

**ESSA Technologies Ltd.**  
Suite 300, 1765 W. 8th Avenue, Vancouver, BC V6J 5C6  
Ph. (604) 733-2996 Fax (604) 733-4657 email dmarmorek@essa.com

## **David R. Marmorek**

Birthdate: December 6, 1952  
Citizenship: Canadian

### **Post-Secondary Education**

- **M.Sc. Zoology**, University of British Columbia, 1983. Thesis topic: Effects of lake acidification on zooplankton community structure and phytoplankton-zooplankton interactions: an experimental approach. 397 pp. Course work included advanced ecology, population dynamics, limnology, oceanography, adaptive management, multivariate statistics, and fish biology.
- **B.E.S. (Honors), Man-Environment Studies and Mathematics**, First class honours, University of Waterloo, 1975. Course work included physics, chemistry, ecology, psychology, environmental impact assessment, computer science, probability and statistics, calculus, and simulation modelling.
- **Negotiating Agreements Among Multiple Interests**, Simon Fraser University, 2010
- **Leadership Laboratory**, University of British Columbia, Vancouver, BC, 1989

### **Awards**

- Environmental Protection Agency - Bronze Medal for Commendable Service, 1987.
- University of British Columbia Graduate Scholarship, 1980.
- Natural Science & Engineering Research Council - Post-Graduate Scholarship, 1979.
- Rene Descartes Mathematics Bursary, University of Waterloo.
- Ontario Scholarship, York Mills Collegiate, Toronto.

### **Research Interests**

- melding my group leadership and facilitation skills with my knowledge of scientific methods (aquatic ecology, data analysis, modelling, experimental design, monitoring, adaptive management, decision analysis)

### **Professional Experience**

2002 – now      **President**, ESSA Technologies Ltd.  
1993 - 2002    **Director**, ESSA Technologies Ltd.  
1991 - now     **Adjunct Professor**, School of Resource and Environment Management, Simon Fraser University.  
1983 - 1993    **Director**, ESSA Environmental and Social Systems Analysts Ltd.  
1981 - 1983    **Systems Ecologist**, ESSA Environmental and Social Systems Analysts Ltd.

### **Adaptive Management of Aquatic and Terrestrial Ecosystems**

- Principal Investigator for the development of an Adaptive Management Plan for the Middle Rio Grande Endangered Species Collaborative Program (with Headwaters Corporation, Kearney, NE)

