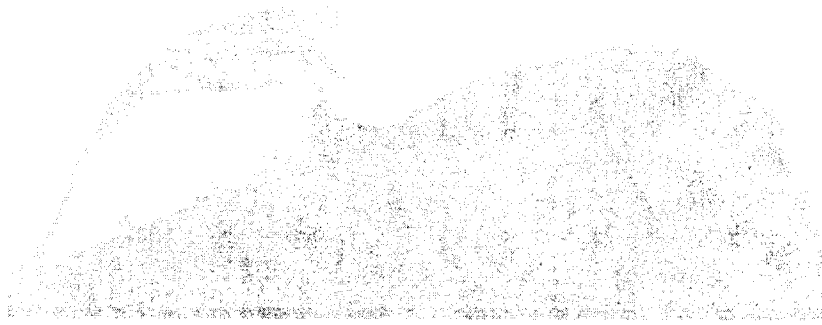


# Regional Science Consortium

## 3<sup>rd</sup> Annual Research Symposium

Tom Ridge Environmental Center at  
Presque Isle – Erie, Pennsylvania



November 1-2, 2007

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## PROCEEDINGS

Tom Ridge  
Environmental Center  
PRESQUE ISLE

**REGIONAL SCIENCE  
CONSORTIUM**  
*at The Tom Ridge Center at Presque Isle*

**3<sup>rd</sup> Annual Regional Science Consortium Research Symposium**  
**Tom Ridge Environmental Center at Presque Isle – Erie, Pennsylvania**  
**November 1-2, 2007**

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**PROCEEDINGS**

**PAPER PRESENTATIONS**

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Title:           **Analysis of genetic diversity and inbreeding in populations of the eastern massasauga rattlesnake in western Pennsylvania**

Author:         Dr. Ann E. Throckmorton, Department of Biological Sciences, Westminster College  
New Wilmington, PA

Abstract:       The eastern massasauga rattlesnake, *Sistrurus catenatus catenatus*, was once locally common in western Pennsylvania. However, because of habitat destruction and human encroachment, the species is currently found in only eight localities in Butler, Mercer, and Venango counties. Of the 32 populations within those localities, one is considered secure, eight are declining or presumed to be declining, and the status of the remaining 23 populations is unknown. In this study, blood from snakes at three sites was subjected to microsatellite analysis to estimate heterozygosity, inbreeding, and number of unique microsatellites in each population. The analysis revealed that there is low genetic diversity within and among snake populations and that significant inbreeding has occurred. This has significant implications for efforts to maintain, augment, or relocate snakes in an effort to preserve the species in western Pennsylvania.

Title:           **Effects of Zebra and Quagga Mussel (*Dreissena* spp.) Invasion on the Feeding Habits of the Stinkpot (*Sternotherus odoratus*) on Presque Isle, Northwestern Pennsylvania.**

Authors:       Patterson, J.C.\*, Lindeman, P.V. 2006. Effects of Zebra and Quagga Mussel (*Dreissena* spp.) Invasion on the Feeding Habits of the Stinkpot (*Sternotherus odoratus*) on Presque Isle, Northwestern Pennsylvania. Edinboro University, Edinboro, PA 16412

Abstract:       The dietary patterns of the stinkpot (*Sternotherus odoratus*) were investigated in northwestern Pennsylvania on Presque Isle, Lake Erie. Three taxa were most prevalent in fecal samples: zebra and quagga mussels, small snails, and trichopteran larvae. The data showed significant positive correlations between the percent consumption of zebra and quagga mussels and the width of both the head and alveolar surfaces. Turtles with wider heads and alveolar surfaces tended to prefer zebra and quagga mussels over freshwater snails. The results indicate a shift in dietary preference with increasing size of the trophic apparatus. The stinkpot is the second turtle species at Presque Isle reported to prey heavily upon invasive mussels.

Title: **Geographic Movements of the Common Snapping Turtle (*Chelydra serpentina serpentina*) on Presque Isle State Park, Erie Pennsylvania**

Authors: Jennifer. R. Hughes\*- Penn State-Erie, The Behrend College, Jeanette. L. Schnars – School of Forest Resources, Pennsylvania State University

Abstract: Presque Isle State Park has a number of unique ecological zones including a lagoon system that opens to both Presque Isle Bay and Lake Erie. Common snapping turtles are normally localized in a home pond with the seasonal movements of gravid females to lay eggs. Our study is presently looking at the movement of snapping turtles throughout the lagoon system to determine if they move into the bay or the lake due to seasonality. Aquatic turtle trapping was employed to capture three male snapping turtles. A single-stage radio transmitter was attached to the carapace of each turtle and has the potential of 12-18 months. Each turtle was released at the capture site and monitored 2-4 times a week during the summer months and are currently being tracked at once every 12-14 days throughout the fall and winter months. Upon identifying their location, environmental parameters are recorded. Thus far, the turtles have been found in a centralized location near the point of release. As the study progresses, our objectives are to determine their over-wintering location, location during the reproductive season, and the possible relationship between water temperature and their movements.

Title: **The Response of Neonate Snapping Turtle (*Chelydra serpentina serpentina*) Hatchlings to a Moisture Gradient**

Authors: Melanie A. Brewer\*, Penn State-Erie, Jeanette L. Schnars, Penn State University Park

Abstract: Upon emerging from the nest cavity, turtle hatchlings use a variety of cues to locate water. Freshwater turtles may encounter more obstacles when locating a home pond since their parameters are often lined with thick vegetation. The objective of this study was to determine the response of neonate snapping turtle hatchlings (*Chelydra serpentina*) toward a moisture gradient. Snapping turtle nests were located and excavated at Presque Isle State Park during June 2007. A total of 194 eggs were excavated and incubated at the Tom Ridge Environmental Center. After hatching and complete absorption of the yolk, neonate hatchlings were tested in an enclosed rectangular arena with a controlled moisture gradient on the substrate. The first experiment used a constant high moisture substrate (40% H<sub>2</sub>O) throughout the arena to establish there was a no preference response of the hatchlings (p=0.5). The next experiment used a moisture gradient of no moisture to high moisture (0 - 40% H<sub>2</sub>O) spanning one end to the other of the arena. Hatchlings were released at the midpoint of the arena and their movements of no moisture or high moisture were recorded. Hatchlings were found to significantly prefer a moist substrate (p = 0.003). This information provides insight into one of the many cues neonate hatchlings rely upon to locate ponds.

Title: **Using leg bands and radio telemetry to study dispersal and use of the Presque Isle roost by Purple Martins (*Progne subis*).**

Authors: E. K. Pifer\*, J. Tautin, Purple Martin Conservation Association, 301 Peninsula Drive, Ste. 6, Erie, PA 16505

Abstract: East of the Rocky Mountains, Purple Martins (*Progne subis*) nest almost exclusively in housing provided by humans. This dependency, their tractable nature, and their strong fidelity to nesting colonies, make Purple Martins ready subjects for banding based studies. The Purple Martin roost on the bay of Presque Isle is active from mid-July until mid-September. In order to study dispersal in both adults and juveniles, the Purple Martin Conservation Association reads bands each summer at a staging area on Beach 11 of Presque Isle State Park. Additionally, in 2007 radio transmitters were attached to 16 fledgling martins to study post-fledging dispersal and roost use. Results from the Purple Martin Conservation Association's long-term banding program, as well as preliminary results from radio telemetry studies are presented.

