

Bruce R. Ward

Fisheries Scientist

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Bruce Ward is a Fisheries Scientist with British Columbia's Ministry of Water, Land and Air Protection, Aquatic Ecosystem Science Section (the previous Fisheries Research and Development Section), at the Fisheries Centre on the campus of the University of B.C. His research on steelhead trout at the Keogh River since 1975 has included work on population dynamics in the marine and freshwater environments, climate change impact and regime shifts, fish age and growth, migration patterns, habitat restoration techniques, nutrient enrichment, innovative fish tagging and electronic enumeration, fish culture and stocking evaluations, hatchery-wild interactions, stock assessment, and salmonid recruitment. Recent work includes definition of limit reference points for stock management, conservation hatchery evaluations, smolt pathways in the ocean, and evaluation of the effectiveness of whole-watershed rehabilitation techniques. Tasks of this position include fisheries science advice and participation in Provincial and Federal habitat and anadromous salmonid (chair) committees and workshops, fish-forestry interactions, aquaculture forums, national climate change working groups, and international fisheries symposia, as well as scientific support and advice on issues ranging from habitat requirements of salmonids, hatchery and wild fish interactions, recreational and commercial fisheries, selective harvest development, stock assessment and inventory, threatened and endangered species management, industrial and hydropower impacts, and presently, coast-wide steelhead recovery plans.

Thirty years of work at the Keogh River have included support to numerous graduate students, and a recognized level of cooperation with local, national, and international fisheries scientists. This work has culminated in >100 papers; Ward's include >20 peer-reviewed journal publications, >50 technical management reports, >40 invited lectures, regular presentations at fisheries congresses, numerous popular articles, and media coverage in the National Post, the Vancouver Sun, the Times Colonist, several local papers and web sites, and national television. Several Keogh-related papers were recently published in the proceedings of the International Conference on Restoring Nutrients to Aquatic Ecosystems (held Eugene, Oregon, 2001). A US-Canada conference on watershed restoration occurred at the Keogh River in Port Hardy. Results of ecosystem restoration studies appeared in the proceedings of an Atlantic salmon conference held in Scotland, 2002, and updates are in review for the proceedings of the Fourth World Fisheries Congress (2004). Four recent papers are in press or published from studies of acoustically-tagged smolts. The Keogh site has hosted many visiting scientists and students from several agencies, universities and countries, continues to do so, and has expanded as a coho and pink salmon index site.

Co-Chair of the highly successful Fourth World Fisheries Congress (Vancouver, 2004), Past-President of the Canadian Aquatic Resources Section of the American Fisheries Society (AFS), and a Certified Fisheries Scientist with AFS and member since 1988, he has also served on the North Pacific International Chapter AFS executive. He is a steering committee member of the Sustainable Fisheries Foundation, the recently formed Climate Change Impacts and Adaptations Research Network - Fisheries Sector (a national advisory council), and the Federal Fisheries Selective Harvest Initiative. He is a project reviewer in the Northwest Power and Conservation Council's Independent Science Review Panel (Columbia River, 5 yrs), and has been a project review scientist for the US CalFed Bay-Delta Program, and reviewer and editor of numerous journal papers and BC technical papers, annually. He was seconded to Forest Renewal B.C.'s Watershed Restoration Program to assist with Province-wide implementation from 1994 to 1996, to manage and direct a framework for skills development. The latter included the development of a program of courses and direction of broadcast video productions (3) on salmonid distribution, identification, and habitat requirements during freshwater life stages, as well as book chapters, training materials, and guides on habitat rehabilitation. He currently also chairs the salmon working group of the Pacific Ocean Salmon Tracking (POST) project and continues with steelhead and salmon research. Bruce resides in Mission, B.C. with his wife Jacqueline.

