

Poster Presentation Abstracts

Listed alphabetically by presenting author. Presenting author names appear in bold. Code following abstract refers to timing of poster presentation (Day [Mon = Monday, Tue = Tuesday, Wed = Wednesday] – posterboard number. For example, Mon-18 indicates: Monday poster session on posterboard number 18. Presenters' contact information is provided in a separate list at the end of this document.

Using Herbaria Records to Examine the Spread of Invasive Glossy Buckthorn

Matthew Aiello-Lammens (Stony Brook University, Stony Brook, NY; mlammens@life.bio.sunysb.edu)

Analysis of herbaria records can be an important tool to study the spread of invasive plant species. I collected herbaria records to investigate the rate of spread and pattern of establishment of the invasive shrub Glossy Buckthorn (*Frangula alnus*) in space and in time. The results suggest novel hypotheses regarding the initial introduction of Glossy Buckthorn into northeast North America. Initial introductions appear to have been greatly separated geographically, ranging from southern Ontario to coastal New York and New Jersey. Additionally, the results indicate that the rate of spread of Glossy Buckthorn increased rapidly during the early stages of its invasion, and leveled off to a relatively constant rate more recently. These results are placed in context of an examination of the reported lag-time between the introduction of Glossy Buckthorn and its rapid spread throughout its current range.

Mon- 17

The Lost Ladybug Project: New Discoveries

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Over the past twenty years, several native ladybug species that were once very common have become extremely rare. During this time, several species of ladybugs from other places have greatly increased both their numbers and range. This shift is happening very quickly and we don't know how, or why, or what impact it will have on ladybug diversity or the role that ladybugs play in keeping plant-feeding insect populations low. Ladybugs are essential predators of insects like aphids and mealybugs. To help *Coccinella novemnotata* (Nine-spotted Ladybug; C9) and others species, we need to have detailed information on which species are still out there. Exciting recent discoveries made by citizen scientists have changed our estimate of C9's range based on sightings and environmental variables. We're asking you to join us in finding out where all the ladybugs have gone so we can try to prevent more native species from becoming so rare. The Lost Ladybug Project gives everyone a chance to be citizen scientists. From the Lost Ladybug Project website (lostladybug.org) you can learn how to catch, photograph, and send images of ladybugs and be part of the database. Every ladybug you find (over 400 species in the United States), rare or common, native or exotic, is important. Even if you photograph 20 of the same species we would like to see them all because that tells us how common those ladybug species are in your area and how rare other species are. The project will continue for years to come. Collections from the same locations over the years will be especially useful. On our website you can view, sort, map, and graph the 13,000+ ladybugs found so far; find children's activities and a 4H SET curriculum; download or print beautiful ladybug materials; and listen to our ladybug song!

Mon- 25

The Use of Camera Trapping Techniques to Assess the Relationship between Mammalian Carnivore Assemblages and Hiking Trails in Westchester County, NY

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Coyotes (*Canis latrans*) can travel up to 50 miles in one day for dispersal, obtaining new territory, or hunting prey. To facilitate movement and reduce energy expenditure, Coyotes may utilize manmade hiking trails which have been cleared of obstacles. Other carnivore species, such as Bobcats (*Lynx rufus*), may avoid these open stretches of land and adhere to areas littered with understory and tree cover. This research seeks to determine which carnivores are utilizing hiking trails as compared to roadless areas in the 4700-acre reservation in Pound Ridge, NY. We have been positioning approximately 14 motion-activated infra-red cameras between trail and non-trail areas using a random point generator. These cameras are relocated every 2 weeks between 4 different trail loops throughout the reservation. Carnivore species that have been captured on camera thus far include eastern Coyote, Bobcat, Red Fox (*Vulpes vulpes*), Raccoon (*Procyon locor*), Opossum (*Didelphis virginiana*), and Long-tailed Weasel (*Mustela frenata*). Based on preliminary analysis, Coyotes have demonstrated a strong affinity to trails as they facilitate travel throughout the reservation.

Tue- 16

Lichen Diversity in Vernal Pool Habitats of Acadia National Park, Maine

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The relationship of lichen diversity in response to seasonally flooded habitats has been previously undocumented. Vernal pools are an important ecological feature in the northeast; therefore, examining lichen diversity in these flooded habitats will help to better understand the ecology of lichens and what factors influence lichen settlement. Terricolous and saxatilis lichens were sampled at six vernal pools in Acadia National Park on Mount Desert Island, ME. Although the factors influencing lichen settlement in vernal pools is still unknown, this study attempts to quantify the lichens of vernal pools by examining their diversity along the gradient of wetland zones characteristic of vernal pools.

Mon- 7

Habitat Restoration for the Endangered *Sistrurus catenatus* (Eastern Massasauga Rattlesnake) on a NY State-owned Property

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In 2010, the Region 7 Cortland Wildlife unit of the New York State Department of Environmental Conservation received a USFWS Great Lakes Restoration Initiative (GLRI) grant to conduct habitat management activities on a Wildlife Management Area (WMA). The goal of this project is to improve habitat for the state-endangered *Sistrurus catenatus* (Eastern Massasauga Rattlesnake), as natural succession is known to be impacting the population. This WMA is one of only two known sites to harbor these snakes. The latest estimates (2007) for the population at this location are ≈ 121 individuals. Habitat work critical to the survival of the snakes included clearing thirty-two 10-m x 10-m plots of all shrubs so that the pregnant female snakes could bask, therefore improving birth and survival rates. The success of the habitat work was monitored by researchers from SUNY ESF, and surveys will continue through 2012.

Mon- 10

An Eradication Program for *Hydrilla verticillata* in the Northeast: A Multi-Organizational Approach

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In August of 2011, the monoecious variety of *Hydrilla verticillata* (Hydrilla) was detected in the Cayuga Inlet in Ithaca, NY, an entrance to Cayuga Lake. Currently, Hydrilla exists in approximately 166 acres of this flowing, connected, high-use waterbody. It is thought that the plant had been in the Inlet for one to two years prior to its discovery. Hydrilla is an extremely aggressive submerged aquatic invasive species with the potential to devastate native aquatic habitats and species populations. It can grow in up to 9 m (30 ft) of water and, in favorable conditions, can grow 0.4 to 4.7 cm (1 to 12 inches) per day. This rapid growth results in dense monocultures of Hydrilla, which cause significant declines in native plant diversity and abundance, low dissolved oxygen, and physiological stress to fish. The spread of Hydrilla threatens the habitats of Cayuga Lake, other Finger Lakes, and the Great Lakes, and has the potential to devastate the local economies surrounding these lakes. Through early detection and rapid response, a multi-organization collaborative task force consisting of academic, local, city, county, and state entities was created. The Hydrilla Task Force immediately began monitoring, public education, and treatment. These efforts and their results are explained in detail. Both an herbicide treatment (endothall) and diver-assisted biomass removal methods were utilized to reduce vegetative survival, with 95% and <1% success, respectively. Drawing on what was learned in 2011, monitoring, education, and treatment plans are currently being developed for the 2012 growing season. In the Cayuga Inlet, herbicide appears to be the most effective control method. However, several years of study and adaptive management will provide more accurate control efficacy. The outcome of these efforts will provide insight into eradicating the monoecious variety of *Hydrilla verticillata* in northern climates, as well as a framework for multi-organization collaboration aimed at invasive species eradication.

Mon- 16

The Helderbergs of Albany County: A New York Fern Hot Spot

Tue- 20

Current Status of the Federally Listed American Hart's Tongue Fern in Central New York

Thomas Brumelow (SUNY ESF, Syracuse, NY; trbrumbe@syr.edu) and **Donald J. Leopold** (SUNY ESF, Syracuse, NY, djleopold@esf.edu)

Asplenium scolopendrium var. *americanum* (American Hart's Tongue Fern) is an evergreen, federally-listed (threatened) fern species that occurs in New York, Michigan, Alabama, and Tennessee. There are 16 known colonies in New York, comprising approximately 90% of the US population. Populations in New York are generally restricted to isolated habitats, and many have been lost due to historic quarrying operations. In order to inform management decisions and track population dynamics, we conducted a census of known colonies in New York from May–August 2011, building on a long-term census database that was initiated in the early 1900s. Results from this census show an overall decline in mature and immature sporophytes on public and private lands since 2008. Previous research has suggested an effect of climatic factors on the population dynamics of this species. Ongoing climatic studies and activities related to the United States Fish and Wildlife Service Recovery Plan are discussed.

Mon- 2

Ecosystem and Decomposer Food Web Effects of Garlic Mustard in Hamilton College Forests, Clinton, NY

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The invasive biennial herb *Alliaria petiolata* (Garlic Mustard) has dramatic effects on forest plant communities and ecosystem processes. This study compared leaf-litter deposition and decomposition and potential decomposer food-web interactions in three sets of paired 400-m² invaded and control plots in two Hamilton College forest stands (Clinton, NY). Litter deposition was not statistically different between forests or the invaded and control plots. In one forest area, decomposition rates were significantly higher in the Garlic Mustard plots, 83% per year versus 69% for the control. In the other forest, decomposition was not significantly different, which perhaps can be explained by differences in tree composition between the two forests. The respective abundances of invasive earthworms, native macroinvertebrates, and native salamanders did not differ significantly in the invaded and control plots. Soil nematode population densities were significantly lower in the Garlic Mustard plots, which is consistent with the nematocidal properties of the glucosinolate allelochemicals produced by plants in the mustard family. These results support previous findings that Garlic Mustard occupies areas with enhanced decomposition rates and may influence soil microorganisms. Further study is needed to better understand the complexities of these trophic interactions and the extent that Garlic Mustard interacts with the soil microenvironment, primary production, and invasive earthworms.

Mon- 13

Monitoring Nests of the Declining Rusty Blackbird (*Euphagus carolinus*) with Motion-triggered Cameras

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Euphagus carolinus (Rusty Blackbird) has experienced one of the most significant declines ever documented among extant North American birds. While the cause of the decline is not yet understood, one possible factor is increased nest predation in regenerating clear-cuts. Previous studies found nests in wetlands adjacent to logged areas suffered significantly higher predation than nests in undisturbed forested wetlands. The identity of the predators responsible, however, remained a mystery. We addressed this question using motion-triggered trail cameras to monitor natural Rusty Blackbird nests. To minimize disturbance, we used covert infrared camera models (Reconyx Hyperfire HC600, Bushnell Trophy Cam, or Uway NightTrakker NT50B IR). From May-August 2011, we monitored 13 Rusty Blackbird nests in the timberlands of central Maine. Ten of these were monitored with a camera during some or all of the nesting cycle. Of ten camera-monitored nests, six successfully fledged chicks, three were depredated, and one was of unknown fate (though probably depredated). We captured images of two predation events: one by an *Accipiter* spp. and one by *Odocoileus virginianus* (White-tailed Deer). We found that cameras operated best when mounted 1–2 m from the nest. Of the three models we used, the Uway cameras were the least reliable. On two occasions, they never triggered at all, and as a consequence, we missed a predation event. On two different nests, they triggered almost continuously initially (the first day or two after installation), and then stopped completely. None of the camera-monitored nests were abandoned, which is critical considering Rusty Blackbirds are known to be neophobic. Through camera footage of a little-understood and imperiled species, we are providing insight into nesting ecology and predation that may aid in conservation efforts. We have also successfully employed a camera technique in the dense vegetation of the boreal forest that was previously only used for monitoring nests of grassland and game birds. This technique may be of use to other researchers interested in remote monitoring of forest-dwelling passerine species.

Wed- 22

Evaluation of Mark-Recapture, PIT Tag Monitoring, and Genetic Sibship Reconstruction Methods to Assess Fish Passage Across Road-stream Crossings

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Improperly designed road-stream crossings can adversely affect the viability of stream fish populations by preventing or impeding movement, resulting in fragmentation. Given the large number of streams affected by crossings, it is important to understand the effectiveness and feasibility of different methods used to assess fish passage. We used mark-recapture techniques, PIT tag monitoring, and genetic sibship reconstruction to assess Creek Chub (*Semotilus atromaculatus*) passage at seven road-stream crossings within the Daniel Boone National Forest, KY. Each crossing was initially surveyed following a standardized protocol to assess potential passage and set relative expected movement rates. Of the seven crossings, three were classified as easy, two as moderate, and two as difficult. Movement rate results showed that mark-recapture was the least informative of the methods, with upstream estimates of <1% for all streams regardless of crossing classification. Comparatively, use of individually implanted PIT tags in conjunction with stationary antennas resulted in upstream movement rates of 31% (easy), 21% (moderate), and 9% (difficult). Similarly, sibship reconstruction produced total movement rate estimates of 55% (easy), 44% (moderate), and 35% (difficult). Of the three methods, PIT tag monitoring provided the greatest detail regarding frequency, timing, and directionality of fish passage. However, this method was also the most logistically challenging and financially expensive, limiting its widespread applicability. The mark-recapture method, while quick and inexpensive, proved to be unreliable despite significant effort. Sibship reconstruction, intermediate to the other methods in terms of cost and effort, provided movement rate estimates similar to PIT tag data, but at a loss of resolution in timing and directionality. In conclusion, we recommend use of PIT tags when timing and directionality are critical, or population size is small. For all other scenarios, sibship reconstruction offers a viable alternative, especially given the potential for increased resolution in movement timing and directionality with improved sampling design.

