

AFS Physiology Section



NEWSLETTER SUMMER 2003

President's Message



Chris Kennedy

Dear Colleagues,

Following a hectic, profitable, productive and exciting meeting in Vancouver, a bit of a lull had settled on our Section. However, things began to pick up as

the midyear meeting of the AFS in Baltimore in March approached. We were well represented by Past-President Jay Nelson who gave an accounting of our more recent activities, program and finances. This summer our Section is putting on a symposium at the annual meeting of the AFS in Quebec City, Canada, which was organized by myself and Denis Chabot. I hope we will be well represented at the conference, and encourage you to let me know if you will be there, as our Section has time and space booked for a meeting. Other exciting things are beginning to happen with preparations for our next Congress at the Tropical Hotel in Manaus, Brazil, to be held August 1-5, 2004. The Congress will be hosted by Dr. Dal Val and Don MacKinlay. Contact Don or Dal if you have any ideas regarding potential symposia. Past-President Michael Redding is again pursuing funds for student travel, and I wish him the best of luck with that project. Our longtime Secretary/Treasurer Gail Dethloff is retiring in December, and I'd like to acknowledge all her work and effort in supporting the Section these many years. Many thanks from myself, and I'm sure, all of our members! We will soon be looking for a replacement, so if anyone would like to contribute to the running of the Section, please let me know. I hope you all have a great summer, and if you have any questions about the Section, feel free to contact me.

With best regards,

Chris

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Wrap-up of Congress '02



Don MacKinlay

The Fish Biology Congress held in Vancouver in July 2002 was a great success. Over 400 scientific papers were presented in oral and poster formats to just over 400

participants. The Proceedings of the 22 different technical Symposia can be viewed on the Congress website at; <http://www.fishbiologycongress.org/>.

Dr. Chris Wood from McMaster University was honoured (in absentia) with the Award of Excellence in Fish Physiology for outstanding, long-time contributions to our science. As Dave Randall quipped (in photo, below, with Don MacKinlay) while accepting the award for Chris, “few people have the time to read all of the vast array of articles that Chris has written, probably not even Chris himself.” Chris joins a distinguished few great physiologists who have been awarded this honour, to be displayed on a permanent plaque at AFS Headquarters.



Acknowledgements by Don MacKinlay:

My sincere thanks go to the many people who contributed to the success of this 5th Congress.

The organizers of each of the Symposia, as well as the people who gave papers, were, as always, the heart of the Congress. Thanks to: Chris Kennedy, Alan Kolok, Scott McKinley, Bill Driedzic, R. Aidan Martin, Kurt Gamperl, Tony Farrell, Brian Small, Jeff Silverstein, Matt Vijayan, Alice Hontela, S. Marshall Adams, Bruce Barton, Joe Cech, Jr., Cincin Young, Tina Swanson, Karin Howard, Ernie Brannon, John Jensen, Craig Clarke, Steve McCormick, Mary Moser, Jennifer Bayer, Patricia Wright, Bill Milsom, Tadeo Rantin, Dave Randall, Dick Beamish, Brian Riddell, Dal Val, Colin Brauner, and especially to Ted Taylor for organizing the Plenary Session as a tribute to Dave Randall.

The staff who worked on the logistical details of the Congress included:

Karin Howard, who helped with editing and catering; Anne Martin, who helped with editing and computer support; Paige Ackerman, who organized the student volunteers; Cammi and Christie MacKinlay and Kirsten Schlosser, who provided break catering; Callan MacKinlay, who provided computer and gopher support; and especially Rosemary Pura and her staff at UBC Conference and Accommodation Services, who provided outstanding support and service throughout the Congress.

Financial assistance was provided for student travel by the US Department of Agriculture and the US Geological Service (through diligent application by Mike Redding (standing at the far left of the picture of all the Student Travel Grant winners, below), with help from Gail Dethloff, Steve McCormick and Jay Nelson), and for publication, meeting rooms and student help by Fisheries and Oceans Canada (through applications by John Davis and Don MacKinlay). UBC Zoology provided some in-kind support (thanks to Bill Milsom and Trish Schulte).