Bruce R. Ward

Publications List

I. Journal (primary) papers.

1. Hart, P.J.B., P. Bisson, K. Cochran, S. Kenelly, J. Nielsen, T.J Pitcher, Y.J. Sadovy, D. Schmidt, D., B.R. Ward, and J. Wingate. 2004 (in prep.) Reconciling fisheries with conservation: have we made progress? *In* J. Nielsen [ed.] Proceedings of the Fourth World Fisheries Congress, 4th-7th May 2004, Vancouver, B. C., Canada.
2. Irvine, J. R., and B. R. Ward. 1989. Patterns of timing and size of wild coho smolts (*Oncorhynchus kisutch*) migrating from the Keogh River watershed on northern Vancouver Island. *Can J. Fish. Aquat. Sci.* 46:1086-1094.
3. Irvine, J. R., B. R. Ward, P. A. Teti, and N. B. F. Cousens. 1991. Evaluation of a method to count and measure live salmonids in the field using a video camera and computer. *N. Amer. J. Fish. Manage.* 11:20-26.
4. Johnston, N. T., C. J. Perrin, P. A. Slaney, and B. R. Ward. 1990. Increased juvenile salmonid growth by whole-river fertilization. *Can. J. Fish. Aquat. Sci.* 47:862-872.
5. Slaney, P. A., B. R. Ward, and D. J.F. McCubbing. 2004 (in prep). Whole-river ecosystem restoration to reconcile fisheries and habitat impacts in coastal British Columbia. *In* J.Neilsen, [ed.] Proceedings of the Fourth World Fisheries Congress, 4th-7th May 2004, Vancouver, B. C., Canada.
6. Slaney, P., B.R. Ward, and C. Wightman. 2002. Experimental whole-river fertilization of the Keogh River and its applications to the Upper Salmon River in B.C. Pages 000-000 *In* J. Stockner [ed.] Proceedings of the International Conference on Restoring Nutrients to Salmonid Ecosystems April 24 to 26, 2001, Eugene, OR.
7. Smith, B.D., and Ward, B.R. 2000. Trends in adult wild steelhead (*Oncorhynchus mykiss*) abundance for coastal regions of British Columbia support the variable marine survival hypothesis. *Can. J. Fish. Aquat. Sci.* 57:271-284.
8. Smith, B.D., Ward, B.R., and Welch, D.W. 2000. Trends in wild adult steelhead (*Oncorhynchus mykiss*) abundance in British Columbia as indexed by angler success. *Can. J. Fish. Aquat. Sci.* 57:255-270.
9. Tsumura, K., and B. R. Ward. 1987. A sling used for boulder placement in instream enhancement projects. *North Am. J. Fish. Manage.* 7:456-457.
10. Walters, C.J, and Ward, B.R. 1998. Is solar UV radiation responsible for declines in marine survival rates of anadromous salmonids that rear in small streams? *Can. J. Fish. Aquat. Sci.* 55: 2533-2538.
11. Ward, B.R. 1996. Population dynamics of steelhead in a coastal stream, the Keogh River, British Columbia. Pp. 308-323 *In* I. Cowx [ed.] *Stock Assessment in Inland Fisheries*. Fishing News Books, Blackwell Scientific Publications, Oxford.
12. Ward, B.R. 2000. Declivity in steelhead trout recruitment at the Keogh River over the past decade. *Can. J. Fish. Aquat. Sci.* 298-306.
13. Ward, B. R., and P. A. Slaney. 1981. Further evaluations of structures for the improvement of salmonid rearing habitat in coastal streams of British Columbia, p 99-108. *In* T. J. Hassler [ed] Proceedings: propagation, enhancement and rehabilitation of anadromous salmonid populations and habitat symposium, Humboldt State University, Arcata, Calif.
14. Ward, B. R., and P. A. Slaney. 1988. Life history and smolt-to-adult survival of Keogh River steelhead trout (*Salmo gairdneri*) and the relationship to smolt size. *Can. J. Fish. Aquat. Sci.* 45:1110-1122.
15. Ward, B. R., P. A. Slaney, A. R. Facchin, and R. W. Land. 1989. Size-biased survival in steelhead trout: back-calculated lengths from adults' scales compared to migrating smolts at the Keogh River, B.C. *Can. J. Fish. Aquat. Sci.* 46:1853-1858.
16. Ward, B. R., and P.A. Slaney. 1990. Returns of pen-reared steelhead trout from riverine, estuarine, and marine releases. *Trans Am. Fish. Soc.* 119:492-499.
17. Ward, B. R., and P.A. Slaney. 1993. Egg-to-smolt survival and fry-to-smolt density dependence of Keogh River steelhead, p.209-217. *In* R.J. Gibson and R.E. Cutting [ed.] Production of juvenile Atlantic salmon, *Salmo salar*, in natural waters. *Can. Spec. Publ. Fish. Aquat. Sci.* 118.
18. Ward, B.R., D.J.F. McCubbing, and P.A. Slaney. 2002. The addition of inorganic nutrients and stream habitat structures in the Keogh River watershed for steelhead trout and coho salmon, Pages 127-147. *In* J. Stockner [ed.] Proceedings of the International Conference on Restoring Nutrients to Salmonid Ecosystems April 24 to 26, 2001, Eugene, OR.

