

## **DYLAN JOHN FRASER**

**CURRENT ADDRESS:** Department of Biology, Dalhousie University, Halifax, NS, B3H 4J1

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**CITIZENSHIP:** Canadian

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### **ACADEMIC POSITIONS**

- 2009 (July) Assistant Professor, Conservation and evolutionary biology  
Department of Biology, Concordia University, Montréal, QC
- 2007-08 Postdoctoral Fellow and Adjunct Research Associate, Conservation biology  
Department of Biology, Dalhousie University, Halifax, NS
- 2006 Temporary Assistant Professor  
Department of Biology, Dalhousie University, Halifax, NS
- 2005-07 NSERC Postdoctoral Fellow, Conservation biology  
Department of Biology, Dalhousie University, Halifax, NS

### **SCIENTIFIC COMMITTEES**

- 2008-12 Committee on the Status of Endangered Wildlife in Canada (COSEWIC)  
Freshwater Fish Species Specialist Committee

### **EDUCATION**

- 2000-05 PhD, Evolutionary biology and population genetics  
Département de Biologie, Université Laval, Québec City, QC
- 1996-00 BSc, Fisheries biology (Specialized Honours)  
Department of Zoology, University of Guelph, Guelph, ON

### **FUNDING AWARDS**

#### **MAJOR SCHOLARSHIPS, GRANTS OR CONTRACTS**

- 2007-08 Department of Fisheries and Oceans Contract (\$20,000) The role of hatcheries in the conservation of biodiversity in Canada
- 2006-09 NSERC Strategic Project research grant (\$510,000 over 3 years) Principal writer: Multi-generational interactions between escaped farm and wild Atlantic salmon: a risk assessment perspective (J.A. Hutchings & L. Bernatchez)
- 2005-07 NSERC Postdoctoral Fellowship (\$80,000 over 2 years)
- 2002-04 NSERC Postgraduate Scholarship (doctoral) (\$42,000 over 2 years)
- 2002-04 NSERC Northern Research Scholarship (\$10,000 over 2 years)
- 2002-03 Eeyou Namess Corporation. Conservation genetics of brook charr (research grant) with L. Bernatchez (\$30,000, 1 year)

#### **OTHER SCHOLARSHIPS AND GRANTS**

- 2007 Trout Nova Scotia, Trout Unlimited Canada and the Ecology Action Centre of Halifax conservation research grant, with D.C. Hardie and J.A. Hutchings (\$7,500)
- 2007 Evolutionary change in human-altered environments (travel grant) (\$500)
- 2006 Canadian Society of Zoologists (travel grant) (\$1,000)
- 2006 Atlantic Salmon Federation Olin Fellowship (\$1,000, 1 year)
- 2004 Fonds Richard-Bernard et Société Provancher (scholarship) (\$2,500)
- 2002 Clemens Rigler Award (travel grant) (\$300)
- 2001 Le Fonds Écologique de Anne Vallée (scholarship) (\$1,500)
- 1999 George Latornell Award (travel grant) (\$500)

#### **DISTINGUISHED AWARDS**

- 2006 TWM Cameron Award, Canadian Society of Zoologists (Outstanding PhD thesis in zoology in Canada for 2005; \$500)
- 2005 Tableau d'honneur de la Faculté des études supérieures/ Faculty of Graduate Studies Excellence List, Université Laval

- 2004 Best Student Paper Award, American Fisheries Society Annual Meeting (1 of 2 winners out of 200 student oral presentations; \$500)

