The Southern Ontario Chapter of the American Fisheries Society

Annual Meeting

February 20-22, 2004
Leslie M. Frost Centre – Dorset, Ontario

"Changing Fisheries in Ontario"

ANNUAL GENERAL MEETING
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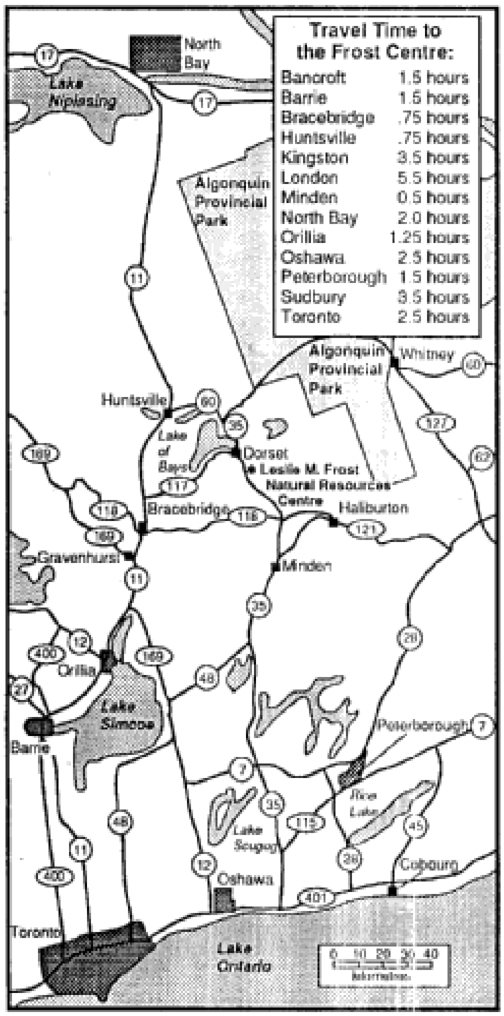

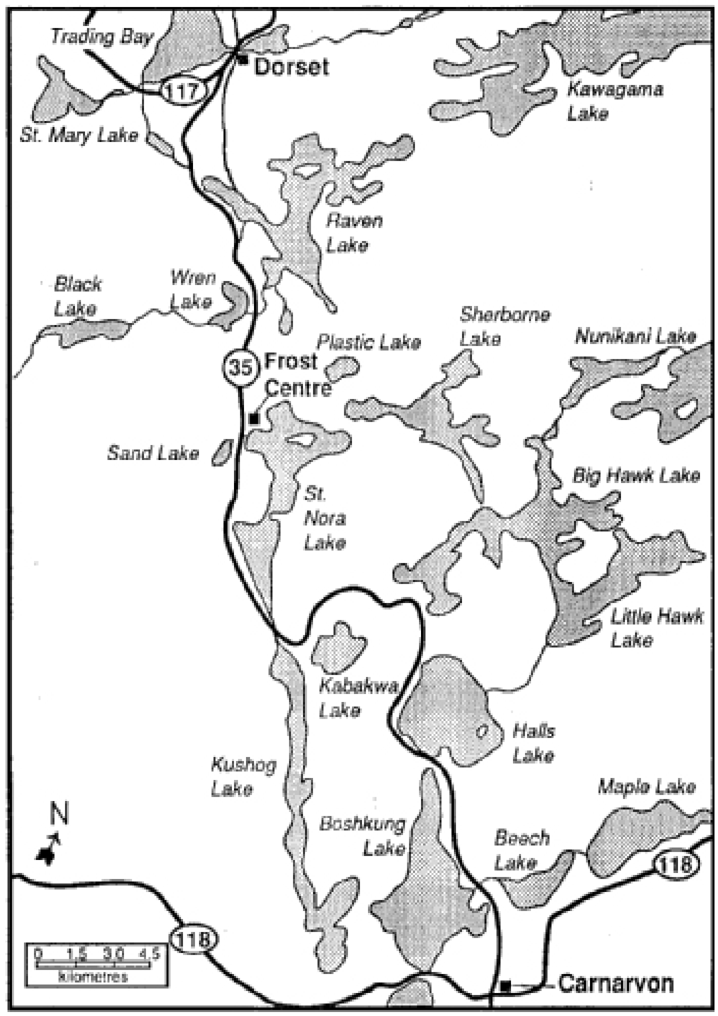

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"Changing Fisheries in Ontario"

