

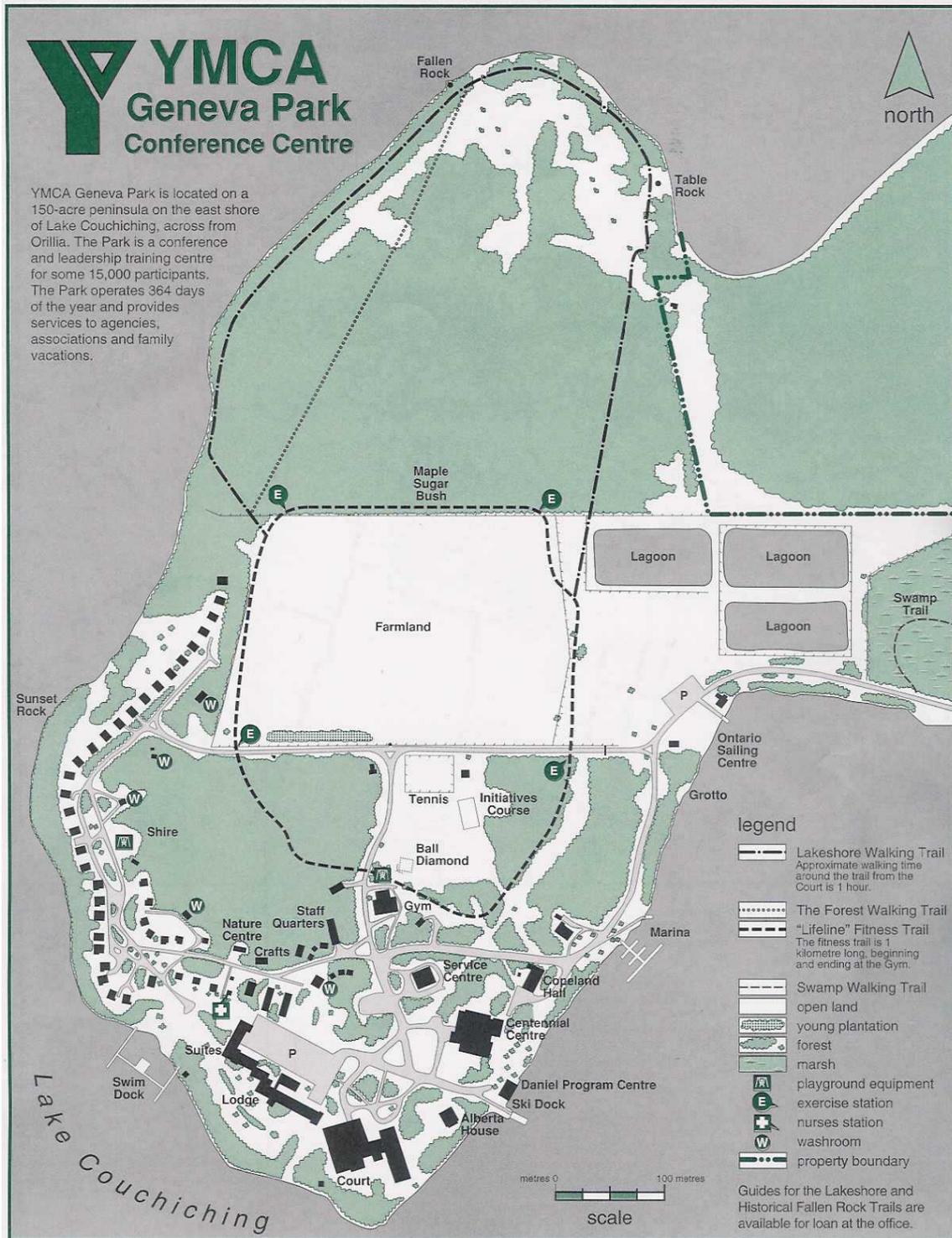


AMERICAN FISHERIES SOCIETY

ONTARIO CHAPTER
ANNUAL GENERAL MEETING

March 4th – 6th, 2010
Geneva Park, Orillia

*“Challenges for a Changing Fishery in a
Changing World”*



Student participation, the E.J. Crossman Award, and the Ontario B.A.S.S. Federation Nation Award have been made possible through the generous support of our sponsors. Please support them.



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Thursday March 4th

5:30 - Arrival, Registration & Opening Mixer (Geneva Lodge Lounge)

7:30-8:30 Stream Monitoring and Research Team (SMART) Leader meeting (all are welcome)

Friday March 5th

07:30 BREAKFAST (Geneva Court)

08:30 GREETING AND CONFERENCE OUTLINE (Centennial Centre Room 15)

Session 1: Managing Streams and Habitats

08:40 *Where Have All the Headwaters Gone? Calculating the Extent and Characteristics of Headwater Enclosures* - Katie Stammer (University of Western Ontario)

09:00 *What is a 'SMART'* - Scott Jarvie (Toronto Region Conservation Authority)

09:20 *How Information Management Facilitates Better Monitoring in Tributaries of the Great Lakes* - Les Stanfield (Ministry of Natural Resources)