## **CONTRIBUTIONS TO RESEARCH**

### **PUBLICATIONS IN REFEREED JOURNALS**

- \*Morris MRJ, DJ Fraser, AJ Heggelin\*, JW Carr, SF O'Neil, FG Whoriskey, JA Hutchings (2008) Prevalence and recurrence of escaped farmed Atlantic salmon in eastern North American rivers. **Canadian Journal of Fisheries and Aquatic Sciences** 65: 2807-2826.
- Fraser DJ (2008) How well can captive breeding programs conserve biodiversity? A review of salmonids. **Evolutionary Applications** 1: 535-586.
- Fraser DJ, AM Cook, JD Eddington, P Bentzen, JA Hutchings (2008) Mixed evidence for reduced local adaptation in wild salmon resulting from interbreeding with escaped farmed salmon: complexities in hybrid fitness. **Evolutionary Applications** 1: 501-512.
- Hansen MM, DJ Fraser, TD Als, KLD Mensberg (2008) Reproductive isolation, evolutionary distinctiveness, and setting conservation priorities: the case of European lake whitefish and endangered North Sea houting (*Coregonus* spp.). **BMC Evolutionary Biology** 8: 137.
- Hutchings JA, DJ Fraser (2008) The nature of fisheries- and farming-induced evolution. **Molecular Ecology** 17: 294-313.
- Fraser DJ, L Bernatchez (2008) Ecology, evolution and conservation of lake-migratory brook trout: a perspective from pristine populations. **Transactions of the American Fisheries Society** 137:1192-1202.
- Fraser DJ, MM Hansen, N Tessier, S Ostergaard, M Legault, L Bernatchez (2007) Comparative estimation of effective population sizes and temporal gene flow in two contrasting population systems. **Molecular Ecology** 16: 3866-3889.
- Fraser DJ, LK Weir, TL Darwish, JD Eddington, JA Hutchings (2007) Divergent compensatory growth responses within species: linked to contrasting migrations in salmon? **Oecologia** 153: 543-553.
- Fraser DJ, MW Jones, TL McParland, JA Hutchings (2007) Loss of historical immigration and the unsuccessful rehabilitation of extirpated salmon populations. **Conservation Genetics** 8:527-546.
- Fraser DJ, T Coon, MR Prince, R Dion, L Bernatchez (2006) Integrating traditional and evolutionary knowledge in biodiversity conservation: a population level case study. **Ecology and Society** 11: 4.
- Fraser DJ, P Duchesne, L Bernatchez (2005) Migratory charr schools exhibit population and kin associations beyond juvenile stages. **Molecular Ecology** 14: 3133-3146.
- Fraser DJ, L Bernatchez (2005) Allopatric origins of sympatric brook charr populations: colonization history and admixture. **Molecular Ecology** 14: 1497-1509.
- Fraser DJ, L Bernatchez (2005) Adaptive migratory divergence among sympatric brook charr populations. **Evolution** 59: 611-624.
- Fraser DJ, C Lippé\*, L Bernatchez (2004) Consequences of unequal population size, asymmetric gene flow and sex-biased dispersal for population structure in brook charr (*Salvelinus fontinalis*). **Molecular Ecology** 13: 67-80.
- Gatt MH, DJ Fraser, AP Liskauskas, MM Ferguson (2002) Mitochondrial DNA variation and stock structure of walleyes from eastern Lake Huron: an analysis of contemporary and historical samples. **Transactions of the American Fisheries Society** 131: 99-108.
- Fraser DJ, L Bernatchez (2001) Adaptive evolutionary conservation: towards a unified concept for defining conservation units. **Molecular Ecology** 10: 2741-2752.

### **SUBMITTED ARTICLES FOR PUBLICATION**

- \*Houde ALS, DJ Fraser, JA Hutchings (2009) Reduced anti-predator responses in multi-generational hybrids between farmed and wild Atlantic salmon (*Salmo salar* L.). **Conservation Genetics**.
- Normandeau E, JA Hutchings, DJ Fraser, L Bernatchez (2009) Population-specific gene expression responses to hybridization between farm and wild Atlantic salmon. **Evolutionary Applications**.
- Hansen MM, DJ Fraser, K Meier, KLD Mensberg (2009) Sixty years of anthropogenic pressure: a spatio-temporal genetic analysis of brown trout populations subject to habitat degradation and stocking. Submitted to **Molecular Ecology**.

## **Curriculum Vitae: DYLAN FRASER, January 09**

Fraser DJ, C Minto, AM Calvert, JD Eddington, JA Hutchings. Evidence for a maladaptive shift in phenology of wild salmon through interbreeding with escaped farmed salmon. **Conservation Biology**.

