

Regional Science Consortium

7th Annual Research Symposium

*Tom Ridge Environmental
Center at Presque Isle, Erie,
Pennsylvania*



NOVEMBER 3 - 4, 2011

PROCEEDINGS

Tom Ridge
Environmental Center
PRESQUE ISLE

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

WELCOME

*Regional Science Consortium
7th Annual Research Symposium
November 3-4, 2011
Tom Ridge Environmental Center
At Presque Isle State Park*

Welcome to the 7th Annual Regional Science Consortium Research Symposium! Every year I look forward to the Symposium, and this year was no different. I am excited to report that we have a total of 35 Oral Presentations and 25 Poster Presentations, of which 42 students will be presenting. I would like to congratulate the students on all their hard work both on their projects and on the preparation of their presentations.

The purpose of our Symposium is to provide a venue to present all types of scientific research. I believe we have a great variety of presentations that will interest everyone. The Symposium is the one time each year that the scientists in this region can inform others of their research and also listen to their colleagues' research, thereby creating a great opportunity for collaboration among scientists... which I believe to be the essence of the Consortium.

I would like to thank all of the participants of the Symposium this year. I would like to thank the researchers, professors, and especially the students for their hard work in preparing their PowerPoint and Poster presentations. I would also like to thank the PA DCNR staff of the TREC, PA Sea Grant, and the Sunset Café for all of their hard work to prepare for this event.

I hope you all enjoy Symposium 2011!
Please mark your calendar for next year's Symposium on November 1-2, 2012.

Cheers!



Jeanette Schnars, Ph.D.
Executive Director
Regional Science Consortium

FACILITIES

*Regional Science Consortium
7th Annual Research Symposium
November 3-4, 2011
Tom Ridge Environmental Center
At Presque Isle State Park*

Welcome back to the Tom Ridge Environmental Center. This year's Research Symposium has expanded and we will be using a larger area of the facilities than previous years. If you have any questions, please do not hesitate to ask at the Registration Table in the lobby.

- Room 112 – Oral Presentations
- Room 110 – Social Area
- First Floor – Exhibitor Tables (throughout visitor's area)
- Second Floor – Poster Presentations
- Research Wing, Room 133 – Workshop: What's in *Your* Water, by Shimadzu Corporation

EXHIBITORS

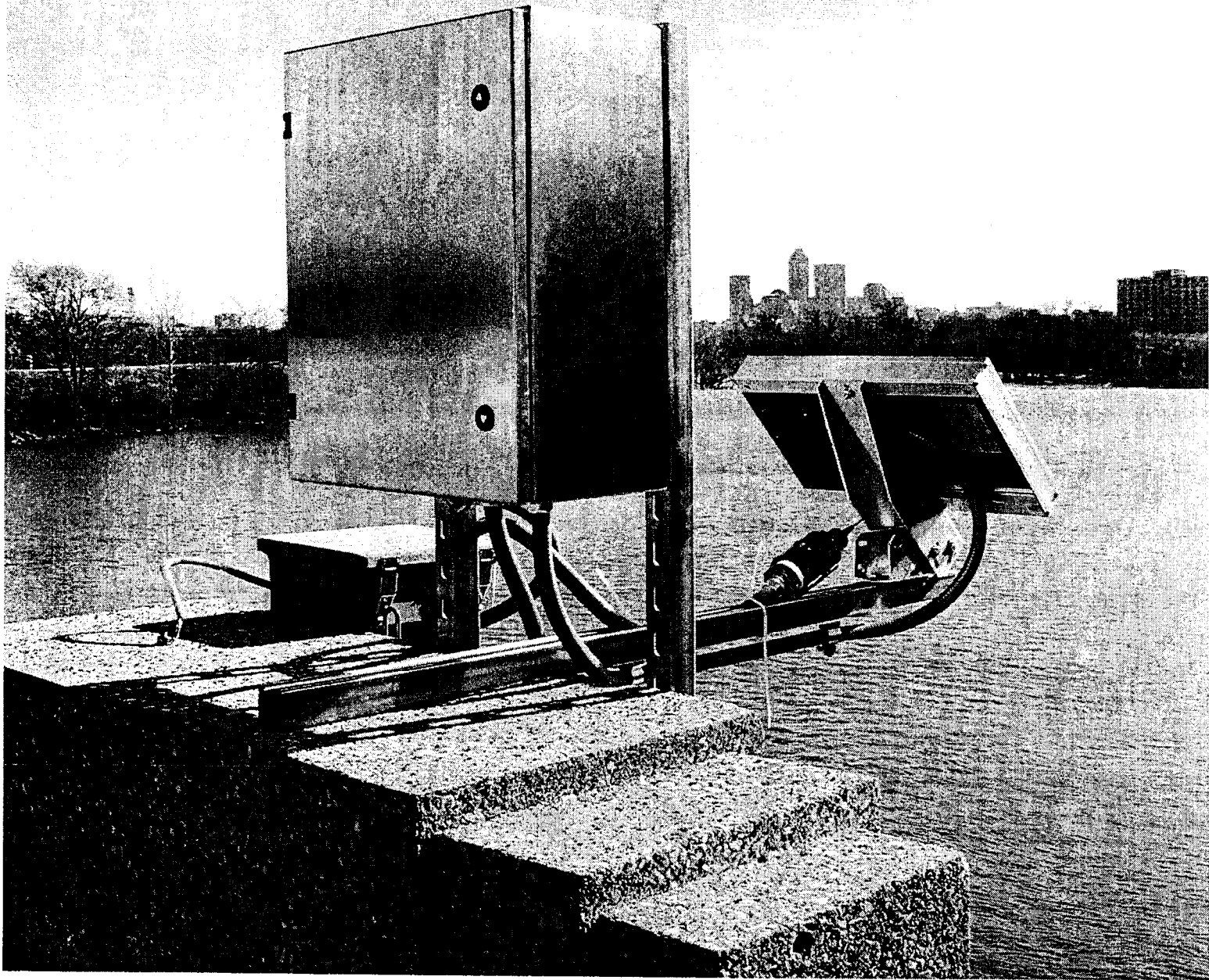
*Regional Science Consortium
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Please take the time to visit the many Exhibitor Tables throughout the first floor of the TREC providing you with information on employment/internship/volunteer opportunities, graduate school programs, analytical services, and product information.

- Cleveland Museum of Natural History
 - Edinboro University of Pennsylvania
 - Environment Erie
 - Erie County Department of Health
 - Fondriest Environmental, Inc.
 - Gannon University
 - Indiana University of Pennsylvania
 - Lake Erie International Coastal Clean-up
 - Lake Erie College of Osteopathic Medicine
 - Natural History Collections at the Tom Ridge Environmental Center
 - PA Department of Conservation and Natural Resources
 - PA Department of Environmental Protection
 - PA Fish and Boat Commission
 - PA Sea Grant
 - Purple Martin Conservation Association
 - Regional Science Consortium
 - Renewergy, Inc.
 - Roswell Park Cancer Institute
 - Shimadzu Corporation
 - S.O.N.S. of Lake Erie
 - Slippery Rock University of Pennsylvania
 - Western PA Conservancy
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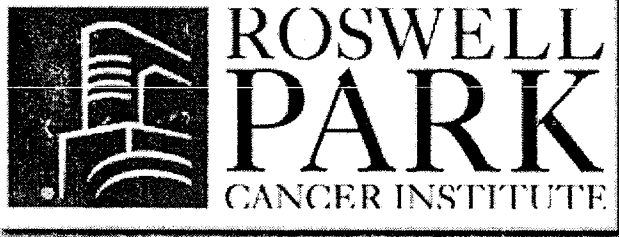
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- Data Analysis and PK/PD Modeling

Contact Information

Gerald Fetterly, PhD

Director

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Joshua Prey, MS

Project Coordinator / Lab Manager

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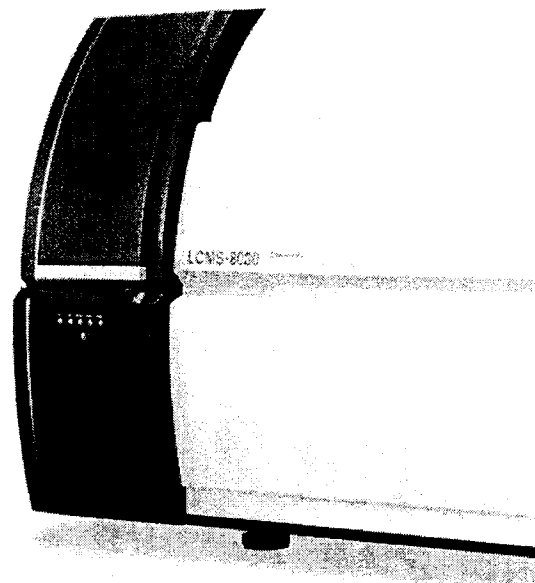




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What's in Your Water?

Workshop

Friday, November 4, 2011 at 12:30 – 1:30

Room 133 (Research Wing)

Abstract: The use of prescription medications has risen dramatically in the past decade. Subsequent excretion and improper disposal has caused a major increase of drugs and their metabolites in our water. It is likely that the concentration of medications will continue to rise, and we do not know their long term or cumulative effects on both humans and aquatic species. Liquid chromatography/mass spectrophotometers (LC/MS) are ideal instruments to measure the active ingredients of these medicines in water. This workshop will examine workflows for doing these analyses from sample preparation, types of mass analyzers, and mass spectral interpretation.

Instructor: Faith Hays, PhD, Shimadzu Scientific Instruments

Dr. Faith Hays graduated from the University of Maryland with her degree in Biochemistry from the lab of Dr. Catherine Fenselau. Her background is in proteomic of cancer and biomarker research. During her post-doctoral position at the National Institute of Standards and Technology, she worked on the National Cancer Institutes' five year Cancer Proteomic Technology Assessment Team (CPTAC) initiative. She is currently a Life Science Account Manager at Shimadzu Scientific Instruments in Columbia, MD.



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SCHEDULE OF TALKS

*Regional Science Consortium
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November 3-4, 2011
Tom Ridge Environmental Center
At Presque Isle State Park*

THURSDAY, NOVEMBER 3, 2011

- 10:30 – 12:00 **RSC Board Meeting**
Board Members
- 11:30 **REGISTRATION OPENS**
- 12:00 – 1:00 **LUNCH – *THE SUNSET CAFÉ***
- 1:00 – 1:15 **Welcome**
Robert Whyte, Ph.D., California University of PA; RSC President
Harry Leslie, Presque Isle State Park Manager, PA DCNR
Jeanette Schnars, Ph.D., Executive Director, RSC

Presentations

Session Chair: Robert Whyte, RSC President

- 1:15 – 1:30 **A Summer Undergraduate Research Experience at the Old Woman
Creek State National Estuarine Research Reserve; Huron, Ohio**
Joel Chronister* and Robert S. Whyte, California University of
Pennsylvania
(*Student Presentation*)
- 1:30 – 1:45 **Restoration of the Black Oak Savanna at Erie Bluffs State Park in
Erie County, Pennsylvania**
Ephraim Zimmerman, Pennsylvania Natural Heritage Program,
Western Pennsylvania Conservancy, Pittsburgh, PA
- 1:45 – 2:00 **Rare, Threatened and Endangered Plant Propagation at Presque Isle
State Park**
Marti Martz, Pennsylvania Sea Grant

* Presenter

- 2:00 – 2:15 **Evaluation of Lake Sturgeon Population and Their Habitat in Lake Erie**
Karla Kaczmarek*, Pennsylvania Sea Grant, Jeanette Schnars, PhD., Regional Science Consortium, Chuck Murray, Pennsylvania Fish and Boat Commission
- 2:15 – 2:30 **Continued Research on Purple Martins (*Pronges subis*) Conducted by the Purple Martin Conservation Association (P.M.C.A.)**
Robert Aeppli, Purple Martin Conservation Association
- 2:30 – 2:45 **Mist-netting and banding of songbirds at Presque Isle and Erie Bluffs State Parks 2007 – 2011: What have we learned?**
Sarah Sargent, Audubon Pennsylvania
- 2:45 – 3:00 **Real-Time Environmental Monitoring**
Steve Fondriest, Fondriest Environmental Inc.
- 3:00 – 3:30 **BREAK AND POSTER SESSION**
Sponsored by Fondriest Environmental Inc.
(www.Fondriest.com)
-
- Session Chair: Frederic Brenner, Grove City College, RSC Executive Board Member*
- 3:30 – 3:45 **The Impact of Shiga Toxin Producing *E. coli* (STEC) on Grazing Protists in the Nuisance Algae *Cladophora* Obtained from Presque Isle State Park**
Drew Spacht*, Kyle Lindsay, Hannah Opalko and Steven Mauro, Mercyhurst College
(*Student Presentation*)
- 3:45 – 4:00 **Assessing a Computer Model for Predicting Bacteria Levels at Presque Isle Beaches**
Michael A. Rutter, Rutter Statistical Consulting
- 4:00 – 4:15 **The Main Ingredient in Anti-Depressants, Fluoxetine, is Present and Can Alter the Microsphere in Presque Isle State Park Beach Waters**
Eric Clark*, Surafel Mulugeta, Kendal Greene and Steve Mauro, Mercyhurst College
(*Student Presentation*)
- 4:15 – 4:30 **Roswell Park Cancer Institute Pharmacokinetics/Pharmacodynamics Core Resource Capabilities and Services for Your Research Needs**
Joshua Prey*, Kimberly Clark and Gerald Fetterly, Roswell Park Cancer Institute

* Presenter

- 4:30 – 4:45 **Molecular Evaluation of the Maternal Genetic Variance in White Tailed Deer Using DNA Sequencing of the Mitochondria D-Loop Region**
Jedediah Seltzer*, Jared McFadden, Daniel Holsinger, Hannah Kehoe, Jessica Peterson and Fred Brenner, Grove City College
(Student Presentation)
(2011 Mini-Grant Recipient)