- leading the development of an adaptive management plan for Dry Creek, Santa Rosa CA, to restore habitat for listed coho and steelhead populations (ongoing)
- led an ESSA team and 25 scientists in the Trinity River Restoration Program to develop conceptual models, restoration objectives, sampling designs, and monitoring methods, all organized into an adaptive management plan called the Integrated Assessment Plan (ongoing)
- Chair of the Independent Science Advisory Committee (ISAC) for the Platte River Recovery Implementation Program, and the ISAC's expert on adaptive management and decision analysis (ongoing)
- member of the Strategic Science Peer Review Panel (SSPRP) for the Puget Sound Nearshore Ecosystem Restoration Project, serving as the Panel's expert on adaptive management (ongoing)
- member of an expert review panel to review two drafts of a guide to implementing adaptive management in the Central Everglades Restoration Program (for the U.S. Army Corps of Engineers)
- led a 5-year, \$5 million (U.S.) multi-agency project (CSMEP) to improve adaptive management in the Columbia Basin, developing consistent, reliable methods of monitoring and evaluating the status of fish populations and their habitats, including responses to hydro, habitat, hatchery and harvest actions
- led a major study in the Columbia Basin to retrospectively evaluate the effects of habitat restoration actions on fish population survival rates, which recommended a stronger approach to regional restoration design, monitoring and evaluation, applying adaptive management principles
- led the development of a decision analysis model of alternative operations and adaptive management plans for maintaining both mountain whitefish populations and power production at BC Hydro's Keenleyside Dam on the Canadian Columbia River
- led an interagency group of 25 fisheries scientists, policy advisors and peer reviewers in a 6-year program to evaluate alternative recovery measures for endangered Columbia River salmon stocks (PATH: Plan for Analyzing and Testing Hypotheses), including adaptive management experiments
- led the completion of a workshop-based, multi-authored interdisciplinary study to evaluate the evidence for delayed mortality in salmon populations as a result of passage through dams on the Columbia River, as part of the adaptive management of the Columbia River hydrosystem
- lead facilitator and project manager for two projects on the Okanagan River (Canadian Columbia Basin): the successful re-introduction of sockeye into Skaha Lake (an adaptive management experiment prior to their potential re-introduction into Okanagan Lake), and the development of a model for adaptive in-season management of water releases from Okanagan Lake
- lead facilitator for research, adaptive management, monitoring and modelling activities to restore salmonid populations in Kennedy Lake, BC, working with native bands, fisheries agencies, logging companies, and local community groups
- facilitated the multi-agency development of conceptual and computer models to assess the impacts of forest operations in Northern Ontario on fish and wildlife populations, which led to the design and implementation of several innovative adaptive management experiments
- led the public-private-academic development of an integrated watershed simulation model for British Columbia's Fish Forestry Interaction Program (FFIP) to understand stream channel dynamics and guide timber management decisions within an adaptive management framework
- led a multi-agency effort to determine the best methods to assess the relative sensitivity of watersheds and streams to forest activities across the province of British Columbia
- facilitated workshops and gave presentations on how to better incorporate adaptive management into: BC's Watershed Restoration Program, BC's Landscape Unit Planning process, the management of Okanagan River sockeye, watershed restoration near Mexico City, and salmon conservation in the Pacific Northwest
- contributed to the development of a training course in Adaptive Management for the BC Forest Service, and delivered adaptations of the course in Washington, California and Mexico
- facilitated scientific and stakeholder committees in a 3-year decision analysis of operating alternatives for a BC Hydro dam on the Cheakamus River, BC, including adaptive management alternatives.

- led the development of a decision analysis modelling tool to assist with the design of restoration and adaptive management strategies for salmonids and fluvial ecosystems in Clear Creek, CA
- facilitated the development of a detailed conceptual framework to guide restoration planning and adaptive management strategies for the San Joaquin River, CA
- designed or built simulation models of to assist with the adaptive management of salmon harvest on the South Coast of BC (including biological and economic indicators), livestock grazing in Nevada (including vegetative and aquatic impacts), and lake trout in Ontario.

### **Environmental Impact Assessment, Research and Monitoring**

- used maximum likelihood estimation models and decision analysis to assess the impacts of power plant water withdrawals on Hudson River fish species (for the New York Dept. of Environmental Conservation)
- led a population modelling team in a comprehensive evaluation of impacts on Delaware River fish populations of cooling water withdrawal operations at the Salem Nuclear Generating Station (for the New Jersey Department of Environmental Protection)
- developed a framework for guiding impact evaluation and research/monitoring of fisheries impacts of BC Hydro facilities on the Columbia and Peace rivers
- played major roles in the overall management and environmental monitoring component of CIDA's 15-year, \$35-million project to build Vietnam's capacity to manage industrial and urban pollution (VCEP and VPEG)
- developed a detailed 4-year monitoring plan for the Fraser River Basin Assessment Program, assessing contaminants, point and non-point sources and overall ecological condition.
- co-ordinated a large team of government and ESSA scientists and led the writing of the first BC State of Environment report, of which over 15,000 copies have been published (and another 40,000 planned)
- led a team of 7 ESSA scientists in the facilitation and synthesis of a large workshop on ecosystem goals and objectives, attended by over 100 government environmental managers
- worked with scientists and native groups to develop monitoring plans to assess the impacts of oil and gas development on the Beaufort Sea (1982-84), and to develop an ecosystem modeling strategy (2009)
- developed monitoring strategies for groundwater contamination, toxic chemicals in the Great Lakes Connecting Channels, pulp mills on the western coast of Canada
- major author of a strategy to guide the development and selection of ecological indicators for the U.S. EPA Environmental Monitoring and Assessment Program (EMAP), and an approach to the development of data quality objectives
- built simulation models for the development of adaptive management approaches to deal with the impacts of gypsy moth in eastern forests, drilling muds in coastal ecosystems, and cottage development in Ontario
- led a project which used modelling workshops to develop research priorities for understanding the fate and effects of pulp mill effluents in the Fraser River system
- project manager and major contributor to a study which assessed the pre-development environmental impact predictions for eleven Canadian hydroelectric reservoirs
- conducted a field, laboratory, and empirical modelling study of mercury contamination of fish in hydroelectric reservoirs