Title: **Bird Banding at Presque Isle State Park: Past, Present and Future**

Authors: Dr. Sarah Sargent\* (NW PA Important Bird Area Coordinator, Audubon Pennsylvania, 301 Chestnut St., Meadville, PA 16335) and Lauren Glorioso (Senior, Environmental Science, Allegheny College, Meadville, PA 16335)

Abstract: On August 1, 2007, we began mist netting and banding land birds at the same location on Presque Isle that has been used since the 1960s by Ron Leberman. We will report on the total birds we band through the end of October, 2007, and compare our results to summaries of earlier banding at PISP by both Ron Leberman and Jean Stull (Cunningham). More than 63,000 birds of 134 species have been banded at PISP starting in 1960, and we plan to use this long-term dataset to look for evidence of shifts in timing of migration possibly resulting from global climate change.

Title: **Small Wind Turbines, Birds, and Bats: A Study Underway at TREC, Presque Isle, PA**

Author: Kenneth W. Andersen, Ph. D., Gannon University

Abstract: An investigation of the possible effect of a 10 kwh wind turbine supported on a 120 ft. mono-pod tower at TREC on birds and bats was initiated in late October, 2006 and is still ongoing. A goal of the study is to determine if the turbine kills birds and bats and if so, under what conditions. A search for carcasses of birds and bats near the tower occurs daily. None has been found. An effort to understand the relationship of birds and bats with the tower is being investigated by learning what species of these animals appear at the tower site. This is accomplished through diurnal observations and by recording nocturnal flight calls of birds and bats. This report will discuss the present status of our recording and evaluation of bird flight calls.

Title: **Bat Activity Near a Small Wind Turbine: A Study Underway at TREC Presque Isle, Pa**

Authors: Jacob Spittler\*, Kenneth W. Andersen, Steve Ropski, Gannon University

Abstract: As part of the potential bat mortality study at the location of the recently installed wind turbine at the TREC, a monitor has also been set up to identify the species of bats that are active in the area. The ongoing study began in June of 2007 with the placement of an ultrasound bat detector on site to record the calls of the bats feeding in the area. Calls were recorded from approximately sundown until sunup. Once the recordings were taken they were analyzed using SCANR software and identified using known calls as references. Currently the calls from one day each week are being analyzed to get an idea of the species present. The weather data for the days being analyzed will also be looked at to see how what effect it has on bat activity. This presentation will discuss the progress that has been made with the identifications and what is planned for the future.

Title: **Trends in Fish Assemblages in the Lower Great Lakes: 1993 – 2007**

Authors: Denise L. Clay\*, Biological Science Technician  
Michael A. Goehle, Aquatic Nuisance Species Coordinator – Northeast Region  
Sandra M. Keppner, Outreach Coordinator  
U.S. Fish & Wildlife Service Lower Great Lakes National Fish and Wildlife Conservation Office

Abstract: Since 1993, the Lower Great Lakes National Fish and Wildlife Conservation Office (LGLNFWCO) Aquatic Invasive Species Program has conducted field surveillance for Eurasian Ruffe (*Gymnocephalus cernuus*) in the Lower Great Lakes. These surveys included bottom trawling in seven harbor locations along the U.S. shore of Lake Erie, and one location on Lake Ontario. Data was collected as part of the Great Lakes Ruffe Control Committee's basin-wide surveillance efforts. Surveys were conducted twice per year (May and September) at Toledo, Sandusky, Cleveland, Ashtabula, and Conneaut, OH; Presque Isle (Erie), PA; Buffalo and Rochester, NY. Fish assemblage data, spanning 14 years and including 26,581 collected and identified from the Lower Great Lakes, was analyzed and a summary report was prepared. Various trends were noted including changes in fish abundance since the introduction of Round Goby, *Apollonia (Neogobius) melanostomus* into the St. Clair River in 1990.

Title: **Use of Fish Community Structure to Assess the Condition of Fourmile Creek (Erie Co., PA)**

Authors: K.M. Smith\*, E.C. Phillips, G.M. Andraso, Biology Department, Gannon University

Abstract: A number of projects on Fourmile Creek (Erie Co., PA) are expected to improve the quality of the stream. For example, the removal of the Spring Creek Dam (Station Road) and a concrete-capped waterfall (Penn State Behrend property) will help restore free-flow to the stream, thereby decreasing sedimentation. We assessed the fish community at 12 sites on Fourmile Creek to get a better understanding of the conditions in the stream prior to improvement projects. Fish assessment work indicated that the stream is in fair condition. We found low species diversity (only seven species were captured), an indication of relatively low stream quality. For comparison, we have found as few as one or as many as 20 species present in other Pennsylvania tributary streams of Lake Erie. The blacknose dace (*Rhinichthys atratulus*), a species tolerant of habitat degradation, composed nearly half of the catch in Fourmile Creek. In contrast, intolerant species such as darters were conspicuously absent from sites on Fourmile Creek, but were abundant at some locations on other streams. We also used the Index of Biotic Integrity (IBI) to determine stream quality. The IBI uses 12 metrics (total number of species, number of intolerant species, percent dace species, etc.) to generate a single value that can range from 12 (very poor quality) to 60 (excellent quality). The IBI for the sites on Fourmile Creek ranged from 18 (very poor) to 34 (marginally good). For comparison, IBI at sites on other tributaries ranged from 20 (poor) to 54 (excellent). The average IBI for the 12 sites on Fourmile Creek was 29, indicating that the stream as a whole is in fair condition. The baseline assessment conducted in this study and future monitoring will allow us to determine the impact of stream improvement projects on the fish assemblage and overall quality of Fourmile Creek

Title: **Movement of Brown Bullheads in and around Presque Isle Bay, Lake Erie.**

Authors: Millard, M.J.<sup>1</sup>, Smith, D.R.<sup>2</sup>, Grazio, J.<sup>3</sup>, Obert, E.C.<sup>4</sup>, Grise, S.\*<sup>4</sup>, Wellington, C.G.<sup>4</sup>, Wellington, R.J.<sup>4</sup>, Rafferty, S.D.<sup>4</sup>, <sup>1</sup>U.S. Fish and Wildlife Service, Northeast Fishery Center, Lamar, PA, 16848; <sup>2</sup>U.S. Geological Survey, Leetown Science Center, Kearneysville, WV, 25430, <sup>3</sup>PA Sea Grant, Lake Erie Office, T. Ridge Center, Erie, PA, 16505; <sup>4</sup>PA Dept. of Environmental Protection, Office of the Great Lakes, T. Ridge Center, Erie, PA, 16505.

Abstract: Presque Isle Bay was listed as the 43<sup>rd</sup> Area of Concern by the U.S. Department of State in January 1991. Tumors and other deformities in the brown bullhead were one of the key beneficial use impairments of Presque Isle Bay leading to this listing. The root cause of the fish tumor beneficial use impairment is unknown. Recent work has called into question whether or not the brown bullhead population is truly confined to the waters of Presque Isle Bay. We proposed to test the hypothesis that brown bullhead migrate in and out of Presque Isle Bay through the single entrance channel to the bay. We used radiotelemetry to monitor the movements of adult brown bullhead in and around Presque Isle Bay. Forty-nine adult brown bullheads were surgically implanted with radiotransmitters in June 2006. Fish were captured from both within the bay and outside the bay (Thompson Bay), tagged and subsequently released near point of capture. Remote radiotelemetry receivers with integrated dataloggers were positioned around the bay and the entrance/exit channel to detect movement of radiotagged fish. Weekly manual tracking was also performed. We present results on movement of brown bullhead in Presque Isle Bay between June and November 2006.

