

Abstracts

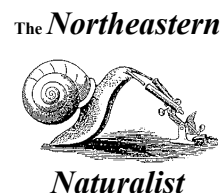
THE NORTHEAST



NATURAL HISTORY CONFERENCE X

APRIL 17 – APRIL 18, 2008

A FORUM FOR CURRENT RESEARCH



THE
NORTHEAST

NATURAL HISTORY
CONFERENCE X

APRIL 17 – APRIL 18, 2008

A FORUM FOR CURRENT RESEARCH

SUGGESTED FORMAT FOR CITING ABSTRACTS:

Abstracts Northeast Natural History Conference X.
N.Y. State Mus. Circ. 71: page number(s). 2008.

ISBN: 1-55557-246-4

The University of the State of New York
THE STATE EDUCATION DEPARTMENT
ALBANY, NY 12230

THE UNIVERSITY OF THE STATE OF NEW YORK

Regents of The University

ROBERT M. BENNETT, <i>Chancellor</i> , B.A., M.S.	Tonawanda
MERRYL H. TISCH, <i>Vice Chancellor</i> , B.A., M.A., Ed.D.	New York
SAUL B. COHEN, B.A., M.A., Ph.D.	New Rochelle
JAMES C. DAWSON, A.A., B.A., M.S., Ph.D.	Peru
ANTHONY S. BOTTAR, B.A., J.D.	Syracuse
GERALDINE D. CHAPEY, B.A., M.A., Ed.D.	Belle Harbor
ARNOLD B. GARDNER, B.A., LL.B.	Buffalo
HARRY PHILLIPS, 3rd, B.A., M.S.F.S.	Hartsdale
JOSEPH E. BOWMAN, JR., B.A., M.L.S., M.A., M.Ed., Ed.D.	Albany
JAMES R. TALLON, JR., B.A., M.A.	Binghamton
MILTON L. COFIELD, B.S., M.B.A., Ph.D.	Rochester
ROGER B. TILLES, B.A., J.D.	Great Neck
KAREN BROOKS HOPKINS, B.A., M.F.A.	Brooklyn
NATALIE M. GOMEZ-VELEZ, B.A., J.D.	Bronx
CHARLES R. BENDIT, B.A.	Manhattan

President of The University and Commissioner of Education

RICHARD P. MILLS

Deputy Commissioner for Cultural Education

JEFFREY W. CANNELL

Director of the New York State Museum

CLIFFORD A. SIEGFRIED

Director, Research and Collections

JOHN P. HART

The State Education Department does not discriminate on the basis of age, color, religion, creed, disability, marital status, veteran status, national origin, race, gender, genetic predisposition or carrier status, or sexual orientation in its educational programs, services and activities. Portions of this publication can be made available in a variety of formats, including braille, large print or audio tape, upon request. Inquiries concerning this policy of nondiscrimination should be directed to the Department's Office for Diversity, Ethics, and Access, Room 530, Education Building, Albany, NY 12234. **Requests for additional copies of this publication may be made by contacting the Office of Cartography and Publications, Room 3140 CEC, State Museum, Albany, NY 12230.**

Table of Contents

Conference Highlights	<i>iv</i>
<i>Focus on Nature X</i>	<i>iv</i>
<i>Keynote Address</i>	<i>iv</i>
Overview of Conference Schedule	1
Session Titles and Codes for Oral Presentations	2
Overview of Conference Sessions	3
Abstracts for Oral Presentations	5
Abstracts for Poster Presentations	61
Index	87

The Northeast Natural History Conference X is a joint project of the New York State Museum, the New York State Biodiversity Research Institute, and the New York State Museum Institute. It is sponsored in part by the New York Flora Association and the *Northeastern Naturalist*. The conference is held biennially at the New York State Museum and the Empire State Plaza Convention Center in Albany, NY. Previous conference abstracts and conference updates are available from the Northeast Natural History Conference website: <http://www.nysm.nysed.gov/nhc>.

Conference Organizers

Ronald J. Gill, Mary Beth Kolozsvary, and Anne L. Duperault (New York State Biodiversity Research Institute)

Abstract Editor

Ronald J. Gill (New York State Biodiversity Research Institute)

Conference Sponsors

New York Flora Association – Sponsor of Two Student Presentation Awards and Advertising Services
The Northeastern Naturalist – Advertising Services

Conference Planners

Plaza Meetings, Latham, NY

Conference Highlights

Focus on Nature X — Opening Reception

A Natural History Art Exhibit at the New York State Museum

Thursday, April 17, 2008

5:30 p.m. – 6:30 p.m.

Exhibition Hall, New York State Museum

(Reception open to all conference participants.)

The Exhibition: *Focus on Nature* is a biennial exhibition of scientific, natural and cultural history. It began in 1990 in conjunction with the Northeast Natural History Conference. While the opening still coincides with the conference, the exhibit has taken on a life of its own and each year the geographical representation, breadth of subject matter and quality has increased to a level of high standard and international participation.

The central purpose of *Focus on Nature* is to highlight illustration as a way of communicating observations of scientists and artists. Scientific discovery and illustration have always been linked, and they have advanced together. At the New York State Museum, there is a research tradition that extends back to the founding of the State Geological and Natural History Survey of 1836. Illustrations have constantly been a part of the effort to communicate the results of these studies.

Purchase Awards have been offered for the past five exhibits to enhance the educational value of the NYS Museum's Illustration Collection. The purchase(s) are selected on the basis of high technical quality, scientific accuracy, aesthetic achievement, and educational value. The artwork becomes part of the permanent collection owned by the people of New York State. *Focus on Nature X* will be exhibited from April 17–September 7, 2008.

Keynote Address

Dr. Kenneth B. Storey

Professor of Biochemistry, Institute of Biochemistry and
Departments of Biology and Chemistry, Carleton University

Thursday, April 17, 2008

8:00 p.m. – 9:30 p.m.

Clark Auditorium, New York State Museum

Life in the Cold: A Biochemist's Perspective on Animals in Winter

*Storey**, Kenneth B. (Institute of Biochemistry, Carleton University, Ottawa, Ontario, Canada)

Winter temperatures below 0 °C pose a severe challenge to animal life. For many species, food supplies fail, the risk of freezing is high, endotherms are plagued by massive energy costs to stay warm, and ectotherms have low metabolic rates that are not conducive to growth and development. Some organisms escape winter by migration or avoid severe cold exposure by retreating under water or deep under ground but many must employ biochemical strategies to preserve life. My lab explores the metabolic and gene adaptations that support two main strategies of animal cold survival: mammalian hibernation and ectotherm freeze tolerance. Our hibernation studies analyze the regulatory mechanisms that allow ground squirrels and bats to sink into cold torpor, coordinating and reprioritizing all cell functions so that metabolic rate drops by >95%, body temperature falls to near 0 °C, and tissue viability is preserved over many weeks. Our research on frogs and insects explores life in a frozen state—how organisms deal with the consequences when 65–70% of total body water freezes. Survival requires extensive metabolic adjustments to deal with issues including oxygen deprivation when blood freezes, extreme cell shrinkage caused by water loss to extracellular ice masses, and physical damage to tissues by ice crystals. Hibernation and freeze tolerance are not only fascinating natural phenomena that are critical to the survival of hundreds of species in temperate and polar environments but the mechanisms identified from our studies have key applications in medicine for the long term preservation of human tissues and organs for transplant. For more information, go to www.carleton.ca/~kbstorey.

Overview of Conference Schedule

Thursday, April 17, 2008

- 7:30 am–5:00 pm Conference registration will be available in the hallway in front of the meeting rooms at the Empire State Plaza Convention Center.
- 8:00 am–noon Posters will be set up and should remain until Friday afternoon in meeting room 6*.
- 8:40 am–3:00 pm Oral Presentations (meeting rooms 1–5* and 7*)
- 3:00 pm–5:00 pm Poster Session (meeting room 6*)
- 5:30 pm–6:30 pm *Focus on Nature X* is a natural and cultural history illustration exhibition. The opening reception with cash bar will begin the evening. Juried acquisition awards will be presented to artists during the exhibit opening. This reception will be held at the New York State Museum in Exhibition Hall where the illustrators' work will be on display. All conference participants are welcome to attend this reception.
- 6:30 pm–8:00 pm Evening dinner buffet with vegetarian options, pre-registration required, located in Adirondack Hall at the New York State Museum.
- 8:00 pm–9:30 pm Keynote address by Dr. Kenneth B. Storey, Clark Auditorium, New York State Museum.

Friday, April 18, 2008

- 8:00 am–1:00 pm Conference registration will be available in the hallway in front of the meeting rooms at the Empire State Plaza Convention Center.
- 8:00 am–5:00 pm Oral Presentations (meeting rooms 1–5* and 7*)
- 1:00 pm Poster session and commercial vending booths begin closing. Posters may be left in the meeting room during the afternoon oral presentations, but they must be removed by 5:30 p.m.
- 5:00 pm Conference adjourn, posters must be removed from meeting room 7 by 5:30 p.m.

* All meeting rooms are located in the Empire State Plaza Convention Center

Session Titles and Codes for Oral Presentations

Session codes are listed at the end of each oral abstract. Abstracts for the poster presentations are listed after the oral presentation abstracts. The abstracts are listed alphabetically by the lead author's last name.

Organized Symposia

- S-1 *Quaternary Environments of the Northeast*
- S-2 *Recent Research on Eastern Coyotes*
- S-3 *Vernal Pools*
- S-4 *The Adirondack Effects Assessment Program (AEAP)*
- S-5 *Ecological Status and Recovery at Brooktrout Lake*
- S-6 *Adirondack Ecology*
- S-7 *Emerging Diseases and Effects of Pollutants on Amphibians and Reptiles*
- S-8 *Aquatic Invaders: Animals*
- S-9 *Aquatic Invaders: Plants*
- S-10 *Invasive Species: Management*
- S-11 *Invasive Species: Research*
- S-12 *The Good, the Bad and the Neutral: Effects of Invaders on Native Organisms and Their Habitats*
- S-13 *State Wildlife Grants Program*

Contributed Oral Sessions

- CO-1 *Ecology of Snakes*
 - CO-2 *Fish Ecology*
 - CO-3 *Insects*
 - CO-4 *Biodiversity Conservation*
 - CO-5 *Botanical and Ecological Studies*
 - CO-6 *Habitat Conservation Issues of Northeastern Amphibians and Reptiles*
 - CO-7 *Invertebrate Species Biodiversity and Conservation*
 - CO-8 *Plant Ecology*
 - CO-9 *Colonial Waterbirds*
 - CO-10 *Avian Ecology*
 - CO-11 *Acoustic Sampling Methods of Nocturnal Migrating Birds*
 - CO-12 *Mammals*
-

Overview of Conference Sessions

THURSDAY – April 17, 2008					
Meeting Room 1	Meeting Room 2	Meeting Room 3	Meeting Room 4	Meeting Room 5	Meeting Room 7
Quaternary Environments of the Northeast 8:40 am – 10:00 am	Recent Research on Eastern Coyotes 8:40 am – 10:00 am	Vernal Pools 8:40 am – 10:00 am	Fish Ecology 9:00 am – 10:00 am	Insects 8:40 am – 10:00 am	
REFRESHMENT BREAK 10:00 am – 10:20 am					
Quaternary Environments of the Northeast (cont.) 10:20 am – 12:00 pm	Recent Research on Eastern Coyotes (cont.) 10:20 am – 12:00 pm	Vernal Pools (cont.) 10:20 am – 12:00 pm	Fish Ecology (cont.) 10:20 am – 12:00 pm		Biodiversity Conservation 10:20 am – 12:00 pm
LUNCH BREAK 12:00 pm – 1:20 pm					
Ecology of Snakes 1:20 PM – 3:00 pm	Recent Research on Eastern Coyotes (cont.) 1:20 PM – 3:00 pm	Vernal Pools (cont.) 1:20 PM – 3:00 pm	Fish Ecology (cont.) 1:20 PM – 2:40 pm		Botanical and Ecological Studies 1:00 pm – 3:00 pm
POSTER SESSION (Meeting Room 6) 3:00 pm – 5:00 pm					

FRIDAY – April 18, 2008					
Meeting Room 1	Meeting Room 2	Meeting Room 3	Meeting Room 4	Meeting Room 5	Meeting Room 7
The Adirondack Effects Assessment Program (AEAP) 8:20 am – 10:00 am	Emerging Diseases and Effects of Pollutants on Amphibians and Reptiles 8:00 am – 10:00 am	Aquatic Invaders: Animals 8:40 am – 10:00 am	Invasive Species: Management 8:00 am – 10:00 am	Plant Ecology 8:00 am – 10:00 am	Colonial Waterbirds 9:00 am – 10:00 am
REFRESHMENT BREAK 10:00 am – 10:20 am					
Ecological Status and Recovery at Brooktrout Lake 10:20 am – 12:00 pm	Emerging Diseases and Effects of Pollutants on Amphibians and Reptiles (cont.) 10:20 am – 12:00 pm	Aquatic Invaders: Plants 10:20 am – 12:00 pm	Invasive Species: Research 10:20 am – 12:00 pm	Invertebrate Species Biodiversity and Conservation 10:20 am – 12:00 pm	Avian Ecology 10:20 am – 11:40 am
LUNCH BREAK 12:00 pm – 1:20 pm					
Adirondack Ecology 1:20 pm – 2:40 pm	Habitat Conservation Issues of Northeastern Amphibians and Reptiles 1:20 pm – 3:00 pm	Acoustic Sampling Methods of Nocturnal Migrating Birds 1:20 pm – 2:40 pm	The Good, the Bad and the Neutral: Effects of Invaders on Native Organisms and Their Habitats 1:00 pm – 3:00 pm	State Wildlife Grants Program 1:30 pm – 3:00 pm	
REFRESHMENT BREAK 3:00 pm – 3:20 pm					
Adirondack Ecology (cont.) 3:20 pm – 4:20 pm	Habitat Conservation Issues of Northeastern Amphibians and Reptiles (cont.) 3:20 pm – 5:00 pm	Mammals 3:20 pm – 4:20 pm	The Good, the Bad and the Neutral: Effects of Invaders on Native Organisms and Their Habitats (cont.) 3:20 pm – 5:00 pm	State Wildlife Grants Program (cont.) 3:20 pm – 5:00 pm	



Rocky Coast Shorebirds

Black Oystercatcher, Black Turnstone, Ruddy Turnstone, Surfbird, and
Wandering Tattler (*Haematopus bachmani*, *Arenaria melanocephala*,
Arenaria interpres, *Aphriza virgata*, and *Heteroscelus incanus*)

Purchase Award Winner (1 of 5) from Focus on Nature VIII (2004)

Artist: James Coe, Hannacroix, NY

Watercolor/gouache on paper (16 × 22 inches, Saunders, HP, 200 lb.), 1994

Abstracts for Oral Presentations

New York State Secretive Marsh Bird Survey Results, 2004–2006

Adams^{*1}, David, **Heidi Kennedy**², **Jim Eckler**², **Irene Mazzocchi**³, and **Carrie Osborne**¹ (¹New York State Department of Environmental Conservation, Albany, NY, ²New York State Department of Environmental Conservation, Avon, NY, ³New York State Department of Environmental Conservation, Watertown, NY)

The long term survival of nesting marsh birds in New York State is dependant on the availability of suitable wetland habitat. Since pre-European colonization, the State has lost greater than 50% of its freshwater wetland habitat, due, largely, to land use changes over time. Other studies have demonstrated that the invasion of cattail (*Typha angustifolia* × *latifolia*), purple loosestrife (*Lythrum salicaria*) and Phragmites (*Phragmites australis*) in emergent marsh habitats can alter the distribution and abundance of secretive marsh birds and negatively impact productivity. During 2004, the Department initiated a three-year project to assess marsh bird abundance and distribution. Surveys were conducted in freshwater emergent marshes during May and June 2004, 2005 and 2006. Sites were surveyed three times utilizing call-playback techniques following the Standardized North American Marsh Bird Monitoring Protocol. Due to logistical constraints, the resulting project focused on large state-owned marshes located throughout New York State. We detected 448 Virginia Rail (*Rallus limicola*) at 46 sites; 168 American Bittern (*Botaurus lentiginosus*) at 29 sites; 136 Pied-billed Grebe (*Podilymbus podiceps*) at 15 sites; 56 Sora (*Porzana carolina*) at 12 sites; 32 Least Bittern (*Ixobrychus exilis*) at 50 sites; and 0 King Rail (*Rallus elegans*). Plans are currently being developed to expand upon this survey effort to implement statistically rigorous State, regional and continental monitoring programs to document the status and trends of secretive marsh birds breeding population. **S-13**

Fine-Scale Genetic Structure and Dispersal among Three Vernal Pond Breeding Amphibians

Ambler^{*}, Jason, **Timothy Maret**, and **Marcie Lehman** (Shippensburg University, Shippensburg, PA)

Temporary or vernal ponds are important breeding habitats for a variety of amphibian species in northeastern woodlands. Mark recapture studies using adult amphibians suggest that the population structure of these pond species follow a metapopulation model. These amphibians have extremely high breeding site fidelity as adults (i.e., most migrants are juveniles) and therefore the studies may have severely underestimated migration rates. In this study DNA was extracted from three amphibian species that inhabit vernal ponds, *Rana sylvatica*, *Notophthalmus v. viridescens* and *Ambystoma maculatum*. The DNA was purified, quantified and analyzed using Randomly Amplified Polymorphic DNA- Polymerase Chain Reaction for comparison of genetic differentiation between populations. Analysis of Molecular Variance was used to estimate migration rates. *A. maculatum* and *N. v. viridescens* show little migration between regions, with 0.500 and 0.811 migrants/generation respectively, and thus follow the metapopulation model. *R. sylvatica* tends to be more panmictic, migrating more frequently between regions (1.71 migrants/generation). These data suggest that not all vernal pond breeding amphibians exist as metapopulations and that conservation efforts aimed at amphibians with metapopulation structures should protect not only the breeding ponds but the corridors that connect the ponds in order to allow for migration to occur. The results of this study also suggest that RAPD analysis and genetic differentiation may be a useful tool to measure the dispersal of amphibian species that have high breeding site fidelity as adults. **S-3**

Pale Swallow-Wort: It's Establishing and Expanding. How Can We Control It?

Averill^{*1}, **Kristine M.**, **Antonio DiTommasso**¹, **Charles L. Mohler**¹, and **Lindsey R. Milbrath**² (¹Cornell University, Ithaca, NY, ²USDA-ARS, Ithaca, NY)

Pale Swallow-wort [*Vincetoxicum rossicum* (Kleopow) Barbar.] is a nonnative, perennial, herbaceous vine invading natural areas in the northeastern U.S.A. and southeastern Canada. In Central New York State, we followed vegetative expansion in forest and old-field environments and conducted disturbance experiments. Number of stems per plant did not change over years in the forested sites, but increased by 30% from July 2005 to July 2007 in the old-fields. First-year results suggested that seedling emergence and survival varied based on old-field locations, which differed in elevation and soil drainage, as well as type of disturbance. At Hanshaw, mowed plots (21%) had greater total seedling emergence than all other treatments: glyphosate + tilled (4%), glyphosate (7%), and control (11%). Control plots had greater emergence than glyphosate + tilled plots. At the Mt. Pleasant field site, total emergence the following growing season was 18% and did not differ between treatments. At Mt. Pleasant, which is at a greater elevation and is better drained than Hanshaw, the May cohort survival was 73% and the June cohort had 88% survival. At Hanshaw, the May cohort survival was 40% and the June

cohort had 43% survival. We also investigated controlling swallow-wort in an old-field with triclopyr and/or clipping. Two years after treatments began, swallow-wort cover was lower in plots treated with triclopyr (20%) compared to clipped-only (56%) or unmanaged controls (76%). Regardless of clipping frequency, clipping in June or July was not effective in reducing swallow-wort stem density, cover, or follicle production. **S-10**

The Roger Tory Peterson Institute's Vernal Pool Project

Baldwin*, Mark and Solon Morse (Roger Tory Peterson Institute, Jamestown, NY)

The Roger Tory Peterson Institute of Natural History (RTPI) is a nonprofit educational institution chartered by the New York State Museum to deliver nature education programs. RTPI has developed the Vernal Pool Project to promote place-based field studies focused on these unique and threatened ecosystems. Vernal pools can be found near most communities in our region. School-based inquiries of vernal pools can link directly to state and national learning standards for science, mathematics and language arts. Vernal pool studies can take place from late winter through spring to coincide with the school calendar. Scientists studying vernal pool ecology in our region have a need for data on vernal pools for research. The project consists of a training seminar that has been taught as a 3-semester hour graduate course in partnership with SUNY Fredonia. Participants learn how to keep field journals to enhance observation and inquiry skills, read and create maps to locate vernal pools, identify vernal pool organisms, and perform physical, chemical and biological investigations. Participants also learn how they can be part of a community of citizen scientists through an interactive web site (vernalpools.rtpi.org) that includes information on vernal pool ecology, keys for identifying vernal pool organisms, and a database of vernal pools under investigation. RTPI's Vernal Pool Project is a full-service resource for education and citizen science about vernal pools. Those interested may contact the Director of Education at mbaldwin@rtpi.org. **S-3**

Mercury Speciation and Bioaccumulation in Amphibian Populations

Bank*, Michael (Harvard University, School of Public Health, Department of Environmental Health, Boston, MA)

Mercury contamination is well-documented and continues to be a public-health issue of great concern for certain sectors of the global human population. Mercury contamination of wild amphibians has received little attention, however, despite reports of worldwide population declines. Documentation of the pervasiveness of this contaminant is a first step toward understanding the potential environmental health and ecological implications of mercury pollution. Identifying broad scale distribution patterns of mercury bioaccumulation can convey to regulators that certain ecosystems may be degraded and require development of policies and regulations that may reduce mercury emissions, and ultimately, improve air and water quality. A more synthesized, holistic, perspective on the mechanisms related to aquatic and terrestrial biogeochemistry linkages of fate, transport, and bioavailability of mercury in aquatic ecosystems will result from long term, multi-ecosystem monitoring programs coupled with process-oriented research questions. Here I present total and methyl mercury amphibian data from freshwater and terrestrial ecosystems in the conterminous United States, including sites where amphibian disease and die-offs have been documented. We evaluate variation in mercury bioaccumulation and distribution in these ecosystems across a broad gradient of physical, climatic, biotic, and ecosystem settings to identify the species, environmental conditions and ecosystem types that are most sensitive to mercury pollution. The role of disturbance (i.e., fire, acidification, eutrophication, high mercury deposition, and land use) mechanisms and abiotic and biotic factors governing mercury distribution, bioaccumulation and its potential ecotoxicological effects, in amphibians inhabiting the different ecosystem types will also be discussed. **S-7**

Northern Black Racers (*Coluber constrictor constrictor*) of the Inland Pine Barrens, Saratoga

Barnett*, Kenneth (New York State Department of Environmental Conservation, Albany NY)

During the summer of 2007, a study of a northern black racer population was initiated in the inland Pine Barren community of Saratoga County, New York. Radio transmitters were surgically implanted in 3 black racers and followed throughout the summer until hibernation. This work documented ecological and behavioural data for this species in a rare landscape community. Radio telemetry tracking documented breeding areas, feeding areas, a summer den/shedding station, an egg deposition site, 2 new study animals and 3 winter den locations. One of the winter dens, in open dune habitat, was documented as communal. During the study, northern black racers moved to and used Wilton Wildlife Preserve lands managed for the Karner blue butterfly (*Lycaeides melissa samuelis*) and lupine (*Lupinus perennis*). This study may support an early theory that the underground caverns of the eastern chipmunk (*Tamias striatus*) as well as hydro-geologic features of the inland barren aquifer may play an important role in winter survival of this large Colubrid snake species. This multi-year study of a black racer population in Pine Barrens of Saratoga will help assess management techniques, and other factors to aid with the species' continued survival. **CO-1**

Managing the Eastern Coyote in New York: “Oh, Really?”

Batcheller*, Gordon (New York State Department of Environmental Conservation, Albany, NY)

The Eastern coyote is arguably one of New York’s most misunderstood species-- maligned and revered; feared and enjoyed. Few species have been as controversial, and there is no consensus on their “place” in New York. What is certain is that they are here to stay. A relatively new member of New York’s wildlife community, many New Yorkers are encountering coyotes for the first time, even in Manhattan. There is little question that they are thriving in many habitats, just as they have across the United States. An adaptable omnivore, they will linger near refuse heaps in one part of the State, and at deer yards in another. New Yorkers have not even agreed on what to call this species: “Brush wolf” and “coydog” remain common appellations. Some New Yorkers continue to erroneously believe that the State released coyotes to “control the deer herd.” Indeed, some deer hunters are concerned that coyotes are profligate predators of deer, and that all legal protections for coyotes should be removed. Through the required tagging of trapped or hunted coyotes, the range expansion of coyotes in New York has been well documented. Yet, basic questions about their population density and behavior remain poorly understood. The current focus of our management is research addressing several fundamental questions. Ultimately, we hope to expand the public’s understanding of the coyote, to build our capacity to model and predict their effects on several key prey species, and to implement sensible management policies based on scientific excellence. **S-2**

Hydrogen Isotopes in Feathers of Northern Saw-Whet Owls (*Aegolius acadicus*)

Battaly*³, Gertrude R., Drew **Panko**¹, and Lawrence **Fischer**² (¹Fire Island Hawk Watch, Robert Moses State Park, NY, ²Northeast Hawk Watch, New England and metro New York, ³Westchester Community College, Valhalla, NY)

Hydrogen isotope values were obtained from secondary feathers of 68 Northern Saw-whet Owls (*Aegolius acadicus*) migrating through Westchester County, New York, during October and November of 2004 to 2006, 27 owls over-wintering along coastal New York during the winters of 2005 to 2007, and 6 owls breeding in Westchester in May 2006. These values were compared to published growing season precipitation values for varying latitudes in North America. Most of the values conform to latitudes north of our region, but some represent more southerly latitudes. This presents some anomalies when compared with conventional knowledge of the breeding range for this species. Comparison of hydrogen isotope values for different aged feathers on the same owls shows a statistically significant difference. Newer feathers from second year birds captured in fall migration are formed at locations south of their natal latitudes. **CO-10**

Gems of Eastern New York: Circumneutral Bog Lakes

Bell*, Kristen and Erik **Kiviat** (Hudsonia Ltd., Red Hook, NY)

Circumneutral bog lakes are calcareous, springfed waterbodies with clear water, deep, organic substrates, and generally floating peat rafts or mats. High alkalinity in the groundwater is hypothesized to promote decomposition of peat and water-lily rhizomes and formation of carbon dioxide and methane, which causes rafts of peat to float to the surface. These rafts may aggregate to form more permanent floating peat mats of vegetation that are insulated from the calcareous lake water, and thus may develop herbaceous and shrubby vegetation characteristic of acidic bogs, or dense stands of cattail, purple loosestrife, or common reed. These lakes typically support abundant white and yellow water-lilies and submerged aquatic vegetation, and may have swamps, calcareous wet meadows, or fens at their margins. This is an uncommon habitat type in eastern New York, and is known to support at least 16 species of rare vascular plants. Rare or vulnerable fauna associated with circumneutral bog lakes includes ribbon snake, spotted turtle, Blanding’s turtle, blue-spotted salamander, least bittern, king rail, marsh wren, and river otter. In eastern New York, these lakes are the core habitat of the endangered northern cricket frog. They have also been found to support diverse communities of mollusks, dragonflies, and damselflies. We know of several circumneutral bog lakes in Ulster and Dutchess Counties. We review the ecology of these rare wetlands, show known locations of circumneutral bog lakes, and suggest avenues for much-needed further research. **CO-5**

Suburban Coyote Ecology and Behavior: Implications for Management and Human Interactions

Bogan*¹, Daniel, Paul **Curtis**¹, and Gordon **Batcheller**² (¹Cornell University, Ithaca, NY, ²New York State Department of Environmental Conservation, Albany, NY)

Suspected increases in coyote (*Canis latrans*) density and visibility in suburban areas of the Northeast are a concern for wildlife professionals and residents alike. People are concerned that loss of pets to coyotes is symptomatic of potential coyote habituation to human development. This could ultimately lead to more severe coyote interactions and human injury. We are using radio- and GPS- tracking to evaluate spatial ecology and demographic parameters of coyotes inhabiting Westchester

County, NY. We have captured and radio tagged 31 coyotes since March 2006. During 2006, fixed kernel home range estimates averaged 4.33 km² (range = 1.16–11.17) and consisted of 67.3% natural habitat, 17.6% low intensity residential areas, and less than 5% of high intensity residential areas, agricultural land, and recreational areas, respectively. Home range data for 2007 appears similar. Survival may be lower during 2007 than it was in 2006. To date, 5 coyotes died from hunting/shooting, 6 due to vehicle collisions, 1 from poisoning, and 1 to drowning. Our findings indicate that most coyotes avoid human interactions by selecting for natural habitats and food sources. Some coyotes incidentally travel through residential areas and infrequently cause conflicts by opportunistically foraging for cats, or have territorial disputes with dogs. Few suburban coyotes demonstrated bold behavior towards people, and most conflicts were associated with coyote-pet interactions. Selective removal of problematic individuals may be sufficient to curb localized nuisance issues between coyotes and humans in effort to maintain balance between coyote behavioral ecology and human safety. **S-2**

Partnering to Manage Invasive Swallow-Worts in Northern New York

Bonanno^{*1}, **Sandra, Naomi Cappuccino**², **Antonio DiTommaso**³, **Frances Lawlor**⁴, **Lindsey Milbrath**⁵, and **George Spak**⁶ (¹SLELO PRISM, Watertown, NY, ²Carleton University, Ottawa, Ontario, Canada, ³Cornell University, Ithaca, NY, ⁴Cornell Cooperative Extension, Syracuse, NY, ⁵USDA Agricultural Research Service, Ithaca, NY, ⁶SLELO PRISM, Watertown, NY)

Cynanchum rossicum and *C. louiseae* (pale and black swallow-wort, *resp.*) were discovered in Jefferson County in the early 1990s. We learned that sightings of scattered individuals had been made even 30 years earlier by people who couldn't identify the plants, but only in the mid to late 1990s were the swallow-worts recognized. By then a large scale expansion was underway. We formed a grass roots *ad hoc* working group around dealing with the invasion. The researchers among us investigated life history and shared their results with the land managers and educators of the public among us. We provided education pieces and public meetings and elicited the interest of many landowners and land managers, who have since begun to use a variety of methods to search for, document, and eradicate or at least manage the infestations. A minimal objective has been to stop the seed rain, reduce the spread. Development a biological control method is underway. This grass roots effort became the foundation of the much broader SLELO PRISM. This talk will focus on what we understand about the natural history of the swallow-worts and what we have learned about effectiveness of various control methods. **CO-8**

Foraging Ecology of Eastern Coyotes in New York State

Boser^{*}, **Christina, Jacqueline Frair**, and **Robin Holevinski** (State University of New York College of Environmental Science and Forestry, Syracuse, NY)

Eastern coyotes have recently become widespread and locally abundant throughout New York State, the ecological consequences of which are not well understood. This study examines diet and habitat selection by coyotes, which will contribute to our understanding of the potential effects of these predators on key species of interest, like white-tailed deer. Based on previous studies, we hypothesized that coyotes will not be selective for adult deer, but will be selective for fawns. To address these hypotheses, the proportional occurrence of adult and fawn deer in seasonal coyote diets will be compared to seasonal deer abundances in two study areas that differ in relative deer density. Preliminary analysis from x scats collected in 2007 indicated a diet dominated by white-tailed deer, small mammals, rabbits, and turkeys. Analyses of proportional occurrence of deer in the diet and deer density are currently underway. To address habitat selection, 8 coyotes have been fitted with GPS and 11 with VHF collars between June 2007 to January 2008. Environmental characteristics of sites used by coyotes will be compared to those available to predict the relative probability of coyote occurrence across the landscape. This research is in its first year and monitoring will continue to ensure adequate sampling of individual, seasonal, and annual variation in diets and habitat use by coyotes. **S-2**

Observations from the New York Herp Atlas on Vernal Pool Amphibians

Breisch^{*}, **Alvin and John Ozard** (New York State Department of Environmental Conservation, Albany, NY)

The Spotted Salamander (*Ambystoma maculatum*), Marbled Salamander (*A. opacum*), Tiger Salamander (*A. tigrinum*), Jefferson Salamander (*A. jeffersonianum*), Blue-spotted Salamander (*A. laterale*), Wood Frog (*Rana sylvatica*), and Spadefoot Toad (*Scaphiopus holbrookii*) are considered to be vernal pool obligates in New York. Data collected since 1990 for the New York Amphibian and Reptile Atlas Project (Atlas) was used to plot statewide distribution and species richness for these five salamander and two frog species. Annual activity patterns for these species were determined along with periods when egg masses and larvae are in the ponds, when road mortality was reported, and for the frogs, when calling peaked and length of calling period. Species associations for the vernal pool obligates were determined based on an analysis of the Atlas data

reports which include a record of all species observed at a specific date, time and location. Since these species often breed in wetlands that fall below the 12.4 acre threshold for New York State regulated freshwater wetlands, we also compared detailed species locations with regulated wetland boundaries for the ten county Hudson River Estuary Program focus area to determine what percentage of the vernal pool obligate species fall outside of the mapped regulated wetland boundary. **S-3**

Development of Standard Survey Techniques for an Endangered Butterfly

Breich, Kirstin (96 Garmish Street, Ellenburg Depot, NY)*

The Karner blue butterfly (*Lycaeides melissa samuelis*) is listed as endangered under the Federal Endangered Species Act as well as by the State of New York. Karner blue populations in New York have been monitored annually using modified Pollard-Yates transects. While these index counts are useful to show yearly trends at individual sites, this survey method can not be used to compare sites nor can it accurately estimate population size. A priority identified in the federal recovery plan is to determine if current Karner blue populations meet viable metapopulation standards. The implementation of a survey technique that is capable of accurately estimating population size would fulfil this need. Accurate population estimates at individual sites would also allow comparisons between sites, subpopulations and metapopulations in addition to identifying significant population declines. Censusing techniques used for Karner blues in other states and for other similar species of Lepidoptera were evaluated based upon accuracy, sampling intensity, minimum qualifications of the sampling personnel, disturbance to butterflies and habitat, and cost. "Distance sampling," which was thought to be one of the most promising techniques, was tested at a number of sites of various sizes and habitat quality in Albany and Saratoga counties to see whether this method would produce an accurate population estimate. The benefits and problems with this technique will be discussed. **S-13**

Making Invasiveness Count in Floristic Quality Assessments

Bried, Jason (The Nature Conservancy, Albany, NY)*

Floristic Quality Assessment is a rapidly growing field of natural areas monitoring and evaluation in the United States. The approach is useful for evaluating restoration and mitigation success, comparing sites of special interest, identifying natural areas of high quality, and establishing baselines for long-term monitoring. Recent breakthroughs have overcome the species richness bias and mathematical exclusion of exotic species that once plagued the classic floristic quality index. But a nagging limitation persists with index methods: failure to account for unique impacts or "invasiveness" of different exotic species. I propose an extended index that defines floristic quality by species richness, conservatism, nativity, and invasiveness. I will discuss the evolution and mechanics of this latest index and give examples of its performance in the Albany Pine Bush. **S-11**

Baseline Floristic Assessment and Classification of Pine Barrens Vernal Ponds

*Bried*¹, Jason and Gregory Edinger² (¹The Nature Conservancy, Albany, NY, ²New York Nature Heritage Program, Albany, NY)*

Pine barrens vernal ponds (PBVP) are intermittently flooded wetlands located within rare fire-prone sand barrens that support a uniquely adapted biotic community. In New York State, the PBVP are relatively scarce, floristically similar to other more common wetland types, and generally threatened by human activity in the landscape. We analyzed existing vascular plant data from New York PBVP to quantify ambient floristic conditions and to clarify floristic identity of the system. We introduce a modified floristic quality assessment index (FQAI") that combines concepts of species richness, conservatism, nativity, and invasiveness. Data sets included snapshot (single year) vegetation surveys of all New York PBVP and an intensive snapshot of PBVP, red maple swamp, and shallow emergent marsh in one landscape (Albany Pine Bush). We found high variation in species conservatism among PBVP sites and complexes, and relatively high floristic quality because of few exotic species. The classic FQAI showed signs of total species richness bias and overestimating floristic quality by mathematically neglecting exotic species. Quantitative floristic classification was stronger than a priori field-based classification and showed evidence for a new PBVP occurrence in the Albany Pine Bush. Useful indicators of PBVP in the Albany Pine Bush included steplebush (*Spiraea tomentosa*), leatherleaf (*Chamaedaphne calyculata*), buttonbush (*Cephalanthus occidentalis*), and hoary sedge (*Carex canescens*). We recommend routine floristic monitoring of PBVP condition and broader refinement of PBVP classification and description in New York State and the northeastern U.S. **S-3**

Using Citizen Scientists to Collect Plant Distribution Data in NY/NJ Forest Land

Brooks^{*1}, Wesley R., David T. **Mellor**¹, Joan **Ehrenfeld**¹, Edwin **McGowan**², Edward **Goodell**³, and Rebecca **Jordan**¹ (¹Rutgers University, New Brunswick, NJ, ²Palisades Interstate Park Commission, Bear Mountain, NY, ³New York New Jersey Trail Conference, Mahwah, NJ)

Citizen science experiences provide the general public with the opportunity to learn ecology in non-traditional settings. We employed citizen scientists in a scientific study documenting the occurrence and habitat conditions of invasive plant species in Northern New Jersey and Southern New York. We studied both ecological learning and invasive plant distribution along trails. Specifically, we investigated the change in knowledge about plant invasions and related ecosystem concepts. Data were collected through the use of questionnaires that combined Likert-type questions with open-ended responses. Qualitative analysis followed standard methods of verbal data categorization. In addition, we collected distribution data from 88 miles of trail. With these data, we analyzed participant accuracy and we generated a predictive multivariate model of plant invasion. While participants were initially limited in their foundational knowledge about ecosystems and plant invasions, we found them to be particularly motivated to find solutions to environmental problems. By the end of the study, however, these participants felt less able to contribute to problem solutions. In spite of this loss in efficacy, we found these participants were able to collect accurate data sufficient for the generation of our predictive model. Our model along with its implications will be discussed with respect to future ecologically-oriented citizen science programs. **S-11**

Timber Rattlesnake Landscape Genetics in the Southeastern Adirondacks

Brown^{*1}, William S. and Rulon W. **Clark**² (¹Skidmore College, Saratoga Springs, NY, ²San Diego State University, San Diego, CA)

In northeastern New York, we examined the genetic structure of Timber Rattlesnake (*Crotalus horridus*) hibernacula using nine microsatellite loci. Five dens spanning a distance of 11 km were analyzed. We computed F statistics, genotype likelihood ratio distances, effective population sizes, and asymmetric migration estimates for the population. Accurately identifying individually marked snakes has previously shown that individuals rarely disperse between hibernacula, yet the current genetic data generally show only modest levels of genetic differentiation among the dens. To explain this apparent paradox, recent data emphasize the importance of basking areas between dens, facilitating summer mating between individuals from different hibernacula. Because gestation and birthing usually occur in basking habitats adjacent to a female's hibernaculum, newborns are likely to adopt the maternal den as their own, leading to an observed high degree of den sharing between mothers and their offspring. Recaptures indicate a greater than 99% fidelity to a particular den among all individuals. However, gene flow between adjacent hibernacula is sufficiently high that the dens comprise what is effectively a single panmictic deme, or a genetically uniform but subdivided population. Basking sites lead to increased gene flow between dens because they provide a means by which males can more easily locate and mate with post-dispersal females from different dens during the summer mating season. **CO-1**

Population Genetics of Purple Milkweed (*Asclepias purpurascens*) in Orange County New York

Broyles^{*}, Steven (SUNY Cortland, Cortland, NY)

Purple milkweed is an insect-pollinated perennial herb found along oak-pine woodlands and wetland margins of eastern North America. We examined genetic diversity and population structure of purple milkweed from Orange County, NY. This population is reported to contain the largest remaining stand of purple milkweed throughout its range. Enzyme electrophoresis was performed on leaf tissue from 360 flowering individuals. Enzyme polymorphisms were observed at 10 of the 11 genetic loci and averaged 2.45 alleles per locus. Mean population heterozygosity and expected heterozygosity are substantially higher than average values reported for other long-lived, out-crossing herbs. In addition, analysis of multi-locus genotypes suggests that purple milkweed is clonal and effective pollen dispersal must occur over greater than expected distances. Our analysis can provide practical information for establishing a breeding program and to re-introduction of purple milkweed to other regional populations. **CO-5**

Unravelling the Mechanism(s) of Ranavirus Transmission

Brunner*¹, Jesse and Danna **Schock**² (¹SUNY College of Environmental Science and Forestry, Syracuse, NY, ²Detroit Zoological Society, Detroit, MI)

Ranaviruses are double-stranded DNA virus of fish, reptiles, and amphibians. They have been associated with mass mortality events in both aquaculture and wild populations. The tiger salamander ranavirus, *Ambystoma tigrinum virus* (ATV), for instance, causes recurrent epidemics in ponds throughout North America that can kill an entire year class. ATV is also being moved in the live animal trade, in the form of infected “waterdogs.” In order to better understand how these viruses “get around,” we conducted several experiments to explore the form, routes, and timing of ATV transmission among tiger salamanders. Our data suggest that ATV is efficiently transmitted by direct interactions between live animals (bumping, biting, and cannibalism) as well as by necrophagy and indirectly via water and fomites. Determining which form of transmission is most important in nature is essential for understanding transmission at the population level. Our experiments also revealed an important temporal aspect to infectiousness: larval salamanders become infectious soon after exposure to ATV and their propensity to infect others increases with time. These results begin to clarify the mechanisms and dynamics of ATV transmission, and lead to key questions that need to be addressed in future research. S-7

Population Dynamics of the Zebra Mussel (*Dreissena polymorpha*) in the Hudson River

Bustamante*, Helen (University of Illinois at Urbana-Champaign, Urbana, IL and Illinois Natural History Survey, Champaign, IL)

Hudson River ecosystem function has been profoundly altered since the arrival of the invasive zebra mussel in the early 1990s. To devise successful strategies for the management and control of such an environmentally and economically important invader, it is critical that zebra mussel population dynamics are understood. I am investigating zebra mussel population dynamics in the Hudson River by undertaking a demographic study to assess the contribution of each life stage to population persistence and growth. Over the past four years, my research has revealed several patterns in zebra mussel population dynamics. These patterns suggest that regulation of populations in the Hudson River switches between recruitment and post-recruitment processes. At times, early settlement events (pre-recruitment) are important in structuring zebra mussel populations. For example, settlement in 2004 was much lower than previous years’ settlement leading to zero recruitment. At other times, later settlement events (post-recruitment) are important in zebra mussel demography. For example, in 2005 high settlement led to high recruitment, but post-recruitment mortality removed virtually all adult animals from the population during late August 2005. The huge post-recruitment mortality phenomenon continued during late August/early September 2006 and 2007. For the past few years, the population has undergone a yearly cycle. By late summer/early fall, the population consists almost exclusively of small cryptic settlers. These settlers survive to spawn the following spring before being subsequently consumed by predators during late summer. Factors affecting such an annual cycle, including likely predators and their impacts, will be discussed. S-12

Community Based Conservation of Vernal Pools in Maine

Calhoun*, Aram (University of Maine, Orono, ME)

Vernal pools and other geographically isolated wetlands are the most vulnerable wetland resource in North America. The United States federal government has slowly deregulated these wetlands since the SWANCC decision in 2003. As our knowledge of the ecological role of vernal pools at the landscape scale grows while protections decrease, conservation practitioners must embrace alternative strategies for conserving vernal pools. We have taken a multi-pronged approach to vernal pool conservation that includes strengthening state regulations, educating enforcement officials and landowners, and fostering vernal pool conservation initiatives at the local level. University research on pool-breeding amphibians was used to leverage state-wide protections of vernal pools as Significant Wildlife Habitat. In 2007, legislation was passed that resulted in regulation of the most productive pools including 250 feet of the adjacent habitat. At the same time, we are working on proactive conservation strategies with six Maine towns using a collaborative approach that includes stakeholders, land trusts, town officials, citizens, and universities and high schools. This 2-year project involves training citizen scientists to inventory and assess all potential vernal pools to create a data base that will be used by the town and state, to develop a digital data layer to be incorporated into other natural resource data layers, and to assist towns in conservation planning that may include protections stricter than currently in place at the state level. Maintenance of the landscape-scale functions of vernal pools can best be achieved through proactive planning at the local level where landscapes, and not simply individual pools, are considered. S-3

The Snail from Hell. Who Eats Invaders with Specialized Defenses?

*Carlsson**, Nils (Carey Institute of Ecosystem Studies, Millbrook, NY)

Mollusk invaders often have drastic effects on invaded ecosystems, here exemplified by the South American golden apple snail, which was introduced to Southeast Asia in 1980, but also by some North American mollusk invasions. One reason that invasive mollusks have strong, cascading effects on the invaded ecosystem is that they may reach extremely high population densities. This phenomenon is often explained by the enemy release hypothesis, i.e. invasive mollusks are assumed to have escaped their native predators, competitors and parasites in the invaded range. There are reasons to believe, however, that we have underestimated the potential long-term regulatory effect of native predators on invasive species long-term population dynamics. It may take time to recognize and adapt to feed on invasive species with specialized defenses, but predators are not fixed units. We are just starting to appreciate that they may adapt and evolve in response to large changes at the food base in contemporary time. In the talk predator adaptation and evolution is discussed and evidence from the scientific literature presented. S-12

Blanding's Turtle Habitat Use in a Changing Landscape: Conservation Implications

*Chaloux*¹*, Andrea, Alvin *Breisch²*, and Michael *Kallaji²* (¹Department of Biological Sciences, University at Albany, Albany, NY, ²New York State Department of Environmental Conservation, Albany, NY)

Blanding's turtles (*Emys blandingii*) in the northeast occur in disjunct populations. In 2003, a population of this state-threatened species was discovered in Saratoga County, New York, approximately 100 km from any other known population. The population was studied from 2003–2007 to gather demography, distribution, and movement data, as well as data on habitat use in the surrounding landscape, which is facing heavy development pressure. In 2007, we conducted a telemetry study of 12 Blanding's turtles (10 adults, 2 juveniles) and tested a variety of survey methods in occupied areas and areas not known to be occupied. Through these efforts we documented additional occupied habitat, but no Blanding's turtles were trapped in new areas. The longest documented distance traveled by an individual Blanding's turtle was 1.6 km. Blood samples were collected for use in an analysis of the genetic uniqueness of the population. In addition, 5 spotted turtles (*Clemmys guttata*) were captured and tracked. Individuals' movements and use of habitat over the five-year time span, during which time certain upland areas utilized by the turtles were impacted by logging and development, support the finding that Blanding's turtles use the landscape opportunistically, responding to activities that open the canopy. The data indicate that protection of drought-refuge/over-wintering ponds is a priority and creation of suitable nesting areas on protected parcels may be warranted.