09:40 *The Effects of Tertiary Treated Municipal Wastewater on Rainbow Darter and Greenside Darter in the Speed River* - Carolyn Brown (University of Waterloo)

10:00 COFFEE & POSTER SESSION (Room 15 Lounge)

Session 2: Species at Risk

- 10:30** *Living on the Edge: Conservation of Fish Species at Risk in Canada* – Bill Glass (University of Windsor)
- 10:50** *Genetic Structure of Lake Sturgeon in Northern Ontario* – Jenni McDermid (Wildlife Conservation Society Canada)
- 11:10** *A Lake Sturgeon (Acipenser fulvescens) Best Management Practices Guide for Existing Hydropower Facilities and Proposed Development in Ontario* – Dan Gibson (AECOM)
- 11:40** *Evaluating the Effects of Agricultural Drain Maintenance on Grass Pickerel, a Species of Special Concern* – Jason Barnucz (Fisheries and Oceans Canada)
- 12:00** LUNCH (Geneva Court) & POSTER SESSION (Room 15 Lounge)

Session 3: Bass and Muskellunge

- 1:00** *Energetic and Reproductive Consequences of Pre-Spawn Stress in Wild Largemouth Bass* – Connie O'Connor (Carleton University)
- 1:20** *Individual and Intergenerational Consequences of Nest Predation Pressure in Smallmouth Bass* – Marie-Ange Gravel (Carleton University)
- 1:40** *Genetic Structure and Diversity Among Populations of Muskellunge (Esox masquinongy) in Lake Huron and Georgian Bay* – Kristyne Wozney (Ministry of Natural Resources)
- 2:00** *The Effects of Catch-and-Release Angling for Muskellunge* – Sean Landsman (Carleton University)
- 2:20** COFFEE & POSTER SESSION (Room 15 Lounge)
- 2:30** *Movie Screening – “RiverWebs – A film about life, death, science and streams”*
See Preview at <http://www.riverwebs.org/previews.html>
- 3:30** FREE TIME (Ice Fishing, Networking, etc.)
- 5:00-6:30** ANNUAL BUSINESS MEETING (Room 15)
- 6:30-1:00** BBQ SUPPER AND SOCIAL (Court Lounge)

Saturday March 6th

07:30 BREAKFAST (Geneva Court)

Session 4: Fisheries Management I

08:30 *New Technology for Understanding Spatial and Temporal Activity Patterns of Fish in Nature* – Dr. Richard Vallee (VEMCO)

08:50 *Bycatch in Ontario Inland Commercial Fisheries* – Sarah Larocque (Carleton University)

09:10 *Influence of an Invasive North American Sunfish on the Decline of Native Perch (*Perca fluviatilis*) in a Thermal Reservoir in France.* – Emily Fobert (Trent University)

9:30 *Estimating Adult Round Goby Population Size Using the Angling Removal Method* – Jake Brownscombe (Trent University)

9:50 COFFEE SESSION (Room 15 Lounge)

Session 5: Fisheries Management II

10:20 *Evaluating Stream Temperature Conditions for Brook Trout Using Continuous Temperature Data*– Andrew Schiedel (Natural Resource Solutions Inc., Waterloo)

10:40 *Using an Angler Mail Survey to Deliver Spatially Explicit Estimates of Fishing Effort and Harvest* - Sarah Hogg (Ministry of Natural Resources)

11:00 *Fish Community Response to Shoreline Restoration Practices in the Greater Toronto Area* – Violetta Tkaczuk (Toronto and Region Conservation Authority)

11:20 CONFERENCE WRAP AND PRESENTATION OF STUDENT AWARDS

11:30 LUNCH (Geneva Court)

Student Posters:

Intraindividual Variability of Stress Responsiveness in Bluegill - Katrina Cook (Carleton University)

Evaluating the Need to Minimize Water Entry and Surgical Aseptic Techniques During Telemetry Implantation Surgeries- Laura Chomyshyn (Carleton University)

Effect of Varying Family Survivorship on Effective Population Size (N_e) of Captive Salmonid Broodstocks - Ryan Hill (Trent University)

Changes in Oxidative Stress Across the Parental Care Period in Smallmouth Bass (Micropterus dolomieu)- Samantha Wilson (Carleton University)

The Consequences of Multiple Stressors on the Overall Condition and Survival of Wild Bluegill Sunfish (Lepomis macrochirus)- Sarah McConnachie (Carleton University)

Grand River Fish Communities Changes Downstream of Secondary Treated Municipal Wastewater Effluent - Carolyn Brown (University of Waterloo)



ANNUAL GENERAL MEETING

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“Challenges for a Changing Fishery in a Changing World”

Oral Presentation Abstracts

Friday, March 5th - 8:40AM

Where have all the headwaters gone? Calculating the extent and characteristics of headwater enclosures.

