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**ACF 2013 July - September Presentations**

**Baisch, David**

July - September FY13

142nd Annual Meeting of the American Fisheries Society

"Origin of Great Lakes Brown Trout, Salmo trutta: A Phylogeographic Analysis Using mtDNA Sequence Variation"

The brown trout, Salmo trutta, was first introduced to the Laurentian Great Lakes in 1887 from European broodstocks to found a recreational salmonid fishery; however, the origins of these progenitor lineages remain largely unknown. The objective of this study was to determine the European lineages of brown trout found in the Great Lakes. We analyzed 125 brown trout from ten watersheds across Michigan and Wisconsin and identified their strain assignment using eight mtDNA ND-1 sequences. European progenitor lineages occurring within these strain assignments were then identified using the first 309 base pairs of the mtDNA control region. We identified seven ND-1 haplotypes in the 71 trout sampled and a total of three different European lineages were identified by 4 SNPs in the mtDNA control region. Fisheries managers can use this information to make informed stocking decisions by stocking strains whose associated lineages are better adapted to Michigan streams.

**Betz, Jordyn**

July - September FY13

Biennial Conference on Chemical Education (BCCE) 2012

"The role of textbooks: does the course content or faculty member matter?"

The role of the textbook in college chemistry courses can be evaluated from two perspectives: How do students use the chemistry textbook and how do chemistry professors integrate the textbook into the course? It is also reasonable to think that the role played by the textbook might differ because of the course content. To determine the role the textbook played for faculty and students in general chemistry and organic chemistry, a semi-structured interview protocol was developed and refined by both researchers. Faculty were interviewed by one researcher and students by the other. Each group of interviews, faculty or student, were analyzed and themes emerged. A set of common themes were identified and used to analyze the pooled data. Similarities and differences between faculty and students perceptions of the role of the textbook and the role of the textbook in different courses have been identified. It is hoped that these results will help faculty determine if the money you spent on textbooks is worth the investment.

**Cusick, Jeremy**

July - September FY13

Biennial Conference on Chemical Education (BCCE) 2012

"Why don't fish die in the winter? Using 3D magnetic models to visualize particulate level arrangements of water"

A robust understanding of the particulate level allows students to understand the chemistry they are doing rather than rely on algorithmic problem solving. This activity uses magnetic water models to help students see and feel the effect of hydrogen bonds on the way water interacts at the particulate level. Students can feel the attraction between the water molecules and see the differences in spacing and density for the different states of matter. By incorporating other magnetic ions and nonmagnetic covalent compounds students can also observe the effects of temperature on solubility of different types of compounds. With proper facilitation students can then apply their knowledge to different properties of water and their effects on lakes and fish. This presentation will include facilitation tips to assist implementation, sample student responses, and teacher reflections on the activity.

**Esch, Michael**

July - September FY13

Mathfest 2012

Some Applications of Bifurcations in Chemistry, Biology and Engineering

The mathematical concept of bifurcations has widespread applications in Engineering and the applied sciences such as Chemistry and Biology. It is especially useful in predicting how dynamical systems which commonly arise in real-life applications evolve with time. In this talk, we perform an in-depth analysis of the mathematical concepts behind some common applications of bifurcations in Chemistry, Biology and Engineering. In particular, we apply analytical techniques such as linearized stability analysis of equilibrium points and geometrical techniques where such analytical techniques fail to understand why the real-life outcomes of such applications appear as they do.

**Hamilton, Lacey**

July - September FY13

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**Harris, Brandon**

July - September FY13

142nd Annual Meeting of the American Fisheries Society

Evaluating Removal and Mark-Recapture Methods for Estimating Abundance of a Small, Non-Game Fish.

Unbiased estimates of stream fish abundance are critical for sound fisheries management. Most studies investigating the bias associated with estimates of stream fish abundance focus on salmonines, yet non-game fishes often comprise a major portion of many stream fish assemblages. We evaluated mark-recapture (i.e., Lincoln-Peterson model with Chapman correction) and removal methods (i.e., models Mb and Mbh) for estimating the abundance of mottled sculpin (Cottus bairdii), a common non-game fish. Specific objectives were to: (1) compare estimates of mottled sculpin abundance, (2) assess bias of removal methods by comparing estimated abundance to known abundance, and (3) evaluate closed-population model assumption. We sampled eight streams via backpack electrofishing; each stream was sampled over 2-days. On day one, fish were batch marked in three sections of a 90-m reach. On day two, fish were captured and temporarily removed from the stream during four electrofishing passes; the number and marking status of fish was recorded during each pass. Removal abundance estimates generated with program CAPTURE were significantly lower (range=22-58%) than mark-recapture estimates. Moreover, the removal method underestimated (range=38-59%) known abundances of marked mottled sculpins. Movement of marked fish was minimal among sections of the 90-m reach in all but one study stream. Survival and mark retention of mottled sculpin after capture was 100% for fish retained overnight in stream enclosures (n=405 fish). Our results suggest the closed-population assumption was valid in most streams and the removal method yielded negatively biased abundance estimates. Consequently, we recommend using mark-recapture methods to estimate abundance of small, non-game fishes.