*\*Supervised or co-supervised undergraduate or graduate students*

### **RESEARCH WITH THE MOST IMPACT AS CONSERVATION BIOLOGY APPLICATIONS**

#### ***Mitigating genetic interactions between farmed and wild salmon – Post Doctoral Research***

- Ongoing research will contribute to the assessment of risk faced by wild salmon from interbreeding with escaped farmed salmon in the Northwest Atlantic, leading towards a more environmentally sustainable aquaculture industry (*Evolutionary Applications, Canadian Journal of Fisheries and Aquatic Sciences* 2008).

#### ***Evolutionary applications to captive breeding programs – Government consulting***

- A detailed evaluation of the capacity of captive breeding programs to conserve genetic diversity and fitness, with an emphasis on salmonid fishes (*Evolutionary Applications*, 2008).
- Facilitated decision-making regarding the implementation of captive breeding programs for endangered fish species carried out by the Department of Fisheries and Oceans, Canada.

#### ***Genetic monitoring – Post Doctoral Research***

- Recent articles in *Conservation Genetics* and *Molecular Ecology* (2007) offer methodological recommendations for considering effective population sizes and gene flow in fish, wildlife and endangered species management

#### ***Northern fisheries sustainability – PhD Research***

- Collaboration with local First Nations people and governmental agencies, coupled with research published in *Evolution, Molecular Ecology*, and *Ecology and Society* (2004-06), led to the development of a co-management committee of fisheries resources that recognizes population diversity within species and local adaptations towards sustainable northern fisheries practices

#### ***Conservation of biodiversity below species levels – PhD Research***

- Influential review article on concepts and criteria for recognizing intraspecific diversity for conservation (*Molecular Ecology*, 2001)
- Through invited speaker presentations in Canada and Scandinavia, it contributed to discussions on the inclusion of evolutionary processes to conserve endangered species in these regions
- Well-cited in the primary and secondary literature (>200 citations since 2002), including more than 60 diverse journals and several book chapters in conservation biology

### **RESEARCH IN THE MEDIA**

- 2009 Radio: Concerns regarding escaped farmed salmon in the wild (CBC, NS)
- 2009 Radio: Concerns regarding escaped farmed salmon in the wild (CBC, NB)
- 2008 Radio: Will captive breeding bring back endangered wild salmon? (CBC, BC)
- 2008 Web: Fisheries catch-22 - captive breeding aims to conserve biodiversity but plunders genetic diversity (press release to several scientific research, science education, fisheries, and fishing magazine websites)
- 2007 Web: Genetic issues related to re-establishing endangered Atlantic salmon in the Bay of Fundy, eastern Canada (Atlantic Salmon Federation)
- 2007 Newspaper: Why causeway removal on the Petitcodiac River, NB is good for wild salmon and other fishes (Moncton Times, NB)
- 2005 Magazine: Diversité chez l'omble de fontaine du Lac Mistassini (Chasse et Pêche, QC)
- 2004 Magazine: Mistassini Lake fish study (The Nation, a First-Nations publication, QC)
- 2002 Television: Genetics and conservation of brook trout (Canadian Sportfishing TV show)

### **TEACHING EXPERIENCE**

#### **COURSE LECTURING AND PREPARATION**

##### ***Dalhousie University***

- 2006 Lecturer: Introductory Ecology (Fall -150 students) (18 lectures)
- 2006-08 Assistant Lecturer: Conservation Biology (Winter - 40 students) (11 lectures)
- 2006 Assistant Lecturer: Introductory Ecology (Winter - 150 students) (2 lectures)

## **Curriculum Vitae: DYLAN FRASER, January 09**

- 2005-08 Assistant Lecturer: Fish Ecology and Evolution (Fall, Winter-30 students) (8 lectures)
- 2005 Assistant Lecturer: Molecular Ecology (Fall - 10 students) (3 lectures)

### **Université Laval**

- 2004 Assistant Lecturer: Molecular Ecology (Winter - 30 students) (3 lectures)

### **Guest Lecturing**

- 2006 Defining intraspecific conservation units. Graduate Course (Dalhousie U.)
- 2005 How humans cause evolutionary change. Evolution (Dalhousie U.)