19. Ward, B.R., D.J.F. McCubbing, and P.A. Slaney. 2003. Stream restoration for anadromous salmonids by the addition of habitat and nutrients, Pp.235-254 In D. Mills [ed.] Proceedings of the Sixth International Atlantic Salmon Symposium, July 2002, Edinburgh, Scotland.
20. Welch, D.W., Ward, B.R. Smith, B.D., and Eveson, J.P. 2000. Temporal and spatial responses of British Columbia steelhead (*Oncorhynchus mykiss*) populations to ocean climate shifts. Fisheries Oceanography 9:17-32.
21. Welch, D.W., S.D. Batten, and B.R. Ward. 2004. (in prep). Growth, survival, and tag retention of surgically implanted acoustic tags in steelhead trout (*Oncorhynchus mykiss*). Trans. Am. Fish. Soc.
22. Welch, D.W., G. W. Boehlert, and B R. Ward. 2002. POST—the Pacific Ocean Salmon Tracking Project. Oceanologica Acta:
23. Welch, D.W., Ward, B.R., and S. Batten. 2004 (in prep). Early ocean survival, movement, and habitat use of juvenile steelhead as determined by an acoustic array: Quatsino Sound, British Columbia. Can. J. Fish. Aquat. Sci.
24. Welch, D.W., Ward, B.R., and S. Batten. 2004 in press. Early ocean survival and comparative movements of hatchery and wild juvenile steelhead as determined by an acoustic array: Queen Charlotte Strait, British Columbia. Deep Sea Research 00:000-000.

