

DANIEL J. HASSELMAN, B.Sc. M.Sc. Ph.D.

CURRICULUM VITAE

School of Aquatic and Fishery Sciences
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EDUCATION

Dalhousie University	2010	Doctor of Philosophy (Biology)
Thesis Title:		Spatial distribution of neutral genetic variation in a wide ranging anadromous clupeid, the American shad (<i>Alosa sapidissima</i>)
Supervisor:		Dr. P. Bentzen
Acadia University	2003	Master of Science (Biology)
Thesis Title:		Discrimination of adult and early life history coregonid fishes in Maritime Canada
Supervisor(s):		Dr. M.J. Dadswell, Dr. R.G. Bradford
Dalhousie University	1999	Bachelor of Science (Marine Biology; Advanced Major)
University of Victoria	1998	Course: Marine Invertebrate Zoology (Bamfield Marine Station, British Columbia)
Biosearch College	1992	Course: Tropical Marine Biology (Bahamian Marine Field Station, San Salvador, Bahamas)

ACADEMIC INTERESTS

I have broad interests in evolutionary biology, molecular ecology, and conservation. My research explores the evolution of wild populations over contemporary time scales, and aims to bridge the gap between academia and application by employing molecular and non-molecular tools to provide linkages between evolutionary biology and practical conservation. My research focuses on i) resolving spatial distributions of genetic variation and contrasting patterns at the core of species ranges with that at range margins, ii) resolving spatial and temporal scales of population structure, and identifying units for conservation, and iii) assessing hypotheses of range expansion and colonization. Further interests include i) testing hypotheses regarding the dichotomous nature of philopatry and dispersal, ii) assessing the impact of intraspecific life history variation on population structure, and iii) determining rates of evolutionary change for invasive species.

RESEARCH EXPERIENCE/EMPLOYMENT HISTORY - SUMMARY

July 2010 – Present	Post-Doctoral Research Associate/Visiting Research Scientist, University of Washington/National Oceanographic and Atmospheric Administration (NOAA); Seattle, WA
May 2004 - June 2010	Ph.D. Candidate - Marine Gene Probe Laboratory, Dalhousie University, Halifax, NS
May 2003 - April 2004	Biological Technician - Marine Gene Probe Laboratory, Dalhousie University, Halifax, NS
September 2000 - May 2003	M.Sc. Candidate - Biology Department, Acadia University, Wolfville, NS
May 1999 - April 2003	Biological Technician - Canada Department of Fisheries and Oceans, Bedford Institute of Oceanography, Dartmouth, NS
July 1993 - August 1997	Naval Signalman - Canadian Armed Forces
January 1993 - June 1993	Biological Technician - Canada Centre for Inland Waters, Burlington, ON

RESEARCH EXPERIENCE/EMPLOYMENT HISTORY - DETAILS

July 2010 - Present; Post-Doctoral Research Associate/Visiting Research Scientist, University of Washington/NOAA. Investigated the distribution, relative abundance, and life history variation exhibited by invasive American shad (*Alosa sapidissima*) in their introduced range (Pacific coast of North America). Examined the potential for invasive American shad range expansion under future climate change scenarios. Examined the degree of niche overlap between invasive American shad and native Pacific salmonids, and assessed the magnitude of the threat posed by this invasive species to evolutionarily significant units and commercially important salmonid fisheries.

May 2004 - June 2010; Ph.D. Candidate, Marine Gene Probe Laboratory, Dalhousie University. Conducted a multifaceted molecular based study that impacts management strategies for a species of conservation concern. Developed biological tissue sampling protocols for, and coordinated the field sampling activities of, 16 governmental agencies in Canada and the United States. Resolved the spatial and temporal scale of population structure for American shad from across its native range. Determined the influences of Pleistocene glaciations, contemporary microevolutionary processes, historical stocking practices, and intraspecific life history strategies on spatial variation of allele frequencies, and patterns of genetic variation for American shad. Developed fisheries management and conservation tools using molecular data. Trained students in correct laboratory based data collection methodologies, and field sampling protocols. Consultant for molecular data analysis software packages.

May 2003 - April 2004; Biological Technician, Marine Gene Probe Laboratory, Dalhousie University. Conducted field sampling and laboratory based collection of biological data for anadromous and lacustrine populations of Rainbow smelt (*Osmerus mordax*). Biological data included genetic information (microsatellites), morphological data using standard (morphometric/meristic) and advanced techniques (geometric morphometrics), ageing data (scales/otoliths), and condition sampling (determination of specimen length, weight, sex, and sexual maturity stage).