The Congressional Legion of Honor

Don MacKinlay

The Fish Biology Congress has been led from its inception by a small group of dedicated men, who have been given commemorative plaques in recognition of a job well done. They are listed below with some of their Congressional accomplishments (from left to right in the photograph taken during the awards ceremony at the barbeque at the Museum of Anthropology, overlooking the ocean and the snow-capped mountains on a beautiful summer's evening):



Dave Randall, City University of Hong Kong (ex University of B.C.)

- contributed papers to every Congress (including plenary talk in '94), plus organized Symposia in '96 (Tropical), '98 (Nitrogen), '00 (Gills) and '02 (Hypoxia).

Dal Val, INPA, Manaus Brazil.

- contributed papers to every Congress since '96 (including Plenary talk), plus organized Symposia in '96 (Tropical), '00 (Extreme Environments), and '02 (Tropical).

Bruce Barton, University of South Dakota.

- contributed papers to every Congress, plus organized Symposia in '96 (Contaminants), Stress in '98, '00 and '02.

Joe Cech, University of California, Davis.

- contributed papers to every Congress (including 10 co-authorships in '94), and organized Symposia in '96 (Performance), and Migration in '00 and '02.

Steve McCormick, Conde Anadromous Fish Lab, Massachusetts.

- contributed papers to every Congress, plus organized Symposia in '96 (Migration), '98 (Smolts), '00 (Migration) and '02 (Ion Regulation). A Past President of the AFS Physiology Section, Steve started the Student Travel Grant Program.

Kurt Gamperl, Memorial University, Newfoundland

- contributed papers to every Congress plus organized Symposia on Cardiovascular in '98, '00 and '02. Kurt is currently President-Elect of the AFS Physiology Section.

Tony Farrell, Simon Fraser University, B.C.

- contributed papers to every Congress (including plenary in '96) plus organized Symposia on Cardiorespiratory/vascular in '98, '00 and '02.

Don MacKinlay, Fisheries and Oceans Canada, Vancouver

- contributed papers in '94, '96 and '02, plus co-organized and published all 52 Symposia so far and was Host in '94 and '02. A Past President of AFS Physiology Section.

Chris Kennedy, Simon Fraser University, B.C.

- contributed papers and organized Toxicology Symposia in '98, '00 and '02. Chris is the current President of the AFS Physiology Section.

Jay Nelson, Towson University, Maryland

- contributed papers to all Congresses since '96, plus organized Symposia in '96 (Performance), '98 (Tropical) and '98 (Herbivorous), plus was Host in '98. Jay is currently the Past President of the AFS Physiology Section.

I would like to express my sincerest thanks to all of the Legionnaires, plus all of the other organizers of technical Symposia, and to all the authors of papers, for their assistance in making the Congress a scientific, literary and social success.

Don MacKinlay

Congress Chair



Terrific Trade Show

Jay Nelson

The 5th International Congress on the Biology of Fish included our first ever trade show. Vendors Lotek Wireless, Smith-Root, Global Tracking Systems and Hydroacoustic Technologies rented booths and seemed happy with the response they received from our delegates. Our parent society, AFS also had a booth displaying their wares and the National Research Council of Canada had a booth describing some of their programs. One indicator of our success in this endeavor is that several companies that did not participate in Vancouver have contacted us about having booths in Manaus. So, it's never too early. If you know someone that would like to hawk their fish biology related wares in sunny Manaus, have them contact Past-President Jay Nelson at jnelson@towson.edu.

Physiology Section Symposium at the annual meeting in August

Denis Chabot

The next general annual meeting of the American Fisheries Society will be held in Quebec City on August 10-14, 2003. The general theme of the congress is "Worldwide decline of wild fish populations" The physiology section has organized a symposium titled "Using physiology to assist in management decisions of declining fish stocks".

The focus of this symposium is to illustrate how physiological information can be used to assess and predict fish productivity, with special reference to

how this knowledge can be applied to the management of fish stocks. The talks will provide examples where temperature, dissolved oxygen, components of an energy budget, or other environmental or physiological factors can affect productivity (egg production, recruitment, growth etc.) and thus affect fish populations. It is the goal of this symposium to communicate recent research findings that will improve the management of fish stocks and populations.