Katie L. Stammer^{1*}, Adam G. Yates, and Robert C. Bailey

¹University of Western Ontario, London, ON

Headwater enclosure is a common practice in all agricultural areas, and is used to increase the efficiency of farming and reduce soil erosion. The incidence of headwater enclosure came to light in southwestern Ontario during a survey of municipal drains. This survey aimed to classify drains in terms of their potential to provide fish habitat. An unexpected finding was a number of ‘missing’ drains. Although these drains appear on the Ontario Ministry of Natural Resource’s GIS flow layer, which shows all stream networks in Ontario, they were not physically found during field surveys. Further exploration revealed that the pre-existing open channel at these sites had been buried and replaced with underground tile drains. It is not known the extent to which these headwater enclosures actually occur. The goal of my study is to quantify the occurrence of headwater enclosure and to describe the watershed conditions under which they occur. ArcGIS has been used to map enclosures and describe their watersheds using available provincial and national data, such as soil type, geology and landuse. This research will help to define the issue of headwater enclosure and is the first step to understanding its potential impacts in stream agro-ecosystems.

Friday, March 5th - 9:00AM

What is a 'SMART'?

Scott Jarvie ^{*1} and Les Stanfield²

¹Toronto and Region Conservation Authority
5 Shoreham Drive, Downsview, ON, M3N 1S4 416/661-6600 sjarvie@trca.on.ca

²Ontario Ministry of Natural Resources, Glenora Fisheries Station
RR 4 Picton, ON, K0K 2T0 613/476-3255, les.stanfield@mnr.gov.on.ca

Many agencies, researchers and private citizens are engaged in conducting or mandating the collection of data on flowing waters. Thousands of site visits are carried out annually to evaluate the biophysical properties of these systems using techniques that vary from being cursory to in-depth. To a large extent the properties of the systems being evaluated are similar (i.e., fish/benthos, water quality/quantity, and habitat). Mechanisms are needed to manage this information to ensure widespread access and to increase its value in the development of new science and management support tools. To address these challenges a network approach is being applied in many parts of the world and several networks have emerged in Ontario. The Stream Monitoring and Research Team (SMART) networks provide a forum for exchange of ideas, data and science. They facilitate collaborative study design development that enables broader questions to be answered. This leads to better decision making capabilities for all participants. This presentation will identify the current networks in Ontario and share experiences from the Southern Ontario SMART network. In addition, highlights on the discussions from the first SMART network Colloquium will be provided.

Friday, March 5th - 9:20AM

How Information Management Facilitates Better Monitoring in Tributaries of the Great Lakes

Les. W. Stanfield^{1*} and Silvia Strobl¹

¹Ministry of Natural Resources, Southern Science and Information,
300 Water Street, Peterborough, ON; phone: 613/476-8777;

The coalition of fisheries management agencies in Ontario are collaborating to develop tools for illustrating and accessing fisheries and habitat information. This new approach poses several challenges to traditional science development and requires a new means of thinking about data. Those who adopt this new approach can benefit in many ways, including much better science development and an increased network of colleagues. This approach also facilitates harmonization of field methods, data management standards and generates a more coordinated approach to monitoring. One tool, the flowing waters information system will provide controlled access to the raw and summarized data associated with all surveys, including fish, conducted on flowing waters. Critical to the success of these projects is ensuring corporate support from each partner organization and that issues around data security and access are addressed. This paper will describe the process undertaken to develop both information management tools and will introduce the tool to practitioners. Finally, linkages to how this tool facilitates a network approach to monitoring in the Great Lakes Basin will be provided.

Friday, March 5th - 9:40AM

The Effects of Tertiary Treated Municipal Wastewater on Rainbow Darter and Greenside Darter on the Speed River

Carolyn Brown^{1*}, B. Knight, M. McMaster, K. Munkittrick, K. Oakes, C. Robinson, G. Tetreault, and M. Servos.

¹University of Waterloo, Waterloo, ON

The Grand River watershed is one of the areas in Southern Ontario that the Government of Ontario has designated for growth in its “Places to Grow” strategy. This watershed has had various historic river water quality problems resulting from impacts such as intense agriculture and poor wastewater treatment. In the early 1970’s oxygen levels were below provincial standards of 4 mg/L downstream of the City of Guelph’s wastewater outfall, located on the Speed River. The receiving environment is small and could not adequately dilute or assimilate the wastes. As a result the treatment plant was upgraded to tertiary treatment in 1979, which raised river oxygen levels above provincial standards. There is concern that with population growth, Guelph’s effluent quality may decrease and degrade aquatic ecosystems unless larger investments are made in additional advanced treatment. Fish communities were evaluated in two seasons of 2008 to assist in determining current conditions and support future decisions. Six sub-sites of a 100 m reach were sampled for 5 minutes each with a backpack electroshocker. At nine sites upstream and downstream of the outfall fish were identified, length and weight recorded, and stable isotope signatures ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) of Greenside Darter (*Etheostoma blennioides*) and Rainbow Darter (*E. caeruleum*) were determined. Detailed habitat evaluations showed no large differences between the selected sites. Sites upstream of the treatment plant were dominated by Greenside Darter, but directly downstream of the discharge, Rainbow Darter became dominant. Greenside Darter also had few young of the year at downstream sites. Stable isotope signatures increased in Rainbow Darter downstream of the outfall, but showed no change in Greenside Darter. At this downstream site there may be a food source the Rainbow Darter is consuming at a higher trophic level, leading to a higher isotope signature and a competitive advantage over the Greenside Darter. Preliminary analysis of data from 2009 revealed a similar pattern in abundance and age structure of Rainbow and Greenside Darter at downstream sites. Even tertiary treated effluent can have subtle effects on fish communities in small aquatic receiving environments.