September 2000 - May 2003; M.Sc. Candidate, Biology Department, Acadia University. Conducted a multidisciplinary study with demonstrable practical application for effective management and conservation of an endangered species in Canada. Documented the complete ontogenetic development of the endangered Atlantic whitefish (*Coregonus huntsmani*) from unfertilized egg through juvenile stage. Developed morphological based criteria for the accurate (*in situ*) discrimination of this endangered species from other closely related coregonines at all life history stages.

May 1999 - April 2003; Biological Technician, Canada Department of Fisheries and Oceans. Conducted field sampling for a suite of marine, anadromous, and lacustrine fishes in Atlantic Canada using western 2A trawl, plankton tows, eel traps, minnow pots, gillnets, fyke nets, trapnets, dip nets, beach seines, angling, and backpack electrofishing. Participated in fishery stock assessments at sea (groundfish survey; CCGS Alfred Needler), and conducted condition sampling for marine fish. Collected physical and chemical oceanographic data using CTD (Conductivity/Temperature/Depth probe). Conducted juvenile fish surveys, bathymetric mapping of aquatic systems and yearly temperature profiles using thermographs (minilog). Experienced with light microscopy (compound and dissecting), microphotography, and biological illustrations. Conducted monitoring activities for Rainbow smelt, Atlantic whitefish, lake whitefish (*C. clupeaformis*), American eel (*Anguilla rostrata*), striped bass (*Morone saxatilis*), including condition sampling, tagging, and pigmentation stage identification.

July 1993 - August 1997; Naval signalman, Canadian Armed Forces. Communications specialist responsible for highly sensitive information relevant to Canada's national defence and sovereignty (security clearance: 'secret'). Responsible for communication activities between ships using Morse code (flashing light), semaphore, naval flags, radio traffic. Responsible for dissemination of classified information from Maritime Forces Atlantic through chain of command to Commanding Officer. Participated in international military exercises in the North Atlantic, and fisheries patrols with conservation officers (Canada Department of Fisheries and Oceans) in several NAFO (Northwest Atlantic Fisheries Organization) divisions.

Awarded Maritime Commander's Commendation, and Chief of Defence Staff Commendation for actions above and beyond the call of duty.

January 1993 - June 1993; Biological Technician, Canada Centre for inland Waters. Participated in a study examining the toxicological effects of pulp mill effluents on the gonadal development of fathead minnow (*Pimephales promelas*). Responsible for all aspects of animal husbandry required for persistence of study subjects.

FUNDING

NOAA - Aquatic Invasive Species Program research grant 2009 (No. NA07OAR4320006): \$239,400 to examine the range expansion of invasive American shad in the Pacific Northwest region of North America

Nova Scotia Museum of Natural History research grant 2001: \$4000 to examine and document the early life history stages of the endangered Atlantic whitefish (*Coregonus huntsmani*)

TEACHING/SUPERVISION

Saint Mary's University, Halifax, NS		
Part-time instructor	2009	Molecular ecology/population genetics
Dalhousie University, Halifax, NS		
Teaching Assistant	2009	Molecular Ecology
Teaching Assistant	2005-2006	Ecology and evolution of fishes
Teaching Assistant	2005	Field Methods in fish ecology
Acadia University, Wolfville, NS		
Teaching Assistant	2001-2002	Introductory Biology

- Supervision of field research crews and laboratory technicians;
- Training of personnel in field sampling methodologies and data collection protocols (electrofishing, gill net, fyke net, trapnet, beach seine, angling);
- Training of personnel in laboratory methodologies/protocols (PCR, agarose and polyacrylamide gel electrophoresis (FMBio, LiCor))

AWARDS/MEDALS

S.L. Richardson award	2007	Best graduate student paper (American Fisheries Society - 31 st Annual Larval Fish Conference)
Dean's list, Dalhousie University	1999	Senior year, B.Sc.
Chief of the Defence Staff of the Canadian Armed Forces Commendation	1996	Actions above and beyond the call of duty
Maritime Commander's Commendation	1996	Actions above and beyond the call of duty
Top student	1995	OSQAB course 9501E; Canadian Armed Forces

PUBLICATIONS

REFEREED JOURNALS/BOOK CHAPTERS:

Hasselman, D.J. and K.E. Limburg. (*In press*). Alosine restoration in the 21st century: challenging the status quo. *Marine and Coastal Fisheries*.

Hasselman, D.J., R.G. Bradford, and P. Bentzen. 2010. Taking stock: Defining populations of American shad (*Alosa sapidissima*) in Canada using neutral genetic markers. *Canadian Journal of Fisheries and Aquatic Sciences* 67: 1021-1039.

Hasselman, D. J., T.A. Edge, and R.G. Bradford. 2009. Discrimination of the endangered Atlantic whitefish from lake whitefish and round whitefish by use of external characters. *North American Journal of Fisheries Management* 29: 1046-1057.

Hasselman, D.J. 2008. Comments on 'Weak population differentiation in northern European populations of the endangered anadromous clupeid *Alosa fallax*.' *Journal of Fish Biology* 73: 1096-1098.