CO-6

Phytoplankton Assemblage Response to Decreasing Acidic Deposition in Adirondack Mountain Lakes

Charles¹, Donald F., Frank A. *Acker¹*, Paul A. *Bukaveckas²*, William H. *Shaw³*, Charles W. *Boylen*⁴*, and Sandra A. *Nierzwicki-Bauer¹* (¹Patrick Center for Environmental Research, Academy of Natural Sciences, Philadelphia, PA, ²Department of Biology, Virginia Commonwealth University, Richmond, VA, ³Marist College, Retired, Poughkeepsie, NY, ⁴Darrin Fresh Water Institute and Department of Biology, Rensselaer Polytechnic Institute, Troy, NY)

Changes in phytoplankton assemblages were analyzed in 30 lakes in the southwestern Adirondack Park from 1994 through 2007. This research is part of the Adirondack Effects Assessment Program (AEAP), a multi-disciplinary study assessing biological recovery from acidification. At the start of the monitoring program, the lakes ranged in pH from 4.5 to 7.1, with 13 lakes having a pH < 5.2. Integrated samples of the epilimnion were collected two times each summer (late June to early September) during the study. The Utermöhl settling chamber technique was used to determine species composition and abundance (cell and biovolume densities). The strongest relationship was an increase in number of algae species with increasing pH. Indicator metrics based on this relationship were the most sensitive phytoplankton indicators found for indicating change in acidity status. No clear trends towards increasing number of taxa, or other assemblage changes, were evident that would indicate other than weak biological recovery from acidification during the study period. There have been, however, some marked inter-annual changes in species composition in several lakes. As in other studies of acidic lakes, dinoflagellates and coccoid cyanobacteria were abundant in lakes with pH < 5.2; chlorophytes and chrysophytes were more common at higher pH values. S-4

The Presettlement Forests of New York and Northern Pennsylvania: The Empirical Data

*Cogbill**, Charles (Harvard Forest, Petersham, MA)

The land division surveys from settlement of the Northeast provide unique quantitative documentary evidence of the region's forests. I have located and collated early (1700–1830) survey records from across New York and northern Pennsylvania. This database covers over 530 individual town-scale units containing over 92,500 individual witness tree citations. The tree abundances are summarized into genera, the vegetation is classified, and the variations are further elucidated by geospatial analysis. These analyses show remarkably detailed distributions of forests and present an empirical map of the vegetation. The region was dominated by mixed northern hardwoods comprised of 28% beech, 21% birch, 13% maples and 12% hemlock. Beech was remarkably dominant in the Catskills, eastern Finger Lakes and on the Allegheny Plateau. Hemlock abundance was focused on the eastern slopes of the Catskills and Adirondacks and across northern Pennsylvania. A dramatic “oak-beech” tension zone extended across northern Pennsylvania separating the northern hardwood forest from the central hardwoods dominated by oaks to the south. This oak forest, mixed in places with pine, had prominent extensions up the Hudson and Susquehanna Valleys. Most interestingly a distinct salient of oak forests extended across the uplands of the Allegheny Plateau from the Tioga-Cohocton to the Genesee Valleys. Contrary to earlier studies there was no tongue of oak forest extending around of Lake Ontario Plain. The oak forests were certainly linked to fire disturbances and probably connected to Native American populations. These historic patterns are apparently the most appropriate baseline for both present and future changes. **S-1**

Range Contraction of Black Terns in New York and the Northeast

*Corser*¹*, Jeffrey, Irene *Mazzocchi²*, and David *Adams³* (¹New York Natural Heritage Program, Albany, NY, ²New York State Department of Environmental Conservation, Bureau of Wildlife, Watertown, NY, ³New York State Department of Environmental Conservation, Nongame and Habitat Unit, Albany, NY)

Black Terns are an endangered species in New York State and have been declining since the 1960s. Prior to 1980, the tern population was comprised of over 50 different colonies with four containing more than 100 pairs each. Since 1989 the state-wide population has been monitored semi-annually and has declined at an annual rate of 2.2%. At the beginning of the monitoring program Black Terns bred in 28 different marshes (44% of those monitored), while in 2007 only 12 different marshes supported breeding colonies (13% of those monitored) and only about half of those were of substantial size. Breeding colonies appear to be coalescing into fewer large wetland complexes on publicly managed lands, with the smaller outlying sites becoming extirpated. In particular, the birds have disappeared entirely from the Lake Ontario Plains in Wayne and Monroe counties in western NYS, which supported over 40 pairs as recently as the late 1980s. Nevertheless, the overall number of breeding pairs throughout the state apparently bottomed out around 2000, and by 2007 had climbed to over 200 pairs for the first time since the late 1990s. Coupled with their occurrence on largely protected lands in NYS this trend gives some cause for optimism. However, because the range contraction within NYS parallels a wider regional contraction on the species range margin in the northeastern U.S. and Canada, solutions to the ongoing decline will require regional, rather than site-specific approaches. **CO-9**

Fish Species-Habitat Association Study in the Great Swamp of New York

*Cotroneo**, Chris and David *Yozzo* (SUNY Purchase, Purchase, NY)

A comprehensive three season, multiple gear fish species-habitat association study was conducted in New York's Great Swamp. Both passive (2 ft and 3 ft fyke nets and minnow pots) and active (seine and 1 m² throw trap) fish sampling methods were used to sample fishes in non-vegetated, emergent and sub-aquatic vegetation (SAV) sites. The 2 ft fyke nets were deployed at four emergent sites and two SAV sites. The 3 ft fyke nets were deployed at three non-vegetated sites and three SAV sites. The minnow pots were deployed close by all fyke nets. A bag seine was used at one non-vegetated site and one moderately dense SAV site. The throw trap was used at four emergent vegetation sites and four SAV sites. Redfin pickerels (*Esox americanus*) and White river crayfish *Procambarus acutus* in the Great Swamp use emergent vegetation as a nursery for young-of-year. Adult redfin pickerels are found in emergent vegetation in Spring and Autumn, but primarily occupy the non-vegetated open channel of the East Branch Croton River during the Summer. Crayfish species in the Great Swamp appear to occupy several niches: Ringed crayfish (*Orconectes neglectus*) are dominant in SAV, while White river crayfish are mostly found in emergent vegetation, and Rusty crayfish (*Orconectes rusticus*) are mostly found in non-vegetated areas. Centrarchids in the Great Swamp are associated with vegetation, while Percids and Cypriniformes are associated with non-vegetated areas. Yellow bullhead catfish are almost exclusively found in SAV. **CO-2**

Monitoring Nocturnal Songbird Migration: Do Banding and Acoustic Recordings Yield Concordant Results?

*Coulter**, Benjamin, Emma *DeLeon*, Lewis *Grove*, and Michael *Lanzone* (Powdermill Avian Research Center, Rector, PA)

Bird banding has been a mainstay of avian population monitoring for decades. While banding and recapture are very useful for identification of unique individuals and for many individual and population parameters, it is labor intensive and constrained to the birds that are netted in small areas. Many species are underrepresented in banding totals. Captures are strongly affected by microhabitat traits (e.g. canopy species) or behavioral traits (e.g. very secretive or nocturnal species). Bioacoustics has the capacity to augment banding by detecting and monitoring birds that might not be well represented by mist-netting. Bioacoustic monitoring has potential for developing large-scale population estimates and elucidating critical migration corridors. We made nightly acoustic recordings at the same location of an intensive bird banding operation in the fall of 2007. We make general comparisons of migratory activity at this one site as determined by these two methods.

CO-11

Viability of Freshwater Mussels (Unionidae) in the Allegheny Basin (NY)

*Crabtree*¹*, Darran, Tamara *Smith²*, and Kathleen *O'Brien³* (¹The Nature Conservancy, Allegheny College, Meadville, PA, ²PA Natural Heritage Program, Union City, PA, ³New York State Department of Environmental Conservation, Albany, NY)

Viability rankings for freshwater mussels offer additional information for determining where river conservation activities are to take place and for determining what type of activity is needed, restorative or preservative. Conservation resources are often drawn to watersheds with populations of threatened species, but the type of actions to pursue should be dictated by the overall viability of species. We summarize species viability across two scales: the integrity of a population at a site, and the extent of the population within the basin. We have used this approach in the French Creek system (NY and PA) and compare these results to the NY portion of Allegheny basin. Compared to French Creek, the Allegheny streams in NY provide viable habitat for far fewer imperiled species. Rayed bean, however, had relatively high viability scores in Cassadaga and Olean Creeks. One other imperilled species, clubshell, was found alive in Cassadaga Creek and as a weathered shell in Allegheny River, but neither was considered viable. No other rivers in the NY portions of the upper Allegheny had high scores for globally imperiled species, although most others had high scores for at least one less threatened species. **S-13**

Impacts of Cormorants and Other Colonial Waterbirds on NY Harbor Island Habitats

*Craig*¹*, Elizabeth, Susan *Elbin¹*, James *Danoff-Burg²*, and Matthew *Palmer²* (¹Wildlife Trust, New York, NY, ²Columbia University, New York, NY)

Colonially nesting waterbirds transfer large quantities of aquatically derived nutrients into small isolated terrestrial systems, potentially altering community and ecosystem structure. Over the past three decades, the Double-crested Cormorant (*Phalacrocorax auritus*) has undergone rapid population expansion throughout much of its historic range in North America, re-colonizing habitats which had not supported colonial waterbirds for decades. There is mounting evidence that these populations are degrading the habitats they colonize primarily through the destruction of vegetation and the alteration of soil conditions. This study examined the effects of waterbird colonies on their nesting habitats by observing plant and arthropod community structure as well as soil and leaf litter characteristics at colonized and non-colonized sites on two islands in New York Harbor. The results reveal that understory plant species richness and total plant cover were significantly depressed while the richness and abundance of certain arthropod functional groups were elevated in habitats beneath cormorant nests in comparison to non-colonized habitats. However, cormorant nesting areas did not consistently differ from nesting areas of other colonial waterbirds in regards to plant and arthropod community structure or soil and leaf litter characteristics. These results suggest that individual cormorant nests are similar to other colonial waterbird nests in their effects on island ecosystems. Perceived differences in impact may be a function of the elevated nesting density of cormorants relative to other colonial waterbirds. **CO-9**

Assessing Zebra Mussel Veliger Mortality via Exposure to Hydrodynamic Forces

*Crane**, Lori and Thomas *Horvath* (SUNY College at Oneonta, Oneonta, NY)

Zebra mussels (*Dreissena polymorpha*) continue to invade new aquatic habitats throughout North America, including now California. Lakes appear to be sites of initial colonization within watersheds. These lake populations serve as sources for propagules available to colonize downstream connected systems via passive veliger drift. Distribution patterns of adult mussels in most lake outlet streams are consistent. Density decreases exponentially with distance from the source population. Exposure to harsh hydrodynamic forces may be increasing mortality of veligers during downstream dispersal. We tested the viability of this hypothesis by exposing veligers to different degrees and durations of hydrodynamic forces. Aliquots (100 ml) of veligers were placed in Erlenmeyer flasks and spun on an orbital shaker at 3 speeds (0–control, 100, 400 RPM) and 3 durations (1, 24, 48 hour). Proportions of live and dead veligers were quantified using microscopy. At 100 RPM, no significant differences existed compared to controls for 1, 24 and 48 hour trials. At 400 RPM differences in the 24 and 48 trials were found compared to the 1 hour. The 24 hour trial treatment data showed 79% alive, with 87% alive in the control. The greatest discrepancy was in the 48 hour run; having only 5% left alive in the treatment, but 61% alive in the control flasks. Duration and intensity of hydrodynamic forces combine to increase veligers mortality. These results support the hypothesis that patterns of zebra mussel colonization of downstream reaches in lake outlet streams are affected by the flow conditions they are experiencing. S-8

The Morphological Variation in Eastern Coyote Skulls

*Curtis**, Abigail, Roland *Kays*, and Robert *Feranec* (New York State Museum, Albany, NY)

The coyote is a newcomer to Northeastern North America, having immigrated from Minnesota through Ontario. This range expansion occurred in the mid 1900s well after extirpation of the eastern wolf in the 1800s. While initial studies showed that the Northeastern coyote was larger than its western counterpart, morphological variation across its range has not been completely studied. To address this question we use a series of measurements taken from over 200 eastern canid skulls to meet three objectives. First, we determined the distinguishing skull characters among Eastern coyotes, Western coyotes, and extinct Eastern wolves. Second, we compared the morphology of New York coyotes from 1950 with those from today to assess recent morphological changes. Third, we examined the morphological variation among Northeastern coyote populations from Ohio to Quebec. Our data confirm that eastern coyote skulls are more robust and have larger and more crowded teeth than western coyotes. These data further show that Eastern coyote skulls more closely resemble the skulls of Western coyotes than wolves. Additional data will be presented on the recent changes in New York coyotes since their original colonization, and on patterns of variation across the Northeast. S-2

Spiny Softshell Habitat Use in a Central New York Embayment

*Czech**, Helen and James *Gibbs* (State University of New York College of Environmental Science and Forestry, Syracuse, NY)

Little is known about the life history of the spiny softshell turtle (*Apalone s. spinifera*)—a Species of Special Concern—in New York State. Softshells are restricted to several lakes and embayments in the central region of the state. A radio-telemetry study initiated in 2006 focused on identifying the seasonal migration patterns, hibernacula, nesting beaches and habitat use patterns of a population located in a Lake Ontario bay. Ten females and 11 males were radio-tagged and tracked for 2 months to 2 years. Two communal hibernacula were located and two main nesting sites were identified. One nesting site, maintained and protected by the NYSDEC, had high hatching success. An unprotected nesting beach saw high levels of depredation from mammalian predators and Sarcophagid fly larvae. Females ranged farther than males and used multiple core use areas. Mating was observed in the fall when turtles were concentrated near hibernacula. Daily activities were primarily restricted to littoral zones with abundant aquatic vegetation, which was used for both foraging and basking. Threats to the population include motorboat collisions, high levels of nest depredation and human disturbance at unprotected nesting beaches, and the lack of safe nesting beaches. Stewardship and management recommendations include enacting boater speed limits near shore and during nesting season as well as obtaining protection for nesting sites and possibly creating new, protected nesting areas. S-13

Assessing Change in Fish Assemblages in Adirondack Lakes

Daniels^{*1}, Robert, Robert **Bombard**², James **Sutherland**², and Charles **Boyle**³ (¹New York State Museum, Albany, NY, ²New York State Department of Environmental Conservation, Albany, NY, ³Darrin Fresh Water Institute and Department of Biology, Rensselaer Polytechnic Institute, Troy, NY)

Twenty-five species of fish and two hybrid forms were taken or observed in 31 lakes in the southwestern quadrant of the Adirondack Park, Herkimer and Hamilton Counties, New York. Species richness in the lakes ranged from 0 to 18 species. Abundant species included brown bullhead, common shiner, golden shiner, white sucker, pumpkinseed and yellow perch. Species composition differed among lakes and composition and abundance differed within lakes over time. Populations of all but the rarest species comprised several size classes, indicating successful local annual recruitment. We compare our results to those of surveys conducted in the lakes during the past 70 years. Assessments of the fish assemblage composition in these lakes, when compared over time showed marked differences. These differences are affected by both changes in the physico-chemical environment and by the introduction of exotic species. We explore these environmental changes and relate them to the observed differences in assemblage structure. We also suggest that sampling in previous surveys may have been inadequate to assess realistically changes in species composition. However, despite the shortcomings of earlier surveys, the presence of exotic taxa, extirpation of native fishes and environmental change can explain gross changes in fish assemblage composition in these Adirondack lakes. Establishment of exotic fishes probably masks any assemblage changes caused solely by physico-chemical changes. **S-4**

Fishes of the Conewango Creek Basin in Southwestern New York

Daniels, Robert, **Richard Morse**, and **Bryan Weatherwax**^{*} (New York State Museum, Albany, NY)

A survey was conducted in 2004 and 2005 on the Conewango Creek and its tributaries, which is the central sub-basin of the Allegheny River watershed. This watershed is part of the extreme northeastern portion of the vast Mississippi River drainage through the Ohio River. The system includes several species on the periphery of their range, many of which are rare in the state of New York. One goal of the survey was to develop a species list and assess the change in status of species by comparing recent catches to those of a synoptic survey conducted in 1937. We collected representatives of 70 species and three hybrid taxa. Ten of these fishes have not been reported from the system previously. These include three introduced exotics and seven species that recently gained access to the system by migrations from downriver sources. Prior to this survey, 69 species were reported from the basin, which included nine species that were not represented in 2004 and 2005. We collected representatives from 16 families, with 26 species in Cyprinidae and 11 in Percidae, the two most speciose families. **CO-2**

Assessment of Residential Developmental Impact on Small Mammal Communities in the Adirondacks

Danks^{*}, **Elizabeth Dowling** and **William Porter** (State University of New York College of Environmental Science and Forestry, Syracuse, NY)

People are increasingly seeking low density residential development adjacent to natural areas. Land-use managers are pressed for science to quantify and minimize impacts of this development on ecosystems. Our primary goal was to quantify the impact of residential development on natural ecosystems by using small mammal communities as an indicator. We addressed three objectives: (1) Determine how small mammal diversity and community composition change with distance from residences into surrounding wild forest. (2) Determine whether the influence of development is manifest as a continuous function or a measurable threshold. (3) Quantify how age and density of housing developments impact species diversity and composition. We sampled small mammals along transects radiating from houses into surrounding forests using live-traps and track tubes over 2 summers. We sampled from 2 housing age and density classes. We quantified mammal communities using multiple metrics, and used regression to determine how these communities changed with distance from development. We used repeated measures analysis to differentiate housing age and density impacts. We detected 18 species of small mammals, and found that abundance, response rate, richness, and evenness varied with distance, but no metric was substantially predictive (max. $r^2=0.096$). These metrics varied in their prediction of a threshold distance, with the strongest indicator demonstrating a 175-m threshold. Housing density did not affect small mammal community metrics near developments, but response rate decreased with distance at older homes. Five species responded differently at older than newer homes, but the response was not consistent across these species. **S-6**

Comparison of Land Conservation Models in Montgomery County, New York

Davis*, John and George **Robinson** (University at Albany, State University of New York, Albany, NY)

In New York State, as elsewhere, much of the remaining native habitat occurs on privately-owned agricultural and forest lands—a form of conservation by default. Land protection decisions made at the local level tend to promote multi-use spaces without explicit attention to biodiversity preservation, which requires information and expertise that are often unavailable. Montgomery County, where more than 50% of the land cover is classified as agricultural, exemplifies these challenges. To assess future planning needs in Montgomery County, two geographic information system (GIS) models of land conservation were compared, each comprising different selection criteria. The first model applied acquisition criteria of the Mohawk Hudson Land Conservancy to identify areas of high priority for open space conservation, using nine layers of publicly-available geospatial data as surrogates. The second model used biodiversity data as selection criteria: known and potential occurrences of rare species and unique communities, and predicted vertebrate species distributions. When the high-priority targets identified by the two models were compared, it was found that only 39% of those aimed at capturing the most species richness and the largest numbers of rare species were also selected by the open space conservation model. However, when compared to the existing portfolio of open space lands in the county, both models incorporated more rare species, unique communities, and high vertebrate species richness. Other New York State agricultural landscapes have seen extensive habitat loss, but careful planning can lead to a better outcome in Montgomery County. **CO-4**

Toxicity of Nitrogenous Fertilizers and Pesticides to Snapping Turtles Eggs (*Chelydra Serpentina*)

de Solla*, Shane and Pamela **Martin** (Environment Canada, Burlington, Ontario, Canada)

Many reptiles oviposit in soil, including agricultural landscapes. We evaluated the toxicity of nitrogenous fertilizers, atrazine, and a complex mixture of pesticides and fertilizers simulating those associated with corn production in Ontario, to snapping turtle (*Chelydra serpentina*) eggs. Eggs were also exposed in vegetable gardens to simulate realistic exposures, and in the laboratory in covered bins so as to minimize loss of volatile compounds. Compounds or mixtures were applied at typical field application rates, and at 10 times these rates. Hatching success, deformities and body size were evaluated for all exposures, whereas for the atrazine exposure gonadal development was also evaluated. Neither urea nor ammonium nitrate had any impact upon hatching success or development in the exposed vegetable garden, despite overt toxicity of ammonium nitrate to endogenous plants. Both laboratory exposures resulted in reduced hatching success, lower body mass at hatching, and reduced post-hatching survival compared to controls at the highest concentrations. A complex mixture of pesticides (atrazine, glyphosate, dimethamid, tefluthrin) and ammonia did not affect turtle development at typical application rates, although at higher rates caused 100% mortality in both laboratory and field exposures. For the atrazine only exposure, some males with testicular oocytes and females were produced in the atrazine-treated groups (3.3–3.7%) but not in the control group, although no statistical differences were found among treatments. Future work may focus on the accumulation of pesticides in eggs from soil exposures. **S-7**

Habitat Use among GPS-Collared White-Tailed Deer: Implications for Disease Spread

Dechen*, Amy, David **Williams**, and William **Porter** (State University of New York College of Environmental Science and Forestry, Syracuse, NY)

Chronic wasting disease, a highly contagious, fatal prion disease among in North American cervids, was discovered in Central New York in 2005. To effectively manage CWD it is important to understand how the disease is transmitted from one individual to another, and how far and how fast an infected individual can spread the disease. Rate of spread is largely dependent on social behavior and movements of deer. Our objective was to create a Risk Assessment Mapping Program (RAMP) designed to incorporate behavioral, spatial, and climatic parameters to predict direction and magnitude of disease spread from a point of first occurrence. We deployed 54 GPS collars on white-tailed deer (*Odocoileus virginianus*) in 2 study areas in Central New York to evaluate the behavioural parameters associated with potential disease spread at multiple spatial scales. Here, we present one component of the RAMP that evaluates the spatial distribution and habitat utilization of collared animals. Investigation of multiple core areas across sex/age classes revealed distinct landcover preferences with respect to agricultural and forested habitat matrices, elevational gradients, and closer proximity to roads. Additionally, life history characteristics including seasonal migration, site fidelity, and dispersal were identified and quantified based on observed variation in habitat use over time. These analyses provide essential fine-scale estimates of the behavioral factors that are likely to contribute to disease spread in various landscape matrices, and when incorporated in the RAMP model, will provide managers with tools to predict isopleths of potential disease risk in the environment. **CO-12**

Automated Detection of Nocturnal Flight Calls: A Comparison of Analytical Software

*DeLeon**, Emma, Lewis *Grove*, Benjamin *Coulter*, and Michael *Lanzone* (Powdermill Avian Research Center, Rector, PA)

Bioacoustic analysis of nocturnal flight calls has potential as a powerful tool for monitoring migratory birds. Recent technological advances are making computerized analysis of nocturnal recordings more practical on a large scale. Perhaps the most notable development involves improvements in automatic detection of flight calls within a recording- a process that is tedious if done manually. However, the utility of computerized analysis depends on the accuracy and precision of counts. In this study we compare the utility of some basic automatic detectors, with several detectors designed using *XBAT* and with manual detection by trained observers. *Tseep-x* (Oldbird.org) is a program traditionally used for extracting warbler-type flight calls from nocturnal recordings and was developed specifically for this purpose. We found this program, consistently misses a large proportion of calls found manually. *XBAT* (Cornell bioacoustics research program), contains a number of improvements over previous programs, notably the ability to customize detector parameters to maximize the number of correctly detected calls. *XBAT* outperformed *Tseep-x* under a variety of conditions and was able to detect a high proportion of calls found by human observers. *XBAT* is not specifically designed for flight calls and requires complicated fine-tuning of its multiple parameters. Minor variations in settings yield wide differences in results. We also show the effect of adjusting several *XBAT* parameters. Without manually scored recordings to help calibrate settings in *XBAT*, extreme caution must be used in the application of this (and other) analytical software. **CO-11**

Spring Elfins (*Callophrys*) and Duskywings (*Erynnis*) of Northeastern Pine Barrens

*Dirig**, Robert (Cornell University, Ithaca, NY)

In the Northeast, the brown and grey landscapes of sandy pinelands can look depressingly barren as winter wanes, but their serene aspect masks spirited activity among the earliest butterflies and skippers. On bright days in April and May, small brown lycaenids called Elfins (genus *Callophrys*) emerge from overwintered chrysalids and sport along sandy trails, revealing subtle beauty and exquisite camouflage. Brown Elfins, Frosted Elfins, Hoary Elfins, and Eastern Pine Elfins inhabit dry sandy sites with their respective foodplants, Lowbush Blueberry, Wild Lupine, Bearberry, and Pitch Pine; while Henry's Elfins require somewhat damper habitats with American Holly or heaths. Slightly larger Duskywing skippers (genus *Erynnis*) comprise another array of similar, spring-flying, earth-tone species that can be quite confusing. All pass the winter as fully grown larvae that pupate in the spring. Juvenal's, Horace's, and Sleepy Duskywings, with oak-feeding caterpillars, are early fliers in pine barrens and oak woods, while Dreamy Duskywings are found near their poplar and willow hosts. Wild Indigo and Persius Duskywing larvae eat Wild Lupine, and Mottled Duskywings prefer New Jersey Tea. Because of specialized life cycles that are tied to fire-maintained, early-successional habitats, several of these insects have disappeared from much of the Northeast during the past 20–30 years. Seven species are currently listed as endangered, threatened, or of special concern in the region. **CO-3**

Developing a Vernal Pool Ranking Scheme for Conservation Prioritization and Wetland Protection

*Dirrigl, Jr.**, Frank (Fuss & O'Neill, Inc., Manchester, CT)

Although no two vernal pools are exactly similar, there are conservation and wetland protection situations that would benefit from being able to prioritize them. We present a vernal pool ranking scheme based on Natural Heritage/NatureServe Methodology that is based on a pool's condition, size, and landscape features. The ranking of each of these features is done through a qualitative description approach. We propose that the condition and size of a vernal pool are the primary factors to be considered. Using the scheme we present, an overall vernal pool rank is determined by converting the individual ranks of the three features to a numerical score. Our preliminary ranking scheme provides researchers, conservationists, and permitting agencies with a comparison tool to assist with protecting isolated or systemic vernal pools on a regional level. **S-3**

A Survey of Attitudes towards Coyotes in a Recently Colonized Area

Draheim*, Megan M., Larry L. **Rockwood**, E.C.M. **Parsons**, and Gregory **Guagnano** (George Mason University, Fairfax, VA)

Coyotes are relatively recent arrivals in the Washington, D.C. metropolitan area. In an effort to understand and obtain baseline data about attitudes towards coyotes, a survey was conducted in 2006. Most respondents had relatively neutral attitudes towards coyotes, with some level of support for their existence in the D.C. area. Only 5.5% of participants wanted to completely eliminate the local coyote population. While 51.8% of respondents were not at all concerned with the potential risk to themselves in a face-to-face encounter with a coyote (scored on a 4-point scale), 45.5% felt that the potential for a coyote to attack a child was a major concern. Respondents were knowledgeable about some aspects of coyote behaviour (81.2% of respondents answered correctly that attacks on humans are uncommon; 71.2% agreed that one should not run away from a coyote; and 77.9% knew that coyotes will kill cats on occasion), but did have some basic misunderstandings (70.2% felt that coyotes are endangered and 57.8% thought that males weigh an average of 100 pounds). Men were more tolerant of the presence of coyotes ($p=0.002$) and liked coyotes more than women did ($p=0.007$). Pet owners seemed to have more extreme attitudes, either positively or negatively, towards coyotes than non-pet owners ($p=0.018$), as did respondents who knew of a coyote attack on a pet ($p<0.001$). This demonstrates the importance of outreach programs that teach people how to live successfully near coyotes, before awareness increases and conflict potentially escalates. **S-2**

Migratory Patterns of Alewife in Big Fresh Pond in Eastern Long Island

Draud*, Matthew (C.W. Post – LIU, Brookville, NY)

In 2006 I studied the migratory patterns of a population of alewife, *Pomolobus pseudoharengus*, in the Big Fresh Pond (BFP) watershed on the east end of Long Island, NY. Big Fresh Pond is an 85-acre natural freshwater lake with a maximum depth of over 50 feet. Alewife Creek is small, shallow, and free flowing and is the sole tributary connecting BFP and North Sea Harbor, which is a sheltered embayment of the Great Peconic Bay Estuary. I established a video surveillance system in Alewife Creek approximately 0.5 km downstream of BFP. Two cameras outfitted with infrared lights, one underwater and one above water, recorded video continuously from early March through November. Alewives were counted during video playback. Over 71,000 alewives passed the video surveillance point on Alewife Creek and presumably a large portion of these completed their migration into BFP. Migratory behavior was almost exclusively nocturnal beginning at 2000 hours and ending at about 0800 hours. The first upstream migrating fish was recorded at the surveillance site on March 26th and the last were recorded moving upstream on May 13th. The upstream migration was cyclic and had three main activity peaks roughly separated by two week increments, with maximum migration recorded on April 2, April 16, and May 1. Emigration of spent adults began on April 29 and the last downstream adult migrant was recorded on June 14. Although pulsed, emigration appeared less cyclic than upstream movements. Less than 40,000 alewives passed the cameras moving downstream back out to sea. **CO-2**

Herpetofauna Population Changes in a Highly-Polluted Urban Ecosystem: Onondaga Lake, NY

Ducey*¹, Peter K. and Alvin R. **Breisch**² (¹State University of New York at Cortland, Cortland, NY, ²New York State Department of Environmental Conservation, Albany, NY)

Onondaga Lake (Syracuse, NY) and its surrounding terrestrial and wetland habitats have been greatly disturbed by human activities for over 150 years. The ecosystem has received wastes from major adjacent industries and from the sewage treatment system for the city of Syracuse; these multifaceted disturbances affected all flora and fauna. Over the last 25 years, some of the major sources of pollutants at the lake have changed in important ways. We have studied the amphibian and reptile populations at the site since 1994, making comparisons with herpetofauna communities in other parts of the state. At the start of the study, the species composition and population densities in the Onondaga Lake ecosystem were dramatically less than comparable sites elsewhere in the region. From 1994 through 2001, no amphibian species were using the lake or the connected wetlands for breeding, although a few species bred successfully in surrounding, but hydrologically-separated wetlands. However, since 2001, some amphibian species have begun to reinvade parts of the lake and connected wetlands possibly due to upgrades in the sewage treatment systems feeding the lake. The species that have been successful here are similar to those found in some other urban areas in NY. **S-7**

Submersed Macrophyte Communities of Adirondack Lakes: Relationships between Community Structure and pH

*Eichler**, Lawrence W. and Charles W. *Boylen* (Darrin Fresh Water Institute and Department of Biology, Rensselaer Polytechnic Institute, Bolton Landing, NY)

Aquatic plant communities play a major role in the structure of lake habitats. As part of the Adirondack Effects Assessment Program, submersed aquatic plant communities in a diversity of lake types were evaluated between 1994–2006. A total of 763 macrophyte specimens including 64 species have been identified and archived from 31 lakes, ranging in pH from 4.71 to 7.80. The lakes contained an average of 14.3 (± 1.3) species per lake, which is comparable to low elevation, moderately productive temperate lakes (15 species). Drainage lakes produced a substantially greater number of species per lake (15.5 ± 1.5) than seepage lakes (6.5 ± 1.8). Aquatic plants were distributed from the lakeshore (emergent species) to a maximum depth of approximately 7 m. In several lakes, specimens of the bladderwort, *Utricularia purpurea*, were found as deep as 12 m. Deep-water range extension is commonly observed in weakly rooted species such as the bladderworts; however, these specimens rarely survive to the next growing season. Aquatic plant species range from highly tolerant species, which are present over a wide range of pH, to species which are distinctly circumneutral or acidophilic. Overall, lakes having decreased pH have a characteristic littoral zone where aquatic plant species are represented largely by nymphaeids, isoetids, *Sphagnum* spp., and *Utricularia* spp. Lakes with less acid pH levels typically support larger pondweeds (*Potamogeton* spp.) with greater habitat complexity and species richness. Aquatic plant community structure in Adirondack lakes has important implications for recovery assessment, given their importance in structuring littoral zones and their associated communities. **S-4**

Longitudinal Variation of Fish Assemblages in Canadaway Creek: Focus on Invasive Species

*Fahrner**, Alicia and Timothy *Strakosh* (SUNY Fredonia, Fredonia, NY)

Dispersion aspects of lentic versus lotic and native versus non-native species were investigated in Canadaway Creek, a tributary of Lake Erie. Longitudinal variation in the fish assemblage was assessed using backpack electrofishing at twenty sampling locations from the mouth to the headwaters during the months of July and August in 2007. Physiochemical measurements at each site included substrate, shoreline vegetation, pH, dissolved oxygen, depth, water temperature, and flow. Over 4,000 fish specimens were collected and brought back to the laboratory for identification and length measurements. The collection serves as baseline data for future research and voucher specimens will be sent to the NYS Museum. The number of fish caught at each site varied widely, as did the distribution of species, with a definite predominance of native species. Many potadromous species were found at the mouth sites due to proximity of the lake. One exotic species, the round goby *Neogobius melanostomus*, was found at a site upstream. This incidence implies that the fish was able to transverse multiple waterfalls. Round gobies are known to be opportunistically predacious, as they eat the eggs of other fish, so their presence could have serious implications. **CO-2**

Lake George Stream Water Chemistry—Historical Data Visualization on an Interactive Website

*Farrell**¹, Jeremy L., Robert T. *Bombard*¹, James W. *Sutherland*², David *Winkler*¹, Lawrence W. *Eichler*¹, and Charles W. *Boylen*¹ (¹Darrin Fresh Water Institute, Rensselaer Polytechnic Institute, Bolton Landing, NY, ²New York State Department of Environmental Conservation, Retired, Nantucket, MA)

The principal source of water to Lake George is its more than 80 permanent and seasonal streams. Streamflow contributes 55 to 57% of the annual hydrologic budget and over 80% of the phosphorus loading to Lake George. The negative effects of stormwater runoff on the water quality of Lake George have been well documented. However, it is also critically important that the scientific community provide current information that addresses the important stormwater runoff issues, particularly in sub-watersheds within the basin where rapid development is occurring. While the chemical characterization of Lake George stream runoff has been the subject of numerous studies since the 1970s, data is only available in reports and scientific papers, with no centralized database. The current project synthesizes data from varying sources, stores it in a centralized location, and provides graphic and statistical analysis capabilities. Data can be visualized and manipulated on an interactive webpage, with graphic representation of all physical and chemical variables comprising historical and current stream studies. The relational nature of the database allows manipulation and retrieval by the casual observer based on location, flow, chemical constituent and time. **S-6**

Hydroacoustic Monitoring of Macroinvertebrates and Introduced Brook Trout into Brooktrout Lake

Farrell*¹, Jeremy L., James P. **Harrison**¹, Clifford A. **Siegfried**², Charles W. **Boylan**¹, and Sandra A. **Nierzwicki-Bauer**¹ (¹Darrin Fresh Water Institute and Department of Biology, Rensselaer Polytechnic Institute, Troy, NY, ²New York State Museum, Albany, NY)

Brooktrout Lake was historically a self-sustaining fishery until becoming fishless due to acidification by the late 1970s. State and federal clean air regulations of the early 1990s led to sulfate deposition reductions which in turn have led to biological and chemical trends that suggest the lake is undergoing natural recovery. In 2005 the NYS DEC, NYS Museum and the DFWI began a cooperative study to assess the biological ramifications of reintroducing fish into the lake. In the fall of 2005 approximately 2000 brook trout fingerlings and 19 adults were introduced by the NYS DEC. In the fall of 2006 an additional 2000 were introduced. Hydroacoustic technology has been employed in Brooktrout Lake as a means to monitor impact, survivability and sustainability of the stocked fish population. Initial fish population estimates were hindered by the small adult population size and a large population of *Chaoborus americanus* larvae that masked the signal of the abundant fingerlings when using a high frequency transducer (430 kHz). We have used hydroacoustics, along with towed nets and zooplankton traps, to document an extensive diel migration by the phantom midge larvae, a behavior generally not associated with larvae of *C. americanus*. Recently, a more accurate description of the fish population has been made available by an additional season of growth of the fish and by utilizing a lower frequency (70 kHz) transducer. **S-5**

Ecological Response of Surviving Megafauna to the End-Pleistocene Extinction

Feranec*, Robert (New York State Museum, Albany, NY)

In North America, the Pleistocene epoch (1.8 Ma to present) is punctuated by the loss of much of the mammalian megafauna due to the end-Pleistocene extinction event. Examination of fossil sites and specimens that occurred during and after the Pleistocene permits an understanding of mammal ecology before, during, and after megafaunal herbivore presence. Many studies have concentrated on examining the ecology of the species that went extinct in an attempt to understand the cause of the extinction event. This study concentrates on the survivors. Specifically, this study aims to understand whether surviving herbivorous mammals experienced competitive release in diet after the end-Pleistocene extinction. Diet is examined through the analysis of stable carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) isotope values obtained from mammalian collagen. Examination of the collagen in white-tailed deer (*Odocoileus virginianus*) from the late Pleistocene through the Holocene of New York shows no significant differences in isotope values before or after the megafaunal extinction event. While we know that large herbivorous mammals can have a significant impact on ecosystems, their disappearance at the end of the Pleistocene does not appear to have had much effect on the ecology of the surviving white-tailed deer populations. **S-1**

Isotopic Comparisons of the Ecology of Eastern Coyotes and Prehistoric Eastern Wolves

Feranec*, Robert and Roland **Kays** (New York State Museum, Albany, NY)

As one of two top predators in prehistoric eastern North America, wolves undoubtedly played important ecological roles in the region by limiting prey populations and changing the behavior of their prey. Unfortunately, we do not know any details about the ecology of these wolves because they were driven to extinction by the late 1800s, without any scientific study. In the latter half of the 20th century coyotes colonized the region, and the extent to which they have ecologically replaced the extinct wolf remains an unanswered question. Here we use carbon and nitrogen isotopes to characterize the dietary ecology of extinct and extant eastern canids. Here we characterize the isotope signature for possible food species in the region, and then compare these with those values found in canid bone to infer diet. The isotope levels in mammal bone reflect their diet over many years, giving a broad average of their ecology. Using these values we will compare the ecology of four canid populations: modern eastern coyotes, colonizing eastern coyotes from 1950s, extant eastern wolves from Ontario, and extinct eastern wolves from New York. Current results suggest that the re-colonizing coyotes occupy a similar dietary niche as the extirpated wolves. Further, Adirondack wolf values hint at the inclusion of moose in the diet, however, more sampling is needed to confirm the use of this particular prey. These analyses highlight the ability of stable isotope analyses to address questions relating to identifying the resource use and requirements of extirpated and/or endangered species. **S-2**

Invasive Waterchestnut Effects on Hudson River Invertebrates—What, They Worry?

Findlay*¹, **Stuart**, **Megan Skrip**², and **Ryder Diaz**³ (¹*Cary Institute of Ecosystem Studies, Millbrook, NY*, ²*State University of New York College of Environmental Science and Forestry, Syracuse, NY*, ³*San Francisco State University, San Francisco, CA*)

Large beds of the invasive Waterchestnut (*Trapa natans*) can lead to near anoxic conditions in the Hudson River with presumed negative effects on resident macroinvertebrates. We examined the consequences of *Trapa* on growth and survival of sessile organisms (the zebra mussel) and rates of movement of insect larvae capable of drifting behavior. Beds of waterchestnut clearly exhibited lower dissolved oxygen than either the open water or patches of native *Vallisneria americana*. Several measures of food availability did not differ between these two habitats. Mussels placed in four pairs of *Trapa* and *Vallisneria* sites showed lower survivorship in *Trapa*, and there was a trend towards greater settlement of new mussels in beds of *Vallisneria*. As expected, lower levels of DO were found during ebb tide in beds with larger areas and more animals were found to be drifting at lower concentrations of DO. The samples were dominated by chironomid midges, chydoridae, cyclopoid copepods, hydracarina, sididae, and naidide oligochaetes. A laboratory experiment reproduced the variation in DO within the beds and measured the effects on the macroinvertebrate movement. These experiments showed that declining levels of DO did not have a significant influence on macroinvertebrate drift. In combination these observations support the expectation that conditions within large *Trapa* beds are stressful for resident invertebrates but the presence of cover and substrate may outweigh negative effects of water quality. Management of *Trapa* is well-justified for several reasons but the effects on invertebrates may not be as severe as previously supposed. **S-12**

Reductions in Torpor and Decreased Survival by Eastern Chipmunks during Warm Winters

Frank*, **Craig**, **Mike Stevens**, and **Gretchen Gary** (*Fordham University, Armonk, NY*)

Winter air temperatures have increased in the Northeast during the past 100 years, and will increase 4 °C further within 70 years. One group of mammals that may be particularly sensitive to climate change is those that hibernate during winter since body temperatures during torpor are influenced by ambient temperature. Eastern chipmunks (*Tamias striatus*) store seeds in underground burrows for winter consumption, and they reduce their rate of energy utilization with long torpor bouts. We conducted a study on the relationship between ambient (air/soil) temperature and the torpor patterns of free-ranging *T. striatus* in Southeastern New York State using temperature sensitive radio-collars from November 2003 through April 2007. Ambient temperatures were also measured. Mean air temperatures during November and December 2006 were the greatest observed in Southeastern New York State during these months since 1909. Mean air temperatures in Southeastern New York during the November-December periods of 2003, 2004, and 2005, however, were similar to those observed previously. All chipmunks had numerous multi-day torpor bouts throughout the November-April periods of 2003–04, 2004–05, and 2005–06, and the mortality rate during these periods was 13%. During the November-April period of 2006–07, however, only 11% of the chipmunks observed had multi-day torpor bouts and the mortality rate increased to 89%. These results suggest that: a) the exceptionally high early winter temperatures associated with recent climate change greatly reduces the propensity of this species to enter torpor throughout the entire winter-spring period, and, b) this reduction in torpor increases mortality rates. **CO-12**

Emerging Infectious Amphibian Diseases and Potential Stressors in Acadia National Park Wetlands

Gahl*, **Megan K.** and **Aram J. K. Calhoun** (*University of Maine, Orono, ME*)

Amphibian mortality events in protected and relatively pristine settings have increased dramatically over the past two decades. We investigated amphibian larval die-off events in Acadia National Park (ANP), Maine, USA, to determine disease ecology and incidence on two scales: within a single breeding pond and at the individual level. Within each breeding pond, we measured biological, chemical, and physical stressors to identify stressors associated with disease incidence. To approach individual amphibian responses, we used three years of comprehensive disease screenings of free-living amphibians combined with in-field health screenings in 26 wetlands to determine potential amphibian reservoir hosts, vectors, and amplifying hosts. We confirmed five major amphibian pathogens within ANP: *Ranavirus*, *Batrachochytrium dendrobatidis* (*Bd*), *Ichthyophonus*, *Saprolegnia*, and a *Perkinsus*-like organism, but did not confirm suspected occurrences of *Ribeiroia*. *Ichthyophonus*, *Bd*, and *Saprolegnia* were relatively benign in our study, and may have natural controls in ANP. Few sublethal stressors were significantly associated with ranavirus or the *Perkinsus*-like organism. We suggest that for *Ranavirus*, the *Perkinsus*-like organism, and *Ichthyophonus*, disease ecology is more important than environmental conditions, with the potential exception of aluminum and temperature stressors. However, for *Bd* and *Saprolegnia*, environmental conditions may be important in controlling and instigating outbreaks. Although some amphibian populations in ANP experienced extensive die-off events caused by *Ranavirus* and the *Perkinsus*-like organism, disease events do not seem to exacerbate natural population fluctuations. **S-7**

Distribution and Abundance of Lowland Boreal Birds in the Adirondack Park

Glennon*, Michale (Wildlife Conservation Society, Saranac Lake, NY)

WCS' Adirondack Program has been engaged in a project since 2003 to assess the status and distribution of boreal birds in the Adirondack Park. Our work focuses on 13 species which primarily make use of lowland boreal habitats. The goals of the project are to (1) map the boreal habitats of the Adirondacks (2) assess the status and distribution of this suite of species, and (3) examine the protection status of the lowland boreal and provide information to contribute toward a long term boreal conservation plan for the Adirondacks. Climate change is a critical threat to these habitats. Our focal species are three-toed woodpecker, black-backed woodpecker, Lincoln's sparrow, palm warbler, bay-breasted warbler, Cape May warbler, Tennessee warbler, rusty blackbird, yellow-bellied flycatcher, olive-sided flycatcher, boreal chickadee, gray jay, and spruce grouse. To date, we have made 932 total observations of our target species at a total of 75 locations throughout the boreal core of the Adirondack Park. The most commonly encountered species are yellow-bellied flycatcher (29% of total detections of target species), Lincoln's sparrow (28%), and palm warbler (15%). Least commonly encountered species are bay-breasted warbler (0.3%), spruce grouse (0), Tennessee warbler (0.2%), rusty blackbird (1%), three-toed woodpecker (0.1%), and Cape May warbler (1%). Those species detected at intermediate levels are black-backed woodpecker (7%), boreal chickadee (4%), gray jay (6%), and olive-sided flycatcher (6%). Two additional field seasons will enable us to further understand spatial and temporal trends, as well as habitat associations of these boreal species. **S-6**

Use of Whiteface Mountain by Bicknell's Thrush and Other Montane Birds

Glennon, Michale, Leslie Karasin*, and **Chad Seewagon** (Wildlife Conservation Society, Saranac Lake, NY)

