



## NORTHEAST PARTNERS IN AMPHIBIAN AND REPTILE CONSERVATION

2008 Annual Meeting

Powder Mill Nature Reserve, Rector, Pennsylvania

August 13<sup>th</sup>-15<sup>th</sup>, 2008

### Poster Abstracts

Posters abstracts are arranged alphabetically by first author.

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#### **Mowing Guidelines in Turtle Habitat: Pastures, Successional Fields, and Hayfields**

**Erb, L.<sup>1</sup> and M. Jones<sup>2</sup>.** <sup>1</sup> Massachusetts Natural Heritage and Endangered Species Program, Westborough, MA. <sup>2</sup> University of Massachusetts, Amherst, MA

Grasslands, shrublands, pastures and hayfields are important habitats for turtles, particularly the wood turtle and eastern box turtle. Therefore, the maintenance of these habitat types is essential, often requiring periodic mowing, though other methods of control are possible (e.g. prescribed burns, grazing). Mowing during the spring and summer months can also cause significant annual mortality; in several western Massachusetts populations of wood turtles mortality due to mowing may be as high as 10%. Similarly, research in Quebec and Massachusetts has found that in rural areas, adult mortality due to mowing is much higher than the mortality due to automobiles. We performed experiments with non-living surrogates to determine if mortality risks vary among different types of machinery, and to determine the mower blade height required to minimize the likelihood of killing or injuring turtles. We found a difference in mortality risk between mowing equipment at a 4" blade height; with 100% mortality due to flail mowers, 50% from brush hog rotary mowers, and 0% percent from sicklebar mowers (these results excluded the effects of tractor type, which is also likely to be significant). In addition, our study showed that blade heights of 6" or more decreased the mortality risk to turtles from 53% to 5%. Based on our results we developed a set of mowing guidelines. These guidelines provide a suite of options, each of which is predicted to reduce turtle mortality. We recognize that all options will not be appropriate for every circumstance and that land managers may need to modify these guidelines to accommodate the needs of other species as well. Things to consider include: mowing rotation, percent of area mowed, timing, mower style, blade height, directionality, and mower speed. In all situations, the most conservative option is to avoid using heavy machinery in early successional habitats from May 15-September 15.

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#### **Sublethal Effects of Chemical Deicers on Larval Amphibians**

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An estimated 10 million tons of road salt (*i.e.*, sodium chloride) are used in deicing activities each year in North America. Elevated levels of chlorine from road salt deposition negatively impact freshwater ecosystems through mortality of aquatic organisms, mobilization of toxic metals, and alteration of native plant communities. Amphibians, particularly when in larval form, are extremely sensitive to such environmental contaminants due to a highly permeable skin membrane. Road salt, as well as a number of commonly used alternatives, may play a major role in localized amphibian declines. Understanding the acute and chronic effects of road deicing chemicals on larval amphibians will help to conserve populations in areas where deicers are applied. We investigated the effect of six commonly used deicing products on the development of *Rana sylvatica* and *Rana clamitans* tadpoles in acute (96 hour) and chronic (time to metamorphosis) tests. Tadpoles were exposed to varying concentrations of each deicer and monitored daily for survivorship. Evidence of physical abnormalities and stage of development were recorded. Results of each test, as well as a comparison between species, will be presented.

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### **The Effects of Natural and Anthropogenic Disturbance on Red-backed Salamanders in Northern Hardwood Forests**

