Belle Isle Aquarium
Second Annual
Conservation Day Symposium

To be held in the classroom of the Belle Isle Aquarium,
900 Insulruhe Avenue, Detroit, MI 48207

April 9, 2016

Presenting authors' names are underlined. Information about co-authors, institutional affiliation, an abstract of the presentation, and the email address and biography of the presenter can be accessed at http://detroitaquarium.weebly.com/uploads/2/5/7/5/25755066/conservationday.pdf, part of the Belle Isle Aquarium website, http://detroitaquarium.weebly.com/

Poster presenters should be at their posters for public interaction for at least the following times: 11:30 am – 12:30 pm, and then again from 1:20 pm – 1:45 pm, and are welcome to be at their posters at other times, according to their own preference. Poster presenters will do a "lightening presentation" (3 min) introduction of their poster at the Round Table and Refreshments session for Presenters, at 1:00 pm.

11:15 am: Introductory remarks: Richard Kik IV, Curator and conservationist, Belle Isle Aquarium; Jeffrey L Ram, Wayne State University and Belle isle Aquarium Director of Science Education

11:30 am: Nicole Farley, Molecular Tools for Monitoring Gar Conservation and Restoration.

12:00 noon: Robert Muller, Lower Rouge River and the Round Goby invasion

12:30 pm: Rebecca Fedewa, #itsnottheriver: The health of the Flint River in light of the City of Flint drinking water crisis

1:00 pm: Round-table and refreshments for presenters. Poster presenter lightening round and general discussion of Conservation issues. Rest-room break, etc.

1:20 pm: Poster viewing until 1:45 pm
Posters: Jason Fischer, We Are All Little Once: Understanding Where Big Fish Begin
Carrie Turner, Development of Indicators for Emerging Trace Organic Compounds
Steven Parrish, Eastern Massasauga Rattlesnake: A Belle Isle Native

1:45 pm: KEYNOTE PRESENTATION
Jason Smith, Tribal Natural Resources Conservation; Building Respectful Relationships

2:30 pm Jim Martin, Sampling a 'hot spot' subbasin: Nutrient fluctuations on a stream through time

3:00 pm Brendan Carson, Harvesting invasive cattail biomass: a potential restoration strategy in Great Lakes coastal wetlands

3:30 pm Jon R. Lawrence, Your Role in the Care and Conservation of Our Local Water Resources

The following abstracts and short biographies are in alphabetical order according to the last name of the presenting author. In the email addresses listed, use "@" in place of "(at)" to send an email

Presenter Name: Brendan Carson, M.S.
Presentation Title: Harvesting invasive cattail biomass: a potential restoration strategy in Great Lakes coastal wetlands
Coauthor names: Shane Lishawa, M.S., Dr. Dennis Albert, Dr. Nancy Tuchman
Organization: Loyola University Chicago, University of Michigan Biological Station
Email address: bcarson1(at)luc.edu

Abstract:
Over the past 14 years Dr. Nancy Tuchman's lab has been conducting research in great lakes coastal wetlands that have been invaded by hybrid cattail (*Typha x glauca*). While the initial work focused on the mechanisms that facilitate this plant's dominance and the impacts invasion has on wetland biogeochemistry and ecology, in 2011 we began to study alternative restoration strategies. Based on the finding that the accumulation of leaf litter leads to the exclusion of other plant species and the degradation of functional wetland habitat, we identified biomass harvesting as a potential method to increase plant diversity and habitat value in these systems. Using funding received through the GLRI, we have been conducting largescale wetland restoration experiments that evaluate restoration based on biomass harvest in cattail-dominated wetlands and its effect on wetland biodiversity and nutrient cycling. We are also investigating potential uses for invasive plant biomass, including composting, direct application to farm fields, and biofuel feedstock.

Biography:
Brendan Carson grew up in Petoskey, Michigan, and like many Michiganders, the Great Lakes have played a central role in his life. He holds a B.S. in ecology and anthropology from the University of Michigan and an M.S. in entomology from Michigan State University. He has worked as an environmental educator, ecological researcher, and restoration practitioner, and he is currently employed as a Research Associate in the Institute of Environmental Sustainability at Loyola University Chicago.