The Wildlife Conservation Society's Adirondack Program is engaged in an effort to assess the use of Whiteface Mtn. by Bicknell's thrush (*Catharus bicknelli*) and other montane forest birds. A species of special concern in New York State, Bicknell's thrush makes use of high elevation conifer forest for breeding and nesting habitat during the summer months. Proposed ski trail expansion on Whiteface, located in Wilmington, NY, raised concerns about the potential for impacts of new trail development on Bicknell's thrush habitat. In the summer of 2004, we surveyed a total of 27 sample points on the mountain in 5 categories: (1) existing glade, (2) proposed glade, (3) existing trail, (4) proposed trail, and (5) control areas. These sites were resampled during summer 2005, 2006, and 2007. Study points were sampled using standard point count methods to monitor the presence of Bicknell's thrush and 4 other high elevation bird species: blackpoll warbler, Swainson's thrush, winter wren, and white-throated sparrow. To date, we have found no significant differences in species richness, diversity, or evenness of any of these species detected among existing ski trails, existing glades, proposed ski trails, proposed glades, and control areas. For the fourth year in a row, we did not detect Bicknell's thrush in areas of existing glades on Whiteface Mt. Glading, in particular, may be detrimental to habitat quality for Bicknell's thrush. Post-construction work in summer 2008 will enable us to determine if the newly created trails have impacted these species. **S-13**

Coyote Diet, Parasites, and Genetic Structure in Protected and Urban Areas, FL

Grigione*¹, Melissa and **Ronald Sarno²** (¹Pace University, Pleasantville, NY, ²Hofstra University, Hempstead, NY)

Coyotes have existed in Florida since the 1960s, although sightings have been rare in south Florida until the 1980s. Increased interaction between people and coyotes in Pinellas County, FL has prompted a need for additional information about this newly colonized species. This study investigates differences in diet, parasite load, and identity (using molecular techniques) between coyotes found in protected (Brooker Creek Preserve) and non-protected (urban) areas in Pinellas County—one of the most densely populated areas in Florida. Determining coyote intestinal parasites will help us decide if any measures need to be taken to prevent transmission of parasites between wild and domestic canids. Also considered in this study are zoonotic diseases that could be a potential risk to children whose activities bring them in close contact with infested soil. Preliminary results suggest that coyotes in protected areas are infected with more enteric parasites than urban coyotes. Several of the parasite species observed during this study have not been previously documented for *Canis latrans*. Coyote diet appears to be more diverse in protected areas than in urban areas. However, there is no seasonal effect on diet in either area. All genetic samples are currently being sequenced in order to obtain individual identity. The program MARK (capture-mark-recapture) will be used to estimate population size for our study area. **S-2**

Counting Night Migrating Birds: Observer Variation in Manually-Scored Audio Files

*Grove**, Lewis, Emma DeLeon, Ben Coulter, and Michael Lanzone (Powdermill Avian Research Center, Rector, PA)

Acoustic recording of nocturnal migrant birds is being developed and promoted as a tool to monitor populations of night migrants. Application of flight call recordings as a monitoring tool requires that we assess the ability, both the human and computer elements, to effectively analyze recordings. We isolated 50 random 15-minute audio segments recorded by a pressure zone microphone in southwestern Pennsylvania during the 2007 fall migration. Five observers of varying experience logged warbler and sparrow flight calls using the audio analysis software Raven. Additionally, observers identified the presence or absence of four potentially confounding variables in each of the 50 file segments: insect noise, a loud “buzz” in the audio track (resulting from partially-defective equipment used for part of the season), rain, and the presence of obvious diurnal calling activity. Considerable variation in calls scores results from different observers. Classifying flight calls improved with experience. Insect noise, frogs and mechanical feedback all reduced accuracy. Manually logged call counts indicate that assessments of software effectiveness for future sites utilize multiple, experienced observers. In addition, efforts should be made to minimize the presence of insect noise, as well as dawn and dusk calling through careful placement of recording microphones. We then used our manual scores to evaluate the efficiency of automated software scans of the same 50 file segments. **CO-11**

Acid Rain, Mercury Deposition, and the Contamination of Forest Foodwebs, Including Birds

*Hames**, Ralph S., James D. Lowe, and Kenneth V. Rosenberg (Cornell Laboratory of Ornithology, Ithaca, NY)

The bulk of acidifying ions and mercury deposited in northeastern forests are derived from coal-burning powerplants and factories. Because previous work found low-level contamination by toxic mercury in terrestrial, forest-breeding birds in New York, we along with cooperators, began several studies to determine the extent and severity of contamination, to trace mercury through forest food-webs, and determine the role played by in the contamination by co-occurring, acid rain-caused declines in soil calcium content. We first concentrated on determining the relationship between acid rain, declines in soil pH and calcium content, and the abundance of calcium-rich invertebrate prey species needed by breeding birds. Later work has concentrated on mercury in living leaves, leaf litter, forest soils, invertebrates, and birds. We show regional differences in soils and leaf litter mercury content, and no significant relationship between soil and leaf litter mercury content, but significant differences in the mercury content of living leaves in *Quercus* and *Fagus* species. Soil mercury content was highly significantly related to soil pH and exchangeable acidity, but leaf litter content was only related to soil pH. Blood mercury and calcium content varied by region in the Black-capped Chickadee and the Red-eyed Vireo, and blood and feather mercury content were weakly related. We present and discuss these and other results, and their implications for New York’s avian biodiversity. **CO-10**

The Impact of Variable Precipitation on Vernal Pond Community Structure

*Hart**, Edmund (University of Vermont, Burlington, VT)

Climate change scenarios for the Northeast predict an increased water budget in the winter/spring and an increased deficit in the summer / fall. Precipitation events are likely to become more variable with longer periods of drought followed by more intense deluges. Vernal ponds are temporary habitats whose hydrology is primarily determined by precipitation events. Rapid climate change induced shifts in precipitation are likely to play an important role in how these communities are structured. The framework for understanding community structure under climate change is that species will respond differentially to the same climate force. The result is the formation of novel communities as opposed to simple linear changes or scaling. In forty-nine mesocosms I orthogonally crossed seven levels of mean water depth with seven levels of variance in depth to simulate different precipitation scenarios that might result from climate change. Each mesocosm experienced a unique time series of experimental filling and drying to represent a continuous variability in mean water level and rainfall variance. I sampled the invertebrate community once a week to measure responses to treatments. I calculated total abundance, species richness as well as estimating population level parameters such as density dependence and population growth rate. Population growth rates and total abundance decreased for all taxa in response to increased rainfall variance. However abundance increased or decreased depending on taxa in response to mean water level. These results add evidence to the growing understanding of how communities will respond to climate change. **S-3**

Wetland and Nest Microhabitats of Blanding's Turtle at a Habitat Restoration Site

Hartwig^{*1}, **Tanessa**, **Erik Kiviat**¹, **Heidi Bock**², and **Gretchen Stevens**¹ (¹Hudsonia Ltd., Annandale, NY, ²Antioch New England Graduate School, Keene, NH)

We studied Blanding's turtle (*Emys blandingii*) microhabitat in natural wetlands and wetland and nesting habitats constructed for the turtles in Dutchess County, New York. We determined Blanding's turtle microhabitat association and the suitability of the constructed habitats for the turtles. Wetland microhabitat was surveyed by radiotracking individuals to their exact locations and recording habitat variables. Blanding's turtles were associated with shallow water depths (mean = 30 cm), muck substrates, and areas of abundant vegetation (total cover mean = 87%), which included the aquatic shrub buttonbush (*Cephalanthus occidentalis*) and submerged and floating vegetation. In the constructed wetlands, Blanding's turtles were associated with significantly less cover and warmer water than in the natural wetlands. The constructed wetlands apparently provided good habitat for basking and foraging in the spring and early summer. We followed females to their nest site and estimated vegetation variables within 1 m and soil characteristics within 0.3 m of the nest and a random site. Nesting females selected soils with more gravel in wetter spring seasons and more sand in drier seasons; hatchling productivity and length/weight ratio did not differ among years. Nest sites had less vegetation cover than random sites. Blanding's turtle wetland habitats in Dutchess County should contain abundant emergent vegetation (particularly shrubs), deep pools and shallow water areas, and plenty of submerged and floating aquatic vegetation. Nesting habitat should include a variety of sparsely-vegetated, friable, and coarse-textured soils to accommodate varying weather conditions. **CO-6**

Northern Cricket Frog (*Acris crepitans*)—Current Knowledge and Research Needs

Hecht^{*1}, **Jack**, **Alvin Breisch**², and **Jesse Jaycox**³ (¹HDR / LMS, Pearl River, NY, ²New York State Department of Environmental Conservation, Albany, New York, ³NY Natural Heritage Program, Albany, NY)

Less than 2.5 cm long, under a gram in weight, and displaying several color phases, the Northern Cricket Frog (*Acris crepitans*) is the smallest and most colorful frog in New York, where it is listed as endangered. Its small size and cryptic color patterns make it a difficult species to observe in aquatic habitats where males calling from sites just above the surface of the water are more conspicuous than females. In its terrestrial habitat, the cricket frog is active on warm, sunny days. On close approach, cricket frogs are easily stimulated into making 50 to 100 cm hops with an audible landing making them easier to locate. During the spring and fall, cricket frogs utilize upland habitats and have been found as far as 400 meters from the nearest known calling and breeding sites. Observed movements in the fall are generally away from calling sites while movements in the spring are generally towards these same habitats, suggesting that some cricket frogs overwinter at sites which are a considerable distance from their breeding sites. Northern Cricket Frogs and their habitats may be impacted by development projects and other activities outside the 100 foot mandatory state regulated wetland buffer surrounding their breeding sites. Additional research on movement and habitat requirements is critically needed to determine potential direct and/or indirect impacts to Northern Cricket Frog populations. We suggest survey methods to identify and monitor breeding sites, locate potential staging areas and migration corridors, determine upland habitat use, and confirm overwintering habitat. **CO-6**

The Effects of an Invasive Grass on a Globally Threatened Wetland Plant

Hill^{*}, **Laura**, **Sarah Friend**, and **Alison Brody** (University of Vermont, Burlington, VT)

Invasive grass species, *Phalaris arundinacea* (reed canarygrass), is currently invading populations of globally threatened wetland plant, *Polemonium vanbruntiae* (Eastern Jacob's ladder), in the Green Mountain National Forest of central Vermont. Demographic population viability analysis has indicated that invaded populations of *P. vanbruntiae* are prone to extinction. Reed canarygrass is an aggressive wetland invader and may decrease native species diversity and exacerbate extinction risk of rare plants. We performed an experiment to directly test the effect of nutrient addition and competition with reed canarygrass on rare plant *Polemonium vanbruntiae*. Plants that received nutrient addition and grew in a competition-free environment had the highest mean overall leaf area, above-ground biomass, basal area. Competition and nutrient addition did not significantly affect the survivorship of *P. vanbruntiae* over the experimental season. Overall, *P. vanbruntiae* performed best in a nutrient-rich and competition-free environment. However, we detected a significant interaction between competition and nutrient addition. Therefore, the competitive advantage *P. arundinacea* experiences in nutrient-rich soils causes an interaction to negatively affect the vegetative growth of *P. vanbruntiae*. Because of this, rare plant *P. vanbruntiae* performs most poorly in a competitive environment with high nutrient input. Our results indicate that the invasive reed canarygrass may pose a significant threat to the rare wetland plant, *Polemonium vanbruntiae*. We are currently designing an experiment to link these results obtained in one season to the cumulative effects over all life history stages in order to predict the long-term effects of species invasion on these rare plant populations. **S-9**

Determining the Population Status of Eastern Coyotes in New York State

Holevinski*¹, Robin, Christina **Boser**¹, Jacqueline **Frair**¹, James **Gibbs**¹, and Gordon **Batcheller**² (¹SUNY College of Environmental Science and Forestry, Syracuse, NY, ²New York State Department of Environmental Conservation, Albany, NY)

The population status of eastern coyotes (*Canis latrans*) in the heterogeneous landscape of New York State is largely unknown, but a reliable population estimate is needed for effective management of this predator and its prey species. The objectives of this research are to 1) produce a broad-scale, spatially-explicit estimate of coyote distribution and abundance across New York State and 2) develop an efficient and cost-effective survey method to assess changes in coyote populations. Two study areas were selected in Otsego and Steuben Counties for intense monitoring of VHF (n=10) and GPS (n=6) collared coyotes. Data collected from radio-marked individuals over 2 to 3 years will provide a basis for comparison to indices of coyote abundance, particularly DNA collected from hair and scat for non-invasive genetic fingerprinting. We will assess the feasibility of using scat detection dogs to collect scat samples along predetermined transects, representing various habitats on public and private lands. Coyote abundance indices will be refined within study areas to determine the intensity and extent of sampling for statewide coyote population surveys. **S-2**

Potential Effects of Endocrine Disrupting Chemicals on Diamondback Terrapins (*Malaclemys terrapin*)

Horn*, Erin (Hofstra University, Hempstead, NY)

Millions of gallons of anthropogenic chemicals, including endocrine disrupting chemicals (EDCs), are discarded into waterways everyday and little is known about their effects on wildlife. The waters of Jamaica Bay, NY contain known endocrine disrupting chemicals (EDCs) as well as New York's largest population of diamondback terrapins (*Malaclemys terrapin*). The purpose of this study was to determine possible effects of EDCs on terrapins by comparing egg and hatchling growth, locomotor performance, shell abnormalities, and aromatase levels of hatchlings from four locations. Terrapin clutches from Jamaica Bay and three comparison sites (Cape May Peninsula, NJ, Peconic Bay, NY, and Barrington River, RI) were collected from naturally laid nests. Eggs were incubated at a constant temperature and massed periodically. Body size was measured routinely for each hatchling. Shell abnormalities were noted for each turtle. Righting response was tested to determine locomotor performance. Eggs and hatchlings from Jamaica Bay were larger than the other sites. Cape May Peninsula turtles had the lowest percentage of shell abnormalities. Locomotor performance of turtles from all sites markedly increased with age. Although Jamaica Bay is probably the most heavily polluted site from which turtles were obtained, the preliminary results did not indicate that Jamaica Bay turtles were adversely affected. Major effects from EDCs on terrapins may occur over a more extended period of time in nature. The aromatase levels of hatchlings will be determined and presented, as they may provide further insight to the effects of EDCs on diamondback terrapin hatchlings. **S-7**

Bridle Shiner and Other Fishes of the Upper Delaware River Drainage

Horwitz*, Richard, Paul **Overbeck**, David **Keller**, and Shane **Moser** (The Academy of Natural Sciences, Philadelphia, PA)

From 2004–2007, The Academy of Natural Sciences (ANS) inventoried fishes in the Upper Delaware Scenic River, the Delaware Water Gap National Recreation Area, and nearby areas. ANS recorded 56 species of fish and documented recent occurrence of 3 other species. ANS studies have focused on the bridle shiner (*Notropis bifrenatus*), which has declined in much of the southern part of its range, possibly due to changes in hydrology, habitat structure, and/or climate change. The bridle shiner was found in a number of sites in Flat Brook, where it occurs in pools with vegetation and in one artificial pond. A number of bridle shiners were caught at a site in the Upper Delaware River where bridle shiner was first reported by NYSDEC in 2005. A few individuals have been found in a few other sites, but no bridle shiners were found on revisits to these sites. In the Delaware River, the bridle shiner was found in backwaters and beaver ponds. Beaver ponds may provide stable, vegetated pond habitats for the shiner, and the shiner may have benefitted from recent increases in beaver populations. Since beaver ponds are ultimately transient habitats, the long term survival of the bridle shiner may depend on its ability to find and recolonize new ponds. Molecular genetic studies are planned to investigate structure and history of bridle shiner populations. **CO-2**

Dragonflies of the Connecticut and Merrimack Rivers in New Hampshire

*Hunt**, Pamela (NH Audubon, Concord, NH)

Although New Hampshire has a rich history of odonatological exploration dating back to the 19th century, most early work was focused on the apparently more intriguing “boreal” habitats of the White Mountains. Meanwhile, the equally intriguing dragonflies of two of New England’s major rivers—the Connecticut and Merrimack—were largely unsurveyed. In the last few years this situation has changed considerably, with significant finds being documented on both rivers. In this paper I present a summary of current knowledge of “big river” dragonflies in NH, compare this with what we know from downstream stretches, and touch on the conservation issues facing these habitats in the region. **CO-3**

A Review of Diagnostic Methods for Reptile Infectious Diseases

*Innis**, Charles (New England Aquarium, Boston, MA)

Reptiles may be infected with bacterial, viral, fungal, and parasitic agents. Identifying an infectious agent in an ill or dead reptile can be accomplished by several methods, each with limitations. Microbiological cultures and fecal parasite tests are best interpreted in combination with histopathology. Histopathology samples must be collected within 48 hours of death. Bodies should be refrigerated, not frozen, prior to necropsy. Autolysis will occur rapidly under warm conditions and will limit histopathologic interpretation. At necropsy, tissues should be fixed in neutral buffered formalin, and a second set of tissues should be frozen. Frozen tissues may be used for later microbiology or molecular diagnostics. While histopathology may be very informative, it may not demonstrate the specific pathogen. Electron microscopy may be useful for demonstrating the presence of viral particles or for further characterizing agents seen histologically. If electron microscopy is planned, it is best to save a set of necropsy tissues in a fixative such as gluteraldehyde. Molecular diagnostic tests such as polymerase chain reaction (PCR) may be useful for demonstrating the presence of specific pathogen genetic material, and can often be run on frozen tissues. Several laboratories offer PCR tests for reptilian infectious agents. Viral isolation may be successful in some cases but may require reptile-specific cell cultures. Immunologic techniques such as in situ hybridization, serology, and immunohistochemistry may also be useful, but generally require the production of monoclonal antibodies. Serologic tests are limited by difficulty in differentiating past exposure from current infection. **S-7**

Bird and Bat Mortality at a New York Wind Resource Area

*Jain**, Aaftab, Paul *Kerlinger*, Richard *Curry*, and Linda *Slobodnik* (Curry and Kerlinger, LLC, McLean, VA)

We examined bird and bat mortality at the 195 turbine Maple Ridge Wind Resource Area (WRA) in Lewis County, New York. In 2005, a total of 120 wind turbines were constructed within the Phase I project area. The remaining 75 towers in Phase IA and II were constructed in 2006. Studies of bird and bat collision mortality in California, West Virginia and elsewhere raised concerns about fatalities in this area. In a 2006 pilot study, 50 out of 120 (42%) turbines (Phase I) were searched mid-June to mid-November for bird and bat fatalities. From May 2007 to mid-November 2007, 64 of 195 (33%) turbines (Phases I, IA and II) were searched. Each site survey consisted of searchers walking in parallel 5m wide transects within an overall search area of 130 m by 120 m, centered on the turbine. These sites were mowed to permit adequate searches. Gravel access roads and construction pads were also searched. Actual searchable area varied from site to site due to the presence of unsearchable wooded areas and varying amounts of graveled areas. 125 avian incidents of 30 species and 326 bat incidents of 5 species were recorded in the 2006 season. Estimates of total mortality using corrections for search efficiency, scavenger rate and search effort, as well as possible relationships between mortality and season, weather, tower lighting and local habitat conditions will be presented. Preliminary analysis and results from data collected in 2007 will also be presented. **CO-12**

Recent and Prospective Changes in the Adirondack Lowland Boreal

*Jenkins**, Jerry (Wildlife Conservation Society Adirondack Program, Saranac Lake, NY)

The Adirondack lowland boreal is an ensemble of boreal peatlands and associated waterbodies. It is the southernmost large boreal ensemble in North America and contains both distinctive habitat types (large open bogs, open river corridors) and many range-limit species. This paper summarizes 25 years of field work in the lowland boreal, appraises its current condition, and presents some information bearing on its future in the climate-change century. The chief findings are (1) that the boreal is quite rich, relative to its overall species diversity, in ecologically specialized birds and plants. (2) That the largest historical loss of boreal habitat has been from the flooding of floating mat communities, which has decreased the area of floating mats by 50% or more. (3) That chief contemporary stresses on boreal lowland habitats are acid deposition and climate warming. The most likely effects of acid deposition are altered lichen communities and stimulated shrub and tree growth. Climate

warming is probably not capable of making detectable changes in mat growth and peat accumulation, but can make rapid changes in nitrogen cycling and in ice damage in alluvial habitats, both of which will combine with acid deposition to promote shrub growth. (4) That changes are currently occurring but are poorly documented. We are seeing apparent increases in shrub growth, decreases in river ice, depauperate macrolichen faunas, and rapid changes in boreal bird occupancy in some habitats, but don't know as yet if these are correlated with each other or with climate change and deposition. **S-6**

Vegetation Patterns on the Champlain Hills and the Structure of Plant Communities

*Jenkins**, Jerry (Wildlife Conservation Society Adirondack Program, Saranac Lake, NY)

Plant communities, when worthy of the name, have a large-scale pattern: you can tell where they will occur and what they will contain. The rich-dry communities of the West Champlain have this sort of structure—their physiography, vegetation structure, species richness, and species composition all differ sharply and in a predictable way from the matrix forests around them. We were curious, both as ecologists and as conservationists, whether they differed in similarly predictable ways from one another or whether they had subcommunities arranged in orderly ways within them. After a study of about 20 sites, involving vegetation measurements at four different scales and comparisons between vegetation, rock types, and soil chemistry, we found they did not. Patterns of species composition and species richness differed strongly from site to site but did not correlate with bedrock, exposure, elevation, or soil chemistry. Patterns of local diversity and composition varied strongly within sites, but had no clear topographic pattern and did not show clear correlations between subfloras. We conclude that community patterns are strongly scale-dependent; in our case they are strong, predictable, and mappable at a scale of 100 to 500 meters, but uncorrelated and unpredictable at a scale of 1 to 100 meters. This has important implications for communities are defined and mapped, and how many examples need to be preserved to capture their full diversity. **CO-8**

Eastern Musk Turtle Ecology in Central Massachusetts

*Johnson**, Lori (Antioch University New England, Keene, NH)

In 2007, I began a two-year telemetry study on eastern musk turtles (*Sternotherus odoratus*) in Hampden County, Massachusetts. The objectives of this research are to document habitat use, population demographics, and observed threats to assess the species' vulnerability relative to other turtle species in New England. 26 individuals were tracked in a shallow, 55-acre lake and an adjacent river from May to November. 559 turtles were marked at this site, with females comprising 44% of the individuals marked. The level of adult mortality observed was high. 23% of the radio-tagged individuals died and an additional 21 adults were found dead. At least 21 of the 27 adults found dead were female. Causes of mortality included predation, automobiles, and a fishing-related injury. The possibility of a virus in the population is being explored to explain the deaths of several individuals with no apparent injuries. Nest predation was also high with a predation rate of 94% percent (n=32). Nesting occurred from May 30 to July 4 and females laid clutches of 2 to 5 eggs (mean=3.5, n=26). Some females were observed laying 2 clutches, 3 to 4 weeks apart. Nest laying appears to be synchronized, occurring during two discrete bouts of nesting activity. A second field season will be conducted in 2008 to see if mortality and predation rates are consistent across years. **CO-6**

Patterns of Spread of Native and Invasive Species in a Regenerating Forest

*Jones**, Chad (Connecticut College, New London, CT)

Habitat modification and land use changes can lead to changes in the distributions of both invasive and native species. I studied the factors influencing the spread of two invasive and two native species that have increased their distribution in the Connecticut College Arboretum over the past 35 years. I asked three questions: 1) Do native and invasive species preferentially colonize species rich sites? 2) Are dispersal variables (e.g. distance to the edge of the natural area) or habitat variables (e.g. canopy cover, soil drainage) more important in explaining patterns of spread? 3) Are different variables important for native and invasive species? I used both univariate analysis and multiple logistic regression to address these questions for each of three sample years: 1982, 1992 and 2002. Both of the invasive species (*Celastrus orbiculatus* and *Rosa multiflora*) and the native vine (*Parthenocissus quinquefolia*) more commonly colonized species rich sites at all time periods even when other variables were included in the analysis. The most important variable in logistic regression for these species, however, was forest age, followed by distance from the edge of the natural area. The fourth species, an understory herb (*Chimaphila maculata*) did not colonize species rich sites and important variables varied by sample data. Thus forest age, dispersal distance and species richness all influence the spread of both invasive species and some native species, while patterns of spread for the native forest herb were very different. **CO-4**

Displacement and Mortality of Wood Turtles by Seasonal Floods

Jones^{*1}, Michael and Paul Sievert² (¹Organismic and Evolutionary Biology, University of Massachusetts, Amherst, MA, ²USGS, Massachusetts Cooperative Fish and Wildlife Research Unit, University of Massachusetts, Amherst, MA)

The wood turtle (*Glyptemys insculpta*) is a widespread, semi-terrestrial species dependent upon streams and riparian habitat for much of the year. We investigated the home range and seasonal movements of 140 wood turtles at 13 sites in central Massachusetts and northern New Hampshire using radio-telemetry between 2004 and 2007. Adult turtles were radiotracked for periods ranging from 1 to 4 years. Twelve turtles equipped with radiotransmitters (8.6%) were displaced from their documented home range a total of fifteen times during five separate flood events. Displacement ranged from 2 to 17 km downstream. Two turtles displaced 3.2 and 3.5 km returned to their original ranges within one year, and one returned overland instead of along the stream corridor. Three turtles died during or shortly after displacement through entombment or mammal depredation. Most displaced turtles sustained minor injuries to the carapace, especially to the marginal scutes. At least two turtles survived transport over a 65-foot dam. We also observed and radio-tracked four turtles that exhibited signs of having been flood-displaced, including an adult male that travelled 16.5 km straight-line from his capture location over a two-year period. Conservation implications will be discussed. **CO-6**

The Use of an Airborne LiDAR Sensor to Locate Amphibian Breeding Ponds

Julian^{*1}, James, John Young², John Jones³, Craig Snyder², and C. Wayne Wright⁴ (¹Penn State Cooperative Wetlands Center, Penn State University, University Park, PA, ²U.S. Geological Survey, Leetown Science Center, Kearneysville, WV, ³U.S. Geological Survey, Eastern Region Geography, Reston, VA, ⁴National Aeronautics and Space Administration, Goddard Space Flight Center, Wallops Island, VA)

Small, seasonal wetlands can be difficult to detect when using only maps and geographical information system data that are readily available to the public. As a result, natural resource agencies and managers are often unaware of the location and extent of wetland habitats that can provide critical breeding habitat for species such as pond-breeding amphibians. We examined data from an airborne light detecting and ranging (LiDAR) sensor to discriminate terrestrial habitats from the boundaries of 24 amphibian breeding pools in the Delaware Water Gap National Recreation Area. This experimental LiDAR sensor used a water-penetrating green laser, and we found that watered areas could be reliably separated from upland areas using return intensity values from this sensor. Furthermore, the addition of Local Indicators of Spatial Association (LISA) to LiDAR return intensity data significantly improved predictive models at all 24 ponds, reduced residual error by as much as 74%, and appeared to improve models by reducing classification errors associated with types of in-pond vegetation. We conclude this experimental LiDAR sensor could help predict the occurrence of small, seasonal ponds, and LISA statistics can help maximize the information content from time resolved LiDAR return data. **S-3**

Beaver Ponds and Vernal Pools: Contributions to Amphibian Production in the Adirondacks

Karraker¹, Nancy, Stacy McNulty^{*2}, and James Gibbs³ (¹University of Hong Kong, Hong Kong, China, ²Adirondack Ecological Center, State University of New York College of Environmental Science and Forestry, Newcomb, NY, ³State University of New York College of Environmental Science and Forestry, Syracuse, NY)

In the northeastern United States (U.S.), current habitat protection measures for amphibians focus on vernal pools. Beaver ponds are an often ubiquitous component of the landscape and could play a significant role in amphibian population dynamics. Notably, no study has contrasted amphibian production in vernal pools, the presumed primary breeding habitat of wood frogs (*Rana sylvatica*) and spotted salamanders (*Ambystoma maculatum*), with any other wetland type. In the Adirondack Mountains of New York, we conducted egg mass counts from 1999–2007. We counted metamorphs using pitfall traps and drift-fences and compared reproduction in beaver ponds to vernal pools from 2002–04. In 65 vernal pools and 37 beaver ponds, densities of spotted salamander egg masses did not differ, yet densities of wood frog egg masses were nearly 2× higher, survival to metamorphosis and metamorph production were an order of magnitude higher, and metamorphs were 1.3 times larger in beaver ponds than in vernal pools. June precipitation was a significant factor in vernal pool persistence and metamorph survival. Our study suggests that beaver ponds may substantially contribute to population viability for these species. Beaver population management may be a critical tool for maintaining or restoring amphibian populations in the northeastern U.S. **S-3**

A Genetic Evaluation of Hybridization in Eastern Coyotes

Kays^{*1}, Roland, Jeremy **Kirchman**¹, Bridgett **vonHoldt**², John **Pollinger**², and Robert **Wayne**² (¹New York State Museum, Albany, NY, ²University of California, Los Angeles (UCLA), Los Angeles, CA)

Since the colonization of eastern North America by coyotes in the 1940s and 50s there has been much speculation about their genetic makeup. Many hunters believe eastern coyotes had bred with feral dogs and broadly refer to them as Coydogs. However, morphological comparisons of eastern coyote skulls in the 1960s and 70s suggested that they were more likely to be large coyotes, or coyote X wolf hybrids. Here we use mitochondrial and nuclear genetic markers to evaluate the hybrid nature of eastern coyotes. We sequenced the d-loop portion of the mitochondrial DNA from 177 coyotes from New York and 8 from Ohio, and compared these with all canid sequences available on Genbank. In New York 19% of animals had one of two mtDNA haplotypes related to those found in modern Algonquin wolves and Great Lakes Wolves from the early 1900s. The remaining 81% of the population had one of three haplotypes typical of western Coyotes. There were no geographic patterns in the distribution of these haplotypes across New York. The 8 Ohio coyotes represented four western coyote haplotypes, none of which were found in New York. This pattern supports the hypothesis that New York was populated with coyote-wolf hybrids moving south out of Ontario while Ohio was colonized by pure coyotes from the west. **S-2**

History and Habitat Use of Catfishes in the Delaware River Estuary

Keller^{*}, David (Rutgers University, Camden, NJ)

In the Delaware River estuary, native white catfish (*Ameiurus catus* Linnaeus 1758) have appeared to decline as the introduced channel catfish (*Ictalurus punctatus* Rafinesque 1818) has become more abundant. Drastic changes in ratios of channel catfish to white catfish have been documented over the last 20–30 years. However, these ratios are not representative of the entire freshwater estuary and have not included tributary habitats used by both catfish species. To determine the current status of these populations and the habitats they use, we surveyed four zones of the Delaware River estuary from March to November 2007. Hoop nets (N=481) were set in mainstem river, lower tributary, and middle tributary habitats. Upper tributary habitats near the head-of-tide were angled (N=44). Catfish were present in all zones and habitats during all seasons, habitat use will be discussed. For the study area as a whole, the ratio of channel catfish to white catfish was 2.9 to 1. Channel catfish and white catfish inhabiting the mainstem river had a 3.6 to 1 ratio, much lower than a 25.5 to 1 ratio documented in the early 1990s. Historical records, mortality, growth rates, and aspects of life history will be presented in the contexts of habitat use and stock status. **CO-2**

Parasitoid Diversity in New York City Community Gardens

King^{*}, Kristy and James **Danoff-Burg** (Columbia University, New York, NY)

Urban green spaces such as the rich network of parks and gardens in New York City create valuable habitat for native species assemblages and increase the quality of life for urban dwellers by supporting community interactions and recreation in nature. With current rates of biotic homogenization and habitat fragmentation, understanding the assembly of biological communities in urban habitat fragments may reveal important trends that can contribute to conservation efforts on a much larger scale. This study focuses on the potential role of plant structural complexity and the surrounding built environment as contributors to parasitoid wasp diversity and abundance in Manhattan community gardens. Parasitoid wasps are especially important to gardeners because, as beneficial insects, they keep pest populations in check, preventing the need for gardeners to spray harmful pesticides within their plots. We sampled from twenty community gardens in New York City over one growing season and captured over 700 parasitoid wasp individuals from over fifty morphospecies and sixteen families. Initial analyses have revealed that the botanical features within each garden are more important than the surrounding urban matrix in determining the abundance and diversity of these beneficial insects. This outcome emphasizes the value of managing plant populations to attract and maintain a healthy insect community. **CO-3**

Using Grass Carp to Control Aquatic Nuisance Species

Kishbaugh^{*}, Scott (New York State Department of Environmental Conservation Division of Water, Albany, NY)

Adirondack Lake is a shallow, 200 acre lake in the town of Indian Lake in Hamilton County, in the southern Adirondack Region of New York State. The lake suffered from nuisance growth of large-leafed pondweed since at least the mid 1980s, and has been the subject of several aquatic plant management actions. Grass carp were stocked in the lake on three separate occasions since 1996. Aquatic plant surveys were conducted by Cornell Cooperative Extension on a few occasions from 1979 through 1999 to evaluate plant populations, using 12 transects and plots scattered throughout the lake. Surveys were

taken over on an annual basis by the NYSDEC Division of Water and Hamilton County Soil and Water Conservation District in 2001, using the same survey locations. Surveys were standardized using the US Army Corps of Engineers rake toss methodology and Cornell University quantitative scale in 2005. Historical results from 2001 through 2005 were converted to this scale, allowing for a seven year evaluation of grass carp herbivory and a long-term comparison of pre- and post-stocking plant communities. Fisheries surveys were also conducted over this period. This presentation will summarize the results from these surveys and evaluate the impacts of the grass carp stocking on both invasive and non-invasive plant species and fisheries populations in a typical Adirondack lake, and will compare these results to recent grass carp stockings in other parts of the state. **S-10**

Should We Work with Phragmites Instead of Against It?

*Kiviat**, Erik (Hudsonia Ltd., Annandale NY)

Although *Phragmites australis* is the most-studied environmental weed in North America its habitat functions for native species are poorly understood. Abundance and diversity of many animals in reedbeds are similar to those in smooth cordgrass or cattails. Eighty species of birds breed in reed-dominated habitats. Differences include: 1. Muskrat eats reed but often prefers other plants; 2. Three species of declining, shortgrass-breeding high salt marsh birds do not breed in reedbeds in Connecticut; 3. In freshwater tidal marshes, reedbeds have less breeding activity of birds but have abundant roosting by several swallows and blackbirds; 4. Early life stages of the mummichog are less abundant in reed than in smooth cordgrass; 5. Reed culms in brackish marshes are less favorable habitat for epifauna than smooth cordgrass culms. Vascular plant layers are typically depauperate beneath dense reed but may be diverse and complex beneath native or introduced sparse reed, and certain rare plants seem facilitated in edges of introduced reed. Methodology, taxa, life stage, geographic area, agricultural legacies, and habitat structure affect reedbed use. Habitat structure includes patch size, edge vs. interior, admixture of other plant species, interspersions with other communities, hydroperiod, soils, and salinity. Goal-directed and site-specific management of reedbeds improve habitat while providing nutrient removal, soil stabilization, and carbon sequestration. Future research should include diachronic studies, experimental addition and removal, extensive spatial and temporal replication, systems other than northeastern tidal marshes, taxa other than birds and fishes, stands of identified reed subspecies, and the effects of observer disturbance on fauna. **S-12**

Matching Livestock Breed Attributes to Conservation Goals

*Kleppel**, Gary and Erin *LaBarge* (University at Albany, Albany, NY)

We are studying the feasibility of using sheep for ecosystem restoration and invasive plant management. While ovine and bovine grazers have been used in a variety of habitat restoration projects, little effort has gone into matching breed attributes with restoration or management requirements. For instance, Romney sheep, a breed developed in marshy habitats proved exceptionally well adapted to selective removal of invasive pasture grasses from a wet meadow on an agricultural landscape. Four, early gestational ewes enclosed in 10 m × 10 m plots in the meadow, altered the ratio of pasture:wetland grasses by a factor of 3 after only 15 hours on site. They removed 56% of the standing plant biomass and created open canopy habitat with extensive areas of standing water. Such habitat changes favor the endangered bog turtle. Romney sheep, however, did not ingest mature *Lythrum salicaria* (purple loosestrife), one of the most invasive wet substrate, open canopy species in the region. Conversely, the primitive Jacob sheep readily ingested *L. salicaria* in feeding trials. Extensive field trials will investigate the primitive breed capabilities for *L. salicaria* management this spring and summer and additional efforts are being made to objectively match livestock breed attributes with needs in restoration ecology. **S-10**

Amphibian Communities of Brooktrout Lake, a “Recovering” Acidified Lake in the Adirondacks

*Kolozsvary*¹*, Mary Beth and Clifford *Siegfried*² (¹NYS Biodiversity Research Institute, New York State Museum, Albany, NY, ²New York State Museum, Albany, NY)

Brooktrout Lake is a high elevation lake located in the southwestern Adirondack mountains. During the latter half of the last century, pH of the lake measured <5, which was typical of acidified clear water lakes in the region during that time period. Over the last decade, long term monitoring of water chemistry indicated signs of recovery from acidified conditions. In 2005–2007, amphibian communities were sampled using minnow traps, activity traps, and dip net sweeps to assess species composition, relative abundance, and reproductive success. Seven amphibian species were documented, with 6 of these species showing successful reproduction. The most abundant amphibians at the site were red-spotted newts (*Notophthalmus viridescens viridescens*) and green frogs (*Lithobates clamitans*). In November 2005, brook trout (*Salvelinus fontinalis*) were stocked into the fishless lake (which contained brook trout prior to acidification). Subsequent to the restocking, stomach

contents of red-spotted newts and brook trout were sampled to determine degree of dietary overlap and to monitor changes in relation to fish introduction. Preliminary analysis indicates that newt diet varied throughout the year and was more diverse than trout diet. In October 2006 and May 2007, stomach samples from trout were dominated by *Chaoborus* (larvae and pupae). In October 2007 samples, *Chaoborus* were present, but not as abundant as in the previous year. Year class trout consumed corixids and zygopterans; fish of larger size classes consumed anisopterans as well. Activity traps are also being used to monitor invertebrate community changes over time, in response to changes in water chemistry and biological communities, including brook trout populations. **S-5**

Do Invasive Rusty Crayfish Affect Stream Macroinvertebrates?

Kuhlmann*, Mark, Anthony **Prisciondaro**, Megan **Ireland**, Greg **Hamilton**, Sara **Caldwell**, and Ryan **Oliver** (Hartwick College, Oneonta, NY)

Rusty crayfish (*Orconectes rusticus*) have invaded streams of the upper Susquehanna River catchment (New York, USA), replacing native crayfish and probably increasing overall crayfish density. Crayfish are important consumers and agents of disturbance in aquatic communities, so the introduction and expansion of rusty crayfish could affect the invaded community through the change in crayfish species composition, the increase in crayfish density, or some combination of the two. Other macroinvertebrates are prey of, competitors with, or subject to disturbance by crayfish and so are likely to be affected by changes in the crayfish assemblage. We conducted correlative field sampling and an enclosure experiment to investigate the effects of invading *O. rusticus* on the abundance, diversity, and composition of the stream macroinvertebrate assemblage. We sampled crayfish and macroinvertebrates at 13 sites on 4 streams in the upper Susquehanna River catchment that varied in crayfish species composition and density. Total macroinvertebrate abundance, taxon richness, diversity, and density of individual taxa were not significantly correlated to either total crayfish density or the relative abundance of *O. rusticus*. We also conducted an experiment in stream enclosures to test the effects of *O. rusticus* density on the macroinvertebrate assemblage. Crayfish density did not significantly affect macroinvertebrate taxon richness or diversity but had a nearly significant effect on total macroinvertebrate density. The density of some individual taxa were also significantly affected by crayfish density. Our experiment shows that crayfish density can affect the stream community; the mechanism of these effects remain to be determined. **S-8**

A Novel Method of Recording Flight Calls from Captive Wood Warblers

Lanzone*¹, Michael and Andrew **Farnsworth²** (¹Powdermill Avian Research Center, Rector, PA, ²Cornell University, Ithaca, NY)

Nocturnal flight calls of migrating birds are poorly known. Incomplete knowledge of flight-call identities and inter- and intraspecific variation in call notes and rates limits the utility of using them as a census tool. We gathered data using a novel method of recording flight-calls from birds held temporarily in captivity to study flight-call identities and inter- and intraspecific variation in call notes. Using this method we recorded 2113 birds of 45 species of passerines over two years. Here we present data for 13,271 flight-calls recorded from 469 individuals of 28 warbler species. Spectrographic analysis of the flight-calls recorded in captivity show that these vocalizations are very similar to flight-calls given in free flight. Our sample included previously undocumented flight-calls for Lucy's, Virginia's, Red-faced, Grace's, and Black-throated Gray Warblers. We verified flight-calls of over 10 species previously assigned to species based primarily on inferential evidence, and amassed data sufficient to begin to assess inter- and intraspecific patterns of variation in warbler flight-calls. The technique we describe allowed us to record a large number of flight-calls rapidly with valuable ancillary data necessary for more detailed analyses of variation in flight-calls. This method is helping researchers to generate data critical for implementing and strengthening future acoustical monitoring applications. **CO-11**

Environmental and Biotic Changes at the Hiscock Site (Late Quaternary, Genesee Co.)

Laub*, Richard (Buffalo Museum of Science, Buffalo, NY)

Hiscock, a late Quaternary site in Genesee County, records changing environments, biota and cultures through the past 13,000 years. During the late Pleistocene this basin was a salt lick adjacent to a probable migratory route, resulting in considerable animal traffic. Trees were notably sparse in the immediate surroundings. The site is carpeted with mastodon remains, with more modest representation of other species. Among the latter are California condor and long-nosed peccary, neither having been reported before from New York. The bones were subjected to several taphonomic agencies, including manipulation by humans, who left lithic artifacts at the site. Following the Pleistocene, the site became stagnant and enveloped first in conifer, and later in broadleaf trees. A remarkably rich fauna, about 2 dozen mammals and 3 dozen birds, as well as turtles and frogs,

inhabited this forest during the Holocene. It is interesting that cultural artifacts are less common in the Holocene than in the more time-constrained Pleistocene horizon. A burning event occurred around 3000 rcyBP. Unconformities and other features indicate varying water table levels and occasional complete drying of the basin. Spring flow was remobilized during the later Quaternary, influenced by ancient excavations in the Pleistocene deposits, and there is evidence of a significant period of drought in the late 1400s AD. Cutting back of the forest by Europeans increased the rate of slope erosion in the basin. **S-1**

Decline of Native Ladybeetles in the Northeast

*Losey**, John and Leslie Allee (Cornell University, Ithaca, NY)

Over the past twenty years several native ladybeetle species including New York's state insect, *Coccinella novemnotata* (the nine-spotted ladybeetle), that were once very common in the Northeast have become extremely rare. During this same time several species of exotic ladybeetles especially *Coccinella septempunctata* and *Harmonia axyridis* have greatly increased both their numbers and range. In many areas exotic ladybeetle species are now dominant. This shift has happened so quickly that concerns have been raised regarding the ability of exotic species to regulate herbivore populations in managed and natural systems as effectively as our familiar native species always have. Here we present data on the decline of native ladybeetles in the Northeast and outline our ladybeetle citizen science program which is being developed to educate non-specialists (particularly youth) on the importance of biodiversity and conservation and to recruit them to join us in our ladybeetle survey. **S-12**

Ecology and Management of Spotted Turtles, *Clemmys guttata*, in Vernal Pools

*Maret**, Timothy (Shippensburg University, Shippensburg, PA)

The spotted turtle, *Clemmys guttata*, utilizes a variety of aquatic habitats, including vernal ponds. For the last 5 years, I have been monitoring a small population of spotted turtles that utilize a vernal pond complex in south central Pennsylvania. The area has an extensive history of habitat modification through timber harvest that continues through the present. Adult turtles were radio-tracked during two different years, one characterized by high temperatures and low rainfall and the other by lower temperatures and high rainfall. During the spring and early summer months, turtles move extensively among ponds. During the summer, they also utilize a variety of upland habitat, including both forested and open areas. Turtle movement, activity, and habitat use varied considerably between the two years, with higher movement and activity during the wet year and higher use of terrestrial habitats during the dry year. The extensive movements and large home range size of these animals present several management challenges, as individuals often move beyond designated wetland buffer areas. Management recommendations include restricting timber harvest to times of year when turtles are not active and managing wetland buffers to protect and maintain aquatic habitats. **S-3**

Biological Control of Zebra and Quagga Mussels with a Novel Microbial Agent

*Mayer**, Denise and Daniel Molloy (New York State Museum, Albany, NY)

The invasion of zebra and quagga mussels (*Dreissena* spp.) and their spread throughout North America over the last two decades have dramatically altered the composition and functioning of freshwater ecosystems and resulted in economic impacts totaling hundreds of millions of dollars annually. An environmentally safe and effective control method for widescale use, however, still is not commercially available. As a consequence, lakes and rivers are being inadvertently polluted by the discharge from power plants and other raw-water dependent facilities that currently commonly use non-selective biocides (like chlorine) to control their pipe infestations. Meanwhile mussel populations continue to spread unchecked because there is no safe method that can be used for control of these mussels in open waters. Strain CL145A of the bacterium *Pseudomonas fluorescens*, however, has been identified as having significant potential as the first environmentally safe control agent—capable of use not only by industry but also for treating open waters. Cells of this bacterial strain contain a natural product which is lethal to zebra mussels when ingested. Dead cells are equally as lethal against these mussels as live cells, providing clear evidence that the mussels die from a toxin, not from infection. Commercial formulations are now under development that will contain dead cells, thus further reducing environmental concerns. Research progress to date will be reviewed, in particular the lack of non-target impact. At dosages which produced high zebra mussel mortality, for example, no bacteria-induced mortality has been recorded among fish, ciliates, daphnids, and bivalves. **S-8**

Is Exposure to Agricultural Runoff Leading to Sexual Disruption in *Rana Pipiens*?