Title: **A Molecular and Morphological Investigation into the Hybridization of Brown Bullhead and Black Bullhead in P. I. Bay.**

Author: John Cingolani, Penn State University, University Park, PA.

Abstract: The Brown Bullhead is a bottom-dwelling fish native to the Great Lakes that is commonly used to determine tumor prevalence in degraded aquatic environments. Brown Bullheads are in constant contact with benthic sediments due to their feeding habitats which may naturally expose them to industrial wastes and other contaminants trapped in bottom sediments. In 1991, the United States Department of State listed Presque Isle Bay, Lake Erie, Erie, Pennsylvania, as an Area of Concern of aquatic habitat for the primary impairments of sediment contamination and high incidences of tumors in Brown Bullheads. It was proposed by Eric C. Obert, extension director of Pennsylvania Sea Grant that the Brown Bullhead population with tumors in Presque Isle Bay may be a hybrid within the genus *Ameiurus*. Studies of hybrid fishes have shown that hybrids and succeeding backcross generations are highly sensitive to pollutants, while the parental wild species are less susceptible. The purpose of this study is to determine if fish identified as Brown Bullheads from Presque Isle Bay, Lake Erie are truly Brown Bullheads or if there is evidence of hybridization and introgression with Black Bullheads. Genetically, over half of the bullheads sampled and examined using microsatellite DNA were identified as having all *Ameiurus nebulosus* alleles, but multi-locus nuclear genotypes suggest the presence of extensive backcrossing between *Ameiurus nebulosus* and *Ameiurus melas* in Presque Isle Bay. Morphological and meristic analysis indicates what is likely being collected as a Brown Bullhead is morphologically a Brown Bullhead but a few intermediate species were identified. External abnormalities rates were the same for Brown Bullhead and those identified as having some Black Bullhead alleles in their nuclear DNA. Continued use of the Brown Bullhead in Presque Isle Bay for tumor studies appears appropriate.



Title: **Lyme Disease in Presque Isle State Park**

Authors: Brown DM<sup>1</sup>, Addis B<sup>2</sup>, Matlock, K<sup>1</sup>, Flanagan J<sup>2</sup>, Larson S<sup>1</sup>, Fulford DE<sup>2</sup>, Rebar CE<sup>2</sup>, and Keller CC<sup>1\*</sup>- <sup>1</sup>Laboratory of Human Pathogens, Lake Erie College of Osteopathic Medicine, Erie, PA, <sup>2</sup>Edinboro University of Pennsylvania, Edinboro, PA

Abstract: Objectives: The wooded areas of Presque Isle State Park contain high numbers of *Ixodes scapularis*, the black-legged tick. This tick transmits *Borrelia burgdorferi*, the causative agent of Lyme disease, which manifests as arthritis-like symptoms. The white-footed mouse has been reported to be the reservoir for *B. burgdorferi*. Since Presque Isle is estimated to have over 4 million annual visitors, there is a very high risk of transmission of Lyme disease to people. Therefore, we investigated the prevalence of Lyme disease in ticks and mice on Presque Isle.

Methods and results: Adult (n=193) and nymph-stage (n=14) *Ixodes scapularis* ticks were acquired using a collection flagging method and DNA was isolated from individual ticks. Mice were trapped with Sherman, folding live traps (8 X 9 X 23 cm), sexed, weighed, and ear tagged for future identification. A 1.5 mm ear tissue biopsy was obtained and stored in 70% ethanol. The number of infected ticks was determined by amplifying *B. burgdorferi* 16S genomic DNA by PCR and visualizing the resulting fragments by gel electrophoresis. The infectivity rate in adult ticks was 55.4% (107 of 193) and 34.0% (18 of 53) in nymph ticks. The prevalence of *B. burgdorferi* in white-footed mice is currently being conducted.

Conclusions: Determining the prevalence of *B. burgdorferi*-infected ticks is an important public health concern, since the vector is present in high numbers in areas of Presque Isle State Park frequented by visitors. In addition, the high percentage of infected adult *I. scapularis* ticks and the low number of white-footed mice caught on Presque Isle suggests that there may be another reservoir for *B. burgdorferi*.

Title: **Resolution of the Phylogenetic Position of the Northern Bobwhite, *Colinus virginianus*: Using Complete D-loop Sequences of the Chukar Partridge, Ruffed Grouse and Ring-Necked Pheasant to Reconstruct a Phylogeny**

Authors: Frederic J. Brenner\*, Durwood B. Ray\*, Ian T. Lamborn, Peter McPherson, Matthew R. Latini, and Joshua P. Haggan, Department of Biology, Grove City College, Grove City, PA 16127 USA

Abstract: Despite being a focal point of research amongst ornithologists, phylogenetic descriptions of the order *Galliformes* are extremely inadequate due to poor scope and low number of samples. Most notably is the total lack of complete D-loop sequences for any bird in the family *Odontophoridae* which contains the highly researched New World quails. Thus it is not possible to molecularly classify the family *Odontophoridae* or any species within it through D-loop based phylogenetic reconstruction, arguable the most dependable and accurate partial reconstruction technique. Here we have sequenced the complete D-loop of *Colinus virginianus*, the northern bobwhite, for the first time in conjunction with the D-loops of the chukar partridge, ruffed grouse and ring-necked pheasant in order to obtain the first phylogenetic picture of *Odontophoridae* and to augment the deficiency of scope and samples depriving us from a widely accepted *Galliformes* phylogeny. Our analysis classifies the family *Odontophoridae* as a distinct from *Numididae*, *Tetraonidae* and *Phasianidae* ( $P < .01$ ), and suggests that it is the most basal family yet to be analyzed in one of the oldest avian orders known to man. The detail of the phylogeny reconstructed from complete D-loop sequences alone substantiates the potential and accuracy of the D-loop as an authority in the study of closely related eukaryotic species. Furthermore, general contributions have been made through the discovery of two new single nucleotide polymorphisms (SNPs) in the chukar partridge and ring-necked pheasant and a new sequenced haplotype for a Western Pennsylvania subpopulation of the ruffed grouse.

Title: **Possible Roles of Barometric Pressure and Relative Humidity in “Flowering Suppression” of Indian Woodoats (*Chasmanthium latifolium*)**

Author: Stephen P. Jenkins, Grove City College

Abstract: Few studies have looked at the effects of transient meteorological conditions on flowering phenology. To address this deficiency, 28 inflorescences of *Chasmanthium latifolium* were studied to determine the timing, frequency, and duration of flowering activity. In this study, each spikelet of each actively flowering inflorescence was examined daily from July 18 to August 26, 2006 (40 consecutive days) for the presence of open florets. Over the course of the study, 6,275 open florets were observed on 666 spikelets. Meteorological data from a nearby NOAA weather station were compared with *C. latifolium* flowering data.

In general, flowering activity, once initiated in an inflorescence, rose rapidly to a peak, and then declined more gradually. Superimposed onto this generalized flowering profile were seven “flowering suppression” events. These suppression events were distinguished as days in which the number of open florets on an inflorescence was reduced by at least 75% compared to both the preceding and the following days. Flowering suppression was particularly heavy on three days (23 July, 28 July, and 4 August), in which between 45% and 92% of inflorescences were suppressed.

Meteorological measurements (wet bulb temperature, relative humidity, barometric pressure, wind speed, and other atmospheric conditions) and meteorological changes (of temperature, relative humidity, and barometric pressure) were statistically tested for correlation with percent reductions in flowering activity of *C. latifolium* on flowering suppression days. Flowering suppression was most strongly correlated with periods of relative humidity  $\geq 90\%$  in the preceding 24 hours ( $r = 0.938$ ), and also with low barometric pressures  $\leq 28.7$  inches Hg in the preceding 48 hours ( $r = 0.892$ ). The results suggest that *C. latifolium*, a wind-pollinated species, may respond to adverse weather conditions with a novel “flowering suppression” behavior.