Tue- 3

The Effect of Garlic Mustard on Forest Soils & Understory Species in Western New York

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Mon- 12

Suckers of Elk Lake and the Dilemma of the Cryptic Species Summer Sucker

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Sucker populations in Elk Lake were thought to be a good place for us to document differences or boundaries between early and late-spawning suckers co-inhabiting a lake in the eastern Adirondacks of New York. The rediscovery of a species called Summer Sucker (*Catostomus utawana*) in 2007 should be followed with better knowledge of populations in the Adirondacks documenting their sympatry with White Sucker (*C. commersonii*). This former species is known in fewer than 25 lakes, is endemic to New York's Adirondacks and will probably soon be classified as endangered or threatened. Intensive studies in Elk Lake from 1971–1973 defined the characteristics and chronology of spawning suckers, and our recent studies in 2007–2011 added to this data and included gathering tissue samples for genetic analysis. There remains doubt whether this form in the eastern Adirondacks conforms to the Summer Sucker of the western Adirondacks, illustrating the complexities of working with a cryptic species in remote areas.

Tue- 4

The Effect of Garlic Mustard on Forest Soils & Understory Species in Western New York

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Mon- 12

Grey Squirrel (*Sciurus carolinensis*) Habitat Use on the University of New England's Biddeford Campus

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As the United States continues to lose wildlife habitat through urbanization, it is increasingly important to understand the ecology and niche of common species. *Sciurus carolinensis* (Eastern Grey Squirrel) is the most commonly encountered mammal throughout much of the eastern US. However, surprisingly little is known about the ecology of this species. In 2010–2012, we studied squirrel movement and survival on the University of New England's Biddeford Campus, a coastal suburban habitat in southern Maine. Eighteen squirrels were live-trapped (12 male, 6 female), measured, ear-tagged, radio-collared, and released. Individuals captured within the campus core were in a more developed habitat than those living on the campus periphery, where there is adjacent forested habitat. Individuals were located an average of 48% (SD 0.48) of the days they wore radio-collars. The average home-range size was 3.8 ha (SD 4.06). Although the sexes were similar in body size, males had larger home ranges (4.46 ha, SD 4.86) than females (2.55 ha, SD 1.15). Individuals in the campus core had smaller home ranges ($n = 10$, 1.89 ha, SD = 1.16) than those captured in the campus periphery ($n = 8$, 6.24 ha, SD = 5.13). Campus-core individuals, with smaller home ranges, likely met their nutritional needs through both natural and anthropogenic sources, while periphery individuals needed larger ranges to meet their nutritional needs, presumably with more natural sources. Home ranges in this study were greater than comparable studies on the East Coast, but were smaller than studies in regions where Grey Squirrels were recently introduced.

Tue- 19

The Potential Competitive Exclusion of Brook Trout from Suitable Habitat in New York Streams

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It is widely believed that the distribution of Brook Trout (*Salvelinus fontinalis*) is restricted by competitive interactions with introduced trout species, particularly Brown Trout (*Salmo trutta*). Recent investigations associated with the Eastern Brook Trout Joint Venture have identified gaps in information about the status of Brook Trout (*Salvelinus fontinalis*) in New York streams and its overlap with non-native Trout distributions. New York State DEC and USFWS Biologists have intensively sampled trout (including Brook, Brown, and Rainbow Trout) in New York stream habitats to supply some of this missing information. As part of the Great Lakes Regional Aquatic Gap Analysis Project, habitat-based predictive models of NY Trout distributions have been developed. These new models and data provide an opportunity to examine potential effects of landscape and introduce trout species on Brook Trout distributions. In this study, we investigated how well predictions from the present Gap Analysis models for Brook, Brown, and Rainbow Trout compare with new collection data and whether Brown Trout and/or Rainbow Trout appear to exclude Brook Trout from appropriate habitat throughout New York State. We also report on how these analyses identify Brook Trout habitats that might benefit from rehabilitation and/or protection. Original models performed well at predicting trout distributions ($R^2 > 0.9$). Faced with new data from DEC Region 4, each trout model showed a low omission error rate ($\approx 15\%$). Seventeen percent of streams predicted to support both Brook Trout and Brown Trout contained only Brown Trout. This work helps to prioritize streams for habitat or biotic community modification.

Tue- 8

Effect of Anthropogenic Factors on Plant and Insect Biodiversity in Urban Conifer Stands

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We quantified plant and insect (Hymenoptera; wasps, ants, bees) diversity at three 70-year-old CCC conifer stands in Watchung Reservation (Union County, NJ) that vary in physical factors, roadway proximity, and land-use history. Sites closer to Interstate-78 had greater plant species richness, as well as greater percent cover and non-native invasive richness. In contrast, hymenopteran diversity varied considerably among taxa. Diversity was highly uneven, with Diapriidae, Ichneumonidae, and Formicidae (ants) comprising 83% of all specimens collected. Diapriid species composition and weekly trap catch varied between adjacent sites, and Interstate distance correlated positively with abundance but negatively with species richness. Ichneumonid diversity measures did not vary with distance from I-78. Ant species composition varied as a function of Interstate distance, but richness was equal among sites. Results emphasize the complexity of human impacts; however, microhabitat differences can strongly affect community composition. Thus, even small urban green spaces may harbor diverse assemblages.

Tue- 23

Patterns of Intestinal Parasite Prevalence in Urban and Rural Chipmunk Populations

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Parasites impact their hosts as well as the ecological system in a variety of different ways. Endoparasites, in particular, can alter the immune response of their host, decrease a host's fitness, and decrease the host's response to predators. Urbanization decreases species richness but it also allows those species well adapted to urban life to thrive. How urbanization impacts the prevalence and richness of parasite species is of particular interest since not much is known about this subject. We examined the difference in species richness and prevalence of helminth eggs and protozoa oocysts in *Tamias striatus* (Eastern Chipmunk) between an urban location and several rural locations. Eggs were isolated and measured qualitatively using fecal floatation and were measured quantitatively using a modified McMaster technique. Five different helminth species and one genus of protozoa were identified. Preliminary analysis indicates that the prevalence of helminths is greater in the rural than in the urban populations. We observed this relationship across 3 years of data collection. These results are consistent with other work comparing parasite prevalence in urban vs. rural areas and suggest that the city may represent a refuge from parasites. This difference in parasite pressure may contribute to the higher host densities that are often seen in urban areas.

Mon- 23

Food Plots for White-tail Deer: Effects on Browse Intensity of Commercial Tree Species in Western NY

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Throughout North America, high densities of *Odocoileus virginianus* (White-tailed Deer) are creating problems that affect humans as well as the natural environment such as: property damage (e.g., deer/car accidents), crop damage, and changes in forest species composition due to browse, resulting in the creation of alternate stable states in forests throughout the northeastern US. This study examined whether food plots for White-tailed Deer increase, decrease, or have no effect on the browse intensity of commercial tree species in the northern hardwood/coniferous forests of western New York. Spring and summer browse intensity was determined in Wyoming, Cattaraugus, and Erie counties at three forested sites with food plots and three forested sites without food plots that were similar in species composition. The study found that food plots were causing an increase in browse intensity on commercial tree species to areas immediately adjacent (0–2 m) to the food plots. However, further analysis that excluded measurements taken for subplots closest to food plots (subplot #1) showed that non-food plot sites had a significantly greater proportion of the surrounding available hardwood trees browsed. The findings suggest that food plots for White-tailed Deer reduce browse on forest timber species, except for those closest to the food plot (within 0–2 m). If food plots are used as a management option for White-tails in western New York, we recommend that a buffer zone of at least 2 m outside the food plot be incorporated to account for the overflow of deer browse into the surrounding forest.

Tue- 18

Mercury in the Forest Spider *Micrathena gracilis*: Does the Mercury Burden Vary with Location?

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Recent research has shown that spiders could be a significant pathway between mercury-contaminated rivers and adjacent terrestrial environments. *Micrathena gracilis* (Spined Micrathena) is a common and widely distributed spider of deciduous forests in North America. *Micrathena gracilis* is also commonly encountered in riparian forests and could potentially serve as a link for mercury transfer from contaminated waters such as the Susquehanna River. In this study, we measured the total mercury burden (THg) of *M. gracilis* at two upland forest sites and two riparian forest sites that averaged 0.75 km and 0.075 km from the Susquehanna River, respectively, to see a) how much THg levels in spiders varied among sites, and b) if locations nearest the river had higher THg concentrations. Female spiders were collected from their webs ($n = 58$) at each location and frozen before analysis. Average THg values for spiders at all four sites ranged between 0.086–0.116 ug/g. Surprisingly, the median THg concentration at the sites farthest from the river were significantly greater than those at the closest sites ($P < 0.001$). We do not know what is responsible for this difference between the upland and riparian sites, but we expect that variation in spider diet is a primary contributing factor. A possible confounding factor for our results was the location of a retired coal-fired power plant 2.7 km away from one of our upland sites. Additional study is required to investigate this variability in the distribution of THg among forest arthropods.

Wed- 11

Using Mitochondrial and Nuclear DNA to Assess *Formica glacialis* Population Structure and Gene Flow

Sarah Dzara (SUNY Geneseo, Geneseo, NY; sad7@geneseo.edu) and **Jennifer Apple** (SUNY Geneseo, Geneseo, NY; applej@geneseo.edu)

Ants are social insects that display a wide variety of reproductive tactics which can affect the resulting genetic structures within and among their colonies. *Formica subintegra* and *F. pergandei* are two ant species considered social parasites, or "slavemaking" ants. *Formica subintegra* and *F. pergandei* conduct raids upon a third species, *F. glacialis*, during which the raiders capture the immature *F. glacialis* ants. The captives are subsequently either used as a food source or are raised as slaves, performing nest maintenance, foraging for food, or caring for the queen and her young within the *F. subintegra* or *F. pergandei* nests. Little is known about the reproductive behavior of the ant species *F. glacialis* and its associated slavemaking parasites *F. pergandei* and *F. subintegra*. We used mitochondrial DNA to determine the number of female lineages present in known polygynous *F. glacialis* colonies, which can reveal if queens are recruited from within the nest or if colonies adopt foreign queens. The relatedness of the offspring-producing queens was assessed based on the mitochondrial DNA sequences of the workers. Genetic relatedness was compared to distance between nests to test for isolation by distance over short spatial scales. Differentiation based on mitochondrial analysis was contrasted with differentiation at nuclear DNA microsatellite analysis to evaluate sex-biased gene flow. The results of this study can contribute to our understanding of the reproductive patterns and factors contributing to population structure of *F. glacialis*.

Wed- 7

Current Status of *Streptopus amplexifolius* (Liliaceae) in Clinton County, New York

Elli C. Edelstein (Plattsburgh State University, Plattsburgh, NY; eedel001@mail.plattsburgh.edu) and Christopher T. Martine (Plattsburgh State University)

Streptopus amplexifolius (Claspleaf Twisted Stalk), an herbaceous monocot of the lily family, was recently discovered in Clinton County, NY. This is the first time that the species has been recorded in the county. Sites consisting of potential habitat for the species were searched between June and August, 2011. A total of four sites were chosen for the study, three of which were ultimately determined to be absent of *S. amplexifolius*. The rarity of *S. amplexifolius* is likely related to glacial influences, but its continued decline may be related to disease, changes in climate, or interactions with its co-occurring congener *S. lanceolatus* (Rosy Twisted Stalk).

