects on the lake and ecosystems in the basin. Because of the growing human population in this region, complex and diverse ecosystems, and multiple ecosystem management issues, it is important to frequently assess the status and impacts of atmospheric contaminants in the basin. This report summarizes the relevant information on regional air quality during the past two decades, collected at several monitoring sites in northern Vermont, New York and Quebec. The data show patterns and trends for concentration or deposition of acidifying compounds, mercury, toxic compounds, fine particulates and ozone. Exposure to many of these contaminants continues to threaten human and ecosystem health in the basin, despite increased regulation of air pollutants. Analysis of regional meteorology and application of air transport models to these data show the probabilistic extent of the airshed affecting the basin and the contaminant source regions. Finally, current information gaps and research needs are identified to guide future work to improve our understanding and control of air pollution issues in the basin.

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### **Climate Change and the Adirondacks; What's Next?**

*Curt Stager and Michael Martin, Paul Smith's College*

There is a consensus among scientists that global average temperatures will probably rise significantly during the next century. However, possible effects of those rising global average temperatures on local or regional-scale precipitation, temperatures, and wind patterns are much more difficult to pin down with precision. With such uncertainty reigning over future weather predictions, it is very risky to make predictions about how climates of the 21st century might affect particular ecosystems. But will we let that stop us? No way! As scientists who study Adirondack ecosystems from the inside, we can't help but draw up a tentative list of possible climate-ecosystem linkages to watch for during the coming decades. We will summarize what we've been able to uncover about this century's climate trends in the Adirondacks, recklessly extrapolate them into the future, and speculate on what our projections could mean for Adirondack forests and lakes and their inhabitants.

### **Acid Rain in the Adirondacks: Why Is It Still a Problem?**

*Karen Roy, Adirondack Park Agency*

*Howard Simonin, DECBureau of Environmental Protection*

*Edward Bennett, DEC Division of Air Resources*

*Walter Kretser, Adirondack Lake Survey Corporation*

Acidification of watersheds and surface waters from atmospheric deposition is a continuing problem in this country, especially in the Adirondacks. We provide an overview of the good news/bad news aspects of acidic deposition recently published in major reports by the US EPA and Canada. While all reports identify significant progress in reducing the deposition of pollutants that cause acidification, unfortunately they also conclude that acidification of Adirondack lakes and streams continues. EPA's 1995 Report to Congress concluded that reductions of both sulfur and nitrogen by 40 to 50 percent below levels achieved by full implementation of the Clean Air Act Amendments (not expected until 2010) would be required to maintain the number of acid lakes in the Adirondacks at 1984 levels. Adirondack high-elevation forests also continue to be impacted. Among other findings, the National Acid Precipitation Assessment Program Biennial Report to Congress concludes that high-elevation spruce-fir forests in the eastern United States are at risk of continued degradation, especially in areas where nitrogen levels are already high, with more adverse effects developing if deposition levels are not reduced. In the meantime, while we wait for further action, it is a major struggle to find adequate funding to support even the "barebones" monitoring systems in place for tracking actual changes in atmospheric deposition, lake recovery and forest ecosystem effects. We conclude by making a plea for increased awareness of this local and national issue and for support in responsibly seeking solutions for the stabilization and recovery of sensitive Adirondack ecosystems.

### **11:00 to 12:30 Research on Adirondack Women, Part I, Academy Room**

Session Organizer: *Lorraine M. Duvall*

Presenters: *Peggy Eyres, Karen Glass, Kenda James, Linda Lumsden, Sandra Weber and Fran Yardley*

The main objective of these two sessions is to provide a perspective on what women today are doing to re-construct the stories and contributions of Adirondack women. The telling of women's experiences and lives can be in many forms: non-fiction and fictional writings, songs, re-enactments, and oral storytelling. Sandra Weber will discuss the obstacles she encountered in searching for information on Esther McComb and Josephine Schofield and the surprising stories and people she met during her research for her two books, Linda Lumsden her research on Inez Milholland, Peggy Eyres her investigations of stories for her songs, Fran Yardley her research on Martha Reben and Jeanne Robert Foster for her storytelling and Kenda James and Karen Glass the research and activities of the organization Adirondack Women in History, Inc.

*Linda Lumsden:*

Inez Milholland was the most glamorous suffragist of the 1910s, famous for her starring role at the head of suffrage parades and as the star of suffrage pageants. She epitomized the New Woman who emerged in the decade, and her life touched upon virtually every aspect of the radical culture that flourished in Greenwich Village in the prewar years. After she collapsed and died unexpectedly at age 30 during a 1916 suffrage campaign, a memorial service for her in the Capitol Rotunda became the first ever held there for a woman. She became an icon of suffragists, who undertook their most militant protests in her name. Her supposed last words — "Mr. President, How Long Must Women Wait for Liberty?"— became their rallying cry. In 1924, Lewis was the site of the last large feminist gathering prior to the women's liberation movement when the National Woman's Party staged a lavish pageant here reenacting Milholland's life and celebrating her spirit. Dr. Lumsden's thesis is that it is no coincidence that this independent woman who loved life had an Adirondack connection. Ms. Milholland's father was born in a small cabin in Lewis; after he became a millionaire in the 1890s, he bought the old homestead and 1,800 adjoining acres on which he erected a grand farm. It is now the Meadowmount School of Music. Inez spent summers here and is buried in Lewis. Much of her character came from her father, an idealistic reformer, who was passionate about the Adirondacks. Dr. Lumsden's research over three years has taken her to nearly twenty archives in seven states and Washington, D.C.: she will do more in London and Northern Ireland this summer. The Ticonderoga Historical Society, the Adirondack Center Museum, and the

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Essex County records office have been valuable resources. In her presentation, Dr. Lumsden will discuss her research in the Adirondacks and show slides of the Milholland family's life in Essex County.

*Sandra Weber:*

Sandra Weber's research has included a study of an Adirondack farm girl, Esther McComb, who lived near Wilmington in 1840-60. Esther is the only woman with a high peak named for her and the first person who climbed an Adirondack peak "for the sheer joy of climbing." Weber also studied a woman who visited the mountains for only two weeks in 1877, but left her name on Mount Jo and her legacy in the greatest love story in Adirondack history. Despite the wealth of literature detailing the Adirondacks' colorful history and wild scenery, it is difficult to find published information about women in the Adirondacks. Weber had to search county clerk basements, old cemeteries, churches, mountaintops, libraries, museums, and cellar holes throughout the eastern states to uncover information about the lives of Esther and Jo.

*Peggy Eyres:*

Peggy Eyres, singer and songwriter, known as "The First Lady of Adirondack Music," has written a collection of songs which deal with women's lives and experiences, combining history, the environment, science, music and women's heritage. She will discuss her investigations on collecting information for her research and will sing one of her songs on Adirondack women.

**3:30 to 5:00 Research on Adirondack Women, Part II, Academy Room**

*Fran Yardley:*

Fran Yardley will present the results of her research and development of "Martha," a story about Martha Reben who cured for tuberculosis on Middle Saranac Lake in the early 20th century. The research included the review of books written by Martha Reben and current and archival literature from the Saranac Lake Free Library; interviews with various people who knew and visited her at her camp on Middle Saranac; and the journal writings of Fred Rice, Martha's guide. Fran will also present her inquiry on Jeanne Robert Foster and Foster's mother, Lucia Newell Oliviere. This work is primarily based upon the poems by Foster published in "Adirondack Portraits; A Piece of Time", Kate Winter's book "The Woman in the Mountain," and extensive conversations with Riedinger-Johnson. This latter work is interesting in that Fran's approach is to respect the literary works of these two women and present their poems and writings verbatim rather than create a story as she did with Martha Reben.