II. Management, Symposia or Technical (secondary) Papers.

1. Burroughs, L.E., P.A. Slaney, and J.S. Cleary. 2001. The Keogh River watershed restoration: 2000/2001 fish habitat rehabilitation. Province of British Columbia, Ministry of Environment, Lands and Parks, and Ministry of Forests, Watershed Restoration Progress Report Number 17:34p.
2. Hogan, D., and B.R. Ward. 1997. Watershed geomorphology and fish habitat, Pp. 2-1 to 2-18. In P.A. Slaney and D. Zaldokas [ed.] Fish Habitat Rehabilitation Procedures. Prov. B.C. Watershed Restoration Tech. Circ. No. 9.
3. Hooton, R.S., B.R. Ward, V.A. Lewynsky, M.G. Lirette, and A.R. Facchin. 1987. Age and growth of steelhead in Vancouver Island populations. Prov. B.C. Fish. Br. Tech. Circ. No. 77. 39p.
4. Johnston, N.T., E.A. Parkinson, A.F. Tautz, and B.R. Ward. 2000. Biological reference points for the conservation and management of Steelhead, *Oncorhynchus mykiss*. Fisheries and Oceans Canada Pacific Scientific Advice Review Committee Working Paper S00-08. 92p.
5. Johnston, N.T., E.A. Parkinson, A.F. Tautz, and B.R. Ward. 2002. Biological reference points from deterministic stock-recruit relations. Prov. B.C. Fish. Proj. Report No. RD100. 42p.
6. McCubbing, D.J.F., and B.R. Ward. 1998a. The Keogh and Waukwass Rivers paired watershed study: juvenile salmonid summer density and growth 1997. Streamlines - B.C.'s Watershed Restoration Technical Bulletin 2 (4):14A-15A.
7. McCubbing, D.J.F., and B.R. Ward. 1998b. The Keogh and Waukwass rivers paired watershed study for B.C.'s Watershed Restoration Program: juvenile salmonid summer density and growth 1997. Province of British Columbia, Ministry of Environment, Lands and Parks, Watershed Restoration Project Report No. 6: 33p.
8. McCubbing, D.J.F., and B.R. Ward. 1998c. The Keogh and Waukwass rivers paired watershed study for B.C.'s Watershed Restoration Program: juvenile salmonid summer density and growth 1998. Province of British Columbia, Ministry of Environment, Lands and Parks, Watershed Restoration Project Report No. 12: 20p.
9. McCubbing, D.J.F., and B.R. Ward. 1998d. Development of a fishery worker escapement estimation method: salmon enumeration estimates on the Keogh (SEEK). Fisheries and Oceans Canada Habitat Restoration and Salmon Enhancement Program Report 1998.
10. McCubbing, D.J.F. and B.R. Ward. 2000. The Keogh and Waukwass Rivers paired watershed study for B.C.'s Watershed Restoration Program: juvenile salmonid abundance and growth 1997-1999. Streamline 4(3):7-11.
11. McCubbing, D.J.F., and B.R. Ward. 2001. Stream rehabilitation in British Columbia's Watershed Restoration Program: Positive response by juvenile salmonids in the Keogh River compared to the untreated Waukwass River in 1999. Province of British Columbia, Ministry of Environment, Lands and Parks, and Ministry of Forests Watershed Restoration Project Report No. 16:33p.
12. McCubbing, D.J.F., and B.R. Ward. 2001. Stream rehabilitation in British Columbia's Watershed Restoration Program: Salmonid Production on the Keogh and Waukwass Rivers – A dynamic comparison of restoration benefits on a treated and an untreated watershed. Province of British Columbia, Ministry of Environment, Lands and Parks, Watershed Restoration Project Report No. 16:34p.