Mon- 1

***Carex backii* (Back's Sedge) in the Vermont Landscape**

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Field work throughout Vermont over the last 15 years has produced a long list of new sites for *Carex backii* (Back's Sedge), a species once considered rare in the state. *Carex backii* is documented from 88 sites in 60 towns scattered in 13 of Vermont's 14 counties, including two new county records. While widely distributed throughout Vermont, this upland sedge most frequently occurs in small populations on lower elevation, dry, rocky hills. It occurs on the summit of Old Baldy Mountain in Woodstock at an unusually high elevation of 732 m (2400 ft). Steep, fertile, rocky, hill slopes with southerly aspects are its typical haunts, especially where bedrock outcrops contain some calcite. *Carex backii* grows in dry-mesic forests with canopies dominated by *Acer saccharum* (Sugar Maple), *Quercus rubra* (Red Oak), *Fraxinus americana* (White Ash), and *Ostrya virginiana* (Hop Hornbeam), and poorly developed understories. Herb layer associates include a comparatively high diversity of herbaceous species, especially other upland *Carex*, Poaceae (Grass Family), and Asteraceae (Aster Family). *Carex backii* typically grows with Red Oak, *Dryopteris marginalis* (Marginal Wood Fern), *Solidago caesia* (Blue-Stemmed Goldenrod), *Carex communis*, and *Carex laxiflora*. Its association with Red Oak is particularly tight, even in northern sites where Red Oak is uncommon and local. *Carex backii* is a distinctive upland sedge, but is probably overlooked because it flowers early with short and often hidden flowering stems, and grows with other *Carex* species that have similar width and length leaves. Being able to identify *Carex backii* vegetatively has been key to discovering the species at many new sites. Its leaves are thicker than other upland sedges, and, perhaps uniquely, it lacks pleated leaves which result in a low relief "M" cross-sectional shape. Confirmation of the species after the perigynia have dropped and the culms have withered can be made by looking carefully for the short dried culms with flattened and broadened distal ends. More research is needed to answer questions about the species' dispersal, fertilization characteristics, and relationship to natural disturbance processes, especially fire.

Mon- 5

Refocusing a Focal Species: Using Photography to Explore Coastal Grizzly Bear-Human Interaction

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Along British Columbia's Pacific coast, interactions between *Ursus arctos* (Grizzly Bears) and people represent some of the most ancient and enduring confluences between ecology and human culture in North America. In response to multiple threats, First Nations are uniting to improve our understanding of Grizzly Bear ecology and human impacts by combining analytical science with natural history. In order to give voice and momentum to this collective effort, I plan to leverage a conservation partnership with the Heiltsuk First Nation science initiative, Coastwatch. This natural history-based approach will empower on-the-ground First Nation naturalists and community members to link photographs of Grizzly Bears to long-term molecular population monitoring studies. Camera traps and geo-referenced photographs will allow us to identify individual Grizzly Bears and directly link molecular data to observational data and human interactions with individual bears. This work will also provide an opportunity for improved community engagement and management outcomes through youth programs and community gatherings. Photographs represent a powerful means to gather and transfer information that is currently absent from other studies in the region to date, and will empower a cultural connection to ecology and natural history.

Tue- 14

The Grotto Sculpins of Pennsylvania: Speciation by Hybridization?

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It is seldom observed in vertebrates that a new species evolves from an event of hybridization between two lineages. Speciation by way of hybridization is thought to be prompted by moving into novel environments that exclude the parental species but do not exclude the hybrid progeny. New populations of sculpins were recently discovered within caves of central and western Pennsylvania which exhibit emergent morphological adaptations. The mitochondrial 16S rRNA and D-Loop genes were sequenced in both cave and surface populations from the Nippenose Valley. The cave populations were found to share mitochondrial haplotypes with two species of sculpin that populate the surrounding surface streams, *Cottus cognatus* and *Cottus bairdi*. In addition, the majority of individuals from the cave population have unique mitochondrial haplotypes not found in any of their surface counterparts. A phylogeny analysis of the haplotypes suggests that the Pennsylvania Grotto Sculpin is a hybrid population of Cottids which has been reproductively isolated from the surface populations and is now forming an adaptationally distinct lineage.

Tue- 7

The Helderbergs of Albany County: A New York Fern Hot Spot

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Our study area includes upland and lowland habitats associated with the Helderbergs, a small mountain range extending diagonally from southeast to northwest through Albany County, NY, in addition to a small adjacent area in Schenectady County. This area totals 300 square km (116 square miles), reaches a maximum elevation of 308 m (1010 ft) above sea level, and is dominated by limestone formations including sheer 30-m (100-ft) escarpments, numerous small caves, linear benches, and prominent outcroppings. At the base of the escarpments are steep, forested talus slopes that transition into diverse lowland habitats cut by streams that drain into extensive and diverse complexes of wetlands. We have botanized within the Helderbergs since the early 1980s, during which time it became obvious that one of its most significant floristic attributes is the exceptionally high diversity of ferns. Over this time period, 40 species of ferns (not including subspecies or hybrids) have been recorded in the Helderbergs. In 2009, we initiated a comprehensive biodiversity survey of the Helderbergs focusing primarily on protected lands, which comprise approximately 9.3 percent of the total area. This survey effort has reconfirmed records for 37 of the previously recorded 40 species of ferns occupying the Helderberg area. The species total for the Helderbergs represents 53% of the 75 fern species listed for the state in the New York Flora Atlas. It is especially noteworthy that the 100-ha (246-acre) Joralemon Town Park in the Town of Coeymans stands out as having the highest fern species diversity (34) for any single protected area within the Helderbergs and is believed to have more fern species than any other site of comparable size in New York State.

Tue- 20

Incipient Speciation in Freshwater Fish Species from Two Parallel Watersheds

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The process of speciation occurs as a result of restricted gene flow between segments of an interbreeding population. Allopatric speciation results in different species occupying different geographic areas as a population is separated by an insurmountable barrier. This separation may result in isolated populations which undergo genetic and phenotypic changes. The Wisconsin glacial period, which ended approximately 10,000 years ago, dramatically altered the geography of North America. The glacier covered almost the entire North America as it advanced. Areas that were not covered with ice provided suitable habitats (refugia) for relict species that were previously widespread in the northern section of the continent. As the ice sheet retreated, animals and plants were able to return to the once glaciated areas. However, as the glacier retreated, it disrupted the distribution patterns of aquatic animals and produced large numbers of small isolated populations. As a result of the Wisconsin glaciation, the Bronx and Saw Mill Rivers now exist in separate but parallel watersheds. They do, however, contain many of the same fish species that have been separated since the end of the Wisconsin glaciation. Therefore, the objective of this research is to determine if there is evidence of incipient speciation between fish populations that reside in these two independent river systems. Three freshwater fish species have been selected for morphometric, meristic, chromosomal, and mtDNA control region sequence analysis. These measures will be used to decipher whether there are any similarities or differences within and between each species. The target species are *Catostomus commersoni* (White Sucker), *Etheostoma olmstedi* (Tessellated Darter), and *Rhinichthys atratulus* (Blacknose Dace). Fish were collected from the headwaters of both river systems from June through September of 2009 and 2010. Physical parameters were measured during each sampling event. These data will be used to determine if environmental conditions associated with each river are acting as selective agents. This poster will highlight preliminary results generated from the analysis of 57 morphometric and 20 meristic characteristics.

Wed- 21

Metacommunity Structure in Edge and Interior of Forest Fragments in Southeastern Massachusetts

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Forest fragmentation often leads to habitat loss and an increase in the proportion of edge habitat compared to interior forest. This change favors generalist species while potentially leading to local extinction of interior specialists. This study characterizes elements of metacommunity structure (i.e., coherence, turnover, and boundary clumping) for multiple taxonomic groups in forest fragments in southeastern Massachusetts. Metacommunity structure was then compared between interior and edge habitats. Results suggest that edge communities are not structured by a common latent environmental gradient. If fragmentation is sufficiently severe, it may disrupt processes that lead to the differentiation of communities along environmental gradients. Therefore, increases in the proportion of edge relative to interior habitats may promote invasion and thereby lead to homogenization of biotas in fragmented habitats.

Tue- 22

Survey of Collembola in an Early Successional Forest in Western New York: Comparing Sampling Methods

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Collembola (springtails) are a microarthropod subclass common in soil. Due to their abundance and sensitivity to pollution, their diversity has been used to indicate soil health. They are important detritivores, as well as consumers of bacteria, plant, and fungal matter. Specimens were collected from the eight-ha Roemer Arboretum on the SUNY Geneseo campus in August 2012 using pitfall traps filled with propylene glycol and set for two days. In September 2012, additional specimens from soil samples taken near the pitfall traps were extracted using Tullgren funnels. Collembola were identified as specifically as possible, typically to genus. Their size was recorded, and any structural damage that prevented identification was noted. Pitfall trap specimens were mainly relatively large epedaphic species from the families Tomoceridae and Entomobryidae. In addition to these, Tullgren funnel specimens also included members from the family Isotomidae and a selection of euedaphic Entomobryidae. Epedaphic species live on the soil surface, and generally have more-developed appendages, eyes, and pigment patterns. Euedaphic species live within soil and generally have less-developed appendages, eyes, and pigment patterns. Due to its extent, this difference in diversity was attributed to sampling method and not seasonal change. The Tullgren funnel method collected a higher range of species, was less labor intensive, collected fewer other arthropods, and had fewer damaged specimens. In the future, it would be the method chosen.

Wed- 8

Edge Effects on the Biodiversity of Woody Plants in Southeastern Massachusetts

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Habitat fragmentation is the division of a large expanse of habitat into smaller, more isolated patches. A reduction in the total area of a habitat can reduce resource availability and increase the ratio of edge to interior habitat. Also, increasing isolation of patches limits movements of individuals, thereby decreasing rates of immigration and the potential for extinct populations to be replaced by the rescue effect. These effects are all thought to reduce biodiversity and abundance of species. In September of 2011, we selected ten forest fragments of varying size, urbanization, and isolation in which to study the effects of habitat fragmentation on the biodiversity and abundance of woody plants in southeastern Massachusetts. Specifically, we examined how landscape and patch characteristics affect abundance and biodiversity of woody plants and compared abundance and biodiversity between edge and interior regions of fragments. Species richness and overall abundance were greater in edge habitat than in interior at most sites, while abundance of particular species differed significantly between edge and interior habitat. The most urbanized sites exhibited the lowest species richness. These results suggest that habitat fragmentation leads to extinctions of interior specialists, but promotes the spread of generalists that can exploit edge habitats.

Tue- 21

Oviposition Behavior in the Bog Buckmoth, a Rare Lepidopteran of Central New York

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The Bog Buckmoth (Saturniidae: *Hemileuca* sp.) is an endangered species known only from 10 sites in the Great Lakes region, including 6 peatlands in Oswego County, NY. Unlike close relatives in the genus *Hemileuca*, the Bog Buckmoth occurs only in peatlands, and the larvae feed almost exclusively on *Menyanthes trifoliata* (Menyanthaceae; Bog Buckbean). However, the moths do not oviposit on *Menyanthes* because their eggs are the overwintering stage and the foliage of *Menyanthes* dies back during the winter. Instead, they place their eggs on a variety of plants that are not the primary food choice for the larvae. It is very unusual among Lepidoptera that eggs are laid near, rather than on, the larval food plant, and that caterpillars must travel substantial distances (often >1 m) to forage for food upon hatching. We sampled vegetation to examine how plant species composition may be related to oviposition patterns. A survey of egg clusters from two field sites indicated that eggs are placed on a variety of plants, and that plant identity, height on plant, distance from *Menyanthes*, and cluster size differ between the sites. The selection of plant species for oviposition does not appear to be random. At one site, Sweet Gale (*Myrica gale*) was the dominant oviposition choice while dead stems of sedges (e.g., *Cladium mariscoides*) and Royal Fern (*Osmunda regalis*) were used most often at another site. As the suitability of habitats for the Bog Buckmoth depends on the ability of the caterpillars to find food, these data may help explain the particular distribution of these insects as well as their relative abundance in various peatlands over time. The use of *Menyanthes* as a primary food source makes the moth susceptible to changes in the abundance of *Menyanthes*, which in turn may be influenced by the availability of saturated hollows where the highest density *Menyanthes* patches are concentrated.

Wed- 1

Can't See the (Herbs in) the Forest for the Trees

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Urban regions are typically depicted as biotically depauperate zones rife with non-native flora that outcompete natives. Despite a select number of admittedly problematic non-natives, not all non-natives are necessarily invasive. A growing body of research cites non-natives as inflating species-richness compared to surrounding regions, which warrants investigation given that urban green spaces provide many of the same ecological functions as intact woodlands. A multiyear, park-wide survey of Van Cortlandt Park in the NW Bronx, New York City (42° 53' 00"N, 73° 53' 00"W), returned an unusually species-rich assemblage of native and non-native plants, representing a 195% increase in taxa compared to a 1981 quadrat survey. Some of this increase is attributed to non-natives, which previously comprised 31% of the 1981 survey (107/347), compared to 45% of the current survey (464/1022). Surprisingly, the greatest overall increase in taxa, however, constitutes native herbaceous plants, indicating the complexity of the herb-layer, which had been previously overlooked. For the last 60 years, the Park has been dissected by three major multilane highways creating East/West divisions. To see if this interruption has affected plant groupings, an initial parsimony analysis using presence/absence data was conducted, which instead resolved the park into North/South divisions, perhaps reflecting disturbance from the populous SW neighborhoods that bracket the park compared to the more residential NE end.