## **STUDENT MENTORING**

### **Graduate or Undergraduate Thesis Supervisor or Co-supervisor**

- 2008- “Effects of inter-population hybridization spanning a large geographic scale in Atlantic salmon” (P. Debes, PhD Candidate, Dalhousie U.)
- 2008- “Compensatory growth and different environmental stressors: a comparison of farmed, wild and hybrid salmon” (M. Morris, NSERC Undergraduate Scholarship, BSc Honours Thesis, Dalhousie U.)
- 2007- “Inbreeding and outbreeding depression in endangered salmon rehabilitation programs” (A. Houde, NSERC Canada Scholar Postgraduate Scholarship, MSc, Dalhousie U.)
- 2007-08 “Environmental and human factors affecting the population biology of Nova Scotia brook trout (*Salvelinus fontinalis*)” (A. Heggelin, BSc Honours Thesis, Dalhousie U.)
- 2006-07 “Ecological and behavioural interactions at individual and population levels between wild salmon and farmed-wild hybrids” (A. Houde, NSERC Undergraduate Scholarship, BSc Honours Thesis, Dalhousie U.)
- 2003-04 “Origine de l’omble de fontaine du Lac Mistassini, Québec/Phylogeographic origin of brook charr in Mistassini Lake, Québec” (K. Allard, BSc Honours Thesis, U. Laval)
- 2002-03 “Structure génétique et la stabilité temporelle des populations d’omble de fontaine du Lac Mistassini, Québec/Population genetic structure and temporal stability of brook charr in Mistassini Lake, Québec” (C. Lippé, BSc Honours Thesis, U. Laval)

### **Other**

- 2007 Undergraduate Co-op Student Supervisor (two students, Dalhousie U.; two semesters)
- 2005-06 Teaching Assistant: Evolution (two semesters, Dalhousie U.)
- 2005 Teaching Assistant: Undergraduate Integrated Science Program (Dalhousie U.)
- 2003 Teaching Assistant: Ichthyology (U. Laval)
- 2000-02 Summer Field and Lab Assistant Supervisor (U. Laval)

## **OTHER CONTRIBUTIONS TO RESEARCH OR RELEVANT EXPERIENCE**

### **INVITED ORAL PRESENTATIONS AT INTERNATIONAL OR NATIONAL MEETINGS**

- Fraser DJ (2009) Genetic factors to consider in fish stocking. *Atlantic salmon stocking as a tool in the restoration toolbox – a workshop for community groups. Antigonish, NS.*
- Fraser DJ (2008) Interbreeding between farmed and wild, endangered Atlantic salmon: conservation conundrum? *Young Investigators Series, University of Washington, Seattle, WA, U.S.A.*
- Hutchings JA, DJ Fraser (2007) Fishing, farming, and their evolutionary consequences to fishes. *Evolutionary change in human-altered environments, Los Angeles, CA, U.S.A.*
- Fraser DJ (2006) Recognizing and maintaining diversity within species for viable fisheries. *Genetic consequences of fisheries and fisheries management, Bornholm, Denmark.*
- Fraser DJ (2006) The interplay between adaptive divergence and evolutionary history in brook charr (*Salvelinus fontinalis*) population divergence: relevance to biodiversity conservation. *TWM Cameron Lecture, Canadian Society of Zoologists, Edmonton, AB.*
- Fraser DJ, L Bernatchez (2004) Evolution and coaster brook trout conservation: implications from underexploited populations in northern Québec. *American Fisheries Society Symposium, Madison, WI, U.S.A.*
- Fraser DJ, L Bernatchez (2002) Conserving lineages below the species level: lessons from a review of the Evolutionarily Significant Unit (ESU) concept. *Annual conference of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Ottawa, ON.*