13. McCubbing, D.J.F., and B.R. Ward. 2002. Stream rehabilitation in British Columbia's Watershed Restoration Program: juvenile salmonids in the Keogh River compared to the untreated Waukwaas River in 2001. Province of British Columbia, Ministry of Environment, Lands and Parks, Watershed Restoration Project Report No. 20: 37p.
14. McCubbing, D.J.F., and B.R. Ward. 2002. Adult Steelhead Trout and Salmonid Smolt Migration at the Keogh River, B.C. during Spring 2002. Habitat Conservation Trust Fund Contract Number: CBIO3006. 41p
15. McCubbing, D.J.F., and B.R. Ward. 2003. Adult Steelhead Trout and Salmonid Smolt Migration at the Keogh River, B.C. during Spring 2002. Habitat Conservation Trust Fund report.
16. McCubbing, D.J.F., and B.R. Ward. 2004 in prep. Adult Steelhead Trout and Salmonid Smolt Migration at the Keogh River, B.C. during Spring 2002. Habitat Conservation Trust Fund.
17. McCubbing, D.J.F., B.R. Ward, and L. Burroughs. 1999. Salmonid escapement enumeration on the Keogh River: a demonstration of a resistivity counter in British Columbia. Prov. B.C. Fish. Tech. Circ. No.104. 25p.
18. McCubbing, D.J.F. 2000. Adult steelhead trout and salmonid smolt migration at the Keogh River during spring 2000. Report to B.C. Fisheries on Contract No. 800534 for the Habitat Conservation Trust Fund by Northern Vancouver Island Salmonid Enhancement Association. 26p.
19. Rempel, M.H., R.W. Land, L.W. Mitchell, and B.R. Ward. 1984. Wild and hatchery steelhead and cutthroat trout populations of the Little Campbell River, B.C. Prov. B.C. Fish. Tech. Circ. No. 62. 11p.
20. Slaney, P. A., C. J. Perrin, and B. R. Ward. 1986. Nutrient concentration as a limitation to steelhead smolt production in the Keogh River. Proc. Annu. Conf. West. Assoc. Fish. Wildl. Agencies 66:146-155.
21. Slaney, P. A., B. R. Ward, and L. Berg. 1990. A preliminary assessment of the effect of external abrasion on the smolt-to-adult survival of net-pen cultured steelhead trout. Prov. B.C. Fish. Tech. Circ. No. 88. 11p.
22. Slaney, P. A., and B. R. Ward. 1993. Experimental fertilization of nutrient deficient streams in British Columbia, p. 128-141 *In* G. Shooner et S. Asselin [éd.]. Le développement du Saumon atlantique au Québec: connaître les règles du jeu pour réussir. Colloque international de la Fédération québécoise pour le saumon atlantique. Québec, décembre 1992. Collection *Salmo salar* n° 1:201 p.
23. Tautz, A. F., B. R. Ward, and P. A. Ptolemy 1992. Steelhead trout productivity and stream carrying capacity for rivers of the Skeena drainage. Dept. Fish. Oceans PSARC Working Paper S92-6 and 7: 42p.
24. Tydemers, P., and B.R. Ward. 2001. Impacts of climate change on B.C.'s freshwater fish resources and possible management responses. U.B.C Fisheries Centre Research Report 9(7):12p.
25. Ward, B. R. 1992. Estimation of the escapement requirement for steelhead trout: a review of methods and recommendations for British Columbia. Prov. B.C. Fish. Prog Rep.
26. Ward, B.R. 1993. Selective harvest in salmonid trap-net fisheries of the past, present and future. First Nations' Amer. Fish. Soc. Workshop, Richmond Inn, B.C., Jan. 16-18, 1993.
27. Ward, B.R. 1997. Keogh River watershed restoration: the past versus 1996. Streamline 1 (1):8a. (abstract only).
28. Ward, B.R. 1997. Boulder clusters to amend juvenile salmonid habitat in streams, Pp.10-1 to 10-10. *In* P.A. Slaney and D. Zaldokas [ed.] Fish Habitat Rehabilitation Procedures. Prov. B.C. Watershed Restoration Tech. Circ. No. 9.
29. Ward, B. R., J. A. Burrows, and D. L. Quamme. 1990. Adult steelhead population size and salmonid migrants of the Keogh River during the spring, 1990. B.C. Fish. Tech. Circ. No. 89. 29p.
30. Ward, B.R., and B.K. Downie. 1994. Report of the skills identification workshop. Prov. B.C. MELP/MOF progress report 1994 for B.C.'s Watershed Restoration Program.
31. Ward, B.R., and McCubbing, D.J.F. 1998. Adult steelhead and salmonid smolts at the Keogh River during spring 1998 in comparison to the historic record. Prov. B.C. Fish. Tech. Circ. No. 102. 20p.
32. Ward, B.R., and P. Plackett. 1995. Skills and knowledge requirements for the British Columbia Watershed Restoration Program. Prov. B.C. Watershed Restoration Management Report No. 2: 36 p.
33. Ward, B. R., and P. A. Slaney. 1979. Evaluation of in-stream enhancement structures for the production of juvenile steelhead trout and coho salmon in the Keogh River: Progress 1977 and 1978. B.C. Fish. Tech. Circ. No. 45. 47p.
34. Ward, B. R., and P. A. Slaney. 1980. Evaluation of in-stream enhancement structures for the production of juvenile steelhead trout and coho salmon in the Keogh River: Progress 1977 and 1978. p. 8-15 *In* E. Seehorn [ed] Proceedings of the trout stream habitat improvement workshop, Nov. 1980. Asheville, N.C.
35. Ward, B. R., and P. A. Slaney. 1993. Habitat manipulations for the rearing of fish in British Columbia, p. 142-148. *In* G. Shooner et S. Asselin [éd.]. Le développement du Saumon atlantique au Québec: connaître les règles