Sponsored by: Algonquin Power; Biosonics Inc.; Credit Valley Conservation; Department of Fisheries and Oceans; Gartner Lee Ltd.; Great Lakes Power Ltd.; Grindstone Angling; Halltech Ltd.; Hook, Line and Sinker; Hoskin Scientific Ltd.; Lotek Wireless Inc.; Minnow Environmental Inc.; Natural Resource Solutions Inc.; Natural Sports; Ontario Ministry of Natural Resources; Ontario Water Power Association; Rainbow Sports, Stantec Consulting Ltd.; Tarandus Associates Ltd.; Tim Hortons and Totten, Sims and Hubicki Associates

Friday Evening 6:00 p.m. to 10:00 p.m.• Arrival and Registration

Saturday

07:30 BREAKFAST

08:20 Greeting and Conference Outline -
Frost Centre – Welcome and Announcements! - Frost Centre Staff

08:30 **Dr. John Casselman (Ontario Ministry of Natural Resources**) - *Effects of Climate Change and Invasive Species on Great Lakes Fisheries* – Plenary address at Parent Society Meeting, Quebec City, PC, 2003

09:20 **Dr. Gertrud Nürnberg (Freshwater Research) -** *Restoration of Eutrophic Lakes with Alum: the Preferred Method?*

10:00 **Ms. Andrea Sinclair (Niagara Restoration Council**) **-** *The Fish Barrier Removal Project* **-** *Restoring Fragmented Watercourses*

10:40 COFFEE

11:00 **Dr. Tim Johnson (Ontario Ministry of Natural Resources) -** *Changing Lake Erie Fisheries*

11:40 **Ms. Deb DePasquale (University of Guelph)** – *Low Head Sea Lamprey Barriers: A conceptual framework for predicting the sensitivity of stream fishes*

12:30 LUNCH

13:40 **Mr. Warren Dunlop (Ontario Ministry of Natural Resources) -** *A Landscape Approach to Fisheries State of Resource Reporting*

14:20 **Mr. Rob Eakins (Stantec Consulting Ltd) -** *Ontario Freshwater Fishes Life History Database demonstration*

15:00 **Tribute to Dr. E.J. Crossman** – Dr. John Casselman and Mr. Dave Green

15:20 COFFEE

Saturday Continued Student/Poster Session

15:40 **Mr. Mark Poos (University of Guelph) -** *Fish Species at Risk Assessment and Protection on the Sydenham River*

16:10 **Ms. Heather Surette (University of Guelph)** – *Ecological Integrity in Uncharted Waters: Historical changes in the Fish Assemblages of Point Pelee National Park of Canada*

16:40 **Ms. Melissa Robillard (Trent University) -** *Changes in the Fish Communities of the Kawartha Lakes, Ontario in Response to Anthropogenic Stressors*

17:30 SUPPER

Saturday Evening • 19:00 Poster Session, Annual Business Meeting and Social

Sunday

07:30 BREAKFAST

08:30 **Mr. Brian Fraser (Stantec Consulting Ltd) -** *Review of the Environmental Effects Monitoring Program*

09:10 **Mr. Scott Gibson (Ontario Ministry of Natural Resources)** - *Southern Ontario Stream Fish Communities: Patterns, Processes and Changes*

09:50 **Mr. Tys Theysmeyer (Royal Botanical Gardens)** - *Phosphorus: the Hidden Component of Fish Habitat, and how it has changed Burlington Bay*

10:30 COFFEE

10:50 **Mr. Al Dextrase (Ontario Ministry of Natural Resources) -** *Watershed Recovery Efforts for Species at Risk*

11:30 **Mr. Rod Penney (Ontario Ministry of Natural Resources) -** *Heterosporis in Yellow Perch in Lake Ontario and the Risks associated with its spread to the other Great Lakes*