*Kenda James, Karen Glass:*

Over the years, there have been numerous writings and stories published about men in the Adirondacks. Adirondack Women in History's mission is to research, publish and celebrate the contributions of women in the Adirondacks. To date, this research has uncovered over 500 notable and remarkable women. AWH's research started in 1994 with an arts council grant. Research typically starts within archive collections within the Adirondacks. From there, sources can direct researchers to California, Michigan, Wisconsin, Iowa, Kansas, Massachusetts, or wherever the women or their descendants have located. AWH has found that indexing these archives relative to "only remarkable" Adirondack women is poorly done. [Notable women are much easier.] Flipping page by page through manuscripts, writings, news articles and photos is the only way to ensure coverage of these women. AWH co-sponsors an annual writing contest on Adirondack women, which also promotes local research activities. Most people are surprised to discover the notable women from the Adirondacks, like the first female steamboat captain in the world, the first ordained female minister in the U.S., the first female dentist/dental surgeon, and many more. The many remarkable women of the Adirondacks, on the other hand, are women who lived normal, common lives in uncommon ways, as they battled against the environment, the culture, etc. An outgrowth of the research was to share this wonderful information through publications and celebrations. AWH conducts lectures on related topics, in addition to more than five different dramatic performances which bring these women and their histories to life. Ms. James is currently working on a first book on women in the Adirondacks, in addition to a two-act play about two women lighthouse keepers on Lake Champlain. AWH outreach programs bring Adirondack women to life to about 5,000 people each year. In her presentation, Ms. James will discuss the work of AWH and share information and slides about some of the notable and remarkable women discovered through this research.

**1:30 to 3:00 Water Quality and Hydrodynamics, Berkeley Room**

**Historical Changes in The Upper Hudson River Watershed**

*Jane Serra, Leo Hetling and Norbert Jaworski*

This paper presents changes in water quality at the mouth of the Upper Hudson River at Waterford over the past 100 years. It explores in detail changes in demographics and land use of the Upper Hudson River watershed over that time period. Data showing changes in population, farm animals, feed crop, fertilizer use, waste water discharges, road salt use and air deposition in the watershed over that time period will be presented.

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#### **Characterization of Dynamics and Source Water within Shelburne Bay for the Champlain Water District**

*Michael G. Barsotti, T.O. Manley, Richard Pratt, James Fay and Dave Sardilli*

Champlain Water District's intake is positioned 2,480 feet offshore at a depth of approximately 75 feet in the northern channel of Lake Champlain's Shelburne Bay in Northwestern Vermont. Current and temperature profiles were gathered from July 1997 to June 1998 at one mooring in close proximity to the intake. Weekly microbial samples were analyzed for total coliform, *E. coli* and enterococci. While raw water microbial source tracking (MST) samples were collected during fall 1997 and spring 1998 raw water turbidity data were also routinely obtained.

Current and temperature data obtained 30 meters to the southwest of the intake pipe documented the presence of an internal standing wave (seiche) with period of approximately one day. This is in strong contrast to the dominant uninodal internal seiche of the central main lake with a period of approximately 4.3 days. Temperature data indicated that the CWD intake is occasionally impacted by warmer surface waters during May-October and that the metalimnion (thermocline) gradually drops below the intake level in mid-October.

The Microbial monitoring showed average *E. coli* levels of 6.3 cfu/100 ml in 1997 with a maximum of 70 cfu/100 ml. The *E. coli* results indicate that levels become relatively higher after the thermocline drops below the CWD intake during the Winter/Spring rain/snowmelt events. For the MST monitoring 65% of isolated clones had unidentified environmental sources, 10.6% were from sewage, 9.1% were from human sources, 7.6% were from cow, 1.4% were from deer/elk, and 6.0% were from avian (duck/goose).

Raw water turbidity data showed consistent trends with the exception following combined rain/snowmelt events. Following a rain/snowmelt event on March 9, 1998, raw water turbidity increased from a stable 2.1 ntu up to 23 ntu.

Combined data sets showed that when the thermocline moved below the level of the intake in late fall, the sanitary quality of the water was degraded for approximately 4 to 6 weeks. This degradation was relatively minor when compared to the State of Vermont bathing beach recommendations. The data from the March 1998 combined rain/snowmelt event showed how the density of stream runoff, as indicated by temperature, can carry high turbidity water to the level of the CWD intake during non-stratified conditions.

#### **Assessing Hg Burdens in Vermont and New Hampshire Lake Waters and Sediments — A Regional Environmental Monitoring and Assessment Program Initiative**

*Neil Kamman*, Vermont Department of Environmental Conservation,  
*Robert Estabrook*, New Hampshire Department of Environmental Services  
*Charles Driscoll*, Syracuse University

In recent years the biogeochemistry of mercury in north-temperate lakes has become increasingly well understood. Such research has been undertaken on a limited scale in the Lake Champlain Basin, and not at all in the remainder of the VT/NH region. Thus, in 1998, a REMAP project was launched to assess total and methylmercury concentrations in the sediments, waters, and biota of 90 spatially-randomly selected lakes, 18 of which are in the Lake Champlain Basin. The project aims to link Hg concentrations in aquatic and trophic compartments of lakes with those physico-chemical constituents (DOC, watershed/lake area ratio . . .) known to mediate methylation and bioaccumulation of Hg, to ascertain the physico-chemical identity(ies) of those lakes which have elevated Hg concentrations in upper trophic levels. The following project components are being undertaken on the study lake set: a 90 lake HgT, MeHg, and physico-chemical survey; a 90 lake survey of the blood and feather Hg burdens of piscivorous birds; a 45 lake fish-tissue Hg survey; and a 20 lake survey of Hg in plankton and macroinvertebrates. In addition, a 12 lake paleolimnological investigation of recent Hg deposition is being conducted in VT/NH, in concert with a similar initiative in the Adirondacks, whereby seven PIRLA study lakes will be re-cored. As of 1999, this collaborative REMAP effort is in year one of a three-year field phase. A comprehensive overview of the project will be provided, along with preliminary findings from the 1998 season.

**3:30 to 5:00 Economics, Land Use, Management, Ballroom**

#### **Developing an Integrated Sustainable Agriculture Concept to Assist with Water Quality Management in Lake Basins.**

*Jean-Marcel Dorioz*, Visiting Professor, School of Natural Resources, University of Vermont, and Chargé de Recherche, Institut National de la Recherche Agronomique, Thonon les Bains, France  
*D. Roybin*, Institut National de la Recherche Agronomique, Systeme Agraire Developpement, Chambéry, France  
*Deane Wang, E. Alan Cassell and Mary Watzin*, Professors, School of Natural Resources, University of Vermont

A lake, its watershed, and the people living there, comprise a complex, functional, landscape unit that should be managed as a whole ecosystem. In the context of the management of water quality, agricultural nonpoint source pollution exerts a negative pressure on sensitive biological systems within lakes and is an increasingly important management issue. The consequent, negative, altered state of the lake elicits a social response and creates the need to change agricultural practices in the landscape. This feedback loop between the state of the lake and the pressures exerted by agriculture can be refined by

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employing sustainability concepts in management activities and the development of policy. However, currently, these responses take the form of voluntary best management practices (BMP's, AMP's) encouraged by subsidies. This management approach lacks the characteristics of a sustainable process because the outcome is too dependent on the continued good will of the farmers and the ability of government to provide long-term subsidies. Using examples for Lac Lemay, France and Lake Champlain, USA, we will illustrate the importance of considering social, aesthetic, economic, and cultural factors in creating more sustainable feedbacks to insure overall environmental quality (with a focus on water). To consider this multidisciplinary framework, we propose to broaden the concept of the farm to a bio-socio-economic system. A preliminary model of this farming system will be presented.

#### **A Watershed Management Model for Optimizing Terrestrial Lime Application to Mitigate the Effects of Acid Rain**

*Dr. Lyn M. McIlroy*, Center for Earth & Environmental Science, Plattsburgh State University

Watershed liming is a mitigation technique used to decrease soil and surface water acidity in response to acidic deposition. This research focuses on the development and application of a mathematical model to accurately predict the mechanisms involved in terrestrial liming, and as a means of planning and evaluating methodologies for lime application. A terrestrial application of calcite was applied to the Woods Lake watershed, located in the Adirondack Park, as part of an Experimental Watershed Liming Study. A dose of 10 MT/ha of calcite was applied to 48% of the watershed, resulting in a total calcite mass application of 1100 MT. A Watershed Liming Dose Optimization Model (WaLDO) was developed to describe pre- and post-liming water quality by comparing model simulations with data collected from soil and stream monitoring stations. Model predictions illustrate a rapid response in soil and surface water ANC and pH as a result of the calcite application, and a slow response to reacidification. Long-term buffering of the watershed/lake system was the result of a large pool of exchangeable calcium on the soil ion-exchange complex. WaLDO predicted an increase in base saturation in the two upper soil layers from 10% to 89% and 60%, respectively, for a calcite dose of 10MT/ha. Model simulations estimated a 15-year time period to completely dissolve the calcite and 35 years until the watershed returns to pre-liming chemical concentrations.