Title: **2007 Bacterial Water Quality Assessment of Presque Isle Bay, Erie, Pennsylvania**

Authors: Nicole Phinney\*, Jerry Covert - Regional Science Consortium, TREC

Abstract: Presque Isle State Park is a seven-mile long migrating peninsula, located on Lake Erie, that curves to the east forming a 3, 718 acre Bay for the city of Erie, Pennsylvania. Presque Isle Bay was designated the 43<sup>rd</sup> Great Lakes Area of Concern by the U.S. Department of State in January of 1991. In 2002, the Bay was announced as in the Recovery Stage. Although vast improvements have been seen in the health of the Bay, the state of the bacterial water quality has yet to be assessed in depth. Presque Isle State Park, using the U.S. EPA standards, posts swimming advisories when *E. coli* levels are greater than or equal to 235 Colony Forming Units/100ml, but less than 999 CFU/100ml and posts a swimming restriction when the levels are greater than or equal to 1000CFU/100ml). Furthermore it is also important to determine the source of the bacterial contamination i.e. human or non-human. This can be determined by identifying levels of Bacteroides which can be accomplished using Real-time PCR. This study aimed to investigate the bacterial water quality and bacterial sources of Presque Isle Bay, Erie, Pennsylvania. This investigation found that the bacterial levels within the Bay both before and after a storm series are within a swimmable range. The Bacteroides analysis results will be available at the Symposium.

Title: **Modeling the Release and Transport of Coliform Bacteria From Selected Watersheds to the Nearshore Pennsylvania Waters of Lake Erie with Implications for Bacterial Contamination of Presque Isle Beaches**

Authors: Kevin Caffrey\*, MS Candidate, Harry R. Diz, Ph.D., PE, Associate Professor  
Department of Environmental Science & Engineering, Gannon University

Abstract: The beaches of Presque Isle State Park, Erie, PA, like many other Great Lakes beaches, have had far too many occasions when high bacterial counts have forced closure of the beaches to bathers. The park is the most visited state park in Pennsylvania and each year draws hundreds of thousands of beach-goers from hundreds of miles away. It is the only Lake Erie beach access for most citizens in the entire region.

It has been suggested that the source of the bacteria is the abundant wildlife of the area, including a large community of waterfowl (the local-source hypothesis). Others have suggested that bacteria are exported during storm events from streams to the west of the park, are transported by wind-driven currents eastward along the Lake Erie shoreline, and are drawn into the surf area of the beaches (the remote-source hypothesis). Both mechanisms may be occurring under various climatic conditions.

The goal of this component of the overall study was to investigate the remote-source hypothesis by modeling the release and transport of coliform bacteria from selected watersheds to Lake Erie, and then transport along the Pennsylvania Lake Erie shoreline. The watersheds to be studied are those of Elk Creek and Walnut Creek. These are the largest watersheds which discharge water and sediments to Lake Erie just to the west of the Presque Isle peninsula, and have been previously identified by the PA DEP and Erie County Department of Health as being the most likely major sources of coliform bacterial contamination. The successful implementation of the model(s) will aid in the explanation of the occasional appearance of unacceptably high concentrations of coliform (especially *E. coli*) bacteria in the bathing waters of the beaches of Presque Isle State Park.

Title: **Contamination in the Beach Waters of Presque Isle State Park as Determined by Real-time PCR**

Author: Steven Mauro- Mercyhurst College

Abstract: In 2006, high bacterial loads in the beach waters of Presque Isle State Park (PISP) led to over 40 beach closures. Similar problems were reported nationwide, accounting for thousands of beach closures. This alarmingly high incidence of beach water contamination has caused concern for public welfare, providing an impetus for studies aimed at detecting sources of high bacterial loads in recreational waters.

As part of an EPA funded initiative involving multiple organizations of the local scientific community, we monitored PISP beach waters with the goal of determining potential sources of microbial pollution. Our methodology consisted of using real-time PCR on specific classes of bacteria that would answer three specific questions: 1.) Where are beach water bacterial loads the highest?, 2.) Is the source of bacteria found in the beach waters predominantly of human or non-human origin?, 3.) Is real-time PCR a useful strategy to determine sources of bacterial contamination?

Our results indicate that Beach One had consistently higher bacterial contamination compared to the other beaches of PISP. Additionally, Beach One had the highest percentage of samples that tested positive for bacteria arising from human fecal matter, with extremely high percentages present on days that coincide with high overall bacterial presence. Interestingly, the days that Beach One had high human dependent bacterial content coincided with spikes in human dependent and total bacterial content in Walnut and Elk Creek, two of the larger tributaries West of PISP. Together, our data is consistent with a model of human dependent bacterial contamination originating from tributaries on West of PISP and highlights the utility of real-time PCR in analysis of non-point sources of bacterial pollution.

Title: **Shiga toxin gene distribution in diverse aquatic environments**

Author: Adam Olszewski - Mercyhurst College

Abstract: The shiga toxin gene produces a protein that is pathogenic to humans, and can lead to severe gastrointestinal illness. One of the transmissible agents of shiga toxin is enterohaemorrhagic *E.coli* (including strain O157:H7), which harbors a bacteriophage that expresses shiga toxin upon lysogenic induction.

Waterborne outbreaks of shiga toxin dependent sickness is a recurring problem in both developed and under developed countries. This work focuses on examining the interrelationship of three elements required for shiga toxin dissemination in an aquatic ecosystem; the shiga toxin gene, *E.coli*, and bacteriophages. Using real-time PCR, we have positively identified and determined the relative abundance of shiga toxin DNA in over 700 samples from sand, beach water and streams in the vicinity of Presque Isle State Park located on Lake Erie. We find that the abundance and distribution of shiga toxin DNA is variable in these samples, and does not correlate with the abundance of *E.coli* and viral counts at these locations. Of the samples analyzed, the beach water tested positive for shiga toxin DNA most frequently, despite having considerably lower numbers of *E.coli* and viral counts compared to sand and stream samples. These results suggest that common microbial indicators of water quality are not adequate in predicting the occurrence of organisms that harbor the shiga toxin gene, and highlight the need for the development of standardized pathogen specific detection protocols for waters utilized for recreational swimming.

Title: **Beach Sanitary Survey Hydrodynamic Monitoring at Presque Isle State Park, Summer 2007 – Progress and Preliminary Results**

Authors: A.M. Foyle\*, J. Doehrel, A. Ethridge, S. Knapp, M. Ritz, M. Sayles – Penn State Erie

Abstract: Understanding coastal hydrodynamics is essential to the success of predictive hydrodynamic models that simulate water flow and water quality characteristics along beaches. Recent data from Great Lakes beaches show that predictive statistical models used in NowCasting can also be strengthened by incorporating variables related to the longshore current and nearshore wave characteristics. Understanding the water flow characteristics in a beach system allows, for example, bacterial concentration measurements at a beach to be utilized in determining bacterial fluxes into and out of a specific beach. This in turn allows prediction of if and when that flux may reach beaches further downdrift. Thus, coastal management decision-making can benefit from characterization of surfzone and nearshore water flow that transports contaminants and sediments along bathing beaches.