Wed- 12

Migratory Patterns and Breeding Locations of Short-eared Owls Wintering in New York State

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The status of the Short-eared owl (*Asio flammeus*), is of major concern to many northeast states, as well as to many Canadian provinces due to population declines related to the rapid loss of grassland habitat. As it is primarily a winter resident in New York State, recent efforts have been made to conserve and study Short-eared Owl wintering concentration areas. Yet little information regarding the migratory patterns and breeding locations of individuals that winter in New York State is available. From 2006 to 2011, wintering Short-eared Owls were captured at three different winter raptor concentration areas in New York State and fitted with platform transmitter terminals (PTTs). Sufficient data were collected documenting the migratory routes and/or suspected breeding locations for seven Short-eared Owls. Estimated departure dates for these individuals ranged from March 21st to April 26th, with breeding ground arrival dates ranging from May 8th to July 6th for the five individuals with approximate breeding ground locations. Of the five owls with sufficient migratory detections, three appeared to migrate north or northeast of their wintering areas. This included two individuals captured in Washington County in 2007 and 2010 that migrated north to the Lake Champlain area before continuing into Quebec. An individual captured in Niagara County migrated northeast into southern Ontario and into northern Quebec. Two Short-eared Owls migrated westward, south of Lake Erie and into Ohio prior to traveling north into Ontario and central Quebec. Five of the seven owls had sufficient data to determine their approximate breeding ground locations. Two of these individuals presumably bred in northwest Labrador and another in southeast Labrador. The breeding grounds of the remaining two individuals were in northeast Quebec adjacent to Ungava Bay and northwest Quebec near Hudson Bay. For these five individuals the average straight-line distance from wintering to breeding area was 1706 km. Additional data would be required to sufficiently evaluate the migratory patterns and breeding ground locations of Short-eared Owls that winter in New York State grasslands.

Tue- 13

Using Stable Isotopes to Infer Dietary Patterns in Black Bears

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Ursus americanus (Black Bear) are the most widespread bear in North America. Their dietary flexibility is one factor in their persistence in a dramatically altered landscape since European colonization. Here, we used stable isotope measurements of carbon and nitrogen in hair (expressed as delta [δ]-13C and delta-15N values) to estimate dietary patterns in bears from New Hampshire and Massachusetts. Those dietary patterns were then compared against those of museum specimens derived from other regions of the country. Massachusetts bears averaged $-22.1 \pm 1.3\text{‰}$ for $\delta^{13}\text{C}$ and $5.4 \pm 1.3\text{‰}$ for $\delta^{15}\text{N}$, whereas New Hampshire bears averaged $-23.8 \pm 1.5\text{‰}$ and $4.0 \pm 1.1\text{‰}$. Carbon isotope values can indicate photosynthetic pathways, with the C4 plant *Zea mays* (Corn) about 14‰ higher in $\delta^{13}\text{C}$ than C3 plants, such as trees and temperate-zone grasses. Marine phytoplankton are also generally higher in $\delta^{13}\text{C}$ than terrestrial plants. In contrast, nitrogen isotope values can indicate trophic level, with consumers about 3‰ enriched in ^{15}N relative to their food sources. The unexpectedly higher variability in $\delta^{13}\text{C}$ than in $\delta^{15}\text{N}$ was attributed to the assimilation of both C3- and C4-derived dietary protein. Because of the heavy emphasis on corn-derived protein in modern North American agriculture, anthropogenic food sources in bear diets could be identified in about 10% of New Hampshire bears (3/34) and 3/5 of Massachusetts bears. Most bears were isotopically similar to values expected for animals highly reliant on forest resources. $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ were correlated ($r^2 = 0.35$, $P < 0.001$), with a slope of 0.44 for the shift in $\delta^{15}\text{N}$ relative to the shift in $\delta^{13}\text{C}$. The expected slope in purely trophic level ^{13}C and ^{15}N enrichment is at least 3, again suggesting that anthropogenically derived food sources from C4 agriculture are altering $\delta^{13}\text{C}$ more than $\delta^{15}\text{N}$ in bear hair. Relatively high values in $\delta^{13}\text{C}$ (-21‰ to -23‰) for bears from regions of the country without significant C4 agriculture (such as Alaska, the Yukon, Newfoundland, and British Columbia) suggest that these bears may assimilate some marine-derived protein, probably from anadromous fish.

Tue- 15

Overstory and Understory Tree Communities and Light Environment in an Old Growth Forest

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Tree seedlings and saplings are influenced by a variety of factors including light availability and the overstory tree community. We examined whether light environment could be predicted by the overstory tree community in an old-growth forest at Huntington Wildlife Forest in the central Adirondacks, NY. We also tested whether the overstory community and light environment could be used to predict the understory tree community. Existing continuous forest inventory data were used to quantify the overstory and we collected additional data on tree seedlings and saplings. We measured the light environment using hemispherical canopy photography. Percent canopy openness was predicted most strongly by the proportion of *Fagus grandifolia* (American Beech) in the overstory. Understory tree species richness was not predicted by light environment or by the overstory. Yet seedling and sapling density of certain tree species could be predicted by aspects of the overstory. Density of understory *F. grandifolia* was most strongly predicted by the proportion of overstory *F. grandifolia* basal area; however, the densities of other tree species in the understory were not as well correlated with the proportion of overstory conspecifics. Understanding these relationships may help shed light on factors influencing regeneration dynamics in this old-growth forest.

Wed- 13

A Study of Black Bear Trails and Sign

Alyssa D. Johnson (Finger Lakes Community College, Canandaigua, NY; alyssajohnson0@aol.com), John Van Niel (Finger Lakes Community College, Canandaigua, NY; bears@flcc.edu), and Sasha Mackenzie (Finger Lakes Community College, Canandaigua, NY; mackensj@flcc.edu)

The Black Bear Management class at Finger Lakes Community College studied a particular type of Black Bear (*Ursus americanus*) behavior during the 2010–2011 school year. We were interested in better understanding the characteristics and potential purposes of trails left by Black Bears in which the bears step directly into the same footfalls each time. These trails, called ritual, hot foot, or retread trails, consist of readily visible circular depressions. We found mention in popular and scientific literature of both Grizzly (*Ursus arctos horribilis*) and Black Bears creating such trails; however, we were unable to find any quantitative work regarding the characteristics and creation of the trails. In July, the class travelled to Massachusetts under a National Science Foundation grant to view an active trail. We noted the proliferation of associated sign along the trail including bites, scratches, rubs, and straddle trees. Camera traps were deployed in order to record frequency and timing of use. We measured the stride and straddle of the trails and found that these trails did not conform to the measurements one would expect from a bear walking "normally", implying that these trails are formed while bears are employing a deliberately altered gait.

Mon- 24

Diversity and Heavy Metal Content of Macrofungi Found on Adjacent Serpentine and Granite Outcrops, Deer Isles, Maine

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Fungal diversity in relation to edaphic conditions has rarely been studied. We are conducting a year-long comparative survey of macrofungi on serpentine and granite outcrops to determine whether there are differences in fungal biodiversity based on edaphic factors, and whether fungi tissue differ in heavy metal content based on the substrate upon which they are found. Previous studies we have conducted document differences in diversity of lichens, bryophytes, and vascular plants at these two sites, including significant differences in heavy metal accumulation in vascular plant species found at both sites. Serpentine soils contain high amounts of heavy metals and low amounts of essential nutrients and are a challenging environment for plant growth. Serpentine outcrops are known to harbor many rare and endemic plants, but very little is known about the ecology of macrofungi in serpentine habitats. We predict that we will find differences in species diversity between the two outcrops, reflecting differing abilities in the fungal species to adapt to the contrasting soil conditions. The poster presents our experimental design and findings from preliminary collections made during the summer and fall of 2011.

Wed- 15

Effects of Habitat Fragmentation on Biodiversity of Microinvertebrates in Southeastern Massachusetts

Jeremy D. Kaplan (Bridgewater State University, Bridgewater, MA; jkaplan@student.bridgew.edu) and Christopher P. Bloch (Bridgewater State University, Bridgewater, MA; cbloch@bridgew.edu)

Habitat fragmentation is the division of large areas of habitat into smaller, more isolated patches, due to natural events or human development. Edge effects, reduced resource availability, and isolation of habitat fragments can reduce population sizes and dispersal capability of organisms. Rates of local extinction may therefore increase in fragmented habitats, inevitably decreasing regional biodiversity. A study was conducted on conservation lands in southeastern Massachusetts to assess how abundance and diversity of microinvertebrates are affected by the size and degree of isolation of forest fragments and how abundance and diversity differ between edge and interior regions of forest fragments. Samples of leaf litter were collected from edge and interior habitats in 10 forest fragments. Organisms were removed from leaf litter through the use of Berlese funnels and stored in 70% ethanol. Leaf litter was then sifted through a #260 mesh size soil sieve to remove microinvertebrates that were not collected by the Berlese funnel. Dominant taxa included nematodes, larval Collembola, and oribatid mites. Most taxa were represented in both the edge and interior habitat samples. Relative abundances of taxa were also similar between edge and interior samples. These results suggest a dichotomy between microinvertebrates and larger organisms. Although larger organisms are often observed to favor either edge or interior habitat, microinvertebrates appear to inhabit both edge and interior habitats equally. The spatial scale at which microinvertebrates perceive their environment may fundamentally influence how they are affected by large-scale processes such as habitat fragmentation.

Tue- 9

Seasonal Upland Habitat Use of Northern Cricket Frogs (*Acris crepitans*)

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New York State marks the northern edge of the range of Northern Cricket Frogs (*Acris crepitans*, hereafter NCF). NCF populations have been in decline over the past several decades and they are listed as endangered in New York State. Their distribution and many aspects of their life history are still poorly understood. Over the past two years, the NYSDEC has conducted basic research to better understand the timing and extent of upland habitat use of NCF in New York State. Visual encounter surveys were undertaken at two locations in Orange County, NY to evaluate seasonal differences in habitat utilization. NCF were found to heavily use woodland pools and riparian corridors after emergence from hibernation. Some of these pools were at considerable distances from breeding areas. NCF moved to breeding areas by June and were not found upland again until September. NCF were found migrating or dispersing in September through November. NCF were found to utilize a wide variety of habitats during fall movement and moved considerable distances from breeding habitats.

Mon- 9

High Dissolved Oxygen Levels in Beaver Ponds and their Potential Impact

Larry Klotz (SUNY Cortland, Cortland NY; larry.klotz@cortland.edu) and Laura Platt (SUNY Cortland, Cortland, NY)

Impoundments constructed by *Castor canadensis* (North American Beaver) create patches along streams that provide important habitat for other organisms. In the Northeast, beaver ponds may occur in habitats negatively impacted by human activity. This study investigated dissolved oxygen levels in two central New York State beaver ponds utilizing a sonde which made measurements every 15 minutes. Dissolved oxygen values for the more nutrient-rich Timmerman Pond ranged from 36.9–339% saturation over 165 days of measurement during the growing seasons of 2006–2007. Values for Hoxie Gorge Pond ranged from 23.7–167% saturation over 137 days of measurement during the growing season of 2010. These values were substantially higher than other beaver ponds from the more northern coniferous forest biome reported on in the literature. Both ponds had thick mats of primary producers; collections along a transect at the Hoxie Gorge Pond revealed a mean dry weight biomass of aquatic plants of 71.6 g m⁻² on 21 June 2010 and 225 g m⁻² on 14 July 2010. Water that is supersaturated with dissolved gases has been found to cause gas bubble disease (GBD) in fish and other organisms. Total dissolved gas levels above 110–120% saturation have been found to cause GBD in fish. In shallow waters (<1 m deep) such as beaver ponds, organisms are unable to descend to deeper locations where the increased pressure would counteract the effect of high dissolved gases. The dissolved oxygen levels found for these central New York State beaver ponds may be detrimental to certain aquatic organisms at certain times of the year.