12:30 LUNCH

13:30 **Mr. Jason Barnucz (Department of Fisheries and Oceans) -** *Developing Sampling Protocols for Fish Species at Risk in the Great Lakes Basin*

14:10 **Mr. Kevin Reid (Ontario Commercial Fisheries Association) -** *Research and Development of Decision Analysis and Adaptive Management to Lake Erie Percid Fisheries*

Closing remarks

Posters:

Fish-habitat associations in the Middle Detroit River. Nicolas W. R. Lapointe, Lynda D. Corkum, and Nicholas E. Mandrak (University of Windsor)

Estimating the age of shorthead redhorse (Moxostoma macrolepidotum) using several calcified structures. Taco den Haas, and Nicholas E. Mandrak (True North Environmental Consultants)

Evaluating the current status of deepwater ciscoes (Coregonus spp.) in Lake Huron. Nicholas E. Mandrak, Mary R. Finch and D.M. Marson (Fisheries and Oceans Canada)

Oral Presentation Abstracts

DePasquale, D.L. and R.L. McLaughlin.
University of Guelph, Guelph, ON

Predicting the sensitivity of stream fishes to low-head sea lamprey barriers using behavioural, morphological and life-history characteristics.

This study investigates the hypothesis that behavioural, morphological and life-history traits of stream fishes are adequate measures to predict their sensitivity to in-stream low-head sea lamprey barriers. Recent research indicates low-head barriers used to control the migratory influx of adult parasitic sea lamprey (*Petromyzon marinus*) into stream tributaries throughout the Great Lakes Basin, are having significant impacts on stream fish communities. Literature frequently suggests behavioural and life history traits can serve as reliable predictors of the effects of habitat disturbance on stream fish communities.

The Great Lakes Fishery Commission in their Strategic Vision of the Great Lakes (2001) seeks to conserve maximal biodiversity and species richness within stream communities while simultaneously maintaining effective control of sea lamprey populations. Numerical analysis found no relationship between stream fish life-histories and their sensitivity to barriers. However, there was a strong association between sensitivity and the migratory habits and lotic preferences of stream fishes. Predictive models help us to understand the response of fish communities to natural or anthropogenic disturbance and to help focus management resources and activities.

Akaike's Information Criterion (AIC) is an Information-Theoretic approach to model selection. More commonly used within the wildlife research community AIC is quickly gaining acceptance as it is more frequently being employed in the ecological sciences. It