McDaniel^{*.1}, Tana, **Pamela Martin¹**, **Mary Buhr²**, **Jim Sherry¹**, **John Struger¹**, and **Mark McMaster¹** (¹Environment Canada, Burlington, Ontario, ²University of Guelph, Guelph, Ontario, Canada)

Intensive row crop agriculture featuring corn and soybean production, is predominant in southwestern Ontario where the two crops account for over 50% of the total acreage of crops grown. The corn herbicides atrazine and metolachlor, used in row crop agriculture, are two of the most heavily applied pesticides in Ontario and are routinely detected in tributaries draining agricultural watersheds. We measured circulating sex steroids, vitellogenin expression, and gonad histology in wild northern leopard frogs (*Rana pipiens*) from agricultural and non-agricultural sites in southwestern Ontario. Agricultural sites, particularly those in Chatham had a significantly higher percentage of males with ova-testes (42%), as compared to non-agricultural sites (7%). To determine if this gonadal abnormality was linked to exposure to water borne chemicals from agricultural activity, we took eggs from a non-agricultural reference site where no intersex individuals had been detected, and raised them in four agricultural sites to determine if the gonadal abnormalities persisted and for comparison in two non-agricultural sites. While effects were seen at earlier life stages there was no consistent difference between agricultural and non-agricultural sites in terms of survivorship to metamorphic transformation, body size, sex ratio or deformity rates. Testicular oocytes were seen in males raised in both agricultural and reference sites, but rates were significantly higher at some agricultural sites. We have also begun to compare sperm viability in male leopard frogs from populations with and without testicular oocytes. **S-7**

Invasion Impacts across Trophic Levels: A Case Study

McGlynn^{*}, Catherine (SUNY Stony Brook, Stony Brook, NY)

Invasive plants have the potential to impact native organisms in several different trophic levels. Invasive plants require resources similar to those of native plants and they may provide food and shelter to native vertebrates and invertebrates. I studied the effects of two invasive plants, *Phragmites australis* (common reed) and *Lythrum salicaria* (purple loosestrife), on native plants, small mammals, birds and invertebrates in six freshwater tidal wetlands along the Hudson River. During three summers (2001–2003) I surveyed percent cover of vegetation by species, point-censused bird species and trapped small mammals in plots in invaded locations (dominated by one or both invasive plants) and in uninvaded locations, dominated by *Typha* (cattail) species. I also collected litter samples for arthropods during 2003. I analyzed these data using both univariate and multivariate non-parametric tests. Effects of *P. australis* and *L. salicaria* varied by species, Class and Kingdom. Dominant plant type affected native plant community composition and abundance. Dominant plant type did not influence the composition and abundance of native small mammal and bird communities. However, *P. australis* was important for *Peromyscus leucopus* (white-footed mouse) while wetland and wetland-specific context influenced native bird species composition and abundance. Arthropod Order composition did not vary among invaded and uninvaded plots, but wetland and wetland-context were important factors. I concluded that trophic level contributes to the impact of an invasive organism, “invasiveness” was not as important as dominance, species-specific characteristics mediate impacts and generalizations about effects are not appropriate given the idiosyncratic responses at different taxonomic levels. **S-12**

Restoration of Paddlefish to the Upper Ohio River and Allegheny River Systems

McKeown¹, Paul, **Doug Carlson¹**, **Mike Clancy¹**, **Rick Lorson²**, **David Argent³**, and **William Kimmel³** (¹New York State Department of Environmental Conservation, Allegany, NY, ²Pennsylvania Fish Commission, Somerset, PA, ³California University of Pennsylvania, California, PA) (Presenter: **Meg Janis^{*,1}**)

Paddlefish *Polydon spathula* historically occurred in the Ohio and Allegheny River systems, extending into the headwater sections of the Allegheny River in New York and Pennsylvania. At the turn of the 19th century paddlefish were reported in the Allegheny River near the cities of Salamanca and Olean, NY. The last published historical account of paddlefish in PA occurred in 1919 at the mouth of the Kiskiminetas River. The demise of paddlefish in PA and NY has been attributed to channelization, dams, gravel dredging and water quality degradation. The closure of Kinzua Dam in 1968 prohibited access for paddlefish to the upper Allegheny River system from farther downstream but may have compensated for losses of nursery areas with creation of Allegheny Reservoir. Until 1986, paddlefish in PA were listed as extirpated and they continue to be classified as such in NY. In the absence of adult stocks and sources of wild recruitment, Pennsylvania initiated a stocking program in 1991 in the Upper Ohio and lower Allegheny Rivers. In 1998, New York initiated a complimentary stocking program upstream in the Allegheny Reservoir. A second stocking location, Conewango Creek, was added in 2006 in a relatively unaltered section of their historic range. Free ranging adult paddlefish were captured by gillnets in Pennsylvania and “reliable source” reports were documented in PA and NY. No evidence of natural reproduction or year class structure has been documented in either state. Therefore, the status of paddlefish reintroduction to the upper Ohio and Allegheny Rivers requires continuing assessment. **S-13**

Evidence of Increasing Incidence of Disease in Native Turtles and Research Needs

Michell^{*1}, *Kathy and Jude Holdsworth*² (¹New York Center for Turtle Rehabilitation and Conservation, Narrowsburg, NY, ²Field Associate, New York State Department of Environmental Conservation, Hyde Park, NY)

In recent years the number of turtles being brought in from the wild for rehabilitation due to illness rather than injury has increased greatly. These illnesses include respiratory infections, aural abscesses, eye infections, dermal lesions, opportunistic infections and documented cases of iridovirus in several states including a semi-aquatic turtle in New York State. Several snakes have also been treated for eye and skin infections. Previously, illnesses treated were predominantly limited to eastern box turtles with respiratory infections and aural abscesses. The reason for the increased number of illnesses is not clear. There is speculation that environmental factors may play a role as well as introduction of disease to isolated populations. Current research on box turtles has shown a possible correlation between levels of organochlorine compounds, which are disruptors of vitamin A metabolism, and aural abscesses. In one study site alone, a researcher this year located five spotted turtles with various illnesses. Several cases will be discussed. There are tremendous research needs in this area including water quality issues, environmental contaminants, infectious diseases, disease vectors and immune suppressants. Are environmental stresses such as diminished habitat and climate change also factors? These issues present many challenging research opportunities. S-7

The Evolution of Timber Rattlesnake Research and Resulting Advances in Conservation Efforts

Michell^{*1}, *Kathy, Kris Schantz*², and *Tom Michell*¹ (¹Research Partner to NJENSP, Northern District, NJ, ²NJ Endangered and Nongame Species Program, Northern District, NJ)

Much attention has been focused on the timber rattlesnake (*Crotalus horridus*) which is currently recognized as endangered or threatened in six states in the northeast. Formerly depicted by early researchers as a dangerous animal that will strike when approached, it is now recognized as a docile, shy and reclusive creature that rarely strikes, even when handled. Research has provided volumes on their natural history, population structure, behavior and home ranges. As knowledge of the animal accumulated, methodology also evolved. Forked sticks, tongs and snares were replaced by hook sticks for capture. Genetic interchange areas are no longer defined by overlapping radii from dens, as travel corridors and habitat preferences have been defined through telemetry, enabling wildlife agencies to protect the critical areas. Larger samples of snakes have been tracked by the authors in several recent studies by supplementing the numbers surgically implanted with non-invasive external attachment techniques to provide better insight on home ranges of multiple dens. Recognizing the detrimental impact of handling snakes and disturbance at dens and gestating areas, several states and providences have developed predominantly hands off survey protocols. Researchers have been rewarded with unique observations such as feeding activity during copulation and unusual forms of male combat, courtship and bonding behavior. In an effort to reduce attrition through loss of individual adults, nuisance relocation programs are becoming common in many areas. Telemetry has enabled the authors to present data to support methods which have been successful in altering rattlesnake behavior and movements. CO-1

The Presumpscot Formation of Maine Revisited: Paleobotany, Tree-Ring Analyses, Radiocarbon Ages, and the Marine Reservoir Effect

Miller^{*1}, *Norton G., Carol B. Griggs*², *Woodrow B. Thompson*³, and *Thomas K. Weddle*³ (¹New York State Museum, Albany, NY, ²Tree-Ring Laboratory, Cornell University, Ithaca, NY, ³Maine Geological Survey, Augusta, ME)

The late-Pleistocene Presumpscot Formation encompasses marine clay, silt, and sand deposited in lowlands of southern Maine during a period of marine transgression when the land was isostatically depressed. The clay contains shells of marine invertebrates but only rarely plant remains. Studies of wood and peat collected in 1976 and 1983–1984 from exposures along the Fore River in Portland, Maine, have been published, but new excavations there in 2007 allowed us to investigate the plant remains and associated sediments over a larger area. Plant macrofossils in the peat include white spruce twigs with needles and balsam poplar buds. Leafy plants of 20 mosses from the peat establish the presence of calcareous wetland and/or spring seeps, mesic and dry forest-floor bryophyte communities, and open well-drained sites on acidic or calcareous mineral soil. A 200-year record of tree-ring growth was obtained from the logs, including anatomical evidence of changes in direction of growth and nutrient availability, suggesting slope erosion or mass movement and associated tree displacement, water table rise and fall, and a return to favorable conditions before the trees all died at the same time. The combined botanical evidence indicates open white spruce-balsam poplar forest, and diverse microsite plant communities. Radiocarbon ages for nine wood samples varied between $11,907 \pm 31$ to $11,721 \pm 40$ ¹⁴C YBP, whereas closely associated shells from various marine invertebrates dated from $12,850 \pm 65$ to $12,800 \pm 55$ ¹⁴C YBP, indicating a marine reservoir value of about 1000 yr in this part of the North Atlantic coast. S-1

The Narragansett Bay Coyote Study

Mitchell^{*1}, *Numi, Ralph Pratt*², and *Lynn Malone*³ (¹The Conservation Agency, Jamestown, RI, ²West Greenwich Animal Hospital, West Greenwich, RI, ³World Views, Barrington, RI)

The Narragansett Bay Coyote Study is the first ecological study of coyotes in Rhode Island. It is unique in using GPS/radio collars and GIS to look at coyote movements and resource use and involving local Schools and after-school programs and communities in real-time scientific exploration. The study is currently based on two Narragansett Bay Islands recently colonized by coyotes, a new top predator. We are collaring and monitoring coyotes from 10 different packs. Collars transmit hourly GPS positions for one year then drop off. Resource use patterns have strong coexistence and management implications. We have identified significant anthropogenic resources available to coyotes that may be increasing coyote density in our study area. Based on our research from 2005–2007 we have developed a management plan which stresses aggressive management of human subsidies with the goal of passively managing coyote numbers. Coyotes have been reported to respond to decreased food resources by lowering reproductive output. We hope to implement the plan and monitor subsequent changes in number of packs and territory size. We predict either an increase in pack territory size, decrease numbers of coyotes/pack, or both. Our website is integral: www.theconservationagency.org/coyote.htm. S-2

Endosymbionts of Zebra and Quagga Mussels: What is Their Significance?

Molloy^{*}, *Daniel* (New York State Museum, Albany, NY)

Want to predict what one might find living inside a zebra or quagga mussel? Since there is a big difference in the endosymbionts documented from these mussels in Europe versus North America, the first question one should ask is on which continent the mussel was collected. In contrast to the lack of infection in North American populations, European zebra and quagga mussels harbor a wide diversity of organisms inside their body cavities and tissues. These endosymbionts range from microbes to the metazoans, from benign commensals to lethal parasites, and from highly host specific to generalist invaders. The impact of endosymbiont infections on the population dynamics of these mussels, as well as how endosymbiont data can be used to test theories of invasion biology and evolution, will be discussed. S-8

Evaluating the Potential Invasiveness of Non-Native Plants in New York State

Moore^{*1}, *Gerry, Marilyn Jordan*², and *Troy Weldy*³ (¹Brooklyn Botanic Garden, Brooklyn, NY, ²The Nature Conservancy, Long Island Chapter, Cold Spring Harbor, NY, ³The Nature Conservancy, Eastern New York Chapter, Albany, NY)

The Brooklyn Botanic Garden and the Eastern New York and Long Island Chapters of the Nature Conservancy have developed a ranking system for evaluating the potential invasiveness of non-native plant species for New York State. The system incorporates components from other systems, primarily the system developed by the Alaska Heritage Program in conjunction with the US Forest Service. The protocol evaluates plants at both the state and regional levels – currently the state is divided into eight regional PRISMs (Partnership for Invasive Species Management). Species are evaluated at the NYS level based on a series of questions from four categories: 1) ecological impact, 2) biological characteristic and dispersal ability, 3) ecological amplitude and distribution, and 4) feasibility of control. A species' invasiveness ranking using these systems is not based solely on its current abundance or distribution in the state, thus allowing for early detection. Based on the answers to these questions, each species is given a ranking of either 1) very high invasiveness, 2) high invasiveness, 3) moderate invasiveness, 4) low invasiveness, or 5) not invasive. An overview is also provided on how this evaluation process could be strengthened using information on species' native ranges, GIS technology, and predictive distribution modeling software. The vast majority of plant species that are introduced in the state do not become invasive; it is hoped that this protocol methods will assist in identifying the small minority of species that will become invasive. S-11

Rediscovered in the Adirondacks: The Summer Sucker (*Catostomus utawana*)

Morse^{*}, *Richard and Robert Daniels* (New York State Museum, Albany, NY)

The summer sucker is a small species of fish that closely resembles the white sucker, *Catostomus commersonii*. In 1886 Fred Mather described it from two localities in the Adirondacks, but some studies since have suggested that this fish was not a species separate from the white sucker. Recent studies demonstrate that it is both reproductively isolated and physically discernable from the white sucker. Attention to these differences will aid in identifying it. A study of museum specimens caught during the Adirondack portion of the statewide watershed survey finds this species distributed in 6 watersheds. It is reported from nowhere else. This species is rare and probably endemic to the Adirondacks. CO-2

Vegetation Change in an Ordinary Forest in an Ordinary Century

Motzkin^{*1}, Glenn and Jerry **Jenkins**² (¹Harvard Forest, Petersham, MA, ²Wildlife Conservation Society Adirondack Program, Saranac Lake, NY)

To assess the response of plant communities to climate change, we need background measurements of the rate of floral change under relatively constant climates in the past. We report one such measurement here. The Harvard Forest is an 1,100 hectare tract of upland forests and wetlands in central Massachusetts. It has been owned by Harvard University for 101 years, and was first used as a forest experiment station and then as a NSF Long-term Ecological Reserve. In this period it has lost pastures, gained forests, passed through a period of intensive silviculture and a major hurricane, and been subject to acid deposition and some climate amelioration. But it has not seen major alterations in the land use of the forest or the surrounding watersheds. The botanical record consists of 3,600 herbarium specimens and 808 verified species, compiled in three checklists and one full flora. We conducted a four-year inventory of the flora and analyzed historical changes using six metrics. We found that the taxonomic and life-form spectra, species richness of characteristic habitats, and level of geographic specialization of the native flora have changed little despite the loss of open lands, the aging of the forests, and a significant (~15%) turnover in species composition; we suggest that these may be robust metrics against which to measure future change. The alien flora, on the other hand, showed distinct richness and compositional changes, and we suggest that it may need to be excluded from future analyses of change. **S-1**

Determining Movement Patterns and Survivorship of Diamondback Terrapin Hatchlings at Jamaica Bay

Muldoon^{*}, Kerry (Hofstra University, Hempstead, NY)

Terrestrial movements of hatchling diamondback terrapins, *Malaclemys terrapin*, are poorly known. Literature suggests hatchlings may migrate either to the water or towards vegetation, but there is little documentation supporting either claim. There have been no in-depth or long-term studies to determine why terrapins behave so differently from other aquatic turtle hatchlings. Aquatic environments can offer hatchlings predator protection and a freeze-proof overwintering location. Vegetated upland locations could also offer predator protection or food availability. My research focuses on determining the terrestrial movements of hatchlings and why they may choose terrestrial locations over aquatic habitats. Eleven drift fences were installed in four areas of Jamaica Bay Wildlife Refuge (JBWR), part of Gateway National Recreation Area on Long Island, New York. Each area had at least two drift fences. Small pitfall traps were placed one meter apart along the fence line, parallel to the fence and submerged up to the top under sand or dirt. I monitored each container daily before dusk during Summer/Fall 2006, Spring 2007, and Summer/Fall 2007. Each captured hatchling was marked, measured, photographed, and placed on the opposite side of the fence under vegetation. Two hundred and thirteen hatchlings were found and a total of one hundred and thirty six were later recaptured. The majority of the hatchlings emerged in the evening hours, avoided water, and travelled upland towards vegetation. Confirmation that hatchlings overwintered on land was found in Spring 2007. This study will end in June. **CO-6**

Amphibian Abnormalities and Parasite Incidence on National Wildlife Refuges, Regional/National Perspectives

Munney^{*1}, Ken, Fred **Pinkney**², Sherry **Krest**², and Piet **Johnson**³ (¹US Fish and Wildlife Service, Concord, NH, ²US Fish and Wildlife Service, Annapolis, MD, ³University of Colorado, Boulder, CO)

The US Fish and Wildlife Service has been studying the prevalence of abnormal frogs on National Wildlife Refuges (NWRs) since 2000. The primary objectives have been to 1) determine if refuges have sites with a high frequency of abnormal frogs, 2) evaluate whether abnormality frequencies are consistent within seasons and among years, 3) investigate possible causes of the abnormalities. Standard operating procedures were developed to insure consistency and replicability nationwide. From 2000–2006, 137 refuges in 46 states were monitored. In the Northeast, 24 refuges have been surveyed with over 200 site-specific collections. Surveys include field exams and subsamples for parasitology and x-ray examination. In the Northeast, the trematode *Ribeiroia*, was detected on six refuges: Aroostook (ME), Erie (PA), Great Bay (NH), Great Swamp (NJ), Iroquois (NY), and Missisquoi (VT). We discuss the relationship between abnormalities and *Ribeiroia* intensity in *Rana clamitans*, *R. sphenoccephala*, and *R. pipiens*, and summarize the types of abnormalities across species, refuges, and years. **S-7**

Water Chestnut Control in Central New York

*Nemecek*¹, Russell and John DeHollander² (1Onondaga County Health Department, Syracuse, NY, 2Oswego County Soil and Water Conservation District, Fulton, NY)*

A multi-discipline approach is being used to control water chestnut in the Three Rivers System of Central New York. The techniques used include chemical treatment, mechanical harvesting, event and individual hand-pulling efforts, public education and native plant restoration. This has been accomplished through the cooperative efforts of several counties and their respective agencies. Successes achieved to date, continued challenges and future initiatives for the various program components will be discussed. S-9

Landscape Characteristics as They Related to Roost Selection of Indiana Bats in the Lower Hudson River Valley

Newman, David J., Carl J. Herzog, and Alan C. Hicks (New York State Department of Environmental Conservation, Albany, NY)*

Development pressure in the Lower Hudson River Valley suggests an immediate need to determine the essential landscape characteristics used by the endangered Indiana bat on its summer range. Our goals were to identify what landscape level factors influence the location of maternity colonies in the Hudson River Valley. Ninety-six roost tree locations from three seasons of spring tracking (42 different bats) were used along with easily accessible GIS layers. These GIS layers included: elevation, land cover, water resources, transportation (roads), and aerial photography. At the broad landscape level (100 km circular buffer from the hibernaculum) we compared the elevation of the known roost to random points on the landscape and determined that roosts were significantly lower in elevation than random points ($p < 0.01$). Minimum convex polygons were created around two clusters of known roost trees ($n > 35$) and land cover was compared between the roost polygons and the area surrounding the polygons with little difference found. A more focused analysis of the roost trees east of the Hudson River was conducted with no significant differences found between random points and known roost when looking at distance to roads, distance to water resources, or number of buildings within 400 meters, although roost tended to be closer to water resources and have fewer buildings within 400 meters. Generalizations that can be made from this work are that Indiana bats from the Williams Lake Mine complex summer in areas below ~300m, away from urban centers, and within 350 meters of a water resource. S-13

AEAP: Temporal Changes in Chemistry Associated with Adirondack Lake Acidification and Recovery

*Nierzwicki-Bauer*¹, Sandra A., James W. Sutherland², James P. Harrison³, Bahram Momen⁴, Robert Bombard³, Lawrence W. Eichler³, David Winkler³, Greg B. Lawrence⁵, and Charles W. Boylen¹ (1Darrin Fresh Water Institute and Department of Biology, Rensselaer Polytechnic Institute, Troy, NY, 2NYS Department of Environmental Conservation (retired), Nantucket, MA, 3Darrin Fresh Water Institute, Rensselaer Polytechnic Institute, Troy, NY, 4Department of Natural Resource Sciences, University of Maryland, College Park, MD, 5US Geological Survey, Troy, NY)*

The Adirondack Effects Assessment Program (AEAP) was established with funding from the US EPA to conduct a synoptic chemical and biological sampling program on 30 lakes and ponds in the Adirondacks. These were selected to represent hydrologic categories that 1) are the most impacted by acidification and 2) may be most likely to demonstrate the effects of recovery. To complement the biological components of the study, midsummer epilimnetic and hypolimnetic chemistries were determined. An evaluation of data collected from 1994–2007 reveals that the majority of lakes showed increases in pH and ANC, and decreases in analytes of interest. For epilimnetic samples, pH increased in 26 of the 30 surveyed lakes, with 17 of these lakes showing significant yearly increases. 19 lakes showed increased ANC with 13 of these being significant. Sulfate decreased in all 30 lakes with 22 lakes showing significant declines. Nitrate decreased in all but 1 lake, with 20 lakes revealing significant decreases. Labile monomeric aluminum decreased in 20 lakes, with 8 showing significant reductions. Overall, these results suggest that a degree of chemical recovery from acidification is evident in the summer sampling. The trends documented in major acidification analytes are supported by parallel trends in some factors that are associated with productivity in lakes and ponds, including transparency of the water column and concentrations of total phosphorus, total nitrogen and chlorophyll *a*. Collectively, these results show increased productivity may be contributing to increased pH and decreased NO_3^- concentrations and demonstrate the interactive relationships between environmental, chemical and biotic variables in Adirondack waters. S-4

Expanding and Enhancing a Web-Based Flora for Tompkins County, New York

Nixon, Kevin C., Anna M. Stalter, Edward A. Cope, and Robert E. Dirig (LH Bailey Herbarium Hortorium, Cornell University, Ithaca, NY)*

The historical plant diversity of Tompkins County, NY, located within the Cayuga Lake Basin, is well represented by the holdings of the Bailey Herbarium Hortorium at Cornell University. Accessibility to this important resource is broadened by an online specimen-based floristic list (Tompkins County Flora, or TCF), which presently includes 27% of the total holdings for the county as well as links to images of live plants, interactive keys and search functions, and cross-referenced phylogenetic and nomenclatural data. To further enhance the value of the flora to researchers and other end users, we are currently adding images of all Tompkins County herbarium specimens to TCF. Our data input procedure simultaneously captures digital images of herbarium specimens, including a full specimen image at ca. 240 dpi and multiple close-up images at 600 and 1200 dpi, and associated label data and annotations. Collector and locality data are captured from images using OCR software and automatically uploaded to the relational database that is available online. We are concurrently curating and verifying the holdings through consultation with staff taxonomists and local experts, and with reference to existing databases, including Mitchell's New York list, the NYFA list, the USDA Plants database for New York, and databased versions of the *Flora of the Cayuga Basin* (Wiegand & Eames, 1926), and Gleason and Cronquist (1991). All label data and specimen images will be provided through the existing website (www.plantsystematics.org/tompkins.html), increasing accessibility to this valuable resource for a wider and more diverse audience. **CO-5**

A Framework for Invasive Species Control in the State Park System

O'Brien, Robert, Pamela Otis, and Kristen Cady-Saywer (NYS Office of Parks Recreation and Historic Preservation (OPRHP), Environmental Management Bureau, Albany, NY)*

The NY State Office of Parks Recreation and Historic Preservation (OPRHP) has been developing a framework for invasive species (IS) control in the State Park system. The goal of this framework is to develop practices and protocols to insure that OPRHP provides comprehensive and consistent guidance for IS management projects and activities at OPRHP facilities. OPRHP has developed an Invasive Species Management Plan for Minnewaska State Park Preserve to serve as a model for other invasive management plans on state parklands. The Minnewaska plan sets forth goals, objectives and actions for IS management; the actions described represent implementation steps. Management activities include: species identification, data collection and mapping, ranking of invasiveness and feasibility of control, control methods and best management practices, restoration, early detection and prevention, monitoring, and finally stewardship, outreach, research, experimentation and education. Included in the development of the Minnewaska plan is a Resource Kit on CD that allows for other regions, parks and sites to undertake IS management actions. Implementation of the framework will also create statewide IS data and GIS layers for OPRHP lands. **S-10**

Phragmites, Frog-Bit, and More: Invasive Plant Management Updates from the Adirondacks

*Oles*¹, Hilary, Steven Flint¹, Raymond Curran², and Stephen Langdon³ (¹The Adirondack Chapter of The Nature Conservancy, Keene Valley, NY, ²Adirondack Information Group, LLC, Wilmington, NY, ³33 Cliff Road, Saranac Lake, NY)*

Thousands of terrestrial invasive plant infestations are documented in the Adirondack Park, and at least 51 waterways are infected with aquatic invasive plants. Though numerous, many infestations are still at manageable levels, and opportunity exists in much of the region for early detection, rapid assessment, and rapid response. Since 2000, partners of the Adirondack Park Invasive Plant Program (APIPP) have controlled hundreds of terrestrial infestations and strived to build a detection and response network to contain, reduce, or eliminate infestations and mitigate impacts. While survey and control efforts increased, limited monitoring occurred after the sites were managed, and little was known about whether managed sites trended towards desired conditions. In 2007, state-funded grants enabled APIPP to begin systematic and quantifiable post-treatment monitoring of infestations as well as to undertake its first aquatic invasive plant eradication project. A summary of experimental design, preliminary findings, and anticipated outcomes will be presented for two ongoing projects: post-treatment monitoring of *Phragmites australis*, *Polygonum cuspidatum*, and *Iris pseudacorus* at numerous sites throughout the Adirondacks, and hand-harvesting of *Hydrocharis morsus-ranae* in the Grasse River. Two projects scheduled for 2008 will also be described: hand-harvesting *Eichhornia crassipes* in the Raquette River, and eradication of *Myriophyllum spicatum* from Follensby Clear Pond. **S-9**

Biodiversity of Spiders of Hudson Highlands

*Ovtcharenko**, Vladimir (Hostos CC of the City University of New York, Bronx, NY)

The Hudson Highlands are the mountainous region on both sides of the Hudson River located north of New York City. Spiders were collected in this region in 1998–2007. The collection site was primarily Black Rock Forest (BRF), Cornwall. The first step of the revisionary study of the BRF spiders has been completed. A total of 300 species of spiders were collected, with all these species belonging to 133 genera and 27 families. All this data is new, because the spider fauna of BRF has not been studied before our research. The website “Spiders and Insects of Black Rock Forest” is located on the server of the American Museum of Natural History (<http://research.amnh.org/entomology/blackrock>). The list of the BRF spiders with the data collected was published on the AMNH website. A completely new website was created and called “Identification Keys of BRF Spider Genera.” The keys include all 133 spider genera found in the BRF. It has been identified as the first “Interactive Identification Keys of Spider Genera” in this country. Recently, the “Identification Keys of BRF Spider Family” were re-presented in a new more convenient design. The revised key is published on the AMNH web site, as well as available on a separately released CD “The Study of Spiders” for the course of “Science Seminars with the American Museum of Natural History. The “Identification Keys” and all the data on the BRF spiders were intensively used in the distance learning course for science teachers in the U.S. **CO-7**

Northeastern Grassland Communities on Urban Rooftops

*Palmer*¹*, Matthew, *Laura Dickinson¹*, *Stuart Gaffin²*, and *Peter Mott³* (¹*Ecology, Evolution, and Environmental Biology, Columbia University, New York, NY*, ²*Center for Climate Systems Research, Columbia University, New York, NY*, ³*The Ethical Culture Fieldston School, New York, NY*)

Grasslands occur throughout the Northeastern United States in areas where soil depth, soil fertility, water limitation, or disturbance regimes prevent the establishment of woody vegetation. Some of these conditions are similar to those found on extensive green roofs. The plants commonly used on green roofs are *Sedum* species, which are succulent plants tolerant of the environmental stresses found there. While *Sedum* has performed well in many biophysical aspects of green roof function, it is unlikely to provide much habitat for native organisms. In contrast, the use native grassland plants on urban rooftops is likely to increase the value of those roofs as habitat for insects, birds, and other organisms. Furthermore, patches of native vegetation are rare in urban landscapes so creating native green roofs may improve connectivity of other natural areas. The Fieldston School in Riverdale, NYC installed a green roof in 2007 where we planted a traditional mix of *Sedum* species and two native plant communities based on local natural grasslands as both an experiment in urban restoration and as a way to provide students access to a living laboratory. The three plant community types are replicated in plots with either flat substrate or with varied microtopography. Researchers, teachers, and students will gather data on the development of natural communities as these roofs mature and will compare ecological structure across the vegetation types. The data gathered will be used in science classes including biology, ecology, and environmental science. **CO-8**

Can the Eastern Coyote Effectively Fill the Niche of the Eastern Wolf?

*Patterson**, Brent, *Jeff Bowman*, *Kevin Middel*, and *Bruce Pond* (Ontario Ministry of Natural Resources, Wildlife Research & Development Section, Peterborough, Ontario, Canada)

During the 20th century wolves were eradicated from much of their historic range in North America. In contrast, coyotes progressively expanded their range and numbers during this time. Wolves and coyotes belong to the same genus, and other than body size (wolves are typically 100–200% larger than coyotes), are morphologically and behaviourally similar. In much of the Northeast, coyotes must contend with relative to their western counterparts. Larger body size, lower prey diversity and abundance, and a greater tendency to hunt in extended family groups during winter have all been related to high use of deer by eastern coyotes. Given these characteristics, and the absence of wolves, some have suggested that coyotes have replaced wolves as a significant predator of white-tailed deer in the Northeast. Here we review the literature and our own data to evaluate this hypothesis. Larger territory sizes of wolves relative to coyotes, mandated by higher energetic requirements, result in lower potential densities of wolves. However larger body size also makes the wolf a more effective predator of ungulates, and kill rates of wolves preying on deer are considerably higher than documented for coyotes. Despite coyotes existing at much higher densities than wolves, and the documentation of coyotes exerting significant predation pressure on deer in some areas under certain conditions (i.e. severe winters), in most forested areas of the northeast coyote predation exerts less influence on deer population growth than what would occur if wolves rather than coyotes occupied the same landscapes. **S-2**

Environment Canada Research on Disease and Contaminant Effects in Reptiles and Amphibians

Pauli*, Bruce (Environment Canada, Ottawa, Ontario, Canada)

The Wildlife Toxicology and Disease Program of Environment Canada funds studies on the effects of contaminants on wildlife, including reptiles and amphibians, and on the incidence and effects of wildlife disease. Research is also being conducted to establish standard rearing, breeding, and toxicological test methods for contaminant screening and risk assessment with amphibians. Environment Canada's contaminant research studies with reptiles and amphibians have typically examined pesticides and priority industrial contaminants, with particular studies focussed on the effects on amphibians of priority in-use pesticides as well as industrial solvents and brominated flame retardants. For example, research conducted on the Roundup® formulation of glyphosate with native amphibians showed that components of the formulation were responsible for the toxicity, and a series of research projects with the herbicide atrazine, from laboratory exposures of individual animals, to outdoor mesocosm exposures, to field work in corn growing areas, has revealed that atrazine exposure alters amphibian development and physiological processes. Both of these herbicides have also shown an ability to alter amphibian gonadal development; possible mechanisms of atrazine's observed effects are currently being studied. The current focus of the amphibian disease research program in Environment Canada is to determine the incidence, distribution and pathogenicity of disease in Canadian amphibians. Studies are also being conducted on the influence of exposure to pesticides on the rate and severity of infection. These studies are complemented by studies that relate surrounding land-use patterns to measures of amphibian health in the field. S-7

Evaluating the Effectiveness of Road Passage Structures for Freshwater Turtles in Massachusetts

Paulson*¹, David and **Paul Sievert²** (¹Department of Natural Resources Conservation, University of Massachusetts Amherst, Amherst, MA, ²U.S. Geological Survey, Massachusetts Cooperative Fish and Wildlife Research Unit, Department of Natural Resources Conservation, University of Massachusetts Amherst, Amherst, MA)

Turtles are possibly the most imperiled group of reptiles. Their life history strategies often require long migrations from hibernating sites to foraging and/or nesting areas. As their habitats become increasingly fragmented, these migrations often cross roadways, leading to the death of many adult turtles. As a long lived species, turtles have evolved a reproductive strategy that accommodates substantial mortality of eggs and juveniles. Removal of breeding-age adults, however, will rapidly drive a population to extinction. The goal of this research is to examine the effectiveness of road passage structures for freshwater turtles in Massachusetts. A successful turtle passage system requires fencing to divert turtles from the road surface to a suitably engineered tunnel through which they will pass under the road. Emphasis is placed on identifying cost-effective structures that will connect those habitats bisected by 2- and 4-lane highways. A series of experiments will ultimately determine the best tunnel design by evaluating fencing and passage dimensions with regard to their influence on the movement behavior of turtles. The first field season utilized 190 painted turtles (*Chrysemys picta*) and 31 spotted turtles (*Clemmys guttata*) to test the effectiveness of tunnel size and position. Passages were evaluated at an outdoor laboratory that allowed for rapid modification of structures to determine their influence on turtle behavior. The next two field seasons will evaluate tunnel length, tunnel openness, and fencing variables. The final season will use Blanding's turtles (*Emydoidea blandingii*) and eastern box turtles (*Terrapene carolina*) to determine the most effective passage structures. CO-6

Macrofossils and Carbon Storage over 15,000 years, Sutherland Fen, Black Rock Forest

Peteet*^{1,2}, Dorothy, **Terryanne Maenza-Gmelch³**, and **Dot Kurdyla²** (¹Lamont Doherty Earth Observatory, Palisades, NY, ²NASA/Goddard Institute for Space Studies, New York, NY, ³Barnard College, New York, NY)

Sutherland Fen formed about 12,600 C-14 years ago (15,000 calendar years), the same time as adjacent Sutherland Pond and regional deglaciation. High-resolution (2 cm) analysis of the 3.2 m fen core indicates three major macrofossils zones. The lowest (SUB-1) dated to the late-glacial, is indicative of a shallow pond characterized by *Najas*, *Nuphar*, and *Potamogeton* seeds and containing *Salix* buds, a *Rubus* seed, and *Picea glauca* needles and sterigmata from the surrounding upland. Sedimentation rates are highest in this zone. The overlying zone (SUB-2) beginning at 11,500 years ago (Holocene) indicates a continuing pond environment with aquatics such as *Najas*, *Nuphar*, and *Brasenia*, but *Picea* disappears and *Pinus strobus* dominates the lower section of the zone. Highest charcoal is found at the Holocene boundary. *Pinus strobus* needles and seeds subsequently disappear and are replaced by *Pinus rigida*, *Betula papyrifera*, and emergent wetland plants such as *Decodon*, *Cladium*, and *Cephalanthus*, as well as *Dulichium*, *Eleocharis*, and *Carex*, suggesting a shallowing pond. The very low accumulation rate in the uppermost meter of sediment indicates a fen environment dominated by *Sphagnum*, *Rubus*, *Hypericum*, *Viola*, *Chamaedaphne*, and *Carex*, though *Brasenia* and *Potamogeton* are occasionally present. Charcoal is present again in this uppermost zone. Carbon storage through time will be calculated and compared with other regional fen sites. S-1

Earthworm Distribution along Riparian Areas and Their Relationship to Streamside Salamander Diets

*Pinder**, Rebecca (University at Albany, Albany, NY)

In North American forests, exotic earthworms are expanding their ranges into forests that were previously earthworm free. Earthworms can disrupt native forests by altering understory plant composition, consuming large amounts of leaf litter, mixing soil layers, and altering nutrient dynamics. The effect of these changes on streamside foodwebs was explored in this study. While it is known that larger salamanders can eat some earthworms, it is unclear if earthworms are a significant prey resource for stream-side salamanders. Earthworm distribution and relative abundance were compared with diets of 328 streamside salamanders across 16 streams in the Helderberg and Catskill Regions of New York. Surveys revealed previously unknown distributions of two earthworm species. Preliminary observations indicate little or no earthworm predation by these salamanders, despite a high degree of co-occurrence. Although more work will be necessary for confirmation, it appears that invasive earthworms are not a significant component of these abundant predators diets. **S-12**

Predicting Threats to a Northern Population of the Marbled Salamander, *Ambystoma opacum*

*Plunkett**, Ethan, Kevin *McGarigal*, and Lloyd *Gamble* (University of Massachusetts, Amherst, MA)

I used the results of an intensive eight-year study of Marbled Salamander demographics and movement at fourteen seasonal ponds in Massachusetts to parameterize a spatially explicit metapopulation model. A drift fence enclosed each pond in the study and animals entering or leaving the ponds were caught in pitfall traps along the fence. Juveniles received a pond specific mark. Each adult was photographed and checked for marks. Individual adults were tracked by matching their photographs. Annual survival of adult females was 61%. Females took either 3 or 4 years to reach reproductive age and 11% survived to breed. I used these and many other parameters to build a stochastic model of the population at the fourteen pools in our field study. To estimate how changes in each parameter would affect the population I conducted an error analysis in which each model parameter was allowed to vary slightly among runs. Adult survival and the frequency of reproductive failure are critical to metapopulation persistence with small changes in either leading to relatively large changes in population size and persistence. This suggests that the biggest threats to Marbled Salamander populations are upland habitat loss and potential climate driven changes in reproductive failure rates. **S-3**

Rainbow Trout (*Oncorhynchus mykiss*) Habitat Utilization and Movements in First Order Streams

*Poole**, Kevin, Christopher *Mandrino*, Jacob *Ambrose*, Scott *Cornwell*, and John *Foster* (State Univ. of New York, Cobleskill, NY)

Studies of habitat utilization and movements of rainbow trout have focused on large streams and rivers, while small tributary streams have received little attention. In this study the movements and habitat utilization of rainbow trout (*Oncorhynchus mykiss*) were examined in two widely separated first order spring fed streams in the Mohawk watershed: Zimmer Creek and Brimstone Creek. Sixteen rainbow trout, ranging from 234 mm (140 gm) to 374 mm (551 gm), were implanted with radio tags. Radio telemetry was utilized to locate the trout and environmental parameters were measured at each location. Rainbow trout spent nearly 100% of their time in their home pool, remaining there during daylight, twilight and darkness. During the spring the only movement that occurred was correlated with stream discharge; with five of the trout having movements ranging from 18 to 288 m. During the summer, fall and winter trout remained in their home pool, in spite of significant fluctuations in temperature, turbidity, hydrogen sulfide, and discharge. This study demonstrated that the behavior of rainbow trout living in small tributary streams is significantly different from that describe for the habitat utilization and movements of rainbow trout in larger streams and rivers. **CO-2**

Characterization of Autecological Requirements of *Carex* Species in Glen Meal State Forest

*Quinn**, Caitlin and Karl *McKnight* (St. Lawrence University, Canton, NY)

Carex is a large and important group of sedges, nevertheless there exists very little information about why these species grow where they do. By defining the autecological requirements necessary for *Carex* growth we can begin to suggest management policies necessary for *Carex* conservation, including habitat preservation and restoration. Toward this end we began collecting abiotic and biotic measures associated with each species found at Glen Meal State Forest (St. Lawrence County). Sedge densities were measured in one meter² focal plots centered around each sedge. Three associated subplots were put out at one, five, and ten meters from the focal plot. At this time other factors were also measured including: soil depth, light

intensity, slope, canopy cover, nearest tree species, and density of other sedges in the plot. Soil samples were sieved and silt, sand, and organic matter fractions were weighed. Soil pH was also recorded. Before our research last spring it was thought that 14 *Carex* species occurred in the area. By the end of the summer we had identified 28 species, only six of which were on the original species list. We found differences in species preferences with respect to soil depth, percent of living cover, and various other biotic and abiotic factors that will be discussed at the Natural History Conference. **CO-8**

Comparison of Multivariate and Parsimony Analyses in Evaluating Bronx River Fish Distributions

Rachlin^{*1}, *Joseph W.*, *Barbara E. Warkentine*², and *Antonios Pappantoniou*³ (¹Lehman College of CUNY, Laboratory for Marine and Estuarine Research, Bronx, NY, ²SUNY Maritime College, Bronx, NY, ³Housatonic Community College, Bridgeport, CT)

A comparison of three different multivariate analysis techniques (hierarchical clustering, detrended correspondence analysis, and nonmetric multidimensional scaling) was compared with parsimony analysis to evaluate the distribution of fish species in the 29.9 km freshwater section of the Bronx River. This section of the river extends from its source in Davis Brook, Valhalla, NY to West Farms, Bronx, NY. We divided this stretch of river into 8 stations which were seasonally sampled between 2001 and 2007 yielding a total of 23 species of fish. All analytical techniques indicated a clear partitioning of stations by species, and showed that “in species’ space” the stations aligned themselves in a structured pattern that was significantly different from random expectations. Parsimony analysis, consistent with the results of the multivariate analysis techniques, further permitted a very graphic representation of species co-occurrence by station. All freshwater stations were united by the presence of two species of fish, the tessellated darter (*Etheostoma olmstedi*) and the blacknose dace (*Rhinichthys atratulus*). The white sucker (*Catostomus commersonii*) along with the pumpkinseed (*Lepomis gibbosus*) united a clade of stations from Davis Brook in the north to our Station E in the south, at Nereid Avenue at the border between Westchester and Bronx Counties. This clearly shows a separation between the stations of Westchester and those more southern stations of the Bronx, which were united in a clade by the fourspine stickleback (*Apeltes quadracus*) and the mummichog (*Fundulus heteroclitus*). **CO-2**

Serpentine Outcrops of Eastern North America: Model Habitats for Geocological Studies

Rajakaruna^{*1}, *Nishanta*, *Tanner B. Harris*², and *Earl B. Alexander*³ (¹College of the Atlantic, Bar Harbor, ME, ²University of Massachusetts, Amherst, MA, ³1714 Kasba Street, Concord, CA)

While much attention has been paid to serpentine outcrops worldwide, the literature on eastern North America is scant. Although outcrops in the region have been mapped, there have been few intensive mineralogical and pedological investigations. Soil analyses suggest elevated levels of Ni, near-neutral pH, and Ca:Mg <1, characteristic of serpentine soils worldwide. Botanical studies have largely focused on floristic surveys. To date, 750 taxa of vascular plants from 92 families have been reported. Two taxa, *Agalinis acuta* and *Schwalbea americana*, are federally endangered in the United States. Globally, *Adiantum viridimontanum*, *Minuartia marcescens*, *Pycnanthemum torrei*, *S. americana*, *Scirpus longii*, and *Symphyotrichum depauperatum* are listed as imperiled (G2) while *A. acuta*, is listed as critically imperiled (G1). *Cerastium velutinum* var. *villosissimum* is the only recognized serpentine endemic plant for the region, while *A. viridimontanum*, *Aspidotis densa*, *M. marcescens*, and *S. depauperatum* are largely restricted to serpentine. Based on current distributions, we propose that *A. viridimontanum* and *M. marcescens* be considered endemic to serpentine in eastern North America. Studies on cryptogams list 163 species of lichens and 146 species of bryophytes for the region. Compared to other regions of the world, ecophysiological and evolutionary investigations are limited. Plant-soil relations, especially the capacity to hyperaccumulate Ni and the ecological consequences of metal accumulation, are also under explored. One report from eastern Canada lists *Arenaria humifusa*, *M. marcescens*, *Packera paupercula*, and *Solidago hispida* as hyperaccumulating Ni, although the findings have yet to be confirmed. Overall, serpentine geocology in eastern North America remains largely unexplored. **CO-8**

Using Town-Wide Habitat Maps to Address Climate Change

Reinmann^{*}, *Andy* (*Hudsonia, Ltd, Red Hook, NY*)

With the growing consensus that human activities are exacerbating climate change there is a sense of urgency about greenhouse gas emissions and the carbon balance. While controlling emissions is essential, land-use management can also play a crucial role in our efforts to mitigate climate change. Habitats such as forests can be significant carbon sinks, offsetting a portion of our carbon emissions, but conversion of land from natural habitats to developed uses can release carbon stored in soil and aboveground biomass. Thus when forested areas are converted, not only does the land lose its ability to function as a carbon sink, but it can even become a net greenhouse gas producer. Since the onset of the industrial revolution, land-use

change has accounted for an estimated one-third of the anthropogenic carbon emissions. Hudsonia is now gathering data (from the literature) on habitat carbon dynamics to understand the relative effectiveness of different habitats for carbon storage. By coupling those data with information from our townwide habitat maps, we can provide landowners and municipalities with additional tools for protecting biological diversity and for mitigating climate change. Preliminary results suggest the annual carbon sequestration in forests in the Town of Rhinebeck, NY, for example, is equivalent to the amount of carbon in over four million gallons of gasoline. Further, losing a hectare of forest to development can be equivalent to burning an additional 800 gallons of gasoline annually. This number can increase by several orders of magnitude depending on the fate of the aboveground biomass. **CO-4**

Monophyly of the Genus *Pseudosinella* (Collembola: Entomobryidae), with Comments on Cave Invertebrate Conservation

Reznik, Joseph (Powdermill Nature Reserve, Rector, PA)*

Caves harbor unique non-vertebrate faunas that have evolved in a stable, yet nutrient-poor environment. The cave environment tends to select for the same morphological adaptations (i.e. reduction of eyes, loss of color) and morphologically similar taxa are often lumped together as single species. Therefore, it is essential for conservationists to understand if each reported species are widespread or each cave represents a single, endemic species, cryptically masked by morphology. The genus *Pseudosinella* (Collembola: Entomobryidae) is an excellent model to test this hypothesis because several species have been reported from caves over a broad geographic distribution. A phylogenetic analysis of the North American *Lepidocyrtus* and *Pseudosinella* was conducted to assess the monophyly of the genus *Pseudosinella* and pattern of speciation associated with the invasion of caves. The analysis included 11 species of *Lepidocyrtus* and eight species of *Pseudosinella*. Seven of the eight species of *Pseudosinella* include specimens from caves and represent three cave regions in North America (Edwards Plateau, Ozark Plateau, Heartland). The results support a paraphyletic *Pseudosinella*, suggesting the invasion of caves has been from multiple invasions into cave ecosystems. If this same pattern exists on smaller geographic scales, then conservationists may be underestimating the number of cave endemics and efforts to preserve these faunas need to be revised. **CO-7**

Stand-Level Dynamics and Consequences of the Endemic Beech Bark Disease

Robinson, George (University at Albany, Albany, NY)*

After >100 years post-invasion, the beech bark disease remains endemic across the NE range of American beech (*Fagus grandifolia*), with slowly-dying old trees serving as pest sources for new cohorts of susceptible hosts. Heritable resistant is apparent in approx. 3–5% of mature stems, and the highly-clonal nature of beech populations could lead to an expansion of resistance; however, clonal recruitment does not appear to reduce the densities of susceptible trees. Escape by distance via seed movement remains a possibility, although high rates of outcrossing limit the potential for spreading resistant genotypes. To date, many studies have reported a decline in mean stem size without declining densities of this potentially long-lived tree. Results from a 50-yr series of forest surveys in the E.N. Huyck Preserve, SW Albany County, indicate that relative basal area beech has declined by 2/3, while basal area of sugar maple (*Acer saccharum*) has doubled. Over 20 yr within stands (N = 5) of mapped and genotyped beech, mortality of susceptibles has ranged from 17 to 57%, with small clonal clusters of asymptomatic trees persisting. Broader ecosystem effects will be difficult to predict, in part due to spatially complex host-parasite dynamics. However, it appears unlikely that American beech will resume its role as an old-growth canopy dominant in its historic northern range, with implications for wildlife resources and for forest carbon flux. **S-12**