- du jeu pour réussir. Colloque international de la Fédération québécoise pour le saumon atlantique. Québec, décembre 1992. Collection *Salmo salar* n° 1:201 p.
36. Ward, B.R., P.A. Slaney, and A.F. Tautz. 1991. Comparison of survival and age at return from the sea of wild and hatchery steelhead smolts of the Keogh River. Presented at Internat. Conf. Wild and Enhanced Salmonids, June 17-20, 1991, Nanaimo, B.C.
 37. Ward, B.R., A.F.Tautz, S. Cox-Rogers, and R.S. Hooton. 1993. Migration timing and harvest rates of the steelhead trout populations of the Skeena River system. Dept. Fish. Oceans PSARC Working Paper S93-06. 44p.
 38. Ward, B.R., and D.W. Welch. 1997. Effects of the 1990 ocean climate shift on trout and salmon. Presented at the Squamish River Watershed Fisheries Sustainability Forum, Nov. 27-30, 1997, Squamish, B.C.
 39. Ward, B. R., and J. C. Wightman. 1989. Monitoring steelhead trout at the Keogh River as an index of stock status and smolt-to-adult survival: correlations with other data sources. Prov. B.C. Fish. Manage. Rep. No. 95. 21 p.
 40. Welch, D., B.R. Ward, B.D. Smith, and F. Whitney. 1997. Changes associated with the 1989-90 ocean climate shift, and effects on British Columbia steelhead (*Oncorhynchus mykiss*) populations. Dept. Fish. Oceans Pacific Stock Assessment (PSARC) Working Paper S97-7. 51p.
 41. Welch, D.W., Ward, B.R., Smith, B.D., and Eveson, J.P. 1998. Influence of the 1990 ocean climate shift on British Columbia steelhead (*Oncorhynchus mykiss*) and coho (*O. kisutch*) populations, p. 77-87. In G. Holloway, P. Muller, and D. Henderson [ed.] Biotic Impacts of Extratropical climate variability in the Pacific; Proceedings of the the Hawaiian Winter Workshop, University of Hawaii at Manoa, Jan. 25-29, 1998.
 42. Wightman, J.C., B.R. Ward, and P.A. Ptolemy. 1998. A recovery plan for east coast Vancouver Island steelhead trout. Prov. B.C. Fish. Proj. Rep.
 43. Ward, B. R. 1988. Trends and forecasts from winter-run steelhead at the Keogh River. Prov. B.C. Fish. Proj. Rep. No. RD6. 8p.
 44. Ward, B. R. 1988. Project proposal: evaluation of a method to enumerate, size sample and separate fish species using video/computer equipment. B.C. Fish. Proj. Rep. No. RD8. 22p.
 45. Ward, B. R. 1989. Trends and forecasts from winter-run steelhead at the Keogh River: Results from 1988. Prov. B.C. Fish. Proj. Rep. No. RD18. 6p.
 46. Ward, B.R. 1995. Keogh Demonstration Watershed: Watershed Restoration Program 1994-95. Summary report to MELP WRP, 1994. 18p.
 47. Ward, B.R. 1996. Keogh River fish habitat rehabilitation, Pp. 65-78. In D. Zaldokas [ed.] Regional examples of fish habitat projects of the Watershed Restoration Program 1994-1996. MELP WRP Progress Report, Nov. 1996. 102 p.
 48. Ward, B.R. 1996. Keogh River habitat restoration: The past versus 1996. Presented at B.C. - U.S. Stream Restoration Workshop, Cowichan Lake Research Station, Oct. 21-23, 1996. See also Streamlines.
 49. Ward, B.R. 1997. Changes to survival and recruitment of Keogh River steelhead trout after 1990. Presented at the Vancouver Island Steelhead Management Workshop, Nov. 8, 1997.
 50. Ward, B.R. 1998. An historical summary of fisheries research and watershed restoration activities at the Keogh River. Prov. B.C. Fish. Info. Brochure. 4p.
 51. Ward, B.R. 1998. Freshwater fishing and climate change. The Recreational Fisheries Institute of Canada Workshop on Global Climate Change: the Risks and Benefits to Recreational Fisheries in Canada. May, 1998, Victoria, B.C.
 52. Ward, B.R. 2000. Canadian supplementation and captive broodstock programs, Page 19. In Independent Multidisciplinary Science Team. 2000. Conservation Hatcheries and Supplementation Strategies for Recovery of Wild Stocks of Salmonids. Report of a Workshop. Technical Report 2000-1 to the Oregon Plan for Salmon and Watersheds. Oregon Watershed Enhancement Board. Salem, Oregon.
 53. Ward, B.R., and T. MacPherson. 1998. Keogh salmonids database. CD-ROM and HCTF progress report, on file, UBC.
 54. Ward, B.R., D.J.F. McCubbing, and P.A. Slaney. 2001. Positive response to watershed-level inorganic nutrient addition and stream habitat structures by Keogh River steelhead trout. Watershed Restoration Tech. Bull. Streamline Vol. 6(1):8A.
 55. Welch, D.W., B.R. Ward, and B.D. Smith. 1998. Influence of a possible 1990 ocean climate shift on British Columbia steelhead (*O. mykiss*) and coho (*O. kisutch*) populations. North Pacific Anadromous Fish Commission Workshop on Climate Change and Salmon Production. March 1998, Vancouver, B.C.