Mon- 11

Forest Herb Community Restoration in Post-Agricultural Second-Growth Forests in Central New York

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Several studies in North America and Europe have demonstrated diminished diversity and abundance of native forest herb communities in post-agricultural second-growth forests. These studies have speculated that forest herb community reassembly is limited by seed dispersal. We established controlled, long-term, field-based, seed-sowing trials to test whether seed dispersal is a limiting factor to herb community composition in post-agricultural secondary woodlots in central New York. In each of three secondary woodlots, we established a matrix of 10-m x 10-m plots (totaling 197 plots at all three sites). In randomly selected plots, seeds of *Actaea rubra* (Red Baneberry), *Allium tricoccum* (Wild Leek), *Caulophyllum thalictroides* (Blue Cohosh), *Maianthemum racemosum* (False Solomon's Seal), *Polygonatum pubescens* (Solomon's Seal), and *Trillium erectum* ssp. (Red Trillium) were sown in September 2008, 2009, and 2010. Stem densities (per 100 m² plot) of each respective species have been monitored on the treatment and control plots since 2008. We will present results comparing three year changes in species densities for the treatment and control plots. Long-term monitoring and assessment of restoration efforts such as this will provide important insights on the possible limitations of seed dispersal as a main limiting agent from which proper management and restoration techniques can be initiated.

Mon- 4

The Influence of Maternal Age and Development on Egg Weight in the Pearl Crescent Butterfly

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We examined the influence of maternal age at oviposition on egg size in *Phyciodes tharos* (Pearl Crescent Butterfly), which is a clutch-laying income breeder. Field-caught females were maintained in the lab with stems of *Aster lanceolatus* (Lance-leaved Aster) as an oviposition substrate and fed with an artificial nectar. For accuracy in determining changes in weight, all eggs were kept with their clutches and weighed individually on a microbalance. Egg weight declined significantly with age for two of the three females, while clutch size declined for all females. Eggs also lost weight after oviposition, presumably from the loss of water. The results suggest the existence of a terminal egg size when fecundity is high and support the resource depletion hypothesis.

Wed- 4

Does Competitive Superiority Contribute to the Rusty Crayfish's Invasion of the Upper Susquehanna River?

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Biological invasions are considered one of the top threats to biodiversity and ecosystem function worldwide. As one of the largest invertebrates in freshwater communities, crayfish play important roles as consumers and agents of disturbance, so crayfish introductions can have strong impacts. *Orconectes rusticus* (Rusty Crayfish) have been widely introduced into both lakes and streams across northern and eastern North America. Most research on *O. rusticus* as an invader has been done in lakes in Wisconsin, where the species is known to displace native crayfish species and alter the composition of lake communities. Much less is known about the effects of introduced *O. rusticus* in streams. One hypothesis for the success of *O. rusticus* as an invader in lakes is competitive superiority over native crayfish for shelter, resulting in higher predation rates on native species. We tested predictions of this hypothesis in the Upper Susquehanna River catchment (New York), where *O. rusticus* has been spreading since at least 1969. For the shelter competition hypothesis to be contributing to this invasion, *O. rusticus* must have a competitive advantage over native crayfish species and shelter must be a limiting resource. We conducted experiments to test both of these predictions. Although *O. rusticus* have a significant advantage over native *Orconectes propinquus* (Clearwater Crayfish) in competition for shelter in the laboratory, the experimental addition of shelters in a stream caused no change in crayfish density relative to control sites, indicating that shelter is not a limiting resource. Because of the abundance of shelter throughout streams of the upper Susquehanna River catchment, competition for shelter is unlikely to be contributing to *O. rusticus*'s successful invasion of this system.

Mon- 15

Flora of Mount Tom, NY

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Plant distribution data is essential for understanding biodiversity. Floristic checklists serve as a means of monitoring invasive species, identifying unique ecological communities, and establishing the location of species of concern. Mount Tom is a Karst landscape located in the town of Springfield, NY. The area formed over a Devonian coral reef as an escarpment of the Panther Mountain Formation. The calcareous nature of Mount Tom facilitates unique communities of calciphilic plants. A series of field surveys were completed during summer 2011 to assess plant diversity on and directly adjacent to Mount Tom. Taxonomic, ecological, and geographic data were recorded for bryophyte and tracheophyte species. A total of 96 species of plants were recorded in 2011. A large population of the thallose liverwort, *Conocephalum conicum*, was found on the summit of Mount Tom. Calciphilic bryophytes recorded included *Tortella tortuosa*, *Radula complanata*, and *Seligeria campylopoda*. Mount Tom was found to have a high diversity of fern species uncommon to the rest of Otsego County. A small population of the uncommon *Asplenium rhizophyllum* was found adjacent to Mount Tom. The most unique plant species recorded was *Equisetum pratense*, a horsetail with severely limited distributions in New York. Data from this study will serve to better elucidate the species diversity and distribution of the New York flora. Future studies will consist of continued floristic surveys as well as gradient analysis of fern communities in the direct vicinity of Mount Tom.

Tue- 24

Analysis of Culverts for Fish Passage within the Ausable River Watershed in the Adirondack Park, New York

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The manufacturing process of culverts beneath roadways must consider many variables prior to construction. The main objective should not only ensure the sufficiency of water flow and flood passage, but also make certain that various ecological dynamics that play major roles in the surrounding ecosystems are able to pass with minimal impact. These factors include the safe passage of fish and microorganisms, and movement of sediment and debris. The only way to ensure the criterion of safe passage is met is to physically measure different features within the culverts and the underlying stream. This involves the measurement of culvert height, width, and length, water velocity and depth (e.g., upstream, downstream, and within the structure), and minimum width of the stream within the culvert. Measurements that were taken outside the culvert include water depth, velocity, and stream width at three separate points both up and downstream. Sedimentary types and deposition both inside and outside the culvert were noted, as well as bank erosion, outlet drop, and the flora/fauna surrounding the stream. The results were placed into a database where the scores were calculated, and GIS maps were constructed demonstrating the functioning culverts, in addition to the structures in need of replacement. Based on the scoring system and the 103 culverts examined, 30 (29%) culverts were rated high priority for replacement, 26 (25%) were ranked medium, and 47 (46%) were ranked low priority for replacement. Additionally, this project is important for further understanding the dynamics of stream movement through culverts and should be repeated in any area subject to stream and human encroachment.

Tue- 2

The Migration and Raiding Patterns of Slavemaking Ants

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Slavemaking ants are social parasites that raid the nests of neighboring ant species, collect larvae and pupae, and raise the brood for their own workforce. In the 8-ha Roemer Arboretum on the SUNY Geneseo campus, the slavemaking ants *Formica subintegra* and *Formica pergandei* parasitize *Formica glacialis* (the host species). More than a dozen slavemaker colonies were monitored over three raiding seasons (summer 2009–2011). Eight colonies migrated at least once during these seasons and the most mobile colony migrated at least twice each of the three seasons. Characteristics of the raids of recently emigrated colonies were compared to pre-migration field data to determine how a migration event can be beneficial to the slavemaker colony. Factors such as raid distance and raid frequency were examined to determine if the high cost of migration (in energy, time, and risk of predation) could be offset by an increase in the number of potential host targets and a decrease in the distance from targets to the newly settled nest. Other local slavemaker colonies have remained stationary over four raiding seasons. The host colony density around stationary nests was compared to the density around nests before their migration. These results contribute to our understanding of the dynamics of slavemaker colony mobility.

Wed- 5

A Survey of Ant Diversity: Season Effects on Ant Activity

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Ant diversity and species composition in a site can be a good indicator of habitat quality and disturbance history. A survey of ant diversity in the 8-ha Spencer J. Roemer Arboretum in Geneseo, NY was conducted through repeated sampling of pitfall traps in spring, summer, and fall of 2011. Multiple samples were collected because a preliminary survey in July 2010 and field observations in September 2010 suggested seasonal variation in the species composition of active ants. Ants were collected from 32 pitfall traps located 10–15 m apart along two transects spanning the research site. Specimens were identified to the species level based on species richness estimates, diversity indices, and species similarity among samples were calculated using the program EstimateS. Comparison of ants sampled in each season indicates whether pitfall trap sampling is sensitive to seasonal shifts in ant activity at this site. Species composition and diversity data can be used as a baseline for continued long-term monitoring of this secondary successional forest.

Wed- 6

Use of Opercles to Age Black Bass: Is there a North American Bias? Preliminary Results

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Scales and otoliths are routinely used by fisheries managers in North America to age *Micropterus salmoides* (Largemouth Bass) and *Micropterus dolomieu* (Smallmouth Bass) (hereafter referred to as Black Bass). Scales are often used for aging because they can be collected without sacrificing the fish. However, there are known problems with accuracy and precision using scales. Otoliths are the most widely accepted aging structure for a variety of species; however, processing them can be difficult for untrained technicians. Opercles are routinely used by fisheries managers in the United Kingdom to age *Perca fluviatilis* (European Perch) and have been validated for use in the United States for *Morone saxatilis* (Striped Bass), both of which are also Perciform species. While they require sacrificing the fish, opercles are much easier to process; however, they have not been validated for Black Bass. We attempted to begin this process by comparing Black Bass ages obtained from opercles, scales, otoliths, and dorsal spines using tournament mortality fish collected at bass fishing tournaments in Plattsburgh, NY. Out of 26 opercle samples aged, readers agreed on 42% and were within one year of each other on 23%. For scales aged, readers agreed on only 15% and were within one year of each other on 26%. For dorsal spines aged, readers agreed on 43% and were within one year of each other on 29% of spines. Spines and opercles showed more consistent results from reader to reader. In the next few months, we will increase our sample size by electrofishing for Black Basses from a wider range of length classes to collect spines, otoliths, scales, and opercles. We also plan to compare our age-length data to established age at length keys for Black Bass in northern latitudes.

Tue- 1

A Quantitative Survey of the Parasites of Coyotes (*Canis latrans*) in Western New York

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Within the last 10–80 years, eastern *Canis latrans* (Coyote) populations have colonized different areas of New York state. Indeed, the ecological and pathogenic relationships between these carnivores and other animal populations are not well understood. Coyotes are opportunistic hunters, and could be bioaccumulators of parasites present in their prey, thus serving as sentinel species for monitoring parasites in other animal populations. Additionally, Coyote populations may act as a reservoir for parasites and diseases that could infect other, more fragile, domestic populations. A survey of parasites present in Coyotes in western New York was conducted using established fecal flotation and light microscopy techniques. Fecal samples were collected and identified based on size and content. Fecal flotation in a Sheather sugar solution and microscopy were performed. Parasite eggs and adults were identified, classified, and quantified using digital light microscopy. From 15 specimens, 14 were positive for parasite infection, and 12 different species of parasites were identified. The number of species per fecal sample ranged from 0–6. Six species of nematode were identified: *Trichuris vulpis*, *Eucoleus aerophilus*, *Eucoleus boehmi*, *Toxacara canis*, *Uncinaria stenocephala*, and *Anclystoma spp.* Two species of cestode were identified: *Dypilidium caninum* and *Taenia spp.*, and two species of protozoans were identified: *Isospora spp.* and *Eimeria spp.* Additionally, the trematode, *Alaria spp.*, and the arthropod, *Mycoptes musculus*, were identified. As eastern Coyote populations are steadily increasing and becoming more urbanized, potential for interactions with human populations and related zoonotic infections is increasing as well. Clinical knowledge of the parasites present in Coyotes is crucial in understanding their potential impacts in more urbanized areas.

Tue- 17

Does the Invasive Shrub Amur Honeysuckle Increase the Human Risk of Exposure to Lyme Disease?

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Invasive plant species have been shown to cause biodiversity loss and to replace native vegetation, but their potential impact on the distribution and abundance of zoonotic pathogens has rarely been examined. The goal of this study was to determine whether the invasive shrub *Lonicera mackii* (Amur Honeysuckle), found in the forests of Hamilton College, increases the human risk of exposure to Lyme disease by affecting the distribution of *Ixodes scapularis*, the Blacklegged Tick (Acari: Ixodidae), which is the parasite responsible for the transmission of the Lyme disease pathogen. The primary host of this tick is *Odocoileus virginianus* (White-tailed Deer), also abundant in Hamilton College forests. It is commonly observed that deer preferentially use densely vegetated honeysuckle-invaded areas. I found that the vegetation density, measured as the number of times any plant part touched a polyester line tied 1.5 m above the ground and passing through the middle of 900-m² study plots, was significantly higher for honeysuckle plots than for paired non-invaded plots. My results also indicated that for two of the three pairs of invaded areas and control sites, deer dung frequency as well as Blacklegged Tick abundance were significantly higher in the honeysuckle-invaded sites; no significant difference was found in the third pair of study areas where both measures, of deer and tick distributions, were very low. These preliminary findings suggest that honeysuckle invasion might be associated with increased tick abundance as well as potentially higher tick-borne disease risk and more extensive sampling and research in this area is necessary.