A New Stag-Moose Find in Goshen, NY

*Robinson*¹, Guy S., Alexander L. Yorke², and Mary G. Egan³ (¹Department of Natural Sciences, Fordham University, New York, NY, ²New Rochelle High School, New Rochelle, NY, ³Department of Biology and Molecular Biology, Montclair State University, Montclair, NJ)*

During the fall of 2007, bones of an extinct stag-moose (*Cervalces scotti*) became exposed on the side of a drainage ditch approximately one meter below the surface. Excavation of the site, near Goshen NY, in a fallow field on the northern edge of the Black Dirt agricultural region, revealed the skeleton of a male individual, lying within a peaty clay unit below the black peat, and overlying the glacial gray clay. The bone bearing unit contains an abundance of grass or sedge fibers, and a layer of gastropod shells of 1 cm average size. Approximately 85% of the skeletal remains of this individual have been recovered. A fragment of rib has been submitted for AMS dating. Sediment removed from the skull has a pollen spectrum reflecting an environment of the latest Pleistocene, though probably earlier than the Younger Dryas climatic reversal of 11,000 radiocarbon years before present. **S-1**

A 23-Year Assessment of Vegetation Change in the Adirondack Alpine Zone

Robinson*, Sean (University at Albany, Albany, NY and New York State Museum, Albany, NY)

The Adirondack Mountains of New York State hold the southernmost communities of alpine vegetation in the eastern United States. Containing the greatest concentration of rare and endangered species found in New York State, this ~ 12,000-year-old ecosystem is important to the ecological history and biodiversity of northeastern North America. Permanent transects were established on the summits of Marcy, Algonquin, Wright, Boundary, and Iroquois in order to document vegetation change in this poorly understood ecosystem. Based on data collected from the Marcy transect in 1957 and 1981, I predicted that while there may be little overall change in vegetation, there would be measurable changes in species composition on the 11 transects on the other four summits. Using the point-intercept method, the 11 transects were sampled in 1984 and 1994. Species occurring every 5 cm along each 30 meter transect provided 600 data points for each transect. I re-sampled these same transects in 2002 and 2007. I then compiled and compared all data collected between 1984 and 2007 in order to analyze vegetation change over this 23-year period. Results revealed that vegetation composition changed significantly, with an overall decrease in bryophytes/lichen and an increase in vascular plants, indicating that a successional change of vascular plants replacing bryophytes is occurring in areas lacking anthropogenic disturbance. Results may also indicate expansion of sub-alpine forest vegetation, in line with predictions on the effects of global warming on alpine plant communities. **S-6**

Spruce Grouse: A Mid-Successional Species in an Aging Forested Landscape

Ross*¹, Angelena M., Glenn **Johnson²**, and James P. **Gibbs³** (¹New York State Department of Environmental Conservation, Watertown, NY, ²SUNY Potsdam, Potsdam, NY, ³State University of New York College of Environmental Science and Forestry, Syracuse, NY)

Recent evidence suggests that the spruce grouse is declining across its range in New York State. In this study, I examined the influence of habitat structure and composition on the distribution and movements of spruce grouse. I surveyed previously occupied ($n = 30$) and potentially occupied ($n = 25$) lowland coniferous forest patches for spruce grouse throughout the northern Adirondack Park Region. Grouse were observed at approximately half ($n = 13$) of the sites occupied from the period of 1976–1987 and at one new site. Greater amounts of black spruce (*Picea mariana*) scrub/shrub vegetation were found within home ranges (mean = 21.9 %) versus random conifer patches (mean = 3.5 %). Stand characteristics at spruce grouse sites with persistent versus extirpated populations consisted of significantly younger (mean = 45 versus 53 years, respectively) and shorter trees (mean = 11.2 versus 12.5 m), more live foliage cover in the 0.2–1.0 m range of the vertical strata (mean = 59.7 versus 36.3 %) and more coniferous shrub cover (mean = 30.4 versus 18.7 %), but less balsam fir (*Abies balsamea*) shrub cover (mean = 3.8 versus 11.6 %). Occupied conifer patches were closer to other occupied patches than extirpated patches were to occupied patches. Findings support that (1) successional changes in the lowland boreal forest and (2) spatial arrangement of these patches in New York may influence spruce grouse site occupancy. **S-13**

GIS Analysis of Changes in Stream Fish Fauna of Schoharie County, NY

Rowe*, Matthew, Peter **Nichols**, Benjamin **Durie**, Mark **Cornwell**, and John **Foster** (SUNY Cobleskill, Cobleskill, NY)

The current trend in fisheries data analysis is geared towards stockpiling information using database applications such as Microsoft Access®. This type of storage is frequently cumbersome and difficult to interpret for those unfamiliar with the specific database. By entering survey data into a GIS map as opposed to a database application, large volumes of data can be presented and analyzed. In this study, surveys were conducted in all the major Schoharie County, NY streams in order to compare current and past fish fauna. Data were organized using ArcView® GIS software and projected onto a comprehensive map providing a user friendly visual representation of the data. Fish fauna data were collected on each stream by members of the Fisheries & Aquaculture Program using a Backpack Electrofisher for 500 seconds. Fish distribution data collected in this study were compared to data collected earlier primarily by the New York State Department of Environmental Conservation and the New York State Museum. The focus of this study was changes in species diversity and species composition. For example, Cobleskill Creek and West Creek both showed a considerable decrease in the diversity of fish species when recent data were compared to the data collected in 1934. West Kill and Line Creek showed a marked increase in diversity. Keyser Kill, Manor Kill, Platter Kill, and Mill Creek all showed very little change in either of these parameters. While significant changes were observed in different watersheds, there was no clear county-wide shift in species diversity or species composition. **CO-2**

Controlling an Invasive Grass (*Phalaris*) to Enhance Tree Establishment in Riparian Areas

Rubbo^{*1}, Jennifer and Robert P. **Brooks**² (¹Hudson River Sloop Clearwater, Poughkeepsie, NY, ²Penn State University, State College, PA)

The establishment of invasive species has caused decreases in biodiversity, degradation of wildlife habitats, economic losses, and shifts in basic ecosystem processes. Deforestation as well as increases in non-point and point source pollution has caused an increase in the establishment of the invasive grass *Phalaris arundinacea* (reed-canary grass) in the Northeastern United States. Once *Phalaris* becomes established, it inhibits the natural regeneration of trees in riparian areas. Studies on the control of *Phalaris* to enhance the establishment of native trees are needed to determine successful reforestation techniques in these systems. In this study, *Fraxinus pennsylvanica* (green ash) and *Salix nigra* (black willow) bare-root seedlings were planted into *Phalaris*-dominated plots. These plots were then subjected to treatments of herbicide, mowing, and landscape fabric. Growth data after the first growing season, as well as over-winter survival data after the first year, were collected for all seedlings. The results of this field experiment showed that controlling *Phalaris*, regardless of the method, significantly increases the growth (height) of both black willow and green ash seedlings in the first growing season. Treatments increased the over-winter survival of willow seedlings. These data indicate that the re-establishment of native tree species can be facilitated by competition control treatments. The establishment of trees in these areas may be the action needed to release these systems from internal feedbacks caused by invasive species, directing the ecosystem onto a trajectory of recovery rather than further degradation. **S-9**

The Influence of Leaf-Litter Inputs on the Food Webs of Vernal Pools

Rubbo^{*}, Michael (Teatown Lake Reservation, Ossining, NY)

Terrestrial support of aquatic food webs is becoming well established in the science of ecology. Vernal pools appear to be unproductive ecosystems that are reliant upon terrestrial inputs of energy to support their food webs, yet the functioning of this system has not been well quantified. To assess the influence of terrestrial inputs of energy to pools, we manipulated leaf-litter inputs to natural pools and monitored ecosystem functioning. Pools were consistently net heterotrophic (respiration exceeded primary production) and removing litter decreased respiration rates in pools. It is hypothesized that decreased microbial production was the mechanism for this response. To determine how litter inputs influence the food web of pools, we manipulated the amount and type (i.e., species composition) of leaf-litter inputs to artificial pools. Increasing litter inputs increased the performance of wood frog (*Rana sylvatica*) tadpoles but did not influence salamander (*Ambystoma maculatum*, *A. jeffersonianum*) larvae. Moreover, wood frog tadpoles exhibited increased performance when oak leaves (*Quercus rubra*) were added to pools as opposed to red maple (*Acer rubrum*) leaves. It appears that both the amount and type of litter inputs may cause shifts in basal energy sources in pools resulting in effects that “bubble up” the food web to amphibians. These data indicate that leaf-litter inputs are important to both ecosystem functioning and food web dynamics in pools and that shifts in forest composition via natural (e.g., succession) or anthropogenic (e.g., climate change, invasive species) factors could have implications for amphibian populations. **S-3**

Raccoon Diet and Its Impacts on Diamondback Terrapins at GNRA, New York

Rulison^{*}, Eric (Hofstra University, Hempstead, NY)

Human-subsidized species have caused numerous conservation problems, through predation and competition on native species. In Gateway National Recreation Area (GNRA) raccoons (*Procyon lotor*) have become a nuisance to visitors and staff and a threat to rare native wildlife. Since a raccoon population increase in the 1990s, raccoons have had a dramatic impact on diamondback terrapin (*Malaclemys terrapin*) nest survivorship. I conducted a diet study of raccoons from May 2006 until September 2007 to determine the impact of raccoons on later terrapin life stages. I collected raccoon scats at least once per week. Each fecal sample was weighed, dried, sieved with a number 12 US standard mesh size, dried again, and then picked apart by hand. Prey items were separated under a dissecting microscope and identified by comparison with a reference collection of items collected from GNRA. Prey items were classified to species where possible and then grouped under umbrella categories. Diet was expressed by each prey item’s frequency of occurrence and by count. Preliminary findings suggest that raccoons predate mostly during the summer on terrapin eggs. No significant findings of predation on terrapin hatchlings or adults were found. Fiddler crabs and insects make up a large part of raccoon diets year round, while fruits of autumn olive, cherry, and mulberry are large components when they are available. **CO-6**

New York Harbor Double-Crested Cormorant Behavior and Productivity as Contaminant Biomonitor

Ruskin^{*1}, **Katharine**, **Susan Elbin**², and **Katharine Parsons**³ (¹Columbia University, New York, NY, ²Wildlife Trust, New York, NY, ³Manomet Center for Conservation Sciences, New York, NY)

Following a mid-century population decline caused by elevated environmental concentrations of chemical contaminants such as organochlorine pesticides, the Double-crested Cormorant (*Phalacrocorax auritus*, DCCO) has undergone rapid population growth. Studies of Great Lakes DCCO populations clearly link contaminant concentration in water and fish with cormorant health, making cormorants an effective bioindicator for environmental quality. In 1999, Parsons analyzed heavy metals and chemical contaminants in eggs from cormorants breeding in New York Harbor. The current study preliminarily examines two alternative methods of assessing DCCO contaminant load: behavior and reproductive productivity. To assess behavior, five experimental tests were designed and executed on DCCO chicks at two study sites, Swinburne Island (Staten Island, NY) (contaminated site) and Muscote Reservoir (Ossining, NY) (uncontaminated site). Sample sizes were small (n=3–15), but one test indicated a nearly significant difference (p=0.07) in parental feeding behavior between the sites. Several tests were both inexpensive and non-invasive, making them viable alternatives to tissue sampling. We examined productivity data as an indicator of contaminant load by analyzing the 1999 Parsons DCCO data. Productivity was calculated for 80 nests from three sites with varying environmental contaminant levels: Swinburne Island, Shooters Island (Staten Island, NY), and Gardiner's Island (Long Island, NY). Forty-two eggs from the three sites were analyzed for six classes of chemical contaminants. A preliminary analysis of the relationship between DCCO productivity and contaminant load was inconclusive and did not support the hypothesis that productivity is an effective proxy for contaminant concentration. Additional analyses of these data are currently underway. **CO-9**

Ancient Evidence for New World Wolf

Rutledge^{*1}, **Linda**, **Robert Pearce**², and **Bradley White**¹ (¹Trent Univeristy, Natural Resources DNA Profiling and Forensic Centre, Peterborough, Ontario, Canada, ²Ontario Museum of Archaeology, London, Ontario, Canada)

Prior to the mid 19th century, western coyotes (*Canis latrans*) were confined to the open plains areas of western North America. In southwestern Ontario, coyotes were not reported until the early 20th century, and the eastern wolf, considered a subspecies of the gray wolf (*C. lupus*), occupied this region. To examine this we sequenced the mitochondrial DNA control region from four *Canis* teeth samples excavated from the Lawson Prehistoric Iroquoian Village in London, Ontario. Recent radiocarbon analysis from carbonized corn dates the samples at 1530 A.D. These data were used to test the hypothesis that the wolf that was present in southwestern Ontario in the 16th century was an Old World evolved gray wolf subspecies. Three of the sequences are of New World origin, and two of those are only 1 bp difference from sequences found in present day western coyotes. The fourth sequence was the same as an ancient domestic dog (*C. l. familiaris*) sequence. We therefore reject the hypothesis that the eastern wolf is a gray wolf subspecies. These results further support previous data that the eastern wolf is a North American evolved wolf, *C. lycaon*, that is more closely related to western coyotes than to gray wolves. The data are also consistent with previous historical data showing the presence of both western coyote and eastern wolf mitochondrial haplotypes in eastern wolves prior to the recent western coyote expansion. **S-2**

Updates on Vouchered Floras of Fulton, Montgomery and Otsego Counties, NY

Ryburn^{*1}, **Adam K.**, **Laurie Freeman**², **Connie Tedesco**¹, and **Donna Vogler**¹ (¹SUNY College at Oneonta, Oneonta, NY, ²Fulton-Montgomery Community College, Johnstown, NY)

Of the 62 counties of New York several have documented floras significantly lower than those of their surrounding counties. With support of the Biodiversity Research Institute we have undertaken a multiyear project to inventory ten NY counties most likely to be underreported and provide vouchered collections to local and State herbaria. Here we report on Phase II, a preliminary inventory of Fulton County with updates on Phase I, Otsego and Montgomery floras. Fulton County, on the southern edge of the Adirondacks was previously listed as containing 453 vascular plant species (<http://atlas.nyflora.org>). During the summer of 2007 over 280 plant species were collected with sufficient voucher material for the Fulton-Montgomery Community College's herbarium and an additional voucher for the State Museum. Several areas of distinctive biodiversity were identified within Fulton County and will be revisited this summer. Fieldwork in Otsego and Montgomery Counties was largely completed in 2006 but additional work now places the flora of Otsego Co. at 1071 species and Montgomery Co. at 683 species, doubling their known floras prior to 2005. Basic county-level floristic work remains an important priority for New York, as these recent studies provided the documentation of over 30 new reports of invasive species and provided vouchers with fine-scale spatial data and updated nomenclature. **CO-5**

How Do Light and Water Levels Affect a Rare Wetland Plant?

*Scanga**, Sara and Donald **Leopold** (SUNY College of Environmental Science and Forestry, Syracuse, NY)

Trollius laxus (spreading globeflower) is a rare, spring-blooming, perennial herb that occurs in open rich fens and northern white-cedar swamps. Previous studies at several sites have shown that light levels are associated with the vigor of *T. laxus* populations. However, the strength of this association has varied among sites, and observations indicate that the effect of light may be modified by water table depth. Here, we present the results of a two-year observational study conducted at a cedar swamp in central New York. At each of 30 *T. laxus* populations, we measured six variables related to plant vigor. We took hemispherical photographs over each population before and after spring leaf-out, and measured the depth to water at a subset (n=13) of the populations biweekly during the growing season. Of the six vigor variables, flower and stem counts showed the strongest positive associations with light. Overall, diffuse light had a greater effect on vigor than direct light, and despite the phenology of *T. laxus*, spring light did not show a stronger relationship with vigor than summer light. Conversely, spring water level was more strongly associated with stem and flower production than summer water level. We explore the impact on vigor of interactions between specific light and water variables. Our results will also be presented as they relate to observations from a canopy manipulation experiment conducted on *T. laxus* populations at the same site. **CO-8**

American Eel Population Structure Is Altered by an Upland Passage Facility

*Schmidt*¹*, Robert, Catherine **O'Reilly**², and Daniel **Miller**³ (¹Bard College at Simon's Rock, Great Barrington, MA, ²Bard College, Annandale, NY, ³New York State Department of Environmental Conservation, Hudson River National Estuarine Research Reserve, Staatsburg, NY)

This presentation documents two seasons of observations on an eel passage facility (eel ladder) placed adjacent to an upland mill dam on a small tributary to the Hudson River, New York. American eel (*Anguilla rostrata*) use of the ladder was significantly correlated with freshets and moon phase similar to other studies of eel migration. Most of the migrants were young (< 20 cm TL). These small eels consisted of individuals concentrated below the mill dam and recruits from below a waterfall, the next barrier downstream, in the first year of operation. In the second season, fewer small eels used the ladder and were mostly recruits from below the next barrier downstream. Several large eels (> 35 cm TL) exhibited local movements that included use of the ladder as shown by recaptures of individuals marked with coded wire tags. Operation of the eel ladder greatly reduced the density of small American eel below the mill dam. Placing eel ladders on upland obstructions has the potential to enhance the productivity of silver eels from a given stream, an important consideration in the Hudson Valley where hundreds of barriers have been constructed on upland tributaries. **CO-2**

Zooplankton Community Indices as Tools for Assessing Lake Acidification Stress and Recovery

*Shaw*¹*, William, Charles **Boylen**², and Sandra **Nierzwicki-Bauer**² (¹Marist College, Retired, 3399 North Rd., Poughkeepsie, NY, ²Darrin Fresh Water Institute, Bolton Landing, NY)

While regression analysis has been useful in revealing zooplankton recovery in Adirondack lakes and elsewhere, it requires a long term data set and is restricted to lakes in which it was generated. We developed zooplankton community indices that quantify community composition based on relative sensitivity to acidic conditions that can be applied to phytoplankton (PCI), rotifers (RCI) and microcrustaceans (CCI) in lakes not connected to the long term data base. The RCI, CCI and PCI were significantly correlated with pH, strongly indicating value in assessing acid stress or recovery of acidic lakes. We applied the rotifer and microcrustacean community indices to the AEAP lakes assessed for recovery by regression analysis. We used changes in specific community composition indices for each lake to assess biotic recovery in the study lakes displaying at least a 0.4 pH unit increase. The RCI and to a lesser extent, the CCI, corroborated significant (p<0.05) changes in community composition in 6 of the 10 lakes showing positive responses by regression analysis and no changes in community composition in the other 20 lakes. We also applied it to estimate the pH of other acidified Adirondack lakes and to a zooplankton data base outside the Adirondacks. The CCI was able to estimate the pH of 15 acidic Adirondack lakes within 0.5 pH units. The application to another data base will be reported. The plankton community indices could be a valuable tool for tracking biotic recovery in lakes and should have broad application in acidification recovery studies. **S-6**

Zooplankton Recovery in Chemically Recovering, Acidified Adirondack Lakes

Shaw^{*1}, William, Paul *Bukaveckas*², James *Sutherland*³, Charles *Boylen*⁴, and Sandra *Nierzwicki-Bauer*⁴ (¹Marist College, Retired, Poughkeepsie, NY, ²Virginia Commonwealth University, Richmond VA, ³New York Department of Environmental Conservation, Bolton Landing, NY, ⁴Darrin Freshwater Institute, Bolton Landing, NY)

Microcrustaceans and rotifers were examined from 30 Adirondack lakes from 1994–2006 as part of the Acidification Effects Assessment Program (AEAP). One goal of this effort was to generate baseline data to assess recovery should water column pH of the study lakes rise, as was expected to occur as a result of the 1991 Clean Air Act Amendments. The 28 species of microcrustaceans and 53 species of rotifers displayed differential sensitivity to acidic conditions and showed direct correlations of species richness and diversity with pH that was readily apparent during 1994–1996, the most acidic period of the study. Although some chemical recovery has occurred, only 13 lakes have shown a pH increase > 0.4 units during the 13 year period and only 3 sites exceeded pH 6.0, a critical level where community changes are believed to occur. Changes in species richness, diversity and densities of acid sensitive species were used to evaluate biotic recovery in sites exhibiting pH improvement. Acid sensitive species were identified by Detrended Correspondence Analysis (DCA). Regression analysis revealed only 3 minor improvements in community variables relative to pH or elapsed time for microcrustaceans and 5 strong and 4 weak improvements for rotifers in 9 lakes. There was 1 strong improvement for microcrustaceans alone in a 10th lake. While it is clear that some biotic recovery is occurring, overall, it appears to be insufficient to overcome individual lake variability in zooplankton species richness and community composition and the annual variation in weather and local ecological conditions. S-4

Effects of Weather on Acidity Variables and Zooplankton Densities in Adirondack Lakes

Shaw^{*1}, William, James *Sutherland*², Charles *Boylen*³, and Sandra *Nierzwicki-Bauer*³ (¹Marist College, Retired, Poughkeepsie, NY, ²New York State Department of Environmental Conservation, Bolton Landing, NY, ³Darrin Freshwater Institute, Bolton Landing, NY, ⁴Darrin Fresh Water Institute, Bolton Landing, NY)

The 30 lakes studied in the Acidification Effects Assessment Program (AEAP) were sampled June, July and August during 1994–1996 and July and August during 1997–2006. The lakes displayed an upward-downward oscillation of acidity variables pH, ANC and inorganic aluminum (Aim) and zooplankton densities from one summer to the next. Winter snow pack, spring, summer and total rainfall levels and summer average temperature were examined for possible sources of this variability. Total spring precipitation (March, April and May) was the best correlate of acidity variables and zooplankton density oscillations from 1994–2001 and total summer average rainfall (June, July and August) was the best correlate from 2002–2006. High rainfall events in either the spring or summer likely depress pH and ANC and increase dissolved inorganic Aluminum by transporting higher amounts H⁺ and Aim from the watersheds to the lakes. High rainfall events also increase the flushing rates of drainage lakes thereby increasing the outflow of plankton from the lakes. In addition to July and August collections, Brooktrout lake was also sampled in May, June, September and October from 2002–2006. The effects of weather events on Brooktrout Lake acidity variables and zooplankton densities from May to October will be reported. S-5

Population Status of the Eastern Massasauga Rattlesnake in New York State

Shoemaker^{*}, Kevin, Alex *Krofta*, and James *Gibbs* (State University of New York College of Environmental Science and Forestry, Syracuse, NY)

The eastern massasauga rattlesnake (*Sistrurus c. catenatus*) is endangered and relegated to small, isolated populations throughout most of its range. In New York, only two populations remain: at Cicero Swamp near Syracuse and at Bergen Swamp near Rochester. During 2006–2007 we used capture-recapture surveys for gravid females within open-canopy fen or shrubland habitats (gestation areas) to estimate a total of 30 (95% CI: 29 to 56) gravid females at Cicero and 19 (15 to 35) gravid females at Bergen Swamp. From these estimates we extrapolated a total population of ca. 121 individuals (81 to 331, given statistical and demographic uncertainty) at Cicero and 80 individuals (33 to 231) at Bergen Swamp (excluding neonates). We determined that an alternative method—distance sampling—is problematic for surveying these populations. Habitat quality influenced probability of massasauga encounter to a greater degree than time of day or weather conditions, although survey success was generally highest during morning hours (between 9:00 and 10:00 AM) and at air temperatures between 19 and 22 °C. Standardized, long-term monitoring of both remaining massasauga populations in New York is warranted due to small population size and on-going threats to their populations (woody plant succession and poaching). CO-1

Biological and Chemical Interactions in the Recovery of an Acid Lake, Brooktrout Lake

Siegfried^{*1}, Clifford, Jay **Bloomfield**², Scott **Quinn**², Robert **Bombard**², James **Sutherland**², Charles **Boylen**³, and Sandra **Nierzwicki-Bauer**³ (¹New York State Museum, Albany, NY, ²New York State Department of Environmental Conservation, Albany, NY, ³Darrin Fresh Water Institute and Department of Biology, Rensselaer Polytechnic Institute, Troy, NY)

Brooktrout Lake is a deep, moderate sized high elevation Adirondack lake that was characterized as a typical clear-water acid lake but which has demonstrated a remarkable recovery from acidification. ANC and pH have risen as sulfate and nitrate declined. Mean annual pH increased from less than 5.00 to a mean of 6.12. Color increased throughout the study period and was generally greater than 16 Pt/Co after 2000. Dissolved organic carbon also increased significantly. Total monomeric aluminum concentrations averaged about 9 $\mu\text{mol/l}$ in the early 1990s but declined by more than 50% by the 2000s. Total phosphorus concentrations did not exhibit significant trends over the course of the study yet chlorophyll levels increased significantly. Secchi transparency decreased significantly as chlorophyll levels increased. The higher chlorophyll per unit phosphorus, i.e., greater productivity, suggests nutrient enrichment in Brooktrout Lake. Increased productivity dramatically changed the dynamics of nitrogen. Nitrate concentrations were high throughout the year prior to 1998 but were below detection levels for much of the growing season in the years subsequent to 1998. The decrease to levels below detection is the result of biological uptake which spurred greater productivity. The uptake of nitrates also accelerated the chemical recovery of the lake by removing acid ions. The increased productivity was responsible for pH increases of about 0.5 pH units. The rapid recovery of Brooktrout Lake was not predicted by most models because they did not consider biological interactions as a mechanism in chemical recovery. Biological interactions appear to be key processes accelerating acidification recovery. **S-5**

Biological Recovery of Brooktrout Lake from the Impacts of Acidification

Siegfried^{*1}, Clifford, Scott **Quinn**², Jay **Bloomfield**², William **Shaw**³, Robert **Bombard**², Robert **Daniels**¹, James **Sutherland**², Charles **Boylen**⁴, and Sandra **Nierzwicki-Bauer**⁴ (¹New York State Museum, Albany, NY, ²New York State Department of Environmental Conservation, Albany, NY, ³Marist College, Poughkeepsie, NY, ⁴Darrin Fresh Water Institute and Department of Biology, Rensselaer Polytechnic Institute, Troy, NY)

Brooktrout Lake is a deep moderate sized high elevation lake in the Adirondack Park that was characterized as a typical clear-water acid lake which has demonstrated remarkable chemical recovery and in which significant biological changes have been documented. Fish surveys in the 1950s documented an established brook trout population in the lake but there is no information on the zooplankton, benthos or phytoplankton communities. By the 1980s the biological communities of Brooktrout Lake were typical of those of clear water acid lakes. Fish had not been present in the lake since the mid-1970s. The benthos community was also characterized by low diversity and species richness. Monitoring programs documented increasing plankton species richness through the 1990s and into the 21st century. The most dramatic biological change was the increase in productivity—reflected in decreasing transparency and increased chlorophyll concentrations. More intensive study of the plankton communities (2005–2007) confirms greater diversity and greater productivity supporting the conclusion that biological recovery is occurring. However, the biological changes are within the range of annual variation documented in other acid lakes in the region. The presence of mayflies, amphipods and fingernail clams in the littoral benthos—all of which were absent in the 1980s, suggests biological recovery has occurred but the deep water benthos community has changed little since the first surveys in 1986. Much of the biological data, although providing a basis for optimism, is inconclusive regarding biological recovery of Brooktrout Lake. However, for resource managers, the survival and growth of introduced trout may be the only indicator of resource recovery required. **S-5**

Habitat and Fall–Winter Survival of Ruffed Grouse in New York State

Skrip^{*}, Megan and William **Porter** (State University of New York College of Environmental Science and Forestry, Syracuse, NY)

In New York, the ruffed grouse (*Bonasa umbellus*) has declined by >75% statewide since the 1960s, while allowable hunting pressure has remained constant. Landscape-scale changes in habitat configuration and composition, particularly maturation of the state's forest, may affect the vulnerability of grouse to harvest or predation. Understanding the patterns in habitat quality at varying scales that influence species' abundance and survivorship is crucial to effective management. We assess the susceptibility of grouse to fall-winter mortality factors and estimate the impact of local and landscape habitat configuration on survival of radio-tagged individuals. During autumn 2007 we radio-tagged 76 grouse captured in lily-pad traps at two study areas in central New York and monitored survival via telemetry through the winter. The two study sites, in

Albany and Jefferson Counties, differ in hunting season length and forest configuration. In Albany County mature hardwood stands characterize the study area, while mixed hardwoods of varying age typify the Jefferson County site. We evaluate the impact of late-season hunting on grouse by presenting the temporal contribution of avian-, mammalian-, and human-induced mortality. We compare also the influence of forest configuration differences between study areas on mortality rates. **CO-10**

Freshwater Mussel Surveys in the Navigational Pools of the Allegheny River, PA

Smith¹, Tamara and Elizabeth Meyer^{*2} (¹Pennsylvania Natural Heritage Program, Union City, PA, ²Western Pennsylvania Conservancy, Pittsburgh, PA)

Freshwater mussel surveys prior to construction of the navigational dams in the Allegheny River documented nearly 40 species of mussels including several rare species. However, little mussel research in the lower Allegheny has occurred since that time. The goals of this work were to assess the present status and distribution of the freshwater mussel communities in five navigational pools of the Allegheny River. Transects 100-meter long were divided into 10-meter segments and were placed perpendicular to flow. Paired SCUBA divers searched each meter wide 10-meter segment for a minimum of 10 minutes. A total of seventy-five transects were sampled, including 6 transects in pool 4 (RM 26.6–27.3), 8 in pool 5 (RM 31.3–35.7), 31 in pool 6 (RM 37.0–45.2), 10 in pool 7 (RM 50.5–52.1) and 20 in pool 8 (RM 53.4–61.3). A total of 6322 live individuals were found. Twenty-four native species were found across all pools, though the species composition changed slightly as we moved upstream. Mean species richness in pool 4 was 1.9 (SE=0.3) species per transect, 5.5 (SE=0.8) in pool 5, 6.2 (SE=0.4) in pool 6, 5.1 (SE=1.2) in pool 7 and 4.2 (0.9) in pool 8. Mean abundance for pool 4 was 2.8 (SE=0.6) animals per 100 m transect, 62.4 (SE=23.9) in pool 5, 69.3 (SE=11.7) for pool 6, 115.0 (SE=174.1) for pool 7, and 133.3 (SE=39.7) for pool 8. This study examines the relationships between mussel distribution, abundances and community composition with habitat parameters such as substrate composition and maximum depth. **CO-7**

Evaluating Solutions to Human–Bear Conflict in Backcountry Areas of the Adirondacks

Smith^{*}, Zoe and Levi Sayward (Wildlife Conservation Society, Saranac Lake, NY)

In 2003 the Wildlife Conservation Society's Adirondack Program, in partnership with NYS DEC Region 5, recognized the need for proper food storage techniques to minimize backcountry encounters with black bears in the Adirondacks, specifically the eastern High Peaks. Subsequently, WCS coordinated a research project to explore the human component of the black bear–human conflict, focused primarily on learning about human behaviour in the backcountry. The Wildlife Conservation Society has conducted an in depth, multi-year evaluation of the causes and possible solutions to human–bear conflict in the eastern High Peaks of the Adirondacks. The results of the research have guided WCS efforts to educate hikers and to assist local land managers in making informed decisions about human–wildlife conflict. Additionally, data has served as a measure of food storage immediately before and following the implementation of the regulation mandating the use of bear resistant canisters in the eastern High Peaks. Finally, the results have provided information to determine the effectiveness of the regulation on minimizing bear–human conflict in the backcountry. **S-6**

A Review of Caddisfly Communities: Why They Are Model Organisms for Ecological Monitoring

Smyers^{*}, Scott (Oxbow Associates, Inc., Acton, MA)

Relatively few species of caddisflies (Trichoptera) primarily from two families, Limnephilidae and Phryganeidae inhabit standing water during their larval stage and many construct portable cases of plant material. In North America the Phryganeidae include 28 species assigned to 10 genera; however, I will focus on a subset of genera from the Limnephilidae, which include 230 species in 39 genera. Most Limnephilidae are dependent on nutrients they obtain from shredding submerged, dead, leaves from both aquatic plants or leaves that have fallen into the pond from the surrounding uplands. Although much of the nutrition is derived from fungi and bacteria that colonize the leaves, the structure and biochemistry of each species of leaf is likely to be an important variable influencing the growth of larval caddisflies. If the forest surrounding a pond changes its composition due to anthropogenic influences, disease, or natural succession, this will alter the composition of submerged leaves available for shredders such as caddisflies. I will report on an experiment demonstrating that caddisflies of the genus *Limnephilus* sp. grow faster when fed a diet that includes leaves of oaks (*Quercus* spp.) compared to a diet restricted to leaves of red maple (*Acer rubrum*). I will explain a proposed research program to focus on *Limnephilus*, which will compare and monitor the productivity of small, fishless ponds. I believe that combining experimentation with quantitative monitoring of caddisflies could be a valuable tool for biological monitoring within the northeastern US. **S-3**

Past Vegetation, Climate, and Sediment Dynamics in Mid-Hudson River Wetlands, NY

Sritrairat^{*1}, *Sanpisa, Dorothy Peteet*^{1,2}, *Dorothy Kurdyla*³, and *Tom Guilderson*³ (¹Lamont-Doherty Earth Observatory/Columbia University, Palisades, NY, ²NASA/Goddard Institute for Space Studies, New York, NY, ³Lawrence Livermore National Laboratory, Livermore, CA)

Tivoli North Bay (42° 02'N, 73° 55'W) and Stockport Flats (41° 19'N, 73° 47'W) are freshwater tidal marshes of the Hudson Estuary, NY. The investigation pollen, spores, macrofossils, charcoal, organic matter content, and radiometric dating at these sites reveal vegetational changes which reflect local and regional ecological and climatic shifts. Significant charcoal maxima at the base of Tivoli North Bay core appears to be parallel to the well-dated 500-yr charcoal maxima in Piermont Marsh (Pederson et al., 2005) downriver, implying a regional climatic impact of the Medieval Warming Interval in the lower Hudson Valley. Extended droughts in the Hudson watershed due to natural variability have major implications for future water availability in this landscape. European settlement is marked by very abrupt shift in vegetation and sediment composition as a result of deforestation, invasive species introduction, and infrastructure construction. *Betula* dominates the forest in addition to *Quercus*, *Pinus*, and *Tsuga*. Weedy and invasive species including *Typha*, *Phragmites australis*, *Ambrosia*, *Impatiens*, *Chenopodiaceae* and *Gramineae* drastically expand, replacing native ferns and sedges as human impact increases. Land use changes significantly affect sedimentation pattern, resulting in the alteration of the hydrology and composition of the wetlands. At Tivoli, higher sedimentation rate due to higher inorganic input appears to contribute to marsh composition changes as woody taxa such as *Salix*, *Cephalanthus*, *Fraxinus*, and *Vitis* appear in the wetland in the most recent centuries. Further comparison of other wetlands in the watershed will help identify regional climatic and anthropogenic changes. **S-1**

Current Range, Status, and Management of Timber Rattlesnake Populations in New York

Stechert^{*}, *Randy* (Timber Rattlesnake Consultant New York State Department of Environmental Conservation, Narrowsburg, NY)

Timber rattlesnake (*Crotalus horridus*) maximum range limits in New York began to recede following the post-hypsithermal cooling period starting approximately 5,000 years BP, culminating in the “Little Ice Age” between ca. 1300–1850 A.D. Their current range in the state has been further reduced since the arrival of European settlers by eradication programs that were conducted during emergence and ingress at the rattlesnakes’ communal overwintering den sites, and the former bounty hunting era in and around the Lake George–Lake Champlain Valley from 1896–1973. During the period between 1925 to 1980, “sport hunting” and commercial collecting for the pet trade took a significant toll from the remaining extant timber rattlesnake populations. Since the inclusion of timber rattlesnakes on the New York State List of Endangered and Threatened Species in 1983, commercial collecting has been largely eliminated. However, the reduction in collecting pressure has recently been negatively offset by an explosion of rural housing developments and second homes within the southeastern triangle of New York, i.e. the state’s primary timber rattlesnake habitat. Fortunately, core areas of contiguous rattlesnake habitat within state park lands provide a refuge for contemporary fragmented local populations that formerly comprised part of the greater Appalachian metapopulation. Management protocol of individual rattlesnake colonies outside of protected lands includes habitat surveys to locate den sites and gestating areas, radiotelemetry studies to identify movement patterns and migration corridors, and public education programs to help prevent incidental killing or collecting and promote habitat preservation. **CO-1**

A GIS Model for Determining Connectivity and Biodiversity Conservation Priorities Adjacent to State Parks

Stein^{*1}, *Amanda and John Davis*² (¹NY State Office of Parks, Recreation and Historic Preservation, Albany, NY, ²University at Albany, State University of New York, Albany, NY)

A state-wide, comprehensive biological survey conducted in 2004 demonstrated the presence and importance of biodiversity resources in the New York State Park system. Building on that effort, the NY State Office of Parks, Recreation and Historic Preservation (OPRHP) has developed a Geographic Information Systems (GIS) model to identify and prioritize land parcels adjacent to OPRHP lands, based upon their potential to protect connectivity and enhance these resources by augmenting natural habitats. The criteria used to identify priority areas—the presence of rare species or significant ecological communities, natural land cover, high vertebrate species richness, and proximity to wetlands and water resources—were chosen based on scientific literature review and OPRHP management goals and objectives. Criteria are not species-specific but rather represent a coarse-filter approach aimed at identifying areas with the richest biodiversity. In the GIS model, each criterion is represented by geospatial data in a 30 × 30 meter raster format. The sum of the raster layers yields a single output raster with a biodiversity score for all unprotected land areas within five miles of state park boundaries. Comparison

of the results with orthoimagery and expert review has demonstrated the model's ability to detect suitable areas for further investigation. Future work will consider the response of the model to changes in the relative weights of the input layers. Final products of this project will include a series of maps as well as raster data layers and GIS tools to inform Agency and local land use decision-making and planning. **CO-4**

Walleye (*Sander vitreum*) Habitat Utilization and Movements in Otsego Lake, NY

*Stich**, Daniel, Bryan **Decker**, Joseph **Lydon**, Michael **Disarno**, John **Byrne**, Isaac **Golding**, Erica **Reinicke**, and John **Foster** (SUNY Cobleskill, Cobleskill, NY)

Walleye (*Sander vitreum*) primarily occurs in warm, shallow weedy lakes, reservoirs or rivers and traditionally studies of their habitat utilization and movements have focused on these waters. Oneida Lake strain walleye have been stocked into the deep, cold waters of Otsego Lake, since 2000. In 2006 the Fisheries & Aquaculture Program, at the State University of New York initiated a study of the habitat utilization and movements of eleven, 4–7 year old walleye in Otsego Lake using acoustical tags. Walleye spawned from 04/07/06–04/11/06 and 04/06/07–04/25/07 at temperatures of 4.5–9.2 °C and depths of 0.24–1.5 m. The minimum greatest distance traveled during the spawning season for a female was 5.8 km and 10.8 km for a male. Walleye captured in the spring of 2006 returned to the exact spawning location in 2007 and returned to their initial position in the lake following spawning. Walleye movement was greatest during the early summer, with walleye moving into deeper water during the fall. Most walleye were found to move constantly over a 24-hour period. For example, on 21–22 August 2007 the diel movements of 5 walleye averaged 247 m/hr, resulting in an average of 5670 m travelled in a day. Hourly movements and habitat utilization of walleye over a 24-hour period were significantly higher than indicated by daily position data from this study and previous studies. Overall, walleye behavior in Otsego Lake was substantially different from that described for other bodies of water, such as nearby Honeoye Lake where the same Oneida Lake strain was stocked. **CO-2**

Life in the Cold: A Biochemist's Perspective on Animals in Winter

*Storey**, Kenneth B. (Institute of Biochemistry, Carleton University, Ottawa, Ontario, Canada)

Winter temperatures below 0 °C pose a severe challenge to animal life. For many species, food supplies fail, the risk of freezing is high, endotherms are plagued by massive energy costs to stay warm, and ectotherms have low metabolic rates that are not conducive to growth and development. Some organisms escape winter by migration or avoid severe cold exposure by retreating under water or deep under ground but many must employ biochemical strategies to preserve life. My lab explores the metabolic and gene adaptations that support two main strategies of animal cold survival: mammalian hibernation and ectotherm freeze tolerance. Our hibernation studies analyze the regulatory mechanisms that allow ground squirrels and bats to sink into cold torpor, coordinating and reprioritizing all cell functions so that metabolic rate drops by >95%, body temperature falls to near 0 °C, and tissue viability is preserved over many weeks. Our research on frogs and insects explores life in a frozen state—how organisms deal with the consequences when 65–70% of total body water freezes. Survival requires extensive metabolic adjustments to deal with issues including oxygen deprivation when blood freezes, extreme cell shrinkage caused by water loss to extracellular ice masses, and physical damage to tissues by ice crystals. Hibernation and freeze tolerance are not only fascinating natural phenomena that are critical to the survival of hundreds of species in temperate and polar environments but the mechanisms identified from our studies have key applications in medicine for the long term preservation of human tissues and organs for transplant. For more information, go to www.carleton.ca/~kbstorey. **Keynote**

Zebra Mussel Grazing and Hydrology Jointly Control the Hudson River Food Web

*Strayer**, David L., Michael L. **Pace**, Nina F. **Caraco**, Jonathan J. **Cole**, and Stuart E.G. **Findlay** (Cary Institute of Ecosystem Studies, Millbrook, NY)

We analyzed long-term data on the food web of the freshwater tidal Hudson River to assess the importance of, and interactions between, hydrology and zebra mussel grazing. Both freshwater inputs and zebra mussel grazing have strong, pervasive effects on the Hudson River food web. High flow tended to dilute most parts of the food web. High grazing also reduced populations in the planktonic food web, but increased populations in the littoral food web, probably as a result of increases in water clarity. The influences of flow and zebra mussel grazing were roughly equal for many variables over the period of our study. Zebra mussel grazing made phytoplankton less sensitive to freshwater inputs, but water clarity and the littoral food web more sensitive to freshwater inputs, showing that interactions between these two controlling factors can be strong and varied. **S-12**

Competitive Advantages and Nutrient Limitations of Eurasian Watermilfoil

*Swinton**, Mark W. and Charles W. *Boyle*n (Darrin Fresh Water Institute, Department of Biology, Rensselaer Polytechnic Institute, Troy, NY)

Competitive advantages possessed by invasive species encourage aggressive growth that ultimately results in loss of native species diversity and richness. Eurasian watermilfoil (EWM), *Myriophyllum spicatum* L., is a non-native invasive macrophyte that has altered, and in some instances, decimated native species on several trophic levels. In this study, we examined nutrient utilization advantages of EWM over native macrophytes, differences in tissue nutrients between native species and EWM, as well as the difficulty in determining nutrient limitations using plant tissue nutrient concentration. EWM has the ability to utilize porewater phosphorus earlier in the season than native macrophytes; consequently porewater phosphorus concentration in areas of dense EWM growth is more dramatically impacted than in comparable native macrophyte areas. Carbon, a more structural component, is stored in EWM tissue in greater quantities relative to nitrogen and phosphorus than in native macrophytes, suggesting an over-wintering advantage. Nitrogen and phosphorus content of most natives and EWM were greater in areas dominated by native plant growth than EWM growth. Evaluating nutrient limitation in select macrophyte species, we found phosphorus content of EWM to be below critical values while native species analyzed were far above. All macrophyte tissue tested was above reported critical values for nitrogen. Examining nitrogen to phosphorus ratios of macrophyte tissues, only EWM was within the accepted range. Native species were determined to be nitrogen limited, but adequate nitrogen was always available for macrophyte uptake and utilization. One should employ caution when utilizing tissue nutrient data to determine nutrient limitations. S-9

Jewel or Weed: Research on an Early Detection Species

*Tabak**, Nava (Hudsonia Ltd., Red Hook, NY)

Research on the potential invasiveness of species that are not yet widespread in their introduced range can be particularly informative for resource managers who must prioritize invasive species control efforts. A study of the invasive potential of *Impatiens glandulifera* (Ornamental jewelweed) in New England provides an example of research methods that can be applied to such “early detection” species. Germination and growth characteristics of *Impatiens glandulifera*, an annual native to the Himalayan region, were experimentally compared with those of the common and widespread native congener *Impatiens capensis* (Spotted jewelweed). The two species had generally similar responses to light and moisture gradients, but *I. glandulifera* plants had greater above-ground biomass and relative growth rate, and survived drier soil conditions than *I. capensis*. *Impatiens glandulifera* seeds also had higher overall germination rates, and contrary to the seeds of *I. capensis*, were tolerant of desiccation prior to the necessary dormancy-breaking cold period. Large scale models using climatic variables and the plant’s current distribution in New England predicted a larger range than is currently known in these states. Observations of naturalized populations of *I. glandulifera* did not reveal any limiting factors such as heavy herbivory or a lack of pollinators. Given these results, it is likely that *I. glandulifera* will continue to expand its range in the northeast. While not a substitute for a precautionary approach to new plant introductions, such research can be invaluable for informing management decisions. S-11

Effects of Forest Management on the Vegetation of a Forested Urban Park

*Tessier**, Jack (SUNY Delhi, Delhi, NY)

Forested urban parks represent an oasis amid the city setting. The maintenance of forest character in these locations is therefore critical to their utility for the local residents. Forest management may play an important part of this maintenance. I compared the standing vegetation and propagule bank in an urban forested park in New Britain, CT the summer before and the second summer after a logging operation, using a systematic sampling technique. An increase in non-forest vegetation was positively correlated with the reduction in basal area among plots. The cover of poison ivy was significantly greater after the cut than before the cut. In the propagule bank, the percent of species that were non-native as well as the percent of species that were non-forest species was significantly correlated with loss of basal area among plots. The Sorenson coefficient of community similarity comparing the standing vegetation at the two time periods was 0.769, but that for the propagule bank was 0.308. Therefore, while there have been some changes in the standing vegetation as a result of cut, there is expected to be a large change in the character of the forested park in the future due to changes in the propagules available to re-stock the stand. Forest management practices in urban settings should therefore consider the volatile settings of these forested refuges and minimize basal area removal in any harvesting operation. CO-5

Microbial Carriage by Spiders (Araneae) from Different Rural Habitats of New York

*Trachman**, Julie and Vladimir *Ovtcharenko* (Hostos CC of the City University of New York, Bronx, NY)

Spiders are a diverse and relatively ancient group of invertebrate organisms that, as predators, play an important role in our ecosystem. However, little is known regarding their interactions with microorganisms in their environment. A few isolated reports indicate there is a possible role for spiders introducing bacteria such as *Clostridium perfringens* and *Photobacterium* into human spider bite wounds. Even fewer reports describe the carriage of microorganisms on or in spiders in their natural settings. In order to determine whether spiders found in their natural environments carry microorganisms on their exterior surfaces, eight different spider species were collected in rural settings located just upstate of New York City. The spider habitats ranged from soil and leaf litter in wooded areas to tall grasses in fields. The majority of spiders associated with soil and leaf litter, *Gnaphosa muscorum*, *Pardosa moesta*, *Trochosa terricola*, *Pisaurina mira*, carried only bacteria. *Micaria pulicaria*, a leaf litter dweller, like two of the 3 grass-associated Salticidae, *Phidippus audax* and *Sitticus fasciger*, carried fungi. The other Salticidae spider, *Salticus scenicus*, did not yield microorganisms of any type. Interestingly, the spiders carrying bacterial organisms had different predominating genera. *G. muscorum* carried mainly Bacillus- and Actinomycetes-type bacteria. With *P. mira*, bacillus predominated along with an occasional pseudomonad and others. *P. moesta* carried mainly a heavily encapsulated microorganism as well as a second—with both possibly being pseudomonads. *T. terricola* had the most diverse mixture of the bacteria—with some bacillus species as well as pseudomonad types. CO-7

Invasive Species Management and Mitigation Area Permit Requirements: Squaw Island Park, Buffalo, NY

*Traynor**, Mike (Malcolm Pirnie, Inc., Albany, NY)

Wetland mitigation areas at Squaw Island Park (formerly the site of Squaw Island Landfill) were monitored for compliance with nationwide permit conditions between 2003 and 2007. In accordance with permit requirements, monitoring data have been collected for the purpose of reporting during the first (2004) and third (2006) years; and will be collected in the fifth year (2008) of the project. Vegetation, soils, and hydrology were examined for evidence of wetland characteristics according to methods outlined in the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual. To aid in determining whether the mitigation areas were on trajectory toward permit requirements during the life of the permit, a plant community weighted average index was developed using species percent cover data. Preliminary results based on data collected in 2006 and limited data from 2007 indicate that the site is moving toward satisfying permit condition requirements. This is due in part to aggressive invasive species management efforts begun in the spring of 2006. Percent cover, desirable species per plot, and total mitigation area occupied by desirable species have all increased since invasive species were first addressed. Continued invasive species management efforts at this site have been ensured by a recent NYSDEC Invasive Species Eradication Program grant. S-10

Invasion of Exotic Species in Already Stressed Urban Ecosystems

*Tripp, Kim and Jessica Browning** (Jamaica Bay Institute, Gateway National Recreation Area, Brooklyn, NY)

Second only to habitat loss, exotic invasive species are the critical threat to global biodiversity. They cause billions of dollars worth of damage to our agriculture, fisheries, and forest economies; and, impose major threats to human health. With exotic species invasion so prevalent throughout the country; how vulnerable are the urban environments? In very similar ways, urbanization wreaks comparable havoc on ecosystems as do exotic species. Urbanization encroaches on limited habitat; reduces biodiversity; reduces food sources for wildlife; alters natural ecosystem processes; and, disrupts native plant-animal associations such as pollination and seed dispersal. Urbanized environments are also quite vulnerable to exotic species invasion; and (most damaging) establishment. As major commerce hubs, urban areas are ports to thousands of commercial ships traveling across the globe; and carrying many exotic flora and fauna stowaways onboard and in their ballast. Habitat fragmentation and the impacts of edge effect also leave urban environs vulnerable to exotic species invasion. How do these additive impacts of invasive species and urbanization alter our city environs? Can natural processes still be sustained in these stressed microcosm habitats? How can we mitigate the many threats and decrease the vulnerability of the precious few natural areas within our cities? S-12

Is Water Table a Driver in Bog Turtle (*Glyptemys muhlenbergii*) Movements?

