



Adirondack Research Consortium

Better Information for Better Decisions

19th Annual Conference on the Adirondacks

Entrepreneurship, Sustainability, and the Environment

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Selected Submitted Abstracts

Session 2.2 : Approaches to Understanding Ecosystems from Lake Bottom to Mountain Top

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Adirondack lakes show pronounced species changes since 1850: a regional paleolimnological survey

Lakes are becoming increasingly impacted by multiple environmental stressors (i.e. acidification, eutrophication, climate warming, etc.). Understanding the impact of these stressors can be difficult due to a lack of long-term monitoring data. Fortunately, paleolimnology can help overcome this difficulty. Paleolimnology is a rapidly developing field in which researchers reconstruct lake histories using the fossils of aquatic organisms preserved in lake sediments. By understanding the present-day ecology of aquatic organisms (e.g. their pH/temperature ranges), we can use changes in their fossil assemblages to infer how aquatic environments have changed over time. This presentation will provide results from a new paleolimnological survey that is being undertaken in the Adirondacks by the PEARL lab at Queen's University. Ideally, to identify the influence of a particular stressor (e.g. climate warming), researchers need to examine a range of *minimally* impacted lakes. For this reason, using the ALSC's online ALS pond database, we have identified 32 'reference' lakes that show little exposure to stressors like acidification or eutrophication. The results of this paleolimnological study show that the reference lakes have undergone a pronounced change in algal species composition since pre-industrial times. The species changes noted in this investigation are similar to those seen in other regional surveys in North America and are likely due to recent climate warming. The implications of these species changes are not currently known but they serve to illustrate that Adirondack lakes are likely already showing an ecological response to recent climate warming.

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Cummings, Cassandra M.^{1*}, Kristina M. A. Arseneau¹, Brian F. Cumming¹.

Climate-Related Changes In Diatom Assemblages In Adirondack Reference Lakes Since Pre-Industrial Times

The majority of Adirondack lakes have been impacted since pre-industrial times by regional stressors such as acidification, and local disturbances including exotic invasions, fish stocking, liming, road salt and eutrophication. When a lake is impacted by multiple anthropogenic stressors, it can be difficult to isolate the effect of climate warming, especially in the absence of long-term monitoring data. When long-term monitoring data aren't available, paleolimnology can be a vital tool. Paleolimnological studies use the physical, chemical, and biological characteristics in lake sediment cores to infer their environmental

histories. In 2003, Stager and Sanger introduced the concept of ‘heritage’ lakes to identify lakes that are as close to pristine as possible, allowing them to act as ‘reference’ systems. Although few ‘heritage’ lakes exist, we identified a set of 32 ‘reference’ lakes from a database of thousands that met a strict set of criteria including: <5% shoreline development, acidification, eutrophication, and the introduction of non-native species. The purpose of this study is to determine if changes in diatom assemblages from recent and pre-industrial sediment samples have occurred in these reference lakes, and if so, if the changes are consistent with warming that has occurred in the Adirondacks since pre-industrial times. This information will be useful in isolating the effects of climate warming on freshwater lakes in the Adirondacks, and will aid in the interpretation of changes in lakes recovering from multiple anthropogenic stressors.

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Goren, Julia^{1*}

Alpine Ecosystems - A Unique Feature of the Northern Forest Region

Alpine ecosystems, located on the highest mountain summits, are a unique feature of the Northern Forest region. Alpine areas are also home both to some of the region’s rarest species and to the Northern Forest’s greatest recreational opportunities. Fragile alpine species in heavily used recreation areas are threatened by human trampling. For over ten years the Adirondack High Peaks Summit Steward program has utilized photopoint monitoring to document changes in alpine vegetation with a particular focus on areas subject to human trampling. Photopoints are photographs of a landscape area taken repeatedly from the same exact position, showing qualitative changes over a set time. Photopoint series were compared between mountains with regular steward presence versus mountains without a regular steward presence and showed a significant difference in change in vegetation over time. While further analysis of this data set is underway, preliminary results suggest that the Adirondack High Peaks Summit Steward program is making a difference in vegetation recovery in New York’s alpine region.