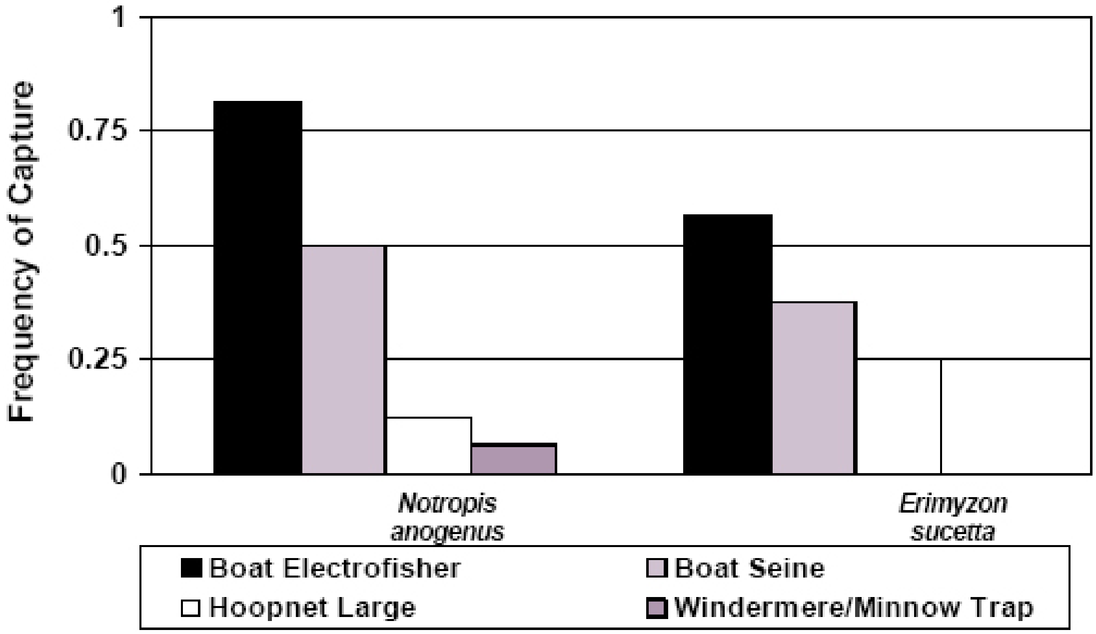
is a technique that, unlike traditional null hypothesis testing, does not rely on arbitrary significance levels and p-values to garner statistical confidence in the information inherent in a set of data. Instead AIC's firm tradition in both information and statistical theory underpins a new way of thinking about complex ecological problems. AIC is based on a fundamental expectation that the researcher has undergone a significant degree of critical biological thinking a priori to develop and specify multiple working hypotheses (models), before setting out to examine the predictive capacity of the data at hand. The process then is one of model specification followed by model selection. Once all potential predication correlates have been identified and multiple working models articulated, a series of simple calculations are performed that arrive at a value known as the AIC-value. Typically the model with the lowest AIC value is considered the best information model to describe the given data. There are guidelines and recommendations for accommodating small data sets and for interpreting the range of possible AIC values. However the attraction of AIC lies not in its actual value but in that fact that each model can be weighted (standardized) and compared directly with one another. The researcher can compare the strength and "Weight of Evidence" that supports one model over another and use that information to make inferences, based on actual data, about the population of interest. The resultant model can then be used as a basis to examine other datasets and make recommendations to resource managers and policy makers. Models are not intended to replace ground-truthing information and circumvent biological investigation but rather they should be used as a tool to help direct research funding and initiatives.

In this study we have learned that although body morphology, existing population densities and life history characteristics of stream fishes are likely important to population persistence, extinction risk lies largely with how they are using the river networks, and how often and how far they are moving in various stages of their life cycle.

Mandrak, N.E[1]., **J. Barnucz[1]**, M. Poos[2] and H. Surette[2].
[1]Department of Fisheries and Oceans, Burlington, ON
[2]University of Guelph, Guelph, ON

Developing sampling protocols for fish species at risk in the Great Lakes Basin.
There are 31 fish species at risk (SAR) present in the Great Lakes basin. They are found in a wide variety of habitats from small, headwater streams (e.g. redside dace, *Clinostomus elongatus*) to the hypolimnion of the Great Lakes proper (e.g. the deepwater ciscoes, *Coregonus* spp.). It is important to conduct ongoing assessments of the distribution and abundance of fish SAR to accurately determine conservation status, identify threats, and evaluate recovery actions. However, by their very nature, fish SAR are often difficult to capture and even more challenging to enumerate. We are currently developing species-specific sampling protocols for the ongoing, standardized monitoring of fish SAR. To determine the best methods for detecting a species, we are conducting sampling gear selectivity comparisons. Preliminary analyses indicate that a combination of active (backpack and boat electrofishing) and passive gears (hoop nets) used in a standardized manner allow for the best detection of many fish SAR in the

Great Lakes basin. Future analyses will examine the amount of sampling effort required for detection, and for developing population estimates.



Gear capture efficiency for species at risk occurring within the Old Ausable Channel, Pinery Provincial Park, Ontario