#### **Balancing Economic and Environmental Impacts of Phosphorus Management: Project Overview**

*D.W Meals, R. Wackernagel, B. Anderson, A. Dodd, D. Erickson, C. Halbrendt, W. Jokela, B. Resosudarmo, and L. Wood.*

Management strategy for Lake Champlain calls for reductions in phosphorus loads from agricultural, as well as other sources; however implementing new farm management practices may increase farm costs while providing public benefits. The goal of this three-year project is to enhance environmental quality and preserve farm economy by evaluating financial and water quality trade-offs associated with implementation of alternative farming practices for phosphorus reduction. A watershed phosphorus loading model (GISPLM) and a farm financial model (FLIPSim) are applied jointly to the Little Otter Creek Watershed in Addison County, Vermont to assess the financial and environmental impacts of a variety of Best Management Practice (BMP) programs. By combining the two models, the project seeks a specific strategy that will achieve the 8% phosphorus load reduction proposed in the Lake Champlain Basin Program plan, while sustaining dairy farm profitability. Quantitative model results will be extended to farmers, agricultural service professionals, and policy makers. The work is being conducted by a team from Associates in Rural Development, Inc. (ARD) and the Departments of Community Development and Applied Economics (CDAE) and Plant and Soil Science (PSS) at the University of Vermont. The project is in the early stages of developing cooperative relationships with watershed farmers and assembling the hydrologic, land use, agronomic, and financial database for model application and calibration. Project design, the two models, and progress to date will be discussed.

**3:30 to 5:00 Fish and Wildlife**, Berkeley Room

#### **Microhabitat Selection of the Eastern Sand Darter (*Ammocrypta pellucida*) with Respect to Substrate Particle Size.**

*Leah K. Staniels and Douglas E. Facey*, St. Michael's College

Eastern Sand Darters (*Ammocrypta pellucida*) are thought to have very specific microhabitat preferences, including a strong preference for sand substrates. Previous sampling experience suggested that some sizes of sand particles might be preferred over others. We undertook this study to investigate whether such a preference could be shown in populations of *A. pellucida* in the Winooski River, Vermont.

Eastern Sand Darters were sampled by seining relatively small areas of the Winooski River having uniform substrate composition. Substrate samples were taken from all areas sampled, whether or not sand darters were caught. Each substrate sample was dried and separated by particle size, the mass of each component was determined, and the percent composition by mass of each substrate size category was calculated. Eastern sand darters were found only in areas containing less than 1.5% fine silt particles (< 0.014mm). No preference was found regarding intermediate sand particle sizes (from 0.07 mm to less than 4.1mm). Few sand darters were found in areas with a high concentration of gravel particles greater than 4.1mm.

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In the course of this study, *A. pellucida* were discovered above the second dam in the Winooski River, an area that had not been previously sampled for the species. Additional sampling in the Missisquoi River revealed *A. pellucida* above the Swanton dam. The location of eastern sand darters in both the Winooski and Missisquoi rivers above dams that were built prior 1920 suggests that these populations have been well established in these rivers for some time.

This study provides quantitative information about substrate particle size preference of the Eastern Sand Darter, which can be useful in management and conservation decisions. It also provides evidence for historical information about populations of *A. pellucida* in Vermont.

#### **Recent Observations of Malformed Frogs in Vermont**

*Richard Levey, Vermont Agency of Natural Resources*

In the summer of 1996 malformed frogs were reported by the general public to the Vermont Agency of Natural Resources (VTANR) from 12 sites in five counties within the Lake Champlain Basin. VTANR surveyed four of the sites reported to have malformations and malformed frogs were found at all four sites. Of 290 northern leopard frogs (*Rana pipiens*) examined, the incidence of malformations averaged 13.1 percent, ranging from 5 to 23 percent. Malformations were primarily missing or incomplete limbs.

During the summer of 1997, VTANR with help from USEPA, USFWS, USGS-BRD and Middlebury College initiated systematic surveys targeting the northern leopard frog in Vermont. In an effort to document the extent and prevalence of frog malformations. Over 2500 northern leopard frog metamorphs from 19 sites which covered 13 towns and 5 counties within the Lake Champlain Basin, were collected and examined during July and September surveys. Roughly 8.0 percent of the frogs had abnormalities, the rates ranged from 1.2 to 45 percent. Categories of malformations were primarily missing and incomplete limbs and shortened and missing digits. VTANR continued the systematic survey during the summer of 1998, returning to 14 of the selected sites. To date VTANR has examined over 5000 northern leopard frogs from 20 sites in the Lake Champlain Basin. Roughly 7.0 percent of the frogs had abnormalities. With regards to the northern leopard frog, the abnormalities appear to be widespread within the Lake Champlain Basin. Based on two years of seasonal sampling records, observed malformity rates can vary considerably both seasonally and annually at sites.

Normal and abnormal frogs from several sites have been examined by an endocrinologist, immunologist, parasitologist, developmental biologist, geneticist and biochemist. Water and sediment samples from several sites have also been sent to researchers for chemical characterization and developmental toxicity tests.

Results from the National Wildlife Health Center, which included detailed examinations of normal and abnormal frogs from Vermont, suggest that there was no correlation between viruses, bacteria or parasites and the frog abnormalities. Radiographic evaluation of abnormal leopard frogs support current theories that many of the abnormalities are caused by primary errors in development, as opposed to deformations which occur later and are mechanical.

Vermont citizens reported abnormal frogs from 53 towns representing all 14 counties in Vermont during 1997 and 1998. Species reported with abnormalities include; northern leopard frog, green frog, pickerel frog, bullfrog, wood frog and American toad.

The widespread reports of malformed frogs in Vermont has made it difficult to link a particular land use correlation with reported malformed frog sites. Field investigations documenting the extent and prevalence of malformed frogs in Vermont and research as to the causation and mechanism of frog malformations will be continued this spring.

#### **Uncommon Ground: Site Characteristics of Landlocked Atlantic Salmon Spawning in two Adirondack Streams**

*Matt Nemeth, Daniel C. Josephson and Charles C. Krueger*

Habitat characteristics of landlocked Atlantic salmon (*S. salar*) spawning grounds were measured in two streams in the southwestern Adirondack Park in November and December of 1998. Stream channel gradients, redd densities, water temperatures, groundwater upwelling, redd depths, and gravel sizes did not differ significantly between sites ( $P > 0.05$ ). However, the two populations spawned in sites with significantly different water velocities, gravel temperatures, and substrate particle sizes ( $P < 0.05$ ). Natural reproduction of stocked salmon is relatively rare in New York; the description and quantification of spawning ground characteristics should help fishery managers identify suitable spawning habitat and thus be an important contribution to salmon restoration efforts in New York. Data from the two Adirondack spawning grounds will be compared with data reported for non-New York populations, and the implications for salmon management in New York will be discussed.



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### **Assessing Long-term Population Dynamics of White-tailed Deer in the Adirondack Park** *Genevieve M. Nesslang and William F. Porter, SUNY-ESF*

There has been an apparent downward trend in the Central Adirondack white-tailed deer population over the last 30 years. A series of three consecutive severe winters from 1968-1971 caused Adirondack deer populations to crash dramatically. Forest industries that lease land to hunting clubs are concerned that the Central Adirondack deer population has not recovered to its pre-crash size. Current Adirondack deer population studies are based upon the New York State Department of Environmental Conservation (DEC) deer-kill index, an index of the number of deer killed in each town per year. However, limited sex and age class information is available for predicting deer population trends because harvest of antlerless deer in the Adirondacks was eliminated in 1971. Therefore, we use a buck-kill per unit effort index from private hunting club records as an alternative method of identifying historic deer population trends. Hunting club records span the last three decades and include a measure of bucks killed per season, total man hours or man days spent hunting, and the size of the property. The trends identified by this index will be compared with results of the DEC buck-kill index. We identify regions within the Park that display similar trends due to regional differences in land use patterns over the last 30 years. We will clarify the direction of regional population trends in the Adirondacks so that forest industries and other private landowners can better manage white-tailed deer and their habitat.