Session Chair: Holly Best, PA DCNR, RSC Executive Board Member

- 4:45 – 5:00 **Badlands Working Group: Investigation of the Holocene Landscape**
Lisa Andresky*, James Stevens*, Colten McDeavitt*, Katherine Mickle, Nichole Litzinger and Patrick Burkhardt, Slippery Rock University
(Student Presentation)
- 5:00 – 5:15 **Joint Art and Science Research in the White River Badlands: Pedagogical Approaches and Outcomes**
Katherine Mickle* and Patrick Burkhardt*, Slippery Rock University
- 5:15 – 5:30 **Long-Term Changes in Pattern of Occurrence of Strong Tornadoes in the United States, 1952-2011**
Nicholas Schiff*, Mike Campbell and Nick Lang, Mercyhurst College
(Student Presentation)
- 5:30 – 5:45 **Effect of CO₂ Addition on Algae Growth in an Experimental Aeroponic Algae Production System**
Robert Crowe and Mike Campbell*, Mercyhurst College
- 5:45 – 6:00 **Statistical Modeling of Nutrient Levels in an Experimental Wastewater-fed Algae Production System**
Prakash Bhatta*, Satish Shrestha, Mike Campbell and Ronald Brown, Mercyhurst College
(Student Presentation)
- 6:00 – 9:00 **POSTER SESSION**
EXHIBITOR TABLES
Includes Organizations with information on Graduate Programs, Employment/Internship Opportunities, Analytical Services and Products
DINNER RECEPTION
Food by the Sunset Café, drinks, silent auction, and the Salmon Frank Band
(Need to purchase a ticket? It's not too late! Please see the Registration Table)

* Presenter

FRIDAY, NOVEMBER 4, 2011

7:30 – 8:00

REGISTRATION OPENS

CONTINENTAL BREAKFAST

8:00 – 8:15

Welcome

Jeanette Schnars, Executive Director, RSC

Session Chair: Eric Obert, PA Sea Grant, RSC Past-President

8:15 – 8:30

Presque Isle Bay Stream Sediment Evaluation

Sean Rafferty, Pennsylvania Sea Grant

8:30 – 8:45

Incorporation of Proteins into Polymer Foam

Shannon Gowen, State University of New York, Fredonia
(*Student Presentation*)

8:45 – 9:00

Measurements in Ichthyology

David Ryan* and Jay Stauffer, Penn State University
(*Student Presentation*)

9:00 – 9:15

**Ecology and Unique Habitat of the Bridle Shiner (*Notropis bifrenatis*)
and the Ironcolor Shiner (*Notropis chalybaeus*)**

Bill Hanson* and Jay Stauffer, Penn State University
(*Student Presentation*)

9:15 – 9:30

**The Morphometrical Variance and Abundance of *Diplotaxodon*
Species Around Mbenji Island, Domira Bay, Malawi**

Titus Phiri* and Jay Stauffer, Penn State University
(*Student Presentation*)

9:30 – 9:45

**Preliminary Assessment of the Genetic Diversity of Carp at the
Pymatuning Spillway**

Samantha Tucker* and Kristen Webb, Allegheny College
(*Student Presentation*)

9:45 – 10:15

BREAK AND POSTER SESSION

Sponsored by Shimadzu Corporation (www.Shimadzu.com)

Session Chair: Greg Andraso, RSC Vice President

- 10:15 – 10:30 **Preliminary Investigation of Lake Trout Spawning Near the Presque Isle Peninsula in Erie, Pennsylvania**
Jim Grazio, Pennsylvania DEP
- 10:30 – 10:45 **Evaluation and Detection of Round Goby Habitat Disturbances and Impacts on Native Fish Populations**
Casey Bradshaw-Wilson* and Jay Stauffer, Penn State University
(Student Presentation)
(2011 Mini-Grant Recipient)
- 10:45 – 11:00 **Ontogenetic Changes in Pharyngeal Morphology Correlate with a Diet Shift From Arthropods to Dreissenid Mussels in Round Gobies (*Neogobius melanostomus*)**
James Cowles* and Greg Andraso, Gannon University; Rose Colt, Philadelphia College of Osteopathic Medicine; Jay Patel and Mike Campbell, Penn State – Erie, The Behrend College
(Student Presentation)
- 11:00 – 11:15 **Phenotypic Plasticity of the Pharyngeal Apparatus of Round Gobies (*Neogobius melanostomus*)**
Noelle Blank*, Greg Andraso and John LaPaglia-Durante, Gannon University
(Student Presentation)
- 11:15 – 11:30 **Evaluating the risk of aquatic invasive species range expansions in a changing climate in Pennsylvania**
Sara N. Grisé^{1,2*} and Theo Light¹, ¹Shippensburg University, Shippensburg, PA; ²Pennsylvania Sea Grant
(Student Presentation)
- 11:30 – 11:45 **Drainage – Wide Survey of Sabine Map Turtles (*Graptemys sabinensis*) in the Mermentau River, Louisiana**
Emily Ilgen*, Carissa Hartson, Olivia Zaleski and Peter Lindeman, Edinboro University
(Student Presentation)
- 11:45 – 12:00 **Survey and Status Assessment of the Blanding's Turtle (*Emydoidea blandingii*) in Pennsylvania**
Ryan Miller, Western Pennsylvania Conservancy – Pennsylvania Natural Heritage Program

* Presenter

- 12:00 – 1:00 **LUNCH – THE SUNSET CAFÉ**
- 12:30 – 1:30 **WORKSHOP – WHAT'S IN YOUR WATER?** (Research Wing, Rm 133)
Faith Hays, Ph.D., Shimadzu Corporation
Sign-up at Registration Table (No Fee, but space is limited)
Description: The use of prescription medications has risen dramatically in the past decade. Subsequent excretion and improper disposal has caused a major increase of drugs and their metabolites in our water. It is likely that the concentration of medications will continue to rise, and we do not know their long term or cumulative effects on both humans and aquatic species. Liquid chromatography/mass spectrometers (LC/MS) are ideal instruments to measure the active ingredients of these medicines in water. This workshop will examine workflows for doing these analyses from sample preparation, types of mass analyzers, and mass spectral interpretation.
- 1:00 – 1:30 **POSTER SESSION**
- Session Chair: Jerry Covert, RSC Past-Executive Director*
-
- 1:30 – 1:45 **Jumping Kinematics of the Plethodontidae: Performance, Morphological Variables and Tail Loss Effects**
Anthony Hessel*, Ariel Statman and Lisa Whitenack, Allegheny College; William Ryerson, University of Connecticut
(Student Presentation)
- 1:45 – 2:00 **Renewable Energy Sources and Their Environmental Impacts**
Michelle Wunderley, Point Park University
(Student Presentation)
- 2:00 – 2:15 **Thermal Conversion of Waste Organics into Solid Fuel by Means of Torrefaction**
Ted McMahan* and Rick Diz, Gannon University
(Student Presentation)
- 2:15 – 2:30 **Determination of the Polybrominated Diphenyl Ethers in the Sediments, Water and Biota of the Lake Erie**
Marissa Vartak*, Weslene Tallmadge and Mary Vagula, Gannon University
(Student Presentation)
(2011 Mini-Grant Recipient)
- 2:30 – 2:45 **IMS/ATP – The Newest, Most Novel Technique Used by the Regional Science Consortium to Monitor Water Quality**
Jerry Covert, Regional Science Consortium
- 2:45 - 3:15 **STUDENT AWARDS**
CLOSING REMARKS

* Presenter

ABSTRACTS

*Regional Science Consortium
7th Annual Research Symposium
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PRESENTATIONS

Thursday, November 3, 2011

Title: A Summer Undergraduate Research Experience at the Old Woman Creek State National Estuarine Research Reserve; Huron, Ohio

Author: Joel Chronister* and Robert S. Whyte, California University of Pennsylvania

Abstract: This summer I had the opportunity to work as an undergraduate researcher at the Old Woman Creek State Nature Preserve. Old Woman Creek consists of 572 acres and is home to one of the last undisturbed freshwater estuaries in the Lake Erie basin. My task and overall goal was to record the present plant species found in the wetland and to subsequently create a map of the major vegetation types. Using a Trimble GeoXH GPS unit, the status of *Phragmites australis* (Giant Reed Grass) was recorded in the wetland. Additionally any state listed species were noted and their position captured. We were also interested in the ecological impacts that *Phragmites* may have on the distribution of muskrat within the wetland. We mapped all existing lodges and feeding platforms and associated biological and physical data (e.g., water depth, lodge parameters, vegetation...) were recorded. We hope the collected information will guide the Old Woman Creek Preserve in future management efforts. The summer research experience was a great opportunity to receive hands on ecological experience and training. I hope to continue to use the knowledge and skills learned from this experience and apply them to my future professional experiences.

Title: Restoration of the Black Oak Savanna at Erie Bluffs State Park in Erie County, Pennsylvania

Author: Ephraim Zimmerman, Pennsylvania Natural Heritage Program, Western Pennsylvania Conservancy, Pittsburgh, PA

Abstract: The relict dune and high beach ridge at Erie Bluffs State Park has long been considered an exceptional biodiversity site, supporting a globally significant plant community typified by a sparse canopy of black oak trees of short stature and an understory of dewberry, bush-clover, and grasses. In 2009, Western Pennsylvania Conservancy initiated a project with DCNR and Cleveland Museum of Natural History to restore the native plant communities for a 14-acre are of the of the dune and beach ridge at Erie Bluffs State Park by removing the black locust and non-native shrub and vine species.

Following treatment of the invasive understory plants, approximately 1500 black locust and other non-oak stems were treated with herbicide and removed from 3.5-acres. Other non-native species were treated within the entire treatment area. Preliminary results indicate a marked return to species commonly associated with the black oak savanna community. In 2011, wild lupine, a species associated with other black oak savanna sites, but not known from Erie Bluffs, was documented within the restoration area. Several other native black oak savanna plants, including several panic grasses, blue curls, dewberry, and bush-clover, were also documented within the restoration area. Invasive species remain the primary concern within the area and successful restoration of the native black oak savanna will only occur with continued management by park staff and partners.

Title: **Rare, Threatened and Endangered Plant Propagation at Presque Isle State Park**

Author: Marti Martz, Pennsylvania Sea Grant

Abstract: *Lithospermum carolinense*, aka Hairy Puccoon (PA endangered), and *Lupinus perennis*, aka Lupine (PA threatened), are 'poster plants' for the Great Lakes Black Oak Savannah /Midwest Sand Barren habitat. This habitat exists at Presque Isle State Park in Erie, Pennsylvania. It is rated G3, S1 which means identifies it as globally vulnerable and sub-nationally critically imperiled. This presentation will describe efforts to create more robust populations of *Lithospermum* and *Lupinus* by collecting seed from parent plants found on the park and the Regional Science Consortium's greenhouse. It will also detail attempts to restore/reclaim/retain representative areas on Presque Isle which were historically populated by these endangered and threatened species

Title: **Evaluation of Lake Sturgeon Population and Their Habitat in Lake Erie**

Author: Karla Kaczmarek*, Pennsylvania Sea Grant, Jeanette Schnars, Regional Science Consortium, Chuck Murray, Pennsylvania Fish and Boat Commission

Abstract: Lake Sturgeon, *Acipenser fulvescens*, are the largest fish in the Great Lakes growing to over six feet in length and weighing over 200lbs. They are an endangered species in Pennsylvania and they have some kind of status (Endangered, Threatened, or Species of Special Concern) in 19 of the 20 states throughout its range. A century ago, Lake Sturgeon was a common fish in Lake Erie but they were considered a nuisance fish because they ruined commercial fishing gear. Later, their eggs were very sought after for use in the caviar industry. Eventually, their population in Lake Erie declined dramatically and Great Lakes wide they are currently at 1% of their original abundance. Although Lake Sturgeon research is picking up in the Great Lakes, very little information exists about their current abundance and distribution in Pennsylvania's portion of Lake Erie. Research is needed to fill this data gap. This research is focused on catching Lake Sturgeon in historic locations using baited setlines. Fin clips will be taken for genetic analysis to determine if there is a unique population here or if they are a transient population from the St. Clair or Niagara Rivers. Other components of the project include taking sediment samples to examine the macroinvertebrate communities, an education and outreach campaign, and new for the summer of 2012 side scan sonar data. Side scan sonar will map out the bottom of the lake revealing locations where the habitat is

favorable for Lake Sturgeon. Once the side scan sonar is complete, baited setlines can be placed in the favorable habitat locations.

Title: Continued Research on Purple Martins (*Progne subis*) Conducted by the Purple Martin Conservation Association (P.M.C.A.)

Author: Robert Aepli, Purple Martin Conservation Association

Abstract: East of the Rocky Mountains, Purple Martins (*Progne subis*) depend almost entirely on housing provided by humans for their nesting. This dependency makes the Purple Martin a great research subject, decreasing time spent searching for birds, and increasing the ease of capturing them, allowing for large numbers to be banded. The P.M.C.A. and its partners at York University in Toronto, Ontario have been conducting joint research on Purple Martins for nearly 10 years studying topics such as paternity, dispersal and disease. Current research reported on includes studies of long-term survival, dispersal and continued ground-breaking migration research using geo-locators to track Purple Martins from different areas of the United States to Brazil and back.

Title: Mist-netting and banding of songbirds at Presque Isle and Erie Bluffs State Parks 2007 – 2011: What have we learned?