### **Acidic Deposition**

- designed and implemented the receptor monitoring and modelling program for an acid deposition study in Northern Thailand

- principal or primary author of state-of-science reports on models for projecting water chemistry conditions, acidic episodes in surface waters, effects of snowmelt episodes, role of organic acids in acid lakes, target loadings for western Canada, effects of acidic deposition on dissolved organic carbon, use of zooplankton for biomonitoring
- directed the development of a regional model to assess the effects of acidification and fishery management actions on Atlantic salmon in Nova Scotia rivers, and a linked chemical model to simulate alternative deposition scenarios (for Fisheries and Oceans Canada)
- major contributor to the 1990 NAPAP Integrated Assessment. Responsibilities included critical analysis and synthesis of studies of impacts of acid deposition on aquatic systems, simulation modelling, and co-ordination of a team of 15 scientists and modellers
- facilitated workshops, designed and wrote research plans, and defended those plans at peer review meetings for the EPA National Surface Water Survey, Direct/Delayed Response Project, Watershed Manipulation Project, and the Episodic Response Project (over \$50 million in research activities)
- developed and published a protocol to determine lake acidification pathways
- worked with a team of EPA scientists to apply the critical load concept to establishing pollutant loading standards
- primary author of a study of the applicability of the target loading concept to Western Canada
- served as modeller, facilitator and data analyst for a series of projects which resulted in the development of a regional model of aquatic effects of acidic deposition with a focus on fisheries and six other classes of aquatic biota
- co-ordinated and contributed to a review of the effects of acidic snowmelt episodes on scientists studying this topic, and a workshop to develop new research initiatives
- contributed to a review of the relative importance of internal (catchment-derived) and external (atmospherically-derived) sources of acidity.

1979 - 1980     **Consultant**, facilitating AEAM workshops.

- facilitated workshops on the effects of logging on salmon habitat, and effects of oil spills on crab populations in the Bering Sea.

1975 - 1978     **Applied Ecologist/Urban Planner**, Proctor and Redfern Ltd.

1975            **Researcher**, Metropolitan Toronto Hospital Planning Council.

1974            **Researcher**, Regional Municipality of Waterloo Planning Department.

1973            **Computer Analyst**, Minerals Research Branch, Ontario Ministry of Natural Resources.

1971 - 1972     **Computer Programmer**, University of Waterloo Computing Center.

### **Refereed Journal Articles and Book Chapters**

**Alexander, C.A.D., C.N. Peters, D.R. Marmorek and P. Higgins.** 2006. A decision analysis of flow management experiments for Columbia River mountain whitefish management. *Can. J. Fish. Aquat. Sci.* 63: 1142-1156.

**C. Murray and D.R. Marmorek.** 2003. Adaptive Management and Ecological Restoration. *In Ecological Restoration of Southwestern Ponderosa Pine Forests.* P. Friederici, ed. Ecological Restoration Institute, Flagstaff, AZ. p. 417-428.