#### **5:00 to 6:30 Poster Session**

### **The Effects of Five Silvicultural Treatments on Ground Flora, Overstory Composition, and Stand Structure: A Case Study in a Northern Hardwood Forest in the Northern Adirondacks**

*James R. Bove, Mark J. Twery, Michael Rechlin, Gary Wade, Kathie Detmar and Linda Fahey*

The environmentally aware public is increasingly concerned about the effects of logging on the ecological integrity of forest stands. Commonly held beliefs of the public are that logging decreases biodiversity, degrades forest plant communities, and reduces productive habitats. Because few studies have evaluated the effects of timber harvesting on ground flora and stand structure, the Northeastern Research Station, Paul Smith's College, and the Visitor Interpretive Center (VIC) have collaborated to study the effects of five silvicultural treatments (timber harvesting) on ground flora, overstory composition, and stand structure. Five-acre stands, located at the VIC in Paul Smiths, NY, are being used to evaluate the following silvicultural treatments: single-tree selection, group selection, two-age, shelterwood, and clearcut. Complete floristic inventories were done in 1998, prior to harvesting that is scheduled for 1999-2000. Re-inventorying the flora at regular intervals will allow us to track changes within and among stands (and treatments) over time. Locating this research at the VIC will allow the public to view and interpret the effects of these silvicultural treatments through both indoor displays and self-guided tours in the field.

### **Factors that Influence Bioavailability of Mercury in Adirondack waters**

*Donald H. Brown*

Mercury in the global environment has drawn attention to anthropogenic mercury emissions, especially the combustion of fossil fuels as well as combustion of municipal and industrial wastes. Environmental cycling of mercury results in its occurrence in the human food chain, being controlled by complex geochemical and ecological processes. The two most important processes are biotransformation and bioaccumulation. Mercury entering surface waters can be biologically transformed to methylmercury species. These are more soluble and mobile resulting in greatly increased bioavailability.

This study examines physico-chemical properties of freshwaters and their watersheds that are associated with bioaccumulation of methylmercury in sportfish. The geographic area of interest is the Adirondack Mountain region of northern New York State. The surface waters are particularly vulnerable to acidification due to steep terrain with shallow soils having limited buffering capacity along with relatively small ratios of watershed area to water surface area.

Recent data have shown elevated mercury levels in sportfish collected from Adirondack waters, some above the FDA tolerance level of 1 part per million. These data will be examined along with available morphometric and chemical data for these waterbodies and their watersheds to identify associations and determining factors that can be used to construct models that predict the potential for the methylation of mercury and subsequent bioaccumulation by fish in Adirondack waters. It is expected that the findings of this study will be applicable to freshwater systems in general.

### **How to Share the Adirondacks on-line with Others? Develop your own WEB**

*Lisa Johnson*

First a brief presentation of findings from a market research project will be made. This research explores if and how small business owners, entrepreneurs and other people in the Adirondacks use the Internet to reach out to customers, tourists and others interested in the Adirondacks. Do they have their own WEB page, if so has it been effective? How do they and others use it? How did they decide what information to include in the page and where on the Internet do they have their page posted?

The second part of the workshop will be a hands-on session where participants will learn how to develop their own WEB page. Participants will go through exercises, which will show how to decide what the purpose of the WEB page will be, and how to develop it. Participants have an opportunity to leave the workshop with a WEB page planned out and techniques to set it up.

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Participants interested in developing a WEB page, which allows them to share results of research, information and their love of the Adirondacks with others, should plan to attend this workshop.

#### **Geographic Information Systems and the Adirondack Community: Understanding the Spatial Relations of Socio-Economic Indicators**

*Andrew J. Keal*

The Wildlife Conservation Society (WCS) and the Adirondack Communities and Conservation Program (ACCP) use a combination of biological and socio-economic research to better understand and address critical issues. As part of its commitment to conservation in the Adirondacks, the ACCP will design an atlas of the Adirondacks. The spatially explicit data generated by GIS and other cartographic techniques will provide an interesting perspective on the history of communities in the Adirondack Park, the socio-economic status of these communities, and the natural environment surrounding these areas. As part of the work on the Atlas of the Adirondacks, an interactive CD-ROM is presently being produced which displays a variety of Adirondack GIS coverages accompanied by text and photos. Designing and compiling GIS data in various formats is an effort to bring many years of geographical work to the community. As people begin to see multiple spatial illustrations of the Adirondacks, they will have a better understanding of the region's character.

#### **Differential Survival of Zebra Mussel Veligers and Juveniles in Lake George, New York**

*Andrew S. Hansen, Brian R. McGrath, Marc E. Frischer and Sandra A. Nierzwicki-Bauer*

Since initial colonization of North America by zebra mussels, the overland spread of zebra mussels to inland water bodies has represented a large concern for future zebra mussel expansion. Since 1995 we have been conducting a zebra mussel-monitoring program at 11 sites in Lake George, New York. Lake George is a large (32 mile) glacial lake located in the Adirondack Mountains in northeastern New York, and despite its proximity to infested waters (e.g. Lake Champlain, NY/VT and the Hudson River) and intense recreational use, the lake appears to be free of zebra mussels. One explanation for the lack of zebra mussels in Lake George is its water chemistry, particularly its low pH and calcium content (10 year average calcium concentration =  $10.68 \pm 1.17$  mg/liter, and  $\text{pH} = 7.56 \pm 0.18$ ). However, based on observational data and current models, Lake George may provide borderline conditions for zebra mussel colonization and thus may be useful as a model for predicting the risk of zebra mussel colonization of other lakes with similar water chemistries. Since monitoring began, veligers have been observed in two of the four years (1995, 1997). Yet, despite the presence of veligers, which in 1997 were sometimes as high (in two locations) as those observed in the Hudson River, no adult zebra mussels or settled juveniles have been observed, despite the deployment of spat collectors, completion of an extensive underwater survey, and the establishment of a public mussel watch outreach program. These observations suggest that although mussels or veligers may be introduced into the Lake, they either cannot survive or reproduce there. To test this hypothesis laboratory experiments were designed to measure survival and growth of veligers and settled zebra mussels in artificial tank environments containing Lake George water and water from either the Hudson River or Lake Champlain (both of which support zebra mussel populations). In replicated experiments settled zebra mussels survived and grew for 17 weeks comparatively well in tanks containing Lake George and Hudson River water types suggesting that water quality parameters associated with Lake George water did not limit the growth of mature mussels. However, veligers placed in Lake George water ( $\text{Ca} = 12$  mg/liter;  $\text{pH} = 7.5$ ) died and dissolved completely within a week while veligers settled, survived and grew in water from Lake Champlain ( $\text{Ca} = 22$  mg/liter;  $\text{pH} = 8.3$ ). These studies suggest that poor veliger survival rather than growth of adults will limit zebra mussel colonization of Lake George and that a simple veliger bioassay can be used to determine the colonization potential of lakes.

#### **The Adirondacks Program at SUNY Potsdam**

*John T. Omohundro*

The Adirondacks Coordinated Environmental Studies program for first year students is in its sixth year. The program strives to enhance awareness of the region, environmental issues, and innovative teaching methods. It offers an integrated group of five courses for up to fifty students for a full semester to interested freshmen of any major. Offered in 1999 are courses in Writing, Environmental Studies, Geology, Biology, and Outdoor Recreation. All courses emphasize environmental studies; most also take the Adirondacks as a case study. Numerous field trips take students into the region.

#### **Adirondack Black Flies and their Control with Bti**

*Mary S. Rutley*

Black flies are nuisance pests that prevent resident and tourist alike from enjoying the Adirondack summer from May until mid-July. The female flies that have emerged from nearby moving waters inflict painful bites in obtaining the blood meal needed for egg production. An introduction to black fly biology — anatomy, habitat, life cycle, and feeding habits — identifies how to best control these insects during their larval stage. The filter feeding by larvae before the pest becomes a flying adult is key to success with an insecticide containing Bti (*Bacillus thuringiensis israelensis*). The basics of the Molloy Struble methodology for use of Bti in cold climate habitats are reviewed. Modifications of methodology now in practice for small streams and larger rivers of the region are examined. Literature concerning the effects of Bti on non-target organisms is identified. The history and development of control programs in the Adirondacks are presented. Information was gathered from interviews and

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correspondence with control program directors and from records of the New York State Department of Environmental Conservation, Districts 5 and 6. An A. C. Walker Foundation North Country Research Fellowship 1997-1998 supported this study.