Author: Sarah Sargent, Audubon Pennsylvania

Abstract: Although bird banding has been conducted at Presque Isle since 1960, the current banding operation started in the fall of 2007. Between August 1, 2007 and May 31, 2011, a total of 7873 birds of 105 species were banded at three locations, two on Presque Isle, and the third at Erie Bluffs State Park. The most numerous species we have banded is the Yellow-rumped (or Myrtle) Warbler (1120) with 98% of these being caught at the Fry's Landing site. Likewise, other species are caught disproportionately at one site, or are relatively more abundant in either spring or fall. These and other summaries of the banding data will be presented.

Title: Real-Time Environmental Monitoring

Author: Steve Fondriest, Fondriest Environmental Inc.

Abstract: Securely deploying a sensor is only half the battle these days. Many environmental monitoring projects now make data available to scientists, researchers, government agencies and in some cases the general public in near real-time. In the past, this would have been a daunting task, but new technology allows even novice computer users to share environmental project data via the Internet. While the US Geological Survey, NOAA and others federal agencies have been transmitting and sharing environmental data for years, many non-government projects continue to rely on remote data acquisition and periodic site visits for data retrieval. Under optimal conditions, these systems can work very well. However, hazards associated with weather, marine environments and harsh field conditions often lead to lost or erroneous data and significant delays waiting for collection. An automated system can eliminate these inconveniences and provide a constant stream of reliable data. This presentation demonstrates setting up a real-time

environmental monitoring system including sensor selection, data logger and telemetry options and software.

Title: **The Impact of Shiga Toxin Producing *E. coli* (STEC) on Grazing Protists in the Nuisance Algae *Cladophora* Obtained from Presque Isle State Park**

Author: Drew Spacht*, Eric Clark, Kyle Lindsay, Hannah Opalko, and Steven Mauro, Mercyhurst College

Abstract: Shiga toxin expressing *E. coli* (STEC) is a pathogenic bacterium that is the causative agent of many cases of human illness in recreational waters. Several labs, including our own, have characterized the distribution and abundance of STEC in The Great Lakes. This work has shown that the presence of STEC in The Great Lakes is not related to fecal indicators that are traditionally used to assess water quality. In this study, we consider the role that grazing protists present on the nuisance algae *Cladophora* have on the survival of STEC that have been doped into beach water obtained from Presque Isle State Park. Our initial findings indicate that grazing protists have the ability to increase the survivability of STEC and other fecal coliforms in this aquatic environment, presumably through a shiga toxin dependent mechanism. The implications of these findings for beach water management will be discussed.

Title: **Assessing a Computer Model for Predicting Bacteria Levels at Presque Isle Beaches**

Author: Michael A. Rutter, Rutter Statistical Consulting

Abstract: The Regional Science Consortium at the Tom Ridge Environmental Center at Presque Isle recently completed a grant from the Environmental Protection Agency as part of their Great Lakes Restoration Initiative to develop computer models to help predict bacteria levels at Presque Isle State Park Beaches. In this talk, I will describe the development and implementation of a random forest model used to predict *E. coli* levels at Presque Isle beaches. The model was deployed for the summer of 2011 and the predictions of the model will be compared to measurements from Erie County Department of Health and the Regional Science Consortium to assess the model's accuracy. Currently, the model uses weather data collected around Presque Isle Bay as predictor variables and I will discuss what other data sources are available to help refine the model.

Title: **The Main Ingredient in Anti-Depressants, Fluoxetine, is Present and Can Alter the Microsphere in Presque Isle State Park Beach Waters**

Author: Eric Clark*, Surafel Mulugeta, Kendal Greene and Steve Mauro, Mercyhurst College

Abstract: Fluoxetine is the active ingredient in anti-depressant drugs. This chemical has been shown to be present and to persist in several aquatic ecosystems, including the Great Lakes. The levels detected have the potential to negatively impact several aquatic organisms including fish, algae, crustaceans, mollusks, clams and mussels. In this study, we tested for the presence of fluoxetine in the beach waters of Presque Isle State Park.

Our results indicate that fluoxetine is present and persists in these recreational waters. Moreover, we find that fluoxetine can influence mortality of some fecal bacteria both in culture and in the beach waters at Presque Isle State Park where they are detected. Further, the presence of fluoxetine has the ability to induce bacteriophage production in certain strains of *E. coli*. These results provide evidence that fluoxetine has the ability to dramatically alter the microbial landscape of Presque Isle beach waters in a manner that can influence the interpretation of current water quality testing protocols.

Title: **Roswell Park Cancer Institute Pharmacokinetics/Pharmacodynamics Core Resource Capabilities and Services for Your Research Needs**

Author: Joshua Prey*, Kimberly Clark and Gerald Fetterly, Roswell Park Cancer Institute

Abstract: The mission of the Pharmacokinetic/Pharmacodynamic (PK/PD) Resource is to support clinical research and clinical/pre-clinical drug development at Roswell Park Cancer Institute (RPCI) as well as providing bioanalytical and consultation services to industry and academia. The PK/PD resource provides state of the art analytical scientific data and PK/PD modeling and simulation services for PK/PD studies of cancer therapeutic and preventive agents. In addition our group advises investigators on PK/PD study design, sample collection and handling and dose selection to optimize the therapeutic window of oncology drug products. Complete services are also provided to investigators, ranging from study design consultation and methodology development, to storage, preparation and assay of samples, and data analysis. The Resource offers a wide variety of analytical assays along with the capabilities to develop and validate new methods. Using state-of-the-art techniques with LC/MS/MS, UPLC, HPLC, Real Time QRT-pcr, ELISA and Atomic Absorption spectrophotometry, the PK/PD facility provides highly sensitive measurements for a wide array of small molecule compounds including chemotherapeutic agents and their metabolites. With emphasis on mass spectrometry the facility is equipped with three triple quad mass spectrometers capable of highly sensitive high throughput quantification of small molecule compounds. In addition to our analytical capabilities we participate in an education program giving students a chance to work within the facility as visiting scientists both in the analytical and modeling sections of the facility.

Title: **Molecular Evaluation of the Maternal Genetic Variance in White Tailed Deer Using DNA Sequencing of the Mitochondria D-Loop Region**

Author: Jedediah Seltzer*, Jared McFadden, Daniel Holsinger, Hannah Kehoe, Jessica Peterson and Fred Brenner, Grove City College

Abstract: A limited number of studies involving electronic monitoring suggest that female white-tailed deer (*Odocoileus virginianus*) exhibit philopatric behavior, ranging only a km² within their lifetime, whereas male deer are known to range in areas of 80 km². Using DNA sequencing to determine the genetic variance in the mitochondrion DNA it is possible to determine the existence of maternal inheritance patterns in white-tailed deer populations. By mapping variations within the 1050 base pair (bp) control (D-loop) region or the first 546 bp, it is possible to determine haplotype identification and comparison within or among deer herds. Results from samples obtained from deer herds from three municipal parks in Dayton, Ohio indicated that a higher percent homology

occurs within these populations and they are more closely maternally related to each other than are deer in the rural herds in Mercer County, Pennsylvania. Recent results from Presque Isle State Park and the surrounding area of Erie County, PA. To date 4 Presque Isle sequences have been published and three more are currently being analyzed. The 4 published sequences show high diversity within the Presque Isle deer herd. To date, 17 complete D-loop sequences and 25 partial 546 bp sequence have been published in GenBank. These data indicate that considerable genetic diversity within whitetail deer populations in these urban and rural settings of Ohio and Pennsylvania that may correspond to the land use surrounding the sampling locations. **KEY WORDS:** D-loop, haplotypes, mtDNA variation, white-tailed deer, population genetics. The Presque Isle portion of this study was supported by a grant from the Friends of Presque Isle.

Title: **Badlands Working Group: Investigation of the Holocene Landscape**

Author: Lisa Andresky*, James Stevens*, Colten McDeavitt*, Katherine Mickle, Nichole Litzinger and Patrick Burkhart, Slippery Rock University

Abstract: Slippery Rock University professors, Patrick Burkhart and Katherine Mickle led a joint expedition of art and geology students to Badlands National Park, South Dakota to gain a greater understanding of the structure and overall Holocene landscape. The White River Badlands is a provoking enigma that has been lacking a satisfactory explanation for the unique landscape. Our working hypothesis is that climate change has led to the incision of large paleofans resulting in a dust source for the Great Plains, as well as the isolation of vestigial sod tables from the larger "castle" formations. The Badlands Working Group has been conducting an on-going investigation to determine radiocarbon ages of Holocene paleosols, or old buried soils. The research highlighted on the 2011 expedition includes radiocarbon dating of Late Holocene fluvial silts. Just northeast of Saddle Pass on Castle Trail, six samples of paleosols were collected and are now currently awaiting carbon dating results. These soil ages should lie in accord with our previous results revealing intervals of pedogenesis at ca. ~900, 1100-1300, 1700-1900, 2300-2400, and ~3,600 RCYBP. Our record for paleosols in the fluvial record (overbank flood deposits) lies in accord with the eolian record (wind-blown deposits), as reported by other investigators. We remain uncertain over the role of climate change. Our interdisciplinary approach provided scholarly explorations that were immensely satisfying. Students shared experiences and problem solving in an atmosphere of synthesizing ideas and valuing perspectives. This synergy resulted in an understanding of the landscape broadened by both geologic and artistic elements.

Title: **Joint Art and Science Research in the White River Badlands: Pedagogical Approaches and Outcomes**

Author: Katherine Mickle* and Patrick Burkhart*, Slippery Rock University

Abstract: For over a decade, the Badlands Working Group of Slippery Rock University has been investigating Holocene landscape development, and training undergraduate geology students in Badlands National Park, SD. In 2006, the working group added SRU Art Department faculty, Katherine Mickle, and expanded its educational and scientific mission to include artistic considerations of light, composition and conveyance of idea. Sketches of the landscape were

completed on several earlier expeditions in order for geology and geography students to examine the landscape more closely. Frustrations arising from the exercise, where students failed to recognize the stepped landscape of lower prairie, escarpment, and upper prairie, prompted a re-examination of using scientific illustration. The collaborative investigations of the new working group are cooperative, combining scientific understanding of landscape processes with captured artistic impressions. Working with an artist not only improved the sketching, it improved the eye of the students working in the field. Artistic media have since expanded from sketches to include sculpture, paintings, printmaking, fibers and video. Geology and art faculty and students have presented Badlands-inspired artwork at conferences, symposia, and exhibitions in addition to scientific papers. This presentation will include a brief history of the tradition of scientific and artistic collaboration, a pedagogical review, and examples of artwork from faculty and students of the working group. Pedagogical strategies are largely experiential and cooperative, including peer mentoring with undergraduate students. Returning students mentor novices, focusing inquiry, enhancing group communication, and diffusing stressors. The cross-pollination between artists and scientists advances scholarly achievement.

Title: **Long-Term Changes in Pattern of Occurrence of Strong Tornadoes in the United States, 1952-2011**

Author: Nicholas Schiff*, Mike Campbell and Nick Lang, Mercyhurst College

Abstract: In compiling and graphing statistics on strong to violent tornadoes in the United States from 1950 through 2010, made available by the Tornado History Project, I have found that two patterns emerge. These patterns are particularly noticeable for intense tornadoes, those rated F3 or higher. First, the number of intense tornadoes appears to spike every eight to nine years. Second, the number of intense tornadoes appears to have phases, one of high activity from 1952 to 1976, and one of lower activity from 1977 until at least 2010. This presentation will examine correlation of these patterns with El Niño Southern Oscillation (ENSO), using information gathered from the Storm Prediction Center, the National Weather Service, and other NOAA sources. Other factors potentially affecting occurrence of strong tornadoes on the long-term include wind shear and mid-latitude cyclone activity; the availability of data on these phenomena is limited. The tornado outbreaks observed in 2011 may represent a return to the higher activity period that occurred between 1952 and 1976. The report will also examine the role that major tornado outbreaks play in the active years.

Title: **Effect of CO₂ Addition on Algae Growth in an Experimental Aeroponic Algae Production System**

Author: Robert Crowe and Mike Campbell*, Mercyhurst College

Abstract: With funding support from Carnegie Mellon University and the Pennsylvania Infrastructure Technology Alliance (PITA), an experimental apparatus was constructed at the Tom Ridge Environmental Center aquaponics laboratory. During May-June 2011, the apparatus was used to evaluate the effects of controlled addition of CO₂ into an enclosed system containing local-source filamentous algae inoculated on an aeroponic growth

substrate. Following a 23-day incubation period at constant light and temperature, final algae growth was indistinguishable between replicate control and CO₂-supplemented growth chambers. An unexpected change in algae composition (from filamentous to small colonial chlorophytes) occurred within the system, and development of a bacterial-algae biofilm during the incubation allowed profuse growth of the algae in unintended locations within the apparatus -- a consistent feature in both treatment and control chambers. The physical dynamic of a flow-through aeroponic algal growth system appears to favor the biofilm-based green algae *Chlorella* sp. and *Scenedesmus* spp., and *Ankistrodesmus Braunii*.

Title: **Statistical Modeling of Nutrient Levels in an Experimental Wastewater-fed Algae Production System**

Author: Prakash Bhatta*, Satish Shrestha, Mike Campbell and Ronald Brown, Mercyhurst College

Abstract: From April through mid-November 2010, during experimental operation by Renewergy Inc. of an algae production system in a greenhouse at the City of Erie Wastewater Treatment Plant (WWTP), inflow and outflow water samples were collected several days per week and analyzed at the WWTP analytical laboratory to monitor the effect of the algal production system on concentrations of the nutrients NO₃-N, NO₂-N, NH₃-N, and P. Exploratory statistical analysis and curve-fitting tools were used to look for correlations between influent and effluent concentrations of the nutrients, whether nutrients correlated with each other, and whether ambient light and temperature conditions were related to variations in nutrient levels in the system. The algae production system appeared to affect reduction of NH₃-N and P in effluent water, but had little consistent effect on NO₂-N and NO₃-N concentrations. Results of the modeling effort suggest that P probably limits this system's ability to remove NO₂-N and NO₃-N from wastewater.