**Harvey, Amanda**

July - September FY13

13th Annual Lily Conference of College and University Teaching

"The Project: Renewing Michigan - One Student at a Time"

In meeting GVSU's goal of supporting service learning, an interdisciplinary team composed of students and faculty, known as The Project, was formed. Utilizing a common passion for civic engagement, the team promotes the development of marketable skill sets for students towards public service. By linking critical thinking with action learning, The Project provides a vehicle whereby students are given the opportunity to design, implement, and sustain endeavors leading to jobs within Michigan.

**Homola, Jared**

July - September FY13

142nd Annual Meeting of the American Fisheries Society

"Environmental and Fish Community Influences on Presence of a Microsporidian Parasite in Mottled Sculpin"

Disease can play a critical role in structuring fish population, although little is known about the factors that influence the spatial distribution of disease in aquatic ecosystems. Knowledge of these complex ecological processes could enhance population risk-assessment capabilities and improve forecasting the spread of infectious disease. Mottled sculpin and the microsporidian parasite Glugea spp. provide an ideal host-parasite system for investigating patterns of disease spatial distribution due to the host species broad range and high abundance, as well as the parasites dichotomous nature of either high prevalence or near complete absence. We evaluated fish community composition and 15 environmental variables in 5 streams with infected mottled sculpin populations and 7 streams without infection. Presence of the parasite was not significantly related to any of the measured environmental variables, although water temperature appeared positively correlated with likelihood of infection. Within-basin land use showed no relationship with disease prevalence. A marginally significant difference exists among the fish communities in infected and uninfected streams, further supporting the importance of water temperature in determining disease presence. Additionally, mottled sculpin were observed to have lower densities and relative abundances in infected streams, suggesting a potential host population abundance regulation role for the parasite.

**Hotchkiss, Brooke**

July - September FY13

13th Annual Lily Conference of College and University Teaching

"Undergraduate Grantwriting: Fostering the Sustainability of Civic Engagement"

Colleges and universities prepare students for excellence in their chosen career paths. Students who have participated in hands-on learning experiences are better equipped to handle the responsibilities of employment and civic engagement in the future. Grantwriting courses provide students with applicable skills that enhance their marketability to organizations because they are capable of generating revenue. As such, grantwriting is a valuable skill that provides benefits for students, as well as the communities in which they live.

**Hoxworth, Aaron**

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**LeaTrea, Matthew**

July - September FY13

Biennial Conference on Chemical Education (BCCE) 2012

"Inquiry into nuclear decay"

Nuclear chemistry is a topic rarely covered in high school chemistry classes, yet in today's society it is a topic of interest to many students. Furthermore, given the increased concerns concerning nuclear processes, it is arguably an important topic with respect to generating a general population able to make informed decisions about such issues. This activity uses a combination lab stations, online simulations, and demonstrations to help high school students gain an understanding of nuclear decay. By experimenting with safe exposure levels of sealed sources to determine the effects of shielding and distance on radioactive exposure and observing decay particles in a cloud chamber to experimentally determine the half-life of an isotope students gain valuable experience with radioactive decay. They then use computer simulations to better understand alpha decay, beta decay, and nuclear fission. A description of each lab station, suggestions for facilitation, and sample student outcomes will be presented.

**O'Neil, Mary**

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**Perry, Jessica**

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**Quackenbush, Erin**

July - September FY13

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**Ragan, Douglas**

July - September FY13

Biennial Conference on Chemical Education (BCCE) 2012

"Where's my salt: A guided inquiry activity looking at dissolving of ionic compounds"

Research indicates that students have several misconceptions associated with the dissolving of ionic compounds in water. Additionally, even after instruction, most students have difficulty providing a correct particulate level description of what happens when an ionic compound dissolves in water. This activity, created as part of the Target Inquiry Program at Grand Valley State University, addresses misconceptions by identifying students initial ideas about what happens when a salt dissolves, challenging these ideas by comparing these ideas with particulate animations of NaCl dissolving in water, and testing their revised understanding with an additional interactive simulation. The guiding questions in this activity are designed to focus students on the role of the solvent in the dissolving process and the difference between the makeup of atoms and ions of the same element. This presentation will include an overview of the activity, sample student data, and facilitation tips.