#### **Balancing Economic and Environmental Impacts of Phosphorous Management: Models and Database Development**

*B. Anderson, A. Dodd, D. Erickson, C. Halbrendt, W. Jokela, D. Meals, B. Resosudarmo, R. Wackernagel and L. Wood.*

This three-year project will enhance environmental quality while sustaining dairy farm profitability by evaluating farm level financial costs and environmental benefits associated with implementation of alternative farm practices to achieve phosphorus load reductions necessary for the management of Lake Champlain. A watershed phosphorus loading model (GISPLM) and a farm financial model (FLIPSim) are being applied jointly in the Little Otter Creek watershed in Addison County, Vermont to assess both the financial and environmental impacts of a variety of Best Management Practice (BMP) programs. By combining the two models, the project seeks a specific strategy that will achieve the 8% phosphorus load reduction proposed for the Otter Creek watershed in the Lake Champlain Basin Program plan, while avoiding negative impacts on farm profitability. The project is in the early stages of developing the hydrologic, land use, agronomic, and financial database for model application and calibration. The poster will present an overview of both models as well as how they are integrated via shared input and output. In addition, the poster will provide a brief description of geo-spatial database development issues, farmer involvement, and lessons learned thus far.

#### **A Study of the Underwater Fault System of Lake Champlain near Port Kent, New York**

*Billie-Jo L. Gauley and Patricia L. Manley*

The fault system beneath Lake Champlain is based on the projection into the lake of well-studied land based faults in New York and Vermont. Due to the limited access, little direct study of the underwater faults has been made until now. In western Lake Champlain, underwater faults may explain topographic anomalies such as Ferris Rock. In order to study the faults, we have to rely on instruments that can image the bottom topography. The data consists of 6.8 square miles of side-scan records, taken during the 1997 Lake Survey, and 22.7 nautical miles of Precision Depth Recorder (PDR) tracts. Topographic escarpments on the lake bottom may represent faults. The alignment of escarpments along neighboring PDR tracts gives us the orientation of the fault. The PDR tracts indicate the existence of one fault west of Schuyler Island as well as several between the northern end of the island and Ferris Rock. The western fault can be aligned with a land based fault in New York that thrusts Ordovician Stony Point shale over Cambrian Potsdam sandstone. A final side-scan mosaic demonstrates the relationship of the underwater faults to those observed on land. The combination of PDR records and the side-scan mosaic allows us to define the underwater fault system of Lake Champlain near Port Kent in a more detailed manner than previous studies.

#### **Eight Year Experimental Sea Lamprey Control Program on Lake Champlain**

*John E. Gersmehl and Adam Zerrenner*

The negative impacts of sea lamprey parasitism on lake trout and landlocked Atlantic salmon in Lake Champlain initiated an experimental sea lamprey control program to help establish a salmonid fishery. Surveys conducted during the 1980's on Lake Champlain indicated that sea lamprey larvae were present at high densities in 14 tributaries and five deltas. An eight year experimental sea lamprey control program began in 1990 using lampricides in order to reduce sea lamprey parasitism on the Lake Champlain salmonid fishery. Agencies involved in the control program include: the New York Department of Environmental Conservation, the Vermont Department of Fish and Wildlife and the U. S. Fish and Wildlife Service. The experimental control program consisted of two applications of chemical lampricides applied to 13 streams and 5 deltas at four year intervals. Assessments to evaluate the success of the control program were conducted in part by the U. S. Fish and Wildlife Service. Assessments included monitoring changes in sea lamprey larval and adult abundance, and the analysis of sea lamprey wounds on salmonids. Sea lamprey populations in Lake Champlain peaked during the late 1980's and declined in 1992, following the first round of sea lamprey control. In the nine tributaries treated with lampricides since 1994, the densities of sea lamprey larvae decreased by an average of 93 percent compared to pre-control densities. On a lakewide basis, the abundance of spawning adult sea lampreys, as indicated by nest count surveys conducted in 10 index streams, declined by 80 percent in 1996 from the average level recorded during 1988-91. However, sea lamprey nest counts increased by 20 percent in 1997. Sea lamprey wounding rates on lake trout declined following completion of the first round of control in 1992; however, wounding levels have increased during 1996 and 1997. Increased wounding rates and nest counts indicates that the sea lamprey population have increased. The increase in the sea lamprey population may partially be explained by the recently established sea lamprey population in the Pike River, located in Quebec, Canada. Currently, a study has begun to evaluate sea lamprey abundance in the Pike River and different control technologies.

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#### **Lake Champlain Basin Native Mussel Monitoring and Research**

*Madeleine Lyttle, Dr. Ellen Marsden, David Hallac, Steve Fiske, Cathi Eliopoulos, Peter Stangel and Rick Levey*

The Lake Champlain Native Mussel Working Group's main focus is to coordinate and implement research of native mussel populations within the Lake Champlain Basin. The Working Group is composed of biologists and researchers who bring their combined experience and agency focuses for the purpose of promoting, maintaining and restoring our diverse native mussel communities.

The Lake Champlain basin area harbors the highest diversity of native mussel species in New England. This is primarily due to its past aquatic connections to the Great Lakes. However, it has been many generations since the mussel population within Lake Champlain had any genetic influence from outside the drainage. Therefore, the majority of the native mussels in the Lake Champlain drainage are considered unique. Currently there are no state or federally listed endangered mussels in the Lake Champlain drainage; however, Vermont lists *Legumia recta* (black sandshell) as Threatened. Additionally, Vermont has proposed *Lampsilis ovata* (pocketbook), *Leptodea fragilis* (fragile papershell), *Potamilus alatus* (pink heelsplitter), *Legumia recta* (black sandshell), *Anodontooides ferussacianus* (cylindrical papershell) and *Lasmigona costata* (fluted shell) for Endangered status and *Pyganodon grandis* (giant floater) for Threatened status.

The current focus on native mussels has been primarily reactive due to concerns regarding potentially conflicting programs such as sea lamprey control and hydroelectric dam operations and because of the recent infestation of zebra mussels. It is the intent of this poster to present some of our current findings and to inform the Consortium participating members of our progressing research

#### **Phosphorus forms and loads variability in Beaver Brook watershed and under rainfall simulation**

*A.R. Michaud and M.R. Laverdière*

Phosphorus forms and loads present high temporal and spatial variability in surface waters of agricultural watersheds. Water quality monitoring of a small (11 km<sup>2</sup>) agricultural watershed in the Pike River basin reveals orthophosphates and total phosphorus concentrations reaching respectively 250 and 1,500 mg/L P in 1998. In order to support the interpretation of this variability, a rainfall simulation study was conducted on 36 experimental plots (6m<sup>2</sup> surface area) distributed on three watershed dominant soil series. The split-plot design compares cropping effect (bare soil and hay) in secondary plot and manuring effect on main plot. Variability observed in forms and loads of P suggests that soluble load of P is controlled by manure treatment while particulate load is controlled by the cropping treatment. Beyond cultural effects, soil properties remains a determinant factor explaining exported phosphorus bioavailability.

#### **The Adirondack Nature Conservancy's 1998 Invasive Plant Survey**

*The Adirondack Nature Conservancy*

The Adirondack Nature Conservancy (ANC) conducted a roadside survey during the summer of 1998 to identify invasive plant species that may pose a threat to native plants and ecosystems in the Adirondack Park. Other goals were to develop a network of volunteers trained to monitor the Park for invasive species and to establish an information base to more efficiently direct conservation efforts. The survey recorded over 400 observations of ten invasive plants throughout the Park. These observations were mapped using Geographic Information System to determine the extent of invasion of each species. Results indicated that several species, particularly Japanese knotweed (*Polygonum cuspidatum*) and white sweet-clover (*Melilotus alba*), are prevalent along the Adirondack roadsides, while other species, such as purple loosestrife (*Lythrum salicaria*) and common reed (*Phragmites australis*), are becoming established in the Park.

