

Career: Fisheries Scientist

Firm: Department of Fisheries and Oceans

Simon Fraser University

c/o Resource and Environmental Management

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EDUCATION:

B.Sc. (Hons), Biology and Geography, Simon Fraser University, Burnaby, BC 1977

Associate in Arts and Sciences, Chemistry, Capilano College, North Vancouver, BC 1978

Ph.D., Zoology, University of Western Ontario, London, Ontario, 1982

RECENT AWARDS:

- Regional Departmental Distinction Award and the National Prix du Excellence 2009. Science in support of the Riparian Areas Regulation Team.
- Regional Departmental Distinction Award 2010. Science in support of the Nechako Cold Water Release Proposal.

RESPONSIBILITY CHRONOLOGY:

1982 - Hired as Research Scientist, West Vancouver Laboratory, Fisheries and Oceans Canada.

1982 - 1987 Partner in Estuarine Research Projects

1987 - Appointed Program Head, Fishery/Forestry Interaction Research Program.

1990 - Initiated Takla Fishery/Forestry Interaction Research Project and became the co-ordinator.

1997 - Appointed Section Head, Freshwater Habitat Section.

2003 - Appointed DSO (Director) West Vancouver Laboratory, later the Centre for Aquaculture and Environmental Research.

APPOINTMENTS:

1995 – Present, Adjunct Professor, Department of Forestry, University of BC.

1998 – Present, Adjunct Professor, Simon Fraser University, Dept. of Resource and Environmental Management.

2000 to present - President, Marine Parks Forever Society.

2003 to present - External Graduate Student Supervisor - Royal Roads University.

RELATED WORK EXPERIENCE:

1990 Secondment to teach university level Statistics Course, I.D.R.C. (Wuxi, China).

1991 Fisheries/Forestry Interaction Course, Bamfield Marine Station.

RESEARCH INTERESTS:

Dr. Macdonald has over 35 years of experience as a biological scientist with a specialization in invertebrates and fish on the east and west coasts of Canada. During 28 years with Fisheries and Oceans he has managed several multi-disciplinary programs and has demonstrated skills in developing cooperative research relationships with representatives from other government agencies, universities, First Nations and the forest industry. Dr. Macdonald is the senior manager for the West Vancouver Laboratory (DSO) and

Head of the Environmental and Aquaculture Research Section for the Pacific Region and supervises 17 staff based primarily at the facility. Section activities include investigations of freshwater habitat health and carrying capacity in relation to the effects of timber harvesting, mining, pulp mill effluent, agriculture, urbanization water withdrawal and energy generation issues. Knowledge generated by his Section is used to assess and develop production estimates for coho, chinook and sockeye stocks in lakes, rivers and streams and to test the efficacy of land development guidelines and habitat restoration techniques. The lab is also engaged in research to enable the aquaculture industry (e.g. fish health, nutrition) and to develop operational techniques that minimize environmental impacts and assist in farm siting regulations.

Dr. Macdonald has recently developed models that for the first time, allow salmon spawning escapement targets to be adjusted to compensate for unfavourable environmental conditions or early migration behaviour. With the prominence of climate change issues, these models provide a means to produce realistic pre-season management targets and provide direction for in-season fisheries. Since being reviewed by the Technical Committee for the Fraser River Sockeye Management Panel, the models have been accepted for use in the international management process.

He is also involved in several multi-disciplinary research programs designed to promote an understanding of ecosystem processes in watersheds in the interior of B.C. Of particular interest is the role of riparian areas in maintaining the integrity of aquatic habitat. Factors such as water temperatures, water quality and habitat structure are being considered. His research has assisted in the development of fishery/forestry interaction management guidelines and has been used to test the efficacy of the Forest Practices Code of B.C. as a means to protect fisheries resources.

SELECTED REFERENCES SINCE 2005:

- Refereed publications, published or accepted;

Macdonald J.S., Guthrie, I., and Patterson, D. 2005. En route loss during sockeye migrations: The influence of unfavourable environmental conditions on the Fraser River. 62-67. *In* Habitat, oceans and fishery management: contributions through Environmental science research (1997-2002). *Edited by* J.D. Pringle, L. Murray, and S.M. Verrin. Can. Manuscr. Rep. Fish. Aquat. Sci. 2726: ix+104 p.

Wagner G.N., A. Lotto, L. Kuchel, S.R.M. Jones, D.A. Patterson, S.J. Cooke, **J.S. Macdonald**, G. Van Der Kraak, M.C. Healey, J.M. Shrimpton, K.K. English, S.G. Hinch, A.P. Farrell (2005). Metabolic rates and swimming performance of adult Fraser sockeye salmon (*Oncorhynchus nerka*) after controlled exposure with *Parvicapsula minibicornis*. Can. J. Fish. Aquat. Sci. 62: 2124-2133.

MacIsaac, E.A., H. Herunter and **J.S. Macdonald**. (submitted). Effects of riparian forest harvesting on sub-boreal headwater streams. J. Amer. Water. Res. Assoc., Special Riparian Issue.