- Marmorek, David R. and Calvin Peters.** 2001. Finding a PATH towards scientific collaboration: insights from the Columbia River Basin. *Conservation Ecology* 5(2): 8. [online] URL: <http://www.consecol.org/vol5/iss2/art8>
- Deriso, R.B., Marmorek, D.R., and Parnell, I.J.** 2001. Retrospective Patterns of Differential Mortality and Common Year Effects Experienced by Spring Chinook of the Columbia River. *Can. J. Fish. Aquat. Sci.* 58(12): 2419-2430
- Peters, C.N. and Marmorek, D.R.** 2001. Application of decision analysis to evaluate recovery actions for threatened Snake River spring and summer chinook salmon (*Oncorhynchus tshawytscha*). *Can. J. Fish. Aquat. Sci.* 58(12):2431-2446.
- Peters, C.N., Marmorek, D.R., and Deriso, R.B.** 2001. Application of decision analysis to evaluate recovery actions for threatened Snake River fall chinook salmon (*Oncorhynchus tshawytscha*). *Can. J. Fish. Aquat. Sci.* 58(12):2447-2458.
- Marmorek, D.R., G. Lacroix, J. Korman, I. Parnell, and W.D. Watt.** 1998. Modelling the effects of acidification on Atlantic salmon: a simple model of stream chemistry. *Can. J. Fish. Aquat. Sci.* 55(9): 2117-2126.
- Marmorek, D.R., R.M. MacQueen, C.H.R. Wedeles, J. Korman, P.J. Blancher, and D.K. McNicol.** 1996. Improving pH and alkalinity estimates for regional scale acidification models: incorporation of dissolved organic carbon. *Can. J. Fish. Aquat. Sci.* 53: 1602-1608.
- Korman, J., D.R. Marmorek, G. Lacroix, P.G. Amiro, J.A. Ritter, W.D. Watt, R.E. Cutting, D.C.E. Robinson.** 1994. Development and evaluation of a biological model to assess regional scale effects of acidification on Atlantic salmon. *Can. J. Fish. Aquat. Sci.* 51:662-680.
- Marmorek, D.R. and J. Korman.** 1993. The use of zooplankton in a biomonitoring program to detect lake acidification and recovery. *Water, Air, and Soil Pollution* 69: 223-241.
- Marmorek, D.R., J. Korman, M.L. Jones, R.M. Macqueen, C.K. Minns, B.W. Kilgour, and K.J. Heltcher.** 1992. Assessing the potential extent of damage to inland lakes in eastern Canada due to acidic deposition. V. Validation tests of a simple regional scale model of lake acidification. To be submitted to *Can. J. Fish. Aquat. Sci.*
- Sullivan, T.J., R.S. Turner, D.F. Charles, B.F. Cumming, J.P. Smol, C.L. Schofield, C.T. Driscoll, B.J. Cosby, H.J.B. Birks, A.J. Uutala, J.C. Kingston, S.S. Dixit, J.A. Bernert, P.F. Ryan, and D.R. Marmorek.** 1992. Use of historical assessment for evaluation of process-based model projections of future environmental change: lake acidification in the Adirondack Mountains, New York, U.S.A. *Environ. Pollut.* 77: 253-262.
- Turner, R.S., P.F. Ryan, D.R. Marmorek, K.W. Thornton, T.J. Sullivan, J.P. Baker, S.W. Christensen, and M.J. Sale.** 1992. Sensitivity to change for low-ANC eastern U.S. lakes and streams and brook trout populations under alternative sulfate deposition scenarios. *Environ. Pollut.* 77: 269-277.
- Holdren, G., J. Cosby, D. Marmorek, R. Santore, C. Hunsaker, D. Bernard, J. Aber, C. Driscoll, and R. Turner.** 1992. A national critical loads framework for establishing pollutant loading standards: IV. Model selection, application, and critical loads mapping. *Environmental Management*. Volume 17:
- Jones, M.L., C.K. Minns, D.R. Marmorek, and K.J. Heltcher.** 1991. Assessing the potential extent of damage to inland lakes in eastern Canada due to acidic deposition. IV. Uncertainty analysis of a regional model. *Can. J. Fish. Aquat.* 48(4): 599-606.
- Baker, J.P., D.P. Bernard, S.W. Christensen, M.J. Sale, J. Freda, K.J. Heltcher, D.R. Marmorek, L. Rowe, P.F. Scanlon, G.W. Suter II, W.J. Warren-Hicks, and P.M. Welbourn.** 1990. NAPAP Report 13: Biological Effects of Changes in Surface Water Acid-base Chemistry. 392 pp. and appendices.
- Jones, M.L., C.K. Minns, D.R. Marmorek, and F.C. Elder.** 1990. Assessing the potential extent of damage to inland lakes in eastern Canada due to acidic deposition. II. Application of the regional model. *Can. J. Fish. Aquat. Sci.* 47: 67-80.
- Marmorek, D.R. and D.P. Bernard.** 1990. Response to K.C. Krug and W.L. Warnick's comments on: A protocol for determining lake acidification pathways. *Wat. Air and Soil Poll.* 50: 209-213.