**Hocking, D.J., S. A. Callaghan, K.J. Babbitt, and M. Yamasaki.**

A significant body of literature exists on the effects of silvicultural practices on wildlife populations; however, research on wildlife responses to natural disturbance events occurs less frequently. Further, research comparing natural and anthropogenic disturbances is rare in forested ecosystems. However, one common goal of ecosystem management is to replicate natural disturbance regimes. Thus, understanding the degree to which silvicultural practices compare with natural disturbance processes is needed for informing ecosystem management approaches. We compared the initial effects of even- and uneven-aged timber management, and ice-storm damage on red-backed salamanders. This study was conducted within northern hardwoods in the White Mountain National Forest, New Hampshire, U.S.A. The abundance of salamanders on the forest floor was estimated using artificial cover boards and area-constrained searches. In addition, we measured the effect of disturbance on microhabitat characteristics and the influence of microhabitat characteristics on salamanders to identify how changes in abiotic characteristics due to forest disturbance influence red-backed salamander populations. Even-aged harvests had a greater effect on salamander abundance than did either uneven-aged management or ice-storm damage. Salamander abundance was similar in natural disturbance and uneven-aged management habitats. Although abundance of salamanders was lower at ice-storm damage and single-tree selection sites compared to undisturbed sites, differences were not statistically significant. Among forest disturbance types, soil temperature and characteristics of leaf-litter predominantly influenced salamander distribution. Overall, even-aged management had greater initial effects on salamander abundance than uneven-aged management. However, to obtain a similar volume of timber uneven-aged harvests require a greater area of land than even-aged harvests. As such, the additional area of forest impacted under uneven-aged management practices may or may not counter the relatively small impact that this type of harvesting has on red-backed salamanders.



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## Thermal and Spatial Ecology of the Eastern Massasauga (*Sistrurus c. catenatus*) in Pennsylvania

**Kowalski, M. J., B.C. Jellen, and R.E. Miller.** Western Pennsylvania Conservancy - Pennsylvania Natural Heritage Program.

In order to determine the thermal and spatial ecology of the Eastern Massasauga (*Sistrurus c. catenatus*) in Pennsylvania, 51 (seven non-gravid females, 17 gravid females, 12 males and 15 juveniles) free-ranging individuals were radio-equipped with temperature sensitive radio transmitters. Body temperature varied during the activity season from 5.6 – 40.4 °C. Gravid individuals were warmer than males and non-gravid females during the summer period. Hibernating *S. c. catenatus* body temperatures ranged from 9.9 – 17.2 °C (mean 12.2 °C), and were warmer than surrounding soil.

Adult *S. c. catenatus* (n=36) had a mean home range of 1.548 ha., mean maximum daily distance moved of 53.7m., mean daily movement rate of 7.3, and mean total distance moved of 751.4m. Gravid individuals had smaller home ranges and movement parameters than males, non-gravid females and postpartum females. When tracked over the entire activity season, there was no significant difference in the home ranges or movements of snakes of different sexes or reproductive conditions.

Seasonal movements were characterized by a general tendency to remain in or near hibernacula in the spring, followed by an expansion of home range and movement to surrounding areas of drier/upland habitat dominated by forbs and open canopy in the summer. In autumn, *S. c. catenatus* showed a gradual return to the hibernacula, with a preference for areas with forbs and open canopy. Gravid females showed a particular preference for dry areas of very low vegetation, often in proximity to shrubs. Fields of forbs and low-growing grasses with an open canopy and spotty distribution of woody shrubs characterize the habitat of the Massasauga in Pennsylvania. Habitat is consistently found in proximity to wetland soils. Use of habitat specific to the age and state of the Massasauga relates to subtle differences in micro-habitat that meet the individual needs of snakes throughout their life histories.

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## Conservation and Habitat Planning for the Eastern Massasauga (*Sistrurus catenatus catenatus*) in Pennsylvania

**Kowalski, M.J., and R.E. Miller.** Western Pennsylvania Conservancy - Pennsylvania Natural Heritage Program.

The Pennsylvania Natural Heritage Program (PNHP) has conducted studies to determine the current distribution and status of the Eastern Massasauga (*S. c. catenatus*) in Pennsylvania as well as examine the spatial, reproductive, and thermal ecologies of *S. c. catenatus* via radio telemetry. Information gathered from PNHP studies will provide the



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framework for a comprehensive Eastern Massasauga conservation and management plan for Pennsylvania as well as habitat management recommendations.

This study investigates the effects of various management techniques upon the habitat of *S. c. catenatus* and takes place on public lands in Butler and Mercer Counties in Western Pennsylvania. Shrub habitat, and canopy (wooded) habitat are treated to remove the woody vegetation from 0.6-acre (50m by 50m) study plots. Habitat is assessed before and after treatments, and comparisons are made with the habitats used by *S. c. catenatus* during a previous 2-year radio telemetry study. The purpose is to determine if the treatments (hand-cutting, mechanical cutting, prescribed fire, and/or cutting combined with prescribed fire) work to effectively create habitat that resembles the habitat used by *S. c. catenatus*. Recommendations (including cost effectiveness) can then be made to landowners about habitat management for *S. c. catenatus* on their properties. Because treatments are currently ongoing, the full results of this study will not be available until the fall of 2009.