Utter*, James (Purchase College, SUNY, Purchase, NY)

Movements of animals are influenced by variations in the physical environment. “Natural” variation that is predictable is often mirrored in predictable patterns of an animal’s habitat use. Human activities that change these key variables can impact animal movements, sometimes depressing survivorship or reproductive success. For rare species, protection may depend on predicting the environmental changes, understanding linkages to target species, and effectively communicating such information to decision-makers and regulators. In southeastern New York, the bog turtle is most successful in groundwater-fed calcareous fens. Although not requiring standing water throughout the year, data obtained from radio-tracked individuals in seven different populations, clearly indicate that animals travel to locations where ground water is close to the surface. Some move to reliable ground-water outflow sites, others move down-slope, and some find microsite depressions that penetrate the water table. Whether this habitat selection is based on temperature regulation, moisture balance, or prey (slug) activity is unclear, but it is evident that ground water level is a driver in summer movement of ‘our’ bog turtles. Large scale developments with high capacity wells may draw down ground water levels, affecting the hydrology of nearby fens and other shallow, ground-water fed wetlands. During drought years such anthropogenic effects could be especially detrimental, increasing both extent and duration of the stress. For bog turtles, most of the summer ‘refuge’ sites appear to be traditional, but if nearby wells further depress the watertable, animals will have to move further to find the same conditions, thus increasing energy drain, risk of road fatalities, and possibly other morbidity factors. **CO-6**

The Biodiversity of Columbia County NY Ponds in Relation to Land Use

Vispo*, Conrad and Claudia Knab-Vispo (Farmscape Ecology Program, Hawthorne Valley Farm, Ghent, NY)

Ponds have proliferated regionally; landscaping has replaced agriculture as the driving impetus. We studied 90 permanent, open-area ponds around Columbia County, N.Y. Approximately half of these were on farms. We surveyed for aquatic and terrestrial plants, amphibians, odonates, and butterflies at each pond, took sediment cores, and collected water samples for chlorophyll analysis. We evaluated land use through aerial photographs. Lack of independence means our correlations are only suggestive. About 41% of the ponds studied were classified as “eutrophic”. Iron, lead, manganese and phosphorous often exceeded levels believed to have ecological effects; mercury was not measured. We found 158 wetland plants, 41 aquatic plants, 10 species of amphibians, 47 odonates, and 39 butterflies. Despite being permanent ponds, vernal pool amphibians occurred in more than 1/3 of the ponds. Sediment contamination increased as nearby houses increased and decreased as pH and sediment depth rose. Eutrophication increased with nearby forest, lawn and ploughed land. Native wetland and aquatic plant diversity increased as wetlands adjacent to the ponds increased. Invasive plant species increased in and around more alkaline ponds. The abundance and diversity of amphibians decreased as adjacent non-agricultural land use increased. When fish were present, amphibians increased with increased shoreline vegetation. Odonates and wetland butterflies were most diverse when ponds were surrounded by grazed pastures. The overall diversity of all taxa we assessed was positively related to pH and negatively related to non-agricultural development. In most cases, ponds in lawns were less diverse than farm ponds, probably because of intensive landscaping. **CO-4**

The Status of the Lycopod *Spinulum canadense* in New York

Werier*, David (Botanical Consultant 30 Banks Rd., Brooktondale, NY)

The boreal and alpine lycopod *Spinulum canadense* (syn: *Lycopodium canadense*) is a taxon that has often been misinterpreted. Some characters that were previously used to distinguish this species from the closely related *Spinulum annotinum* were either uninformative or misleading, and newly discovered diagnostic characters (e.g. stomata distribution) are recommended. A putative hybrid between *S. canadense* and *S. annotinum* further obscured the distinction between these two taxa. As a result, *S. canadense* (as *L. annotinum* var. *pungens*) was either lumped under *S. annotinum* (as *L. annotinum*) or shown to be a widely distributed taxon in New York. Field work and herbarium research were needed to determine the distribution of *S. canadense* in New York, assess its rarity in the state, and determine if any hybrids occur here. Field work in 2007 confirmed that *S. canadense* is extant in New York on at least two of the high peaks in the Adirondacks (Mt. Marcy and Mt. Skylight). Herbarium work revealed that in New York, this species occurs almost exclusively on the high peaks in the Adirondacks, although one collection was found from a peatland in St. Lawrence County. A putative hybrid, recognized by intermediate morphology, was also found from the high peaks. Many specimens of *S. annotinum* were, at least at one point, misidentified as *S. canadense*, accounting for the previous assessment that *S. canadense* is widespread in New York. Existing data suggest that this species is a rarity in New York and should be given the Heritage rank of S1S2. **CO-5**

Mile-a-Minute Vine in the Hudson Valley: A Collaborative Response

*Weyeneth**, Laura and Emilie *Hauser* (Hudson River National Estuarine Research Reserve, Staatsburg, NY)

Mile-a-minute vine, *Persicaria perfoliata* (formerly known as *Polygonum perfoliatum* L) was accidentally introduced to the United States in the 1930s and is found in the Mid-Atlantic states. Except for small occurrences in Massachusetts and Rhode Island, the vine extends north to Orange and Dutchess counties in the mid-Hudson Valley and to Fairfield and Litchfield counties in Connecticut. The annual vine, native to East Asia, can grow up to six inches a day, has scandent growth and can shade out most vegetation. Seeds can persist for up to seven years, so a multi-year effort is required to deplete the seed bank. Seeds are believed to be transported by water and birds. Early detection and rapid response of mile-a-minute infestations in the Hudson Valley can prevent the spread of this vine to other parts of New York. In 2006, an ad hoc collaborative group, made of more than 15 agencies and not-for profits began working together to set up a volunteer system for reporting, mapping, monitoring and controlling mile-a-minute infestations. Twenty-six infestations were reported in 2007, including several acres in the upper watershed of the Fishkill Creek in Dutchess County and 11 new sites in northern Orange County. Control efforts have concentrated on hand-pulling of vines by volunteers and herbicide application by property owners. The collaborative effort which includes a paid intern and a system of county coordinators and volunteer weed watchers and busters could be duplicated elsewhere. **S-10**

The New York Dragonfly and Damselfly Survey: Project Update and Preliminary Results

*White*¹*, Erin and Paul *Novak²* (¹New York Natural Heritage Program, Albany, NY, ²New York State Department of Environmental Conservation, Schenectady, NY)

The New York Dragonfly and Damselfly Survey is a four-year atlas (2005–2007) funded by the State Wildlife Grants Program and implemented by the New York Natural Heritage Program. The major objective of the project is to document the distribution of dragonfly and damselfly species that occur in New York State. In addition, intensive survey efforts are directed toward threatened damselfly species and habitats that support odonate Species of Greatest Conservation Need (SGCN), as specified by the New York Comprehensive Wildlife Conservation Strategy. We currently have over 300 volunteers registered, along with several NY Natural Heritage staff and contractors contributing to the project. All data are submitted on a yearly basis and compiled in a database by NY Natural Heritage staff. Over 150 new county records representing 90 odonate species, including SGCN and two new species for New York, have been confirmed as a result of this survey. Knowledge of species' county distributions throughout the state and the number of odonate species per county can be gained from this database and added to existing statewide odonate distributional data. At the survey's conclusion, a final publication will outline project results including species distributions and discussions of odonate species known to occur in New York. **S-13**

Chittenango Ovate Amber Snail: Current Results from the Field

*Whiteleather**, Kristian (State University of New York College of Environmental Science and Forestry, Syracuse, NY)

The first, post-rockfall season of a mark-release-recapture (MRR) study of the endangered Chittenango Ovate Amber Snail (COAS) (*Novisuccinea chittenangoensis* Pilsbry) was conducted at Chittenango Falls, New York over a ten week period between 28 June and 30 August 2007. This study was a continuation of the work performed in the 2002–2005 field seasons with the unique position of having taken place after a potentially damaging rock fall into the center of the COAS habitat. A total of 282 individual COAS were captured and marked during the official survey period in 2007. In addition, we had 52 encounters with animals too small to tag. As per the protocol, 1018 invasive snails (*Succinea sp. B*) were captured and removed from the area. After 10 samples, population size was estimated at 455 individuals (Schumacher-Eschmayer Estimate: SEE) with a 95% CI of 377–534 animals. Our concern was that the rockfall of 2006 would have severely impacted the already limited habitat available to COAS in such a way that the population size and structure would suffer. The results, while comforting, are not conclusive. The work with NY State's endemic snail will continue in 2008 as a collaborative effort of the US Fish and Wildlife Service, the NY State Department of Environmental Conservation and the State University of NY's College of Environmental Science and Forestry. **CO-7**

iMapInvasives: A Web-Based Approach to Invasive Species Data Aggregation, Mapping and Decision-Making

*Wilkinson**, Meg (NY Natural Heritage Program, Albany, NY)

A crucial part of invasive species management is having good location information. The New York Natural Heritage Program, the Florida Natural Areas Inventory, The Nature Conservancy and NatureServe are working together to develop an on-line, GIS-based mapping tool to assist on-the-ground land managers and others working on invasive species. This national prototype will allow users to view and search data and will allow trained individuals to enter data on-line using a password. Learn how iMapInvasives will serve the needs of those working on invasives in New York and how you can participate. Learn how other states can join iMapInvasives. Anyone interested in collecting, viewing and utilizing invasives species data is encouraged to attend this session. **S-11**

Use of Anthropogenic Nesting Areas by *Terrapene c. carolina* in Central Massachusetts

*Willey**, Lisabeth and Paul *Sievert* (University of Massachusetts, Amherst, MA)

Eastern box turtles (*Terrapene c. carolina*) may be limited by suitable nesting and early successional habitat near the northern extent of their range in Massachusetts. To evaluate the willingness of box turtles to utilize anthropogenic nesting habitat, existing nesting habitat at two sites in central Massachusetts was enlarged over the winter through the removal of adjacent forest. The cleared forested areas were located immediately adjacent to open sand areas used by turtles over the previous summer. Radio-transmitters were placed on 6 and 12 turtles at each site and animals were located twice per week during the years prior to and immediately following clearing. Home ranges were compared before and after clearing. Many turtles incorporated the cleared area into their home range in the second year of study, and females nested in the cleared areas at both sites. Animals will be followed for one additional year during summer 2008. Potential conservation applications will be discussed. **CO-6**

Genetic Characterization of the Eastern Coyote

*Wilson**, Paul, Bradley *White*, and Walter *Jakabus* (Trent University, Peterborough, Ontario, Canada)

The eastern coyote is considerably larger than its western counterpart with recent reports from areas such as upper New York State describing animals reaching the size of eastern wolves in Algonquin Provincial Park. The first sightings of the eastern coyote were in the beginning of the 20th century as western coyotes expanded into areas inhabited by eastern wolves and there has been considerable debate over the role that hybridization with wolves has had on its origin. A number of other hypotheses have been proposed to explain the larger size of the eastern coyote including prey selection and hybridization with dogs. This study describes genetic analyses of mitochondrial DNA and microsatellite loci from over 600 wolves and coyotes. Individual-based clustering analyses of genotypes and the relationship of genetic structure among populations grouped eastern coyotes separately from other coyotes. No eastern coyotes contained grey wolf or dog mitochondria and eastern coyotes were divergent from western wolf populations supporting minimal inter-breeding with these canids. Admixture with eastern wolves was observed in Ontario demonstrating bi-directional introgressive hybridization. Given the historic reports of coyote expansion and eastern wolf extirpation, genetic evidence of eastern wolf and coyote hybridization and the some divergence of eastern coyotes from other coyotes and eastern wolves, the most parsimonious model is that expanding coyotes hybridized with remnant eastern wolves in areas such as Ontario and continued expanding eastward as a reproductively viable hybrid population in the absence of any significant representation of the parental species. **S-2**

Demography and Conservation of Hybrid Blue-Spotted Salamander Populations in Massachusetts

*Windmiller*¹*, Bryan and Rebecca *Homan*² (¹Hyla Ecological Services, Inc., Concord, MA, ²Denison University, Granville, OH)

The basic natural history of hybrid populations in the *Ambystoma jeffersonianum* – *A. laterale* complex is not widely described in published literature. We report on data obtained from surveys of 22 populations of salamanders within this complex from eastern Massachusetts; the distribution, demography, and morphology of studied salamanders suggest that they are mixed-ploidy populations with *A. laterale* genotypes predominant. Sex ratios varied widely, but samples showed a strong female bias in most cases. When compared to the more common and widely distributed *A. maculatum* populations, blue-spotted salamander hybrids showed extremely high levels of embryo mortality. Necropsy data also revealed that females leaving their breeding pools may retain a large proportion of mature embryos in their oviducts. Relative to spotted salamanders, blue-spotted salamanders from 2 adjacent sites matured somewhat earlier, were shorter-lived, and less likely to skip reproductive

opportunities. Our data further demonstrate that field surveys for this hybrid complex, listed as a protected species in much of its range, can easily fail to detect even moderate-sized populations. Egg mass surveys were found to be highly unreliable indicators of the presence of *A. laterale* complex individuals and we provide a comparison of breeding population size estimates using minnow trap and drift fence surveys. Finally, we describe the relative tolerance of this species complex to human habitat disturbance and attempt to offer a possible explanation to the apparent contradiction between the relative rarity of populations of blue-spotted salamanders and their ability to persist in many degraded habitats. **S-3**

The Role of Prediction in Prey Interception in Dragonflies

Worthington^{*,1}, **Andrea and Robert Olberg**² (¹*Siena College, Loudonville, NY*, ²*Union College, Schenectady, NY*)

In an act of elegant precision, a dragonfly swoops up to pluck a flying insect from the air. The entire event, from takeoff to capture, often takes only one or two tenths of a second. It's over so quickly that the flying insect usually takes no evasive maneuvers. By the time we humans can register that we saw something happen, it's over. How does the dragonfly recognize its prey? How does it so quickly send the necessary information from eyes to brain to wings to guide the behavior? How does it so accurately plot its deadly course? These questions and more have occupied our interest for much of our professional lives as we have sought to understand the neural basis of this deadly accurate behavior. Our attempts to answer these questions has led us from inserting tiny electrodes into the dragonfly brain, to videotaping the natural behavior in the field, and finally to dissecting the behavior in a flight cage with high speed video. **CO-3**

Effects of Earthworms on Salamanders, Litter Decomposition, Invertebrates and Water Quality

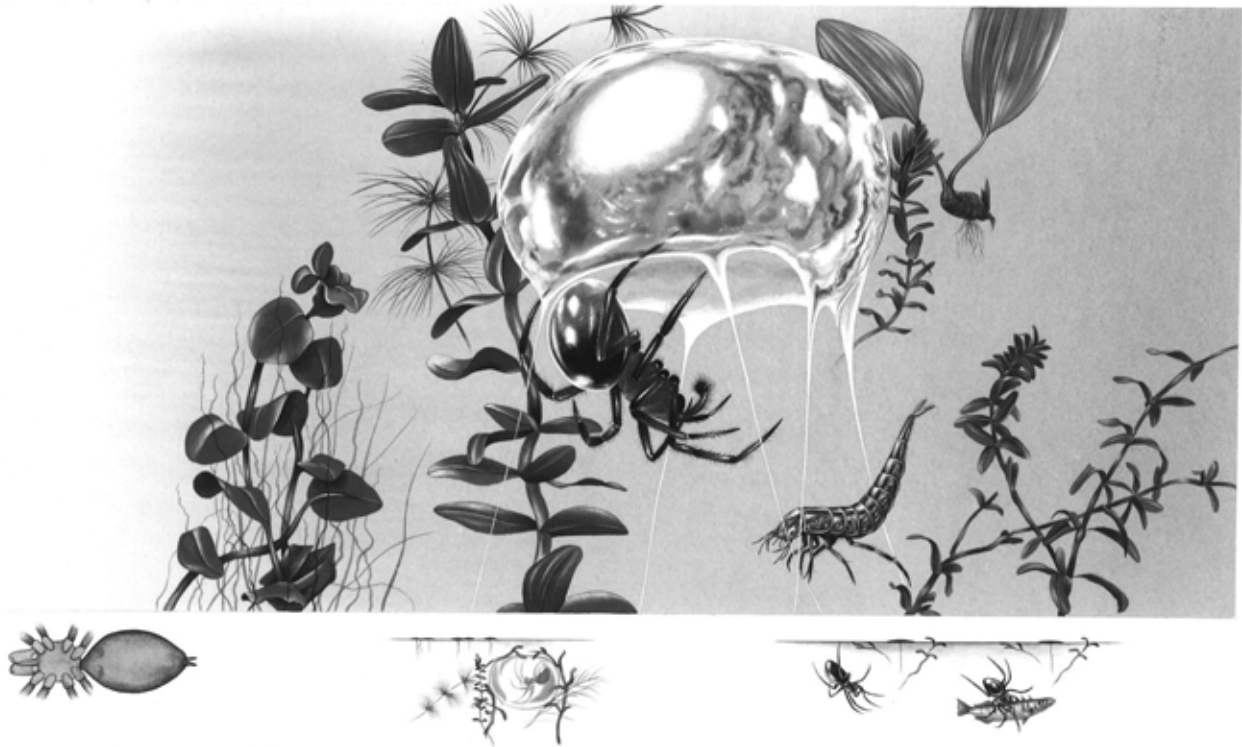
Wyman^{*}, **Richard** (*Huyck Preserve, Rensselaerville, NY*)

New research demonstrates that invasive earthworms can alter forest floor ecosystems, suppressing native herbs and modify soil properties. In our experiments on the detritus food web in southwest Albany County, we have begun finding strong earthworm effects in both litter decomposition rates and diversity of leaf litter biota. We find negative relationships between earthworm abundance and invertebrate biodiversity. In addition, new anecdotal evidence indicates that earthworms are expanding into regions without previous reports, including parts of the Catskill range. We report on two lines of research into (1) more detailed relationships between invasive earthworms and biodiversity of detritus food webs, and (2) the current ranges and habitat specificities of two earthworm species in the Catskills. Results from field surveys will be used to develop predictive habitat models for larger-scale inventories. Results from the experimental work will be used to predict watershed-level effects of invasive earthworms. This would represent the first work of its kind in New York State. **S-12**

Bird Ranges Shifting Polewards in New York State

Zuckerberg^{*}, **Benjamin**, **William Porter**, and **Anne Woods** (*State University of New York College of Environmental Science and Forestry, Syracuse, NY*)

Warming of the northern hemisphere over the past half-century has spurred research on the responses of species to global climate change. Although several model-based studies predict large shifts in avian distributions throughout the Northeast, empirical studies quantifying potential range shifts in relation to regional warming are rare. The New York State Breeding Bird Atlas represents one of the few ecological databases in the world by which shifts in breeding bird ranges can be assessed. Our objective was to analyze changes in three distinct geographic range components (center of occurrence, range boundaries, and states of occurrence), within an information-theoretic framework, to test hypotheses that species are moving polewards and up in elevation. Species included in this analysis showed a positive latitudinal range shift in their center of occurrences of 3.58 km ($n = 139$, $Prob(H_a|data) = 0.92$). We found that, after controlling for range expansion and contraction, the northern margins of southerly species ($n = 42$) and the southern margins of northerly species ($n = 41$) have moved northward an average of 15.9 km ($Prob(H_a|data) = 1.00$) and 11.4 km ($Prob(H_a|data) = 0.75$), respectively. We found no evidence for systematic shifts in elevational boundaries. We also found that patterns of distributional change can be complicated by biases in sampling effort. Although a causal relationship between climate change and range shifts is difficult to establish, this repeated pattern of a northward shift in bird ranges in various geographic regions of the world is compelling. **CO-10**



Fishing Spider
(Argyroneta aquatica)

Purchase Award Winner (1 of 7) from Focus on Nature IX (2006)

Artist: Alan Male, Truro, Cornwall, England

Watercolor/gouache on paper (17 × 10 inches, Schollerhammer), 2000

Abstracts for Poster Presentations

Fifteen Years of Purple Loosestrife Biological Control, 1992–2006

Adams*¹, David, Rich **Malecki**², and Bernd **Blossey**³ (¹New York State Department of Environmental Conservation, Albany, NY, ²New York Fish and Wildlife Cooperative Research Unit, Ithaca, NY, ³Cornell University, Ithaca, NY)

Purple loosestrife (*Lythrum salicaria*) is an exotic invasive perennial, which has been documented to negatively impact wetland dependant wildlife, such as, Black Tern (*Chlidonias niger*) and Bog Turtle (*Clemmys muhlenbergii*). After decades of unsuccessful attempts to control purple loosestrife using mechanical, physical, and chemical means, the successful development of biological control program by an international team of scientists in the early 1990s offered a new opportunity to better manage this pest plant. Following approval by federal and state regulatory agencies, more than 1 million leaf eating beetles (*Galerucella californiensis* and *G. pusilla*), 100,000 root feeding weevils (*Hylobius transversovittatus*), and 25,000 flower feeding weevils (*Nanophyes marmoratus*) were released throughout New York State between 1992 and 2006. Monitoring protocols developed by Cornell University staff have been implemented to assess program effectiveness and evaluate changes in the vegetative community. Although monitoring results are promising, and wildlife have returned to previously abandoned sites, the initial objective, to reduce purple loosestrife abundance to approximately 10% of its current level over approximately 90% of its range, remains an illusive goal.

Japanese Stilt Grass Provides Alternative Habitat for Anurans in Suburban Northeastern Forests

Aschen*, Seth, Christopher **Nagy**, Rod **Christie**, and Mark **Weckel** (Mianus River Gorge Preserve, Bedford, NY)

Japanese stilt grass *Microstegium vimineum* is native to Asia, yet has become a successful invader in the Eastern United States. Stilt grass can grow to be more than three feet tall and can form dense mats of vegetation on the forest floor. This dense ground cover may positively affect ground anuran communities particularly in those suburban forests where intense browsing by white-tailed deer *Odocoileus virginianus* have eliminated native vegetation. The objective of this project was to model the effects of stilt grass and selected microclimate conditions upon capture rates of common anuran species compared to non-invaded sites in a suburban nature preserve in Bedford, New York. Pitfall trap arrays were established in invaded and non-invaded areas and monitored during the summers of 2006 and 2007. Greater numbers of pickerel frogs *Lithobates palustris*, American toads *Bufo americanus*, and wood frogs *Rana sylvatica* were caught in stilt grass plots vs. non-invaded plots. AIC was used to select and interpret models based on stilt grass presence/absence and relevant microclimate conditions for each species.

Predicting Potential Habitat for Selected Rare Species Using GIS Habitat Classification

Batcher*¹, Michael and James **Beemer**² (¹1907 Buskirk-West Hoosick Rd., Buskirk, NY, Buskirk, NY, ²U.S. Army Garrison-West Point, West Point, NY)

Developing predictions of potential habitat for rare, declining and vulnerable species can help direct survey and conservation efforts. From 1991 to 2006, natural resource managers at West Point observed 16 animal species listed as endangered, threatened or special concern by the New York State Department of Environmental Conservation and/or the U.S. Fish and Wildlife Service, Department of the Interior at the 16,000-acre (6,451 ha) West Point Military Reservation in southeastern New York State. They theorized that another 14 might be found on the Reservation based on observations, historic records, and likely habitat. Extensive reviews of the literature were completed on all 30 species to identify critical habitat variables that could be used to identify potential habitat. Based on the findings from the literature review, habitat characteristics such as cover type, patch size, presence of invasive species and others documented in available GIS coverages were used to identify potential habitat for these species. GIS analyses were completed based on individual species requirements. Comparisons of known locations of the 16 confirmed species and predicted potential habitat indicated varying degrees of correspondence between observed occurrences and predicted potential habitat for the 16 species. Methods used and the advantages and disadvantages of this basic approach to species modeling are discussed.

The Presence of Japanese Knotweed at Marist College's Forest Preserve

Bishop*, Jocelyn (Marist College, Department of Biology, Poughkeepsie, NY)

Japanese knotweed, *Polygonum cuspidatum*, is a highly invasive plant that is very abundant in Fern Tor, a 13 acre forest preserve at Marist College in Poughkeepsie, New York. *P. cuspidatum* was introduced to the USA in the late 1890s and has been reported across the nation. A chief characteristic of invasive plants is that they oftentimes create a monoculture and out-compete native plants. In Fern Tor, and elsewhere, *P. cuspidatum* has a canopy six to seven feet above the ground which blocks the sunlight and together with its extensive rhizome and root system, which takes up all the available nutrients and moisture, leave the forest floor bare. In this study, the presence of *P. cuspidatum* was mapped with GPS and GIS, so that the extent of its growth could be monitored. The number, size and locations of the various stands of *P. cuspidatum* in Fern Tor were studied in the fall of 2007. In total, four large (>4 m².) stands were counted in addition to seven smaller stands. *P. cuspidatum* occurred in a variety of microclimates that differed in soil moisture and elevation. Of particular interest is that all the stands of *P. cuspidatum* were located in conjunction with disturbed areas that were both manmade and natural, though not all disturbed areas had *P. cuspidatum* present. The hope is that this map will be useful for developing a management plan for Fern Tor, which will control the spread of *P. cuspidatum* and serve as a model for its management elsewhere.

Noninvasive DNA Sampling to Monitor a Population of Coyotes in Northern Virginia

Bozarth*², Christine, Larry **Rockwood²**, and Jesus **Maldonado¹** (¹Center for Conservation and Evolutionary Genetics, Smithsonian National Museum of Natural History/National Zoological Park, Washington, DC, ²Department of Environmental Science and Public Policy, George Mason University, Fairfax, VA)

The coyote (*Canis latrans*) is a recent immigrant to the mid-Atlantic states, becoming established in Virginia in the 1980s. Virginia is one of the last states in the US to be settled by coyotes and they were first observed at Marine Corps Base Quantico (MCBQ) in Northern Virginia in 2001. Determining the population dynamics of coyotes is the first step in designing wildlife management plans for this species. In this project, we use non-invasively collected samples from scat to determine the presence and the relative distribution and abundance of coyotes and other wild canids on the base. We used mtDNA control region sequences and 6 highly polymorphic microsatellites to identify species, haplotype, and individual. In this poster, we present our preliminary results of the first year of a two-year survey of coyotes at MCBQ. Analysis of 300 scat samples shows that coyotes, grey foxes, and red foxes occur sympatrically across much of the base and are similarly abundant. We also discuss patterns of abundance, distribution, survival, recapture rates, home range size, movement, and habitat usage of coyotes at MCBQ. Understanding the population dynamics of coyotes to design an effective wildlife management plan is critical for these new canid colonists, especially since the potential for human conflict is high in this area.

Development of Site Specific Herp Atlas Location Information for Local Decision Making

Breisch*², Kirstin, Ariana **Breisch³**, Alvin **Breisch¹**, Leslie **Zucker²**, and Milo **Richmond²** (¹New York State Department of Environmental Conservation, Albany, NY, ²Cornell University, Ithaca, NY, ³Foundation for Ecological Research in the Northeast, Upton, NY)

The NYS Amphibian and Reptile Atlas Project (Atlas) contains data for all species of amphibians and reptiles occurring in the wild in New York State for the period 1990–1999, mapped at the county, town, and USGS topographic quadrangle scale. While these scales are extremely useful for statewide analysis, they are less so for outreach to local municipalities or for modeling species distributions at the ecosystem or habitat level. Statewide the Atlas contains approximately 59,900 species reports with more than 99% of these reports containing site-specific information in addition to the required county, town, and USGS topographical quadrangle location. Using this detailed location information, digital point data was developed for the approximately 16,000 species records that occur within the Hudson River Estuary Program area and stored in a Geographic Information System (GIS) to enable analysis of species composition for any size or shape area. Examples of relevant areas include wildlife management areas and state forests, town and state parks, nature preserves, and watershed or stream sections. The data could also be analyzed at the level of the individual species to determine range and habitat affinity or to identify areas where Atlas surveys were perhaps inadequate. The point data will be available to NYS DEC biologists via the Master Habitat Data Bank (MHDB).

Invasive Terrestrial Planarians (*Bipalium*) in North America: Current Understanding

Broadwell*, Devin S., Maria **DeSisto**, Chelsea **Cook**, and Peter K. **Ducey** (State University of New York at Cortland, Cortland, NY)

Exotic terrestrial flatworms that have been brought from Asia over the last century may be a significant threat to North American ecosystems. The extent of their impacts will depend upon their distributions and rate of spread, feeding and reproductive abilities, intraspecific interactions, and impacts on native animal populations. Herein, we present the state of our knowledge concerning the three most abundant invasive planarians, *Bipalium kewense*, *B. adventitium*, and *B. vagum*. We have documented aspects of the geographic ranges of the invaders on a nationwide scale, but don't know the factors determining these distributions. In addition, we lack information on local abundances and distributions, but have begun field studies with students in New York. *Bipalium* have moderately slow reproductive rates employing a combination of asexual and sexual strategies. The diets of *B. kewense* and *B. adventitium* include many earthworm species, while *B. vagum* feeds on terrestrial mollusks. Thus far, no predators on these flatworms have been identified. Studies of intraspecific interaction, predation, and antipredator behavior are ongoing. Additional experimentation and field investigations are necessary to close the critical gaps in our understanding of the flatworm invasion.

Forest Floor Temperature Following Timber Harvesting in Southern New England

Brooks*¹, Robert and Thomas **Kyker-Snowman²** (¹U.S. Forest Service, Amherst, MA, ²MA Department of Conservation and Recreation, Belchertown, MA)

Forest amphibians, especially salamanders, prefer shaded, cool, and moist forest floor habitats. Timber harvesting opens the canopy and exposes the forest floor to direct sunlight, which can increase forest floor temperatures and reduce soil moisture. These microclimatic changes can potentially degrade amphibian habitat or affect other biotic resources or ecological processes at the forest floor. The degree of forest floor disturbance is directly related to the intensity of harvesting, however, the duration of this effect is unknown. We conducted a study of forest floor temperature and relative humidity over a 12-year chronosequence of timber harvests. We compared simultaneous, paired measurements at three vertical positions in harvested and control sites over three seasonal survey sessions. Vegetation composition and structure were measured at each survey location. Ambient weather conditions were recorded at three open-field locations across the study area. We recorded over 75,000 paired measures of temperature and relative humidity over the study. While we found significant differences in temperature between harvested and uncut sites, the average differences were generally small (<1°C) and there was no temporal response to time-since-harvest. Time-since-harvest had no effect on differences in relative humidity. The variation in forest floor microclimate among locations and sites was large, likely due to small-scale differences in cutting intensity, understory vegetation growth, and micro-topography or aspect. We conclude that timber harvesting, within the range of intensities assessed in this study, and would have only minimal and short-term effects on forest floor microclimate and on microclimatic influences forest floor biota and ecological processes.

Digital Field Guides: An Innovative Technology for Exploring Biology

Broyles*, Steve, Jacquelyn **Getman**, Laurie **Klotz**, and Larry **Klotz** (SUNY Cortland, Cortland, NY)

Educational technology provides students with exciting opportunities for hands-on, student-centered learning in the sciences. We have developed innovative digital field guides for aquatic macro invertebrates, aquatic plants, trees, birds, and insects using personal digital assistants. The BOWISE (<http://acs7.cortland.edu/biowise/>) Digital Field Guides provide students, educators, and field biologists with taxonomic keys, color photographs, glossaries, and audio files for classroom or field use. These educational tools are designed to improve student observational skills, to learn taxon specific terminology, and to facilitate environmental and ecological research projects. The BOWISE Digital Field Guide software is free and may also be used from classroom computers. Educators interested in enhancing or providing a more structured exploration of the natural world will benefit from the Digital Field Guides.

Nest and Egg Characteristics for Two Turtle Species on Long Island, NY

Burke*, Russell and Beverly **Clendening** (Hofstra University, Hempstead, NY)

Eastern box turtles (*Terrapene carolina*) and snapping turtles (*Chelydra serpentina*) are two fairly common turtles species on Long Island. We collected data on 40 gravid box turtles at Wertheim National Wildlife Refuge (Suffolk County) 2000–2002, and data on 67 snapping turtle nests at Brookhaven National Lab (Suffolk County) 2005–2007. Mean *Terrapene* clutch size was 4.3 eggs. Radiographs showed gravid females as early as 30 May and as late as 25 June; later radiographs showed no

females with eggs. The earliest *Terrapene* observed nesting was on 12 June, the last was on 3 July. For 9 of 11 field-incubated nests, egg viability was 100% and for 8 of these nests, emergence success was 100%. This contrasts with generally low levels of egg viability reported in most *Terrapene* populations. *Chelydra* data were compared to national trends from a recent review of *Chelydra* life history traits. BNL *Chelydra* began nesting in the end of May and beginning of June, 4–6 days later than predicted. Overall clutch sizes averaged 5 eggs fewer than predicted. Annual laboratory-incubated egg viability varied from 69–86%. This was mostly due to the complete failure of 4 clutches in 2007. The cause of generally low egg viability in this population is unknown.

A Student-Developed Database of Invasive Plant Rankings

*Chabot**, *Ember*, *Lori Crane*, *Brian Benner*, *Thomas Lansing*, and *Donna Vogler* (State University of New York, College at Oneonta, Oneonta, NY)

In the fall of 2008 two undergraduate classes at SUNY Oneonta developed an invasive plant database as a collaborative class project. In the previous semester two students developed the template of information where each species was given a ranking for nine traits of innate invasibility using the National Park Service protocol of Heibert and Stubbendieck (1993). The traits included numbers of seeds, mode of reproduction and competitive ability. The 18 students of Plant Ecology (Biol381) expanded the database with information on 2–3 additional species of greatest threat to the Catskill region. These data were then placed into a searchable website developed by Computer Science students (CSCI345). The collaboration of these academic classes resulted in efficient compilation of a useful data set applicable to a wider community. The searchable dataset is expected to be fully operational by late spring 2008.

A Study to Characterize the Flora of Vernal Pools, Acadia National Park

*Ciccotelli**, *Brett* and *Nishanta Rajakaruna* (College of the Atlantic, Bar Harbor, ME)

In the northeastern United States vernal pools have received much attention in recent times as amphibian populations decline and development threatens their breeding grounds. Yet there have been limited studies on floral diversity of vernal pools, especially the phenology of species that characterize these habitats. Studies to date show that vernal pools can provide refuge for rare wetlands species. In Acadia National Park, Maine there is no current inventory of vernal pools and their associated plant species. In the spring and summer of 2008 we will document the lichens, bryophytes, and vascular plant diversity of selected pools within the Park. We will characterize each pool based on water quality, soil characteristics, bedrock geology, and photosynthetically active radiation at several key phenological stages of the associated flora and map the pool locations using Geographic Information Systems. We will also record the phenology, including time of germination, flowering, and seed set of vascular plant species associated with each pool. We hope our study will provide much-needed information on the taxonomy, phenology, and ecology of species that characterize vernal pools of the Park. We propose our preliminary research plan to gain input necessary for finalizing the study.

Lupinus perennis Habitat Management by Tree Removal in Rome Sand Plains (NY)

*Clark**, *Heidi*, *Emily Stinson*, *Katie Goodwin*, *Alex Hodgens*, *William Pfitsch*, and *Ernest Williams* (Hamilton College, Clinton, NY)

Wild blue lupine populations are declining in the Rome Sand Plains as white pine trees proliferate in their open habitat. Experimental tree removal implemented in 2003 has positively affected a population of the NY threatened Frosted Elfin butterfly (*Callophrys irus*) that requires lupine for oviposition and larval feeding. The objective of this study was to assess the lupine population response to the tree removal. We hypothesized that the lupine population would increase as a result of increased light availability in experimental plots. All lupine stems were tallied based on leaf number and presence of inflorescences at the time of maximum flower in three permanent sub-plots around nine control and cut white pine trees. The number of lupine stems in control plots has decreased somewhat over time while lupine numbers in experimental plots have varied considerably but without trends. On average, individuals with three or fewer leaves represent less than 20% of the total population, and that proportion has decreased over time in both treatments. Although the total number of larger individuals has followed the patterns described for all stems, the proportion producing inflorescences has increased in both treatments. In conclusion, increased light has benefited individual lupine stems; more are larger and produce flowers, but the population has not expanded and potential recruits to the mature population have decreased. At best, tree removal has stayed the observed decline of lupine stem numbers in the control plots. Further investigation of the factors limiting lupine recruitment is warranted.

A Review of Cause Specific Mortality in Mammals

Collins^{*1,2}, Christopher and Roland **Kays**² (¹University at Albany, Albany, NY, ²New York State Museum, Albany, NY)

The death of an animal can come from a variety of agents including predation, disease, starvation, exposure, accidents, and humans. The relative importance of these different agents reflects not only the factors limiting population size, but also the evolutionary pressures acting on a species. Despite the rich history of cause specific mortality studies, there has been no attempt to integrate or summarize their results to give a broader view. Therefore, we conducted a comprehensive review of published estimates of cause specific mortality for North American mammals. We compiled data from 42 studies, covering 23 species, and describing 1254 total mortality events. Although existing theory predicts that that predation should be the main cause of mortality in all but the largest mammal species, we found that humans are now the primary cause of mortality for North American Mammals, accounting for nearly half (48%) of all deaths. Predation accounted for 28% of deaths, natural causes (disease, senescence, exposure) for 8%, while the cause of death for the remaining 15% were unknown. Across species, rates of predation were negatively correlated with mean adult body mass. The two outliers in this relationship were two species with specialized defenses (skunks, porcupines) that have lower rates of predation than predicted based on body mass. Where hunting was allowed it was typically the primary cause of mortality (31%). Our results indicate that humans have replaced predation as the primary cause of mortality in North American mammals, and are therefore the dominant evolutionary force in the region.

Organochlorine Pesticide and PCB Accumulation and Trophic Level in Snapping Turtles

de Solla^{*}, Shane (Environment Canada, Burlington, Ontario, Canada)

Unlike many vertebrates used for environmental monitoring of body burdens of organochlorine pesticides (OCs) and polychlorinated biphenyls (PCBs), snapping turtles (*Chelydra serpentina*) have indeterminate growth. Consequently, even after sexual maturity at approximately 3.5 kgs, snapping turtles continue to grow, up to 19 kgs in males. The phenomenon of indeterminate growth has some implications for the use of turtles as environmental monitors of contamination. Concentrations of PCBs and OCs, for example, increase with body size in turtle liver and blood plasma. We are using stable isotopes (δN , δC) in red blood cells of snapping turtles to determine if body size is related to trophic levels. Concurrently, we will be measuring PCBs and OCs in plasma of the same animals to determine if trophic position is related to PCBs and OCs. Turtles were sampled from a number of wetlands in southern Ontario, so we will have some ability to determine if there may be differences among populations in diet. We will also attempt to determine if trophic position is sufficient to explain the variance in body burdens, or if some other mechanism (i.e. changes in metabolism) is required to explain the observed relationship between contaminant burdens and body size.

Predicted Habitat for Selected Forest-Interior Birds on the Mohonk Preserve

Deppen^{*1}, Jamie and John **Thompson**² (¹192 Mountain Rest Road, New Paltz, NY, ²Daniel Smiley Research Center, Mohonk Preserve, New Paltz, NY)

Forest fragmentation and its edge effects are threats to the preservation of species and biodiversity. Within forest edges forest bird populations can be affected by nest predation/parasitism, human disturbances, species interactions, and altered vegetation. Four birds, the worm-eating warbler, scarlet tanager, black-throated blue warbler and cerulean warbler, were chosen as study species because of their dependence on core forest habitat. To predict where preferred habitat for these species was located on Mohonk Preserve lands a 50 m buffer was modeled around carriage roads, public roads, trails, and open cultural areas from Mohonk Preserve GIS data as a conservative representation of the extent of edge effects in the forest. An "inverse buffer" shapefile was made out of vegetation data to represent core forest fragments. For each species, vegetation polygons corresponding to its preferred forest type were selected out of the core vegetation layer. These polygons were made into a separate shapefile and dissolved. Polygons were selected out of the preferred forest type layer whose area was equal to or greater than the species' minimum habitat area requirements. The resulting shapefile is the species' predicted habitat.

County Natural Heritage Inventories in Pennsylvania

*Eichelberger**, Charlie, Shana *Stewart*, and Peter *Woods* (Pennsylvania Natural Heritage Program, County Natural Heritage Inventory Program, Middletown, PA)

The County Natural Heritage Inventory (CNHI) program is a cooperative effort undertaken by the Pennsylvania Natural Heritage Program (PNHP) partnership. County Inventories collect and present information on rare species and natural communities. These projects identify and map important ecological places within a county; prioritize them based upon their attributes; and provide information on threats and recommendations regarding their management and protection. County Inventories are designed to inform the residents of a county about their living heritage and give them a tool to use in planning the future of their communities. County and municipal planners; federal, state and local agencies; businesses; environmental consultants; developers; local conservation organizations; and others use these studies to help make landuse decisions within their counties and municipalities. Funding for County Inventories comes largely through the Pennsylvania Department of Conservation and Natural Resources, but also through a variety of other public and private sources. Since 1990 PNHP has completed inventories for nearly all counties in the state and the remaining counties are in progress now. Inventories will continue, in order to provide more complete and updated information to the public. Inventories are an evolving product; over time we have expanded our taxonomic coverage, added landscape-scale features, refined the concept of conservation polygons, and incorporated analyses of gaps in biodiversity protection.

Mute Swans of the Hudson River: Potential Consequences Predicted by Spatial Ecology

*Elbin*¹*, Susan and Fred *Koontz²* (¹Wildlife Trust, New York, NY, ²Teatown Lake Reservation, Ossining, NY)

Mute Swans were introduced into the eastern United States from England in the late 1800s, and their numbers have been steadily increasing. The New York State Department of Environmental Conservation estimates that there are about 3,000 swans living in New York. Negative impacts include destruction of submerged aquatic vegetation (SAV), displacement of native waterbirds, and spread of pathogens. The aim of this study is to investigate the spatial ecology of Mute Swans living in the lower Hudson River and to ultimately assess their impacts on local biodiversity. Monthly aerial surveys were conducted on the Hudson River from the Tappenzee Bridge to Troy, 2005–06. Swan numbers ranged from 17 to 176. Swan locations were plotted on a GIS map and coincided with SAV beds. Solar powered Argos/GPS PTT satellite transmitters were attached to 8 swans. Birds were released at the capture sites: Roundout Creek, Rockland Lake, and Lake Meahagh, NY. By the end of the winter (February) three swans had moved to Barnegat Bay, NJ, one remained near the capture site at Croton Reservoir, two remained on Rockland Lake, and one moved 17 miles north to Red Hook, NY. By March, four of five birds returned to the general region of the river and one moved to Jamaica Bay. Swan abundance on the River and seasonal movement patterns suggest a low impact on SAV in the Hudson.