Hydrodynamic monitoring was conducted twice per week for 10 weeks during summer 2007 at Presque Isle State Park Beaches 2 and 10 to characterize typical summer hydrodynamic conditions. Both sites were being near-simultaneously monitored for water quality and/or shallow-substrate bacterial populations by other participants in the EPA-funded BSS Program. Topography and longshore current velocities were measured within the surfzone and nearshore landward of existing breakwaters at both beach cells, as were wind, wave, bird-count, and cladophera conditions (qualitatively). NOAA-modeled wind, wave and current data extended hydrodynamic coverage for both sites to 1-2 km lakeward of the breakwaters. The primary goal of the hydrodynamic monitoring is to identify typical surfzone and nearshore flow rates, alongshore and onshore/offshore fluxes of water, and water residence times for both sites. A secondary goal is to determine if NOAA near real-time offshore model data can be a good proxy for conditions landward of the breakwaters where concentrations of bacterial contaminants, when present, are likely to be higher than in the offshore.



Title: **Analysis of Shiga Toxin Gene Distribution in Deer Fecal Matter**

Author: Whitney Kistler, Mercyhurst College- Biology

Abstract: Shiga toxin is a human pathogen that contaminates food and water supplies. The main carrier of shiga toxin is a strain of *E.coli* commonly found in animal fecal matter, which is thought to be the main reservoir for these strains of pathogenic bacteria. Recent shiga toxin dependent illness has been reported from consumption of deer meat, suggesting that deer may be an environmental reservoir for shiga toxin producing *E.coli*. To test this idea, we have isolated DNA from deer fecal matter originating from Presque Isle State Park, and two other locations in Western Pennsylvania, and probed for the presence and amount of the shiga toxin gene in the DNA recovered using quantitative real-time PCR. Our results indicate the presence of the shiga toxin gene in a number of the isolated samples, suggesting that shiga toxin producing *E.coli* is present in deer fecal matter. We are currently in the process of culturing the bacteria in recovered samples so that individual strains of shiga toxin *E.coli* can be isolated and analyzed more thoroughly.

Title: **Mapping French Creek's active floodplains: a methodology for identifying lands necessary to sustain crucial instream habitats**

Authors: Darran Crabtree<sup>1\*</sup> and Eliza Czowlowski<sup>2-1</sup>The Nature Conservancy, Allegheny College, Meadville, PA 16335, Department of Environmental Science, Allegheny College, Meadville PA 16335

Abstract: Many of the rare freshwater mussels in French Creek rely on riffle and run habitats (areas of hydrologic gradients which create relatively faster flowing waters). These habitats are not permanent as they are susceptible to erosional forces that are constantly shifting particles downstream. New habitats are created through various processes that may involve debris dams that narrow the creek, new channel formations through meanders, and deposits of upstream materials. The destruction of old habitats is assumed to be in equilibrium with the creation of new habitats in relatively unaltered river systems, thus any actions that accelerate habitat destruction may lead to a net loss of riffle habitat.

We hypothesize that episodic events, such as floods or even just times of relatively high water, are when the majority of habitat creation and destruction occurs. Human activities that alter the flooding regime of rivers may cause disequilibrium and thus would be a threat to the mussels and other organisms that rely on riffle habitats.

To better identify sites on the ground that may be of importance to the dynamics of rivers we used Landsat imagery coupled with GIS to locate areas that are prone to flooding. We believe that areas that flood are important because they allow the creek to dissipate erosional forces that would otherwise be focused on the stream bed or bank. In French Creek, a system of high biotic integrity, we expect that the current extent of flooding is at or near equilibrium, but future changes to land-use in flood prone areas might alter this. Our approach is suggested as a method for proactively identifying and then managing areas *for* flooding rather than mitigating *against* flooding.

## Posters

### POSTER

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Title: **A Herpetological Inventory of Presque Isle State Park, Erie, Pennsylvania**

Authors: J. R. Hughes\* - Penn State-Erie, The Behrend College, J. L. Schnars - School of Forest Resources, Pennsylvania State University

Abstract: Declining herpetofauna populations have been a concern worldwide. Presque Isle State Park has identified 16 reptiles and 13 amphibians as being native to the Park. A herpetological inventory has not been performed on Presque Isle State Park since 1987 (D.M. McKinstry). Our study, conducted from May-August 2006 and May-September 2007, identified current populations of herpetofauna, their abundance and location. Sampling included drift fences and pitfalls at Duck Pond Trail, Dead Pond Trail, and Gull Point Trail, aquatic turtle traps, coverboards, opportunistic observations, and frog call identification. Overall, from the 2006 and 2007 seasons we identified 17 species and 328 specimens compared to the 20 species and 1,650 specimens identified in 1987. Our study identified three species not identified in 1987. Six species found on the park in 1987 were not yet obtained in this study: Mudpuppy, *Necturus maculosus*; Spotted Salamander, *Ambystoma maculatum*; Eastern Spiny Softshell Turtle, *Apalone s. spinifera*; Northern Water Snake, *Nerodia s. sipedon*; Shorthead Garter Snake, *Thamnophis brachystoma*; Northern Ribbon Snake, *T. sauritus septentrionalis*. Although declines in herpetofauna are presently a concern, this long-term study will continue to monitor the native species at Presque Isle State Park.

Title: **Aquatic Invasive Species Early Detection and Monitoring Programs in the Lower Great Lakes**

Authors: Denise L. Clay\*, Biological Science Technician  
Michael A. Goehle, Aquatic Invasive Species Coordinator – Northeast Region  
U.S. Fish & Wildlife Service Lower Great Lakes National Fish and Wildlife Conservation Office

Abstract: The Lower Great Lakes National Fish and Wildlife Conservation Office (LGLNFWCO) supports various programs for aquatic invasive species, federal lands, geographic information systems, habitat restoration, and native species. The Aquatic Invasive Species Program conducts multiple surveys along the U.S. shores of the Lower Great Lakes for new invasive species, as well as to determine densities and range expansion of existing invaders. These projects include trawling for Eurasian Ruffe (*Gymnocephalus cernuus*), trammel net and electrofishing for Asian carp, ponar and kicknet sampling for New Zealand Mudsail (*Potamopyrgus antipodarum*), and setting baited bottle traps for Bloody Red Shrimp (*Hemimysis anolmala*). Although efforts have not yet yielded Eurasian Ruffe and Asian carp in either of the lower Great Lakes, New Zealand Mudsail and Bloody Red Shrimp have been found in Lake Ontario.

Title: **Emerging Roles of Sex Hormone-Binding Globulin and Corticosteroid Binding Globulin.**

Authors: Jack D. Caldwell<sup>1\*</sup>, Robert A. Shapiro<sup>2</sup>, Bertalan Dudas<sup>1</sup>, Zsofia Herbert<sup>3</sup>, Benjamin Mopert<sup>4</sup>, Gustav F. Jirikowski<sup>4</sup>; 1- Lake Erie College of Osteopathic Medicine, Erie, PA; 2- Oregon Health Science Center, Portland, OR; 3-Ludwig-Maximillian University, Bavaria, Germany; 4-University of Jena, Jena, Germany

Abstract: A new model of sex hormone-binding globulin (SHBG) and corticosteroid binding globulin (CBG) action is emerging in which steroid binding globulins are active components in steroid action. One model is that they are actively internalized into cells, which was demonstrated for SHBG when infusions of fluor-labeled SHBG into the lateral cerebroventricles resulted in uptake of SHBG in specific brain regions. Uptake of SHBG is also demonstrated in HT22 mouse hippocampal cells *in vitro*. Interestingly, with these HT22 cells only the cell line that is stably transfected with cDNA for estradiol receptor  $\beta$  (ER $\beta$ ) shows a capacity to internalize SHBG indicating that ER $\beta$ , perhaps on the inner surface of the plasma membrane, is essential for SHBG internalization. We have previously demonstrated that SHBG is made in the brain, which, when combined with the current data, would suggest SHBG is a neurotransmitter. Brain cells that make SHBG often also make the neuropeptide oxytocin, a relationship so close that in the posterior pituitary SHBG and oxytocin are found in the same synaptic vesicles, suggesting that there may be a co-function of SHBG and oxytocin. We are currently attempting to discover the SHBG receptor. CBG is also found in several, but not all, of the same brain areas as SHBG, in the hypothalamus, the median eminence, and in both the posterior and anterior pituitary. Both SHBG and CBG have also been found in the olfactory bulb and the olfactory mucosa where they may be responsible for olfactory detection of pheromones, sex-associated aerosol steroids indicating sexual readiness as well as glucocorticoids that indicate fear.