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### **Conservation of the Eastern Massasauga in Pennsylvania: Five years of *Sistrurus catenatus catenatus* research**

**Kowalski, M.J. and R.E. Miller.** Western Pennsylvania Conservancy - Pennsylvania Natural Heritage Program.

The Western Pennsylvania Conservancy (WPC) has been involved with Eastern Massasauga research since the first radio telemetry study with the species in 1978. Since 2003, WPC has conducted three research projects on *S. c. catenatus* in Pennsylvania. An inventory of 63 historic Massasauga localities detected extant populations at only four of 19 sites. Populations now exist in only 2 of 6 counties with historic records. Radio telemetry research conducted on 42 Massasaugas produced a plethora of information about their spatial, thermal and reproductive ecologies. Management of Eastern Massasauga habitat is necessary to prevent natural succession from prairie to woodlot. Common methods of management are currently being studied to determine which treatments are most effective at creating habitat that the species will use. These studies, conducted by Pennsylvania Natural Heritage Program cooperators, will ultimately contribute information to a comprehensive conservation plan for the Eastern Massasauga in Pennsylvania.

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### **The distribution and movement of The Northern Dusky Salamander (*Desmognathus fuscus*) within a third order stream: Implications for stream conservation and management**

**Plenderleith, T.** Towson University.

Northern Dusky Salamanders (*Desmognathus fuscus*) are reported to concentrate their nests in the headwaters of first order streams although larvae, juveniles and adults



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may be found in larger-order streams as well as headwaters. To investigate the relative habitat value of headwater and larger-order streams we are conducting a two-year mark-recapture study along the upper 3.5 km of Baisman's Run, a third-order stream system located in Baltimore County Maryland, USA. We are testing three hypotheses pertaining to the distribution and movement of salamanders along the stream channel: (1) Salamanders participate in a 'colonization cycle' whereby eggs are laid in the headwaters, larvae drift downstream and adults compensate by returning upstream to oviposit; (2) salamanders may be part of a source-sink dynamic in which the headwaters act as a source and the downstream area a sink ; (3) salamander movements are limited and habitat quality and thus density vary from upstream to downstream reaches. Between May 2007 and May 2008 we captured and marked, using Visible Implant Elastomers, 1975 juvenile and adult *D. fuscus*, 228 of which have been recaptured at least once. The mean linear distance moved is ~4 m. Movement did not vary by age class, sex, or season. To date, salamanders have not exhibited a significant up or downstream bias in movement. Our results indicate that the distribution of juvenile and adult *D. fuscus* conforms to the distribution of nests and that the species exhibits minimal movement. Moreover, greater than 71% of the individuals were captured from the top one-third of the stream, suggesting these areas are prime habitat for dusky salamanders. Headwaters (the sites where first order streams emerge from the ground) are often not accurately depicted on USGS maps and are frequently disregarded as important habitat. As a consequence, they are currently under minimal protection. The distribution of nests, juvenile and adult *D. fuscus* emphasizes the ecological importance of headwater systems to the long-term persistence of this salamander within developing watersheds.

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### **Impaired stress response in a stream-side salamander living in an episodically acidified stream habitat.**

**Ricciardella, Lauren F. and Woodley, Sarah K.** Department of Biological Sciences, Duquesne University, 600 Forbes Ave., Pittsburgh, PA 15282

Salamanders of the family Plethodontidae are found in forested headwaters and streams throughout the Mid-Atlantic states. Many of the stream habitats are acidified, either chronically due to acid mine drainage or episodically due to poor buffering capacity. Acidified stream habitats have decreased salamander abundance, although the mountain dusky salamander (*Desmognathus ochrophaeus*) persists in acidified streams. To determine whether acidification has sub-lethal effects on mountain dusky salamanders, we measured the physiological stress response to capture and handling in salamanders from an acidified site and in salamanders from an acid-neutral site. Salamanders from the acid-neutral site demonstrated a healthy stress response (increased plasma corticosterone) whereas animals from the acidified site had a blunted stress response (no significant increase in plasma corticosterone). The stress response is important in coping with challenges to homeostasis suggesting that animals from the acidified site may have difficulty coping with stressors. Future studies will examine more stream sites representing an acid-alkaline gradient to confirm the relationship between acidification and a blunted stress response.