Mon- 19

Growth and Nitrogen Content of *Lycopersicon esculentum* (Tomato) Plants Intercropped with *Glycine max* (Soybean) Plants

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Bradyrhizobium japonicum are nitrogen-fixing bacteria that form symbioses in the root nodules of soybean plants. Previous research has shown that crop rotation with leguminous plants like soybeans effectively supplies the soil with excess nitrogen that supports the next year's crop. The objective of this study is to determine the effect of *B. japonicum*-soybean symbioses on the growth and nitrogen content of neighboring tomato plants grown in the same pot. Plants will be compared between a control group (without soybeans) and two experimental groups. In one experimental group ("crop rotation"), we will grow the soybean plants for 20 days before terminating them, in an approximation of the crop rotation process. Soybean plants in the second experimental group will be living for the duration of the experiment ("intercropping" group). Our hypothesis is that growth and nitrogen content in the tomato plants will be lowest in the control group, followed by the crop rotation group, and then the intercropping group. Our results will help to develop more effective methods for growing tomatoes without the use of artificial fertilizers.

Mon- 3

Utilizing a Community Cichlid Fish Tank for Animal Behavior Studies

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A 379-L (100-gallon) fish tank placed in a public place on display at St. Francis College, has served as a unique opportunity to study animal behavior using cichlids. Interest has arisen in finding answers and mechanisms that may have contributed to the occurrence of the astounding variety of species of these fish. The 379-L (100-gallon) tank was partitioned into equal thirds with vertical stripes of transparent tape. Using timers, we recorded of how much time an individual spent in a particular third of the tank over a twenty-minute period. Three species of cichlids were used for this part of the experiment: the Red Zebra (*Pseudotropheus estherae*) originally from Lake Malawi in Tanzania, Africa; the Maulana Peacock (*Aulonocara stuartgranti*) from Lake Malawi; and Albino Brichardi (*Neolamprologus brichardi*) Lake Tanganyika, also in Africa. For the second part of the experiment, two Maulana Peacocks were each placed in two separate tanks. These were labeled Fish A and Fish B. After a one-day acclimation period, Fish A was placed in the tank with Fish B, and, after a day, the reverse was undertaken. The results of the first part of the experiment, the Red Zebra and the Albinos Brichardi spent 18 out of twenty minutes in section 3 and Maulana Peacock kept exclusively (19 out of 20 minutes) in section 2. When Fish A was introduced into a tank with Fish B, Fish B chased and bit Fish A. The experiment was repeated, but Fish A did not even attempt to face Fish B; it only exhibited avoidance behavior. The reverse experiment was attempted the next day, in which Fish B was introduced into a tank with Fish A, who became the new aggressor. The fish also changed colors, and their stripes became more prominent. This type of project was an excellent example to demonstrate the territorial behavior of fish. This type of behavior most likely helps the fish to survive and may have contributed to sympatric speciation.

Tue- 6

A Pilot Study of Herbivory Using Image J in Two New York City Parks

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Herbivory or the destruction of leaves by insects or other animals is prevalent in city parks. In order to understand the factors contributing to this, and to possibly mitigate the process, it is necessary to know the extent of the herbivory. The null hypothesis was that there would be no difference in species composition and in herbivory in two New York City Parks. Two-hundred and twenty five leaves were collected from the Brooklyn Bridge Park in Brooklyn, NY and 237 leaves were collected from the Riverdale Park in the Bronx, NY in the summer of 2011. The leaves were measured and photographed and analyzed for total area of herbivory. This was done with the assistance of Image J, a free-downloadable software from the National Institute of Health. The program converts the picture of the leaf to a white image with black spots indicating herbivory. It calculates the total area of the leaf, and the total percentage of the area where herbivory has occurred. We rejected the first part of our hypothesis because six prominent tree species exhibiting herbivory were found in the Bronx (Chestnut Oak, Red Maple, Sassafras, Shagbark Hickory, White Oak and Mulberry), whereas only one (Mulberry) was sampled in the Brooklyn Bridge Park. However, we were not able to reject the second part of the hypothesis because herbivory was low for leaves studied from both parks and averages ranged from 1.32% to 4.29% for all species. The lack of species diversity in Brooklyn Bridge Park is probably attributable to the fact that it has planted trees that are only two years old, whereas the Riverdale Park has been around for over one-hundred years and contains a mature oak-hickory forest. The low amount of herbivory for both parks is encouraging as it shows that the trees are able to flourish in spite of it. This might be analogous to a parasite not killing its host, so that it might survive to infect the next host. Future work includes sampling additional species at various times of year and also identifying agents of herbivory and studying their food preferences and life cycles.

Effect of Varying Salinities on Horseshoe Crab Body Movements

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Horseshoe Crabs are medically interesting because a certain type of blood cell, their amoebocytes, reacts to bacterial endotoxin and causes massive clotting. Bacterial endotoxins often escape sterilization, and so pharmaceutical companies use a commercially prepared lysate containing the amoebocytes that is then used to test human and animal injectable drugs for endotoxins. Study is currently being conducted on additional components of the Horseshoe Crab blood that may lead to anti-viral and anti-cancer drugs. Because of these medical interests, there has been concern about both potential overharvesting of the Horseshoe Crab and possible changes to its ecology as a result of climate change. The null hypothesis for this experiment was that there would be no changes in larval body contractions due to changing salinities that were a simulation of environmental change at a constant temperature (20 °C). Hundreds of Horseshoe Crabs were collected along Connecticut beaches from Long Island Sound in June 2011. These were refrigerated in finger bowls, and the seawater was replaced with 20 parts per thousand (ppt) Instant Ocean, and changed weekly. Larvae began emerging in August, and development was delayed through refrigeration. During November through December, larval development was observed and recorded using a Motic camera and a dissection scope. Larvae were placed in salinities ranging from 0–50 ppt, (0 ppt, 10 ppt, 20 ppt, 30 ppt, 40 ppt, and 50 ppt) which would mimic the extreme and average conditions that might be faced by Horseshoe Crabs in their natural environment. The number of body contractions per minute were recorded to show the affect of varying salinities. There were decreased body contractions in horseshoe crab larvae at 0 ppt, 30 ppt, 40 ppt, and 50 ppt, which caused us to reject our null hypothesis. The results are important in lieu of increased harvesting pressure and possible ecological changes in salinity due to climate change. For example there may be a decrease in salinity over time due to increased rains that could result from climate change. This research has provided a broader understanding of conditions that could possibly affect survival of these medically (and ecologically) important organisms.

Mon- 22

Invasive Plant Species Distribution in Hamilton College Forests in Relation to Canopy Height and Density

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Forest canopy structure influences the availability of vital resources such as light and moisture that may affect where invasive plants grow. The abundance and spatial distribution of five invasive plant species: *Alliaria petiolata* (Garlic Mustard), *Lonicera* spp. (Honeysuckle), *Rhamnus cathartica* (Buckthorn), *Rosa multiflora* (Multiflora Rose), and *Berberis thunbergii* (Barberry) were mapped in three Hamilton College forest areas (Clinton, NY). Species abundances were recorded in transects, and GPS locations of high-density patches of each species along trails were mapped using ArcGIS. We characterized the canopy height and density of Hamilton College forests with LiDAR (light detection and ranging) data to create raster maps in ArcGIS at a 5-meter resolution. There were significant differences in the abundance of the five species among forest areas, suggesting that differences in forest history and/or physical environment influence patterns of spread of non-native species. Many high-density invasive plant patches were found in areas outside or at the edge of areas that were forested in 1955. Preliminary visual analysis of invasive plant species richness in the transects suggested a correlation with areas of low forest canopy height and low canopy density. We compared canopy height and canopy density at patches of each invasive species to the same variables at randomly selected points in the forest. Buckthorn, Honeysuckle, and Multiflora Rose were found to have distributions associated with lower canopy heights (ANOVA: $P < 0.05$). Multiflora Rose and Garlic Mustard were found to have distributions associated with less dense canopy (ANOVA: $P < 0.05$). These results suggest that forest canopy structure is one physical environmental factor affecting invasive plant species distribution in Hamilton College forests.

Minor Fitness Benefits for Edge Avoidance in Nesting Grassland Birds in the Northeastern United States

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Grassland birds are affected by habitat fragmentation, resulting in increased nest predation and parasitism and decreased colonization rates in small, isolated patches, and increased nest density in remnant core habitats. While these effects are well known in the Midwest, little is known about edge effects and grassland birds in the highly fragmented agricultural fields within the forested landscapes of the northeastern United States, where grassland habitat quality varies across a diverse gradient of agricultural management practices. In 2002–2010, we studied the effects of edge on *Passerculus sandwichensis* (Savannah Sparrows) and *Dolichonyx oryzivorus* (Bobolinks) breeding in 11 fields (range: 13.2–38.3 ha; mean: 21.1 ha) within a large agricultural region of Vermont. Mean (SD) distance to edge was 80.3 ± 39.6 m for Savannah Sparrows ($n = 995$) and 94.5 ± 56.5 m for Bobolinks ($n = 652$). Both species nested within 50 m of the edge significantly less than expected. For Savannah Sparrows, on fields managed after the breeding season, daily nest survival (DNS) was lower within 50 m of the edge. For both species, on fields hayed or grazed during the breeding season, DNS was not affected by distance to edge. Both species used areas near hedgerows less than expected, but used wetland, forest, agricultural, road, and developed edges in proportion to availability. For Bobolinks, DNS was not affected by proximity to any edge type, while for Savannah Sparrows, DNS decreased with proximity to wetland and road edges. Of nest whose closest edge was forest, patch size was shown be negatively correlated with Savannah Sparrows' DNS, while Bobolinks' DNS showed no relative effect of forest patch size. While edges were used less than expected, there were only minor consequences for nesting near edges.

Tue- 11

Spatial Partitioning of Macroinvertebrate Diversity in Southeastern Massachusetts

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Habitat fragmentation is generally thought to reduce biodiversity by promoting local extinction and limiting immigration and the reestablishment of populations via the rescue effect. Nevertheless, regional (gamma) diversity can remain high in a fragmented landscape if turnover (beta diversity) is high, even if local (alpha) diversity declines. This study evaluates the degree to which alpha and beta components contribute to gamma diversity of macroinvertebrates in forest fragments in southeastern Massachusetts, and to which local diversity depends on landscape and patch characteristics. If invertebrate species are able to maintain high population size or are able to move easily through an urbanized matrix, then alpha components should contribute more to gamma diversity than do beta components. Beta diversity was greater than expected by chance. However, local environmental conditions (e.g., soil pH, soil moisture) had a greater effect on local biodiversity than did patch or landscape characteristics such as patch size or isolation. Persistence of many invertebrate taxa may depend more on maintenance of local environmental conditions than on patch size or connectivity.

Wed- 9

Stressors and Threats to the Flora of Acadia National Park, Maine: Current Knowledge, Information Gaps, and Future Directions

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Acadia National Park is a center of plant diversity in northeastern North America. The Park's varied habitats and their resident flora are sensitive to a number of natural and anthropogenic perturbations. Stressors such as invasive plants, browsing, pests and pathogens, ozone and acidic fog, fire, other atmospheric pollutants such as nitrogen and heavy metals, visitor use, and land-use practices have all had effects on the Park's habitats and plant species at some point and it is unclear how many of these stressors are currently affecting the flora of Acadia National Park. We highlight our current understanding of the botanical diversity of Acadia, assess the natural and anthropogenic stressors and threats affecting the Park's flora, and summarize critical information gaps to better assess the known stressors and threats to the flora. An understanding of these stressors and threats is critical for our ability to make informed management decisions to preserve the botanical diversity and natural heritage value of Acadia and other regional parks.

Wed- 17

The Invasive Plant Management Decision Analysis Tool

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The Invasive Plant Management Decision Analysis Tool (IPMDAT) assists project managers in deciding if an invasive plant control project is warranted, feasible, and has a high return on investment. The IPMDAT is comprised of a strategy-selection decision tree and three decision trees for specific control strategies (e.g. , eradication, containment/exclusion, and suppression) to determine whether control is feasible given the socio-political environment, biological attributes of the plant, effectiveness of control methods, risk of non-target impacts, and available resources. If the project is determined to be feasible, then the user is asked to weigh the cost and benefits of control project. The poster will display the use of this tool for analyzing *Phragmites australis* (Common reed) management at RamsHorn Marsh, a freshwater tidal wetland of the Hudson River.

Mon- 14

Habitat Use and Survey Methods for Wintering Raptors in Northern New York.