**Schoenborn, Ryan**

July - September FY13

Biennial Conference on Chemical Education (BCCE) 2012

"A Very Cool Investigation: A Guided Inquiry Lab"

High school chemistry students often struggle with concepts related to thermochemistry and enthalpy. The misconceptions related to heat and temperature are well documented. This lab, developed as part of the Target Inquiry Program at Grand Valley State University, requires students to use thermochemistry to determine how many disposable ice bags are required to induce therapeutic hypothermia for an accident victim. Using a guided inquiry format, this lab helps students understand the difference between heat and temperature as they investigate the concept of enthalpy of dissolution. Facilitation tips and sample student data will be provided.

**Simon, Kristen**

July - September FY13

Biennial Conference on Chemical Education (BCCE) 2012

"The Role of the Textbook for Students in Organic and Analytical Chemistry"

This study is to observe and analyze how undergraduate chemistry students use their textbooks to study and learn chemistry. This work seeks to identify fundamentally different ways students interact with the text. Seventeen in-depth interviews with second and third year organic and analytical chemistry students were conducted to identify the role the text plays in student learning of chemistry. After analyzing these interviews it is clear that the instructors actions affect students textbook usage. The book is seen mostly as a backup to their professor and as a source of problems for the student. We believe we have found the various roles for the text and that we can soon begin work on a questionnaire that will measure how the students use their textbooks as they study and learn chemistry. This poster will present our analysis of the interviews and our in-depth findings of how the students view the roles of their textbook.

**Swanson, Neal**

July - September FY13

142nd Annual Meeting of the American Fisheries Society

"Juvenile Steelhead in the Muskegon River: Analysis of Larval Drift and Juvenile Diet"

Steelhead (Onchorhynchus mykiss) are an important component of the Lake Michigan ecosystem and provide an important regional fishery. Steelhead populations are heavily supplemented with hatchery stocks due to low production in many coastal Michigan streams. Understanding the early life history is critical to improving wild fish populations. During spring 2010 and 2011 maximum larval steelhead drift varied from 0.259/m3 to 0.045/m3 respectively, with peak drift between May 31 and June 7. The total estimated numbers of larvae drifting during the two sample periods were higher for 2010 than 2011. Physical factors, particularly discharge, may account for some of the variation between years. During summer 2011, juvenile diets were dominated by hydropsychids, baetids, midge larvae and adults, and simuliids. Fall diets were dominated by hydropsychid larvae. Juvenile diets averaged more prey items per fish in the fall. Juvenile diets have varied over the past ten years apparently in response to the introduction of zebra mussels. Understanding the relationship between larval drift and annual year class, as well as diet, may provide managers with additional tools to manage steelhead stocks in the Great Lakes region.

**Thompson, Lauren**

July - September FY13

Biennial Conference on Chemical Education (BCCE) 2012

"What type of fish will you catch in warm water?"

No Abstract.

**Tole, Olvi**

July - September FY13

24th European Medical Informatics Conference - MIE 2012

"Translational Meta-Analysis Tool for Temporal Gene Expression Profiles"

Widespread use of microarray technology that led to highly complex datasets often is addressing similar or related biological questions. In translational medicine research is often based on measurements that have been obtained at different points in time. However, the researcher looks at them as a progression over time. If a biological stimulus shows an effect on a particular gene that is reversed over time, this would show, for instance, as a peak in the genes temporal expression profile. Our program SPOT helps researchers find these patterns in large sets of microarray data. We created the software tool using open-source platforms and the Semantic Web tool Protégé-OWL.

**Tryc, Lindsay**

July - September FY13

The Association for the Authentic, Experiential, and Evidence-Based Learning (AAEEBL) Annual Conference: ePortfolios as a Catalyst for Connections: Celebrating the Curious, Creative, and Capable Learner

"Inside Out: ePortfolios for Program Assessment"

The presentation introduces an ePortfolio model that facilitates students demonstration of mastery of learning outcomes and a developmental assessment of their personal growth and identity as a professional. The model assesses individual mastery and intended program outcomes that permeate from the first year through the capstone experience.