- Marmorek, D.R., M.L. Jones, C.K. Minns, and F.C. Elder.** 1990. Assessing the potential extent of damage to inland lakes in eastern Canada due to acidic deposition. I. Development and evaluation of a simple "site" model. *Can. J. Fish. Aquat. Sci.* 47: 55-66.
- Thornton, K., D. Marmorek, P. Ryan, K. Heltcher, and D. Robinson.** 1990. Methods for projecting future changes in surface water acid-base chemistry. State-of Science/Technology Report 14. Prepared for National Acid Precipitation Assessment Program. 271 pp.
- Marmorek, D.R., D.P. Bernard, C.H.R. Wedeles, G.D. Sutherland, J.A. Malanchuk, and W.E. Fallon.** 1989. A protocol for determining lake acidification pathways. *Wat. Air and Soil Poll.* 44: 235-257.
- Marmorek, D.R., M.L. Jones, C.K. Minns, and F.C. Elder.** 1989. Assessing the potential extent of damage to inland fisheries in eastern Canada due to acidic deposition: I. development and evaluation of a simple "site" model. *Can. J. Fish. Aq. Sci* 47(1): 55-66.
- Marmorek, D.R.** 1984. Changes in the Temporal Behavior and Size Structure of Plankton Systems in Acid Lakes. In: *Early Biotic Responses to Advancing Lake Acidification*. G.R. Hendrey (ed.), Butterworth Publishers, pp. 23-41.
- Marmorek, D.R.** 1983. Effects of Lake Acidification on Zooplankton Community Structure and Phytoplankton-Zooplankton Interactions: An Experimental Approach. M.Sc. Thesis, University of British Columbia, 397 pp.

#### **Refereed Technical Reports and Conference Proceedings**

- Marmorek, D., I. Parnell, T. Webb, M. ZGraggen, W. Kurz, and J. Korman.** 1998. The Fish/Forestry Interaction Program Simulation Model (FFIPS). In: D.L. Hogan, P.J. Tschaplinski, and S. Chatwin (eds.). *Carnation Creek and Queen Charlotte Islands Fish/Forestry Workshop: Applying 20 Years of Coast Research to Management Solutions* BC Ministry of Forests, Research Branch, Victoria, BC. Land Management Handbook No. 41. pp. 231-243.
- Baker L.A., J.P. Baker, A.T. Herlihy, P.R. Kaufmann, D.H. Landers, D.R. Marmorek, M.J. Sale, T.J. Sullivan, K.W. Thornton, and P.J. Wiggington.** 1990. NAPAP Integrated Assessment. Question 1 - Aquatic Effects of Concern and the Relationship between Acidic Deposition and Aquatic Effects. 57 pp.
- Knapp, C.M., D.R. Marmorek, J.P. Baker, K.W. Thornton, J.M. Klopatek, and C.P. Charles.** 1990. The indicator development strategy for the environmental monitoring and assessment program. U.S. Environmental Protection Agency. 78 pp.
- NAPAP.** 1990. Integrated Assessment: Questions 4 & 5: Results and Comparisons of Illustrative Future Scenarios. External review draft, September 1990. The National Acid Precipitation Assessment Program, Washington, D.C.
- Turner R.S., P.F. Ryan, J.P. Baker, S.W. Christensen, D.R. Marmorek, M.J. Sale, T.J. Sullivan, and K.W. Thornton.** 1990. NAPAP Integrated Assessment. Question 3 - Sensitivity of Aquatic Effects to Changes in Future Acidic Deposition. 75 pp.
- Bernard, D.P., D.B. Hunsaker Jr., and D.R. Marmorek.** 1989. Tools for improving predictive capabilities of environmental impact assessments: structured hypotheses, audits, and monitoring. In: *The Scientific Challenges of NEPA: future directions based on 20 years of experience*. (Eds: S. Hildebrand and J.B. Cannon). Based on the Ninth Oak Ridge National Laboratory, Life Sciences Symposium, Knoxville, TN, October 24-27, 1989. Lewis Publishers. Ann Arbor. pp. 547-564.
- Cook, R.B., M.L. Jones, D.R. Marmorek, J.W. Elwood, J.L. Malanchuk, R.S. Turner, J.P. Smol.** 1988. The effects of Acidic Deposition on Aquatic Resources in Canada: An Analysis of Past, Present and Future Effects. Oak Ridge National Laboratories. Environmental Sciences Division Publication No. 2894.
- Marmorek, D.R., D.P. Bernard, and J. Ford.** 1988. Biological Monitoring For Acidification Effects: U.S.-Canadian Workshop. Final report from the Burlington Workshop prepared for U.S. Environmental Protection Agency, Environmental Research Laboratory, 66 pp.