Title: **Epidemiological Characteristics and Clinical Manifestations of Lyme Disease as Reported by Physicians in Erie County**

Authors: Larson SA\* and Keller CC - Laboratory of Human Pathogens, Lake Erie College of Osteopathic Medicine, Erie, PA

Abstract: There are an estimated 4 million visitors to Presque Isle State Park annually. Previous studies have shown that 60% of the black-legged ticks on Presque Isle were infected with *Borrelia burgdorferi*, the causative agent of Lyme disease. The Erie County Health Department records reported cases of Lyme disease, with less than 20 cases being reported every year for the past five years. The purpose of this study is to determine Erie County physicians' perceived risk for their patients contracting Lyme disease in Erie County.

A questionnaire was distributed by mail to local physicians practicing in Erie County. A total of 178 surveys were sent out, with 52 being returned, for a response rate of 29.2%. A total of 366 patients were reported to have experienced a tick bite and been seen by the physicians each year. Approximately 71.1% rated the risk of Lyme disease to their patients as being low risk, while 25.0% rated the risk as high. Of the physicians surveyed, 48.1% reported diagnosing a case of Lyme disease and 28.8% stated that they had reported a case of Lyme disease to their county health department. Approximately 65.4% of respondents had treated a possible case of Lyme disease, with a significant number of patient's being reported to have continued symptoms following treatment, possibly signifying a co-infection or other alternate diagnosis.

These results demonstrate that Lyme disease is present in Erie County and may be underreported to the County Health Department. Physicians that responded were found to underestimate the risk of Lyme disease for their patients given the tick population that has been studied at Presque Isle and the need for a higher index of suspicion would be an avenue for future educational aims.

Title: **Genetic Variance Determined By Sequencing *Odocoileus virginianus* (white tailed deer) mtDNA D-loop**

Authors: Natalie Domenick\*, Chelsea Toth\*, Natalie King, Daniel Reese Durwood Ray and Fredric Brenner, Biology Department, Grove City College, Grove City, PA 16127

Abstract: A concern in deer management is that larger, older deer are preventing younger from breeding, thereby limiting the gene pool. Our intention is to use mitochondrial DNA (for maternal) and nuclear genetic sequences (for maternal and paternal) to trace breeding history within deer populations. Mitochondrial DNA (mtDNA) was prepared by Perfectprep Plasmid Mini Spin Columns (Eppendorf) from *Odocoileus virginianus* fetal liver. Polymerase Chain Reaction (PCR) was employed to amplify the mtDNA d-loop using primers we designed from a previously published sequence of mtDNA d-loop. PCR products were evaluated by slab gel electrophoresis and purified using the QIAquick PCR purification Kit (Qiagen) spin column. Cycle sequencing reactions with BigDye Terminator Chemistry were run in triplicate for each DNA strand and purified to remove dye terminators by DyeEx Spin Kit (Qiagen). The samples were then sequenced using our ABI single capillary Prism 310 Genetic Analyzer. Our complete d-loop contig was compiled using Lasergene sequence analysis software (DNASTAR, Inc). Our data shows Western Pennsylvania's *Odocoileus virginianus* haplotype GCC-A (Accession number EF061657) is a distinct haplotype. We discovered three previously unknown haplotypes, Western Pennsylvania's GCC-A (Accession number EF061657), Englewood, Ohio (Accession number pending), and Taylorsville, Ohio (Accession number pending). We have employed this preparation method to evaluate the breeding patterns of two parks in the Dayton, Ohio MetroParks system. We found a limited mitochondrial gene pool. It appears female deer are not breeding outside of the park where they were born.

Title: **Infection Rate of *Borrelia burgdorferi* in Adult and Nymph Black-Legged Ticks Inhabiting Presque Isle State Park**

Authors: D. M. Brown\*, K. Matlock, C. C. Keller, Laboratory of Human Pathogens, Lake Erie College of Osteopathic Medicine, Erie, PA

Abstract: Objectives: *Borrelia burgdorferi*, the bacteria that causes Lyme disease (LD), is transmitted by the hard tick, *Ixodes scapularis*. Early clinical manifestations of LD include erythema migrans (“bull’s-eye rash”) and flu-like symptoms. Chronic symptoms include arthritis and myalgia, and may include cardiac and neurological dysfunction. Since the vector is highly present on Presque Isle, it is an important public health concern to determine the prevalence of *B. burgdorferi*-infected ticks.

Materials and Methods: Adult (n=193) and nymph (n=53) *I. scapularis* ticks were obtained from Presque Isle State Park in fall 2006 and spring 2007. Ticks were collected using a flagging method and stored in ethanol. DNA was isolated by crushing ticks in a 5% Chelex solution followed by centrifugation at 12,000g for 7 minutes. The presence of DNA in all samples was determined by spectrophotometry. In addition, *I. scapularis* 16S ribosomal genomic DNA was amplified by PCR in random ticks to ensure that high-quality DNA was obtained. Resulting fragments were separated by gel electrophoresis and visualized on 1% agarose gels containing ethidium bromide. All samples that contained DNA were examined for the presence of *B. burgdorferi*. Bacterial 16S ribosomal DNA was amplified using a *B. burgdorferi*-specific PCR.

Results: PCR analysis demonstrated that 55.4% (107 of 193) of adult ticks were positive for *B. burgdorferi* DNA. There was no statistical difference in the infectivity rate for sex, date of collection, or location of collection. For nymph stage ticks, 33.96% (18 of 53) tested positive. There was a significant difference in the *B. burgdorferi* infection rate between adult and nymph ticks ( $P<0.01$ ).

Conclusions: These results illustrate that *B. burgdorferi*-infected adult and nymph *I. scapularis* ticks are present on Presque Isle, indicating that there is a potential risk of human *B. burgdorferi* infection for the estimated 4 million annual visitors to the park.