The symposium will take place on Monday afternoon (Aug. 11) and Tuesday morning (Aug. 12), and will be moderated by Denis Chabot (Institut Maurice-Lamontagne) and Chris Kennedy (Simon-Fraser University). Twenty talks and six posters have been selected (there is a poster session on Wednesday morning, Aug. 13).

On Monday afternoon, the following themes will be presented: Bioenergetics of reproduction, Techniques, Anthropogenic effects on fish abundance or reproduction, and chemical challenges, toxicity, endocrinology.

On Tuesday morning, the themes will be Factors affecting the quality of stock assessments or measured physiological variables, Swimming activity and growth, survival, condition, fatigue or reproduction, and Environmental challenges (temperature, hypoxia, salinity, food deprivation).

We'll see you in Quebec City!

Denis and Chris

Bioenergetics of reproduction	
Mark S. Bevelhimer*, Yetta I. Jager and Ken Lepla	A Bioenergetics Model of Gonad Development and Egg Production in White Sturgeon <i>Acipenser transmontanus</i>
Yvan Lambert	<i>Condition, and reproductive potential of northern Gulf of St. Lawrence cod and its influence on the</i>

	<i>population's rate of increase</i>
Techniques	
Christine M. Moffitt*, Yasunari Kiryu, William P. Connor, James L. Congleton and Douglas Burum	EFFECTS OF PIT TAGS ON GROWTH, SURVIVAL AND BLOOD CHEMISTRY OF FALL CHINOOK SALMON IN DIFFERENT TEMPERATURES
Christopher B. Rees*, Hong Wu, Yu- Wen Chung-Davidson and Weiming Li	Cellular distribution and relative levels of CYP1A mRNA and protein in lake trout (<i>Salvelinus namaycush</i>) brain.
Thomas E. McMahon*, Alexander V. Zale, Frederic T. Barrows, Jason Selong and Robert Danehy	Laboratory protocol for deriving ecologically relevant temperature criteria for aquatic species
<i>Antropogenic effects on fish abundance or distribution</i>	
Munehico Iwata*, Yasufumi Fujimoto, Kouhei Kurosaka, Noriyoshi Sato	<i>Some freshwater fishes decrease with environmental changes by human activities</i>
<i>Chemical challenges, toxicity, endocrinology</i>	
Michelle Y. Monette* and Stephen D. McCormick	Short-term, sub-lethal acid/aluminum effects on salinity tolerance of Atlantic salmon smolts
Ken Overturf*, Scott LaPatra, and Ronald Hardy	Molecular Probes for the Analysis of Fish Health
Cheryl A. Murphy*, Kenneth A. Rose and Peter Thomas	Using physiological modeling to relate biomarkers of endocrine disruption to ecological endpoints
S. Flynn*, M. Reith, M. Matsuoka, D. Martin-Robichaud, T. Benfey	Gynogenesis in shortnose sturgeon, <i>Acipenser brevirostrum</i> , LeSuere

Factors affecting the quality of stock assessments or measured physiological variables	
Taggart, C.T.*, E. Colbourne and J.	Interpreting variation and trend in the physiological state of a

Morgan	stock using annual point estimates: how much is artefact?.
Boonchai K. Stensholt	On causes and effects of variation in fish vertical distribution expressed in terms of the free vertical range
Swimming activity and growth, survival, condition, fatigue or reproduction	
Anthony Peter Farrell*, Scott Hinch, Mike Healey, David Patterson, Steve Macdonald and Steve Cooke	Physiological studies on adult wild salmon in relation to their upstream migration in the Fraser River, BC.
Handelsman, C. A.*, G. Claireaux and J.A. Nelson	Repeat swimming performance of European sea bass (<i>Dicentrarchus labrax</i>) after time in an estuary: Implications for pelagic fish management
Darren T. Lerner*, Amy M. Moeckel and Stephen D. McCormick	Stress and Fatigue During Fish Ladder Migration Of Adult American Shad, <i>Alosa sapidissima</i>
Environmental challenges (temperature, hypoxia, salinity, food deprivation)	
Peter Allen*, Joseph J. Cech, Jr., Mary Nicholl, and Stephanie Cole	Effects of elevated and fluctuating temperatures on the growth of juvenile green sturgeon (<i>Acipenser medirostris</i>)
Dutil, J.-D. *, H. Lemieux, M. Martinez, H. Guderley, F. Bélanger, P. Blier	Linkages between physiological condition, individual performance and stock productivity in cod
Chabot, D.*, J.-D. Dutil, C. Couturier and S. Plante	Hypoxia constrains growth production of the northern Gulf of St. Lawrence cod (<i>Gadus morhua</i>) stock
James L. Congleton*, Tyler Wagner, Darin T. Jones, and Joseph T. Evavold	Blood-chemistry correlates of nutritional condition in lab-reared and migrating juvenile chinook salmon <i>Oncorhynchus tshawytscha</i>
Peter F. Galbreath*, Nathan D. Adams, and Thomas H. Martin	Effect of heating rate on measurement of chronic lethal maxima in rainbow trout, brook trout and brown trout