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Session 2.4 : Aquatic Research

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Common Loons – Sentinels of Mercury Pollution in Adirondack Aquatic Ecosystems

We used the Common Loon (*Gavia immer*), a top trophic-level piscivorous predator, as an indicator species to assess mercury exposure and risk in aquatic ecosystems in New York’s Adirondack Park. We related mercury levels in loons to long-term reproductive success to evaluate the effects of mercury contamination on the breeding loon population in the Park, and enable the development of a mercury hazard profile. From 1998-2007, loon blood, feather, and eggs were sampled, and loon productivity was monitored on the study lakes. Lake acidity also correlated with mercury levels, with more acidic lakes exhibiting higher loon mercury concentrations. Twenty-one percent of males and 8% of females were at a high risk of behavioral and reproductive impacts based on blood mercury exposure, and 37% of male and 7% of female birds were at high risk based on feather mercury exposure. Female and male loons in the highest exposure category showed a 32% and 54% reduction in the number of chicks fledged per year, respectively, compared to birds in the lowest exposure category. Population model results indicated that the portion of the Adirondack loon population exposed to high mercury levels has a reduced growth rate

($\lambda = 1.0005$), compared to birds with low body burdens of mercury ($\lambda = 1.026$). The results of this project will assist in the continued refinement of state and national policies and regulations that effectively address the ecological injury mercury and other contaminants pose to freshwater ecosystems.

Session 3.4 : Land Use Management in the Adirondacks

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Carrie M. **Tuttle**^{1*} and Martin D Heintzelman²

The Value of Forever Wild: An Economic Analysis of Land Use in the Adirondacks

The mix of public/private land ownership within the Adirondack Park creates opportunities for conflict between development and conservation. The goal of this paper is to explore this conflict through the use of hedonic analysis and propensity score matching approaches. We investigate the effects of the APA classifications which tightly restrict private land uses and development. We do this while simultaneously controlling for the environmental and recreational amenities. Results show that lands in the Park classified for moderate intensity use sell at a premium of up to 27% while lands in more restrictive classes are discounted. There is also evidence that decreasing human impacts by one unit increases property values by ~4%. Furthermore, our results confirm that areas with more development restrictions exhibit lower levels of human impacts and have more biotic integrity. The Adirondack Park is under pressure from increased private land development. Much of this development is occurring along shorelines of lakes and rivers and most of it in the areas zoned as hamlet, low and moderate intensity use. Policy makers will be faced with tough decisions about whether to increase the amount of State land holdings or to allow additional development in potentially sensitive environmental areas. These decisions will have lasting consequences on private land values and on the future character of the Park. By developing a broader understanding of the impacts of natural amenities and land use restrictions on property values we can consider the implications of policy changes in a more holistic manner.

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Kanze, Ned

Moose Hill Farm Biological Survey

Introduction

The Moose Hill Farm Biological Survey was launched in February, 2000, shortly before Debbie and Ed Kanze acquired Moose Hill Farm, formerly known as "the Williams Camp." The property is rich and diverse---a paradise for naturalists, or at least naturalists not deterred by biting insects. The land was owned by A.A. "Al" Williams and heirs from Warren, Ohio from the 1920s until we bought it in early 2000. Moose Hill Farm consists of eighteen and a half acres, more or less, along the Saranac River in northwestern Essex County, New York, in the Adirondack Mountains. The property in the mid nineteenth century was owned by Gerrit Smith, a crusading abolitionist from New York's Finger Lakes region and the man who brought John Brown to the Adirondacks. Apparently it was intended to be part of a colony of freed slaves, a sister colony to the well-known Timbuctoo colony Smith and Brown established in nearby North Elba. Shepard Bowen, a nineteenth century iron magnate from Saranac, New York, near

Plattsburgh, owned the land after Smith. Sanford Hayes, the grandfather of our friend and neighbor Sandy Hayes, held the property early in the 20th century. Hayes used the place as summer pasture for dairy cows. Shortly before we purchased the land, the upland portion of it was logged.

Session 4.4 : Trends in Land Values and Communities

Carrie M. Tuttle¹ and Martin D. **Heintzelman**²

A Loon on Every Lake: A Hedonic Analysis of Lake Quality in the Adirondacks

This paper explores how residents of the Adirondacks value lake water quality using fixed-effects hedonic analysis. We develop a database including ten years of real estate transactions data, including the price and date of sale for parcels within the twelve counties in the Adirondack Park. This dataset includes parcel-level information on land cover, property and building characteristics, access to public utilities, Adirondack Park Agency land development classifications, road distance to libraries, schools, hospitals, and airports. Our lake quality data contains a combination of analytical water quality measurements for parameters such as pH, dissolved oxygen, clarity, and trophic state, as well as indicator measures such as the presence of loons, fish, invasive species, and an index measure of human impact. We explore the impacts of water quality using a number of different measures of geographic proximity to lakes including the quality of the nearest lake and an index of quality at the lakes contained within various distances of the parcel. We take advantage of the quasi-panel nature of our dataset to control for potential endogeneity, omitted variables, and spatial biases using fixed effects at various geographic scales. Preliminary results indicate that both analytical and indicator measures of water quality have significant effects on property values. The presence of loons on a lake has a positive impact on property values while the presence of invasive species like Eurasian milfoil has a negative impact. Through a broader understanding of these effects, the financial benefits of conservation may be more accurately compared to costs.