- Marmorek, D.R., D.P. Bernard, M.L. Jones, L.P. Rattie, and T.J. Sullivan.** 1988. The Effects of Mineral Acid Deposition on Concentrations of Dissolved Organic Acids in Surface Waters. Report prepared for U.S. Environmental Protection Agency, Environmental Research Laboratory, 110 pp.
- Thornton, K., J.P. Baker, D.R. Marmorek, D.P. Bernard, M.L. Jones, P.J. McNamee, C.H.R. Wedeles, and K.N. Eshleman.** 1988. Episodic Response Project: Research Plan. Prepared for U.S. Environmental Protection Agency.
- Marmorek, D.R., D.P. Bernard, M.L. Jones, C.S. Davis, N.W. Reid, A.R. Fradkin, and R. Caton.** 1987. Interim Target Loadings for Acidic Deposition in Western Canada: A Synthesis of Existing Information. Technical Committee for the Long-Range Transport of Atmospheric Pollutants in Western and Northern Canada. Victoria, British Columbia, 214 pp. and appendices.
- Marmorek, D.R., D.P. Bernard, M.L. Jones, L.P. Rattie, and T.J. Sullivan.** 1987. The Effects of Mineral Acid Deposition on Concentrations of Dissolved Organic Acids in Surface Waters. Final report prepared for U.S. Environmental Protection Agency, 110 pp.
- Jones, M.L., D.R. Marmorek, B.S. Reuber, P.J. McNamee, and L.P. Rattie.** 1986. "Brown Waters": Relative Importance of External and Internal Sources of Acidification on Catchment Biota — Review of Existing Knowledge. Report prepared for Environment Canada and Department of Fisheries and Oceans, 85 pp.
- Marmorek, D.R., K.W. Thornton, J.P. Baker, D.P. Bernard, and B. Reuber.** 1986. Acidic episodes in surface waters: the state of science. Final report for the U.S. Environmental Protection Agency, Environmental Research Laboratory, Corvallis, Oregon. 232 pp.
- Thornton, K.W., D.R. Marmorek, D.P. Bernard, P. Shaffer, D. McKenzie, and J. Malanchuk.** 1986. Watershed Manipulation Project: Research Plan. Final report for the U.S. Environmental Protection Agency, Environmental Research Laboratory, Corvallis, Oregon.
- Turner, R.S. J.L. Malanchuk, R.J. Olson, and D.R. Marmorek (eds.).** 1986. The Effects of Acidic Deposition on Aquatic Systems: 1985 Assessment. Report prepared for Environmental Protection Agency, 161 pp.
- Church, R. D.R. Marmorek, K.W. Thornton, M.L. Jones, J. Malanchuk, P. Shaefer, B. Rochelle.** 1985. Direct/Delayed Response Project. Long Term Response of Surface Waters to Acidic Deposition: Factors Affecting Response and a Plan for Classifying Response Characteristics on Regional Scales. Part B. Implementation Plan. Report prepared for Corvallis Environmental Research Laboratory, Environmental Protection Agency.
- Marmorek, D.R., G.L. Cunningham, M.L. Jones, and P. Bunnell.** 1984. Snowmelt Effects Related to Acidic Precipitation: A Structured Review of Existing Knowledge and Current Research Activities. Report prepared for Environment Canada and Department of Fisheries and Oceans, 80 pp.
- Andrews, A.K., G.T. Auble, R.A. Ellison, D.B. Hamilton, J.E. Roelle, D.R. Marmorek, and O.L. Loucks.** 1981. Impacts of Acid Precipitation on Watershed Ecosystems: An Application of the Adaptive Environmental Assessment Process. In: W.J. Mitsch, R.W. Bosserman, and J.M. Klopatek (eds.), *Energy and Ecological Modelling*, Elsevier Scientific Publishing Company, pp. 393-400.