Penney, R.
Ontario Ministry of Natural Resources, Peterborough, ON

Heterosporis: A recently discovered protozoan parasite in Lake Ontario.
A previously unknown protozoan parasite (*Heterosporis* sp.) that degrades the muscle of yellow perch (*Perca flavescens*) has been confirmed in Prince Edward Bay, Lake Ontario (yr. 2000). This microsporidian parasite has been shown through laboratory studies to exhibit wide host specificity, thus showing potential for distribution throughout many important sport and commercial fish populations. Susceptible fish species include yellow perch, carp (*Cyprinus carpio*), largemouth bass (*Micropterus salmoides*), walleye (*Sander vitreus*), rainbow trout (*Oncorhynchus mykiss*), channel catfish (*Ictalurus punctatus*), northern pike (*Esox lucius*) and fathead minnow (*Pimephales promelas*). Clinical signs of the associated condition called Heterosporosis are observed internally; there are no external signs of infection with the parasite. Infected fish fillets are milky white in colour and granular in texture appearing as if they were freezer burned or previously cooked. Heterosporis has no effect on human health, however, the palatability of infected fillets is significantly decreased. Up to 80-95% of the fillet can be infected, which can significantly reduce the marketability of the fish. The Heterosporis parasite may be transferred through baitfish movement, stocking, and other mechanisms to water bodies throughout the Great Lakes. Currently much remains unknown about this parasite regarding its original source of origin, lifecycle, mode of transmission (scavenging predators, piscivorous birds and mammals may be vectors) and current

distribution. Additional sampling is underway in Lake Ontario to determine the current level of infection, and research on transmission of the parasite is ongoing.

Poos*, M.S.[1], N.E Mandrak[2], and R.L. McLaughlin[1]
[1]University of Guelph, Guelph, ON
[2]Department of Fisheries and Oceans, Burlington, ON

Fish Species Assessment and Protection in the Sydenham River.
The passage of new Canadian Legislation known as the Species at Risk Act (SARA) has created the need for improved scientific tools to assess and monitor species at risk (SAR), identify factors that limit their distribution and abundance, and identify their recovery requirements. We are using the Sydenham River as a test case to address these needs. The Sydenham is inhabited by 82 fish species, 8 with designations by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). In the SARA framework, once a SAR has been assessed by COSEWIC, a mandatory recovery strategy and action plan must be prepared. This plan is essential in determining recovery actions necessary for SAR preservation. Although recovery needs have been identified, specific assumptions within the SARA must be further tested to ensure proper SAR management. For example: Are we appropriately sampling fish SAR? Is the capture of fish SAR gear selective? Do fish SAR share habitat characteristics that allow easy remediation and, if so, will improving these habitat characteristics ultimately lead to species recovery? This study attempts to address these research requirements through a basinwide study of SAR in the Sydenham River. The objectives of the study were to: 1) identify what sampling gears were effective in capturing fish SAR; 2) identify what habitat characteristics influenced the presence of fish SAR; and, 3) identify appropriate recovery strategies.

Fishes were sampled at 100 sites throughout the watershed using a variety of gear types, including backpack electrofishing, seine nets, Windermere traps and gill nets. A combination of backpack electrofishing and seine netting effectively detected (at greater than 90% of sites where SAR occurred) four of the five species at risk that were collected. The fifth species, the spotted sucker (*Minytrema melanops*), was collected only using backpack electrofishing. Passive methods such as Windermere traps and gill nets were not effective in detecting fish SAR. Targeted sampling of fish SAR should utilize both backpack electrofishing and seine netting in order to increase detection.

Corresponding measures of water chemistry, geomorphology (using the Ontario Stream Assessment Protocol), and land use were made at each collection site. Canonical correspondence analysis (CCA) was used to determine species-environment relationships. Monte Carlo randomizations were used to develop forward selection of environmental variables that predicted SAR presence. Flow, turbidity, substrate size, amount of aquatic grasses and dissolved oxygen were all correlated with the presence of species at risk. However, all five species were dispersed amongst the environmental characteristics, with each species showing interspecific habitat preferences.

A preliminary post-hoc analysis assessed traditional management using single factor remediation (altering one species or habitat characteristic); management aimed at maintaining the most SAR collectively; and, management aimed at maximizing species richness. Managing using single factor remediation would not be prudent because SAR on the Sydenham River do not: 1) share habitat characteristics where they are found (from above results); 2) react similarly to shifts in these habitat characteristics (using generalized linear models); and, 3) differ in spatial distribution. Alternative recovery strategies, such as preserving the most SAR and maximizing species richness, were assessed using CCA biplots with Loess smoothing of both SAR and species richness. Both strategies would, at best, conserve 2 of the 5 SAR found, with the species richness scenario also conserving 20 other species. Obviously, management based on preserving all SAR in complex systems remains problematic. However it is clear that in complex systems like the Sydenham River, management plans to alter habitat features to benefit one SAR species must consider the varying and often contrasting habitat use of other SAR. In order to reach its mandate, SARA must consider: assessment based on multiple gear types; recovery based on SAR interspecific habitat preferences; and management based on innovative strategies that do not negatively favor one SAR over another.