PRESENTATIONS

Friday, November 4, 2011

Title: **Presque Isle Bay Stream Sediment Evaluation**

Author: Sean Rafferty, Pennsylvania Sea Grant

Abstract: In 1991, Presque Isle Bay became the Great Lakes 43rd and final Area of Concern, partially due to contaminated sediments. In 2007, the restrictions on dredging beneficial-use impairment was delisted for Presque Isle Bay. As a result of the delisting, the *Presque Isle Bay Watershed Restoration, Protection, and Monitoring Plan* was developed to ensure that the quality and quantity of water and sediment entering Presque Isle Bay from the watershed will not cause adverse impacts to the Bay's ecosystem. Measuring the success of restoration and protection efforts relies heavily upon a long-term watershed monitoring plan. The objective of this study was to evaluate the sediment quality conditions at the 16 sites assessed by Diz and Johnson (2002) in 2001 and four sites assessed by Rafferty (2010) in 2009, per the monitoring recommendations of the *Plan*. Chemicals of potential concern (COPC) were compared against existing sediment quality guidelines and the ecosystem health targets developed for Presque Isle Bay were evaluated, including mean PEC-Q, SEM-AVS, SEM-AVS/ f_{oc} , and ESB-TUs. Copper, lead, nickel, zinc, and oil and grease concentrations decreased at the majority of the sites assessed in 2011 compared to 2001; however, a few sites had increased metal concentrations when evaluated in 2011. The bioavailability of metals was assessed using SEM-AVS and SEM-AVS/ f_{oc} measurements. The ecosystem health target for SEM-AVS is not being met as only 16% of the sites had a SEM-AVS less than zero. However, the ecosystem target for SEM-AVS/ f_{oc} is being met as 100% of the sites had a SEM-AVS/ f_{oc} less than 3,000 $\mu\text{mol g}^{-1} \text{OC}$. Sediment quality guidelines were exceeded at six sites. When potential toxicity was evaluated considering a mixture of contaminants (mean PEC-Q), the ecosystem health target for mean PEC-Q was met as 95% of the sites had a PEC-Q less than 1.0. The bioavailability of PAHs was assessed by calculating ESB-TUs. The ecosystem target for ESB-TUs is not being met as only 68% of the sites had an ESB-TU less than 1.0. The results of this study provide a robust dataset in which to compare future COPC sediment concentrations. Initial watershed restoration efforts should focus on sub-watersheds where COPC concentrations exceeded sediment quality guidelines, in addition to the subareas recommended in the *Plan*.

Title: **Incorporation of Proteins into Polymer Foam**

Author: Shannon Gowen, State University of New York, Fredonia

Abstract: We prepared polyurethane foam and added algal cells or mitochondria to evaluate the quality and thickness of the foam layers. We used plastic layers as a sandwich which allowed a thin layer of foam that separated from the plastic and maintained the upper and lower bubble layer of the foam. We observed remnants of algae cells and a tetrazolium dye reaction may indicate active enzyme activity of the mitochondria within the polymer foam.

Title: **Measurements in Ichthyology**

Author: David Ryan* and Jay Stauffer, Penn State University

Abstract: This presentation will discuss measurement of fish characters and the analytical tools Ichthyologists use to study these measurements to differentiate taxa and assess their interrelationships. These characters are divided into the categories of meristic, morphometric, anatomical, and molecular. Discussion includes what is measured in each category along with their respective scope, range of information provided, and limitations to use. A few of the examples discussed and photographs shown are from an Ichthyology lab at Penn State.

Title: **Ecology and Unique Habitat of the Bridle Shiner (*Notropis bifrenatis*) and the Ironcolor Shiner (*Notropis chalybaeus*)**

Author: Bill Hanson* and Jay Stauffer, Penn State University

Abstract: The endangered Bridle Shiner (*Notropis bifrenatus*) and Ironcolor Shiner (*Notropis chalybaeus*) co-exist in Marshalls Creek (Delaware River drainage), Monroe County, Pennsylvania. Although both species were historically widespread, Marshalls Creek may be the only locality where they currently occur sympatrically. The Bridled Shiner occurs sporadically north of Marshalls Creek and the Ironcolor Shiner south of the creek. Although the Bridle Shiner and the Ironcolor Shiner were found throughout the Delaware River drainage in Pennsylvania, and the Bridle Shiner inhabited the Susquehanna River in Pennsylvania, currently the only known habitat in Pennsylvania for these two species is Marshalls Creek. The objective of this proposed research project is to determine the critical habit requirements of the Bridle Shiner and the Ironcolor Shiner. Specifically, this research project will focus on the chemical, physical and biological (e.g., food preference, fish species associates) dimensions of their habitat to establish any unique features, characteristics and attributes which they require. Other historical and current population sites, both within and outside of Pennsylvania will be visited to compare and contrast data with the Marshalls Creek site.

Title: **The Morphometrical Variance and Abundance of *Diplotaxodon* Species Around Mbenji Island, Domira Bay, Malawi**

Author: Titus Phiri* and Jay Stauffer, Penn State University

Abstract: Studies have shown that *Diplotaxodon* species comprise the majority of commercial fish catches in Lake Malawi. At least seven species in the genus *Diplotaxodon* have been formally described by morphometric procedures and include; *D. aeneus*, *D. apogon*, *D. argenteus*, *D. ecclesia*, *D. greenwoodi*, *D. limnothrissa* and *D. macrops*. Little is known, however, on the population/species diversity from areas which are the localised sites where commercial fishing is taking place. It is extremely important to examine the annual population variances and abundance in the areas like Mbenji Island where *Diplotaxodon* catches are considerably higher than those of other species. Annual population structure and abundance may significantly differ among the species of *Diplotaxodon* and fishing pressure may endanger certain species differently. This study will provide a basis for annual species significance in abundance and the morphometric variance. It is possible

that some of the species migrate, change position or orient, etc. within the area. To answer the above questions, *Diplotaxodon* species from commercial catches will be grouped morphologically and male colour will be used to validate species presence. The species abundance differences will be closely examined for a period of one year to determine the species trends. There will be weekly *Diplotaxodon* sampling from commercial boat operating around Mbenji Island. Morphometric data will be analysed.

Title: **Preliminary Assessment of the Genetic Diversity of Carp at the Pymatuning Spillway**

Author: Samantha Tucker* and Kristen Webb, Allegheny College

Abstract: The Pymatuning Spillway, located at the northern end of Pymatuning Lake in Crawford County, Pennsylvania, is home to the infamous “carp bowl.” Each year between May and October thousands of carp (*Cyprinus carpio*) gather here and feed on bread thrown to them by tourists. Using mitochondrial DNA sequencing, we have assessed the genetic diversity of the carp at the Pymatuning Spillway. Specifically, DNA was extracted from the fin clips of ten carp and both the cytochrome oxidase II (COII) gene and the D-Loop region of the mitochondrial genome were sequenced. In comparing the combined sequences (1560 nucleotides) of all ten fish, only two single nucleotide polymorphisms were found. The results of this study indicate that the carp occupying Pymatuning Spillway are genetically very similar to one another. Future studies of carp from other areas of the lake, as well as more samples from the Spillway will lead to a better understanding of how approximately 70 years of an unnatural association with humans has influenced the evolution of this natural carp population.

Title: **Preliminary Investigation of Lake Trout Spawning Near the Presque Isle Peninsula in Erie, Pennsylvania**

Author: Jim Grazio, Pennsylvania DEP

Abstract: Lake Trout (*Salvelinus namaycush*) was the dominant native predator in the eastern basin of Lake Erie. Lake Trout populations began to decline from 1850-1900 when subjected to intense exploitation from a poorly regulated and expanding commercial fishery and were completely extirpated from Lake Erie by 1965 with the addition of predation pressures from the invasive Sea Lamprey (*Petromyzon marinus*). Despite intensive stocking efforts, this keystone species has failed to establish naturally reproducing populations in Lake Erie. While there are many factors that impede Lake Trout recruitment into the lake, a primary factor is the loss of historical spawning shoals as the result of fouling by non-native, invasive dreissenid mussels and the filamentous green alga *Cladophora*. Important traditional spawning grounds like the Brocton Shoal near Dunkirk, NY have been abandoned by Lake Trout and the spawning sites utilized by currently stocked strains remain largely unknown. The Department of Environmental Protection regularly collects Lake Trout in spawning condition during fall gill net sets for fish tissue contaminant analysis. Preliminary side-scan sonar and underwater videography work indicates that suitable Lake Trout spawning habitat (e.g., cobbles, boulders, and fractured bedrock) is present immediately to the east of the Presque Isle Peninsula. These facts, taken together, strongly suggest that Lake Trout may be spawning in the vicinity of Presque Isle. The results of preliminary assessments of the

putative Presque Isle spawning habitat will be presented and prospective Lake Trout spawning research will be discussed.

Title: **Evaluation and Detection of Round Goby Habitat Disturbances and Impacts on Native Fish Populations**

Author: Casey Bradshaw-Wilson* and Jay Stauffer, Penn State University

Abstract: The current range of the invasive Round Goby (*Neogobius melanostomus*) is limited to Lake Erie and downstream sections of Lake Erie tributaries, below natural barriers, in Pennsylvania. The objective of this portion of the project is to examine diet overlap between the invasive Round Goby and native benthic fishes in Presque Isle Bay and tributaries of Lake Erie. Study sites for this project focused on three tributaries to Lake Erie; Elk Creek, Twelve-Mile Creek and Twenty-Mile Creek along with sections of Presque Isle Bay. Using seines, fishes were collected at each tributary and preserved for morphometric data and gut analysis. Kicknets were used to collect macro-invertebrates, which will compare available food versus stomach content in each benthic fish collected. Electric trawls were used to collect fish in Presque Isle Bay. Round Gobies were collected as well as Tubenose Gobies, which are new invasive species to the Pennsylvania waters of Lake Erie. To continue this project, artificial streams will be set up in the lab to examine competition between native benthic fish and each species of Goby, as well as competition between Round and Tubenose Gobies. The streams will have the same proportion and species of macro-invertebrates that were found in the tributaries during 2011 sampling season.

Title: **Ontogenetic Changes in Pharyngeal Morphology Correlate with a Diet Shift From Arthropods to Dreissenid Mussels in Round Gobies (*Neogobius melanostomus*)**

Author: James Cowles* and Greg Andraso, Gannon University; Rose Colt, Philadelphia College of Osteopathic Medicine; Jay Patel and Mike Campbell, Penn State – Erie, The Behrend College

Abstract: The potential of predators to regulate populations of dreissenid mussels (*Dreissena polymorpha* and *D. rostriformis bugensis*) has been addressed since early in the dreissenid invasion of North America. Round gobies (*Neogobius melanostomus*) larger than approximately 60 mm have been shown to prey extensively on dreissenids, whereas smaller round gobies feed mainly on aquatic insects and crustaceans. We propose that ontogenetic changes in pharyngeal morphology may contribute to this diet shift in round gobies. Pharyngeals of 69 round gobies ranging from 31 to 164 mm total length were investigated using light microscopy and scanning electron microscopy. Areas of lower pharyngeals and pharyngobranchial 2 increased allometrically with fish length. Pharyngeals of round gobies smaller than 50 mm contained narrow (< 0.1 mm diameter) papilliform teeth that are consistent with eating soft-bodied prey. By the time round gobies reached approximately 80 mm in length, pharyngeals contained larger diameter (0.3-0.5 mm) molariform teeth typical of those found in molluscivorous fish. Pharyngeal teeth of the largest round gobies also showed considerable wear. Although changes in pharyngeal morphology may contribute to the previously described diet shift in round gobies as they age, genetic and environmental factors both likely influence pharyngeal remodeling and therefore merit further investigation.

Title: **Phenotypic Plasticity of the Pharyngeal Apparatus of Round Gobies (*Neogobius melanostomus*)**

Author: Noelle Blank*, Greg Andraso and John LaPaglia-Durante, Gannon University

Abstract: When young, round gobies (*Neogobius melanostomus*) prey on a variety of arthropods, but switch to dreissenid mussels (*Dreissena polymorpha* and *D. rostriformis bugensis*) once they reach approximately 60 mm. Previous work in our laboratory has demonstrated that the age-related diet shift from arthropods to dreissenids is correlated with developmental changes in pharyngeal structures. It is possible that changes in the pharyngeal apparatus cause gobies to switch from arthropod to dreissenid prey. However, work on other species suggests that the dietary switch may drive pharyngeal remodeling. To test the possibility of phenotypic plasticity in the pharyngeal apparatus of round gobies (i.e. that diet influences pharyngeal morphology), we compared prey availability, food habits, and pharyngeal morphology of round gobies from a “dreissenid-rich” location (Presque Isle shipping channel) and a “dreissenid-absent” location (Fairview gravel pit). If the pharyngeal apparatus is phenotypically plastic, we would expect to see less robust pharyngeals and the maintenance of relatively long and narrow (papilliform) teeth in round gobies from the gravel pit, compared to those from the shipping channel. Work to date indicates that dreissenids are abundant in the shipping channel and compose nearly the entire diet of round gobies collected from that site. In contrast, dreissenids appear to be absent in the gravel pit and the diet of round gobies collected from that site is composed of a variety of arthropods including ostracods, chironomid larvae, and caddis larvae. A comparison of the pharyngeal apparatus of round gobies collected from the two sites will be presented.