### **Recent Conference Presentations**

- Adaptive Environmental Assessment and Management in the Trinity River Restoration Program: Progress, Challenges and Opportunities (Trinity Science Symposium, Weaverville CA Jan 2010; Klamath River Basin Science Conference, Medford OR Feb 2010)
- Manejo adaptivo (gestion adaptativa) y salmon en la Canada y Los Estados Unidos (Adaptive management for salmon in Canada and the United States), invited presentation at *New developments in the management of coastal fisheries in Canada and Spain: from participatory management to adaptive management*. Santiago de Compostela, Spain (Feb 2009)

- The Sacramento Ecological Flows Tool (SacEFT): Ecological modeling to support river management decisions that meet multiple objectives (CALFED Science Conference, Sacramento CA, October 2008)
- Using hydro-ecological models to design resilient policies: principles and examples, including the Sacramento River Ecological Flows Tool (SacEFT) (CALFED Science Board, Sacramento CA, May 2008)
- Integration – the *holy grail* of Columbia Basin monitoring and evaluation: Challenges, examples and lessons learned from the Collaborative Systemwide Monitoring and Evaluation Project (CSMEP) – (AFS Portland OR, May 2008)
- True vs. Pretend Adaptive Management (2<sup>nd</sup> National Conference on Ecosystem Restoration, Kansas City, MO, April 2007)
- Enabling Adaptive Forest Management (AWRA, Missoula MT, June 2006)
- The Collaborative Systemwide Monitoring and Evaluation Project – CSMEP (AFS Anchorage AK, September 2005)
- Implementing Adaptive Management for Salmon Recovery at a Regional Scale: Insights from the Columbia Basin (Invited Presentation at: *Navigating the Course to Puget Sound Salmon Recovery*, Seattle WA, February 2005)
- Guidance in Applying Quantitative Tools to Adaptive Management Decisions (AAAS, Washington DC, February 2005)
- A Multiple Watershed Approach to Assessing the Effects of Habitat Restoration Actions on Fish Populations (AFS Skamania WA, November 2004)
- Adaptive Management: Theory and Practice (Invited Presentation at *Real World Experiments*, Bielefeld, Germany; September 2004)
- The Okanagan Fish-Water Management (OKFWM) Tool: Balancing Water Objectives in Real-Time for Sockeye Smolt Production Gains (AFS Vancouver BC April 2003; AFS Skamania November 2004, AFS Victoria BC October 2005; AWRA Missoula MT, June 2006 – a sequence of updated presentations with new findings)
- Challenges and Opportunities in Testing the Effectiveness of Habitat Restoration Actions (AFS Eugene OR, Feb 2003)
- Strengths and Weaknesses of the Endangered Species Act (ESA): Some Insights from the Columbia Basin (Vancouver Salmon Summit, BC; June 2003)
- Moving at Glacial Speed toward Adaptive Management in the Columbia River (AFS Spokane WA, April 2002)
- Methods of Testing Models Used for Major Decisions (AFS Spokane WA, April 2002)
- A Decision Analysis of Adaptive Management Experiments for Whitefish Management in the Columbia River: Is it Worth Varying Flows to Reduce Key Uncertainties? (AFS Spokane WA, April 2002)