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Second Homeownership in the Central Adirondacks: Trends and Potential Directions

Second homeownership is an important aspect to many Adirondack communities. To understand how second home ownership is related to community well-being, we administered a mail survey to 500 residents (permanent and seasonal) of three Central Adirondack communities. Our presentation will report survey responses related to second home ownership plans (length of ownership, property maintenance and transfer), residents' attitudes towards second homeownership, as well as concerns towards the environment and municipal services in the region. We will relate these findings to other areas experiencing high rates of second home ownership, and examine recent patterns of in-migration for the region.

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Erik Backlund¹

Tourism, Amenities, and Community Prosperity in the Adirondacks

The purpose of this analysis was to assess the effects of tourism and amenity based socio-economic structures on indicators of community prosperity across the Adirondack Park. At a national scale, previous research has suggested that natural amenities are positively associated with quality of life and economic performance. In this study, a typology of Park communities is developed and differences indicators of community prosperity are evaluated. Data from the 2010 American Communities Survey 5-year estimates and the 2010 Census were used to cluster analyze towns based on six socio-economic indicators suggested in the literature on amenity driven change: percent seasonal homes, median value of owner occupied housing, percent of homes valued above \$500K, percent of residents college educated, population change between 2000-2010, percent employed in arts, entertainment, recreation, accommodation and food services, and median household income. Cluster analysis results suggest a typology with five distinct town types: “Classic Resort Towns,” “Second Home Enclaves,” “Multifunctional Towns,” “Service Sector Centers,” and “Traditional Rural” communities. Three basic measures of community prosperity including unemployment, poverty, and high school drop-out rates were then analyzed. Significant differences were found for all three measures, suggesting that the community types oriented toward tourism and natural amenities have less poverty, lower high school drop-out rates, and less unemployment than those oriented toward traditional rural activities like forestry, agriculture or manufacturing. These results confirm some popular perceptions about the Park’s community life but also provide policy-makers a framework for thinking about tailored community development approaches.

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Poster Presentations:

James E. **Dukett**^{1*}; Nathan Houck¹; Phil Snyder¹; and Sue Capone¹

The Adirondack Lakes Survey Corporation: Where timely environmental monitoring data reaches the Public

The Adirondack Lakes Survey Corporation (ALSC) monitors changes to natural ecosystems of the Adirondack Mountain ecological zone with a focus on water quality, atmospheric deposition, fish surveys, and other biological and chemical studies for the benefit of regulatory agencies and the general public. Its mission is accomplished by working with New York State, federal agencies, other agencies and the general public through an exchange of objective information.

The ALSC delivers timely data to its website, www.adirondacklakessurvey.org, throughout the calendar year. Researchers, students, anglers, government agencies, and the public can find recent spreadsheet data on projects associated with: lakes, streams, clouds, snow (coming soon!); and historical data from the popular 1984-1987 Adirondack lake survey. The website also provides annual program summaries, research reports, and its 2005 publication of “Acid Rain in the Adirondacks”. In addition, an interactive Google map of the monthly monitored lakes, with an interfaced link to the thorough 2011 publication release of the “Compendium”, provides the web surfer with a turn-key resource for Adirondack acid deposition knowledge.

This poster will highlight the products available from the ALSC and the current research.

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The Adirondack Club and Resort: Identifying Common Interests Through an Interdisciplinary Approach.

The Adirondack Club and Resort (ACR) is the largest development approved by the Adirondack Park Agency (APA) to date. Since 2004, this controversial plan to develop a 6,000-acre four-season resort in Tupper Lake, NY has captured local and nationwide attention, creating significant controversy and polarization among participant groups. There has been no comprehensive analysis of the social, political, and environmental problems associated with the ACR. In 2012, North Country Community College students conducted a 3-month rapid appraisal using the Interdisciplinary Policy Sciences framework to contextually examine the ACR case study. Students used multiple-methods to answer the following questions: 1) What are the policy problems of the ACR case?, 2) Did the ACR review process identify the common interest among participants?, and 3) What contextual alternatives may improve the social and decision processes? The policy problem is that the focus of the decision process has been on the ordinary issues of zoning, density regulations, and undue adverse impacts, and not on constitutive problems such as governance. Goals were not clarified and the common interest among participants was not identified. The lack of leadership and of a timely decision process has created an exclusive decision-making arena allowing for special interests to dominate. We recommend decision makers focus on constitutive issues and comprehensive, contextual problem solving. Collecting thorough intelligence, defining goals, and identifying the common interest may improve the social and decision processes. Finally, adaptive governance techniques and opening the arena may enhance the APA's institutional structure, proposal review process, and problem-solving abilities.