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The Short-eared Owl (*Asio flammeus*) and the Northern Harrier (*Circus cyaneus*) are state-endangered and state-threatened species, respectively. Both species are distributed in the New York's Grassland Bird Focus Areas at relatively high densities during the winter. Presently, residential and commercial development poses serious threats to the species' remaining habitat and ultimately, their persistence in Northern New York. During the winter of 2010–2011 (15 December–31 March), we gathered basic information on the species' habitat use and tested the efficacy of both driving and stationary surveys in detecting target species. Short-eared Owl habitat consisted of significantly less standing live and dead graminoids, and a greater percentage of bare ground than low-use areas. Moreover, stationary surveys were better than driving surveys at detecting Short-eared Owls. Optimal survey length for detecting target species was >50 minutes. Northern Harriers were not present in sufficient numbers to draw adequate conclusions regarding habitat use and optimal survey methods. Future work should focus on performing surveys before 15 December to increase incidence of Northern Harrier observations.

Tue- 10

Pumpkinseed Growth Rate Variation Along the Hudson River Watershed

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Lepomis gibbosus (Pumpkinseed) is a common sunfish found in many bodies of water in northeastern United States. Due to its wide range of habitat it was possible to use this species to study how environmental factors as well as genetics influence the growth of fishes. The study was conducted to look at how Pumpkinseed growth rate along with age and size change throughout the range of the Hudson River watershed. Fish were collected with either trapnets or beach seines in locations coinciding with the three divisions of the Hudson River watershed: the upper Hudson River from Mt. Marcy to Troy, the Mohawk River from Rome to Troy, and the lower Hudson River (the estuary) from Troy to New York City. Fish caught were weighed and measured prior to scale removal for age and growth analysis. Along with the field collection, a common garden experiment was conducted to test whether the differences found in the field were also due in part to genetics. Juveniles from the three locations were kept in aquaria for the duration of the experiment (on average 4 weeks), with their lengths and weights taken at the beginning of the experiment and the end. Data from the common garden experiment showed no statistically significant difference in growth. Field results obtained show that the northern most fish grew slower on average, were the smallest, and had the largest mean-to-length ratio (size comparisons done on same-aged individuals).

Mon- 20

Legacy Changes in Soil Chemistry Associated with over 200 Years of Agricultural Land Use and Forest Recovery on Heiberg Forest, Tully, New York

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On Heiberg Forest, twenty-seven 40.5-ha (100-acre) farms operated from circa 1800 to the middle of the 20th century. Forest was cleared to pastures and fields; areas near homes were used for gardens, orchards, and waste depositories. Farm abandonment began during the Depression in the 1930s, and continued through the 1960s. Cropped fields were planted with conifers by various state and federal organizations while other fields, pastures, and homesites reverted back to forest cover. In 2011, some 50 to 80 years after the last farm operation, we sampled soils from the A horizons on different land-use areas—continuous hardwood forest, cultivated field to hardwood forest, cultivated field to Norway spruce plantation, and homesite—associated with three historic farms. Soil samples were composited per farm and land-use area, air-dried, ground, sieved, and analyzed for soil chemical properties. All soil chemical properties varied as a function of land use indicating a significant, long-term legacy of human use of these sites. Exchangeable Ca, Mg, and K were substantially higher on homesites relative to adjacent hardwoods and conifer plantation. It is important for land managers, policy makers, and the public to appreciate the magnitude of these legacy effects. Failure to account for soil property variability due to past human influence may confound the study of other human-based effects on forest and agricultural ecosystems.

Wed- 14

The Effect of Garlic Mustard on Forest Soils & Understory Species in Western New York

Dr. Jonathan Titus (Jonathan.Titus@fredonia.edu)

Poster Co-authors: Brian Schmidt, Tom Caggianelli, Jessica Wooten, Renee Solly, Kyle Carson

Mon- 12

Mercury in a Common Riparian Forest Salamander: Does Form Matter?

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Terrestrial salamanders are some of the most abundant vertebrates of deciduous forests. Acting as both predator and prey, salamanders are an important link in trophic webs. Because of this importance, we measured the concentration of total mercury (THg) found in *Plethodon cinereus* (Northern Redback Salamander) in a riparian forest to see 1) the extent to which the salamanders were concentrating THg in their tissues, and 2) to determine if the redback and leadback forms of this salamander accumulated THg differently. *Plethodon cinereus* specimens were collected from beneath artificial cover objects located in a riparian forest along the Susquehanna River in northeastern Pennsylvania. The snout–vent length (SVL) of the salamanders were measured and tail tips were removed, frozen, and analyzed for THg. The average concentration of THg in all of the *P. cinereus* sampled was 0.024 ug/g ($n = 169$). However, the leadback salamanders contained almost twice the THg concentration measured in the redback form (averages = 0.034 vs. 0.018 ug/g, respectively). There was no difference in the sizes of the forms to account for this difference, but other researchers have reported significant behavior differences between redbacks and leadbacks. Additional research is needed to identify factors that contribute to the difference in THg concentration between the forms.

Wed- 20

Geographic Range and Intertidal Microhabitat Selection of the Rock Gunnel (*Pholis gunnellus*)

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Habitat selection was investigated in *Pholis gunnellus* (Rock Gunnel), a small, eel-like fish found in the coastal waters and intertidal zone of the north Atlantic, using three independent approaches: 1) quadrat surveys employed in the intertidal zone at various locations in midcoast Maine and on Kent Island in New Brunswick to quantify habitat characteristics and Rock Gunnel densities; 2) intensive searches in the types of habitats identified in the quadrat surveys along the entire coast of New England from Maine to Long Island Sound to determine the southern limit of the rock gunnel's intertidal range; and 3) analysis of long-term datasets from trawl surveys conducted by state and federal fisheries management agencies throughout the entire continental shelf from Virginia to Nova Scotia. Logistic regression and classification and regression tree (CART) analysis determined that Rock Gunnels prefer habitat with substrates of rocky cobbles overlying sand or gravel (CART: $P < 0.001$) in the lower intertidal zone (exposed for less than an hour at low tide; CART: $P < 0.001$). Rock Gunnels were absent from surveyed intertidal zones south of Woods Hole, MA, suggesting that the limit of their intertidal occurrences may be further north than previously reported, possibly due to temporal variation in environmental conditions (e.g., increasing seawater temperatures). Data from NOAA and state agencies indicate the southern terminus of the Rock Gunnel's range in previous decades (1960s–1990s) was located between Delaware and Chesapeake Bay above the 37th parallel north, but may have shifted northward since 2000. As an important food source for a number of mammalian and avian predators, understanding the Rock Gunnel's habitat preferences and distribution can enhance knowledge of the landscape ecology of the intertidal and subtidal zones off of the Northeast United States.

Mon- 21

Habitat Affinity Model and Meaningful Regulatory Thresholds for New York State Streams

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The objective of this study is to develop a habitat affinity model (HMA) metric for use in assessing habitat information in wadeable streams of New York State. Two models are under development, one for high-gradient and one for low-gradient streams. The model will allow streams to be compared to determine percent similarity. Based on this similarity, the water quality and the benthic community structure can be estimated. Models are based on reference sites identified using data collected by the New York State DEC's Stream Biomonitoring Unit including chemical and land-use variables. The reference condition will be the model by which percent similarity score can be calculated using HMA scores from other streams. Meaningful regulatory thresholds for impairment will be developed to compare the site percent similarity scores in order to establish a level of quality of stream and surrounding riparian habitat. The models will be tested against a new dataset to determine if there are correlations to biological conditions, water chemistry, and land-use data.

Tue- 5

***Anastatus furnissi* (Hymenoptera: Eupelmidae), Parasitoid of the Endangered Bog Buckmoth**

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The Bog Buckmoth (Saturniidae: *Hemileuca* sp.) is an endangered species known only from 10 sites in the Great Lakes region, including 6 peatlands in Oswego County, NY. Population monitoring in New York over the past 14 years indicates that populations undergo dramatic fluctuations. They have declined in some peatlands, and have disappeared from at least one. The causes of the fluctuations and declines are unclear, as the ecological factors that might affect their population dynamics have not been systematically studied. However, a parasitic wasp, *Anastatus furnissi* (Hymenoptera: Eupelmidae), which attacks the moths' eggs, has been identified as a potentially important source of Bog Buckmoth mortality. Parasitism rates as high as 45% were observed in the late 1990s, but parasitism was not routinely monitored in Bog Buckmoths until this project began in 2010. Data collected in 2010 and 2011 indicated a consistent parasitism rate of approximately 25% in three different Oswego County wetlands. Various parameters of the wasps' oviposition behavior, including effects of plant identity, egg-cluster size, and egg-cluster height on parasitism rate as well as adult sex ratios of *A. furnissi* also were measured. Combined with the annual Bog Buckmoth census data, information about parasitism rates and the wasp's oviposition preferences may eventually help determine whether *A. furnissi* contributes to the observed population fluctuations of the Bog Buckmoth.

Wed- 3

Can Variations in Leaf-litter Inputs Induce Bottom-up Effects in Vernal Pool Food Webs?

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Vernal pools are seasonal forest ponds that lack a permanent aboveground outlet. They are important to study because of their role as energy cyclers in forests, and amphibian and reptile breeding habitat. Due to their lack of aquatic vegetation, vernal pools rely on allochthonous (terrestrial) carbon inputs from leaf-litter from surrounding trees. With climate change, it is predicted that the tree species composition in New York forests will undergo changes. These changes in composition may affect the organic matter supply for vernal pools, which in turn may affect water chemistry and bacterial communities. Using aquatic mesocosms, I tested the effects that Red Oak, White Oak, and maple leaf litter have on water chemistry and bacterial abundance. Repeated-measures ANOVA indicated significant treatment and time effects for dissolved NH_4^+ , TDP, and DO, as well as pH, and bacterial densities. I also observed significant treatment effects for tannins ($P < 0.001$) and color ($P < 0.001$). From these results I conclude that variation in leaf-litter inputs significantly affect water chemistry. Maple leaf-litter caused the most notable treatment effect with greatest NH_4^+ , TDP, color, and tannins, but least pH, DO, and bacterial densities. Greater nutrient supplies would be expected to support greater bacterial growth, and low DO suggests enhanced bacterial activity. These results seem counter intuitive, but there are several possible explanations. Greater tannin concentrations and low pH may inhibit bacterial growth, while elevated protozoa and zooplankton grazing may have decreased bacterial counts. Though maple leaf litter provided greater carbon and nutrient supplies, future research is warranted to investigate the impact of changes in leaf-litter inputs in vernal pools in the northeastern US.

Mon- 8

Plant-Soil Relations of the Rockland/Thomaston Limestone Quarry

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Substrate is inextricably linked to the character of habitats and their resulting flora. Unique substrates tend to have an increased number of endemic species proportional to their surface area. Limestone represents one of these unique substrates. Minimal research has been conducted in regards to limestone outcroppings of the Northeast. The available literature suggests that limestone plant communities have distinct vegetation zones that actively demonstrate an edaphic climax often with predictable resulting plant communities on a regional basis. These distinct climactic stages will be characterized and defined for the Rockland/Thomaston Limestone Quarry. This survey will look at plant diversity along with corresponding edaphic features including soil pH, depth, moisture content, and elemental chemistry. Soil and plant tissue elemental uptake relations will also be examined in describing the vascular flora and edaphic climax of this limestone outcropping. Unique to the study is its comprehensive nature. From measuring physical features associated with the species present to generating a plant checklist for the site including species diversity indices, this study will characterize the plant diversity associated with limestone in the region. Our study will provide new insights into the edaphic relationships of limestone in northern climes and suggest ways to conserve a potentially distinct flora threatened by continuous quarrying and other human-induced disturbances.

Wed- 16

***Cirsium palustre*: Distribution Mapping and Spread of a Newly Invasive Thistle**

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The European Marsh Thistle, *Cirsium palustre*, is a species of plant that is not native to North America. It has spread throughout several states in the United States, including Michigan, Wisconsin, New York, Massachusetts, and Vermont. This invasive plant is frequently associated with disturbances and can be found in roadside ditches, pastures, and wetlands. This plant also invades natural wetland habitats, threatening the diversity of the natural environment. The European Marsh Thistle has the potential to spread into areas throughout the northern hemisphere with warm summers and cold winters. In the summer of 2011, a survey of *C. palustre* was conducted in Otsego County and the adjacent counties including Madison, Chenango, Delaware, Herkimer, and Schoharie counties. At the locations where populations of European Marsh Thistle were observed, the coordinates were recorded using a global positioning system (GPS). A map was created using the iMapInvasives website and database to display the current extent of the European Marsh Thistle. These data were used to create a predictive model of distributions should *C. palustre* spread. The model uses habitat type, slope, and soil type to predict where this thistle can potentially invade. This model is a resource for the management of the *C. palustre* plants in the future.