Hasselman, D. J., J. Whitelaw, and R.G. Bradford. 2007. Ontogenetic development of the endangered Atlantic whitefish (*Coregonus huntsmani* Scott, 1987) eggs, embryos, larvae, and juveniles. *Canadian Journal of Zoology* 85:1157-1168.

Purchase, C.F., **D. J. Hasselman**, and L.K Weir. 2007. Relationship between fertilization success and the number of milt donors in rainbow smelt (*Osmerus mordax* Mitchell): implications for population growth rates. *Journal of Fish Biology* 70: 934-946.

Bentzen, P., **D.J. Hasselman**, L. Anstey, and R.G. Bradford. 2006. Adaptive morphological divergence vs. neutral genetic divergence in sympatric morphs of rainbow smelt, *Osmerus mordax*. *Journal of Fish Biology* 69:231 (Suppl. C).

Hasselman, D. J., P. Longue, and R.G. Bradford. 2006. First record of age 0+ Atlantic Whitefish (*Coregonus huntsmani* Scott, 1987) from the wild. *Canadian Field Naturalist* 119 (2):294-295.

REFEREED CONFERENCE PAPERS AND PRESENTATIONS:

Hasselman, D.J., R.G. Bradford, and P. Bentzen. 2009. Population structure of American shad within and among Canadian rivers *in* Haro, A. J., K. L. Smith, R. A. Rulifson, C. M. Moffitt, R. J. Klauda, M. J. Dadswell, R. A. Cunjak, J. E. Cooper, K. L. Beal, and T. S. Avery (eds.). *Challenges for Diadromous Fishes in a Dynamic Global Environment*. American Fisheries Society, Symposium 69: 835-836.

SELECTED REPORTS FOR GOVERNMENT

Hasselman, D.J. 2000. Life history analysis of the Atlantic whitefish (*Coregonus huntsmani*): Extrapolations from closely related coregonids. Diadromous Fish Division, Canada Department of Fisheries and Oceans. 100 pp.

WORKS UNDER REVIEW/ IN PROGRESS

Hasselman, D. J., and R.G. Bradford. (*In review*). Discrimination of the endangered Atlantic whitefish (*Coregonus huntsmani* Scott 1987) larvae and juveniles. Environmental Biology of Fishes.

Hasselman, D.J., Hinrichsen, R.A., Shields, B.A., and C.C. Ebbesmeyer. (*In review*). Factors underlying the establishment, dispersal, and increased abundance of invasive American shad (*Alosa sapidissima*) in the Pacific Northwest. Fisheries.

Hasselman, D.J., D. Ricard, and P. Bentzen. (*In prep*). Rangewide population structure in American shad (*Alosa sapidissima*): historical contingency or anthropogenic influence? Molecular Ecology.

Hasselman, D.J., D. Ricard, R.G. Bradford, and P. Bentzen. (*In prep*). Spatial distribution of neutral genetic variation in Nearctic fishes: does latitude matter? Molecular Ecology.

REVIEWS AND REFEREEING

2011	U.S. Geological Society
2011	Fishery Bulletin
2010	Transactions of the American Fisheries Society
2010	North American Journal of Fisheries Management
2008-2009	Journal of Fish Biology
2007	American Fisheries Society Symposium 69

ORAL PRESENTATIONS

Hasselman, D.J. R.A. Hinrichsen, and B.A. Shields. 2011. History of introduction and dispersal of non-indigenous American shad (*Alosa sapidissima*) in the Pacific Northwest. 47th Annual meeting of the Oregon chapter of the American fisheries Society, Bend, OR.

Hasselman, D.J., T.P Quinn, B.E. Feist, and P. Roni. 2010. Range expansion of invasive American shad along the Pacific coast of North America. Cooperative Institute for Limnology and Ecosystem Research, Ann Arbor, MI.

Hasselman, D.J. and P. Bentzen. 2010. Rangewide distribution of neutral genetic variation in American shad (*Alosa sapidissima*). Restoration of American shad and River Herring Symposium; 140th American Fisheries Society Annual Meeting, Pittsburgh, PA.

Hasselman, D.J. and P. Bentzen. 2008. Genetic structure of American shad (*Alosa sapidissima*) populations across the species native range. Canadian Conference for Fisheries Research, Halifax, NS.

Hasselman, D.J. and P. Bentzen. 2008. Latitudinal trends in genetic diversity for an anadromous fish of conservation concern. 1st Annual Dr. Patrick Lett Conference. Dalhousie University, Halifax, NS.

Hasselman, D.J. and P. Bentzen. 2007. Population structure of American shad within and among Canadian Rivers. Canadian Conference for Fisheries Research. Montreal, PQ.