### **ORAL PRESENTATIONS AT INTERNATIONAL OR NATIONAL MEETINGS**

- 2008 American Fisheries Society Symposium, Ottawa, ON

## **Curriculum Vitae: DYLAN FRASER, January 09**

- 2008 \*Canadian Society for Ecology and Evolution, Vancouver, BC
  - 2008 Canadian Conference for Fisheries Research, Halifax, NS
  - 2008 \* Canadian Conference for Fisheries Research, Halifax, NS (2 presentations)
  - 2007 Ecosystem Sciences Division, Department of Fisheries and Oceans, Ottawa, ON
  - 2007 Six decades of fishery genetics, Seattle, WA, U.S.A. (Poster)
  - 2007 Challenges for diadromous fishes in a dynamic global environment, Halifax, NS (Poster)
  - 2007 Evolutionary change in human-altered environments, Los Angeles, CA, U.S.A. (Poster)
  - 2006 International Congress on the Biology of Fish, St. John's, NF
  - 2004 American Fisheries Society Symposium, Madison, WI, U.S.A. (Poster)
  - 2003 American Fisheries Society Symposium, Québec City, QC
  - 2003 Canadian Conference for Fisheries Research, Ottawa, ON
  - 2002 Ecological and Evolutionary Ethology of Fishes Symposium, Québec City, QC
  - 2002 Lowell Wakefield Fisheries Symposium - Genetics of Subpolar fishes, Juneau, AK, U.S.A.
- \*Supervised or co-supervised undergraduate or graduate students*

### **UNIVERSITY DEPARTMENTAL SEMINARS**

- 2009 University of Alberta, Edmonton, AB (Invited)
- 2009 Dalhousie University, Halifax, NS (Invited)
- 2008 University of Washington, Seattle, WA, U.S.A. (Invited)
- 2007 Concordia University, Montreal, QC (Invited)
- 2006 Dalhousie University, Halifax, NS (Invited)
- 2004 Université Laval, Québec, QC

### **ORAL PRESENTATIONS AT PROVINCIAL MEETINGS**

- 2009 Nova Scotia Atlantic Salmon Association Annual Meeting, Guest Speaker, Truro, NS
- 2008 \*Trout Nova Scotia Annual General Meeting, Sportsman Show, Halifax, NS
- 2007 \*Atlantic Provinces Council on the Sciences Aquaculture Conference, Saint John, NB
- 2007 \*Atlantic Provinces Council on the Sciences Biology Conference, Saint John, NB
- 2007 Trout Nova Scotia Annual General Meeting, Sportsman Show, Halifax, NS
- 2006 Environnement et Parcs, Gouvernement du Québec, Chibougamau, QC
- 2005 Cree Nation of Mistissini, Société de la faune et des Parcs du Québec (FAPAQ), Société des établissements de plein air du Québec (SEPAQ), Mistissini, QC
- 2004 Conférence annuelle du Québec Océan, Rimouski, QC (Poster)
- 2004 Cree Nation of Mistissini, Cree Trapper's Association, Mistissini, QC
- 2004 Hydro Québec, Eeyou Nameless Corporation, Montréal, QC
- 2003 Grand Council of the Crees, Ouje-Bougamau, QC
- 2003 Cree Nation of Mistissini, Société de la faune et des Parcs du Québec (FAPAQ), Société des établissements de plein air du Québec (SEPAQ), Mistissini, QC
- 2002 Société de la faune et des Parcs du Québec (FAPAQ) et la Société des établissements de plein air du Québec (SEPAQ), Chibougamau, QC

*\*Supervised or co-supervised students, or collaborators as first authors and presenters*

### **OTHER PUBLICATIONS**

- Heggelin AJ, DJ Fraser, DC Hardie, JA Hutchings (2008) Environmental and human influences affecting the population biology of Nova Scotia brook trout (*Salvelinus fontinalis*). Dalhousie University, NS. 34 pages.
- Bernatchez L, Fraser DJ (2005) Mémoire relatif à la création du Parc Albanel-Témiscamie-Otish, un premier parc habité en forêt boréale – l'omble de fontaine (*Salvelinus fontinalis*) du Lac Mistissini. Technical Report, Développement durable, Environnement et Parcs, Gouvernement du Québec. 12 pages.
- Fraser DJ, V Castric, F Bonney, L Bernatchez (2004) Genetic diversity of brook trout (*Salvelinus fontinalis*) in Rapid River, Maine. Technical Report, Maine Department of Inland Fisheries and Wildlife, Strong ME, U.S.A. 10 pages.