Friday, March 5th - 10:30AM

Living on the Edge: Conservation of Fish Species at Risk

William R. Glass¹, Lynda D. Corkum¹ and Nicholas E. Mandrak²

¹ University of Windsor, Department of Biological Sciences
401 Sunset Ave, Windsor ON, N9B 3P4

² Fisheries and Oceans Canada, 867 Lakeshore Rd, Burlington ON. L7R 4A6

In North America, the native ranges of many species reach northward into southern Canada. These species at the edge of their range often have limited distributions and are considered rare in Canada. Several aquatic species whose range extends into southern Canada, and whose main population is found further south, are listed by the Committee on the Status of Endangered Wildlife in Canada, and subsequently, have been afforded protection under the federal Species at Risk Act (SARA). There is an ongoing debate in Canada as to whether these species deserve protection merely based on political boundaries, if they are more abundant elsewhere in their range.

The freshwater fish species listed as at risk under SARA were placed into one of three groups, (widespread, endemic, or range edge) based on their distribution. Values for several traits were tabulated for each species and a discriminant function analysis was performed to distinguish among the three groups. Results showed that 87% of taxa were correctly assigned to the three groups. Factors that best distinguished the groups were family, conservation status, maximum age, body size, and perceived threat. These findings have possible application when considering the listing of new species to be afforded protection under SARA or other endangered species regulations.

Friday, March 5th - 10:50AM

Genetic Structure of Lake Sturgeon in Northern Ontario.

Jenni McDermid^{1*}, Kristyne Wozney², Shawna Kjartanson³, and Chris Wilson²

¹ Wildlife Conservation Society Canada, Trent University, 2140 East Bank Drive, Peterborough, ON, Canada K9J 7B8; jmcdermid@wcs.org

² Ontario Ministry of Natural Resources, Trent University, 2140 East Bank Drive, Peterborough, ON, Canada K9J 7B8

³ Golder Associates Ltd., 1721 8th Street East, Saskatoon, SK, S7H 0T4

Lake sturgeon have been listed as Special Concern in the southern Hudson Bay and James Bay watersheds and Boreal Forest bioregion by COSEWIC and COSSARO, respectively, in part due to a lack of information on lake sturgeon in the area north of the managed forest boundary. Northern Ontario is thought to contain some of the few remaining healthy lake sturgeon populations, with this area acting as a potential refuge for a species that is threatened or endangered across most of its range. Northern Ontario contains 5 of the 12 undammed, unregulated watersheds south of 55 degrees latitude, with hydroelectric potential having been identified in 4 major rivers, imposing future threats to these populations. The recent provincial commitment to undertake land use planning in the Far North provides further impetus to understand potential impacts of development to lake sturgeon populations in the region.

Preliminary research suggests that northern Ontario lake sturgeon are genetically distinct from the depleted sturgeon populations in the Great Lakes Basin. However, minimal sampling has occurred in this area and it represents a large gap in our understanding of lake sturgeon phylogeography and genetic biodiversity. Through collaborative research we have sought to: (1) address gaps in the phylogeography across Ontario; (2) estimate local effective population sizes (N_e), and (3) examine impacts of hydroelectric development on genetic variability of lake sturgeon.

Friday, March 5th – 11:10AM

A Lake Sturgeon (*Acipenser fulvescens*) Best Management Practices Guide for Existing Hydropower Facilities and Proposed Development in Ontario

Daniel P. Gibson^{1*}, G. Wichert, G., R. Booth.

¹AECOM, 300 Town Centre Boulevard, Markham, ON L3R 5Z6

Ontario's water resources are an integral part of the Province's environmental, social, cultural and economic fabric, and are vital to meeting the renewable energy requirements of the Province through waterpower. Today, the need for renewable energy is greater than ever as the provincial government aims to double the amount of electricity generated by renewable sources by 2025 while drastically reducing its dependence on coal generation. To this end, harmonizing energy production to meet the needs of the province while maintaining a living legacy for future generations is the responsibility of both industry and resource managers. One such challenge that currently exists is to plan for the sustainability of Lake Sturgeon (*Acipenser fulvescens*) in relation to current and future development of waterpower in Ontario. As of September 11, 2009 the Committee on the Status of Endangered Species in Canada (COSEWIC) and the Committee on the Status of Species at Risk in Ontario (COSARO) have listed numerous Ontario Lake Sturgeon populations as either threatened or endangered. Based on these reviews the Best Management Practices Guide for Waterpower Development and Operation affecting Lake Sturgeon was developed as a proactive undertaking by the OWA and reflects a synthesis of the best available science and industry-wide knowledge to date.