Presenter Name: Nicole Farley
Presentation Title: Molecular Tools for Monitoring Gar Conservation and Restoration
Coauthor names: Adrian A. Vasquez, Richard Kik IV, Solomon David, and Jeffrey L. Ram
Organization: Wayne State University Department of Physiology and the Belle Isle Aquarium
Email address: Nicole.Farley(at)wayne.edu

Abstract:
Gars are apex predators in aquatic systems and traditionally viewed as bad for sport-fishing; however, a more modern perspective is that gar have important roles in aquatic ecosystems. To better manage gar species, this project seeks to develop and validate PCR primers of the seven species of gar, all of which are on display at the Belle Isle Aquarium, to be used to identify species present in environmental DNA samples. Focusing mainly on mitochondrial cytochrome oxidase I (COI), primers designed to amplify only gar species (i.e. "universal gar primers") amplified DNA from all species, primers specific to *Atractosteus* and *Lepisosteus* genera have been tested, and specific primers for several species have been developed. While confirming identities of the seven gar species at the Belle Isle Aquarium, the data also suggest possible *L. osseus* x *L. platostomus* hybrids. When fully developed, these primers will fill a need for gar

eDNA markers in managing gar fisheries and restoration projects; where gar are being restored, these molecular tools can be used to assess population distributions with great sensitivity.

Biography:
Nicole Farley is an undergraduate student studying biology at Wayne State University, as well as a researcher in the Department of Physiology. Her current research focuses on developing molecular tools that can be used to identify and monitor populations of gars through the detection of environmental DNA. Nicole's other research interests include studying the relationship between humans and natural systems particularly concerning invasive species management, preservation of biodiversity, and ecological site restoration, with special interest in lotic ecosystems. Looking forward, she plans to graduate in 2017 and later attend graduate school to study the conservation and restoration of aquatic systems.

Presenter Name: Rebecca Fedewa
Presentation Title: #itsnottheriver: The health of the Flint River in light of the City of Flint drinking water crisis
Organization: Flint River Watershed Coalition
Email address: rfedewa(at)FlintRiver.org

Abstract:
The Flint River is a vibrant river system with abundant recreational, environmental, and economic opportunities. When the City of Flint chose to switch their drinking water source to the Flint River, inadequate treatment coupled with terrible government oversight and an aged drinking water infrastructure led to the catastrophe that is now making national and international headlines. But we know that #itsnottheriver. We will discuss our long-term benthic monitoring data, our current weekly monitoring protocol, and our efforts to bring massive improvements to the channelized portion of the Flint River.

Biography:
Rebecca Fedewa serves as the Executive Director of the Flint River Watershed Coalition, an environmental group dedicated to the protection, preservation, and improvement of the Flint River and its watershed. Rebecca originally came to the FWRC as a member and volunteer, joined the board of the Coalition in January, 2007 and was hired as its third executive director in February 2008. Prior to her position with the FWRC, Rebecca worked as the Director of Grantwriting and Foundation Relations for the Ecology Center, an Ann Arbor based nonprofit that works at the local, state, regional, and national level to promote clean production and healthy communities. Rebecca originally came to Flint in 2000, when she was hired by the C. S. Mott Foundation.

Presenter Name: Jason Fischer[1,2,3]
Presentation Title: We Are All Little Once: Understanding Where Big Fish Begin
Coauthor names: Ed Roseman[1], Robin DeBruyne1, Greg Kennedy[1], Jaquie Craig[1], Bruce Manny[1]
Organization: [1]USGS Great Lakes Science Center, Ann Arbor, MI, USA
[2]University of Toledo, Department of Environmental Sciences, Toledo, OH,
[3]USA Cooperative Ecosystems Studies Unit, Department of Fisheries and Wildlife, Michigan State University, East Lansing, MI, USA
Email address: jfischer(at)usgs.gov

Abstract:
Anglers and commercial fisherman prefer big fish, but all fish start off small. Small fish are vulnerable to predators and pollution and need safe habitats where eggs and young fish can be protected. Unfortunately, fish habitat in the St. Clair and Detroit Rivers has been degraded by dredging and wetland loss. Therefore, scientists at the USGS Great Lakes Science Center have collaborated on restoration projects such as instream reefs and shoreline softening to recreate habitats for spawning and young fish. We are following up on this restoration to determine where adult fish lay their eggs, how larval fish (newly hatched fish) move through the river, and the effectiveness of these projects.