Title: **Evaluating the risk of aquatic invasive species range expansions in a changing climate in Pennsylvania**

Author: Sara N. Grisé^{1,2*} and Theo Light¹, ¹Shippensburg University, Shippensburg, PA; ²Pennsylvania Sea Grant

Abstract: Climate change and invasive species are two of the most pervasive aspects of global change, and the two acting synergistically may create one of the greatest threats of our time. Due to the uncertainty involved with these interactions, there is a need to develop predictive management tools that can offer resource managers proactive strategies for prioritizing invasive species that may benefit from the warming temperatures of a changing climate. This study explores the vulnerability of Pennsylvania’s aquatic ecosystems to the movement and introduction of invasive species responding to changing thermal regimes. It addresses which species currently south of Pennsylvania have the greatest potential to expand their ranges northward and establish in Pennsylvania based on the temperature changes predicted in three IPCC emission scenarios. The USGS Non-Indigenous Aquatic Species database was used to identify over 50 species that could pose a future threat. Statistically downscaled temperature projections from 14 climate models were used to estimate Pennsylvania’s future temperature averages up to 2099. The climate-matching tool *CLIMATCH* then determined that half of these species could not survive Pennsylvania’s current climate. By 2099, over 50 percent of species showed an increase in climate suitability, and 33 percent had climate suitability increases over 30

percent. Since establishment involves a number of factors, the combined effects of warming temperatures, propagule pressure, competition, and other stressors were also assessed for species designated most at risk to establish.

Title: **Drainage – Wide Survey of Sabine Map Turtles (*Graptemys sabinensis*) in the Mermentau River, Louisiana**

Author: Emily Ilgen*, Carissa Hartson, Olivia Zaleski and Peter Lindeman, Edinboro University

Abstract: The Mermentau River drainage in Louisiana has been relatively ignored by turtle biologists. In particular, very little is known about the range and distribution of the Sabine map turtle (*Graptemys sabinensis*). It was collected from the upper Mermentau in 1893-94, but has not been studied in the drainage since then. Cagle described the species in 1953, and reported their range to include to the Sabine, Calcasieu, and the Mermentau rivers in southwestern Louisiana. These localities were based on Cagle's analysis of three 1890s specimens from the Mermentau, one specimen from the Calcasieu, and a large type series Cagle collected from the Sabine. We determined the density and relative abundance of Sabine map turtles in the Mermentau drainage. We surveyed the Mermentau, Lake Arthur, and five major tributaries: Bayou Plaquemine Brule, Bayou des Cannes, Bayou Nezpique, Bayou Queue de Tortue, and Lacassine Bayou. We recorded all turtles seen during boat surveys and in point counts from bridges and other access points. The Mermentau and Bayou Plaquemine Brule had the highest basking densities, ranging from 14.0 to 34.5 *G. sabinensis* per river kilometer. Bayou des Cannes and Bayou Nezpique had intermediate average densities of 5.0-6.3 *G. sabinensis* per river kilometer and the river below Lake Arthur and the southern tributaries Bayou Queue de Tortue and Lacassine Bayou had the lowest average basking densities, ranging from 0.7 to 1.4 *G. sabinensis* per river kilometer. Sabine map turtles were the most abundant turtle on the Mermentau drainage, accounting for 74.2% of all turtles seen.

Title: **Survey and Status Assessment of the Blanding's Turtle (*Emydoidea blandingii*) in Pennsylvania**

Author: Ryan Miller, Western Pennsylvania Conservancy – Pennsylvania Natural Heritage Program

Abstract: The Blanding's turtle (*Emydoidea blandingii*) has been designated as an "Immediate Concern" species in the Pennsylvania Wildlife Action Plan, and has been on the Pennsylvania Fish and Boat Commission's candidate list since the 1970's. However, very little information on the species' distribution in Pennsylvania exists; the species was last officially documented in the state in 1983. Consequently, there was a dire need for current information on the presence and distribution of *E. blandingii* in Pennsylvania. Historic locations were surveyed to determine if those populations remain, and areas holding potential habitat were assessed in an effort to discover new populations. At the conclusion of two seasons of surveys, an approximate total of 124,800 total trap-hours were logged at fourteen locations in Erie and Crawford Counties. Four Blanding's Turtles were captured in Erie County in 2009. All of the Blanding's turtles had the appropriate data recorded: exact location, age class, sex, health of animal, habitat information, etc. These data will help to determine not only the distribution of individuals, but also the size and viability of each Blanding's turtle population in

Pennsylvania. The final report to the Pennsylvania Fish and Boat Commission detailed the survey methods and results, the status of the Blanding's turtle in Pennsylvania, the turtle's most important ecological requirements, and management recommendations based on our findings.

Title: **Jumping Kinematics of the Plethodontidae: Performance, Morphological Variables and Tail Loss Effects**

Author: Anthony Hessel*, Ariel Statman and Lisa Whitenack, Allegheny College; William Ryerson, University of Connecticut

Abstract: The Plethodontidae family consists of lungless salamanders. Many defense mechanisms exist in the tool belts of the Plethodontidae family. Recently, William Ryerson showed that one species in the family could ascertain vertical height via an atypical jumping mechanism called C-Start jumping. We took five other species within the same family to see if they could also jump in the same way, as well as get a more detailed analysis of the jumping mechanism. We also explored the link between jump performance and morphology as well as the effect of tail loss on performance. Salamanders were filmed at 500 fps jumping over a 5 cm gap, with five trials per individual. Variables measured include bending angles, durations, and velocities, as well as jump height. Our preliminary results indicate all species are capable of "C-start" jumping. Very few morphological comparisons exist for all variables. Since it was hypothesized that the tail stabilized the salamander in the unloading and mid-air phase, we ran specific statistical analyses between tailed and non-tailed individuals within each species and found that no significant differences in the jumping abilities between tailed and de-tailed individuals existed. Removing tails represented a large loss of mass (mean mass loss: 27%, mean length loss: 48%). We speculate why no increase in performance occurred. Future molecular analysis of the elastic properties of salamander muscles was also contemplated.

Title: **Renewable Energy Sources and Their Environmental Impacts**

Author: Michelle Wunderley, Point Park University

Abstract: The uses of renewable energy sources have become more in demand over the last several decades. However, currently renewable energy sources still play a fairly small role in our energy demand. Fossil fuels emit large amounts of carbon dioxide into the atmosphere and have other environmental impacts that are of concern. Hydropower, wind power, solar power, geothermal power and biomass power generation are all types of renewable energy sources that are alternatives to power through fossil fuels. Renewable energy sources are important to integrate into our energy demand, but they too have environmental impacts that must be taken into consideration. The background of each source, the environmental impacts and an overall assessment are included for each renewable source. Renewable energy sources do have some negative impacts on the environment; however, they emit less carbon dioxide and other pollutants into the atmosphere than fossil fuels. Renewable energy sources are vital for the future and there needs to be ways to reduce the environmental impacts and maximize the energy being produced.

Title: **Thermal Conversion of Waste Organics into Solid Fuel by Means of Torrefaction**

Author: Ted McMahan* and Rick Diz, Gannon University

Abstract: Torrefaction is a mild pyrolysis process that improves the fuel properties of solid organic materials such as woods and organic wastes. When heated in an anoxic environment to temperatures between 200 and 400°C organic material decomposes producing volatile gasses. The major goal of this project was to determine the optimum heating profile to maximize mass and energy yield for each of the selected feedstocks while generating sufficient off-gases to provide the fuel for heating the system. The resulting solid material has an increased energy density and improved physical characteristics as a fuel. The various feedstocks investigated included horse manure, waste dry dog food and grape pomace. Preliminary results indicate that

Title: **Determination of the Polybrominated Diphenyl Ethers in the Sediments, Water and Biota of the Lake Erie**

Author: Marissa Vartak*, Weslene Tallmudge and Mary Vagula, Gannon University

Abstract: Lake Erie is one of the five great lakes of North America, and it is the shallowest, the warmest and biologically most productive of the Great Lakes producing more fish than all the other four lakes combined. It is the drinking water source for 11 million people and a recreational asset, a magnet for tourism and fishing. On the flipside, it is also very vulnerable and troubled with environmental challenges because it has the smallest water volume and the greatest pressures from the human settlement. One of the many issues faced by the Lake is pollution. It receives larger loads of many pollutants than any other Great Lake. Concerted efforts and research of many agencies and universities along with Clean Water Act of 1972 were able to restore the Lake and address the conventional pollution problem. However, even with the best pollution controls many pesticides and organohalogenes continue to enter the lake from many sources. Polybrominated diphenyl ethers are flame retardants used in a variety of consumer products since 1970s. Ever since, PBDEs have become ubiquitous environmental contaminants. Being largely non-polar and chemically stable, these chemicals are extremely lipophilic and resist degradation in the environment, giving them a high affinity for bioaccumulation. The present study reports the levels of these compounds in the sediments and water of Lake Erie. The body burdens of these toxicants in biota living in Lake are also presented.

Reference: Our Great Lake : accessed at
http://www.ecocitycleveland.org/smartgrowth/watershed/lake_erie/lake_erie_intro.html

Title: **IMS/ATP – The Newest, Most Novel Technique Used by the Regional Science Consortium to Monitor Water Quality**

Author: Jerry Covert, Regional Science Consortium

Abstract: Since its inception, the Regional Science Consortium has been involved with monitoring the quality of the water of Presque Isle State Park: the Lake, the Bay and the tributaries. As we have progressed, we have incorporated more and more high tech, cutting edge technologies. We began with simple plating techniques following, as much as possible, the lead of the laboratories of the Erie County Department of Health. In 2006, we began

using a Cepheid Smartcycler to perform qPCR (real time Polymerase Chain Reactions) on bacterial water contaminants, primarily *E. coli*. During the summer of 2011 we proceeded to refine the qPCR techniques and are currently identifying *E. coli* and *Enterococci* using EPA methods. This summer we completed water quality studies on 4 streams in Union County, Edinboro Lake, Lake Erie and Presque Isle Bay. The newest addition to our diagnostic arsenal is IMS/ATP. That stands for Immuno-Magnetic Separation/ Adenosine Tri Phosphate Technique. This presentation will explain how this newest technique works.

POSTERS PRESENTATIONS

Title: **Atmospheric Mercury Deposition in the Great Lakes Region of Pennsylvania**

Author: Brianne Campbell^{1*}, Alexis Rowley¹, Jason Bennett¹, Michael Naber¹, Elizabeth Boyer², Kevin Horner², and Matt Borden². ¹Pennsylvania State University, Behrend College, at Erie, PA; ²Pennsylvania State University at University Park, PA
(*Student Presentation*)

Abstract: Mercury occurs naturally in the environment in air, soil, and water. Mercury pollution is widespread, and is a well-known neurotoxin that can enter the food chain and bioaccumulate in fish and other biological systems. A primary mechanism of dispersal of mercury in the environment is by *emissions* to the atmosphere followed by *deposition* to the earth's surface. Much of the mercury emitted to the atmosphere eventually deposits onto land or water bodies. Biological transformations can produce methylmercury, which is the primary form of mercury implicated with regard to negative effects. Our research group has been quantifying atmospheric mercury deposition in the Erie region, in both *wet deposition* (via precipitation) and in *dry deposition* (via dry fallout). We measure wet mercury deposition weekly at a long-term monitoring site in Erie on Presque Isle using an active sampling technique. We also have initiated a pilot study to measure dry mercury deposition every two weeks using a new passive sampling technique at eight sites in Erie County. Our work helps to understanding status of atmospheric deposition in the Great Lakes region and will be useful to researchers aiming to understand the effects of mercury pollution.

Title: **Undo the Great Lakes Chemical Brew: Proper PPCP Disposal**

Author: Anna McCartney* and Marti Martz, PA Sea Grant

Abstract: Traces of chemicals from pharmaceutical and personal care products (PPCPs) have been found in many waters tested in the United States. Proper disposal of these chemical-laden products will avoid harm to fish and other aquatic wildlife, as well as drug misuse or accidental poisoning in humans. Many sectors of society play a role in the creation, dispensation, consumption, and disposal of these products. Undo the Great Lakes Chemical Brew: Proper PPCP Disposal, a project funded through the Great Lakes Restoration Initiative, combines outreach with action to educate Great Lakes basin residents on proper disposal and to facilitate additional collection events of unused or expired PPCPs. This poster describes the issue.

Title: **Roswell Park Cancer Institute Pharmacokinetics/Pharmacodynamics Core Resource Capabilities and Services for Your Research Needs**

Author: Joshua Prey*, Kimberly Clark*, and Gerald Fetterly, Roswell Park Cancer Institute

Abstract: The mission of the Pharmacokinetic/Pharmacodynamic (PK/PD) Resource is to support clinical research and clinical/pre-clinical drug development at Roswell Park Cancer Institute (RPCI) as well as providing bioanalytical and consultation services to industry and academia. The PK/PD resource provides state of the art analytical scientific data and PK/PD modeling and simulation services for PK/PD studies of cancer therapeutic and

preventive agents. In addition our group advises investigators on PK/PD study design, sample collection and handling and dose selection to optimize the therapeutic window of oncology drug products. Complete services are also provided to investigators, ranging from study design consultation and methodology development, to storage, preparation and assay of samples, and data analysis. The Resource offers a wide variety of analytical assays along with the capabilities to develop and validate new methods. Using state-of-the-art techniques with LC/MS/MS, UPLC, HPLC, Real Time QRT-pcr, ELISA and Atomic Absorption spectrophotometry, the PK/PD facility provides highly sensitive measurements for a wide array of small molecule compounds including chemotherapeutic agents and their metabolites. With emphasis on mass spectrometry the facility is equipped with three triple quad mass spectrometers capable of highly sensitive high throughput quantification of small molecule compounds. In addition to our analytical capabilities we participate in an education program giving students a chance to work within the facility as visiting scientists both in the analytical and modeling sections of the facility.