VI. Video productions.

1. Ward, B.R. 1994. Director, "British Columbia's Watershed Restoration Program for Forest Renewal B.C." Length 16 min.. Prov. B.C. FRBC/WRP video.
2. Ward, B.R. 1998. Director, "A Catalogue of British Columbia's Salmonids" Length 24 min. Prov. B.C. FRBC/WRP video. Jan. 1998.
3. Ward, B.R. 1998. Director, "The Seasons of the Salmonids" Length 24 min. Prov. B.C. FRBC/WRP video. available Jan. 1998.

Symposia / Technical Presentations and major workshops.

1. Can. Conf. for Fish. Res., January 6-9, 2001. Fredericton. N.B. (chair, plenary session, Keogh presentation).
2. Vancouver Island Steelhead Recovery Public meeting, January 14-15, 2001 (continues as an annual meeting). Nanaimo, B.C. (invited speaker)
3. B.C. Fisheries Anadromous Committee Meeting, Jan. 31 – Feb. 4., 2001 Harrison, B.C. (Keogh presentation)
4. June 2001. Speaking for the Salmon Workshop: Hatcheries and the Protection of Wild Salmon. Simon Fraser University, Burnaby, B.C.<http://www.sfu.ca/cstudies/science/calendar.htm#2001>
5. Oregon Chapter Annual Meeting, Am. Fish. Soc., Feb. 16-18, 2002. Eugene, OR. (invited speaker)
6. Sustainable Fisheries Workshop, Feb. 23-25, 2002. Kamloops, B.C. (Keogh presentation)
7. Salmon Aquaculture Impacts Workshop, Mar. 2-3, 2000. Simon Fraser Univ., Burnaby, B.C. (invited)
8. N. Pac. Internat. Chapter Annual Meeting, Am. Fish. Soc., Apr. 10-12, 2000. Mount Vernon, WA. (presentation)
9. Sustainable Seafood in a Changing Climate, May 24-26, 2000. U. of Victoria, B.C. (invited). Proceedings published. <http://www.cics.uvic.ca/workshop/FinalReport.htm>
10. Steelhead stock assessment and recovery workshop, June 8-9, 2000. U.B.C., Vancouver (chair).
11. Why are Atlantic salmon returns to North American rivers declining? A workshop on research strategies, June 10-16, 2000, Halifax, NS (invited). Proceedings published.
12. A Scientific Workshop on Conservation Hatcheries and Supplementation Strategies for Recovery of Wild Stocks of Salmonids. Independent Multidisciplinary Science Team Oregon Plan for Salmon and Watersheds, June 19-21, 2000. Portland, Oregon. (invited speaker). Proceedings published.
13. BC Government, Fish. Ministry Executive and Minister Evans, Victoria, July 11, 2000. Keogh steelhead declivity and reversal.
14. Am. Fish. Soc. Annual General Meeting, Aug 18-21, 2000. St. Louis, Missouri. (presentation; chair annual meeting of Can. Aquat. Resources Section).
15. Ward, B.R. 2001. Factors in the decline of steelhead trout: ocean conditions and the Keogh River rehabilitation experience. Lower Mainland B.C. Fisheries Public Meeting, Jan. 2001.
16. Ward, B.R. 2001. Keogh River steelhead: trends and restoration efforts. Public presentation, March, 2001, Vancouver Island Trout hatchery, Duncan, B.C.