Biography:
Jason Fischer is a PhD student at the University of Toledo and works with the fisheries biologist with the USGS Great Lakes Science Center. He studies how fish use habitat available to them and is currently helping evaluate restoration projects in the St. Clair and Detroit Rivers. Jason has been in the fisheries field for nearly a decade and has worked with the USGS on the St. Clair and Detroit Rivers since 2013. His co-authors have expertise in fish early life stages (eggs and larvae), habitat mapping, and Great Lakes fisheries. Collectively, his co-authors have decades of experience on the St. Clair and Detroit Rivers and have been a part of the St. Clair and Detroit River reef restoration team since its onset in 2004.

Presenter Name: Jon R. Lawrence
Presentation Title: Your Role in the Care and Conservation of Our Local Water Resources
Organization: U.S. Coast Guard Auxiliary – Flotilla 20-19 Mt. Clemens, MI
Email address: jonrlawrence(at)yahoo.com

Abstract:
Nothing is as essential to our survival as access to clean, safe water. The Great Lakes contain 20% of the World's fresh surface water yet many Michigan residents know little about water. Interesting facts about water, non-native species, invasive species and marine debris in the Great Lakes basin will be presented. Local volunteer individuals, groups and projects provide significant impact in caring for and conserving our precious water resources. Opportunities to join in these efforts will be described.

Biography :
Jon Lawrence is the Marine Safety and Environmental Protection officer for Flotilla 20-19 of the U. S. Coast Guard Auxiliary in Mt. Clemens MI and participates and leads a variety of community outreach efforts. Also on behalf of Michigan State University Extension he gives Water Conservation presentations to local grade school classes and leads students in water quality science experiments as part of the Great Lakes Education Program. Mr. Lawrence lives of the shores of Lake St. Clair and has over 50 years of experience sailing, kayaking, power boating, fishing and enjoying the local waters. Mr. Lawrence is a certified Vessel Examiner and holds national and international sailing certifications.

Presenter Name: Jim Martin
Presentation title: Sampling a 'hot spot' subbasin: Nutrient fluctuations on a stream through time
Coauthor name: Emily N. Huber
Organization: Adrian College, Biology and Environmental Science Department
Email address: jmartin(at)adrian.edu

Abstract: The River Raisin Watershed is in southeast Michigan, ultimately flowing into Lake Erie. Nutrient outflow from the waterways surrounding the western basin of Lake Erie have become a great concern due to the growth of cyanobacteria that thrive in nutrient rich water. We examined Nitrate and Phosphate concentrations in the water column along a reach of an identified 'hot' sub basin. We will present and discuss our results in the light of the dynamics of these nutrients in upstream systems and their effects on water quality in the system at large.

Biography: Jim Martin is a Professor of Biology at Adrian College. He received his Doctorate in Entomology from Texas A&M. His current research interests include aquatic insects, parasitology, and abiotic sampling of nutrients in potentially impaired Great Lake watersheds. He has worked as supervisor of the River Raisin Watershed Council's 'Adopt-a-Stream' program for the last ten years.

Presenter Name: Robert Muller
Presentation Title: Lower Rouge River and the Round Goby Invasion
Coauthor Names: Larissa Sano (University of Michigan), Sally Petrella (FOTR), and Philip Kulkulski (FOTR)
Organization: Friends of the Rouge (FOTR)
Email address: rdmuller625(at)gmail.com

Abstract:
In August 2012, a dam at Wayne Road on the Lower Rouge River in the City of Wayne (MI) was removed. Prior to dam removal, the round goby (*Neogobius melanostomus*) was found in large numbers below the dam, where it was the most common fish species. In order to understand the rate of upstream migration of the round goby as well as its effects on native fish communities, fish were intensively sampled over many areas of the Lower Rouge River during the past four years. Our results indicate that in the Lower Rouge, the presence of the round goby is associated with dramatic decreases in the number of Johnny darter (*Etheostoma nigrum*). Results of sampling other, more sensitive fish species in the Lower Rouge suggest that these sensitive species from the Detroit River have also begun to migrate upstream. The results from the Lower Rouge will also be compared to observations we've made in a tributary to the Clinton River, where the round goby and several species of darters appear to be coexisting.

Biography:
Robert Muller is a recent graduate from University of Michigan Dearborn in Environmental Studies, and he has been studying non-game native fishes for over 50 years, with a special interest in darters and other benthic fishes. Sampling a Round Goby in a local river in 2008 began an interest in the effect they would have on the benthic fish community. He has been working in partnership with Friends of the Rouge and Dr. Larissa Sano since 2013 under a grant from the Graham Water Center at the University of

Michigan to collect data on the goby and fish community of the Lower Rouge. Beyond the grant, he has also been investigating other local river fish communities and the impact of the Round Goby on them.