World Perch Experts to Convene in Madison, Wisconsin in July

Terence Barry

Perch scientists from around the world will meet July 20-24 in Madison, Wisconsin, for Percis III, the Third International Percid Fish Symposium. A sequel to the Percis II Symposium held in 1995 in Vaasa, Finland, Percis III is designed to provide updates on the latest research on percid fishes, identify future priority research areas, and increase international collaboration and exchange among researchers. Featured symposium topics include:

- * Current status of percid fisheries
- * Management of percid fisheries
- * Recent breakthroughs in percid aquaculture
- * Percid biology (including sessions on ecology, genetics and physiology)

The symposium will also feature two special sessions on (1) the status of yellow perch in the Great Lakes and (2) the ecology and evolutionary biology of darters (Etheostomatine fishes). The deadline for submitting abstracts and early registration is March 15. The deadline for other communications and hotel reservations is June 15. For more information, including online registration, visit www.seagrant.wisc.edu/percis.

Percis III is sponsored by the Sea Grant College Programs of Minnesota, Ohio and Wisconsin; North Central Regional Aquaculture Center; Great Lakes Fishery Commission; Great Lakes Fishery Trust; Minnesota Department of Natural Resources; Cornell University Biological Field Station; Michigan State University's College of Agriculture & Natural Resources and Department of Fisheries & Wildlife, and the University of Wisconsin-Madison Aquaculture Program.

Terence Barry, University of Wisconsin-Madison

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Spotlight on Research: Newfoundland's Ocean Sciences Centre



Kurt Gamperl

Newfoundland, Canada's far eastern province, is known world-wide for its rugged beauty, icebergs, whales, birding, and yes fog. However, there is another gem in this province's fabric, the Ocean Sciences Centre (OSC; www.osc.mun.ca). This facility, which is part of Memorial University of Newfoundland, is a self-contained facility at the head of Logy Bay, a small rocky cove on the outskirts of St. John's. The geographic location of the OSC lends itself to the shore-based study of cold-ocean processes and sub-arctic and arctic organisms, and is the only year-round research laboratory of its kind in North America.

The OSC consists of two main laboratory buildings, three buildings dedicated to holding aquatic animals including the new Aquaculture Research and Development Facility

(ARDF), and other buildings which house the Field Services Unit. In total, there are 35 self-contained laboratories of varying size (20 provided with flowing seawater), 2,000 m² dedicated to the maintenance of aquatic animals, and 750 m² for general use rooms for surgery, microscopy, histochemistry, photography, image analysis, centrifugation, radioisotope counting, aquatic respirometry, and nine cold rooms. The holding facilities permit investigators to work with organisms ranging from bacteria to adult halibut that can be held under temperature, photoperiod, and oxygen controlled conditions. Further, the ARDF's facilities and capacity for live food production (daily production capabilities of 1,000 L algae, 1 billion rotifers, and 500 million *Artemia*) permit commercial scale 'egg to plate' aquaculture trials on alternative species.