Title: **Patch dynamics-wetland plant and macroinvertebrate recovery- in response to *Phragmites* control during low water conditions in a Laurentian Great Lakes coastal wetland**

Authors: Robert S. Whyte\*, California University of Pennsylvania, Joseph R. Holomuzki, Department of Evolution, Ecology, and Organismal Biology, Ohio State University, Mansfield, David M. Klarer, Ohio Department of Natural Resources, Division of Wildlife, Old Woman Creek National Estuarine Research Reserve

Abstract: The spread of an invasive strain of *Phragmites australis* and the associated biotic patch response in vegetation stands was monitored in a Lake Erie wetland (Laurentian Great Lakes). The invasion of *Phragmites* into the Great Lakes region is a recent phenomenon, facilitated by a decline in lake levels. Few studies have documented its presence and tracked the invasion process. This is in contrast to the numerous studies in the estuaries and coastal wetlands along the east coast of the United States. From 2000 to 2006, *Phragmites* expanded from less than 1% to greater than 30% of the vegetation cover in the Old Woman Creek National Estuarine Research Reserve, a 60-hectare wetland along the south shore of Lake Erie's western basin. Rapid expansion has triggered a herbicide control program; yet our knowledge of system impacts from an increased presence of *Phragmites* is limited. In sprayed and non-sprayed beds of varying sizes and plant community structure we recorded benthic and juvenile fish community response, and plant diversity. Observed differences in animal communities were spatial (distance from the bed's center), genera specific dependent upon herbicide treatment, and to a lesser degree plant species specific. Results suggest that *Phragmites* may not be the ecological disaster often associated with this plant.

Title: **Preconcentration of Metal Ions from Natural Water Samples Using Thermoresponsive Hydrogel Polymers: Bulk Gels Versus Nanoparticles**

Authors: Kayla R. Lincoln\* and Clinton D. Jones, Department of Chemistry and Biochemistry, Mercyhurst College, Erie, PA 16546

Abstract: Hydrogel polymers are a cohesive network of crosslinked polymer chains that can be created in bulk to form any shape or synthesized into nanometer sized spheres *via* emulsion polymerization. These gels act similar to a sponge in water by allowing the solvent to penetrate throughout the network. Using *N*-isopropylacrylamide (NIPAm) as the monomeric unit affords thermoresponsive gels that have the ability to change volume according to local solution temperature. Water is expelled from the network as the temperature increases above 31 °C and the gel network begins to shrink in volume. In addition, functional ligands can be easily incorporated into the gel during the synthesis to create systems with specificity toward water soluble analytes of environmental concern, such as heavy metal ions. Preconcentration of analytes is possible *via* entrapment inside the gel by the ligands. The polymer network can then be separated from the original water sample, and release of the analytes controlled by changing the temperature and/or the solution chemistry, such as the pH. Currently, we are using acrylic acid ligands to trap divalent cations, such as lead(II), for subsequent analysis with atomic absorption spectrophotometry (AA). The pH of natural water samples can be adjusted so that negatively-charged acrylic acid ligands can electrostatically bond to the heavy metal cations; changing the pH of the final gel protonates the acidic groups and releases the bound metal ions. Further expulsion of the ions from within the network is possible *via* temperature change. We plan to compare the facility of use and entrapment efficiency between bulk gels and nanoparticles for preconcentration in AA analysis.

Title: **The Use of Polarized Light in Adult and Hatchling Freshwater Turtles**

Authors: C.R. Bradshaw\* – Penn State-Erie, J.L. Schnars – Penn State University Park

Abstract: The cues turtles use to find water is a question that is still being investigated. The use of multiple cues has been the consensus, however studies are still identifying those individual cues. In this study we test the cue of polarize light in hatchling snapping turtles (*Chelydra serpentina*) and adult painted turtles (*Chrysemys pica*). Turtles were placed in a rectangular arena and given the choice of orienting toward a neutral light or polarized light. A one-tailed binomial test was used to analyze the data. The results indicated a trend for the hatchlings to favor a neutral density light, however this was not significant ( $p=0.12$ ). Results from the adult painted turtles indicated a trend toward the polarized light ( $p=0.05$ ). This is an on-going study and some presented results reflect small sample sizes. Additional testing will continue next season.



**Title:** Targeting a Mitochondrial Enzyme to the Secretory Pathway by Leader Sequence Exchange

**Authors:** Rachel Pratt\*, Ezekiel Adewale, and Michael W. Bradbury, Ph.D., Lake Erie College of Osteopathic Medicine, Erie, PA 16509

**Abstract:** Protein targeting of mitochondrial and secreted proteins involves the inclusion of an N-terminal leader sequence. If the information directing these proteins is completely contained in the leader sequence, it should be possible to direct a protein to a different location by altering the leader.

The leader sequence of mitochondrial aspartate aminotransferase (mAAT) was replaced with that of preproalbumin (ppa), the precursor to serum albumin. The mAAT was also fused in-frame with Green Fluorescent Protein (GFP) as a tracer. Expression was driven by the inducible Metalllothionein-1 (MT-1) promoter. Constructs containing a neomycin resistance marker were transfected into HuH7 human hepatoma cells and selected with Geneticin to produce stable transfectants. Limited dilution cloning was applied and clones examined with fluorescence microscopy. Medium and solubilized cells were analyzed for GFP fluorescence before and after induction with zinc.

Clones with the normal mAAT leader showed mitochondrial fluorescence and significant increases in cellular, but not medium, GFP after exposure to zinc. However, those with ppa leaders show little cellular fluorescence, but substantial GFP in the medium after induction. Thus, the ppa leader appears to direct the mAAT fusion protein to the secretory pathway. This method may allow proteins to be secreted and harvested from medium for more efficient production methods of recombinant protein from human cells.

# REGIONAL SCIENCE CONSORTIUM

## 3rd Annual Research Symposium

November 1 – 2, 2007  
Tom Ridge Environmental Center  
Room 110 and 112

### Agenda

#### Thursday, November 1

- 12:00 – 1:00 Room 110 – Poster Viewing  
(Lunch for Board Members and Presenters in Room 112)
- 1:00 – 1:20 Registration and Poster Viewing

#### Presentation Times, Presentation Titles, Presenters and Institutions Represented

- 1:30 – 1:50 **Analysis of Genetic Diversity and Inbreeding in Populations of the Eastern Massasauga Rattlesnake in Western Pennsylvania**  
A. E. Throckmorton\* – Westminster College
- 1:50 – 2:10 **Effects of Zebra and Quagga Mussel (*Dreissena spp.*) Invasion on the Feeding Habits of the Stinkpot (*Sternotherus odoratus*) on Presque Isle**  
J.C. Patterson\*, P. V. Lindeman – Edinboro University of Pennsylvania
- 2:10 – 2:30 **Geographic Movements of the Common Snapping Turtle (*Chelydras s. serpentina*) on Presque Isle State Park**  
J.R. Hughes<sup>1\*</sup>, J.L. Schnars<sup>2</sup> - <sup>1</sup>Penn State Erie, <sup>2</sup>Penn State University Park
- 2:30 – 2:50 **The Response of Neonate Snapping Turtle (*Chelydra serpentina*) to a Moisture Gradient**  
M. A. Brewer<sup>1\*</sup>, J. L. Schnars<sup>2</sup> - <sup>1</sup>Penn State Erie, <sup>2</sup>Penn State University Park
- 2:50 – 3:10 **Break**
- 3:10 – 3:30 **Using Leg Bands and Radio Telemetry to Study Dispersal and Use of the Presque Isle Roost by Purple Martins (*Progne subis*)**  
E.K. Pifer\*, J. Tautin - Purple Martin Conservation Association
- 3:30 – 3:50 **Bird Banding at Presque Isle State Park: Past, Present and Future**  
S. Sargent<sup>1\*</sup>, L. Gloriso<sup>2</sup> - <sup>1</sup>PA Audubon, <sup>2</sup>Allegheny College
- 3:50 – 4:10 **Small Wind Turbines, Birds and Bats: A Study Underway at TREC**  
K. W. Andersen\* – Gannon University
- 4:10 – 4:30 **Bat Activity Near a Small Wind Turbine: A Study Underway at TREC**  
J. Spittler\*, K. W. Andersen, S. Ropski – Gannon University