Furthermore, the BMP Guide also furthers the OWA's approach to providing the best available information to its members. The guide is intended to serve as a practical, useable resource for practitioners and furthers the OWA's commitment to foster and maintain positive and productive relationships with those with an interest in waterpower. The purpose of the Lake Sturgeon BMP is to provide a toolbox of approaches and guidance to proponents and practitioners in order to minimise/avoid impacts to Lake Sturgeon with regards to existing and future waterpower development. Through this, the BMP Guide is aimed at streamlining the review and approval requirements related to impacts on Lake Sturgeon under:

1. *The federal Fisheries Act,*
2. *The federal Species at Risk Act,*
3. *The Lakes and Rivers Improvement Act,*
4. *The provincial Endangered Species Act (if applicable), and,*
5. *The Green Energy Act*

The BMP Guide has been produced to allow proponents and practitioners greater ability to continue to act as good stewards of the environment. The BMP Guide is specifically designed specifically for the Ontario policy and approval context, however because the BMP Guide follows an analytical approach consistent with existing Fisheries and Oceans Pathways of Effect and Operational Statements it can be applied to other regions or provinces of Canada.

Friday, March 5th - 11:30AM

Evaluating the Effects of Agricultural Drain Maintenance on Grass Pickerel, a Species of Special Concern

Jason Barnucz*, Nicholas Mandrak and Kevin Hedges

Fisheries and Oceans Canada, 867 Lakeshore Rd, Burlington ON. L7R 4A6

The Grass Pickerel (*Esox americanus vermiculatus*) is listed as Special Concern under the *Species at Risk Act*. It prefers warm, slow moving streams and shallow bays of larger lakes dominated with dense emergent aquatic plants. The Grass Pickerel occurs within many stream systems in the Niagara Region, Ontario, most of which are part of expansive agricultural drainage networks. Stakeholders (federal agencies, provincial agencies, municipal governments and landowners) are involved in a three-year project to address the need to protect fish communities, including Grass Pickerel, and habitat while maintaining local agricultural drainage systems. To better understand the effects of agricultural drain maintenance on the fish community and Grass Pickerel, the objectives of this project are: 1) to develop a habitat supply model that can be used to determine changes in habitat supply, and consequently Grass Pickerel abundance; and, 2) to compare key life history characteristics of Grass Pickerel between control and reference sites before and after drain maintenance in Beaver Creek. In the first year of the study, we PIT-tagged over 600 individuals within Beaver Creek and have preliminary estimates of population size, density, individual movement within the creek and adult diet. The results of this study will provide scientifically defensible guidance on the potential impacts, and possible mitigations, of drain maintenance on fish communities, and Grass Pickerel in particular, in the study watersheds and similar-sized waterbodies elsewhere.

Friday, March 5th - 1:00PM

**Energetic and Reproductive Consequences of Pre-spawn Stress in
Wild Largemouth Bass**

Constance M. O'Connor¹, David H. Wahl, Michael Nanini, David P. Philipp, Kathleen
M. Gilmour, Robert Arlinghaus, and Steven J. Cooke.

¹Carleton University, Ottawa, ON

In general, stress inhibits reproductive activity. However, previous study of the relationship between stress and reproduction in teleosts has been conducted using physical stressors that also cause tissue and other secondary damage. It is difficult to disentangle the effects of stress (i.e., the experience of a physiological stress response) from the secondary effects of the stressor (i.e., tissue damage) on reproductive capacity. We tested whether stress has an inhibitory effect on reproductive indices in a parental care-providing species, the largemouth bass (*Micropterus salmoides*) using hormone manipulations in a field setting. Using hormone implants, we elevated circulating plasma cortisol (the primary stress hormone) for 5-6 days in a group of largemouth bass, and compared reproductive indices (GSI, proximate analysis of gonads, cortisol concentration in gonads) to a group of fish only exposed to physical handling stressors. Furthermore, we compared energetic indices (HSI, proximate analysis of muscle, glycogen concentration in the liver, plasma biochemistry) between the two groups. We found no evidence of energetic costs, and limited evidence of reproductive costs, to elevated plasma cortisol beyond the costs already incurred during physical handling. However, we did see an increase in cortisol concentration in female gonads of fish treated with hormone implants. This suggests that while most of the energetic and reproductive costs of stress may be a secondary effect of tissue damage sustained during the stressor, the experience of a stress response might carry reproductive costs to the offspring that are independent of any physical damage to the parent.

Friday, March 5th - 1:20PM

Individual and Intergenerational Consequences of Nest Predation Pressure in Smallmouth Bass

Marie-Ange Gravel^{1*}, Cory D. Suski, and Steven J. Cooke

¹Carleton University, Ottawa, ON

Predation pressure is considered an important selective force able to influence the behaviour and morphology of prey individuals. Most work has focused on how prey avoid individual predation but little work has examined the role of predation pressure in species which provide parental care, where it is not the parent who faces immediate predation threat, but vulnerable offspring. Our work sets out to examine the individual and intergenerational consequences of predation pressure on a species which provides parental care, the smallmouth bass. Our study took place in a narrow geographic region in southeastern Ontario and tested whether a natural gradient of predation pressure influenced the behaviour and physiology of nest-guarding parents and larvae. We have shown that parents from lakes with high predation pressure spend a greater proportion of their time engaged in antipredator behavioural activities than parents from lakes with low predation pressure. The behavioural implications for larvae seem rather more complex but it is clear that developmental environment plays a key role in the antipredator behaviour of larval smallmouth bass. Physiologically, parental energy stores seem to be influenced by predation pressure. Furthermore, the recovery following exercise of larvae was influenced by predation, where larvae from sites with high predation pressure have lower active metabolic rates and recover more quickly from exercise than larvae from low predation pressure. Together, our work shows that natural gradients in predation pressure can have important behavioural and physiological implications for both parents and larvae of a nest-guarding species.