### **OTHER WORK EXPERIENCE**

- 2000-04 Molecular Ecology Laboratory Techniques and Data Analysis, (Université Laval, QC)
- 2000-02 Field Coordinator (Université Laval, Cree Nation of Mistissini, QC)

## **Curriculum Vitae: DYLAN FRASER, January 09**

- 2000 Molecular Genetic Laboratory Assistant (University of Guelph, ON)
- 1999 Field Assistant, US Fish & Wildlife Service, AK
- 1998 Field Assistant, Department of Fisheries and Oceans, ON
- 1997-99 Senior Residence Assistant (University of Guelph, ON)
- 1997 Field Assistant, Ontario Ministry of Natural Resources, ON

### **PEER REVIEWING EXPERIENCE**

I review on average one paper per month and have served as a reviewer (or have been requested to review) for the following 28 journals and organizations: *National Science Foundation (NSF)* (1), *Natural Sciences and Engineering Research Council of Canada (NSERC)* (1), *Ecology Letters* (2), *Ecology* (1), *Molecular Ecology* (18), *Evolution* (1), *Proceedings of the Royal Society of London Biological Sciences* (1), *Conservation Biology* (4), *Evolutionary Applications* (2), *Ecological Applications* (1), *Oecologia* (1), *Evolutionary Ecology* (2), *Heredity* (2), *Conservation Genetics* (6), *Philosophical Transactions of the Royal Society* (1); *Biological Journal of the Linnean Society* (1), *Canadian Journal of Fisheries and Aquatic Sciences* (7), *BMC Ecology* (1), *BMC Evolutionary Biology* (2), *Transactions of the American Fisheries Society* (3), *Journal of Fish Biology* (5), *Great Lakes Fishery Trust (GLFT)* (1), *Invertebrate Biology* (1), *Animal Genetics* (1), *Environmental Biology of Fishes* (1), *Aquatic Living Resources* (1), *Journal of Great Lakes Research* (1), *U.S. Fish & Wildlife Service, Endangered Species Act* (1)

As a member of COSEWIC's Freshwater Fish Species Specialist Committee, I am responsible for routinely reviewing status reports of endangered/threatened fish species in Canada, and for recommending status designations according to criteria stipulated in the Species At Risk Act (SARA).

I have also served as a reviewer for the Pacific Scientific Advice Review Committee, Department of Fisheries Oceans Canada, on a major biodiversity conservation initiative: *Conservation units for Pacific salmon under the Wild Salmon Policy* (2007)

### **SKILLS, ACTIVITIES AND INTERESTS**

- Fluent in oral French, working knowledge of written French
- Excellent leadership, time-management, organization and interpersonal skills
- Ability to work independently and as a team player
- Reliable, flexible and adaptable
- Fishing, wilderness camping, canoeing, cooking, travelling, photography, skiing, hiking, visual art

### **CURRENT OR PAST PROFESSIONAL SOCIETY MEMBERSHIPS**

- 2009 Session Co-chair, Canadian Society for Ecology and Evolution
- 2008 Session Chair, Evolutionary Ecology, Canadian Conference for Fisheries Research
- 2007-2008 Department of Biology Seminar Committee, Dalhousie University
- Society for Conservation Biology
- Society for the Study of Evolution
- Canadian Society for Ecology and Evolution
- Canadian Society of Zoologists
- American Fisheries Society
- Trout Unlimited Canada
- Trout Nova Scotia

### **REFERENCES**

Dr Louis Bernatchez  
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