

PRESQUE ISLE STATE PARK
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Biodiversity in Our Backyard

ABSTRACTS

Assessment and restoration of a riparian ecosystem degraded by all-terrain vehicles at Erie Bluffs State Park

J. Michael Campbell

Lake Erie Region Conservancy and Mercyhurst College, Department of Biology

The ravine of Duck Run near the western end of Erie Bluffs State Park has been degraded by many years of unrestricted operation of all terrain vehicles. Several hundred yards of trails traverse the stream valley walls, floodplain, and channel. Compaction of soil and elimination of ground-layer vegetation has created situations conducive to gully formation and stream bank erosion. Habitat degradation may have contributed to a population decline by the Allegheny Mountain salamander (*Desmognathus ochrophaeus*) in the Duck Run ecosystem. Baseline studies of vegetation, benthic macroinvertebrates, and amphibians are underway to facilitate planning to restore this ecosystem, supported by a grant from the Great Lakes Basin Program for Soil Erosion and Sediment Control.

The Roles of Rank and Season on Foraging Behavior in Black-Capped Chickadees

Emily J. Morse

Pennsylvania State University, Behrend, Department of Biology

The Black-capped Chickadee (*Poecile atricapillus*) experiences changing environmental conditions throughout the year that alter foraging behavior. Dominance rank, time of year, and environmental factors were examined during winter to determine their impact on chickadee foraging performance. Foraging performance was quantified by θ , the efficiency with which energy is gained. Results showed that θ depends on rank in a winter flock ($p=0.0047$). Time of day was also found to be significant ($p=0.0238$), with birds obtaining higher θ values in the evening than the morning. A multiple regression

analysis was used to evaluate the impact of a number of environmental conditions on θ . Wind speed ($p=0.0009$), time of day ($p=0.0231$), and dominance rank ($p=0.0013$) were found to be significant. High-ranking birds were unaffected by wind, however, subordinates had much lower θ values as wind speed increased. Group interactions were also analyzed. Subordinate birds never fed alone, although dominants frequently did. An optimal foraging group size was determined to be 4 individuals. Although the number of individuals feeding together was significant, there was no effect from the mix of dominance ranks feeding together; this trend was universal and unaffected by bout. During the breeding season, foraging behavior was defined as the time a female bird spent away from the nest. This was positively correlated with the food suitability index of the nest site ($R^2=0.6168$). Despite predictions that other environmental factors should impact foraging, none were found to be significant.

Diet of the common map turtle, *Graptemys geographica*, on Presque Isle —

Peter V. Lindeman

Edinboro University, Department of Biology and Health Services

Diet of the common map turtle (*Graptemys geographica*) on Presque Isle was examined via overnight collection of feces. Adult males ranged in size from 66–114 mm plastron length, while adult females reached 235 mm plastron length, thus female fecal samples were examined in three size classes: small juveniles (those overlapping adult males in body size); larger juveniles; and adults. Primary prey items identified include case-building trichopteran larvae, small snails, and zebra mussels (*Dreissena polymorpha*), but the prevalence of each varied according to sex and size class of the turtles. Trichopteran larvae were strongly predominant in the diet of adult males, but less important in females, with their mean percent of total fecal volume declining with size of the female. Snails were most common in the diets of males and also declined in importance as female body size increased. Zebra mussels were taken in only small quantities by males but increased in prominence in female diets as body size increased, becoming the nearly exclusive prey of adult females. Previous reports of the diet of *G. geographica* from habitats not invaded by zebra mussels indicate a strongly molluscivorous diet, yet one more varied overall, for females. Change in diet associated with this invasive species thus mirror similar narrowing of diet that has been reported for more southern species of *Graptemys* following invasion of rivers in the southeastern U.S. by Asian clams (*Corbicula* spp.).

The Effects of Erosion Control Blankets and Burlap on Seeding of Native Plants Along the Lake Erie Bluffs

Brendan Lake, Dawn Messina, and Rebecca Miller (Mike Campbell and Marlene Cross),

Mercyhurst College, Department of Biology

Lake Erie's shoreline is constantly being eroded by surface runoff, groundwater seepage, wave action, and manmade disturbances. The steady rate of erosion, damage, and loss of private property calls attention to this problem. As a part of a research project funded by Coastal Zone Management and Mercyhurst College for the Propagation of Native Plant Species for Habitat Restoration Projects in the Lake Erie Coastal Zone, two separate methods of stabilizing the bluffs using native plant species are being tested. The purpose of this is to find a practical way for homeowners to slow the rate of erosion on their property. One method uses erosion control blankets (ECB); the other uses the less expensive material, burlap. Both utilize seeds of native plant species found locally on the bluff. The studies are testing whether the treatments (ECB or burlap) affect how well the native plant seeds are able to germinate and establish. Also being tested are possible effects of the treatments on non-native weedy species growth and possible inhibitory effects on seedling emergence through the covers.