In 1999, ANC will expand the Invasive Plant Project to include aquatic and additional plant species, to see if invasives have spread from the roads and into the backcountry, and to initiate management of key species where positive results are expected. We will also work with other organizations throughout the Park to increase awareness, monitoring, and management efforts for invasive plants in the Adirondacks.

### **Thursday, May 27**

**9:00 to 10:30 Panel Discussion**, Ballroom

#### **Rural Regions, Identity and Politics: The Cultural and Ecological Significance of Place**

*Cali Brooks, Marla Emery, James McCarthy, Dan Smith and Laura Tam*

How do regional naming, definition, and identity affect the politics, culture, and economies of rural American regions? What is it about a "place" or "region" that defines community identity, and shapes various stakeholders' actions toward its future? Discussants to this panel will explore the meanings behind regional definition, how local factors play into regional "place" identification, and how regions are useful and are used for particular interest group objectives. With research backgrounds on the influences of regions in political ecology, organized social movements, resource use, issue/problem definition, and

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collective sense of place, panelists will consider several ways in which regional paradigms are perceived and utilized by stakeholders. Using comparative studies from the Adirondacks, the Northern Forest, the Upper Peninsula of Michigan, and the American West, the panel will address how rural regions engender identities particular to their places, and how they have (re)constructed themselves over time. We will also explore what they have in common, with particular attention to challenges and changes in rural regions brought by the influence of the global economy.

**9:00 to 10:30 Economics, Land Use, Management, Academy Room**

#### **Modeling Land Use and its Effects of Biodiversity in the Adirondack Park**

*Michale J. Glennon and William F. Porter, SUNY-ESF*

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 a successful application of sustainable development principles. However, the true effects of land use management on wildlife populations in the Adirondacks are unknown. Little research has been done to assess the effects of development or forest industry practices in the Park. Assessing biodiversity in the Adirondacks has been established as an important research goal. We often have no scientific basis for understanding possible effects of issues such as major state land purchases and other land exchanges. We are using modeling to investigate how land use/cover patterns affect biodiversity in the Adirondack Park, focusing on vertebrate species. Data sets compiled by both the New York State Gap Analysis Program and Huntington Wildlife Forest make available some basic habitat relationships which form the basis of our model. We are exploring how these relationships might change as land use patterns change within the Park. Considering the Adirondack landscape as a whole unit is important to determining possible outcomes of management practices in terms of impacts on biodiversity. Preliminary analysis of data from the New York State/Breeding Bird Atlas indicates that species richness of breeding birds is related to habitat diversity, and probably affected by surrounding landscape characteristics. We are modeling several different management scenarios to determine how each may affect diversity and distribution of vertebrate species.

#### **A Management Model for Controlling Total Phosphorus in Lake Champlain**

*Dr. Lyn M. McIlroy, Center for Earth & Environmental Science, Plattsburgh State University*

*Joseph Racette, New York State Department of Environmental Conservation*

A user-friendly, interactive computer model for determining the transport and fate of total phosphorus was developed for Lake Champlain. The goal of this project was to create a management framework that could be easily shared among individuals and groups to assist in encouraging a consensus when developing pollutant reduction strategies. The model is formulated using a two-dimensional, multi-segmented approach for representing areas of concern within Lake Champlain. A dynamic mass balance equation is written for each segment to describe time-variable changes in total phosphorus concentration throughout the lake. Model input parameters are estimated using the data base produced as part of the Diagnostic Feasibility Study for Lake Champlain. The model uses a graphical user interface that makes it possible for anyone with basic computer skills to manipulate phosphorus input to the lake and instantaneously predict the resulting in-lake concentrations. A demonstration will be presented to illustrate the general usability of the model as an educational, research, and management tool.

#### **Defining Sustainable Ecosystems through Landscape- Scale Natural Resource Analysis**

*Daniel M. Spada, Raymond P. Curran and Avram G.B. Primack, New York State Adirondack Park Agency*

Maintaining sustainable development in the Adirondack Park relies on the preservation of natural systems as the basis for economic health and cultural stability. To better understand the effects of human activities on natural systems and to meet its statutory responsibility to evaluate new development for 'undue adverse impact,' the Adirondack Park Agency has been collecting and analyzing data on the condition of natural resources present in the Park. Data collection and assessment at a landscape level provides a means to measure and monitor ecosystem health at appropriate spatial and temporal scales, and offers a way to place the effects of development on natural systems in perspective. Assessment criteria such as lake nutrient sensitivity and wildlife habitat tailored to Adirondack conditions at the landscape scale need to be developed, tested, and incorporated into a comprehensive cumulative impact assessment protocol. Such a protocol could serve as the basis to improve existing impact analysis methods aimed at preserving and sustaining key ecological processes.

**9:00 to 10:30 Citizen Participation, Berkeley Room**

#### **Restoring an Historic Conservation Legacy: 897 St. Davids Lane, Niskayuna, N. Y.**

*David Gibson and Ken Rimany, Association for the Protection of the Adirondacks*

Since 1901, the Association for the Protection of the Adirondacks has worked to increase levels of public information, awareness, understanding, and commitment to the Adirondack Park as a protected area. Today, 98 years after its founding, the Association seeks to acquire the home and property of a great Adirondack conservation leader, the late Paul Schaefer, and build an adjoining publicly accessible Adirondack and Catskill research library.

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It is the Association's aspiration to have this facility (located halfway between the Adirondacks and Catskills, within 20 minutes drive to the State Capitol, the Albany Airport, and major highways) to become a place of learning to benefit and inspire current and future generations who will be called upon to protect their Forever Wild heritage in the Adirondack and Catskill Parks.

Key educational goals are to establish a permanent, publicly accessible library collection of cultural, natural and political history related to the Adirondacks and Catskills, develop collaborative partnerships with educational institutions to further both formal and informal learning in many fields, develop with these partners educational outreach programs for youth that can lead to informed future park and conservation supporters and leaders, provide meeting space for Adirondack and Catskill diverse interests, and create a link with the adjacent 100 acre Reist Wildlife Sanctuary and contribute to its public appreciation and educational potential as a vital open space asset.

#### **The Public Management of Private Septic Systems in the Adirondacks**

*David J. Allee*, Professor of Resource Economics, Cornell University

Several million households in New York State are served by on-site waste water treatment systems. They represent an important non-point source of pollution to our waterways and drinking water sources. Often the principle risk is for wells nearby, suggesting that education is an important policy tool. But in what other ways have we tried to improve the performance of this approach to environmental protection, how well do those who tried each approach think it has worked, and what do they think would improve results? Focus groups are being held all over the state, a number in the North Country. The experiences of lake and watershed associations are particularly interesting. The study is being funded by the NYS Environmental Protection Fund. Preliminary results will be presented and those in the audience will be asked to share their opinions to become part of the data for this policy and planning study.

**11:00 to 12:30 Economics, Land Use, Management**, Academy Room

#### **Guiding Outdoor Recreation Toward the Land Ethic**

*Dr. Charles J. List*, SUNY Plattsburgh

The Adirondacks and the Lake Champlain region present many opportunities for outdoor recreation. Aldo Leopold's *Land Ethic* provides, I argue, the means for evaluating and transforming such recreation along three dimensions. First, the aesthetic appeal of outdoor practices may be enriched and focused upon the value of the experience. Issues surrounding the use of gadgets versus skill are central. Second, there is an ecological dimension which requires an understanding of relationships necessary between recreationists and the land. Third, ethical commitments made in the form of codes of conduct for outdoor practices may be transformed by placing them in the context of the land ethic. This paper will extend these ideas into an area of great interest to me: angling.

This case presents many challenges because of the quality and variety of angling opportunities in this region. Two case studies will be examined: "fly fishing only" restrictions and the growing popularity of fishing tournaments. The basic question pursued will be whether the land ethic, as presented, provides the means for evaluating and resolving some of the issues involved in these cases.

My own interest in this area stems from my involvement with Trout Unlimited (as former president of the Lake Champlain Chapter and Region Five Vice President) and also it gives me the chance to extend some of my previous work on sport hunting into a new area.