Hasselman D.J. and P. Bentzen. 2007. Population structure of American shad within the Bay of Fundy. Northeast Wildlife Graduate Student Conference. Dalhousie University, Halifax, NS.

Hasselman, D.J., J. Whitelaw, and R.G. Bradford. 2007. Ontogenetic development of the endangered Atlantic whitefish (*Coregonus huntsmani* Scott, 1987) eggs, embryos, larvae, and juveniles. American Fisheries Society - 31st Annual Larval Fish Conference. St. John's, NL. (**S.L. Richardson award for best student paper**).

P. Bentzen, **D.J. Hasselman**, I. Bradbury L. Anstey and R.G. Bradford. 2006. Adaptive morphological divergence vs. neutral genetic divergence. Fisheries Society of the British Isles. Aberdeen, Scotland.

Hasselman, D.J. and R.G. Bradford. 2004. Discrimination of Coregonid fishes in Maritime Canada. Canadian Conference of Fisheries Research. St. Johns, NL.

Hasselman, D.J. 2004. Atlantic whitefish Research: Historical perspectives and future objectives. Nova Scotia Museum of Natural History. Halifax, NS.

Hasselman, D.J. 2003. A synopsis of Atlantic whitefish research. Huntsman Marine Science Center. St. Andrew's, NB.

Hasselman, D.J. 2003. Atlantic whitefish Research: Where we've been, where we are, where we're going. University of New Brunswick (Fredericton and Saint John campuses, NB).

Hasselman, D.J. and R.G. Bradford. 2003. The early life history of Atlantic whitefish. Atlantic Society of Fish and Wildlife Biologists. Halifax, NS.

Hasselman, D.J. and R.G. Bradford. 2003. Assessment of discrimination techniques between Atlantic whitefish and lake whitefish. Northeast Wildlife Graduate Student Conference. University of Prince Edward Island, Charlottetown, PEI.

Hasselman, D.J. and R.G. Bradford. 2002. Description of the early life history stages of the Atlantic whitefish. Northeast Wildlife Graduate Student Conference. University of New Brunswick, Fredericton, NB.

Hasselman, D.J. 2001. Identification of the life history stages of the Atlantic whitefish. Atlantic Whitefish Conservation and Recovery Team meeting. Bridgewater, NS.

POSTER PRESENTATIONS

Hasselman D.J., T.P. Quinn, B.E. Feist, and P. Roni. 2010. Range expansion of invasive American shad along the Pacific coast of North America. Cooperative Institute for Limnology and Ecosystem Research. Ann Arbor, MI.

Hasselman D.J., R.G. Bradford, and P. Bentzen. 2007. Population structure of American shad within and among Canadian rivers. Second International Symposium on Diadromous Fishes. Halifax, NS.

PROFESSIONAL AFFILIATIONS

Review editor - Frontiers in Evolutionary and Population Genetics	2011-present
Atlantic whitefish Conservation and Recovery Team (founding member)	2000-2009
American Fisheries Society	2000-2011
Atlantic Society of Fish and Wildlife Biologists	2002-2004

CERTIFICATIONS

First Aid/CPR Training	2010	School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA
Autoclave safety training	2003	Dalhousie University, Halifax, NS
Workplace Hazardous Materials Information System (WHMIS)	2003	Dalhousie University, Halifax, NS
Backpack electrofishing (team leader)	2001	Malaspina University-College, Nanaimo, BC
Small watercraft operation training	2001	Canadian Coast Guard, Dartmouth, NS
Fish species identification training	2001	Nova Scotia Museum of Natural History, Halifax, NS
Occupational Health and Safety	2001	Bedford Institute of Oceanography, Dartmouth, NS
Geographic Information Systems (GIS)	2000	MAP info training, Dartmouth, NS
Advanced open water SCUBA diver	1999	PADI, Dartmouth, NS

VOLUNTEERING

Atlantic whitefish Conservation and Recovery Team	2000-2009	Member
Halifax Condominium Corporation #54	2007-2009	President
Halifax Condominium Corporation #54	2006-2007	Vice-president

University of Windsor, Ontario, field sampling expedition (May-June 2007) in Belize to collect larval and adult bi-color damselfish (*Stegastes partitus*) for ongoing genetics based research.

MISCELLANEOUS

MEDIA RELATIONS

CTV (February 2003): segment on Atlantic whitefish research

Reader's Digest (January 1997): 'Heroes for today - Dan Hasselman'

Burlington Spectator (1997): "Arrestorman' reaps his reward: Navy honors Burlington Man'

Chronicle-Herald/Mail star (May 22, 1996): 'Beyond the call of duty: Reservist makes arrest'

CBC News (May 22, 1996): segment on citizen's arrest

OTHER

Eligible to work within the European Union (possession of dual Canadian-Dutch citizenship)