The Making of a Wildlife Film

Tracy Graziano

Montana State University, Science & Natural History Filmmaking Department

Tracy is currently working towards her Masters Degree in Montana State University's Science and Natural History Filmmaking program. Montana State University is host to the only Masters program in the world in Science & Natural History Filmmaking. Its goal is to bridge the gap between filmmaker and scientist, and to increase science content in science and natural history films. For her degree requirements she must produce and raise the funds for a 15-minute and a 30-minute film (\$50,000-\$100,000). Chasing Coyotes, the 15-minute film, is an intensive look at the research of Dr. Robert Crabtree and his field technicians in Yellowstone National Park. The 30-minute film, Gods' Dog: America's Little Wolf, will explain the differences between eastern and western coyotes, basic natural history, how genetics (Dr. Robert Chambers, SUNY Syracuse) have changed our view of the Canidae family in North America, and includes a window into the Native American Trickster (Coyote) stories (Dr. Henrietta Mann, Cheyenne Elder, Montana State University). Altogether, the footage represented in Gods' Dog has been filmed over a six-year period between Presque Isle State Park, Yellowstone National Park, Algonquin Provincial Park, and various locations. Tracy plans to graduate in the fall of 2004 following an intensive oral exam and defense on her thesis paper and film.

Because of the nature of the graduate program, Tracy's thesis will provide a unique viewpoint relating her film to documentary theory, the history of women in science and film, the ethics employed in production of these films, and natural history film history. Upon graduation, Tracy plans to start a business to produce educational films on the research that takes place at Presque Isle for the new Tom Ridge Center at Presque Isle, and also wishes to pursue her PhD. in the wildlife sciences. You will see a 10-minute sample of her footage set to music. Coyotes are surely in your backyard.

Freshwater Mussel and Fish Community Studies in French Creek

Tamara A. Smith

Western Pennsylvania Conservancy

Located in northwest Pennsylvania, French Creek has the highest remaining freshwater mussel diversity of any stream in the state, with 29 native species recorded from its drainage as well as over 80 species of fish. The objectives of this ongoing study are to determine the present status of freshwater mussels in the French Creek watershed and to interpret distributional trends within the main stem river with respect to habitat, water quality, and fish.

In 2003, 27 sites in the main stem of French Creek were surveyed to estimate species richness and to determine if endangered or rare species are present. Search area was standardized to 2500 m² per site with a total search time of 300 minutes, divided equally among 4-6 snorkel or SCUBA surveyors. Water quality and physical habitat parameters were measured in conjunction with the biological surveys.

A total of 7680 individual live mussels representing 24 species were found at the 27 sites sampled in 2003. The mucket (*Actinonaias ligamentina*) was the most abundant and widely distributed species, found at 24 sites and accounting for about 45% of the total number of mussels found. The second most abundant species was the kidneyshell (*Ptychobranhus fasciolaris*), which was found at 24 sites and made up 13.7% of the total catch. The two next most abundant species were spike (*Elliptio dilatata*) and the rayed bean mussel (*Villosa fabalis*). Two federally endangered species were found: the northern riffleshell (*Epioblasma torulosa rangiana*) was found at 9 sites, and the clubshell (*Pleurobema clava*) was found at 5 sites.

Data from 2003 was used to select study sites for 2004, in which intensive quantitative surveys are being conducted to estimate parameters such as mussel density and recruitment. In addition to mussel surveys, the fish community composition is being evaluated at each mussel survey site.