Title: **The Carriage Rate of Antibiotic Resistant *Staphylococcus aureus* in Preclinical Medical Students**

Author: Niailah Ochai*, Mary Ann Bliley, Christopher Keller, Ph.D., C.P.H., and Nancy Carty, Ph.D., Lake Erie College of Osteopathic Medicine, Erie, PA
(*Student Presentation*)

Abstract: Introduction: Methicillin-Resistant *Staphylococcus aureus* (MRSA) continues to be a health threat in both community-and hospital-acquired infections. Since MRSA is estimated to be carried by 1% of the population, and is transmissible from person to person, it is possible for healthcare personnel to transmit these bacteria to their patients. Preclinical medical students have much less patient contact compared to third and fourth year students; therefore, the goal of this study was to determine the rate of MRSA carriage in preclinical medical students.

Methods: Nasal swab samples were taken from first and second year medical students (n=217) and tested for the presence of *S. aureus* by growth on mannitol salts agar. Confirmed *S. aureus* isolates (n=63, 29.0%), were subcultured into Trypticase Soy Broth and subsequently grown on Mueller-Hinton agar. Susceptibility to select antibiotics was determined in duplicate using disk diffusion methods.

Results: Of the clinical isolates, 95.2% were resistant or intermediate to penicillin, followed by erythromycin (74.6%), amoxicillin/clavulanic acid (15.9%), tetracycline (14.3%), ciprofloxacin (12.7%), cefoxitin (6.3%), chloramphenicol (3.2%), sulfamethoxazole-trimethoprim (3.2%), and vancomycin (1.6%). None of the clinical isolates tested were resistant to oxacillin.

Conclusion: While the national average of MRSA carriers is roughly 1% of the population, none of the clinical isolates in the present study were MRSA as demonstrated by sensitivity to oxacillin. Future studies will compare the present results to MRSA carriage rates in third and fourth year medical students.

Title: **Age Group Associated Risk of Chlamydia and Gonorrhea as Perceived by Physicians Practicing in Erie County**

Author: Shuchi Kapoor *, M.P.H., Jennifer Saad, M.P.H., and Christopher C. Keller, Ph.D., C.P.H., Laboratory of Human Pathogens, Lake Erie College of Osteopathic Medicine, Erie, PA
(*Student Presentation*)

Abstract: **Purpose:** *Chlamydia trachomatis* and *Neisseria gonorrhoeae* are the two most commonly reported bacterial sexually transmitted infections (STIs) in the U.S. Rates of chlamydia and gonorrhea are highest in the 15-19 and 20-24 age groups in Erie County, PA, and rates of chlamydia in the 15-19 age group have increased in recent years. The purpose of this study was to determine if physicians in Erie County perceived the 15-19 age group to be at highest risk for contracting STIs.
Methods: A questionnaire focusing on rates and perceived risks for patients becoming infected with STIs was distributed to primary care physicians and OBGYNs practicing in Erie County.
Results: Of the respondents, 53.8% had reported at least one case of gonorrhea and/or chlamydia to the Erie County Department of Health (ECDH) in the past year. The majority of respondents indicated their patients were at high and low risk for chlamydia and gonorrhea, respectively. Relative to respondents who had not reported an STI case in the previous year, respondents who had reported at least one case indicated their patients were at a higher risk for contracting both STIs. Furthermore, respondents who had not reported an STI identified the 20-24 age group as highest risk, while respondents who had reported an STI indicated the 15-19 age group as highest risk.
Conclusions: There was a difference of perception of populations at risk between physicians who reported STIs and those who had not. Appropriate interventions should target the populations most at risk of contracting chlamydia and gonorrhea.

Title: **The 2011 Bacterial Water Quality Assessment of Presque Isle Bay, Erie, PA**

Author: David Stull, Jr., Regional Science Consortium

Abstract: Presque Isle State Park is a seven-mile long migrating peninsula, located on Lake Erie, which curves to the east forming a 3,718 acre Bay for the City of Erie, Pennsylvania. Presque Isle Bay was designated the 43rd 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. This study is intended to investigate the bacterial water quality of Presque Isle Bay, Erie, Pennsylvania. This investigation found that the bacterial levels within the Bay are within a swimmable range regardless of weather conditions.

Title: **Badlands Working Group '11: An Interdisciplinary Approach to Contemporary Research**

Author: Eric D. Charlton, Slippery Rock University
(*Student Presentation*)

Abstract: The Slippery Rock University's Badlands Working Group is a progressive and fully integrated artistic and geological experience. As a team of professors and students, graduate and undergraduate, we work to achieve common goals of learning about the landscape through scientific and aesthetic exploration. Throughout our two week expedition to and from the one-of-a-kind Badlands National Park, the cross-pollination between the two fields of study flourished. With scientists and artists attempting side by side to render the difficult and brutal badlands landscape and simultaneously study the rock formations and try to figure out how exactly this impressive land formation occurred. These experiences have afforded us new opportunities in the approach to our respective fields. The poster will exemplify the interdisciplinary approach taken by the BWG in our attempts to learn from each other and the land. It will discuss some of the artwork currently underway by the artists on the trip as well as touch on the research conducted by the geologists. It will also show how these seemingly different fields of study are much more closely related than most people expect.

Title: **Art and Geology: An Interdisciplinary Approach to Field Research in Badlands National Park, SD**

Author: Ben Bires*, Eric D. Charlton*, Eli Blasko, Vincent Rozzi, Patrick Burkhart, PhD, Katherine Mickle, MFA, Slippery Rock University
(*Student Presentation*)

Abstract: Slippery Rock University's art and geology professors, Ms. Katherine Mickle and Dr. Patrick Burkhart led a team of students on an interdisciplinary expedition to Badlands National Park in South Dakota. Both professors worked together in close collaboration with students to gain knowledge outside the traditional educational experience. Mickle and Burkhart push their pupils to challenge themselves outside of the classroom setting. This has led to a self-developed and commanding understanding of both geologic and artistic information. As artists, our two week expedition gave our team endless possibilities for learning about the landscape through the eyes of both an artistic and a scientific viewpoint. Multiple analyses of the Holocene landscape took a variety of artistic forms, including drawings, paintings, performance-based video and printmaking. The collection of data combined with the overall experience in a unique and challenging learning environment helped to promote artistic portfolios in addition to amplifying scientific research. This poster will reflect the integration of art and geology with an emphasis upon artistic efforts and conclusions. Artistic observations and realizations continue to help define the collaborative efforts of our educational team: the Badlands Working Group of 2011.

Title: **Ground Penetrating Radar Survey and Geologic History of Presque Isle**

Author: Adam Baldwin* and Eric Straffin, Ph.D., Department of Geosciences, Edinboro University of Pennsylvania
(*Student Presentation*)

Abstract: The purpose of this study is to develop a better understanding of the pre-historic geologic history of the prehistoric beach and dune ridges on the peninsula of Presque Isle. A MALA ground penetrating radar (GPR) unit with 250 MHz and 100 MHz antennae was employed to study four dune/beach ridge landforms, including one modern and three prehistoric systems. GPR profiles illustrate differences in beach and dune sand deposits (facies). Beach facies show strong lake-ward dipping reflectors, likely due to the presence of alternating, laminated quartzose and heavy mineral sands. Dune facies are characterized by more complex reflectors with a weaker signal than beach deposits. Dunes are composed of fine, predominantly quartzose sands, that overly coarser beach sand. Episodic spit migration and dune development resulted in several prominent dune ridges separated by low beach and wetland environments. When compared to the older dune facies, the modern beach facies shows much steeper angle beds, possibly due to changing depositional patterns caused by the anthropogenic influence on Presque Isle. Radargrams from the 250 MHz antennae image only the upper ~5m of sediment. Deeper imaging is achieved by using a 100 MHz antenna. Present methodology for this in-progress study includes transects of 250 MHz and 100 MHz antennae, oriented both parallel and perpendicular to dune crests to achieve a 3D display of dune and beach structure. Vibra-coring and hand-augering of prehistoric dune and beach environments permits detailed examination of sediments, calibration of GPR profiles, and interpretations of the geologic evolution of Presque Isle.

Title: **An Evaluation of the Feasibility of Composting on the Downtown Urban Campus of Gannon University**

Author: Jon Petrigac*, Rick Diz, Ph.D., Michelle Homan, Ph.D., Department of Environmental Science & Engineering, Gannon University
(*Student Presentation*)

Abstract: Composting is an old idea which can be dated back to the Roman times. Probably the best known person to start the idea of composting is a man by the name of George Washington Carver. Carver helped teach people about composting and how efficient and important it is for gardening. There are numerous composting methods; a few types are vegetable or food composting, paper composting, windrow composting and verma-composting. There are several ways to compost; bin, mound, wire and barrel systems. The experimental phase of this project will test and compare certain composting methods as well as systems to determine which is the most efficient and feasible for use on the downtown urban Gannon University campus. Specifically food composting, paper composting and verma-composting will be compared and various mixtures of wastes will be evaluated for composting efficiency. The physical management of the composting unit will also be evaluated. The study will be conducted indoors due to the academic time frame and the approaching winter conditions. Gannon University's food service, Metz Culinary Management, may play a vital role in the study by providing certain food

wastes. A small-scale community garden is located on campus, producing beans, green and hot peppers, squash, and tomatoes. The needs of this garden for compost will be used to size the preferred composting system once results are obtained.

Title: **Design of a Thermal Processing System to Convert Waste Organic Materials into Solid Fuel Pellets**

Author: Leanne Bennett*, Dean Smith*, Rick Diz, Ph.D., Department of Environmental Science and Engineering, Gannon University
(*Student Presentation*)

Abstract: The goal of this project is to design a prototype system for the production of a renewable fuel from a variety of organic wastes. The project involves participation from various disciplines: environmental engineering to evaluate the feedstocks and control air pollution, mechanical engineering to design the prototype system, and electrical & computer engineering to design and install a data acquisition system with telecommunications capability. The system will be constructed and operated at a recycling facility in the city of Erie in conjunction with the on-site recycling personnel. The system will use torrefaction, which is the thermal decomposition of organic material in an oxygen-free environment with the capture of generated off-gases. These off-gases are flammable, and can be used to provide the heat for the thermal reactor unit. Preliminary results indicate that greater than 80% of the mass remains after processing, and that the energy density of the material is nearly as high as bituminous coal. The phases of the project include documentation of the thermal decomposition of the selected organic wastes including grape pomace, horse manure, and waste dog food, including the heating value of the off-gases generated; determination of the energy density of the final product from these potential feedstocks in comparison to that of wood pellets and coal; determination of the performance efficiency of the prototype design based on pilot-testing in an actual recycling facility; and, a determination of the economics of operation based on the prototype operating experience.

Title: **Evaluation of Dairy Manure Digester Effluent for Use on the Farm as Fertilizer**

Author: Bret Terry*, Chris Daniels*, and Rick Diz, Ph.D., PE, Department of Environmental Science and Engineering, Gannon University
(*Student Presentation*)

Abstract: Fertilizers are used to enhance crop growth and output on farms whose soils lack nutrients. Dairy farms typically use manure to augment purchased chemical fertilizers. Spreading manure on the ground creates odor and water quality problems due to the coliform bacteria, nitrogen, and phosphorus that often leach into nearby streams. If manure is processed through a biogas generator, the liquid effluent could still be used as a fertilizer and the potential for bacterial and nutrient contamination of nearby streams might be reduced. We will analyze manure digester effluent from an experimental system on an actual dairy farm to determine its variability and usefulness as fertilizer for growing soy beans, alfalfa, clover, and hay. Temperature and photoperiod and light intensity will be controlled in the laboratory. Over the course of the study, the growth of the test crops will be compared to controls to determine the effect of the digester effluent on the plants and the coliform bacterial level in the effluent will be determined.

Title: **Engineering Pilot-Scale Two Stage Anaerobic Digester Utilizing Dairy Manure**

Author: Michael Show*, Harry Diz, PhD, PE, Hwidong Kim, PhD, PE, Department of Environmental Science and Engineering, Gannon University
(*Student Presentation*)

Abstract: Anaerobic digestion is a multistage process by which complex organics are broken down by a consortium of bacteria in anoxic conditions to produce a mixture of gases known as biogas. Anaerobic digestion (AD) has proven lucrative for dairy farms with more than 500 cows in the United States. On larger farms, the biogas runs a generator to produce electricity. The EPA and USDA claim AD of dairy waste reduces odors on farms, destroys harmful bacteria, and maintains nutritive value in effluent that can be applied to crops. However, the majority of dairy farms in Pennsylvania have less than 500-head. Without financial aid, small dairy farms cannot maximize their profits. Therefore, a pilot-scale digester was designed that incorporates innovative engineering design and was installed at the Lost Acres Farm in Conneautville, PA. Manure is in the free-stall barn to roughly 90 milking cows. A pretreatment process for the manure was developed to avoid introducing fibers into the two-stage sequential digester. Numerous technical challenges have been encountered during the trial; preliminary samples have indicated that 50-70% of the gas is methane. The concentration of solids and COD decrease as feed flows through the digester, indicating an active anaerobic microbial community. The experimental plan is to slowly increase the loading rate to determine the performance of the system design and to estimate flammable gas production as a function of organic loading.

Title: **Anaerobic Digester Design for Methane Production on the Lost Acres Dairy Farm**

Author: Stephanie Schwabenbauer*, Justan Studley*, Hwidong Kim, Ph.D., Rick Diz, Ph.D., Department of Environmental Science & Engineering, Gannon University
(*Student Presentation*)

Abstract: The purpose of this project is to protect water quality and produce renewable energy by designing an innovative anaerobic digester system for The Lost Acres Dairy Farm. The Lost Acres Dairy Farm has a herd size of approximately 200 head and currently manages its manure by storing it in a lagoon until it is needed to fertilize the fields. Designing a digester to accommodate the farm's herd will benefit the farm because they will still be able to use the waste manure as fertilizer, while also producing and capturing methane gas for energy use. Anaerobic digesters are currently economically challenging for the average family operated farm to construct and manage without government assistance. Our goal is to design a digester that can efficiently produce methane from a small herd size that will be able to pay for itself within a reasonable time frame. We have collected manure samples of varying solids content and are analyzing the samples for total solids and volatile solids in preparation for the Biochemical Methane Potential (BMP) assay. The BMP experiment will allow us to determine the expected methane production from the manure at the Lost Acres Dairy Farm, which will in turn allow us to design an appropriately sized anaerobic digester for the farm. Installing an anaerobic digester will allow the Lost Acres Dairy Farm to utilize the methane gas that would otherwise escape to the atmosphere as a source of renewable energy, therefore allowing the farm to increase its environmental sustainability.