**Friday, November 2**

- 8:00 – 9:00 Registration and Poster Viewing – Continental Breakfast – Room 110
- 9:00 – 9:20 **Trends in Fish Assemblages in the Lower Great Lakes: 1993-2007**  
D.L. Clay\*, M. A. Goehle, S.M. Keppner – U.S. Fish and Wildlife Service
- 9:20 – 9:40 **Use of Fish Community Structure to Assess the Condition of Fourmile Creek**  
K.M. Smith\*, E.C. Phillips, G.M. Andraso – Gannon University
- 9:40 – 10:00 **Movement of Brown Bullheads in and Around Presque Isle Bay, Lake Erie**  
M.J. Millard<sup>1</sup>, D. R. Smith.<sup>2</sup>, J. Grazio<sup>3</sup>, E.C. Obert<sup>4</sup>, S. Grise<sup>4\*</sup>, C.G. Wellington<sup>4</sup>, R.J. Wellington<sup>4</sup>, S. D. Rafferty<sup>4</sup>, - <sup>1</sup>U.S. Fish and Wildlife Service, <sup>2</sup>U.S. Geological Survey, <sup>3</sup>PA Sea Grant, <sup>4</sup>PA Dept. of Environmental Protection
- 10:00 – 10:20 **A Molecular and Morphological Investigations into the Hybridization of *Ameiurus nebulosus* and *Ameiurus melas* (Brown Bullheads) in P. I. Bay**  
J. Cingolani\* – Penn State University Park
- 10:20 - 10:40 **Break**
- 10:40 - 11:00 **Lyme Disease in Presque Isle State Park**  
D.M. Brown<sup>1</sup>, B. Addis<sup>2</sup>, K. Matlock<sup>1</sup>, J. Flanagan<sup>2</sup>, S. Larson<sup>1</sup>, D.E. Fulford<sup>2</sup>, C.E. Rebar<sup>2</sup>, and C.C. Keller<sup>1\*</sup> - <sup>1</sup>Lake Erie College of Osteopathic Medicine, <sup>2</sup>Edinboro University of Pennsylvania
- 11:00 – 11:20 **Resolution of the Phylogenetic Position of the Northern Bobwhite, *Colinus virginianus*: Using Complete D-loop Sequences of the Chukar Partridge, Ruffed Grouse and Ring-Necked Pheasant to Reconstruct a Phylogeny**  
F.J. Brenner\*, D.B. Ray\*, I.T. Lamborn, P. McPherson, M.R. Latini, J.P. Haggan - Grove City College
- 11:20 – 11:40 **Possible Roles of Barometric Pressure and Relative Humidity in Flower Suppression of Indian Woodoats (*Chasmanthium latifolium*)**  
S.P. Jenkins\* – Grove City College
- 11:40 – 12:00 **2007 Bacterial Water Quality Assessment of Presque Isle Bay**  
N. Phinney\*, J.B. Covert – Regional Science Consortium
- 12:00 – 12:40 **Room 110 - Poster Viewing**  
(Lunch for Presenters in Room 110)
- 12:40 – 1:00 **Modeling and the Release and Transport of Coliform Bacteria from Selected Watersheds to the Nearshore Pennsylvania Waters of Lake Erie and Implications for Bacterial Contamination of Presque Isle Beaches.**  
K.Caffrey\*, H. R. Diz – Gannon University
- 1:00 – 1:20 **Contamination in the Beach Waters of Presque Isle State Park as Determined by Real-Time PCR**  
S. Mauro\* – Mercyhurst College

- 1:20 – 2:00 **Shiga Toxin Gene Distribution in Diverse Aquatic Environments**  
A. Olszewski\* – Mercyhurst College
- 2:00 – 2:20 **Beach Sanitary Survey Hydrodynamic Monitoring at Presque Isle State Park, Summer 2007 – Progress and Preliminary Results**  
A.M. Foyle\*, J. Doehrel, A. Ethridge, S. Knapp, M. Ritz, M. Sayles – Penn State Erie
- 2:20 – 3:00 **Analysis of Shiga Toxin Gene Distribution in Deer Fecal Matter**  
W. Kistler\* - Mercyhurst College
- 3:00 – 3:20 **Mapping French Creek's Active Floodplains: a Methodology for Identifying Lands Necessary to Sustain Crucial Instream Habitats**  
D. Crabtree<sup>1</sup>\* and E. Czowlowski<sup>2</sup> - <sup>1</sup>The Nature Conservancy, <sup>2</sup>Allegheny College

### Poster Presentations

- A Herpetological Inventory of Presque Isle State Park, Erie, Pennsylvania**  
J.R. Hughes<sup>1</sup>\*, J.L. Schnars<sup>2</sup> - <sup>1</sup>Penn State Erie, <sup>2</sup>Penn State University Park
- Aquatic Invasive Species Early Detection and Monitoring Programs in the Lower Great Lakes**  
D.L. Clay\*, M.A. Goehle – U.S. Fish and Wildlife Service
- Emerging Roles of Sex Hormone-Binding Globulin and Corticosteroid Binding Globulin**  
J.D. Caldwell<sup>1</sup>\*, R.A. Shapiro<sup>2</sup>, B. Dudas<sup>1</sup>, Z. Herbert<sup>3</sup>, B. Mopert<sup>4</sup>, G.F. Jirikowski<sup>4</sup>; - <sup>1</sup>Lake Erie College of Osteopathic Medicine, Erie, PA; <sup>2</sup>Oregon Health Science Center, Portland, OR; <sup>3</sup>Ludwig-Maximilian University, Bavaria, Germany; <sup>4</sup>University of Jena, Jena, Germany
- Epidemiological Characteristics and Clinical Manifestations of Lyme Disease as Reported by Physicians in Erie County**  
S.A. Larson\*, C.C. Keller - Lake Erie College of Osteopathic Medicine
- Genetic Variance Determined by Sequencing *Odocoileus virginianus* (white tailed deer) mtDNA D-loop**  
N. Domenick\* C. Toth\*, N. King, D. Reese, D. Ray and F. Brenner - Grove City College
- Infection Rate of *Borrelia burgdorferi* In Adult and Nymph Black-Legged Ticks Inhabiting Presque Isle State Park**  
D.M. Brown\*, K. Matlock, C.C. Keller – Lake Erie College of Osteopathic Medicine
- Patch Dynamics – Wetland Plant and Macroinvertebrate Recovery – In Response to *Phragmites* Control During Low Water Conditions in a Laurentian Great Lakes Coastal Wetland**  
R.S. Whyte<sup>1</sup>\*, J.R. Holomuzki<sup>2</sup>, D.M. Klarer<sup>3</sup> - <sup>1</sup>California University of PA, <sup>2</sup>Ohio State University, <sup>3</sup>Ohio Department of Natural Resources

**Preconcentration of Metal Ions from Natural Water Samples Using Thermoresponsive Hydrogel Polymers: Bulk Gels Versus Nanoparticles**

K. R. Lincoln\*, C.D. Jones – Mercyhurst College

**The Use of Polarized Light in Adult and Hatchling Freshwater Turtles**

C.R. Bradshaw<sup>1\*</sup>, J.L. Schnars<sup>2</sup> – <sup>1</sup>Penn State Erie, <sup>2</sup>Penn State University Park

**Targeting a Mitochondrial Enzyme to the Secretory Pathway by Leader Sequence Exchange**

R. Pratt, E. Adewale, and M.W. Bradbury, Ph.D.\* - Lake Erie College of Osteopathic Medicine

\* **Presenters**