#### **Restoration of an Adirondack Ecosystem Using Papermill Sludge**

*Christina A. Ricci and Dr. Michael R. Bridgen*, SUNY-CSEF

SUNY College of Environmental Science and Forestry and Appleton Paper, Inc. are testing the benefit of using one industrial waste product, papermill sludge, to reclaim another, iron mine tailings. Papermill sludge was entrenched in iron mine tailings in an attempt to rehabilitate the land and establish an artificially vegetated ecosystem. The iron mine tailing site contrasts sharply with the natural ecology and landscape of the Adirondack Park. As the tailings are in such a prominent place along the horizon of the landscape, it is desirable to improve this area in order to improve the overall aesthetics of the region. This research and development project has evaluated the benefit of adding sludge to the sand tailing "system" and whether an improved ecosystem may be established. Grasses were planted as a cover crop to control erosion. Hardwoods and conifer seedlings were later planted to promote the rapid development of a forest-like system. The tree species and grasses were evaluated for successful establishment and contribution to the improvement of the ecosystem. The immediate benefit of sludge application to the planted tree seedlings was also tested. Other ecosystem components such as new herbaceous growth, fungus, insects and wildlife were evaluated. The sludge treatment has positively affected seedling survival, growth, and structural diversity in the development of the improved ecosystem.

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### **Conservation Policy in Time and Space: Lessons from Divergent Approaches to Salvage Logging on Public Lands**

*George R. Robinson and Jeffrey Zappieri, SUNY Albany*

A fifty-year New York State precedent was reversed in 1995 when, following a powerful windstorm, salvage logging was disallowed in the Adirondack Park State Forest Preserve. Damage from a similar windstorm in 1950 had provoked massive salvage operations, approved by the state legislature on grounds of fire prevention and resource conservation. Following the 1995 storm, conservation officers and consulting ecologists, prepared with up-to-date assessment tools and a theoretical framework that treated large disturbances as normal ecosystem processes, recommended against salvage, and the executive branch acted in accord with those recommendations. Concurrently, large tracts of previously protected federal forest preserves in western states were being opened to salvage sales. Under the rubric of "forest health," federal legislative amendments that mandated salvage had been added to unrelated bills and passed without open debate. Whereas Adirondack Park salvage rulings have evolved to address large-scale forest disturbances as natural events rather than catastrophes that demand intervention, federal salvage policies appear to have escaped scientific scrutiny. Different economic and political frameworks, including historical differences in management objectives, have contributed to this clear disparity in state and federal forest conservation policies.

**11:00 to 12:30 Water Quality and Hydrodynamics, Berkeley Room**

### **Long Nonlinear Waves in Slowly Varying Channels**

*Brian Nowak and James Saylor, Great Lakes Environmental Research Laboratory  
Stanley Jacobs, University of Michigan*

This paper investigates the effects of slow variations in both channel cross section and channel curvature in the propagation of long nonlinear waves. The data available from Lake Champlain reveals long nonlinear waves similar to bores or shock fronts. These waves have a relatively slow propagation speed and lack the undular characteristics of similar waves that have been observed in other basins. In the past, solutions to specific parts of this problem with application to particular basins such as Loch Ness, Lake Babine, and Seneca Lake, have been accomplished. This investigation adds changes in bathymetry of the lake as well as the effects of friction as boundary conditions into the governing equations. The incorporation of rotation and the adoption of a coordinate system following the centerline of the lake into the equations complete the model. The shallow water approximation and the narrowness of the lake have been used to simplify the equations. From analysis of the observations and estimation of the major parameters governing wave propagation it has been determined that nonlinear effects balanced by frictional effects dominate the kinematics of the system. The resulting equations are then solved in the separate regions of the theoretical domain.

### **Groundwater and Aquatic Vegetation in Adirondack Lakes: Interactions at the Groundwater, Sediment, and Macrophyte Interface**

*Stephen D. Sebestyen and Rebecca Schneider, Cornell University*

Groundwater flow is an important mechanism that transports dissolved ions, compounds, and gases past the rooting zone. Numerous biogeochemical transformations occur at the groundwater-sediment interface, and influence the environment in which rooted macrophytes grow. Relationships among groundwater seepage, sediment chemical composition, and aquatic vegetation are being investigated as part of a study of water lily populations in Adirondack lakes. Over the summer of 1998, subsurface flow rates were measured with seepage meters, and sediment pore-water samples were collected weekly for chemical analysis to assess how sediment chemistry varies with groundwater flow rates. Tissue samples of all floating leaved and emergent species and two replicate sediment cores were collected in late July at the time of peak biomass. Patterns of seepage varied dramatically over the summer along different sections of shorelines. Flow reversals, continuous discharge, and low and high rates of seepage were observed at various stations distributed among three Adirondack lakes. Patterns of seepage along segments of the shoreline were noted, and suggest that seepage in the near-shore regions is important in the maintenance of aquatic habitats and water quality. Surface water and pore water samples are being analyzed to determine nutrient and trace metal concentrations. These data will be compared to sediment and plant tissue samples in order to assess patterns of nutrient availability, base action dynamics, and trace metal mobility and uptake as related to flow rates.

### **Large-Amplitude, Wind-Generated, Internal Motions in Lake Champlain: Modeling and Visualization**

*T. O. Manley, Department of Geology, Middlebury College*

*Kenneth L. Hunkins, Lamont-Doherty Earth Observatory of Columbia University*

Extremely large displacements of the thermocline occur in Lake Champlain in response to wind forcing during the stratified season. These motions have been documented by five years of observations with moored current meters and temperature sensors. Vertical displacements of 20 to 40m are observed with periods of about four days. These oscillations are accompanied by high-velocity currents often exceeding 25 cm/s. At times the thermocline intersects the lake surface or lake bottom creating upwelling and downwelling conditions which could have an important influence on biological productivity. These motions have been reproduced with some success by a relatively simple numerical computer model. The model

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approximates Lake Champlain as a rectangular basin with two layers, a warm epilimnion overlying a cold hypolimnion. When the model is driven by wind data based on recordings at Burlington Airport there is reasonable agreement between modeled thermocline movements and observed movements. A video presentation of the model output has been developed which demonstrates the thermocline motions as they develop in time over three dimensions when driven by the Burlington Airport winds. The cross-lake tilting of the thermocline resulting from the earth's rotation is particularly well illustrated.

**11:00 to 12:30 Panel Discussion and Dialogue, Ballroom**

#### **Engaging the Adirondack Community to Create a Truly Regional Digital Research and Information Center in the Adirondack Park: A Presentation and Discussion about the Proposed Adirondack Information Resource Center at Paul Smith's College.**

*Curt Stiles*, trustee of Paul Smith's College and library program team director

*Gail Gibson Sheffield*, Learning Resources Center coordinator, Paul Smith's College

*Jim Gould*, professor of writing and literature, Environmental Studies Program, and vice president of development, Paul Smith's College

*George Miller*, President, Paul Smith's College.

The \$9 million Adirondack Information Resource Center, a new regional digital library, will create a high-tech information provider for the Adirondack community and those beyond the Adirondacks, who wish to access information and research about the Park. In other words, the Adirondack Information Resource Center will be a repository for all Adirondack information, data, and research, a state-of-the-art facility that will combine the best of traditional library services with electronic information access for the Adirondack community. It will support the educational, research, and planning efforts of elementary and secondary schools, local municipalities and state government agencies, businesses and not-for-profits, and economic and community development groups within the Park. Individual entrepreneurs, scientists, and students of all ages will especially benefit from this resource. In addition, the new library will create a central repository for GIS data set sharing in the Adirondacks, and provide access to local municipalities and businesses to use GIS mapping systems (including training seminars) for local planning and community development; and will create electronic gateway services and links to information resources within and beyond the Adirondacks.

Paul Smith's College has received funding for this project from a variety of sources. Most exciting are the commitments from Lucent Technologies and Sun Microsystems to gift all of the technology and expertise — estimated at nearly \$1 million — to make this facility an unparalleled resource for the Adirondack community. Furthermore, the library's program team, led by Curt Stiles, a trustee of the College and former president of a division of Xerox, Inc., has been meeting with a cross-section of Adirondack constituents in order to program their needs into the digital design and function of the facility's electronic repository.