Surette, H[1]., N.E. Mandrak[2] and T.D. Nudds[1].
[1]University of Guelph, Guelph, ON
[2]Department of Fisheries and Oceans, Burlington, ON

Ecological integrity in uncharted waters: historical changes in the fish assemblages of Point Pelee National Park of Canada.

National parks provide unique opportunities to study and protect fish assemblages, including the component fish species at risk (SAR). Parks allow the study of the factors that influence distribution and abundance of fishes in an environment where many confounding factors (e.g. land use, exploitation) are controlled. While science related to fishes and their habitats is growing, few studies have focused on the links between the dynamics of fish populations and communities, and the supply and distribution of critical habitats. Point Pelee National Park of Canada (PPNP) is unique because of its historic species record and nationally unique flora and fauna. PPNP is a spit extending south into Western Lake Erie, 30 km south of Windsor, Ontario. Historical sampling of the PPNP fish community, throughout the marsh complex, dates back to the 1940's and has continued periodically through 1997. By examining the historic composition of fishes in the ponds of the PPNP marsh complex, and comparing them to present day composition, we hope to gain an understanding of how, and why, species composition has changed over time. During the summers of 2002 and 2003, 111 sites in seven ponds in PPNP were systematically sampled to incorporate all wetland habitats, and provide information describing the current fish assemblage. Fishes were collected using a combination of passive and active gears including hoop nets, minnow traps, Windermere traps, trap nets, and seining. In the combined sampling of seven ponds, 36 fish species (four of which were fish SAR), representing 14 families were captured. Sorensen's Similarity Index (SSI) will be used to determine if the association between physical, chemical and biotic interactions are affecting the assemblages in the marsh complex, and whether the assemblages have changed over time.

Theysmeyer, T.
Royal Botanical Gardens, Burlington, ON

Phosphorus: the hidden variable of fish habitat, and how it has affected Hamilton Harbour.

Often the key factors that underpin fish habitat are overlooked, as in natural undisturbed environments they are in balance with the fish community. A hierarchy of key habitat variables in order of significance might be as follows: 1) temperature, 2) trophic status, 3) dissolved oxygen, 4) water clarity/colour, and then 5) physical features or lack there of. However in Hamilton Harbour, located at the western tip of Lake Ontario, and one of the Great Lakes Area of Concern (AOC), the underlying variables have been changed, resulting in a dramatic shift in the fish community. One of these underlying variables, trophic status has changed dramatically over the past century, and is changing again. In the 1850's the harbour was considered mesotrophic, with total phosphorus concentrations estimated to be typical of Ontario, at between 10 and 20 ug/l. This resulted in high water clarity and dissolved oxygen levels always above 5mg/l. At this time the harbour supported an incredibly diverse fish community, dominated by fall spawning runs of whitefish (*Coregonus clupeaformis*) and lake herring (*Coregonus artedi*) from Lake Ontario. By 1950 eutrophication had resulted in total phosphorus concentrations of 100ug/l (hypereutrophic). This resulted in key habitat variables such as water clarity declining to about 1m and much of the harbour becoming anoxic. As a result many fish species were extirpated, including the whitefish and lake herring. These fish were replaced by spawning runs of alewife (*Alosa pseudoharengus*), white perch (*Morone americana*) and gizzard shad (*Dorosoma cepedianum*), all species adapted to high disturbance environments. These new species are able to tolerate dissolved oxygen levels of 2 to 3mg/l and have egg incubation periods of less than 3 days. In contrast the whitefish and herring require higher dissolved oxygen for their survival, and environmental stability for the long egg incubation period (>100 days). The higher phosphorus levels did result in substantially greater productivity, with the Hamilton Harbour littoral zone estimated to support approximately 300kg/ha fish biomass, and the adjacent Cootes Paradise marsh supporting 800kg/ha. In comparison, the Severn Sound littoral zone on Georgian Bay is estimated to support 80 to 120 kg/ha. While productivity was higher, due to the poor water clarity, the fish community took the form of fish adapted to forage by taste and touch, not sight, such as catfish (Ictaluridae), and the introduced common carp (*Cyprinus carpio*). Currently the harbour, is under recovery through the Hamilton Harbour Remedial Action Plan (RAP), and native species populations are beginning recovery. As of 2003, harbour total phosphorus levels have been reduced to an average of 35ug/l (still eutrophic), and summer water clarity has increased to an average of 220cm. However, while the trophic status of the harbour is continually improving, as it is still eutrophic, the hypolimnetic zone still becomes anoxic during the summer months.