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### Vernal Pool Amphibians of New York City

**Stanley, S. and E. Pehek.** Natural Resources Group, New York City Dept. Parks, New York, NY 10029

While some species of amphibians remain abundant in New York City parks, those with specific habitat requirements, such as dependence on ephemeral wetlands, are far less common. Of the vernal pool-obligate amphibian species found throughout the Northeast, only two species, *Ambystoma maculatum* and *Rana sylvatica*, persist in the borough of Queens. Understanding how these habitat specialists survive in a heavily-developed area such as New York City may have implications for their conservation and management in an increasingly urbanizing world. Therefore data collection on habitat characteristics and an assessment of the local population size and reproductive success are proposed for the near future. Egg mass counts and calling surveys, begun in 1993, will continue, while funnel traps will likely be used to survey larvae in the summer of 2009.

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### Effects of Forest Clearcutting and Buffer Width on Demography of Vernal Pool Amphibians

**Veysey, J.S., J.E. Theriault, E.F. Carcagno, and K.J. Babbitt.** University of New Hampshire; Department of Natural Resources; Durham, New Hampshire

Conservation of vernal-pool-breeding amphibians is inhibited by inadequate understanding of the amphibians' upland habitat requirements. Upland forested buffer zones around vernal pools have been proposed as a management strategy for these amphibians. However, the effectiveness of buffer zones as mitigation for habitat disturbance has yet to be substantially validated. Specifically, few studies have examined the effects of clearcutting and buffer width on demography of amphibians breeding in vernal pools. We used clearcutting to experimentally manipulate upland buffer widths at 11 vernal pools. Over the next four breeding seasons, we used drift fences and pitfalls traps to capture, identify and count all amphibians entering and exiting the pools. We marked each exiting spotted salamander (*Ambystoma maculatum*), blue-spotted salamander (*Ambystoma laterale*), and wood frog (*Lithobates sylvaticus*) for recapture, and documented sex, age class, mass, and snout-vent length. We are using these data to assess the impacts of buffer width on such population parameters as sex ratio, size structure, fecundity, and population size variability. We will use results from this study to improve forestry best management practices.

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### Nesting habitat improvement for Blanding's turtles in northern New York.



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**White, A. J., Gokey, J. Ferguson, G. Johnson<sup>1</sup>, D. Parker<sup>2</sup> and Lee Harper<sup>3</sup>.**

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The nesting behavior of the New York State-Threatened Blanding's turtle (*Emydoidea blandingii*) was investigated in a wetland complex in St. Lawrence County from 2003-2006. Investigations identified three potential nesting areas characterized by exposed sandy substrates. Movement patterns of telemetered gravid females indicated that one area, a large cornfield, was used exclusively for nesting. To improve the nesting habitat in the other two potential nesting areas, vegetation was cleared from a 2.7 ha area in Fall 2006. In 2007, temperature dataloggers monitored soil temperature during the nesting season in the cornfield, newly-cleared areas, and adjacent forested habitat. Nest construction, egg laying, egg hatching, and hatchling emergence were also monitored. Of 18 Blanding's turtles observed in the cornfield from 9 -16 June, eight were found nesting. All nests suffered egg mortality and two nests (25%) failed completely. Of the 99 eggs deposited, 51 (52%) hatched. Only one Blanding's turtle was observed in the cleared area but it was not observed to nest. Daily high and low soil temperatures were consistently higher in the cleared area than either the cornfield or forested area during the nesting period. The lack of nesting in the cleared area despite the thermally-superior nesting habitat may be due to a high degree of fidelity to previously used nesting locations coupled with low recruitment of new females into the nesting population in a given year. Monitoring for additional years is needed before the success of the nesting habitat manipulation can be fully assessed.