Indiana Bat Habitat Characteristics in Central New York at Multiple Spatial Scales

*Fishman**, Michael and Drew *Wanke* (Stearns & Wheler, LLC, Environmental Engineers & Scientists, Cazenovia, NY/Northeast)

Regional changes in endangered Indiana bat (*Myotis sodalis*) populations indicate a need for a better understanding of this species' regional habitat use at multiple spatial scales. Selection of roost trees by Indiana bats is well understood rangewide, but no work has been published on the landscape scale selection of habitat by this species in central New York State. We radio-tracked 4 post-reproductive female Indiana bats to roost and foraging locations in the summer of 2007 to define their home ranges. We used GIS to conduct a compositional analysis of each bat's home range and compared home range cover type proportions with the surrounding landscape to produce a habitat selection function. We also analyzed home ranges for proximity to man-made and natural landscape features such as roads, watercourses, edges, and human development. Finally, we characterized diurnal roosts of these individuals by size and species. This poster will summarize the habitat use and roost characteristics of these 4 bats, addressing both common and distinct elements of each.

What's Hidden in Coney Island? A Look at the Flora

Glover*¹, **Tara, Kathleen Nolan**¹, and **Gerry Moore**² (¹St. Francis College, Brooklyn, NY, ²Brooklyn Botanic Garden, Brooklyn, NY)

Approximately 200 specimens were collected from June to November, 2007, within a five mile radius of the Coney Island section of Brooklyn, New York. Plants growing without cultivation were collected from numerous habitats, including beaches, marshes, open fields, as well as areas associated with development and disturbance, such as parking lots, curbs, and sidewalk cracks. These plant specimens were pressed using standard plant presses and dried at 38 °C for 3 days and then identified to species using standard regional manuals. The specimens will be deposited in the herbarium at the Brooklyn Botanic Garden. Additional historical data on the flora were obtained from the database maintained by the Brooklyn Botanic Garden for its New York Metropolitan Flora Project. The New York Metropolitan Flora project seeks to document the occurrences of all plant species within a 50 mile radius of New York City. Most of the habitats in Coney Island are now dominated by non-native species, such as common reed (*Phragmites australis* ssp. *australis*) and Japanese knotweeds (*Fallopia japonica*, *F. sachalinensis*). Because of many planted gardens in Coney Island, cultivated species were also occasionally found. In some tidal marshes, assemblages of native species, such as cordgrass (*Spartina alterniflora*), still persist. In open sands adjacent to the beach, populations of the state rare sedge species Schweinitz's flatsedge (*Cyperus schweinitzii*) can still be found. The federally threatened sea beach amaranth (*Amaranthus pumilus*) was not noted during this survey, although it has historically been reported from the area.

Barotraumas in Fish in the St. Lawrence River

Gokey*, **Jason and Jason Schreer** (SUNY Potsdam, Potsdam, NY)

Barotraumas have been documented in many freshwater and marine game fish and are increasingly being recognized as a serious conservation and management issue in catch-and-release fisheries. Barotraumas result from a process called decompression where fish are brought from depth to the surface quickly leading to rapid changes in ambient pressure. The decline in ambient pressure can have profound physiological and physical consequences, especially in physoclistous fishes (including black bass) where the swim bladder does not directly connect to the digestive tract. In the summer of 2007 we angled for deepwater fish (>20 ft.) in the St. Lawrence River to determine the rates of incidence of barotraumas in commonly angled fish. A total of 66 fish were caught including perch (n=42), smallmouth bass (n=11), rock bass (n=7), blue gill (4), walleye (1), and bullhead (1) in depths ranging from 0–42 ft (42% > 20 ft.). The only fish that showed signs of barotraumas (bloated and unable to maintain equilibrium) were 3 of the 4 fish caught at >35 ft (2 smallmouth bass and 1 rock bass). This study suggests that there are some species differences in the incidence of barotraumas, but clearly sample sizes were small and more work is needed. In the summer of 2008 we will increase sample sizes through additional angling effort and by conducting creel surveys in the area.

Habitat Usage of Frosted Elfins in the Rome Sand Plains

Goodwin, Katherine, Heidi Clark, Emily Stinson, Alexander Hodgens, Ernest Williams*, and **William Pfitsch** (Hamilton College, Clinton, NY)

Frosted Elfins, *Callophrys irus* (Godart), are found in the Rome Sand Plains of central New York only where their wild blue lupine host plant, *Lupinus perennis*, grows. We studied the behavior of Frosted Elfins at this site to contribute to planning the best habitat management for the Rome Sand Plains. In this study we followed focal individuals. Males and females use the habitat differently, with males patrolling distinct territories along exposed sandy trails next to lupine patches. Females are found mostly within lupine patches, where they fly from plant to plant laying eggs, rather than along trails, and they fly for shorter flights than males (averaging 5 sec for females, 9 sec for males) and fly more frequently (averaging 39 sec between flights for females, 79 sec between flights for males). Oviposition is predominantly on bracts (35%) and buds (27%) of unopened inflorescences. We observed neither sex taking nectar from flowers, but both fed from extrafloral exudates in lupine inflorescences. These observations suggest that Frosted Elfins benefit from dense lupine patches in partially open habitat, but that flowering nectar sources are not important.

A Forest History of the Rome Sand Plains

Goodwin*, Katie and William **Pfitsch** (Hamilton College, Clinton, NY)

Pine barren ecosystems are characterized by the prominence of pitch pine (*Pinus rigida*) and are host to rare animal species such as the New York threatened Frosted Elfin butterfly (*Callophrys irus*). Pitch pines are a pioneer species adapted to frequent disturbance. The Rome Sand Plains, in Rome, NY, contain a variety of pitch pine ecosystems suggesting that natural and/or human disturbance may have been important in the past. The history of these forests, however, is not well understood, although aerial photographs taken in 1938 reveal formerly cleared areas that today are locations where populations of the early successional nitrogen-fixing legume, wild blue lupine (*Lupinus perennis*), are decreasing due to increased coverage particularly by white pine (*Pinus strobus*). Diameter measurements and dendrochronology were used in four transects to evaluate current forest composition and forest history. Results from closed canopy forests show an aging pitch pine population with few small individuals. In contrast, white pine populations are increasing, with large numbers of young trees. In a pine barren area where lupine is present, however, there is evidence of pitch pine regeneration and a younger white pine population expanding into the open lupine habitat. This trend indicates that without management practices such as burning or clearing, the Rome Sand Plains may develop into a mixed deciduous, coniferous forest, and lose the plants and insects that are native to the current pine barren ecosystem.

Facultative Use of Vernal Pools by a Highly Aquatic Amphibian, *Rana catesbeiana*

Graves*, Rose, Megan **Gahl**, and Aram **Calhoun** (University of Maine, Orono, ME)

The importance of vernal pool habitats for obligate pool-breeding amphibians has been well documented. Recent work has also demonstrated the importance of surrounding upland habitats for obligate pool-breeding amphibians. However, less is understood about the extent to which vernal pools are used as habitat for facultative amphibians, particularly highly aquatic species such as the Bullfrog (*Rana catesbeiana*, Shaw). Though movement between breeding ponds has been documented, evidence of Bullfrog movement among breeding (permanent) and non-breeding (temporary) wetlands is scarce. Our goal was to determine the extent of Bullfrog use of vernal pools by examining movement patterns between breeding and non-breeding wetlands in relatively undisturbed forests in Acadia National Park, Maine, USA. We examined patterns of Bullfrog occupancy in different wetland habitats within one catchment using visual encounter surveys, mark-resighting, and radiotracking. Bullfrogs readily moved between wetlands with permanent and temporary water regimes. Until pools completely dried, density of Bullfrogs was much greater in vernal pools than in the permanent breeding pool, underscoring the significance of these seasonal wetlands for Bullfrogs. The regular use of vernal pools by Bullfrogs provides additional evidence for the important role of vernal pools within a habitat complex for many species presumed to be highly aquatic. These observations offer an additional argument for the importance of seasonal pools at a landscape level and support for managing vernal pools in connection with the surrounding habitat.

Diet Analysis of Double-Crested Cormorants, *Phalacrocorax auritus*, in New York Harbor

Grubel*, Colin and John **Waldman** (Queens College, New York, NY)

Double-crested Cormorants, *Phalacrocorax auritus*, have been breeding in and around New York Harbor since 1986. Cormorants are opportunistic hunters and their diet may change by region and season. Concerns are often raised regarding the effect their predation may have on fish species valued economically and recreationally. The purpose of this study was to assess, for the first time, the diet of Double-crested Cormorants in the New York Harbor area. Through the breeding and chick-rearing seasons of 2006 and 2007, boluses dropped by adults and chicks were collected and later identified and measured. The results indicate a varied diet encompassing 28 species consisting of fish, crustaceans and mollusks, and including species associated with both marine and freshwater environments. Size of prey ranged from 3.0 cm long up to an estimated 30.0 cm long. Both spatial and temporal variations in diet were investigated as well, indicating that both aspects may affect the diet. Species of interest to local fishermen such as striped bass, *Morone saxatilis*, and winter flounder, *Pseudopleuronectes americanus*, were also identified in the samples but not in high numbers. Our results are consistent with what is known of the diet preferences elsewhere, but the prey species and numbers found indicate that future management of the local cormorant population must consider the particular details of the population's place in the ecosystem with regards to their diet.

Effect of Size on Begging Behavior and Success in House Wrens

Gurbacki*, David and Kristina **Hannam** (SUNY Geneseo, Geneseo, NY)

House wrens (*Troglodytes aedon*) nest readily in artificial nest boxes, and in New York raise one or two broods of up to 7 young each breeding season. The altricial young require intensive parental care, and parents spend daylight hours delivering food to the nest. Begging in nestlings is a form of competition between siblings over food allocated by the parents. House Wren nestlings compete with one another using vocal and non-vocal signals for access to food resources each time parents return to the nest with food. In the summer of 2007, a House Wren population in Geneseo, NY, was studied to determine whether nestling begging behavior was associated with size or body condition of individuals, and whether success at obtaining food from parents was related to either of these variables. Chicks were marked, measured, weighed and videotaped over the span of development in the nest. Videos taken during two developmental stages were later analyzed to determine begging behavior and parental food distribution as related to nestling size. We will present our results examining whether differences in size among nestlings within a brood decreased with nestling age, indicating brood reduction or increasing uniformity in size of broodmates. We are also examining the frequency of begging and of feeding by the smallest nestling. Our results will illuminate how size differences among siblings affects behavior and resource acquisition.

Use of Hydroacoustics to Detect the Presence of Eurasian Watermilfoil (*Myriophyllum spicatum*)

Harrison*¹, James P., **Jeremy L. Farrell²**, and **Charles W. Boylen²** (¹Darrin Fresh Water Institute, Bolton Landing, NY, ²Darrin Fresh Water Institute and Department of Biology, Rensselaer Polytechnic Institute, Troy, NY)

Eurasian watermilfoil (EWM) is an invasive aquatic plant species prevalent in many New York freshwater bodies. Once introduced to a lake, controlling its spread is labor-intensive and costly. Since its discovery in Lake George (1984), yearly monitoring has identified 160 sites where it is known to exist or have existed in the lake. The identification of new sites, and hence the focus of management efforts, has depended on a combination of dedicated transect surveys and reported sightings from various stakeholder groups. However, at this time no comprehensive whole-lake survey has been conducted due to the vast size of Lake George (113 km²) and the time and cost such surveys demand using traditional survey methods (scuba, rake toss, etc.). In 2007, we tested a new method, utilizing hydroacoustic technology, to rapidly identify EWM across large spatial areas. Surveys were conducted on four major bay areas of the lake, using a Biosonics 430 kHz split-beam (10 degree) transducer. Two methods of interpretation of the hydroacoustic data were developed and cross referenced during analyses to identify sites of potential EWM. Presence, absence, and growth type were verified for each identified site using snorkel surveys. Salient results of these efforts include: (1) confirmation that hydroacoustic surveys can provide efficient and accurate identification of EWM across large spatial scales; (2) verification that hydroacoustic surveys can accurately identify previously unknown sites while also providing corollary information regarding established sites; (3) the development of a successful data analyses algorithm for identifying and indexing potential EWM sites.

Simple Modifications to Transportation Infrastructure to Reduce Impacts on Wildlife

Hecht*, Jack (HDR / LMS, Pearl River, NY)

Transportation infrastructure, such as concrete median barriers and rails can be an impediment to movements and pose threats to amphibian, reptile, and small mammal populations adjacent to transportation right of ways (ROWs). Small animals attempting to cross roadways with solid concrete median barriers are subjected to increased time on the roadway and therefore at greater risk of collision, predation, or dying of dehydration and/or exhaustion. During rain events, curbing and median barriers channeling runoff from the road surface may result in swift currents. Small animals (primarily amphibians) may be entrained into channeled runoff and transported to drains and catchments where they may be trapped or discharged into other conduits. In addition, rail lines also create partial barriers to the movements of some small animals between habitats bisected by railways. Turtles are generally unable to cross over rails and unlike other small animals, they cannot squeeze under them. Modifications such as cut-outs near the base of median barriers allow terrestrial animals to cross roadways. In addition, reinforced preformed channels securely placed between two ties provide under rail crossings for small animals (primarily turtles). These simple modifications are not in general use; however, under specific conditions (primarily the presence of species and suitable habitats on both sides of the ROW) their use could be valuable in reducing impacts to small animals. These and others modifications are recommended and described.

Survey of Canine Heartworm Infection in Eastern Coyotes

Heininger^{*1}, Natalie, Roland **Kays**², and Ward **Stone**³ (¹Princeton University, Princeton, NJ, ²Research and Collections Unit, New York State Museum, Albany, NY, ³New York State Department of Environmental Conservation, Delmar, NY)

When coyotes spread into eastern North America roughly fifty years ago, they also introduced themselves as a susceptible host population for parasites that threaten the health of local domestic dogs and other wildlife. Since their initial colonization, coyote populations have steadily grown, making them a potentially important reservoir for disease in the region. The canine heartworm parasite, *Dirofilaria immitis*, is of particular interest, as the identification of heartworm infection in pets somewhat coincided with the appearance of coyotes in the northeast, though it is unclear whether the parasite was previously endemic but unidentified. To evaluate the importance of coyotes as a reservoir for canine heartworm and determine the parasite's significance in the health of eastern coyote populations, we are conducting a survey of heartworm prevalence. To date, we have visually examined 36 specimens from the Northeastern United States and Quebec for the presence of adult heartworms in the heart and pulmonary artery. Of these, 4 were identified as infected (11.1%) with varying parasite burdens. Data will be compared to previous surveys of heartworm in coyotes from New York and Pennsylvania, and also compared with geographic distribution of coyote populations, weather trends and local domestic animal heartworm prevention strategies. With the preliminary findings of this survey showing low prevalence of heartworm infection, eastern coyotes appear to be less significant as a reservoir species for the parasite than they have previously been considered based on surveys across the country.

Preliminary Findings from Surveys of Native Bees on Columbia County, NY Farms

Holdrege^{*}, Martin (Farmscape Ecology Program, Hawthorne Valley Farm, Ghent, NY)

We conducted a survey of native bees and Honey Bees on seven organic farms in Columbia County, NY, throughout the summer of 2007. Relatively little is known about native bees in the Northeast. However, there is a growing concern about the effects of colony collapse disorder on European Honey Bees (*Apis mellifera*). Alternate pollinators (especially native bees) may be of growing importance for crop pollination. We surveyed for bees in three ways: visual surveys, netting, and pan traps. Bees were mostly collected and observed around crop plants. Some bees were also collected and observed on wildflowers growing near crops. We have collected at least 12 genera and 19 species of native bees. Many of these bees were taken directly off of flowers and thus were probably pollinating the given plant. These records increase our knowledge of pollinator/crop interactions in the Northeast. Our visual surveys showed that there were more native bees than Honey Bees on the majority of crops surveyed. These preliminary results emphasize the relative importance of native bees as crop pollinators. Finally, by knowing what kinds of bees are important pollinators of crops, we may be able to help farmers manage for them.

Comparing the Effectiveness of Two Acoustic Detectors in Road Surveys of Bats

Indelicato^{*}, Andrea (University at Albany, Albany, NY)

Bats comprise almost 25% of all mammal species, yet much of their ecology remains unexplained. For the endangered Indiana bat (*Myotis sodalis*), an improved range estimation is needed for better population management. Two acoustic bat detectors, Anabat II and AR125, were compared in road surveys to test the technique's effectiveness and the detectors' accuracy. In July 2006 in a rural area of eastern New York, the detectors were mounted on a car and a 17-mile route was driven twice each night for two weeks. The bat call files were examined using discriminant-function analysis to associate each one to a species. The 1,960 identifiable calls belonged to six species. Several statistical tests were used to compare the identifications of each detector per night, and most of them found no significant difference. There was a significant difference for Simpson's index and Inverse Simpson's index. Calls were also matched using the time stamps in file names. Of 268 corresponding files, 63% were identified as the same and 37% as different species. The primary misidentifications were between Big brown (*Eptesicus fuscus*) and Little brown (*Myotis lucifugus*) bats (39.4%), and Big brown and Silver-haired (*Lasiurus noctivagus*) bats (33.4%). None were identified as an Indiana bat by both detectors. Based on the statistical analyses, either detector would be effective in determining bat species presence in future road surveys.

Citizen Scientists Study Native Bees in New York City

Johnson^{*.1}, Elizabeth and Edward **Toth**² (¹American Museum of Natural History, Center for Biodiversity and Conservation, New York, NY, ²New York City Department of Parks and Recreation Greenbelt Native Plant Center, Staten Island, NY)

Bees are our most important plant pollinators, yet despite the concern about colony collapse syndrome in European honey bees, native bees have been overlooked in conservation planning, land management, and habitat restoration. Additionally, these pollinators are often not considered in urban settings yet are vitally important to the productivity of community gardens, and to the plants of city parks and natural areas. Urban areas can support healthy wild bee and other pollinator populations as these insects can use smaller habitat patches that are most abundant in urban areas. To date, more than 217 wild bee species have been documented in New York City (NYC). The Great Pollinator Project has been designed to look at pollinator service (how quickly bees arrive to pollinate flowers) in relation to surrounding land use. Over the summer of 2007, citizen scientists throughout NYC were recruited to observe bee visitation at selected native plant species and at a sunflower cultivar. The sunflower cultivar data are part of a larger initiative being conducted in collaboration with colleagues from San Francisco. Preliminary work by LeBuhn in California has shown that native bumble bees respond to the proximity of a park or natural area and the percentage of that park that is natural. In this poster we discuss the results of the pilot year of the Great Pollinator Project in NYC. The Project will increase awareness of native bees and their management needs and generate baseline data about what characteristics in urban areas are important to maintain pollinator communities.

Diet of Suburban and Rural Fisher

Kays¹, Roland, Dan **Bogan**², Paul **Gallery**^{*.1,3}, and Joe **Bopp**¹ (¹New York State Museum, Albany, NY, ²Cornell University, Ithaca, NY, ³University at Albany, Albany, NY)

Populations of fishers (*Martes pennanti*) have been growing across much of northeastern North America. In addition to their traditional wilderness habitat, populations are spreading into rural and suburban areas. Fishers living in wild areas are generalist predators of small and medium sized mammals, and are famous for preying on porcupine. Although fishers may now be an important predator of suburban fauna, including pets and livestock, their diet has not been studied in suburban or rural areas. Here we report on the contents of 4 scats and 18 stomachs from fishers. The scats were collected in the suburban Albany Pine Bush Preserve and were genetically identified as fisher. The stomachs were collected from trappers in the rural/suburban Saratoga area. Fishers ate a diversity of foods including 9 different mammal species, wild grapes, yellow jackets, and occasional garbage. Grey squirrels were the most important prey, while no remains of porcupines were observed. No evidence for cat predation was recorded, although two animals did eat domestic chickens, and others had consumed bird and part of a flannel shirt. We conclude that fishers will eat a variety of food items that are typically common in suburban areas, and represent a new predator for the abundant and bold urban squirrels.

A Test for Domestic Origin of Recent Northeastern Wolves Using Carbon Isotopes

Kays^{*}, Roland and Robert **Feranec** (New York State Museum, Albany, NY)

In the last 15 years there have been at least six canids killed by hunters that were much larger than typical eastern coyotes and, in some cases, were shown by genetic tests to be *Canis lupus*. Two explanations argue that these animals are wolves that have escaped (or been released from) captivity or that they are naturally colonizing individuals. Testing these two hypotheses is not always straight forward. Genetic tests can sometimes assign an individual to an existing wolf population, but can not reflect on how it got from there to the Northeast. A captive individual may show physical characteristics such as worn claws or tarter on the teeth. However, wild wolves can also have these traits, and they might not be found in animals kept in captivity for a short time. Here we show that a measure of carbon isotopes in wolf tissue offers a diagnostic signal of a captive history for an individual by detecting a unique aspect of the captive diet. We show that all typical wild canid foods from the region have a low carbon isotope signature reflecting their consumption of native C₃ plants. However, typical captive canid foods have a high carbon isotope signature reflecting their consumption of corn, a C₄ plant. We evaluate this using tissue from canids known to be either wild or captive and find that it clearly distinguishes the two groups. We will present the results of this test on a small sample of large Northeastern wolves of unknown origin.

New York State Museum Bird Collection: A Resource for Ornithologists and Educators

Kirchman^{*.1}, **Jeremy**, **Paul Gallery**^{1,2}, and **Joe Bopp**¹ (¹New York State Museum, Albany, NY, ²University at Albany, Albany, NY)

The bird collection at the New York State Museum is one of the oldest and most historically and scientifically important collections in northeastern North America. Specimens are primarily from New York State and surrounding states, but the collection also includes birds from throughout North America and from other continents. The recent completion of an electronic database of the 10,500 skins, skeletons, and whole anatomical specimens has enabled us to summarize the NYSM specimen holdings and strengths. In this poster we summarize the NYSM bird collection by geography and taxonomy, and describe the history of the growth of the collection. We provide information to scientists and educators interested in visiting the collection, obtaining loans of specimens for research and exhibition, or contributing to the growth of the collection.

Biogeochemistry of a New York State Beaver Pond

Klotz^{*}, **Richard**, **Victoria Benson**, and **David Kalb** (SUNY College at Cortland, Cortland, NY)

The recovery of beaver (*Castor canadensis*) from near extinction around 1900 has led to the reestablishment of their impoundments in the Northeast and elsewhere. Beaver have returned to stream habitats that were negatively impacted by humans in their absence. The purpose of this study was to assess the biogeochemical processes that occur in a beaver pond on an agricultural stream. In the study during 2006 and 2007, a multi-probe sensor equipped to measure temperature, dissolved oxygen, pH, turbidity and conductivity was deployed in the Virgil, NY beaver pond. These parameters were measured every 15 minutes, 24-hours a day, 7-days a week during the ice-free season. The data were sent via a cellular signal to a website. The beaver pond exhibited characteristics of a highly productive system, with the daily range for several parameters approaching the seasonal range. In 2007, the maximum daily range was 7.5–39 mg·L⁻¹ for oxygen concentration, 64–448% for oxygen saturation, 7.38–9.33 for pH, and 0.363–0.606 mS·cm⁻¹ for specific conductivity. These daily fluctuations resulted from high rates of photosynthesis and respiration by the benthic algal mat. The diurnal oxygen change method was used to measure primary production and respiration rates. Compared with a previously studied beaver pond from a pristine area, this pond had significantly higher rates of gross primary production. This may be typical for northeast beaver ponds located in disturbed landscapes.

Habitat Enhancement to Improve Waterbird Productivity: What Is the Best Method?

Lauro^{*}, **Brook** (St. John's University, Jamaica, NY)

Different methods are evaluated to enhance habitat to improve waterbird productivity at Breezy Point, Gateway National Recreation Area, New York City, New York. In the absence of a major storm to open habitat in the past ten years American Beachgrass (*Ammophila breviligulata*), through the process of succession, has become dense and is encroaching upon the oceanfront. This appears to be discouraging waterbird breeding, including federally threatened Piping Plovers (*Charadrius melodus*) since available nesting habitat has become limited. Moreover, waterbird species, including Piping Plovers and Common Terns (*Sterna hirundo*), are shifting nesting closer to the high tide line creating a conflict with beach bathers. Thus, to improve nesting and to ease interaction between birds and people a project has been proposed to enhance habitat by removing vegetation. Different methods are considered including: large mammal grazing, burning, hand removal, mowing, the use of landscape fabric, disking, herbicide application, bulldozing, raking, and burying vegetation with sand. These methods used either singly or in combination have advantages and disadvantages depending upon the site, as well as equipment, staff and funding available. Based upon a review of the literature and discussions with wildlife professionals, the preferred method for Breezy Point is bulldozing to remove vegetation above and below ground followed by beach raking. Reasons for this are discussed. After an initial experimental removal results will be evaluated and incorporated into a long term habitat management plan.

Effects of Beech Bark Disease on Small Mammal Assemblages in New York

Lawler^{*}, **Meghan** and **Danielle Garneau** (Colgate University, Hamilton, NY)

Forest pathogens play a major role in altering the overstory and understory vegetation communities in the Northern forest. Beech bark disease, one such threat involving a scale insect (*Cryptococcus fagisuga*) and a fungus (*Nectria coccinea*), has spread quickly through the range of American beech (*Fagus grandifolia*), thereby altering successional patterns, nutrient cycling, and faunal composition in New York. In acid-rain stressed regions, much attention has focused on forest health, but much less research has investigated the implications that beech decline might have on communities of small mammals. We

surveyed small mammal composition and beech nut mast in the Adirondack Park (Huntington Forest; Newcomb, NY) in comparison to the Catskill Park (Frost Valley YMCA; Claryville, NY) to compare patterns of Beech bark disease infestation. Preliminary results suggest that both forests were dominated by deer mice *P. maniculatus* and Southern red-backed voles (*Clethrionomys gapperi*), known seed predators. Salivary amylase gels were run to confirm identities among *Peromyscus* spp. in the laboratory. Diversity indices suggest that the Adirondack small mammal assemblage ($H= 0.892$, $n= 68$) is less diverse than that of the Catskills ($H= 1.049$, $n= 55$). Seed trap data suggest that 2007 was a non-mast year in both the Adirondack Park ($n= 2$) as well as in the Catskill Park ($n= 18$). In both stands there was a statistically different disease state for size/age classes (Catskills $F= 25.44$, $p < 0.000$, $df = 4$; Adirondacks $F= 26.18$, $p < 0.000$, $df= 4$), suggesting that stand demography is important for disease management.

Do Native Ants Protect Invasive Japanese Knotweed?

*Leipzig-Scott**, Peter, Erin Kenison, and J.H. Ness (Skidmore College, Saratoga Springs, NY)

Japanese knotweed is a highly invasive weed currently invading the riparian zones of the northeastern United States. Knotweed produces extrafloral nectar, a resource believed to be attractive to ants that may defend the plants as a result. We tested the hypotheses that 1) access to ant attendants alters herbivory on knotweed plants, and 2) ants recruit to damaged plants. Experiments in four invaded sites in the Kayderosseras watershed in upstate New York demonstrated that Knotweed is rarely attacked by herbivores (relative to attack rates in its native Japan) and that ant ‘bodyguards’ alter the distribution of herbivory within plants. These ant guards became more common after knotweed was experimentally damaged (with scissors), a response that may be attributable to damage-induced increases in the production of nectar by the plant. We conclude that the knotweed invasion is facilitated by the presence of ant bodyguards and, perhaps more importantly, a paucity of effective natural enemies.

American Eel (*Anguilla rostrata*) Restoration in the Onondaga Creek Watershed

*Limburg, Karin and Catherine Landis** (State University of New York College of Environmental Science and Forestry, Syracuse, NY)

The proposed project takes initial steps to restore American eel (*Anguilla rostrata*) to the drainage of Onondaga Creek, near Syracuse, NY. Onondaga Creek is part of the Onondaga Lake and Lake Ontario watersheds. American eels were once a dominant near-shore predator in freshwater systems throughout eastern North America. Recently, however, a decline in eel populations has been widely documented throughout eastern North America including the Great Lakes region. Water pollution and physical barriers (such as dams) have been cited as causes for decline in populations of eels. Our project comes in response to these declines and to growing public interest in eels. The objectives of our research are to identify areas of suitable eel habitat in the Onondaga Creek drainage, and to locate disease-free sources of eels to potentially add to areas of suitable habitat. A sample of eels will be collected from locations known to be largely free of disease; all necessary precautions will be taken to assess the health status of these fish. The eels will be quarantined, and a subsample tested for pathogens as required by the NYS Department of Environmental Conservation (DEC). For habitat evaluation, we will follow a standard protocol for aquatic habitat assessment, with species-specific modifications for eels. Through education, our project also aims to restore cultural relationships with eels and other native biota of the Onondaga Lake watershed.

Mapping Coyote Sightings in Suburban Westchester County, New York Using Questionnaires

*Mack*¹, Deborah, Linda Gormezano², Rod Christie¹, Chris Nagy¹, and Mark Weckel¹* (¹Mianus River Gorge Preserve, Bedford, NY, ²City University of New York, New York, NY)

Coyote *Canis latrans* numbers have increased dramatically in suburban environments and are particularly abundant in Westchester County, a densely human populated region north of New York City. This study used questionnaires to examine the relationship between coyote sightings by residents and landscape features throughout Westchester. Surveys were distributed to school districts across the county asking for reports of coyote sightings on each participant’s household property between 2003 and 2007. After receiving 1,562 valid reports, the survey responses were imported into ArcGIS 9.1 and the distances to various landscape features were calculated. We used step-wise logistic regression to select those variables that best predicted coyote sightings. Coyote sightings were positively correlated with distance to forests and grasslands and negatively correlated with distance to high and medium intensity developments, supporting previous studies of coyote habitat preference. Currently, additional fine-scale factors are being incorporated to increase the accuracy of the model. A final coyote sighting map will be used to identify hotspots of potential human-coyote conflict. By predicting potential ‘conflict’ zones, education and awareness campaigns can be more effectively implemented and negative coyote-human interactions can be reduced.

Comparing Pollen Records from a Pond and Fen, Black Rock Forest, NY

Maenza-Gmelch^{*.1}, Terryanne and Dorothy **Peteet**^{2,3} (¹Barnard College Environmental Science, New York, NY, ²Lamont Doherty Earth Observatory, Palisades, NY, ³NASA/Goddard Institute for Space Studies, New York, NY)

Pollen analysis and AMS radiocarbon dating of sediments from Sutherland Fen, Black Rock Forest, NY provide a record of forest history spanning the last 12,350 radiocarbon years. These data were compared to fossil pollen, plant macrofossil, and charcoal data from Sutherland Pond, a large basin, 4.05 ha in surface area. Pollen analysis of Sutherland Fen sediments indicates a mixed pollen assemblage of boreal and temperate tree taxa (*Picea*, *Abies*, *Ostrya/Carpinus*, *Fraxinus*, *Quercus*) and herbs like Cyperaceae, Gramineae and Tubuliflorae from 12,350 to 11,300 yr BP. This is followed by increased dominance of *Pinus strobus* and *Betula* pollen until ~10,000yr BP. The early Holocene (~10,000 to 8500 yr BP) is characterized by increased *Quercus* pollen percentages and sustained high values, expansion of *Tsuga canadensis* pollen at ~9500 yr BP and a decrease in pollen percentages of *Pinus*. From 8500 yr BP to present is a dominance of *Quercus* pollen, high pollen percentage values of *Alnus*, Ericaceae, Cyperaceae, Tubuliflorae and spores of *Sphagnum*. A preliminary comparison of the two sites reveals: Both sites begin recording pollen of the mixed boreal and temperate tree assemblage at approximately the same time: 12,350 ±70 yr BP for the fen and 12,600 ±380 for the pond. The fen accumulated approximately 254 cm of sediment in roughly 12,000 yr BP whereas the pond accumulated 830 cm of sediment during the same period. Both sites appear to have had the same sensitivity in recording the diversity of plant taxa. S-1

Effects of Two Non-Native Plant Species on Western New York Forests

Martin^{*}, Lindsay and Jonathan **Titus** (SUNY-Fredonia, Fredonia, NY)

Garlic mustard (*Alliaria petiolata*) and Japanese knotweed (*Polygonum cuspidatum*) are non-native perennials that establish monospecific stands in forest understories. At Bentley Preserve, Jamestown, NY, 36 plots were established, 24 are in dense garlic mustard stands and garlic mustard was removed from half of these, and 12 plots are in adjacent non-invaded areas. Species response to the presence, removal or absence of garlic mustard was assessed and plots were assessed for mycorrhizal inoculum potential (MIP) because garlic mustard may outcompete native species by suppressing mycorrhizal fungi. First season data showed little vegetational differences between the three treatments and MIP differences were not detected. New York's riparian forests may be at risk because trees appear not to regenerate in Japanese knotweed dominated stands. In a Canadaway Creek riparian zone 18 plots were established, 12 are in dense Japanese knotweed stands and Japanese knotweed was cut in half of these, and 6 plots are in adjacent non-invaded areas. Native species were planted in the plots (*Acer saccharum*, *Agrimonia striata*, *Celastrus scandens*). By planting species in these plots it will be seen if riparian forest species can be maintained by planting in areas where knotweed has been cut. More species will be planted this year. Plots were monitored for species response and growth of the planted species. First season data showed little vegetational difference between the three treatments and the planted species appeared to persist and grow slightly in all three treatments. Both studies will be monitored for four years.

Site Prioritization for Grassland Bird Conservation Efforts on Private Land

Morgan¹, Michael, Michael **Burger**^{*.1}, and Marcelo **del Puerto**² (¹Audubon New York, Ithaca, NY, ²New York State Department of Environmental Conservation, Albany, NY)

Populations of grassland birds have declined to the extent that significant efforts and immediate actions are needed to maintain the remaining populations. Several new and existing conservation programs are soliciting and enrolling landowners to participate in efforts to conserve critical habitat. Given the limited staff and funding resources available to these programs, care must be given to ensure that impracticable sites are not selected for enrollment. Two programs in particular that are implementing rigorous schemes for evaluating applications include the NYSDEC Landowner Incentive Program for Grasslands and the USDA/NRCS Wildlife Habitat Incentives Program. Rather than accepting any participants on a first-come-first-served basis, these programs are selecting priority sites by incorporating best available knowledge on the habitat needs of the targeted grassland bird species through support from Audubon New York's Grassland Bird Program and other partners in the New York grassland bird conservation effort. Important variables considered in these prioritization efforts include: location within or outside of grassland focus areas, patch size, patch shape, hostility of adjacent and nearby habitats, composition of the local grassland bird community, and existing habitat condition.

Predicting Carbon Exchange in the Red-Stemmed Moss, *Pleurozium schreberi*

Neal*, Nathali, Jesse Mango, and Steven K. Rice (Union College, Schenectady, NY)

The red-stemmed moss *Pleurozium schreberi* contributes significantly to carbon balance in boreal forests, yet little is known about the range or underlying causes of variation in its CO₂ exchange. In vascular plants, leaf nitrogen concentrations positively associate with maximal net photosynthesis on an area basis (A_{area}) due to the N requirement of photosynthetic metabolism. However, in mosses, the form of this relationship remains unknown. Since moss photosynthesis occurs in a region >5 cm thick, properties of the canopy that influence light attenuation and biomass distribution may impact rates of carbon uptake. We hypothesized that variation in plant N would have a positive relationship with A_{area} , although the form of this relationship should be altered by the distribution of N within the moss canopy. To evaluate this hypothesis, we collected 26 samples of *P. schreberi* from northern New York and measured A_{area} at optimal water contents in saturating light using a closed-chamber, IRGA-based system. Plant biomass (green and brown tissue separately), shoot area, light attenuation and N contents were assessed in whole canopies and at depth increments within the canopy. A_{area} varied by over four-fold (2.2–9.2 $\mu\text{mol CO}_2 \text{ m}^{-2} \text{ s}^{-1}$). Stepwise multiple linear regression was used to develop a predictive model of A_{area} . The resulting model employed A_{max} on a mass basis (A_{mass}), green and brown tissue weights and the light extinction coefficient and explained 93% of variation in A_{area} . Further studies will explore the relationships between A_{mass} and plant traits with a focus on the distribution of N.

Is “All Clear” Signaled by a Specific Song in House Wrens?

Nemeth*, Michael and Kristina Hannam (SUNY Geneseo, Geneseo, NY)

The two primary functions of male song in birds are mate attraction and territory defense. In House Wrens (*Troglodytes aedon*), there is evidence that a third function of male song may be communication with the female to coordinate nest entrances/exits during incubation, defined as the “all clear” signal (Johnson and Kermott 1991). House Wrens have a repertoire of up to 130 songs that vary in complexity. It is unknown whether the song used in a particular context is random or specifically chosen by the male – whether a specific song type contains information indicating “all clear”. Male House Wren song was recorded during the pre-incubation and incubation periods of 6 mated pairs in a nestbox population in Geneseo, NY. Female activity was noted during the recording, and songs were analyzed using the computer program Raven. To characterize song a type, each syllable was designated a letter (AABBDDGGDD). Song types were distinguished by the placement of each syllable within the pattern (Platt 1987). We examined whether a specific song type was associated with female activity (entrance/exit) at the nest. We will present the results of our analyses testing whether song patterns suggest that the male is using a particular song type to signal “all clear” to the female, or if all song types signal “all clear” equally well.

Using Best Development Practices for Vernal Pools to Inform Responsible Development

Oscarson*¹, Damon B. and Aram J. K. Calhoun² (¹Westchester Land Trust, Bedford Hills, NY, ²University of Maine, Orono, ME)

We tested the application of Best Development Practices published by Calhoun and Klemens (2002) in four New England towns. Our goal was to see if citizen scientists could effectively inventory pools and provide data to towns to be used for proactive conservation planning. Potential vernal pools were remotely identified using aerial photography. Fifty-two citizen-scientists surveyed 382 potential vernal pools and the adjacent terrestrial habitat. Data were collected on breeding amphibians, egg mass numbers, presence of rare, threatened or endangered species, and the quality of the adjacent habitat within 230 meters (750 feet) of each pool. Two hundred and sixty-two (69%) of the 382 surveyed potential pools were confirmed as vernal pools. A rating system based on pool use by breeding amphibians and quality of adjacent terrestrial habitat was used to rank town pool resources from high to low conservation priority. Data from each pool were entered into a Geographic Information System (GIS) database and delivered to each town. All four towns have begun to propose and develop conservation plans and apply conservation mechanisms to protect high priority vernal pools.

Elucidation of Microbial Communities in Adirondack Lakes Using 16S rDNA Sequencing

Percent^{*1}, Sascha F., Vincent **Milano¹**, Margaret **McLellan¹**, Marc E. **Frischer²**, Christie **Stagnar¹**, Michael P. **Schaaff¹**, Sandra A. **Nierzwicki-Bauer¹**, and Charles W. **Boylan¹** (¹Darrin Fresh Water Institute and Department of Biology, Rensselaer Polytechnic Institute, Troy, NY, ²Skidaway Institute of Oceanography, Savannah, GA)

The use of nucleotide sequencing has done much to redefine how microbial ecologists view taxonomic phylogeny of microbial components of freshwater food chains. Knowledge of bacterial community structure of freshwaters has progressed from the limitations of pure cultures to phylogenetic characterization using 16S rDNA amplification. Based on a limited number of nucleic acid sequence data worldwide, there may exist a unique global freshwater prokaryotic flora. As of 2005, combined diversity studies using random cloning have produced less than 5,341 freshwater bacterial 16S rDNA sequences deposited to the databank. Earlier studies on a suite of six Adirondack lakes had shown that the bacterial sequences from the Adirondacks were closely related to other freshwater clones, illustrating species or groups of species indigenous to freshwater. Although over 2,800 lakes exist in the Adirondack region of upstate NY, they are extremely varied in their pH, alkalinity, and nutrient chemistry. We have selected 34 lakes ranging in pH from 4.71 to 7.80 for long term study and characterization that represent a range of limnological characteristics. As of January 2006, we have obtained over 1200 16S rDNA gene sequences from 31 of these Adirondack lakes. Results are more intriguing amongst these lakes than previously thought. In both the upper epilimnetic layer and the hypolimnetic layer beneath the summer thermocline, our data supports the conclusion that species diversity increases with pH. The Actinobacteria, alpha-proteobacteria, beta-proteobacteria, and Cytophaga-Flexibacter-Bacteriodes dominated throughout all the lakes; whereas, delta-proteobacteria were found in 19 of 31 lakes and gamma-proteobacteria in 22 lakes.

Analyses of Bite Force, Head Shape, and Prey Preference in Diamondback Terrapin

Petrochic^{*}, Sara and Matthew **Draud** (C.W. Post – LIU, Brookville, NY)

Diamondback Terrapins are one of a few emydid turtle species that are specialized to crush mollusk and crustacean prey. The ability to crush prey that possess calcareous and chitinous exoskeletons presumably requires a skull design that allows forceful jaw closing. We directly measured bite force in terrapins ranging in carapace length from approximately 30 mm to 220 mm using a gnathodynamometer. We quantified differences in head shape through skull and mandible measurements. We found significant differences in the head shapes of males and females and a great deal of variation within the sexes. Female terrapins produced significantly greater bite force than similarly sized males, and overall attributes of head shape strongly influence bite force. The best correlates with bite force were measurements of the lower jaw length. Terrapins had significantly greater bite forces compared to those of a closely related emydid species, the red eared slider, which does not specialize in crushing prey with hard shelled exoskeletons. Prey preference from feeding choice experiments and fecal analyses will also be presented.

The Effect of Anthropogenic Impacts on Stream Epilithic Communities

Porter-Goff^{*1}, Emily R., Charles W. **Boylan¹**, Sandra A. **Nierzwicki-Bauer¹**, and Catherine A. **Gibson²** (¹Rensselaer Polytechnic Institute, Troy, NY, ²Skidmore, Saratoga Springs, NY)

Watershed development can lead to nutrient enrichment in streams. This enrichment can modulate the epilithic community, changing its structure as a whole. The epilithic community is defined as the matrix of, bacteria, algae, fungi and associated stream particles which form on and around a submerged surface. Changes due to human development will be reflected throughout the trophic levels of the stream ecosystem. In this study, several methods were used to compare epilithon of three Lake George sub-watershed streams in different stages of development. The sub-watersheds ranged in development from 2.3–14.5% developed. Ambient levels of chlorophyll *a* and ash free dry mass were measured from *in situ* rocks. Nutrient-amended glass and wood substrates were used to grow the biofilm from which; ash free dry mass, algal biomass (via chlorophyll *a* analysis), bacterial biomass (via enumeration), and fungal biomass (via ergosterol extraction) were quantified. A preliminary analysis suggests that nutrient limitation is not a major controlling factor in epilithic growth. No significant nutrient limitation was found in any of the streams. However, very strong changes in community structure were observed seasonally. Bacterial and fungal growth peaked in the summer, whereas chlorophyll *a* was highest in the spring and fall. It was also found that the most developed stream generally had the highest chlorophyll *a* whereas the less developed streams tended to accumulate more of their biomass as fungi and bacteria.

Golden-Winged Warbler (*Vermivora chrysoptera*) Habitat Analysis at Fort Drum, NY

Post*, Timothy, Theresa **Rush**, and Ryan **Collins** (New York State Department of Environmental Conservation, Bureau of Wildlife, Nongame and Habitat Unit, Albany, NY)

Surveys of golden-winged warbler (*Vermivora chrysoptera*) were conducted at Fort Drum, New York in 2007. Roadside routes were utilized to detect singing male golden-winged and blue-winged warblers, as well as hybrids. Observed singing locations were used to plot territories for each male. A visual observation was made for each bird recorded to distinguish between golden-wings, blue-wings and their hybrids. Each singing male territory was re-visited to map habitat types and conduct vegetation sampling. Vegetation sampling was conducted by dividing each territory into parallel transect lines. The distance between transect lines within a territory were as equal as possible given the uneven shape of territories. Vegetation measurements and habitat characteristics were recorded at equidistant intervals along the transect lines within each territory. The density of three layers of vegetation were estimated within a 100 foot diameter circle. The three layers of vegetation estimated included 1) herbs and grassy patches; 2) shrubs and woody trees <4 m in height; and 3) trees >4 m in height. The density of each layer was estimated and recorded as % cover within the plot. The dominant herb, shrub, and tree species for each point were recorded. The presence or absence of standing water (dry, moist, wet, or swamp), and the stage of succession (early, middle, or late) were also estimated for each point. The data for the vegetation sampling was then used to compare the habitat characteristics of territories utilized by golden-winged warblers to territories utilized by blue-winged warblers. Results of this analysis will be presented.

Activity Levels in Relation to Habitat and Energy in Freshwater Hermaphroditic Snails

Prestia*, Laura, Terri **Provost**, and Thomas **McCarthy** (Utica College, Utica, NY)

Short-term activity of congeneric physid snails was studied in relation to habitat and energy reserves. We recorded crawl-distances of individual *Physa gyrina* in separate containers, to which they had acclimated, and again immediately following relocation to an unfamiliar container. There was no significant difference in activity between old and new environments as determined by snails' crawl-distances. However, individuals' activity levels were significantly correlated between containers: snails that were highly active in the old environment remained so in the new, while other snails exhibited low activities in both containers. Next, activity of *Physa acuta* was measured and compared to the glycogen levels present in their tissues. Glycogen was determined through a phenol-sulfuric acid technique. Crawl-distances and glycogen levels were not significantly correlated. Therefore, glycogen is not a good measure of energy storage in relation to activity of physid snails.

Conservation Assessment of Wood Turtles at Two Sites in Oswego County NY

Pursel*, Kyle and Peter **Rosenbaum** (SUNY Oswego, Oswego, NY)

This presentation will report on research of a study population of the wood turtle, *Glyptemys insculpta*, in eastern Oswego County, NY in relation to the demographics, life history, ecology, nesting and conservation of this declining species at two sites in this portion of its range over three years. Habitat data collected is consistent with findings from the published literature. Observations at one nest site at the location reveal a large amount of nest predation and reduced juvenile recruitment. Age distribution of marked individuals is consistent with low juvenile recruitment. Overall, the data suggests that this population appears to have a low juvenile survival and reduced recruitment.