Friday, March 5th - 1:40PM

Genetic Structure and Diversity Among Populations of Muskellunge (*Esox masquinongy*) in Lake Huron and Georgian Bay

Kristyne Wozney^{1,*}, A. Liskauskas, and C. Wilson.

¹Ontario Ministry of Natural Resources, Peterborough, Ontario
(email: kristyne.wozney@ontario.ca)

Conservation and management issues related to genetic diversity and stock structure have been largely unexplored in Great Lakes muskellunge (*Esox masquinongy*). In eastern Georgian Bay and the North Channel of Lake Huron, populations of muskellunge have been impacted by recreational fisheries and marked ecological changes, including loss of spawning habitat and deterioration of water quality. Spawning adults were sampled from nine tributaries in the North Channel and eastern Georgian Bay and screened with 21 highly polymorphic microsatellite DNA markers to assess their spatial structure and diversity, as well as to determine the number of genetic groups present and their ranges and relationships. The microsatellite data showed substantial genetic diversity among wild muskellunge, with good congruence between sampling sites and genetic populations. Individual- and population-based analyses revealed hierarchical population structuring with strong patterns of spawning site fidelity and isolation by distance. The extremely limited evidence of straying between spawning sites based on individual assignment tests and significant pairwise divergences among sites indicate very low levels of gene flow over historical and contemporary timescales. The results of this study will help inform management options for muskellunge in the Great Lakes, and will also be useful for assessing the effectiveness of restoration and rehabilitation efforts for extirpated populations of muskellunge in Spanish River (Georgian Bay) and Lake Simcoe.

Friday, March 5th - 2:00PM

Evaluation of the Behaviour, Physiology and Survival of Muskellunge that are Captured and Released by Specialized Anglers

Sean J. Landsman^{1*}, Hedrik Wachelka, Cory D. Suski, and Steven J. Cooke

¹Carleton University, Ottawa, ON

Over the last 50 years, organizations such as Muskies Inc. and Muskies Canada have created major paradigm shifts in muskellunge (*Esox masquinongy*) angling from catch-and-kill to catch-and-release (C&R). Today, release rates approach 100% for specialized anglers. Despite its popularity, little is known about the short- and long-term biological consequences of C&R on muskellunge, particularly in light of such high release rates. The purpose of our study was to quantify the physiological disturbances, behavioural consequences, and mortality rates of muskellunge subjected to C&R by specialized anglers, and to relate these disturbances to handling practices. In total, 30 muskellunge were caught with conventional angling gear. Fish were divided into two treatment groups: “normal” handling (reflective of angling and air exposure durations performed by most anglers in typical angling scenarios), and “gentle” (where air exposure and handling duration were reduced). All fish were non-lethally sampled for blood to quantify physiological disturbances, and affixed with external radio transmitters to monitor behaviour and survival after release for one week. Differences in both physiology and post-release behaviour across groups were minimal, and all 30 tagged muskellunge survived beyond one week. Results indicate that current handling procedures are likely adequate to ensure survival of released muskellunge.

Saturday, March 6th - 8:30AM

**New Technology Developments for Understanding Spatial and Temporal Activity
Patterns of Fish in Nature**

Richard Vallée*, Dale Webber, and Denise King

Vemco, 211 Horseshoe Lake Drive, Halifax, Nova Scotia, Canada B3S 0B9
phone: 902 450-1700 ext 253, email: richard.vallee@vemco.com

Measurements of fish movements, activity, and energetics in nature have always been technologically challenging. In many species around the world, detailed movement and activity information is urgently required for a variety of reasons. Issues related to fishing pressure, habitat degradation, pollutants, and responses to environmental change are just a few of the many applications that require knowledge of the temporal and spatial movement and activity patterns of fish.

Here we describe the development and implementation of a new multi-array positioning system (VPS – VR2W Positioning System) and a new activity acoustic transmitter (V9AP) that can be used in a variety of biological applications to study the behavior of fish in nature. VPS is more suited to a larger variety of applications compared to existing positioning systems that are constrained by cost and equipment deployment limitations (i.e., wire connecting hydrophones). A VPS study can be as small as 1 triangle covering 2500 m² or less (3 receivers) and up to tens of kilometers² and greater. To date VPS has been successfully used in small and large area studies in lakes, rivers and ocean environments.

In this presentation, we will discuss the design and specifications of VPS, the factors that influence positioning accuracy and we will show examples of various VPS study designs. We will also illustrate how to use an accelerometer transmitter to get the most of your VPS study.