Mon- 6

Migratory Patterns and Breeding Locations of Short-eared Owls Wintering in New York State

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The status of the Short-eared owl (*Asio flammeus*), is of major concern to many northeast states, as well as to many Canadian provinces due to population declines related to the rapid loss of grassland habitat. As it is primarily a winter resident in New York State, recent efforts have been made to conserve and study Short-eared Owl wintering concentration areas. Yet little information regarding the migratory patterns and breeding locations of individuals that winter in New York State is available. From 2006 to 2011, wintering Short-eared Owls were captured at three different winter raptor concentration areas in New York State and fitted with platform transmitter terminals (PTTs). Sufficient data were collected documenting the migratory routes and/or suspected breeding locations for seven Short-eared Owls. Estimated departure dates for these individuals ranged from March 21st to April 26th, with breeding ground arrival dates ranging from May 8th to July 6th for the five individuals with approximate breeding ground locations. Of the five owls with sufficient migratory detections, three appeared to migrate north or northeast of their wintering areas. This included two individuals captured in Washington County in 2007 and 2010 that migrated north to the Lake Champlain area before continuing into Quebec. An individual captured in Niagara County migrated northeast into southern Ontario and into northern Quebec. Two Short-eared Owls migrated westward, south of Lake Erie and into Ohio prior to traveling north into Ontario and central Quebec. Five of the seven owls had sufficient data to determine their approximate breeding ground locations. Two of these individuals presumably bred in northwest Labrador and another in southeast Labrador. The breeding grounds of the remaining two individuals were in northeast Quebec adjacent to Ungava Bay and northwest Quebec near Hudson Bay. For these five individuals the average straight-line distance from wintering to breeding area was 1706 km. Additional data would be required to sufficiently evaluate the migratory patterns and breeding ground locations of Short-eared Owls that winter in New York State grasslands.

Tue- 13

The Effect of Garlic Mustard on Forest Soils and Understory Species in Western New York

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Garlic Mustard (*Alliaria petiolata*) is a non-native biennial species that establishes monospecific stands in forest understories. Garlic Mustard may successfully invade mature forest understories by inhibiting mutualistic interactions between native plants and AM fungi. In 2007, thirty-six 1-m² plots were established in a moist deciduous forest with three treatments as follows: areas of high Garlic Mustard density, areas of high Garlic Mustard density with the Garlic Mustard repeatedly removed, and areas where no Garlic Mustard was present. Species response to Garlic Mustard removal was assessed and percent mycorrhizal inoculum potential (MIP) measured each year using a corn bioassay. No significant species richness differences were observed between treatments, perhaps due to the loss of native understory species from the local species pool. Plots with high Garlic Mustard density had the lowest MIP, which indicates that Garlic Mustard may be inhibiting this critical mutualist and that MIP recovers with the repeated removal of Garlic Mustard.

Mon- 12

Chloride Ion Content of Adirondack Headwater Streams Crossed by State or County Roads

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Road salt for winter de-icing is a major anthropogenic environmental input throughout the Northeast. Waterbodies adjacent to roads receive road salt runoff, potentially affecting aquatic life. In the Adirondacks, the patchwork of residential and wild areas provides an opportunity to compare the effects of different road-salting regimes in producing runoff into local streams or wetlands. Adirondack towns are served by county roads maintained by county highway departments, which follow the traditional local practice of allowing a snowpack of a few inches to form on top of the road asphalt. After plowing, a mixture of 92% sand, 8% salt is added to this snowpack. In contrast, state roads in the Adirondacks are maintained by the New York State Highway Department, are plowed to bare pavement after each snowfall, and receive only salt, no sand. To see whether these differences in road maintenance are reflected in different local water quality, study sites on Adirondack streams crossed by these two types of road were tested for chloride ion content. In 2007 and 2008, two streams crossed by a county road and two streams crossed by a state road were tested monthly. In 2009, the study was expanded to include eighteen streams, twelve crossed by county roads and six crossed by state roads. These eighteen streams were tested three times in 2009. A small wetland lying alongside a state road was also included in the study. Study sites were 30 m above and below the road on all study streams. Water samples were titrated for chloride ion content. Preliminary data indicate that, as expected, streams crossed by county roads have lower chloride ion loads than streams crossed by state roads. In terms of effects of chloride ion load on the instream biota our preliminary data indicate that larval salamanders are present in water with up to 20.76 mg/L Cl⁻, and are not found at higher chloride concentrations. Analysis of benthic invertebrate and vegetative results is ongoing.

Wed- 18

Effects of Wind Speed and Temperature on Flight Numbers of the Bog Buckmoth

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The Bog Buck Moth (BBM) (Saturniidae: *Hemileuca Maia*), an endangered species of New York State, has been monitored since 1998, to assess adult populations during the peak flight period in September. Adult flight patterns are sensitive to temperature and wind speeds, but to date only general conditions, including a single temperature measurement and wind-speed values estimated using the Beaufort index have been used to describe the conditions suitable for monitoring. Increased accuracy in the measurement of temperature and wind speed would improve population monitoring by establishing the weather conditions and times of day in which flights are likely to occur and determining optimal transect locations for counting. This study focused on a site in which two sub-populations of the BBM are separated by less than 100 meters. Here, temperature, average wind speed, and maximum wind speed associated with flight counts can be measured and compared at the same time intervals and on the same days for both populations. This approach allows analysis of specific effects of temperature and wind speed on BBM flight patterns, including the peak flight dates for the season. Using these more detailed measurements, it was found that clear, sunny days accounted for the majority of BBM flight counts. Additionally, it was found that wind speed is a critical factor in BBM flight; as wind speed increased, flight count increased as well. With previous wind speed values being only estimated using the Beaufort index, which can vary depending on the individual using it, the correlation between wind speed and flight count could not be observed nor established. Temperature seemed to be less important, as many BBM were counted at temperatures below the supposed ideal flight temperature of 18 °C. The orientation of the two fans and monitoring stations with the prevailing wind direction also appears to be important, but additional wind direction data are necessary to positively correlate the impact of wind direction on flight numbers.

Wed- 2

Effect of Wind Speed and Temperature on Flight Numbers of the Bog Buckmoth

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Wed- 2

Developing a Method to Census Waterbirds in Canada's Boreal Forest: Year 2

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With increased development slated for Canada's Boreal Forest, an area equal to the eastern 2/3 of the US, methods must be developed to estimate the number and distribution of colonial waterbirds for trend assessments. This study is being designed to track colonial waterbird populations. In 2010, all water courses in six 5-km² waterfowl survey plots and the eastern half of Lake St. Joseph (near Pickle Lake, ON) were surveyed by helicopter; surveying the waterfowl plots proved ineffective, as reported here last year. In 2011, we used a float plane to survey lakes across five tertiary watersheds in NW Ontario based on a stratified (by surface area and the presence of unvegetated islands and/or shoals [rocks]) random design. A nearby large lake, North Caribou Lake (NCL), was also surveyed. In both years, colonies of Common Terns (*Sterna hirundo*; COTEs), Herring Gulls (*Larus argentatus*; HERGs) and Ring-billed Gulls (*L. delawarensis*; RBGUs) were the most frequently encountered nesting aggregations; Common Loons (*Gavia immer*) and Bald Eagles (*Haliaeetus leucocephalus*) also were encountered regularly. In 2011, we tallied 90 HERG nests (at 44 sites), 339 COTE nests (15 sites) and 193 RBGU nests (10 sites) on 574 lakes and 33, 125, and 104 nests of those species, respectively, on NCL. Those were the only colonial waterbird nests located. Most nests were found on lakes with both rocks and islands. Next year, we hope to conduct surveys elsewhere in the boreal forest to assess the generality of these observations and evaluate model predictions of waterbird occurrence.

Wed- 23

Determining the Dominant Eurasian Watermilfoil Biocontrol Agent in a Northern Adirondacks Lakes System

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Several native or naturalized herbivores exist that could serve as biocontrol agents for the invasive aquatic macrophyte *Myriophyllum spicatum* (Eurasian Watermilfoil). These include *Euhrychiopsis lecontei* (Milfoil Weevil), which has been shown to correlate negatively with lake size and depth, and *Acentria ephemerella* (Acentria Moth), which correlates positively. Since the two species rarely co-dominate because of these habitat preferences and competition with one another, it is important for lake managers to know which is the dominant species before implementing a biocontrol program. The goal of this study was to determine the dominant species of the Chateaugay Lakes System in the northern Adirondacks. Milfoil Weevil presence was confirmed in April 2011 when leaf-litter samples collected from around the lakes system containing overwintering insects were placed in Berlese funnel setups. Due to the confirmed presence of Milfoil Weevils, it was hypothesized that they were the dominant species. Milfoil stem sampling was conducted in four sites in Upper Chateaugay Lake and the Chateaugay Lake Narrows from early July to early August using a modified Downing sampler. Two sites were adjacent to earlier milfoil hand-harvesting operations, which have been shown to negatively impact the Milfoil Weevil population. Ten apical stems were collected during each sampling, with each site sampled three times. Acentria Moths were observed in greater abundance on the stem samples, and more leaf-litter samples collected in November contained no weevils. It was then concluded that the Acentria Moth is the dominant species in the lakes system.

Tue- 25

Monitoring Water Quality in a Small Adirondack Lake

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The hamlet of Star Lake in northwestern Adirondack Park depends on its namesake lake as the source for its municipal water supply and for recreational resources. The Star Lake Protective Association (SLPA) was formed in 1901; since 2001, students from Houghton College have been monitoring water quality. While historically Star Lake has had good water clarity (Secchi depths of 4–8 m) and low amounts of phytoplankton, its shoreline density and small watershed make it susceptible to changes in its trophic status as well as contamination for road salt. This typical dimictic lake shows stratification during each summer (as measured since 2001) with a metalimnetic oxygen maximum at 9 m and an anoxic hypolimnion. Total phosphorus levels in winter 2003 and 2005 and summers 2007 and 2008 showed extremely low levels (< 5ppb) in the epilimnion and higher amounts (up to 30 ppb) in the hypolimnion, especially during late summer. Amounts of nitrate as measured during summer 2007 and 2008 were in the moderate range for ALSC lakes, with a peak (up to 200 ppb) noted in the lower metalimnion. Chlorophyll levels peaked in the metalimnion during summers 2007 and 2008 with levels at 3 micrograms per liter. Total phosphorus as measured in fall 2008 and spring 2009 confirmed the oligotrophic status of Star Lake; however development of an anoxic hypolimnion each summer indicates the sensitivity of the lake to changes in nutrient status. The SLPA has recently been concerned with possible increases in chloride levels from salt contamination. In this study, we report on the status of possible chloride contamination as well as the most recent (2011 and 2012) total phosphorus readings for the entire water column.

Wed- 19

The Effect of Garlic Mustard on Forest Soils & Understory Species in Western New York

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Mon- 12

Distribution and Occupancy of Breeding Marsh Birds in New York State, 2009–2011

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Conservation and management of marsh birds requires an understanding of population status and trends; however, these parameters are difficult to estimate due to these species' elusive behavior, infrequent vocalizations, and affinity for inaccessible emergent wetlands. In order to determine species-specific distributions and estimate occupancy trends, New York State Department of Environmental Conservation (NYSDEC) participated in the US Fish and Wildlife Service's (USFWS) National Marsh Bird Monitoring Program Pilot Study. The pilot study integrated a probabilistic sampling design with targeted marsh bird surveys that followed the Standardized North American Marsh Bird Monitoring Protocols. From 2009–2011, NYSDEC conducted nearly 1500 call-broadcast surveys at 417 survey points (including random pilot study points [$n = 366$] and non-random long-term monitoring points [$n = 51$] previously established by NYSDEC) in freshwater wetlands throughout upstate NY and one freshwater site on Long Island. Statewide, the number of detections was low for all species, as were the weighted model-averaged estimates of probability of site occupancy. *Rallus limicola* (Virginia Rail) was the most frequently observed species with detections at about 25% of the survey points ($n = 94$ points) and probability of site occupancy of $\leq 32\%$ each year. *Botaurus lentiginosus* (American Bittern) were detected at 10% of survey points ($n = 42$) and occupancy probability was $\leq 30\%$. *Podilymbus podiceps* (Pied-billed Grebe) were detected at 9% of points ($n = 39$) and occupancy probability was $\leq 18\%$. *Ixobrychus exilis* (Least Bittern) were detected at 8% of points ($n = 33$) and occupancy probability was $\leq 18\%$ each year. *Porzana carolina* (Sora) were detected at 7% of points ($n = 30$) and probability of site occupancy was $\leq 27\%$. *Rallus elegans* (King Rail) were detected at $< 1\%$ of points ($n = 3$) with naïve occupancy of $\leq 1\%$ each year; sparse detection histories precluded occupancy modeling. In order to gain a better understanding of statewide marsh bird trends, a sustained or increased intensity of future survey efforts will be required.

Tue- 12

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