**Wieten, Alex**

July - September FY13

142nd Annual Meeting of the American Fisheries Society

"Movement and Spatial Distribution of Juvenile Lake Sturgeon in Muskegon Lake, Michigan"

Efforts to restore remnant populations of lake sturgeon, Acipenser fulvesc ens, are hindered by the lack of information on juvenile habitat requirements. We examined the movements and spatial distribution of juvenile lake sturgeon in Muskegon Lake, Michigan, a drowned river mouth lake that links the Muskegon River to Lake Michigan. Juveniles were captured in gill nets, surgically implanted with ultrasonic transmitters, and tracked during August-November in 2008 and 2009 and from September 2010 to November 2011. Weekly vertical profiles of dissolved oxygen concentration and temperature were measured at two locations frequented by juvenile lake sturgeon (September 2010-November 2011). In the summer, juvenile lake sturgeon were observed near (d 1.5 km) the mouth of the Muskegon River in Muskegon Lake, then moved to deeper waters at fall turnover (i.e., loss of thermal and dissolved oxygen stratification). Additionally, multiple cohorts of juvenile lake sturgeon were caught in Muskegon Lake throughout the study. Our results suggest that Muskegon Lake serves as an important nursery habitat for juvenile lake sturgeon that hatched in the Muskegon River before they enter Lake Michigan and that there are seasonal shifts in the spatial distribution of juveniles in Muskegon Lake.

**Wisniewski, Emily**

July - September FY13

13th Annual Lily Conference of College and University Teaching

"Submersive Learning"

No Abstract.

**Zhu, Huijing**

July - September FY13

American Society of Plant Biologists (ASPB) Annual Meeting: Plant Biology 2012

"Induction of Desiccation Tolerance in Developing Seed of Phalaenopsis amabilis: the Role of the Late Embryogenesis Abundant Proteins"

The Orchidaceae is the most diverse family of flowering plants and is famous for its unusual and beautiful structural floral variation. It is distributed predominantly in rapidly disappearing tropical and sub-tropical forest ecosystems. Long-term seed storage banks can be a solution for threatened plant species but the stored seeds must tolerate extreme drying and cold. This ability is acquired during the last stage (maturation drying) of seed development and is correlated with a decline in water content and expression of the Late Embryogenesis Abundant (LEA) protein genes. Our goal is to investigate whether and when orchid seeds acquire desiccation tolerance during normal maturation and, if harvested prematurely, can be artificially induced to become desiccation tolerant. The specific aim of this work is to monitor changes in water content, germinability, desiccation tolerance and LEA protein gene expression in seeds undergoing natural ( in planta) and artificial drying in Phalaenopsis amabilis. The moisture content of fresh seeds drops quickly between 150DAP (when it is 70% moisture) and 165DAP (when it is 50% moisture), suggesting the onset of the maturation drying phase. Freshly harvested seeds can germinate as early as 90DAP but they are not capable of surviving desiccation (defined as the ability to germinate after drying to 5-10% moisture) until 170DAP. On the other hand seeds as young as 120 DAP can tolerate desiccation if they are slowly dried. During slow drying, seeds are placed in atmospheres of progressively lower relative humidity. During this time, seeds maintained their starting moisture content of 70% for 3 days, and then dried to 10-15% moisture on the 4th day. During this time, they acquired desiccation tolerance. Our results suggest that mature seeds of Phalaenopsis amabilis can tolerate desiccation and, if seeds are harvested prematurely, they can be rendered desiccation tolerant by appropriate post-harvest treatments.

**Zuiderveen ,Grady**

July - September FY13

Botany 2012 - The Next Generation

"A Genetic Analysis of Native and Invasive Phragmites australis along Michigan's West Coast"

Phragmites australis (common reed) consists of a native North American group with several genetic forms, and a non-native and highly invasive introduced group with a single genetic form. Little is known about the environmental factors that affect the distribution of native and non-native populations, and it is difficult to differentiate between the two based on physical characteristics alone. The west Michigan region provides an excellent opportunity to evaluate the relationship between environmental gradients and the spread of Phragmites. The Lake Michigan coast presents a strong temperature gradient from the north to the south, whereas a strong moisture gradient is found along the east-west axis from the Lake Michigan shoreline inland. Thus, the goals of this study are to: 1) determine the genetic composition of common reed populations along the west Michigan coast from southern (warmer) to northern (cooler) Lake Michigan, 2) determine the genetic composition of common reed populations along an east-west (wetter-drier) gradient from the west Michigan coast to more inland locations, 3) determine the current distribution of the exotic Phragmites in western Michigan, and 4) evaluate the importance of genotype in the distribution and abundance of the native common reed. Examination of 44 populations of Phragmites australis throughout western Michigan yielded only the non-native haplotype in the southern regions and a mixture of native and non-native haplotypes in the northern regions. A single population contained individuals of both haplotypes. No trends have been observed along the east-west axis.