The effects of nonindigenous and exotic species on the biodiversity of the Presque Isle Bay watershed

Renea A. Ruffing

Penn State University, University Park, Department of Ichthyology

The homogenization of the Earth's biota by the introduction and spread of non-native species is one of the most damaging anthropogenic impacts on biodiversity today. Degradation of aquatic ecosystems by the introduction of nonnative species is exemplified in the Great Lakes of North America. Native fish and other aquatic communities in this region have been irreparably harmed by the introductions, both accidental and intentional, of exotic species. The most recent round of aquatic invaders that have impacted the integrity of the Great Lakes are mainly Pontio-Caspian natives including two bivalve species; the zebra mussel (*Dreissnia polymorpha*), the quagga mussel (*Dreissnia bugensis*), and three piscine species; the ruffe (*Gymnocephalus cernuus*), the tubenose goby (*Proterorhinus marmoratus*), and the round goby (*Neogobius melanostomus*). Of the three most recent fish introductions, round gobies are the most prolific and widespread. This presentation discusses the impacts that these invaders and others have had on the biodiversity in the Presque Isle Bay region with a particular focus on the effects of the round goby.

The effects of habitat fragmentation and urbanization on anuran species of Erie County

Maggie J. Campbell and Erik A. Weber

Mercyhurst College, Department of Biology

Habitat fragmentation and urbanization may contribute to the decline of anuran (frog and toad) populations in Erie County. In a study conducted during the spring of 2004, breeding populations of spring peeper, American toad, and northern leopard frog were compared among urban, suburban, and rural localities to determine if the degree of habitat fragmentation affects the abundance and diversity of anuran species. Advertisement calls detected during nocturnal road vocalization surveys on nine different routes (three each in urban, suburban, and rural areas) were quantified using the Wisconsin Index rating scale. Spring peepers were least affected by fragmentation; northern leopard frogs were most affected. Results for a route which included Lake Erie Bluff State Park indicated diverse and abundant anuran populations in that area. .

The Effects of Paternal Contaminants on Snapping Turtle Hatchlings, *Chelydra serpentina serpentina*

Jeanette L Schnars

Penn State Behrend, Department of Biology

Previous research has revealed high levels of contaminants in snapping turtle tissues in northwestern Pennsylvania. This study examines the effects of PCB contaminants at both the embryo and hatchling states and their possible vectors that may be encountered during the first year. Eggs were collected directly from females and exposed to various concentrations of PCB solutions. Clutches were then incubated using a split-plot design of temperature and moisture to determine possible differences in the amount and type of contaminants metabolized. Immediately after hatching, respirations will be measured and compared between those individuals exposed to PCB treatments. Results will indicate possible affects of PCB exposure on the metabolism of the yolk sac during the first critical hours post-emergence. A behavioral evaluation will also be conducted by observing reactions to phototaxis and righting responses. Such data may give insight to the effects of PCB exposure on basic innate behaviors and neurological development. Over-wintering experiments will also be conducted to determine if hatchlings submerged in contaminated sediments acquire contaminants over their body's surface. This study encompassing exposure from embryogenesis through the first year of life will reveal possible vectors of exposure affecting development and future impacts to the overall population.

The Influence of Secondary Orientation Cues on Emerging Snapping Turtle Hatchlings (*Chelydra serpentina serpentina*) at Presque Isle State Park

Amy Jo Smith (Jeanette Schnars)

Penn State Behrend, School of Science, Department of Biology

Snapping turtle, *Chelydra serpentina serpentina*, hatchlings emerge from their nest and remain "naive" until they become oriented using cues presented by the environment, such as light geomagnetic, geotropic or sound. Many species of turtles are positively phototactic and use light as a primary cue. Secondary cues for freshwater turtles have not been studied in the past. This study examined hatchlings' utilization of secondary cues. Eleven nests were located and protected on Presque Isle State Park. Naive hatchlings were collected and tested in three arenas, one natural and two treatment arenas. The first arena was uncontrolled and observed hatchlings natural orientation from the nest. The treatment arenas controlled light, geotropism, sound, and olfaction. The second arena tested compass heading in the absence of other cues. The third arena tested slope and orientation to light vs. shadows. Data from the natural arena indicated orientation in a northern direction. Data analysis from the slope arena indicated no preference for up or

downhill, suggesting geotropism was not utilized as a secondary cue. Preference for light or shadows was inconclusive. This study implies that the secondary cues tested may not be a priority for efficient location of water.

Pennsylvania Game Commission waterfowl monitoring at Presque Isle and Erie County

Kevin J. Jacobs

Pennsylvania Game Commission

Waterfowl monitoring by the Pennsylvania Game Commission at Presque Isle and Erie County consists mainly of pre-season leg banding and the mid-winter waterfowl inventory. Kevin Jacobs will present these data along with harvest survey data collected through the United States Fish and Wildlife Service parts collection survey and the Erie Christmas bird count. He will also discuss threats to waterfowl in the lower Great Lakes and a recently completed Tundra swan research study.