Saturday, March 6th - 8:50AM

Bycatch Issues Associated with Inland Commercial Fisheries of Southeastern Ontario

Sarah Larocque¹, Alison H. Colotelo¹, Gabriel Blouin-Demers², and Stephen J. Cooke¹

¹Carleton University, Ottawa, ON

²University of Ottawa, Ottawa, ON

Bycatch mortality is a major concern for commercial fisheries and their sustainability. In general, bycatch refers to the inadvertent capture of non-targeted species which can include fish, turtles, mammals, and birds, some of which may be species at-risk. From a management perspective, bycatch needs to occur at low enough levels to ensure the sustainability of the fishery. Currently, little research has been done on freshwater bycatch reduction and survival, and thus there is a need for scientific information to aid in the creation and support of regulations to minimize bycatch. During a typical fishing season in southeastern Ontario, we simulated commercial fishing in small warm water lakes and quantified rates of capture for both bycatch and targeted species. In addition, blood physiology, behavioural impairment, and injury were measured for fish captured in the nets. Turtles represented the largest proportion of non-fish bycatch, while non-target fish species represented 11% of the total catch throughout the season. As a result of the capture rate of turtles, including some species at-risk (i.e. northern map turtles), research was conducted to understand the behaviour of turtles captured in the nets and gear modifications have been applied to increase survival of those captured. This research has improved the understanding of the rates of bycatch occurring in these fisheries and will be useful for future management and conservation decisions.

Saturday, March 6th - 9:10AM

**Influence of an Invasive North American Sunfish on the Decline of Native Perch
(*Perca fluviatilis*) in a Thermal Reservoir in France**

Emily Fobert^{1*}, Anne Pedon-Flesch², Gérard Masson³,
Michael G. Fox⁴, and Gordon H. Copp⁵

¹Environmental and Life Sciences Graduate Program, Trent University, Peterborough,
Ontario K9J 7B8, Canada

²Pedon Environnement et Milieux Aquatiques, rue Paul Michaux, 57000 Metz, France

³Laboratoire Biodiversité et Fonctionnement des Ecosystèmes, UFR Sci. F.A., Université
de Metz, rue du Général Delestraint, 57070 Metz, France

⁴Environmental and Resource Studies Program and Department of Biology, Trent
University, Peterborough, Ontario K9J 7B8, Canada

⁵Centre for Environment, Fisheries & Aquaculture Science, Pakefield Road, Lowestoft,
Suffolk NR33 OHT, UK, and Bournemouth University, Poole, Dorset, UK

Climate change is considered a key threat to the structure and function of ecosystems. One way in which it is predicted to disrupt ecosystem structure is through the modification of the invasiveness of some existing non-native species, which can result in changes in community level interactions. Our study examines long-term changes in native Eurasian perch *Perca fluviatilis* and the invasive pumpkinseed *Lepomis gibbosus* in a heated environment, Mirgenbach Reservoir (Moselle, France). Historical French literature has blamed introduced pumpkinseed for declines in native perch, but this postulation has never specifically been examined. The reservoir, which was constructed in 1985 as a thermal buffer for the cooling water from the Cattenom Nuclear Power Plant has mean monthly water temperatures 3 to 7° C warmer than in neighbouring waterbodies. The pumpkinseed was initially identified in the reservoir in 1991, and therefore Mirgenbach provides a rare opportunity to evaluate the potential effects of both the invader and the progressive temperature increase on the population density and growth rates of Eurasian perch. The Eurasian perch population in Mirgenbach has been in decline since 1991, with significant declines in young-of-year biomass, whereas the pumpkinseed population was initially increasing and is now showing a fluctuating trend. Preliminary analysis suggests that changes to the perch population are primarily the result of increasing temperatures in the reservoir. A fish-scale library as well as fish abundance data collected from the reservoir since 1986 is being analyzed to determine the impact of pumpkinseed on perch growth in the thermal environment.

Saturday, March 6th - 9:30AM

Estimating Adult Round Goby Population Size using an Angling Removal Method

Jake Brownscombe^{1*}, Lee Gutowsky², Michael G. Fox³

¹ Environmental and Life Sciences Program, Trent University, Peterborough, ON K9J 7B8; Phone: (705) 761-9012; E-mail: jacobbrownscombe@trentu.ca

² Doctor of Biology Program, Carleton University, Ottawa, ON K1S 5B6; Phone: (613) 523-9447; E-mail: lgutowsk@connect.carleton.ca

³ Environmental & Resource Studies Program and Department of Biology, Trent University, Peterborough, ON K9J 7B8; Phone: (705) 748-1011; E-mail: mfox@trentu.ca

The round goby (*Neogobius melanostomus*) is an invasive fish found in many areas throughout the Great Lakes watershed. Their population sizes are very difficult to estimate from conventional sampling techniques such as electrofishing, seine netting or trawling. We have devised and validated an angling removal method for estimating round goby population size. A controlled experiment was conducted where round gobies were angled in tanks with a surface area of 1 m² and a water depth of 1 m. Angling trials were conducted with round goby densities of 5, 10, and 15/m², in simple and complex habitat types with 3 replicates for each treatment. Results indicate actual density was within the 95% confidence interval of estimated density in all trials using Carle and Strubb estimation. There was no significant effect of size, density, or habitat type on the catchability of round gobies. This method was used in the field to estimate round goby densities in the Trent Severn Waterway in May and August of 2009. Preliminary results indicate very large increases in round goby density at the edges of their range over the summer months, but minimal range expansion over this period. In ideal, rocky habitats at the upstream edge of expansion the average goby density increased from 1/m² in May to 8/m² in August with a maximum density of 16.5/m². At the downstream edge of expansion, densities increased from 0.5/m² in May to 3/m² in August, with a maximum density of 8/m².