Title: Feasibility of using Waste Grape Biomass as a Feedstock during Anaerobic Fermentation to Produce Biogas

Author: Laura Frischkorn*, Rick Diz, Ph.D., PE., Department of Environmental Science & Engineering, Gannon University
(*Student Presentation*)

Abstract: Biofuels have proven to be a reasonable and practical answer to help overcome environmental concerns that confront our society today. Some of these concerns include environmental pollution, energy insecurities, and an increased demand on fossil fuels. Biogas from anaerobic digestion can help ease our reliance on fossil fuels as well as contribute to the elimination of some wastes. A problem with using waste grape juice and pomace as a feedstock is that it is contaminated with yeast, which competes with bacteria for food, space and produces only carbon dioxide. The goal of this study was to control the growth of yeast during anaerobic digestion, resulting in enhanced biogas production. Both batch and continuous flow studies were conducted to evaluate various pretreatment strategies. In the lab-scale anaerobic digester, operational conditions such as pH were explored to estimate gas production potential. It was determined that the best way to control the growth of yeast was to pre-filter the waste grape juice. The organic loading rate of the system was 1,000 mg/day COD. The average COD removal efficiency was $47\% \pm 5\%$ (2,331 mg/L \pm 264 mg/L COD removed). The methane production yield was calculated to be 243 mL CH₄/g COD-added, or about 500 mL methane produced per gram of COD consumed, with an average hydraulic retention time of 16 days. The experimental results indicated that it is feasible to operate a lab-scale anaerobic digester fed with waste grape juice to produce methane-rich biogas.

Title: Evaluation of the Bioremediation Potential of Organoclay for the use with Diesel Fuel and Motor Oil

Author: Lauren O'Hara*, Vitaly Bonkun*, Rick Diz, Ph.D., Department of Environmental Science and Engineering, Gannon University
(*Student Presentation*)

Abstract: Petroleum Remediation Product (PRP) is a commercial product manufactured by the Green Stream Solutions Company. PRP is an organoclay compound that the company claims to have high potential for remediation of petroleum spills. Potential sources of petroleum spills in the Erie area are from diesel fuel and motor oil, both along our highways and along our shoreline. The goal is to document the efficiency of the organoclay product at different concentration in the following mediums: soil, sand, and water at varying temperatures. To obtain the data, variables and controls will be created and then sampled once a week for a period of one month. Samples will be tested for Total Petroleum Hydrocarbons (THP), using the EPA's standard procedure for THP. The data will be analyzed to compare the degradation of the petroleum products in the samples containing the organoclay compound to the control groups. The data generated will be used to verify the performance and economic value of the organoclay product for use as a remediation strategy with diesel fuel and motor oil spills.

Title: **Researching High Efficiency Algae Production Through Aeroponic Algal Culture**

Author: Lucas McConnell*, and Eric Karrfalt, Ph.D., Renewergy Corporation

Abstract: The essence of aeroponic algal culture (AAC) technology is the growing of algae on a wet substrate. The substrate is sprayed with just enough nutrient laden wastewater to maintain a film flowing over the algal cells. The substrate material may be sheets or panels of some durable synthetic material sized, spaced, and hung so as to allow sufficient light to reach all of the substrate surface. It is highly translucent so that light can reach the algal cells from either side of the growth surface. The three greatest advantages of aeroponic algal culture in regards to algae production concern light, carbon, and harvesting. As noted above, light can be optimally distributed to the growing cells simply by the structural design of the growth surfaces. In any aquatic environment, open ponds or closed photobioreactors, when all other conditions are favorable and growth is rapid, carbon becomes limiting because of the low solubility of carbon dioxide and its extremely slow rate of diffusion in water. Supplying additional carbon in an aquatic environment is difficult and energetically costly. The physics are much more favorable for the supplying of optimal carbon to the growing algal cells in aeroponic algal culture. The wastewater treatment facility in Erie, Pennsylvania processed 12 billion gallons of water in 2010. It used \$380,000 worth of ferric chloride to remove phosphorus. An aeroponic system could recover about 130 metric tons of phosphorus, use no ferric chloride, and produce about 13,800 metric tons of biomass which could be utilized in various ways.

Title: **Integrated Aquaculture Agriculture (IAA) Waste Management for Sustainable Development**

Author: Erin Cavagnero* and Thomas Eatmon, Ph.D., Allegheny College
(*Student Presentation*)

Abstract: Bosanska Krupa, Bosnia and Herzegovina is a town that suffered severe environmental, economic, and social destruction during the war of the 1990s. Recently a fish hatchery was constructed to increase biodiversity in local waterways, create jobs for injured war veterans, and to augment the local economy by promoting ecotourism and fishing. A Recirculating Aquaculture System (RAS) was employed that has increased the efficiency of water consumption. The RAS however is an energy intensive process that releases concentrated waste to the local watershed. We examined potential waste management strategies using aquaponic systems. The objective of the study was to construct a pilot-scale conveyor production system (CPS), and to collect data demonstrating its potential to remove nitrates while also producing Romaine lettuce.

Title: **Possible Mutualistic Relationship Between Japanese Knotweed and European Fire Ant**

Author: Jessica Wooten*, Tom Caggianelli, Jonathan Titus, Ph.D., State University of New York – Fredonia, Biology Department
(*Student Presentation*)

Abstract: Japanese Knotweed, *Fallopia japonica*, is an invasive herbaceous perennial first introduced to North America in the late 1800's. *F. japonica* outcompetes native species and threatens biodiversity through the formation of thick dense colonies and rhizomatous root systems. Despite these detrimental factors associated with *F. japonica*, little is known about possible symbiotic relationships associated with this species. The European fire ant, *Myrmica rubra*, has been identified crawling around the stem and leaves of *F. japonica*, however no studies have examined why these ants are present. *M. rubra* is an aggressive ant known to protect colonies during periods of disturbances. This potential myrmecophytic relationship can be possible by the contribution of nectar to the ants by extrafloral nectaries located on the stalks of *F. japonica* while *M. rubra* can protect the plant from herbivory. Examination of a possible relationship between these two species will take place in field studies along the riparian zone of Canadaway Creek in Fredonia, NY. Disturbances that will be used include rustling of leaves and stems to mimic vibration, a wire brush on leaves to mimic herbivory, and gluing a Japanese beetle, *Popillia japonica*, to *F. japonica* to stimulate an invasion. Investigation of the behaviors associated with *M. rubra* after those disturbances will aid in understanding the relationship it has with *F. japonica*.

Title: **Old Growth in the East? Forest Structure in Western new York Swamps**

Author: Jonathan Titus, Ph.D., Biology Department, State University of New York – Fredonia

Abstract: Trees in 20 900m² plots at four wetland sites (Elm Flats, Bonita Swamp, Frog Valley and Bentley) were identified and measured. At Elm Flats trees exhibited a hump-shaped basal area distribution with a high proportion of shade tolerant trees in the larger size classes. This is indicative of a forest that has been subjected to limited anthropomorphic disturbance and possibly retains some old growth characteristics. Trees at the other three sites exhibited characteristics indicative of a successional forest. This study is part of a project to assess forest response to the Emerald Ash Borer.

Title: **Preliminary observations of sand dune-obligate spider *Geolycosa wright* on Presque Isle State Park**

Author: Adam Hoke* and Matthew Foradori, Ph.D., Edinboro University of Pennsylvania
(*Student Presentation*)

Abstract: *Geolycosa wrighti* is a sand dune-obligate spider currently inhabiting Presque Isle State Park. Although most wolf spiders are ambulatory in nature, *G. wrighti* spends most of its life in a burrow excavated from a sand substrate and reinforced with silk. *G. wrighti* is found sporadically in its range, exclusively in sandy environments along the Great Lakes from the eastern end of Lake Erie near Buffalo to Chicago, south to the middle of Illinois. *G. wrighti* is a rare spider species; several conservationists have suggested that it should

be categorized as threatened or even endangered. Learning about *G. wrighti* on Presque Isle State Park could eventually lead to long term conservation strategies to protect these rare spiders. Preliminary observations on behavior and density of *G. wright* were performed weekly on an established plot from May to October 2011. These observations included visible activity around each individual burrow, feeding behavior, and rearing of young. The data collected will help us understand more about these secretive spiders, including relocation tendencies and frequency.

Title: **An Evaluation of the Relationship between Quantitative Stream Habitat Classifications and Corresponding Fishery Health Data: Does EPA's Visual-based Habitat Assessment Protocol Adequately Predict the Health of a Fish Community?**

Author: Jake Lybrook*, Rick Diz, Ph.D., Department of Environmental Science & Engineering; Greg Andraso, Ph.D., Department of Biology, Gannon University
(*Student Presentation*)

Abstract: The goal of this project was to assess the validity of *Chapter 5: Habitat Assessment and Physicochemical Parameters* of the EPA's Rapid Bioassessment Protocol in Pennsylvania Lake Erie streams as a predictor of the health of the fish community. This visual stream assessment uses parameters such as embeddedness, sediment deposition, frequency of riffles, channel alteration etc., to assess habitat quality. It is hypothesized that high habitat scores are related to greater fish diversity. However, many Pennsylvania streams that drain into Lake Erie have shale bedrock as the primary substrate, greatly reducing the potential for suitable fish habitat. Issues such as this create a need to explore the existing visual-based protocol, and determine whether or not certain parameters should be weighted or modified to accommodate unique stream types for certain regions. For the purposes of this study, habitat data collected in 2010 from individual sites along streams in the Pennsylvania Lake Erie watershed will be compared to fishery data collected for the same sites in 2011. All fish will be collected using electrofishing equipment, counted and identified on site or in a lab if needed. After data collection is complete, all data will be analyzed using statistical tests to see if any relationships exist. Based on the results of this analysis, suggestions may be made to either improve or sustain the use of the existing EPA protocol.

Title: **The Stages and Rate of Salamander Forelimb Regeneration: Establishing a Timeline**

Author: Cathrine Youngs* and Lisa Whitenack, Allegheny College
(*Student Presentation*)

Abstract: Regeneration presents science with both an enormous challenge and endless possibilities. Among vertebrates, only salamanders have retained impressive regenerative abilities. Salamanders can regenerate their limbs, tail, jaw, and portions of their eyes, heart, brain, and spinal cord (Zukor et al., 2010). In contrast, humans have the ability to regenerate the tips of their fingers (if they are under the age of ten), and parts of their ribs and livers (Illingworth, 1974). To gain a better understand of regeneration, I will be studying the effects of limb regeneration on locomotor performance in aquatic versus terrestrial salamanders. Rates of limb regeneration have only been studied in a few species, and vary from 30 days to 7 months (Young et al, 1983). Therefore, in advance, I have

completed a preliminary study of the stages and rate of five representative species of three different families of salamanders to regenerate. My central objective was to determine and verify the length of time it takes these salamanders to completely regenerate their right forelimb. I hypothesized that the terrestrial pelthodontid species would be more successful in regenerating an exact replica of their original limbs due to their reliance on their limbs (Iten and Bryant, 1973; D'Aout and Aerts, 1997). However, I discovered that the aquatic axolotl regenerated the fastest and the most proficient. At the conclusion of the experiment, all of the salamanders had reached the level of fingers/finger buds in 78 days, or 2.7 months, a timeframe I can work with for future studies.

Title: Channelization Impacts on Sabine Map Turtle Habitat in the Mermentau River, Louisiana: Use of Cut-offs vs. Original Channels

Author: Carissa A. Hartson*, Olivia S. Zaleski, Emily L. Ilgen, and Peter V. Lindeman, Edinboro University of Pennsylvania
(*Student Presentation*)

Abstract: Sabine map turtles (*Graptemys sabinensis*) occur in the Sabine, Calcasieu, and Mermentau rivers. Between 1915 and 1935, the upper Mermentau and its major tributaries were straightened, deepened, and cleared of vegetation. In the 1970's, the upper Mermentau was altered again by construction of seven cut-offs between Lake Arthur and the town of Mermentau. There are also several cut-offs on the river's largest tributary, Bayou Plaquemine Brule. The new channels created potential habitat for the Sabine map turtle. In May 2011, we conducted visual surveys of basking turtles from a jonboat to determine if the new channels are used to the same extent as original channels. We compared basking numbers and basking densities (turtles per km) of original channels and new channels on lower Plaquemine Brule and the Mermentau and compared basking density of the island bank to the mainland bank on original channels of the Mermentau. Original channels had nonsignificantly higher numbers of basking turtles than new channels, but there were significantly more Sabine map turtles per kilometer (higher densities) on new channels than original channels. Dredging created a bypass for excess water on the river, allowing higher flow on the new channel, which is preferred by map turtles. There was no significant difference in Sabine map turtle density between inner and outer banks of Mermentau original channels, presumably because dredging made the depths along the inner and outer banks similar. New channels divert the flow of water, which may maintain the homogenized condition of the original channels.