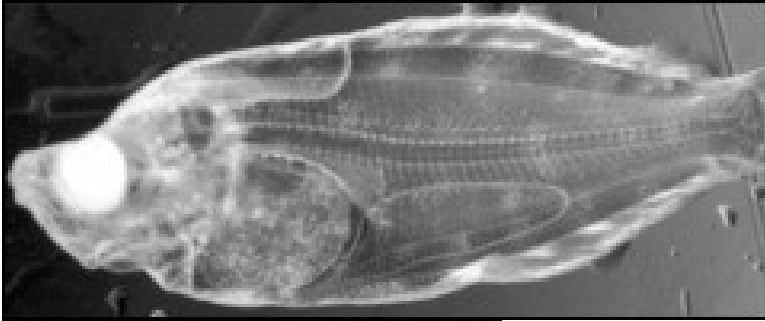
The Ocean Sciences Centre provides it's 11 resident faculty, and scientists at Memorial University and other institutions, with access to the flora and fauna of the north-western Atlantic Ocean, and supports research activities related to aquaculture (finfish and molluscs), oceanography (biological and chemical), and basic aspects of behaviour, biochemistry, and physiology that are fundamental to these two themes. A large component of the OSC's research is on fish biology/physiology, and species presently under vigorous and sustained scientific investigation are Atlantic cod, Atlantic salmon, Atlantic halibut, witch flounder, wolffish, rainbow trout, cunner, winter skate, sculpins, sea raven, lumpfish, winter flounder, and eel pout.

Current research on fish biology/physiology by resident and cross-appointed faculty utilizes a wide variety of approaches and techniques. **Dr. Joe Brown:** Applies theories of behavioral ecology to studies on larval and juvenile fishes, and conducts applied larviculture research on species with aquaculture potential. **Dr. Bill Driedziec:** Research themes include, activation of metabolic pathways at low temperature, hypoxic adaptation in fish hearts, protein synthesis in free-living fish, and growth enhancement of fish in aquaculture. **Dr. Kurt Gamperl:** Endeavours to understand how environmental and physiological variables interact to affect fish biology. Central to this research are the role that blood oxygen transport, cardiac function, stress and humoral factors play in mediating fish performance under varied environmental conditions. **Dr. Garth Fletcher:** The diversity, evolution, mechanisms of action, and physiological regulation of fish

antifreeze proteins and their genes; transgenic salmon containing GH, lysozyme and antifreeze gene constructs **Dr. Helene Volkoff:** Research focuses on the neuroendocrine mechanisms regulating food intake and reproductive behaviour in fish. **Dr. Rasul Kahn:** Studies long-term effects of parasites on fish health, and the synergism between parasites and pollutants. **Dr. Margaret Burton:** Focuses on fish reproduction, including variations in gametogenesis and the control of early oogenesis and spermatogenesis in northern marine teleosts. **Dr. Derek Burton:** Investigates the neural and hormonal control of fish chromatophores.

The OSC provides facilities and support services to qualified researchers who wish to collaborate with OSC personnel or conduct independent research. Researchers wishing to visit or conduct research at the OSC should contact the OSC Director (oscdir@mun.ca).





**Physiology Section Profile: Dr. Chris
Myrick**

Dr. Chris Myrick grew up in a family of an international diplomat. Because governments tend to move their diplomats around the world, he spent his boyhood years on several continents. Chris enjoys sportfishing very much, and he has many great stories about fishing in the Mediterranean Sea and Australia's coastal waters. Dr. Myrick's family moved to the USA, and he entered university life at the University of California, Berkeley. I first met Chris when he was finishing up his undergraduate work there (in Natural Resource Management), and I was impressed with a presentation he made at an AFS (California-Nevada Chapter) meeting. We discovered that we had some interests in common, regarding stream-dwelling fishes and how they function. Fortunately, I was able to recruit Chris for graduate work in my laboratory at UC Davis.

Because Dr. Myrick was not sure about committing to a research career (perhaps, because he saw me around the lab and office so much during evenings and weekends?) as he entered UC Davis, Chris started (and completed) an M.S. program first. He conducted an excellent thesis research project (swimming performance of four, native stream fishes), which significantly advanced our understanding of "non-game" species' swimming abilities, assisting intelligent management of modified streams for restoring native fish species balance. He presented these findings at some meetings and we published the results in a well-known journal.