Poster Presentation Abstracts

Lapointe, N.W.R.[1], L.D. Corkum[1] and N.E. Mandrak[2].
[1]University of Windsor, Windsor, ON
[2] Department of Fisheries and Oceans, Burlington, ON

Fish-habitat associations in the Middle Detroit River.
A 10 km reach of the Detroit River near Fighting Island was sampled during the summer of 2003 to examine fish-habitat associations. Using underwater video and Ekman grabs, we classified the substrate at 300 locations in depths <3 m as either mud, sand, gravel, weeds on a soft substrate, or weeds on a hard substrate. Thirty sites with homogeneous substrates were selected at random. Fishes were then sampled at these sites in July and August using minnow traps, Windermere traps, hoop nets, trap nets, seine nets, and boat electrofishing. Based on species richness and abundance, minnow traps and trap nets were found to be inefficient sampling methods, whereas seine netting captured the highest species diversity (32 species). Overall, 42 species were found in the study area including spotted sucker (*Minytrema melanops*), a species at risk. Yellow perch (*Perca flavescens*), spottail shiner (*Notropis hudsonius*), bluntnose minnow (*Pimephales notatus*), rock bass (*Ambloplites rupestris*) and largemouth bass (*Micropterus salmoides*) were the most common species. Cyprinids (spottail shiner and bluntnose minnow) were spatially distinct from largemouth bass, pumpkinseed (*Lepomis gibbosus*) and yellow perch.

den Haas, T. and N.E. Mandrak[,2]
[1]True North Environmental Consultants, Guelph, ON
[2]Department of Fisheries and Oceans, Burlington, ON

Estimating the age of shorthead redhorse (Moxostoma macrolepidotum) using several calcified structures.

In general, fish can be aged using their calcified structures including scales, pectoral fin rays, otoliths, vertebra, or opercula. The use of the calcified structures for aging shorthead redhorse (*Moxostoma macrolepidotum*) has not been studied before in Canada, although related species such as white sucker (*Catostomus commersoni*) have been studied. For the white sucker, the use of scales of mature fish (approx. 5 yrs and older) were found to be inappropriate for ageing. Otoliths, vertebra, and opercula have been found suitable for age estimation of white sucker. The purpose of this study is to determine which calcified structures of shorthead redhorse can be used for age estimation.

Mandrak, N.E., **M.R. Finch** and D.M. Marson.
Department of Fisheries and Oceans, Burlington, ON

Evaluating the current status of deepwater ciscoes (*Coregonus* spp.) in Lake Huron.
The purpose of this ongoing study is to evaluate the status of deepwater cisco species in Lake Huron. The current status of deepwater cisco species is relatively unknown in Lake Huron; however, it is thought that the deepwater cisco (*Coregonus johannae*), kiyi (*C. kiyi*)

and shortjaw cisco (*C. zenithicus*) might be extirpated from the lake. Although ciscoes are still commercially fished, and experimentally sampled, in the Canadian waters of Lake Huron, they are typically grouped together as "chubs" as the deepwater cisco species are difficult to distinguish from one another. Deepwater ciscoes were captured by DFO, OMNR and the Chippewas of Nawash First Nation using fine mesh gillnets in depths of 30-200m at various locations in Lake Huron during 2002 and 2003. For each of the 1514 specimens examined, the following characters based on Koelz (1929) were evaluated: lower jaw position; angled snout; number of gill rakers; length of gill rakers; paired fin length, and eye diameter. Gill raker characteristics were examined by extracting the first gill arch. Species determinations were made by using the morphological character guide developed by Todd (data unknown). Three species of deepwater ciscoes were identified from the Lake Huron cisco samples: lake herring (*C. artedi*), bloater (*C. hoyi*) and shortjaw cisco (Figure 1). The finding of shortjaw cisco is interesting as it was previously thought to have been extirpated in Lake Huron since 1982 (Todd 2002). Bloater constituted the largest proportion of ciscoes from the sampled sites. Ongoing field sampling and lab identification of deepwater ciscoes is hoped to yield more information on the status of these fishes in Lake Huron.