Presenter Name: Steven Parrish
Presentation Title: Eastern Massasauga Rattlesnake: A Belle Isle Native
Organization: University of Michigan Matthaei Botanical Gardens
Email address: parrishs(at)umich.edu

Abstract:
Belle Isle was once known as "snake island" due to the great number of eastern Massasauga Rattlesnakes that made this place its home. Belle Isle was an ideal environment for the Massasauga because of the riparian habitat and adjacent open meadows allowed the snake to flourish. Today the Massasauga has been extirpated from the island, and this follows a national downward population trend throughout its range. As Michigan is considered to be the last stronghold for the Massasauga Rattlesnake, a question to consider is why this venomous snake is a desirable presence in our midst?

Biography:
Steven Parrish is the Natural Areas Manager at the University of Michigan Matthaei Botanical Gardens, and recently completed a 4year grant-funded assignment as the Eastern Massasauga Habitat Restoration and Education project manager funded by the National Fish and Wildlife Foundation. He previously worked as a restoration ecologist for the City of Ann Arbor, Natural Area Preservation where he learned conservation work managing invasive species, tending native plants, native seed collection and conducting prescribed burns. Steven earned his Bachelor of Science degree in Resource Ecology and Management from the School of Natural Resources and Environment at the University of Michigan.

Presenter Name: Jason Smith
Presentation title: Tribal Natural Resources Conservation; Building Respectful Relationships
Coauthor names: Kevin Donner, Maxwell Field
Organization: Little Traverse Bay Bands of Odawa Indians
Email address: jsmith(at)ltbbodawa-nsn.gov

Abstract:
Traditional natural resource management has relied upon determining ‘safe’ levels of exploitation. However, a change in this model to one based upon strong, respectful relationships may be the critical factor in successful modern stewardship of natural resource. These relationships include all kin: human, animal and even the land. In fact, I would argue that success requires all three types of relationships (human to human, human to animal and human to the land) be based on mutual respect. The Little Traverse Bay Bands of Odawa Natural Resources Natural Resources Department aspires to build, maintain and strengthen these kin relationships through research and conservation of natural resources.

Biography:
Jason Smith is the Great Lakes Researcher for the Little Traverse Bay Bands of Odawa Indians. He is currently leading the in-lake assessment portion of the Tribe’s Cisco Restoration Project. Jason’s main fishery related interests revolve around population dynamics, especially of Great Lakes native fishes.

Jason completed his BS in Fisheries at Michigan State University and then went on to earn his master's degree in fisheries studying under Daniel Hayes and Mary Tate Bremigan.

Presenter Name: Carrie Turner
Presentation Title: Development of Indicators for Emerging Trace Organic Compounds
Coauthor names: John Wolfe, Ph.D; G. Allen Burton, Ph.D., Jennifer Daley, Ph.D.
Organization: LimnoTech
Email address: cturner(at)limno.com

Abstract:
Trace organic compounds (TOrCs), such as pharmaceuticals and personal care products, are emerging pollutants of concern because of documented adverse effects on aquatic life. Sampling and analyzing TOrCs is challenging because their physical and chemical properties are often quite different from conventional pollutants and highly sensitive analytical methodologies are needed to measure quantifiable amounts of TOrCs that can relate exposure levels to aquatic effects. Because these methods require the use of multiple preparatory and analysis procedures, the costs and equipment needed for sample collection, preparation and analysis can exceed the resources of the typical municipal utility. A simpler and smaller list of compounds to function as indicators has been developed as part of a Water Environment Research Foundation (WERF) study (CEC6R12) to develop screening tools for evaluating the impact from TOrCs. This paper presents the development of the list of indicator TOrCs, the analytical methodology to measure the indicator TOrCs, cost considerations, and the factors used to develop the list, including ubiquitousness, chemical properties, fate and transport, toxicity, treatability through conventional wastewater treatment processes, reliability as an indicator, and aquatic effects.

Biography:
Carrie Turner is a Senior Project Engineer with LimnoTech. She has over 17 years of experience in environmental engineering, primarily focused on developing databased and modeling tools to address water resource planning and watershed management needs. Prior to joining LimnoTech, Carrie managed an environmental laboratory. She has a Masters in Civil and Environmental Engineering from Wayne State University and a BS in Chemistry from Miami University. She is a licensed Professional Engineer in the State of Michigan.