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Like Never Before – SUNY-ESF offers high school and college students unique internships

In summer of 2011, SUNY-ESF's Northern Forest Institute (NFI) initiated a new integrated program unique to both ESF's Adirondack Interpretive Center (AIC) and the Adirondack Park as a whole. Funded by the National Science Foundation (NSF), the Junior Naturalist Internship program was specifically designed to offer opportunities for Adirondack high school students interested in science and nature, and with help from the Adirondack Park Institute, the Interpretive Naturalist Internship provided advanced professional experience in outreach and mentoring for a student from ESF's Natural History and Interpretation program. For eight weeks, the Junior Naturalists' explored different aspects of AIC's daily operations and informal science education programming. The internship included the unique opportunity for the Junior Naturalists to shadow ESF researchers, providing firsthand experience in the scientific process, field work and sampling. The Interpretive Naturalist intern served as the primary mentor for the Junior Naturalists, gaining significant supervisory and mentoring skills not available in most traditional entry-level internships. The purposeful interactions between these interns separate these programs from any other in the Adirondack Park. And this integration proved to be very successful, creating strong interactions and knowledge transfer through the near-peer mentoring between the Interpretive Naturalist intern and the Junior Naturalist interns. Through the NSF grant, the interaction between the interns from both programs is continuing through the 2011-12 school year with collaboration to develop a poster and presentations for two regional scientific events, ESF's Spotlight on Research and the Adirondack Research Consortium.

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Law, Jon M.^{1*}, Mark R. Miller ^{1*}, Todd M. Schorer ^{1*}, Valerie A. Sullivan ^{1*}, Courtney M. Taylor ^{1*}, Zachary L. Young ^{1*}, Cassandra J. Whyte ^{1*}, and Judith S. Steinberg ¹.

Aquatic Invertebrates, Water Quality, and Soil Characteristics – Chubb River and Farrington Brook.

The Chubb River in Lake Placid and Farrington Brook in Saranac Lake were sampled in October, 2011 for water quality, soil nutrient content, and aquatic invertebrates. Nitrate-nitrogen, phosphate dissolved oxygen, and pHs were very similar, but Chubb River had triple the alkalinity. Soil data showed identical data for nitrogen, phosphorus, and potassium. Aquatic invertebrate orders at Chubb Creek include Trichoptera, Diptera, Odonata, Megaloptera, Hemiptera, and Coleoptera, while Farrington Brook contained Trichoptera, Diptera, Odonata, and Ephemeroptera.

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Reinventing the Field Guide: The Northern Forest Atlas Project

The biological field guide is a little over a hundred years old. In this time it has produced a distinguished literature. The works of Schuyler Mathews, Elsie Klots, John Comstock, Roger Peterson, Boughton Cobb, and John Farrar are, by any reasonable standard, intellectual milestones. So, I believe, will prove some of the works of our own generation: David Sibley of course, but also a number of others. Field guides, as currently conceived, have limitations. Paper books have limited numbers of pages and can have these pages ordered in only one way. Their authors are, to a large extent, locked into a tradition of serial description. They are great at characters but poor on comparisons. Ecology and associations get short shrift. Illustrations of whole creatures are common; illustrations of significant details rarer, and illustrations of communities and landscapes almost unknown. All this is changing. The current generation of naturalists has new techniques available for imaging and presenting nature. It also has, I am convinced, a deeper and more systematic knowledge of ecology and landscape than its predecessors. These techniques and understanding will remake the field guide. What might the new field guides look like? In my concept they will be open format, linked to libraries of online images and illustrations; comparative, using mosaic illustrations to compare similar species; ecologically focused, showing who associates with whom and where; multi track and multi scale, using imagery and drawings in parallel, at scales ranging from millimeters to miles; and multi platform, produced in paper, e-book, and interactive forms. This talk reports on one such attempt. I am producing a series of field guides to the natural history of the northern forest region. The first products from this project will appear online soon, and I can give you a detailed preview here.