Koelz, W.1929. Coregonid fishes of the Great Lakes. Bulletin of the Bureau of Fisheries. 43, 1048:297-643.

Todd, T.N. 2002. Status of the Shortjaw Cisco, *Coregonus zenithicus*. COSEWIC Status Report. Unpublished manuscript.

Todd, T.N. Date unknown. Sure-fire guide to identifying the ciscoes of Lake Superior. United States Geological Survey. Unpublished manuscript.

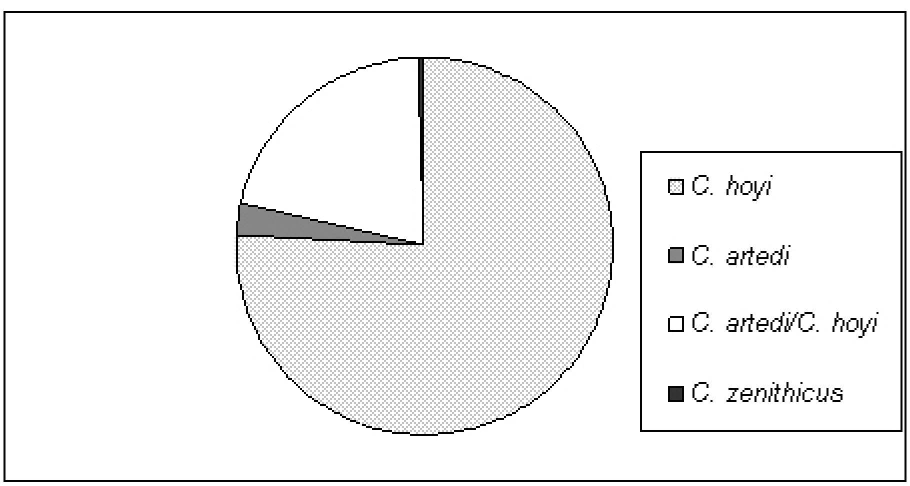


Figure 1. Proportion of cisco species found in Lake Huron.

Grand Prize – SOC Raffle

The Southern Ontario Chapter of the AFS is pleased to announce that the grand prize to be awarded at the Annual General Meeting in Dorset (Feb 20-22) is a one day guided drift boat fishing adventure for two (retail value $500). This amazing opportunity is made possible by the generosity of Grindstone Angling in Waterdown, Ontario who donated the drift boat. Dave Green, your very own SOC President will be your guide for the day on a drift of your choice. You and your fishing partner will have the choice of booking an early spring drift for steelhead, a summer drift for resident rainbow trout on the lower Grand River or bass on the Saugeen River, or a fall fishing extravaganza for aggressive fall steelhead and/or salmon on the Saugeen or Grand River. This prize will include transportation from a central location, lunch and all the fishing hints and tactics that you can handle. Historically, Grindstone catered to fly fishing, but spin and/or float fishing will also be supported. All you need is a pair of waders, camera and your fishing equipment. This prize is available for one year and cannot be reimbursed for the monetary value. A date will be selected in advance but may be subject to change due to river flow or weather conditions. For details on Grindstone and their fishing trips please visit: http://www.grindstoneangling.com/

Tickets will be sold at the Saturday night social (February 21 – note if you cannot attend and are interested in the prize contact a SOC ExComm member for tickets or have an AGM attendee purchase tickets on your behalf). Ticket price is $5 each or 3 for $10. In addition to the grand prize we will have numerous other prizes. Good Luck to all avid anglers and fisheries professionals.

NOTES