Restoration of the Great Patchogue Lake

Rana*, Mohammad, Thomas **Orioles**, Matthew **Berkhout**, Joseph **Denninger**, and Gabrielle **Laurenti** (St. Josephs College, Patchogue, NY)

The restoration of Great Patchogue Lake, studied since 1996. Patchogue Lake is located in Patchogue Suffolk County, NY. It is fed by the Patchogue River from the north through two inlets, and empties south into the Great South Bay. A part of the Patchogue River system, which, in 1873, was 8 km, but has since been reduced to 6km. The loss also included the disappearance of two lakes. In 1996, lake islands were observed and algal bloom and rooted plants covered the benthic zone of the lake. The sedimentation rate was 7mm per year, and the flow rate was between 0 and 1.32 seconds per foot at one inlet, and between 0 and 1.75 seconds per foot at the other inlet. Levels of *E. aerogenes* were very high, at an average of 94,000/100mL, near ten times the normal level. Heavy metals were present in high concentrations, including cadmium (0.11–1.0 ppm) and lead (0.1–5.0 ppm). These observations all indicated that Patchogue Lake was in the final stages of eutrophication/death. Clearing of the inlets and removal of the rooted plants would increase the flow rate, reduce sedimentation, and slow the formation of lake islands. It was also recommended that the local community be educated about reducing the use of fertilizers

and detergents containing phosphorous to reduce algal bloom. Deterrence of ducks on the lake by dog presence would reduce levels of organic wastes. Selected aquatic plants were used for phytoremediation of heavy metals. The lake began to show signs of improvement until 2002. Due to lack of funds, the lake began to deteriorate. As of 2006, 60% of the lake appears dead.

Mercury in Stream Water and Biota in the Upper Hudson River Basin

Riva-Murray, Karen and Douglas Burns (U.S. Geological Survey, Troy, NY)*

An investigation of mercury (Hg) cycling and bioaccumulation in the Upper Hudson River basin of New York was initiated in 2005 as part of the National Water Quality Assessment. This study has the overall goal of determining the biogeochemical, geomorphic, and landscape controls on mercury in stream biota. Intensive study of the 6522 ha Fishing Brook sub-watershed was initiated in 2007 to determine factors associated with temporal and spatial variation in mercury concentrations in water and biota. Water and macroinvertebrate samples were collected seasonally at nine stream sites draining 98 to 6522 ha, and low to high percentages of wetlands. Water samples were analyzed for dissolved and particulate total and methyl mercury, and related constituents. Macroinvertebrates and fishes representing various functional feeding groups were analyzed for mercury and stable isotopes of carbon and nitrogen. Most of the MeHg in water samples was in the dissolved phase. Dissolved MeHg concentrations showed large spatial and temporal variation, with lowest concentrations at a small stream draining entirely uplands and highest at sites immediately downstream of large wetlands. Mercury in muscle tissue from 5 brook trout (*Salvelinus fontinalis*) collected at the watershed outlet in November ranged from 0.18 to 0.35 ppm wet weight (median 0.31 ppm). Carbon stable isotope values for selected macroinvertebrate taxa varied among sites in relation to a land cover characteristics. Mercury concentrations in biota will be examined in relation to spatial and temporal variation in biological, physical, and chemical characteristics.

Plant Apparency and Vulnerability to Herbivory

Rollinson, Emily, Susan Tsang, and Joshua Ness (Skidmore College, Saratoga Springs, NY)*

Plant apparency describes the probability that a plant will encounter an herbivore within its lifetime; “apparent” plants are more likely to be discovered by natural enemies. Here, we test the consequences of three possible scales of plant apparency: the lifespan and size of a plant, and its origin (i.e. native or non-native). We predicted that apparent plants are more easily discovered by herbivores than are unapparent plants. As a result, apparent confamilials would experience relatively consistent levels of herbivory, while unapparent confamilials would experience lower mean herbivory rates with greater among-individual variation. We identified perennial trees, shrubs and vines as highly apparent, perennial herbs as intermediately apparent, and annuals and biennials as unapparent. We define a non-native plant as unapparent in relation to native plants. We tested these hypotheses by estimating leaf area loss on individuals in 31 plant families. Native plants on average lost a significantly higher percentage of leaf area than did non-native plants; there was no difference in leaf loss among lifespan and size groups. Variability in leaf loss was significantly higher in annual plants than in either perennial character, and perennial herbs were significantly more variable than perennial trees, shrubs and vines. Our results support lifespan/size and origin of a plant as accurate descriptors of its apparency to herbivores, and support the plant apparency hypothesis as an accurate descriptor of the distribution (mean and variability) of herbivory among plants.

Analysis of Whip-Poor-Will Habitat Characteristics in New York State

Rush, Theresa and Timothy Post (New York State Department of Environmental Conservation, Albany, NY)*

Whip-poor-will (*Caprimulgus vociferus*) populations in the Northeast are believed to have declined in the past 50 years. Comparison of New York State Breeding Bird Atlas results from the 1980–1985 and 2000–2005 surveys, indicate that they have experienced significant declines in New York State. Whip-poor-will roadside surveys were conducted in June and July of 2006 (except for 1 location that was surveyed in May 2007) at 15 locations that were selected based on knowledge of the presence of current or past populations of whip-poor-wills near the route locations. The routes were a combination of random (woodcock routes) and non-random (routes run in known habitats). Survey protocol followed that of the Northeast Nightjar Survey with exceptions noted at certain locations. Habitat characteristics were determined within a 0.5 mile diameter circle around each survey point using aerial orthoimagery. Eight of the 15 routes (53%) surveyed had at least one singing male whip-poor-will detected. Fifty-three of the 144 (37%) total survey points had whip-poor-wills detected, with a total of 99 whip-poor-wills detected. Analysis of habitat characteristics indicated that in this study, a positive correlation was present between whip-poor-wills and low elevations and sandy soils. A negative correlation was seen between whip-poor-wills and high numbers of houses present within the survey plot. Further research would be needed to determine the significance of these findings.

Initial Hydrologic Performance and Amphibian Utilization of Created Vernal Pools

*Samanns, Ed, Richard Bolton**, and *Dana Long* (The Louis Berger Group, Inc., Morristown, NJ)

Construction of a new two-lane access roadway has been completed to provide improved access to Stewart International Airport in Orange County, New York. To minimize potential impacts to two New York State Species of Special Concern; spotted turtle (*Clemmys guttata*) and; Jefferson salamander (*Ambystoma jeffersonianum*), and other wildlife species, a mitigation plan was devised to replace vernal pool habitat utilized by these species. The design places major emphasis on site hydrology since this would be the determining factor for target species use of these habitats. The intended inundation hydroperiod (March through July) was based on the target species breeding requirements and was the basis of determining if an individual vernal pool site could be successful. Water budgets developed for each proposed site determined the necessary design elements required to establish naturally functioning vernal pool hydrology (Samanns and Zacharias 2003). Construction of the vernal pools was completed in December of 2006 and monitoring began in 2007. Monitoring included the use of data loggers to measure daily water levels in each pool and amphibian presence/absence surveys weekly during the peak breeding period of target species (March–April, and the second week in September through October). Vernal pool amphibians including *Rana sylvatica*, *Bufo americanus* and *Pseudacris crucifer* were observed in seven of twelve created vernal pools during monitoring. The performance of the model was evaluated by comparing recorded water level fluctuations with model outputs using 2007 climactic data for four of the vernal pools which were successful in attracting vernal pool amphibians.

Impact of Japanese Barberry on Soil Nitrogen and Ectomycorrhizal-Eastern Hemlock Mutualisms

*Spitzer*¹*, *Jesse, Mark Weckel¹*, *Rod Christie¹*, and *Tom Horton²* (¹Mianus River Gorge Preserve, Bedford, NY, ²State University of New York College of Environmental Science and Forestry, Syracuse, NY)

Japanese barberry, *Berberis thunbergii*, an invasive plant common in the Northeastern United States, has been shown to increase nitrogen cycling and nitrification. Increased soil nitrogen has been found to cause a decrease in ectomycorrhizal fungal (EMF) colonization of tree roots, presenting a further obstacle to forest regeneration in most Northeastern forests. In this exploratory study, we investigated the relationship between soil nitrogen levels and ectomycorrhizal colonization of hemlock seedlings in the presence of Japanese barberry. We hypothesized that nitrogen availability would decrease and percent EMF colonization increase as a function of increasing distance from individual barberry plants. No soil nutrient (NH₄, NO₃, P, total organic matter, total N) was significantly correlated with distance; however, percent inoculation and distance were positively correlated as predicted ($R^2 = .554178$, $P < 0.001$). Though our results suggest that barberry presence does cause a decrease in ectomycorrhizal colonization of young hemlocks, changes in soil nitrogen do not seem to be the ultimate cause.

Biodiversity of a Unique Habitat in an Urban Setting

*Stanley**, *Susan and Ellen Pehek* (New York City Department of Parks & Recreation, Natural Resources Group, New York, NY)

Despite New York City's mountains of concrete and dense population, its natural areas provide an important refuge for many species of wildlife. Most of the city's undeveloped land is in the borough of Staten Island, much of it in private ownership. As these green spaces quickly disappear, parkland becomes essential to the continued survival of local wildlife species. The 110-acre Ocean Breeze Park is a unique natural area in northern Staten Island supporting an incredible diversity of flora and fauna. Originally an estuarine salt marsh, the site was filled in, over time developing into a complex of seasonal freshwater wetlands within open, sandy uplands. An unusual habitat type in the metropolitan area, Ocean Breeze Park has the highest odonata species count in the city for any one year in recent times, including three New York State rare species, Rambur's forktail (*Ischnura ramburii*), citrine forktail (*Ischnura hastata*), and Needham's skimmer (*Libellula needhami*). The park also hosts a sizeable population of fowlers toads (*Bufo fowleri*) and may still support the southern leopard frog (*Rana sphenoccephala*), found there historically, now extremely rare within city limits. Locally uncommon bird species recorded include the savannah sparrow (*Passerculus sandwichensis*), field sparrow (*Spizella pusilla*), and boat-tailed grackle (*Quiscalus major*). As recent survey work took place only in 2007, further exploration of the park will likely yield more interesting finds of both invertebrate and vertebrate species.

Community-Level Physiological Profiling Differentiates Rome Sand Plains (NY) Soil Microbial Communities

*Starr**, Emily, William *Pfitsch*, and Michael *McCormick* (Hamilton College, Clinton, NY)

Community-level physiological profiling (CLPP) is a method for studying the catabolic potential of microbial communities. This study used CLPP to compare the soil microbial communities from different habitat types at the Rome Sand Plains, a pine barren in Central New York. Multivariate analysis of the results from CLPP showed that the microbial communities in areas with wild blue lupine (*Lupinus perennis*) had a catabolic potential that differed from the microbial communities of the other habitat types that were sampled: sand, moss, and forest. These differences were apparent when either raw data or data normalized to account for differences in inoculum density were analyzed. The normalized data indicate that soil pH and total organic content may influence the catabolic function of these microbial communities. Information regarding the microbial community function at the Rome Sand Plains could be important to habitat restoration, as the community is losing open areas such as the sand, moss, and lupine habitats due to forest succession. Restoration efforts currently focus on expanding the lupine population, on which the New York State-threatened frosted elfin butterfly (*Callophrys irus*) depends.

An Examination of Winter Diet, Parasites, and Diseases of Coyotes in Pennsylvania

*Stewart**, Richard (Shippensburg University, Shippensburg, PA)

Coyotes, *Canis latrans*, have recently (10–85 years) expanded their range into eastern North America. Because of this expansion, I began a study to investigate their natural history in Pennsylvania. Blood, stomach, and colon samples were collected from hunter and trapper-killed coyotes from various regions of the state between 2003 and 2007. The contents of 98 stomachs were collected and analyzed using hair (medullary and scale patterns), bone, and feather comparison with reference specimens. Ten mammal species were identified, although white-tailed deer, *Odocoileus virginianus*, was the most abundant, present in 62% of examined samples. Three bird species were also identified with wild turkey, *Meleagris gallopavo*, most abundant, present in 6% of the stomachs. Using ELISAs; we tested 72 serum samples for Canine Distemper Virus and Canine Parvovirus with antibodies present in 32 (44%) and 39 (54%) of the samples respectively. Additionally, 116 coyote serum samples were tested for antibodies to dog heartworm, *Dirofilaria immitis*, with antibodies present in 7 (6%) of the samples. The contents of 93 coyote colons were examined for endoparasite eggs or cysts using standard fecal floatation technique. Each sample was split and exposed to sodium chloride or zinc sulfate solutions. Sixty-three percent of these samples demonstrated infection and 31% showed concurrent infection with more than 1 parasite. The parasites identified include seven species of nematode; three species of Platyhelminthes; and three different protozoans.

Is *Lupinus perennis* Population Expansion Symbiont-Limited in the Rome Sand Plains?

*Stinson**, Emily, Heidi Clark, Katie Goodwin, Alex Hodgens, William Pfitsch, and Ernest Williams (Hamilton College, Clinton, NY)

Wild blue lupine, *Lupinus perennis*, is the host plant for the threatened butterfly *Callophrys irus* in central New York state. Lupine benefits in nitrogen deficient conditions from an association with nitrogen-fixing bacteria, *Bradyrhizobium* that colonize root nodules. Lupine populations at the Rome Sand Plains (RSP) are declining due to the encroachment of trees in its open habitat, but natural and transplanted populations in open areas and tree removal management areas have not increased recently in stem numbers. Our objective was to determine whether a lack of availability of *Bradyrhizobium* in the soil might potentially be limiting lupine population expansion. We grew lupine seedlings in soil samples collected from each of 23 locations at RSP including natural and transplanted lupine plots as well as bare sand and cryptogam dominated plots. To assay the *Bradyrhizobium* availability, we counted root nodules formed after 8 week of growth under greenhouse conditions. We weighed the plants to estimate the growth benefit of nodulation. Root nodules formed on plants grown in soil from each plot, but the number of nodules formed was significantly less in the bare sand samples. There was a positive correlation between plant biomass and nodule number, except for in the bare sand samples. These results suggest that *Bradyrhizobium* is present in the soils at RSP and availability shouldn't be a limitation to lupine establishment, but bacterial abundance and perhaps symbiotic benefit differs depending on location. Further investigation is required to fully understand the role of *Bradyrhizobium* limitation to lupine expansion at RSP.

Biodiversity Conservation at the Townwide Scale: A Tale of Extremes

Tabak*, Nava, Kristen **Bell**, and Claudia **Knab-Vispo** (Hudsonia Ltd., Red Hook, NY)

Since 2002 Hudsonia's Biodiversity Resources Center has produced maps of the ecologically significant habitats of seven towns in Dutchess County, and two additional large areas in Dutchess and Ulster Counties. Along with specific conservation recommendations for particular habitat types, the reports for these projects provide towns with recommendations for conservation at the townwide scale to achieve the greatest returns for native biological diversity. The two most recent townwide habitat maps were created for the Dutchess County towns of North East and Poughkeepsie, which represent the rural and suburban extremes among the towns we have mapped to date. The Town of North East has a tremendous array of intact, high-quality habitats (including several rare habitats) in a matrix of large contiguous areas of forests and fields. The landscape of the Town of Poughkeepsie is highly fragmented by roads and developed land uses, yet still retains an array of habitat types that can support a diverse biota. Our conservation recommendations were designed to address the dramatically different landscape conditions in each town. In both cases we focused on the protection of the rarest habitats, the most vulnerable habitats, and the largest areas of contiguous intact habitat. For Poughkeepsie our recommendations also addressed possible enhancements to developed areas that could moderate the effects of development on nearby habitats, provide travel corridors for wildlife, and provide some elements of habitat in and of themselves for certain species of conservation concern.

Influence of Leaf-Litter Quality and Diversity on In-Stream Decomposition Rates

Taggart*, Brian, Megan **Garfinkel**, and Joshua **Ness** (Skidmore College, Saratoga Springs, NY)

We tested the hypothesis that increasing foliar C:N slows decomposition rates, and that the magnitude of these differences are influenced by the plant diversity. We compared leaf litter decomposition rates and arthropod colonization of artificial leaf packs of known C:N ratios in Kayaderosseras Creek, Ballston Spa, New York. Single- and two-species leaf packs with C:N ranges from 20–70 were collected after 14 and 21 days, sorted for arthropods, and weighed after drying. Our leaf packs included a selection of local species, and decomposition rates varied by an order of magnitude across treatments. Decomposition rates decreased with increasing foliar C:N, but were also typically twice as fast for single species leaf mixes, relative to leaf packs with similar C:N that included two species. We attribute this latter difference to differences in mean leaf toughness and arthropod community composition between single and mixed species leaf packs. Although the total numbers of arthropods were similar among the species richness treatments, the single species packs included a greater proportion of stoneflies (leaf shredders) relative to taxa identified as omnivores, and, by chance, were less tough. Our study demonstrates that plant and animal community composition interact to influence leaf decomposition rates in streams.

***Polemonium vanbruntiae* Britton (Jacob's Ladder) Pollination Trials and Point Quarter Transect Survey**

Tedesco*, Connie, Donna **Vogler**, and Jen-Ting **Wang** (State University of New York College at Oneonta, Oneonta, NY)

Although *Polemonium vanbruntiae* Britton (POLEMONIACEAE), Appalachian Jacob's Ladder, is considered to be a rare plant in the northeast United States, little is known about its pollination biology and population demographics. Compounding this problem is the lack of a consistent monitoring protocol for populations spatially and temporally. The population for this study, one of the largest and most robust in its range, is located at the Lordsland Preserve in Roseboom, NY, a Nature Conservancy site. Like many *P. vanbruntiae* populations this isolated wetland experiences beaver activity, periodic flooding, deer herbivory, and variable canopy cover and pollinator activity. Although the flower morphology, protandry, and pollinator activity indicate a primarily out-crossed species, the unpredictable environment and vegetative regeneration suggest a potential for self-pollination for reproductive assurance. Five pollination treatments including pollinator exclusion and hand pollinations were applied to 315 flowers to test this hypothesis. Results indicate that *P. vanbruntiae* is capable of some degree of autogamous selfing and that fruit set, seed number, seed weight, and seed germination rate of self- versus out-cross pollinations were not significantly different. To quantify plant density, a point quarter transect survey was utilized. The estimated population of 4,365 plants covered a 1200 m² area, 12% of which flowered in 2006. The ecologically distinct upper and lower sites varied in plant density and plant height. This survey method works well when monitoring populations under heterogeneous strata with a moderately clumped dispersion.

Forest Change in the Chestnut Oak Forest of the Mohonk Preserve

Thompson^{*1}, John, Thomas Sarro², and Les Lynn³ (¹The Mohonk Preserve, Daniel Smiley Research Center, New Paltz, NY, ²Mount Saint Mary College, Newburgh, NY, ³Bergen Community College, Paramus, NJ)

Chestnut Oak forest is an important ecological community on the Mohonk Preserve and throughout the Shawangunk Mountains. Prescribed burns were performed in 1978 and 1979. Vegetation plots were surveyed in 1977 (pre-burn), 1980 (post-burn), and again in 2003. Unburned plots were surveyed in Chestnut Oak forest 1982 and 2004. Tree composition of the Chestnut Oak forest is changing with a decline in Chestnut Oak importance within the forest. Red Maple is becoming more important as is Red Oak. Gypsy Moth defoliation in combination with other environmental factors, such as drought, and winter damage, has had a prolonged effect on Chestnut Oak in the tree canopy, causing mortality of larger trees. A lack of regeneration of Chestnut Oak threatens the future of the forest. Saplings within the Chestnut Oak forest have declined in number and there were no Chestnut Oak saplings found in burned plots in 2003. Fire impacted the sapling and small tree layers, having a pronounced negative effect on Striped Maple. The 1979 prescribed fire caused mortality of small Red Maple trees, and consequently over the 24 years subsequent to the burn less Red Maples have matured into the larger size class. The prescribed fires favored shade-intolerant species and lack of fire favored shade-tolerant trees. Red Maple increased in areas that were burned and in unburned areas. By studying vegetation change it is hoped that we will better understand the underlying processes maintaining ecological systems in the northern Shawangunks and to better manage for functional systems in the future.

Seasonal Movement Patterns, Habitat Preferences, and Implications for Management of *Clemmys guttata*

Treanor^{*1}, Sarah, Rachael Freeman², and Sarah Hinman² (¹University of Connecticut, Storrs, CT, ²Nantucket Conservation Foundation, Nantucket, MA)

Clemmys guttata (spotted turtle) is a semi-aquatic, fresh-water species of eastern North America. Throughout most of its range, this species is considered threatened, endangered, or vulnerable. Declines in the abundance and distribution of *C. guttata* are primarily attributed to factors such as habitat destruction, fragmentation, over-collection and road mortality. Habitat succession is also known to negatively impact *C. guttata* populations. However, management actions aimed at maintaining the early successional habitats preferred by this species, especially mowing, have recently been shown to have significant negative impacts on turtle populations. Since 2005, the Nantucket Conservation Foundation (NCF) has been studying the demographics and habitat preferences of *C. guttata* on its Squam Farm conservation property, which is actively being managed with mowing and sheep grazing to prevent habitat succession. Individual turtles have been tracked via radio telemetry to examine home ranges, daily and seasonal movements, and distances traveled. These patterns were assessed by individual and by season to determine overall habitat use patterns. We also compare seasonal activity patterns of *C. guttata* on Nantucket with other north eastern *C. guttata* populations. Given that management implemented to maintain early successional habitats may negatively impact *C. guttata* individuals, information on habitat use patterns is being used to guide management strategies and develop property conservation plans. To perpetuate *C. guttata* populations, it is imperative to have a thorough understanding of their population dynamics and movement patterns in order to avoid disturbance in migration corridors, breeding grounds, and hibernacula locations during critical times of the year.

Hatchling Locomotor Performance within and among Four Northeastern Diamondback Terrapin Populations

Trotta^{*2}, Alex, Erin Horn¹, and Russell Burke¹ (¹Hofstra University, Hempstead, NY, ²Wellington C Mepham High School, Bellmore, NY)

Variation in hatchling locomotor performance among four Northeastern diamondback terrapin populations Diamondback terrapins (*Malaclemys terrapin*) live in a narrow strip of Atlantic Ocean coastal habitat from MA to FL and the Gulf Coast to TX. Significant inter-population variation in adult body size, egg size, and clutch sizes has been reported in terrapin populations along the east coast latitudinal gradient. Such patterns are seen in many turtle species, but their evolutionary origins are poorly understood. One hypothesis suggests that eggs tend to increase with latitude because selection favors larger hatchlings in colder climates. We performed a common garden experiment, in which terrapin eggs were collected from two sites at the same latitude, and two sites at different longitudes. The eggs were incubated and hatchlings raised under common conditions. We used measures of willingness to walk and walking speed as indicators of hatchling fitness. As expected, egg sizes varied significantly between the four sites, and egg size was significantly correlated with hatchling size. Egg size, hatchling mass, and hatchling carapace length were not associated with walking speed. However, egg size was significantly associated with willingness to walk. This suggests that selection on egg size may be associated with subtle behavioral traits.

The Horned Clubtail Dragonfly, a Recent Arrival in New York State

*Trybula**, Jan (SUNY Potsdam, Potsdam, NY)

Arigomphus cornutus, the Horned Clubtail, is a dragonfly native to the upper Midwest and the Great Lakes. The species has also been known from southern Ontario, Canada, with most locations there being identified since the 1980s. In the U.S., the farthest eastern record was Michigan. This species favors sluggish streams, ponds, and other waters with marshy margins. On 6 June 2006, a teneral adult female and a mature male were collected along the Racquette River, just south of Potsdam, NY. On 21 June 2006, another mature male was collected at Indian Creek Nature Center at Upper and Lower Lakes Wildlife Management Area, near Canton, NY. The two sites are approximately 24 km apart. Efforts are underway to study the distribution of this species in northern New York.

Morphometrics of Grass Shrimp Species in New York and Florida

Viloria, Franchette, Eugene *Didonato*, Islam *Aly*, Tara *Glover*, Allen *Burdowski*, and Kathleen *Nolan** (St. Francis College, Brooklyn, NY)

Over one hundred grass shrimp *Palaemonetes pugio*, *P. vulgaris*, and *P. intermedius* were collected in the spring of 2006 and 2007 from the Salt Marsh Nature Center, Jamaica Bay (Queens, New York), Beczak Environmental Education Center (Yonkers, New York) and Apalachee Bay in Florida. These were identified, weighed, and measured. *P. pugio* was the most abundant, comprising over 70% of the samples collected. Eggs of gravid shrimp were counted using a Motic camera set-up and Image J. Data graphs (frequency distribution, length vs. mass, length vs. egg count, and mass vs. egg count) were created. There is a direct exponential relationship between length and mass of *P. pugio*. *P. pugio* from the north are generally longer and heavier than their southern counterparts. Gravid *P. pugio* from the south average 3.0 cm in length, while gravid *P. pugio* from the north average 4.0 cm in length. Global warming may affect the various habitat of *P. pugio* along the Atlantic and Gulf coast, which in turn, may upset the ecosystems of those areas. Therefore, it is imperative to have a baseline to compare future data against.

Effect of Artificial Night Lighting and Time on Aquatic Snail Activity Patterns

*Vo**, Khoa, Thomas *McCarthy*, Bryant *Buchanan*, and Sharon *Wise* (Utica College, Utica, NY)

Light pollution (artificial night lighting) affects the behavior of many vertebrate and insect species. However, few studies have examined the effect of artificial night lighting on behavior of aquatic invertebrates. *Physa acuta* is a common aquatic snail found throughout North America. We investigated the activity of *P. acuta* exposed to a 12L:12D photoperiod with 100 lx illumination during photophase (diurnal) and illuminations of 100 lx (daylight), 1 lx (dim daylight), 0.01 lx (full moon light), and 0.0001 lx (dark night) during scotophase (nocturnal). Infrared cameras were used to record snail movements at 0700–0900 h, 1230–1330 h, 1700–1900 h, and 0030–0130 h. We found no differences in activity due solely to variation in nocturnal light levels. Snails did show significant variation in activity based on time of day with more activity during the dark-to-light transition period (0700–0900 h) than during the light-to-dark transition period (1700–1900 h). There was no difference in activity between mid-photophase (1230–1330 h) and mid-scotophase (1700–1900 h). We did find a significant interaction effect of night lighting treatment by time: only snails exposed to the dark night treatment (0.0001 lx) showed significant variation in activity between the light-to-dark and dark-to-light transition periods; those in the continuous lighting treatment (100 lx) showed relatively low activity during both transitional periods. These results suggest that individuals of *P. acuta* are crepuscular (being more active at dawn than during other periods) and that constant bright light at night (constant day-night lighting) may reduce snail activity at dawn.

Assessing Temporal and Spatial Variation within a Region of the Bronx River, NY

*Warkentine**¹, Barbara and Joseph *Rachlin*² (¹SUNY Maritime College, Bronx, NY, ²Lehman College of CUNY, Bronx, NY)

Community structure of freshwater invertebrates is routinely used to assess the state of a water body. By analysing community structure data, using a number of established indexes, the system can be classified along a continuum which ranges from very poor to excellent. In this study we collected invertebrates from the Bronx River, NY at two adjacent sites within the New York Wildlife Conservation Society's Zoological Park. Collections were made on a weekly basis over a three month period (6 June 06–22 August 06) and were used to test the hypotheses that: 1) water quality will show temporal variation, and 2) the two adjacent sites would show spatial variation. These sites, one along the west bank (W) of the river and one within the middle section (MS) of the river separated by approximately 6 meters, constituted our sampling site

locations. Five minute simultaneous samples at each site were taken using 500 micron mesh drift net samplers. Assessment metrics used were: family-level biotic index (FBI), EPT index, family-taxa richness (RICH), Shannon diversity and evenness indices. FBI values showed minimal temporal variation with values ranging from 5.92 to 7.06. This places the system within the fairly poor to poor range. FBI values showed minimal spatial variations with values differing from 0.08 to 0.23. Thus, system classification congruence between sites (W vs. MS) was observed. All other index values (EPT, RICH, Shannon, & Evenness) were in agreement both on a spatial and temporal basis. Therefore, the hypotheses postulated in this study have been falsified.

Mile-a-Minute Vine in the Hudson Valley: A Collaborative Response

*Weyeneth**, Laura and Emilie *Hauser* (Hudson River National Estuarine Research Reserve, Staatsburg, NY)

Mile-a-minute vine, *Persicaria perfoliata* (formerly known as *Polygonum perfoliatum* L) was accidentally introduced to the United States in the 1930s and is found in the Mid-Atlantic states. Except for small occurrences in Massachusetts and Rhode Island, the vine extends north to Orange and Dutchess counties in the mid-Hudson Valley and to Fairfield and Litchfield counties in Connecticut. The annual vine, native to East Asia, can grow up to six inches a day, has scandent growth and can shade out most vegetation. Seeds can persist for up to seven years, so a multi-year effort is required to deplete the seed bank. Seeds are believed to be transported by water and birds. Early detection and rapid response of mile-a-minute infestations in the Hudson Valley can prevent the spread of this vine to other parts of New York. In 2006, an ad hoc collaborative group, made of more than 15 agencies and not-for profits began working together to set up a volunteer system for reporting, mapping, monitoring and controlling mile-a-minute infestations. Twenty-six infestations were reported in 2007, including several acres in the upper watershed of the Fishkill Creek in Dutchess County and 11 new sites in northern Orange County. Control efforts have concentrated on hand-pulling of vines by volunteers and herbicide application by property owners. The collaborative effort which includes a paid intern and a system of county coordinators and volunteer weed watchers and busters could be duplicated elsewhere.

Food Intake and Growth of Salamanders (*Ambystoma*) Fed Different Earthworm Species

*Wheeler**, Brandon, Marybeth *Voltura*, and Peter *Ducey* (SUNY Cortland, Cortland, NY)

Changes in earthworm communities, resulting from invasion of exotic species and/or loss of established species, could significantly impact the nutritional ecology of salamanders that feed on earthworms. The goal of this experiment is to determine whether diets composed of different earthworm species affect the food intake and growth of newly-metamorphosed juvenile salamanders (*Ambystoma* spp.). Salamanders (*A. maculatum* and *A. jeffersonianum*) were captured from local populations in Cortland County NY, just after emergence from the ephemeral ponds in August 2007. They were randomly assigned to a diet containing *Octolasion*, *Eisenia* or *Lumbricus* earthworms (which were collected locally, maintained in the laboratory, and gut clearances performed before feeding). Twice weekly, salamanders were offered earthworm meals equivalent to approximately 20% of their total body mass. Food intake, body mass and linear growth were measured for 14 weeks. Food intake over the 14 weeks was a very good predictor of body mass gain for both *A. jeffersonianum* and *A. maculatum* ($R^2 = 0.95$, and $R^2 = 0.89$, respectively). There was a significant effect of earthworm diet on linear growth for *A. maculatum*: salamanders fed *Octolasion* worms grew longer (as measured by change in snout-vent length) than salamanders fed *Eisenia* or *Lumbricus* ($p=0.0008$ and $p=0.0062$, respectively).

Nesting Habitat Improvement for Blanding's Turtles in Northern New York

*White*¹, Alaina, Jason *Gokey*¹, Joshua *Cameron*¹, Glenn *Johnson*^{*1}, Daniel *Parker*², and Lee *Harper*³ (¹Department of Biology, SUNY Potsdam, Potsdam, NY, ²New York Power Authority, Massena, NY, ³Riveredge Associates, Massena, NY)

The nesting behavior of the New York State-Threatened Blanding's turtle (*Emydoidea blandingii*) was investigated in a wetland complex in St. Lawrence County from 2003–2006. Investigations identified three potential nesting areas characterized by exposed sandy substrates. Movement patterns of telemetered gravid females indicated that one area, a large cornfield, was used exclusively for nesting. To improve the nesting habitat in the other two potential nesting areas, vegetation was cleared from a 2.7 ha area in Fall 2006. In 2007, temperature dataloggers monitored soil temperature during the nesting season in the cornfield, newly-cleared areas, and adjacent forested habitat. Nest construction, egg laying, egg hatching, and hatchling emergence were also monitored. Of 18 Blanding's turtles observed in the cornfield from 9–16 June, eight were found nesting. All nests suffered egg mortality and two nests (25%) failed completely. Of the 99 eggs deposited, 51 (52%) hatched. Only one Blanding's turtle was observed in the cleared area but it was not observed to nest. Daily high and low soil temperatures were

consistently higher in the cleared area than either the cornfield or forested area during the nesting period. The lack of nesting in the cleared area despite the thermally-superior nesting habitat may be due to a high degree of fidelity to previously used nesting locations coupled with low recruitment of new females into the nesting population in a given year. Monitoring for additional years is needed before the success of the nesting habitat manipulation can be fully assessed.

Comparison of Symbiotic Benefit of *Lupinus perennis* Root Nodule Bacteria

*White**, Katie and William *Pfitch* (Hamilton College, Clinton, NY)

Rhizobia, soil born bacteria, and legumes form a vital symbiotic relationship via root nodules that enrich soils with the most common limiting nutrient, nitrogen. The understanding of this relationship has been crucial in the agricultural world but little has been studied regarding non-crop species. *Lupinus perennis*, the common blue lupine, native to the Rome Sand Plains, Rome, New York, forms a symbiotic relationship with the soil bacterium *Bradyrhizobia*. The objectives of this study were to determine whether *Bradyrhizobia* strains cultured from soil from different locations were different and whether there were differences among strains in symbiotic benefit to the lupine host plant. Strains were cultured from root nodules developed on lupine grown in different soil collections: 1) native lupine habitat, 2) bare sand, lupine and moss free habitat, and 3) lupine transplant habitat. Subsequently, lupine seedlings were inoculated with these cultures and grown for eight weeks to assess bacterial symbiotic benefit. All replicates developed root nodules and inoculated plants were significantly ($p < 0.01$) larger than the non-inoculated control plants. There was a positive correlation between total mass and number of nodules but no differences in total mass (g), root mass (g), shoot mass (g) or number of nodules were observed among strains ($p > 0.05$), thus there was no evidence for differences in symbiotic benefit. Future genetic sequencing of each strain and nitrogen analysis of plant material will supplement these results.

Role of Leaf Litter in Phosphorus Uptake in a Hudson River Tributary

*Wohl-Pollack**¹, Leah, Catherine *O'Reilly*², and Catherine *Gibson*¹ (¹Skidmore College, Saratoga Springs, NY, ²Bard College, Annandale-on-Hudson, NY)

Phosphorous is commonly a limiting nutrient in aquatic ecosystems. Dissolved phosphorous is taken up by bacteria and fungi, which cycle it downstream. We investigated the role of leaf litter in stream nutrient cycling by testing phosphorous uptake length before and after removing leaves from a stream in autumn. We used a battery operated pump to drip phosphorous downstream, then determined uptake length by measuring the concentration of phosphorous in the water at 30 m intervals. We performed the phosphorous drip twice, once while leaves were in the water, and again after removing the leaf litter by hand. We found that phosphorous concentrations decreased over the 225 m stretch of stream both before and after leaf removal. We calculated that uptake length prior to leaf removal was 163 m, and it increased to 282 m following leaf removal. Therefore, it appears that removing the leaves from the stream resulted in a decrease in phosphorous uptake efficiency. The microbial activity and subsequent nutrient uptake promoted by leaf litter inputs is essential to the health and productivity of the stream, therefore protection of riparian zones is necessary as they provide essential organic matter to the benthos and aid in nutrient retention.

Index of Authors

A

Acker 12
Adams 5, 13, 61
Alexander 43
Allee 33
Aly 83
Ambler 5
Ambrose 42
Argent 34
Aschen 61
Averill 5

B

Baldwin 6
Bank 6
Barnett 6
Batcheller 7, 26
Batcher 61
Battaly 7
Beemer 61
Bell 7, 81
Benner 64
Benson 72
Berkhout 77
Bishop 62
Bloomfield 50
Blossey 61
Bock 25
Bogan 7, 71
Bolton 79
Bombard 16, 20, 38, 50
Bonanno 8
Bopp 71, 72
Boser 8, 26
Bowman 40
Boylen 12, 16, 20, 21, 38, 48, 49,
50, 54, 69, 76
Bozarth 62
Breisch, Alvin 8, 12, 19, 25, 62
Breisch, Ariana 62
Breisch, Kirstin 9, 62
Bried 9
Broadwell 63
Brody 25
Brooks, Robert 46, 63
Brooks, Wesley 10

Brown 10
Browning 55
Broyles 10, 63
Brunner 11
Buchanan 83
Buhr 34
Bukaveckas 12, 49
Burdowski 83
Burger 74
Burke 63, 82
Burns 78
Bustamante 11
Byrne 53

C

Cady-Saywer 39
Caldwell 32
Calhoun 11, 22, 68, 75
Cameron 84
Cappuccino 8
Caraco 53
Carlson 34
Carlsson 12
Chabot 64
Chaloux 12
Charles 12
Christie 61, 73, 79
Ciccotelli 64
Clancy 34
Clark, Heidi 64, 67, 80
Clark, Rulon 10
Clendening 63
Cogbill 13
Cole 53
Collins, Christopher 65
Collins, Ryan 77
Cook 63
Cope 39
Cornwell, Mark 45
Cornwell, Scott 42
Corser 13
Cotroneo 13
Coulter 14, 18, 24
Crabtree 14
Craig 14
Crane 15, 64

Curran 39
Curry 27
Curtis, Abigail 15
Curtis, Paul 7
Czech 15

D

Daniels 16, 36, 50
Danks 16
Danoff-Burg 14, 30
Davis 17, 52
Dechen 17
Decker 53
DeHollander 38
DeLeon 14, 18, 24
del Puerto 74
Denninger 77
Deppen 65
DeSisto 63
de Solla 17, 65
Diaz 22
Dickinson 40
Didonato 83
Dirig 18, 39
Dirrigl, Jr. 18
Disarno 53
DiTommaso 5, 8
Draheim 19
Draud 19, 76
Ducey 19, 63, 84
Durie 45

E

Eckler 5
Edinger 9
Egan 44
Ehrenfeld 10
Eichelberger 66
Eichler 20, 38
Elbin 14, 47, 66

F

Fahrner 20
Farnsworth 32
Farrell 20, 21, 69
Feranec 15, 21, 71

Findlay 22, 53
 Fischer 7
 Fishman 66
 Flint 39
 Foster 42, 45, 53
 Frair 8, 26
 Frank 22
 Freeman, Laurie 47
 Freeman, Rachael 82
 Friend 25
 Frischer 76

G

Gaffin 40
 Gahl 22, 68
 Gallery 71, 72
 Gamble 42
 Garfinkel 81
 Garneau 72
 Gary 22
 Getman 63
 Gibbs 15, 26, 29, 45, 49
 Gibson 76, 85
 Glennon 23
 Glover 67, 83
 Gokey 67, 84
 Golding 53
 Goodell 10
 Goodwin, Katherine 67
 Goodwin, Katie 64, 68, 80
 Gormezano 73
 Graves 68
 Griggs 35
 Grigione 23
 Grove 14, 18, 24
 Grubel 68
 Guagnano 19
 Guilderson 52
 Gurbacki 69

H

Hames 24
 Hamilton 32
 Hannam 69, 75
 Harper 84
 Harris 43
 Harrison 21, 38, 69
 Hart 24
 Hartwig 25

Hauser 57, 84
 Hecht 25, 69
 Heininger 70
 Herzog 38
 Hicks 38
 Hill 25
 Hinman 82
 Hodgens 64, 67, 80
 Holdrege 70
 Holdsworth 35
 Holevinski 8, 26
 Homan 58
 Horn 26, 82
 Horton 79
 Horvath 15
 Horwitz 26
 Hunt 27

I

Indelicato 70
 Innis 27
 Irland 32

J

Jain 27
 Jakabus 58
 Janis 34
 Jaycox 25
 Jenkins 27, 28, 37
 Johnson, Elizabeth 71
 Johnson, Glenn 45, 84
 Johnson, Lori 28
 Johnson, Piet 37
 Jones, Chad 28
 Jones, John 29
 Jones, Michael 29
 Jordan, Marilyn 36
 Jordan, Rebecca 10
 Julian 29

K

Kalb 72
 Kallaji 12
 Karasin 23
 Karraker 29
 Kays 15, 21, 30, 65, 70, 71
 Keller 26, 30
 Kenison 73
 Kennedy 5

Kerlinger 27
 Kimmel 34
 King 30
 Kirchman 30, 72
 Kishbaugh 30
 Kiviat 7, 25, 31
 Kleppel 31
 Klotz, Larry 63
 Klotz, Laurie 63
 Klotz, Richard 72
 Knab-Vispo 56, 81
 Kolozsvary 31
 Koontz 66
 Krest 37
 Krofta 49
 Kuhlmann 32
 Kurdyla 41, 52
 Kyker-Snowman 63

L

LaBarge 31
 Landis 73
 Langdon 39
 Lansing 64
 Lanzone 14, 18, 24, 32
 Laub 32
 Laurenti 77
 Lauro 72
 Lawler 72
 Lawlor 8
 Lawrence 38
 Lehman 5
 Leipzig-Scott 73
 Leopold 48
 Limburg 73
 Long 79
 Lorson 34
 Losey 33
 Lowe 24
 Lydon 53
 Lynn 82

M

Mack 73
 Maenza-Gmelch 41, 74
 Maldonado 62
 Malecki 61
 Malone 36
 Mandrino 42

Mango 75
Maret 5, 33
Martin, Lindsay 74
Martin, Pamela 17, 34
Mayer 33
Mazzocchi 5, 13
McCarthy 77, 83
McCormick 80
McDaniel 34
McGarigal 42
McGlynn 34
McGowan 10
McKeown 34
McKnight 42
McLellan 76
McMaster 34
McNulty 29
Mellor 10
Meyer 51
Michell, Kathy 35
Michell, Tom 35
Middel 40
Milano 76
Milbrath 5, 8
Miller, Daniel 48
Miller, Norton 35
Mitchell 36
Mohler 5
Molloy 33, 36
Momen 38
Moore 36, 67
Morgan 74
Morse, Richard 16, 36
Morse, Solon 6
Moser 26
Mott 40
Motzkin 37
Muldoon 37
Munney 37

N

Nagy 61, 73
Neal 75
Nemecek 38
Nemeth 75
Ness 73, 78, 81
Newman 38
Nichols 45
Nierzwicki-Bauer 12, 21, 38, 48,
49, 50, 76

Nixon 39
Nolan 67, 83
Novak 57

O

O'Brien, Kathleen 14
O'Brien, Robert 39
O'Reilly 48, 85
Olberg 59
Oles 39
Oliver 32
Orioles 77
Osborne 5
Oscarson 75
Otis 39
Overbeck 26
Ovtcharenko 40, 55
Ozard 8

P

Pace 53
Palmer 14, 40
Panko 7
Pappantoniou 43
Parker 84
Parsons, E.C.M. 19
Parsons, Katharine 47
Patterson 40
Pauli 41
Paulson 41
Pearce 47
Pehek 79
Percent 76
Peteet 41, 52, 74
Petrochic 76
Pfitsch 64, 67, 68, 80, 85
Pinder 42
Pinkney 37
Plunkett 42
Pollinger 30
Pond 40
Poole 42
Porter 16, 17, 50, 59
Porter-Goff 76
Post 77, 78
Pratt 36
Prestia 77
Prisciondaro 32
Provost 77
Pursel 77

Q

Quinn, Caitlin 42
Quinn, Scott 50

R

Rachlin 43, 83
Rajakaruna 43, 64
Rana 77
Reinicke 53
Reinmann 43
Reznik 44
Rice 75
Richmond 62
Riva-Murray 78
Robinson, George 17, 44
Robinson, Guy 44
Robinson, Sean 45
Rockwood 19, 62
Rollinson 78
Rosenbaum 77
Rosenberg 24
Ross 45
Rowe 45
Rubbo, Jennifer 46
Rubbo, Michael 46
Rulison 46
Rush 77, 78
Ruskin 47
Rutledge 47
Ryburn 47

S

Samanns 79
Sarno 23
Sarro 82
Sayward 51
Scanga 48
Schaaff 76
Schantz 35
Schmidt 48
Schock 11
Schreer 67
Seewagon 23
Shaw 12, 48, 49, 50
Sherry 34
Shoemaker 49
Siegfried 21, 31, 50
Sievert 29, 41, 58
Skrip 22, 50

Slobodnik 27
Smith, Tamara 14, 51
Smith, Zoe 51
Smyers 51
Snyder 29
Spak 8
Spitzer 79
Sritrairat 52
Stagnar 76
Stalter 39
Stanley 79
Starr 80
Stechert 52
Stein 52
Stevens, Gretchen 25
Stevens, Mike 22
Stewart, Richard 80
Stewart, Shana 66
Stich 53
Stinson 64, 67, 80
Stone 70
Storey 53
Strakosh 20
Strayer 53
Struger 34
Sutherland 16, 20, 38, 49, 50
Swinton 54

T

Tabak 54, 81
Taggart 81
Tedesco 47, 81
Tessier 54
Thompson, John 65, 82
Thompson, Woodrow 35
Titus 74
Toth 71
Trachman 55
Traynor 55
Treasnor 82
Tripp 55
Trotta 82
Trybula 83
Tsang 78

U

Utter 56

V

Viloria 83
Vispo 56
Vo 83
Vogler 47, 64, 81
Voltura 84
vonHoldt 30

W

Waldman 68
Wang 81
Wanke 66
Warkentine 43, 83
Wayne 30
Weatherwax 16
Weckel 61, 73, 79
Weddle 35
Weldy 36
Werier 56
Weyeneth 57, 84
Wheeler 84
White, Alaina 84
White, Bradley 47, 58
White, Erin 57
White, Katie 85
Whiteleather 57
Wilkinson 58
Willey 58
Williams, Ernest 64, 67, 80
Williams, David 17
Wilson 58
Windmiller 58
Winkler 20, 38
Wise 83
Wohl-Pollack 85
Woods, Anne 59
Woods, Peter 66
Worthington 59
Wright 29
Wyman 59

Y

Yorke 44
Young 29
Yozzo 13

Z

Zucker 62
Zuckerberg 59

Notes

The New York State Museum is a program of
The University of the State of New York
The State Education Department

ISBN 1-55557-246-4



9 781555 572464

2008
NEW YORK STATE MUSEUM CIRCULAR 71
ISSN: 1052-2018
ISBN: 1-55557-246-4