Paul Smith's College further seeks to include the participants of the Adirondack research community to ensure that the needs and goals of this vital community is included in the process, and the presentation will largely center on an open discussion of those needs and goals.

**1:30 to 3:00 Panel Discussion, Ballroom**

#### **Collaboration and Conflict in the Preservation of Open Space through Hamlet Revitalization**

*Ann Ruzow Holland*, Friends of the North Country

*Terry deFranco-Martino*, Adirondack North Country Association

*Jayne Daily*, Glynwood Center/Countryside Institute, US-UK Exchange Program

*Stephen Erman*, Adirondack Park Agency

*Ernest Hohmeyer*, Adirondack Economic Development Corporation

*Virginia Westbrook*, Champlain Valley Heritage Network

*David Allee*, Cornell University

*William Johnston*, Essex County Office of Community Planning and Development

*Linda Depo*, Friends of the North Country, AuSable Valley Promotional Committee

In the past thirty years, most of the attention of the public, as well as policymakers, has been on the process of regulating development, particularly in open space areas in the Adirondack Park. While the focus of academics, policymakers, practitioners and interest groups has been on the natural environment, a core of practitioners have been working on an alternative process. Their focus has been the viability of the 111 hamlets in the Park. Most can agree on what makes the chain of communities important to our Adirondack Region. Practitioners need to collectively determine their complementary roles in the process and how to effectively collaborate to provide for ongoing sustainable development and preservation of open space through hamlet revitalization. This panel comprises professionals who are involved in prototypes of process and product associated with hamlet revitalization that have resulted either in collaboration or conflict. Ten "lessons to be learned" about



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hamlet revitalization strategies will be culled from the session. Dialogue amongst the practitioners and participants will result in the identification of five "common ground" issues creating obstacles to comprehensive hamlet revitalization.

**1:30 to 3:00 Economics, Land Use, Management, Academy Room**

### **A Water Quality Management Model for Small Adirondack Watersheds**

*Dr. Lyn M. McIlroy*, Center for Earth & Environmental Science, Plattsburgh State University

*Joseph Racette*, New York State Department of Environmental Conservation

A simple management model was developed to determine the transport and fate of total phosphorus in small watershed systems, where measured physical and chemical data are minimally available. The model application is demonstrated using the Chateaugay Lakes watershed/lake system, located in the northern Adirondack Mountains. The watershed consists primarily of forested lands that drain into the Upper and Lower Chateaugay Lakes. Upper Chateaugay Lake may be characterized as oligotrophic and dimictic with low to moderate shoreline development. Lower Chateaugay Lake is narrow, shallow, and mesotrophic, with moderate to high shoreline development. The lower lake receives outflow from the upper lake via a short river reach, thereby forming a chain lake system. Both the environmental and political nature of this type of watershed system often exacerbates the difficulties of implementing an equitable, long-term management plan. For instance, chain lakes are a relatively common geological occurrence in the Adirondacks and are of particular importance since cascading drainage can have dramatic cumulative effects on downstream water quality. In this example, watershed management is further complicated by the fact that the system boundary is located in both Franklin and Clinton counties and incorporates parts of the townships of Belmont, Dannemora, Ellenburg, and Saranac. In addition, outlet drainage flows to the Saint Lawrence River, a system of international significance. A demonstration of the model will be used to illustrate current water quality conditions, prioritize future data acquisition, and assess potential management strategies.

### **The Tourism Economy: Confluence of Business, Community and Environment in the Adirondack Park**

*Timothy P. Holmes*, Holmes and Associates

*Bryan Higgins*, SUNY Plattsburgh

Tourism is one of the leading economic activities in the Adirondack Park. This report provides an in-depth look at Adirondack tourism opportunities from the perspective of 258 business owners in sixteen communities in the central and western Adirondack Park. It comes at a time when communities, regional organizations and state agencies are exploring new approaches to economic development for the Adirondacks. This local business and community-based information can help to inform and refocus initiatives for tourism planning, community development, business assistance, environmental protection and improved recreation opportunities.

### **Regional Control of Local Natural Resources: Can It Work to Protect Them?**

*Timothy D. Schaeffer and Valerie A. Luzadis*, SUNY-CESF

New York State's system of watershed rules and regulations offers a way to overcome the problems posed by inconsistent political and watershed boundaries by permitting municipal water suppliers to effectively exert control over other local governments. The New York City Department of Environmental Protection recently updated its watershed rules and regulations and is analogous to the Adirondack Park Agency in its power to adopt measures that impact local governments. This paper presents extraterritorial control as a mechanism through which the state defines the scope of municipal home rule with regard to drinking water and, in doing so, addresses the problems associated with environmental resources that cross municipal boundaries.

Fundamental questions emerge: Does extraterritorial control of natural resources work to protect them? Given the historical and present context, do intermunicipal rules and regulations build commitment to and capacity for the protection of natural resources among local elected officials? These questions are explored using the New York City watershed example. Ultimately, the success of intermunicipal regulations will hinge upon their social and behavioral effectiveness among town and village council members in local communities. Understanding the decisions of these elected officials complements biophysical assessments of the effectiveness of such regulations to protect natural resources.

**1:30 to 3:00 Culture and Society, Berkeley Room**

### **Social Constituencies of Adirondacks Ecologies**

*Marla Emery*, Aiken Forestry Sciences Lab

*Luis Malaret and Dianne Rocheleau*, Clark University

Combining ethnographic field techniques, ecological inventory, and remote sensing/GIS analysis, this research will identify the interactions of a variety of Adirondacks social constituents (e.g., year-round residents, seasonal residents, regular and occasional tourists) with plant and wildlife in the vicinity of towns that span a continuum from heavy tourism development (e.g., Lake Placid) to remote natural resource-based industrial development (e.g., Fine). Ecological inventories will document selected floral and faunal composition of these areas and analyses will look for patterns, if any, associated with distinct social

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constituencies and their activities. Aerial photos and satellite images of the study area will be examined in a geographic information system (GIS) before intensive fieldwork begins to identify land cover patterns and existing land-use classifications and permit cross-checking/validation with ethnographic and ecological findings in the field. GIS analysis will be revisited following field work with the goal of refining the representation of land use and land cover that provides both broad new categories and more nuanced detail about the social and biophysical processes that constitute them.

#### **The Adirondacks and the Feminization of Landscape: Toward an Integrative Perspective**

*Elaine Handley*, SUNY Empire State College

This paper will examine the concept of the feminization of the land and its usefulness to current thinking about the future of the Adirondacks. Drawing from the writings of Adirondack writers and thinkers, as well as ecofeminism and its critics, this paper will explore some hard questions women have been asking themselves about their relationship to the earth. Perhaps what contemporary women have unearthed in their re-examination and discussion of 'male' and 'female' ecological assumptions can offer some kind of working model for this era's conflicts about the proper purpose of the Adirondack Park in the 21st century.

#### **Nineteenth Century Agriculture on Lands within the Present Blue Line**

*Glen R. Harris*, St. Lawrence University

Not much is known about nineteenth-century farming in the area now comprising the Adirondack Park. Regional histories devote a few pages or, at most, a short chapter to agriculture. This inattention is due, in part, to our collective perception of what is meant by the Adirondack Park. As constructed, it is physically a place of mountains, woods and water, not farmland. Inattention is also due to our collective focus on the larger political economy. Policy-making has emphasized reconciliation of mining, logging, and recreation. Early agriculture consisted of subsistence and small-scale farming that did not conflict with these land uses, so it rarely captured statewide attention. Finally, Adirondack agriculture has been little studied, especially among scholars. Reference material for research is limited, but some primary sources do exist. Despite serious handicaps, reports of the New York State census provide a wealth of information. Collected on a township basis, every ten years from 1825 to 1875, these data show amounts of land and measures of productivity for dozens of crops, farm animals, and other agricultural products. This information is, at long last, aggregated and summarized to show overall trends for the entire Adirondack Park, as delineated today. To supplement this quantitative approach, bits and pieces of qualitative material have been collected together by consulting newspapers, as well as county and town histories, especially in the northern Adirondacks. In particular, vignettes illustrating various practices and types of farming have been identified. This presentation will highlight both the census data and a handful of illustrative case studies.