### Other Recent Publications

- Peterman R.M., D. Marmorek, B. Beckman, M. Bradford, N. Mantua, B.E. Riddell, M. Scheuerell, M. Staley, K. Wieckowski, J.R. Winton, C.C. Wood.** 2010. Synthesis of evidence from a workshop on the decline of Fraser River sockeye. June 15-17, 2010. A Report to the Pacific Salmon Commission, Vancouver, B.C., 123 pp. + 35 pp. of appendices.
- Trinity River Restoration Program, ESSA Technologies Ltd.** 2009. Integrated Assessment Plan, Version 1.0 – September 2009. Final report prepared for the Trinity River Restoration Program, Weaverville, CA. 285 pp.
- Pickard, D., M. Porter, K. Wieckowski, and D. Marmorek.** 2009. Workplan to Pilot the Fisheries Sensitive Watershed (FSW) Monitoring Framework. Report prepared by ESSA Technologies Ltd., Vancouver, BC. for BC. Ministry of Environment, Victoria. 16 pp.

- ISAC (Independent Science Advisory Committee).** 2009. 2009 Report on the Platte River Recovery Implementation Program. Prepared for the PRRIP Governance Committee. 38 pp.
- Collaborative Systemwide Monitoring and Evaluation Project (CSMEP) - Marmorek, D.R., M. Porter, D. Pickard and K. Wieckowski (eds.).** 2007. Snake River Basin Pilot Study: Volumes 1 and 2. for Columbia Basin Fish and Wildlife Authority, Portland, OR. 47 pp (Volume 1) and 216 pp (Volume 2).
- Greig, L., D.R. Marmorek, C. Murray and D. Robinson.** 2006. Enabling Adaptive Forest Management. *Manuscript in preparation for J. Forestry.*
- Marmorek, D.R., D. Robinson, C. Murray and L. Greig.** 2006. Enabling Adaptive Forest Management – Final Report. Prepared for the National Commission on Science for Sustainable Forestry by ESSA Technologies Ltd., Vancouver, B.C. 94 pp.
- Nelitz, M., C. Murray, M. Porter, and D.R. Marmorek.** 2006. Managing Pacific salmon for ecosystem values: Ecosystem indicators and the wild salmon policy. Final Report prepared by ESSA Technologies Ltd., Vancouver, B.C. for Pacific Fisheries Resource Conservation Council, Vancouver, BC. 76 pp.
- Porter M. and D.R. Marmorek.** 2006. Bull Trout Recovery Monitoring and Evaluation Technical Working Group (RMEG) Workshop 5 (January 3-4, 2006) – USFWS Regional Office, 911 NE 11th Ave., Portland, Oregon - Workshop Report. Report prepared by ESSA Technologies Ltd., Vancouver, BC for the US Fish and Wildlife Service, Vancouver, WA. 98 pp.
- Marmorek D.R., I. Parnell and M. Porter, eds.** 2005. CSMEP DQO Status & Trends, Habitat, Harvest, Hatchery and Hydrosystem Assessments - Policy Interpretations (Snake River Pilot) Prepared by ESSA Technologies Ltd., Vancouver, B.C. for CSMEP Monitoring Design Workshop, Napa, ID. 125 pp.
- Porter M. and D.R. Marmorek.** 2005. Bull Trout Recovery Monitoring and Evaluation Technical Working Group (RMEG) Workshop 4 (June 27-28, 2005) – USFWS Regional Office, 911 NE 11th Ave., Portland, Oregon - Workshop Report. Report prepared by ESSA Technologies Ltd., Vancouver, BC for the US Fish and Wildlife Service, Vancouver, WA. 100 pp.
- Porter, M. and D.R. Marmorek.** 2005. Bull Trout Recovery Monitoring and Evaluation Technical Working Group (RMEG) Workshop 3 (Dec. 16 - 17, 2004) – USFS Regional Office, 333 SW First Ave., Portland, Oregon - Workshop Report. Report prepared by ESSA Technologies Ltd., Vancouver, BC for the US Fish and Wildlife Service, Vancouver, WA. 113 pp.
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