17. Ward, B.R. 2001. Declivity reversal in steelhead trout: fisheries research on ecosystem rehabilitation at the Keogh River. U.B.C. Fisheries Centre Fish 500 Issues in Fisheries Research Seminars.
18. Ward, B.R., and P. Tyedmers. 2001. Impact of climate change on British Columbia freshwater fish and possible management response. Presented at the American Fisheries Society Annual General Meeting, Phoenix, Arizona, August 2001.
19. Ward, B.R., McCubbing, D.J.F., Slaney, P.A., and R. Billings. 2001. The steelhead trout conservation hatchery and habitat restoration experimental approach at the Keogh River, B.C. North Pacific International Chapter, American Fisheries Society Annual General Meeting, Victoria, B.C., Oct. 2001.
20. May 15-17, 2001. BC-US Watershed Restoration Technical Exchange Conference "Linking Physical and Biological Processes", Port Hardy, B.C.
21. October 27, 2001. Invited paper. Coastwide Salmonid Genetics Meeting, Bodega Marine Laboratory, University of California Davis. "Genetic Analysis of the Keogh River Steelhead Trout 1998 Living Gene Bank" (Ardren, Ward, Egge).
22. Ward, B.R., D.J.F. McCubbing, and D.W. Welch. 2002. Flip, flop and fry: climate-induced variation in Keogh River salmonid carrying capacity and survival in the ocean. Canadian Conference For Fisheries Research, Jan. 2-5, 2002, Vancouver, B.C.
23. Ward, B.R., and D.J.F. McCubbing. 2002. Trends in steelhead trout and coho salmon survival in the eastern Pacific Ocean based on the Keogh index. 4th Annual Salmon Ocean Ecology Meeting, 15-16 January, 2002,

National Marine Fisheries Service, Southwest Fisheries Science Center, Santa Cruz Laboratory, Santa Cruz, California.

24. Ward, B.R. Climate-induced variation in survival of salmonids on the West Coast of North America during freshwater and marine life stages. West Division Am. Fish. Soc. Spokane, WA. April 27 – May 1, 2002.
25. Ward, B.R., D.J.F. McCubbing, and P.A. Slaney. 2002. Stream ecosystem restoration for anadromous salmonids by the addition of habitat and nutrients. 6th International Atlantic Salmon Symposium, July 15-19, 2002, Edinburgh, Scotland.
26. Aug. 2002. American Fisheries Society Annual General Meeting, Baltimore, Maryland.
27. Jan. 2003. Canadian Conference For Fisheries Research, Ottawa, Ontario.
28. April 2003. North Pacific International Chapter of Am. Fish. Soc. Meeting, Vancouver, B.C.
29. April 2003. Canadian Climate Indicators and Adaptations Research Network meeting, Vancouver, B.C.
30. Western Division Am. Fish. Soc. April 14-17, 2003. San Diego, California.
31. Aug. 2003. American Fisheries Society Annual General Meeting, Quebec, City, Quebec.
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