Title: The Cause of Body Mass Increase in the Eastern Coyote

Author: Stephanie Wood* and Frederick Brenner, Ph.D., Hopeman School of Science, Engineering & Mathematics – Biology, Grove City College
(*Student Presentation*)

Abstract: The eastern coyote (*Canis latrans*) continues to expand in eastern North America. The purpose of this research is to explore the potential genetic factors in different populations of this species. Specimens were collected from various regions of Pennsylvania and frozen. Using primers designed from published genomic sequences of the western coyote, a 350 base pair mtDNA segment of the D-loop region of an eastern coyote was compared to the published GenBank sequences from a western coyote. This 350 base pair sequence

matched the published region of the western coyote, but other primers designed from the western coyote genome did not yield successful result suggesting that the genome of the eastern coyote differs in these regions. Additional primers were designed from mitochondrial D-Loop regions of Spanish Grey Wolf (*Canis lupus*) and Canada Grey Wolf (*Canis lycaon*). There was a 96% homology between the Spanish Grey Wolf and a 99% homology between the Canada Grey Wolf and the western coyote, respectively. It has been speculated that the Canada Grey Wolf and the Red Wolf (*Canis rufus*) both may have contributed genetic material to the eastern coyote. Some of these primers have been tested successfully and have produced another 200 base pair mtDNA segment of the eastern coyote 's mitochondrial D-Loop; this has resulted in a current segment of the eastern coyote's mtDNA D-loop of approximately 550 base pairs – slightly over half of the estimated total. The remaining primers are being tested and results are not yet known.

Biography on Presenters

Aeppli, Robert

Biological Technician, Purple Martin Conservation Association (PMCA) at the Tom Ridge Environmental Center. The PMCA is dedicated to the conservation of Purple Martins (*Progne subis*) through scientific research, state of the art management techniques, and public education, with the end goal of increasing martin populations throughout North America.

Andraso, Greg, PhD

Dr. Andraso is an Associate Biology Professor at Gannon University in the College of Science, Engineering and Health Sciences. His research interests include the predator/prey dynamics and the evolution of defensive behavior and morphology of fish.

Andresky, Lisa

Undergraduate student at Slippery Rock University working in Dr. Burkhardt's lab.

Baldwin, Adam

Student at Edinboro University working in Dr. Straffin's lab.

Bennett, Leanne

Undergraduate student at Gannon University working in Dr. Diz's lab.

Bhatta, Prakash

Undergraduate student at Mercyhurst College working in Dr. Campbell's lab.

Bires, Ben

Undergraduate student at Slippery Rock University working in Dr. Burkhardt's lab.

Blank, Noelle

Undergraduate student at Gannon University working in Dr. Andraso's lab.

Bovkun, Vitaliy

Undergraduate student at Gannon University working in Dr. Diz's lab.

Bradshaw-Wilson, Casey

Ph.D. student at Penn State University working in Dr. Jay Stauffer's lab.

Brenner, Frederic, PhD

Dr. Brenner is a Professor at Grove City College in the Department of Biology.

Burkhart, Patrick, PhD

Dr. Burkhart is a Professor at Slippery Rock University with research interests in hydrogeology.

Campbell, Brianne

Undergraduate student at Penn State Behrend.

Campbell, Michael, PhD

Dr. Campbell is the Associate Dean and Professor of Biology at Mercyhurst College in the Department of Biology. His research interests lie in aquatic, climate change, invasive species and soil ecology.

Cavagnero, Erin

Undergraduate student at Allegheny College working under Dr. Eatmon.

Charlton, Eric

Undergraduate student at Slippery Rock University working in Dr. Burkhart's lab.

Chronister, Joel

Undergraduate student at California University of Pennsylvania in Dr. Whyte's lab.

Covert, Jerry, PhD

Dr. Covert is the past executive director of the Regional Science Consortium and retired microbiology professor at Penn State University. He has recently worked on qPCR and IMS/ATP for the Regional Science Consortium.

Cowles, James

Undergraduate student at Gannon University working in Dr. Andraso's lab.

Crowe, Robert

Undergraduate student at Mercyhurst College working in Dr. Campbell's lab.

Eatmon, Thomas, PhD

Dr. Eatmon is an assistant professor of biology at Allegheny College in the department of Environmental Sciences.

Fetterly, Gerald, PhD

Dr. Fetterly is the Director of PK/PD Core Facility at Roswell Park Cancer Institute. Specifically, his doctoral work and subsequent publications focused on an extensive comparison of the PK/PD relationships of various anticancer drugs, such as liposomal paclitaxel, trabectedin, and mTOR inhibitors.

Fondriest, Steve

Steve is the President of Fondriest Environmental. Located in the Lower Great Lakes and Ohio River Valley region, Fondriest Environmental sells and services environmental monitoring products from industry leading suppliers.

Frischkorn, Laura

Undergraduate student at Gannon University working in Dr. Diz's lab.

Ganger, Mike, PhD

Dr. Ganger is an Associate Biology Professor at Gannon University in the Morosky College of Health Professions and Sciences. His research interests lie in reproductive ecology of plants and flora of northwestern Pennsylvania.

Gowen, Shannon

Undergraduate student at State University of New York, Fredonia.

Grazio, Jim

Aquatic biologist at the PA Department of Environmental Protection, Office of the Great Lakes at the Tom Ridge Environmental Center.

Grise, Sara

Graduate student at Shippensburg University and coastal outreach specialist for Pennsylvania Sea Grant.

Hanson, William

PhD Candidate at Penn State University working in Dr. Stauffer's lab.

Hartson, Carissa

Graduate student at Edinboro University working under Dr. Lindeman.

Hessel, Anthony

Undergraduate student at Allegheny College working with Dr. Whitenack.

Ilgen, Emily

Student at Edinboro University working in Dr. Lindeman's lab.

Kaczmarek, Karla

Coastal outreach specialist at Pennsylvania Sea Grant.

Kapoor, Shuchi

Graduate student at Lake Erie College of Osteopathic Medicine working with Dr. Keller.

Keller, Christopher, PhD

Dr. Keller is an assistant professor of Microbiology and Immunology at Lake Erie College of Osteopathic Medicine. He is also the Director of Microbiology and Immunology.

Klarer, David, PhD

Dr. Klarer is the Research Coordinator at Old Woman Creek State Nature Preserve and National Estuarine Research Reserve, Ohio Department of Natural Resources in Huron, Ohio. His research interests lie in phycology.

Lindeman, Peter, PhD

Dr. Lindeman is a professor at Edinboro University. His research interests lie in herpetology, specifically map turtles.

Lybrook, Jake

Graduate student at Gannon University working under Dr. Diz and Dr. Andraso.

Mauro, Steve, PhD

Dr. Mauro is an Associate Biology Professor at Mercyhurst College in the Department of Biology. His research interests lie in microbial ecology, virology and environmental protection.

Martz, Marti

Coastal outreach specialist at Pennsylvania Sea Grant.

McConnell, Lucas

President of Renewergy Corporation whose primary goal is using an approach to growing algae is known as *Aeroponic Algal Culture*. It provides an efficient, controlled growing environment that combines pollution mitigation with biomass production.

McMahan, Ted

Undergraduate student at Gannon University working in Dr. Diz's lab.

Mickle, Katherine, MFA

Assistant professor of Art at Slippery Rock University.

Miller, Ryan

Ryan works at the Pennsylvania Natural Heritage Program in the Western Pennsylvania Conservancy.

Ochai, Niailah

Student at Lake Erie College of Osteopathic Medicine working with Dr. Keller and Dr. Carty.

O'Hara, Lauren

Undergraduate student at Gannon University working in Dr. Diz's lab.

Petrigac, Jon

Undergraduate student at Gannon University working in Dr. Diz's lab.

Phiri, Titus

Graduate student at Penn State University working in Dr. Stauffer's lab.

Prey, Joshua

Graduate student at Roswell Park Cancer Institute working with Dr. Fetterly.

Rafferty, Sean

Coastal outreach specialist working for Pennsylvania Sea Grant.

Ropski, Steven, PhD

Dr. Ropski is a Biology Professor at Gannon University in the College of Science, Engineering and Health Sciences. His research interests lie in the hibernation and behavior of small mammals, ecology of wetlands, and ecology of Yellowstone National Park.

Rutter, Michael, PhD

Consultant from Rutter Statistical Consulting, specializing environmental and fisheries data.

Ryan, David

Graduate student at Penn State University working in Dr. Stauffer's lab.

Sargent, Sarah

Avian Biologist with the Audubon Pennsylvania whose mission is to promote the conservation and protection of wildlife, plants, soil, and water in relation to human activity.

Schiff, Nicholas

Undergraduate student at Mercyhurst College working in Dr. Mauro's lab.

Schnars, Jeanette, PhD

Dr. Schnars is the Director of Regional Science Consortium at Presque Isle. The Regional Science Consortium is a collaborative, non-profit organization that focuses on and coordinates educational and research projects for Lake Erie and the upper Ohio River Basin. Her research interests lie in ecotoxicology, herpetology and fisheries studies.

Schwabenbauer, Stephanie

Undergraduate student at Gannon University working in Dr. Diz's lab.

Seltzer, Jedediah

Undergraduate student at Grove City College working under Dr. Brenner.

Show, Michael

Undergraduate student at Gannon University working in Dr. Diz's lab.

Spacht, Drew

Undergraduate student at Mercyhurst College working in Dr. Mauro's lab.

Stauffer, Jay, PhD

Dr. Stauffer is a Distinguished Professor of Ichthyology at Penn State University in the School of Forest Resources. His research interests lie in endangered fishes; freshwater fish behavior; impact of introduced fishes; systematics and zoogeography of freshwater fishes.

Straffin, Eric, PhD

Dr. Straffin is a Professor at Edinboro University in the Department of Geosciences.

Stevens, James

Undergraduate student at Slippery Rock University working in Dr. Burkhart's lab.

Stull, David

Lab technician at the Regional Science Consortium working with the bacteria *E.coli*.

Terry, Bret

Undergraduate student at Gannon University working in Dr. Diz's lab.

Titus, Jonathan, PhD

Dr. Titus is an Associate Professor of Biology at State University of New York at Fredonia in the Department of Biology. He focuses on teaching courses in plant biology.

Tucker, Samantha

Undergraduate student at Allegheny College working in Dr. Webb's lab.

Vagula, Mary, PhD

Dr. Vagula is an Assistant Professor of Biology at Gannon University in the Morosky College of Health Professions and Sciences. Her research interests lie in xenobiotic toxicity studies in mammals and identification of defense mechanisms against these substances.

Vartak, Marissa

Undergraduate student at Gannon University working in Dr. Vagula's lab.

Webb, Kristen, PhD

Dr. Webb is an assistant professor at Allegheny College.

Wood, Stephanie

Undergraduate student at Grove City College working under Dr. Brenner.

Wooten, Jessica

Student at State University of New York at Fredonia working under Dr. Titus.

Whitenack, Lisa, PhD

Dr. Whitenack is a visiting professor at Allegheny College.

Whyte, Robert, PhD

Dr. Whyte is an Associate Professor of Biology at California University of Pennsylvania in the Department of Biological and Environmental Sciences. His research interests lie in the impacts of *Phragmites* on wetland systems and organisms.

Wunderley, Michelle

Graduate student at Point Park University.

Youngs, Cathrine

Undergraduate student at Allegheny College .

Zimmerman, Ephraim

Works at the Pennsylvania Natural Heritage Program in the Western Pennsylvania Conservancy.

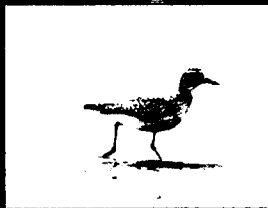
Web Site; Natural History Collection at

Tom Ridge Environmental Center

Presque Isle State Park

<http://dynamicdunes.bd.psu.edu>

Dynamic Dunes



Natural History Museum At The Tom Ridge Environmental Center

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Welcome to Dynamic Dunes

Web site for The Natural History Museum at the Tom Ridge Environmental Center (TREC)

Our focus is on specimens collected primarily from northwest Pennsylvania with an emphasis on Presque Isle.

The collections provide a resource for scientific studies about the ecology of the region, and are available for loan by qualified research and educational programs.

Our facility is primarily staffed by volunteers

Web site best viewed with:

- 🖥️ Internet Explorer 7 and above
- 🦊 Mozilla Firefox 3.0 and above
- 📏 Screen resolution of 1024x768 or higher

PETRA RESTAURANT



Chef Kal Darres

APPETIZERS

Raspberry Almond
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Eggplant Napoleon

ENTREES

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Veal Chop Neffertiti
Chicken
Mediterranean
Couscous Marrakech
Lobster Shrimp Ravioli
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Salmon
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Penne

DESSERTS

Baklava
Coconut Rice Pudding
Bananas Foster Crepe
Peanut Butter Pie

Serving Dinner
Monday thru Saturday
from 4 pm.

Ancient Bounty

Named for an ancient city in a distant homeland, Petra Restaurant is Kal Darres' culinary connection to Jordan. The Eastern Mediterranean region is as famous for hospitality as it is for piquant and delightful food. Both are available in abundance at Petra. Nothing in the upscale yet understated dining room can prepare you for the explosion of flavors in Petra's cuisine. The secret to the restaurant's success is in the spices. Most of the spices come right from Jordan at the open-air spice shop – which explains why each dish served at Petra is fresh and authentic. Petra's recently acquired liquor license and new fully-stocked bar provides the perfect accompaniment to your meal. Start with Fatayer, puff pastry dough stuffed with either three cheeses or filled with filet mignon, onions & pistachios. Try the Mediterranean Chicken, strips of boneless chicken pan sauteed finished with cream served atop penne pasta. And for the more adventurous – the Middle Eastern Platter has a little bit of everything ... hummus, baba ganoush, fatoush, tabouli, ouzzi and cheese fatayer – a perfect introduction to this type of cuisine. The Kabobs are marvelous, in whatever form: soft-as-butter beef tenderloin; fragrant lamb; shrimp & scallop or vegetable. The entire menu is low-fat and built on fresh ingredients ... so that means you can go ahead and indulge ... have dessert!

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814.838.7197 petrarestaurant.com