Saturday, March 6th - 10:20AM

Evaluating Stream Temperature Conditions for Brook Trout Using Continuous Temperature Data

Andrew E. Schiedel^{1*}, Nicole S. Weber², David C. Arseneau², Robert R. Walker³, Ray H. Tufgar², and Peter J. Cartwright⁴

¹Natural Resource Solutions Inc.; Waterloo, Ontario

²AECOM; Kitchener, Ontario

³EBNFLO Environmental; Waterloo, Ontario

⁴City of Guelph; Guelph, Ontario

The Hanlon Creek Business Park in the City of Guelph, Ontario is being developed around one of the tributaries to Hanlon Creek (Tributary A) which has been designated as a coldwater stream to be managed for Brook Trout. A continuous hydrologic model was developed using HSP-F software to predict temperature data under post-development conditions based on 2 years of continuous stream temperature monitoring and meteorological data from the years 2000 to 2007. In analyzing the thermal suitability for Brook Trout, we compared the predicted summer stream temperatures with information available in the literature. This allowed us to consider both maximum and optimum temperature conditions in a variety of ways. Studies found in the academic literature include both laboratory-based and field-based information. We compared information from various sources by applying a variety of descriptive statistics to the continuous temperature data.

Saturday, March 6th - 10:40AM

Using an Angler Mail Survey to Deliver Spatially Explicit Estimates of Fishing Effort and Harvest

Sarah Hogg¹

¹Ontario Ministry of Natural Resources, Applied Research and Development Branch
300 Water Street, Peterborough, ON

The 2005 Survey of Recreational Fishing in Canada was the seventh in a series of federal-provincial angler mail surveys conducted since 1975. Data collected from anglers was georeferenced in 2009 allowing for the generation of spatially explicit estimates of effort, catch and harvest. We compared estimates from the 2005 mail survey with corresponding estimates from traditional creel surveys and found that mail survey estimates tended to be higher than creel estimates but were well correlated with them. Additionally, mail harvest estimates tended to be closer to creel estimates than catch estimates. We attribute the differences in survey estimates to biases in both mail and creel surveys; creel surveys tend to underestimate due to coverage issues while mail surveys tend to overestimate due to non-response and recall biases. In order to make this type of survey more useful at smaller spatial scale, we recommend future mail surveys take steps to reduce and/or quantify recall and responses biases. This talk will also provide the results of the effort, catch and harvest information collected at the Fisheries Management Zone (FMZ) level.

Saturday, March 6th - 11:00AM

Fish Community Response to Shoreline Restoration Practices in the Greater Toronto Area

Violetta Tkaczuk¹

¹Toronto and Region Conservation Authority, Restoration Services Division
5 Shoreham Drive, Downsview, ON, M3N 1S4 416/661-6600

Toronto and Region Conservation Authority has led the restoration and enhancement of habitats along the shores of Lake Wilcox, one of the largest lakes on the Oak Ridges Moraine. Lake Wilcox is located at the north end of the Town of Richmond Hill in York Region within the headwaters of the East Humber River Watershed. This inland kettle lake, surrounded by housing complexes and fast growing communities, had reached a state of degradation limiting many of the critical ecological components which facilitate the natural function of the lake. The restoration work focused on the east shore of Lake Wilcox where over the years the shoreline had become degraded as a result of bank erosion due to high public use and overgrazing of critical aquatic vegetation by migratory waterfowl. The shoreline was absent of emergent vegetation, lacked structural diversity, and did not provide any substantial habitat for local fish and wildlife. Through extensive planning and consultation, a strategic natural shoreline enhancement plan was developed, and implementation of aquatic habitats began in the summer of 2009.

Species specific essential habitats that target a range of life stages of fish, herpetiles, waterbirds, mammals and invertebrate communities were created and enhanced. Projects included fish spawning habitat, amphibian pools, in-water and shoreline structural habitat, diversified substrates, weedy pockets and pools, transitional habitat zones and emergent vegetation zones. The restoration work has created a structurally complex shoreline typical of a natural kettle lake on the Oak Ridges Moraine which will work to increase fish productivity and the overall health of the lake.

A range of monitoring programs have been undertaken including sediment sampling, water quality testing, vegetation mapping, and fish community analysis. Since 2001 the fish community at Lake Wilcox has been monitored annually using a Smith Root SR-18 electrofishing vessel. The extent of data obtained at Lake Wilcox pre, during and post restoration work, presents an opportunity to gain valuable insight and information concerning the response of fish communities to nearshore restoration work. Monitoring data obtained in 2009 marks the first year of post shoreline restoration data, and the initial findings show intriguing changes in the flora and fauna community. Future monitoring will continue to track the effects shoreline restoration work has on the biological communities and the overall health of Lake Wilcox.