I'm not sure whether it was his positive M.S. research experience in my lab, the securing of grant funds for subsequent research, the enchanting female grad. student down the hall in Peter Moyle's lab (Gail Dethloff, Ph.D., who is now Chris' wife, as well as the Physiology Section's Treasurer), or the persuasive voice of the UCD Men's Volleyball Team that convinced Chris' to stay on for a Ph.D. In any case, he stayed to complete an interesting dissertation on salmonid bioenergetics, conducting several experiments on rainbow trout strains and subspecies to elucidate temperature-related differences in food consumption rates, growth rates, metabolic rates, temperature preferences and tolerance limits, and swimming performance. Dr. Myrick found subtle differences among resident and migratory California trout strains and important differences from more northern strains. His high-quality work is unique, because no one has previously collected these data in such "complete" studies, and no one has used genetic strains from this far south in

the rainbow trout's geographic range. Chris has presented some of this work at our Biology of Fishes Congresses, and the relevant stream of papers started appearing in 2000.

Dr. Myrick impressed me as a natural teacher, as my “Physiology of Fishes” T.A. at UCD, even with his willingness to help plumb the tanks for the class laboratory sessions, each year. At CSU, he teaches several fish-related courses. These include undergraduate “Fish Physiology,” “Fish Culture,” and “Introduction to Fish Biology” courses, and a graduate “Advanced Fish Ecophysiology” course (all of which have laboratory components!) Apparently CSU is treating him well, by building a new laboratory building for his research and teaching activities. Ever the entrepreneur, Chris had his Fall Semester “Fish Culture” students helping him plumb the new lab, as they set up tanks for their class projects. I am proud to claim Chris as one of my “academic offspring,” and I look forward to more collaborations with him in the future!

Written by Joe Cech, Jr.



Welcome to VI International Congress on the Biology of Fish

Aldaberto Val

The VI International Congress on the Biology of Fish will be held in the Tropical Hotel, Manaus, Amazonas, Brazil, on the first week of August 2004. This is the next in

the series of American Fisheries Society Congress in fish biology. The two preceding ones were held in Aberdeen (2000) and Vancouver (2002). The local organizers are Drs. Adalberto Val and Vera Almeida-Val of INPA (National Institute for Research in the Amazon). The Tropical Hotel is one of the most beautiful hotels in South America and is located at the margins of Rio Negro. Manaus is a thriving modern city located in the heart of the Amazon jungle, just in front of the confluence of Rio Negro (black water) and Rio Solimões (white water). These two rivers form the greatest Rio Amazonas. This will be an excellent opportunity to visit the Amazon, the most exciting area on the earth for a fish biologist as near 40% of all freshwater teleosts are endemic to the Amazon and its tributaries. In addition, you can visit the Amazonas Theater, built during the Rubber period; spend over night on the floating lodges; and have a glimpse on one the most spectacular cultural manifestation of the tropics - the bumba-meu-boi dance. The venue will take place in Tropical Hotel on Sunday, August 1st, 2004. Monday, Tuesday, Wednesday and Thursday are reserved for 42 scientific sessions. We are estimating to welcome something around 750 participants, including colleagues and students from all Brazilian states and from several countries world wide. You may want to organize one of these sessions. If so, please contact us (Dal, dalval@inpa.gov.br Vera, veraval@inpa.gov.br or Don MacKinlay MacKinlayD@pac.dfo-mpo.gc.ca). We are negotiating a preferential rate at Tropical Hotel as well as special air fares to Manaus, from São Paulo, US (Miami) and Europe. Soon, all this information will be available on a web page. On Friday we are organizing a full day field trip to water meeting zone, Lake Janauari and Negro river beaches. The local committee is working on a fantastic social program for accompanying persons and this includes a visit to Presidente Figueiredo waterfalls and Anavilhanas archipelago. You can't miss this meeting. Attending it, you will never forget it.

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THE PHYSIOLOGY SECTION**

Please visit the AFS website (<http://www.fisheries.org/>) click "membership" from the menu and join online. Or contact

The American Fisheries Society, 5410 Grosvenor Lane, Bethesda, MD 20814, phone 301/897-8616, fax 301/897-8096 | e-mail <mailto:main@fisheries.org> for more information.