Galbraith, R.V., E.A. MacIsaac, A.P. Farrell, and **J.S. Macdonald** (2006). The effect of suspended sediment on fertilization success in sockeye salmon (*Oncorhynchus nerka*) and coho (*O. kisutch*) salmon. Can. J. Fish. Aquat. Sci. 63: 2487-2494.

Rand, P.S., S.G. Hinch, J. Morrison, M.G.G. Foreman, M.J. MacNutt, **J.S. Macdonald**, M.C. Healey, A.P. Farrell, and D.A. Higgs. 2006. Effects of river discharge, temperature, and future climates on energetics and mortality of adult migrating Fraser River sockeye salmon. Trans. Am. Fish. Soc. 135:655-667.

Kelly, B.C., Samantha L.Gray., Michael G. Ikononou, **J. S. Macdonald**, Stelvio M. Bandiera, and Eugene G. Hryciak. (2007). Lipid reserve dynamics and magnification of persistent organic pollutants in spawning sockeye salmon (*Oncorhynchus nerka*). Environmental Sci. Technol. 41: 3083-3089.

Johannessen, D.I., **Macdonald, J.S.**, Harris, K.A., and P.S. Ross. (2007). Marine environmental quality in the Pacific North Coast Integrated Management Area (PNCIMA), British Columbia, Canada: A summary of contaminant sources, types and risks. *Can. Tech. Rep. Fish. Aquat. Sci.* 2716: 53p.

Johannessen, D.I., Harris, K.A., **Macdonald, J.S.** and P.S. Ross. (2007). Marine environmental quality in the north coast and Queen Charlotte Islands, British Columbia, Canada: A review of contaminant sources, types and risks. *Can. Tech. Rep. Fish. Aquat. Sci.* 2717: 87p.

Macdonald J.S., Morrison, J., Patterson, D.A., Heinonen, J., and Foreman, M. (2007). Examination of Factors influencing Nechako River discharge, temperature, and aquatic habitats. *Can. Tech. Rep. Fish. Aquat. Sci.* 2773: 32p.

Patterson, D.A., K. Skibo², D. Barnes³, J. Davidson⁴, and **J. S. Macdonald**. (2007). Estimating the visibility of adult sockeye salmon (*Oncorhynchus nerka*) carcasses in a large river, Fraser River, British Columbia, in relation to water temperature, clarity and carcass buoyancy. *North Am. Jour. Fish. Manage.* 27: 878-884.

Marwan A. Hassan, Allen S. Gottesfeld², David R. Montgomery³, Jon F. Tunnicliffe⁴, Garry K.C. Clarke⁵, Graeme Wynn¹, Hale Jones-Cox¹, Ronald Poirier¹, Erland MacIsaac⁶, Herb Herunter⁶, and **Steve J. Macdonald** (2008). Salmon-driven bedload transport and bed morphology in mountain streams *Geophysical Research Letters*: 35, L04405.

Johnston, N.T., Calla, K., Down, N.E., **Macdonald, J.S.**, MacIsaac, E.A., Witt, A.N., and Woo, E. (2007). A review of empirical source distance data for the recruitment of large woody debris to forested streams. BC Ministry of Environment, Fisheries Project Report R.D.119. Victoria, BC. pp.41.

Donaldson, M.R., Cooke, S.J., Patterson, D.A. and **Macdonald, J.S.** (2008). - Cold shock and fish - a review paper. *J. of Fish Biol.* Vol. 73: 1491-1530.

Patterson D. A., **J. S. Macdonald**, K.M. Skibo, D. Barnes, I. Guthrie, and J. Hills. (2007). Reconstructing the summer thermal history for the lower Fraser River, 1941 to 2006, and implications for adult sockeye salmon (*Oncorhynchus nerka*) spawning migration. *Can. Tech. Rep. Fish. Aquat. Sci.* 2724: 43p.

Thompson, W.J. T.F. Sutherland, N.A. Cook and **Macdonald, J.S.** (2009). Bibliography for environmental assessments associated with port developments at Fraser River Delta and Prince Rupert Harbour, British Columbia. *Can. Tech. Rep. Fish. Aquat. Sci.* 2857: 216p.

Macdonald, J.S., D.A. Patterson, M.J. Hague, and I.C. Guthrie 2010. Improving the sustainability of sockeye salmon fisheries by modeling the influence of environmental factors on spawning migration success. *Trans. Am. Fish. Soc.* 139(3).

Macdonald J. S., King C.A., and Herunter, H. 2010. Sediment and salmon: The role of redd construction in bedload transport. *Trans Am Fish. Soc.* 139(3).

- Articles submitted to refereed journals;

Macdonald, J.S., J. Morrison, and D.A. Patterson, (submitted). The efficacy of reservoir flow regulation for moderating migration temperatures for Pacific salmon in the Nechako watershed. *North Am. J. of Fish. Manage.*