

Katherine Wieckowski

Systems Ecologist, ESSA Technologies Ltd.

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Post Secondary Education

- Simon Fraser University, Master of Resource Management – Fisheries Science.
September 2004 – April 2008
- McGill University, B.Sc. Biology and International Development Studies - with Distinction,
September 1998 - August 2003
- Smithsonian Institute for Tropical Research – McGill University. Field semester in Panama focusing on the ecology and socio-economic characteristics of Latin America.
Jan 2003 – Apr 2003
- Canadian Field Studies in Africa – McGill University. Field semester in Kenya focusing on conservation biology and sustainable development.
Jan 2001 – Apr 2001

Professional Skills

Area of interest: Analysing the interface between science and policy and developing tools with which decision makers can make informed decisions. This includes the identification of project goals and objectives, followed by the development of quantitative tools to evaluate the alternatives to determine which option best achieves the initial goals and objectives.

Technical Skills: Structured decision making (decision analysis, quantification of uncertainty, and trade-off evaluation), risk assessment and management, environmental planning and management (adaptive management), computer modelling and simulation (deterministic and stochastic approaches), statistical analysis (classical and Bayesian methods), environmental impact assessment.

Research and communication: Literature reviews, concise summaries, technical writing, and presentation of scientific information to a variety of audience groups.

Field Experience: Scientific scuba diving and data collection, environmental monitoring, fish and wildlife inventories.

Software Skills

- Statistical analysis using R, SAS, and JMP.
- Data analysis and simulation modelling using R, Mathcad, WinBUGS, and Excel with Crystal Ball
- Database management using Microsoft Access.
- Report and presentation preparation using Microsoft Word, PowerPoint, and Adobe Acrobat.

Languages

English, French, Polish, and Spanish

Professional Experience

2006–present	Systems Ecologist , ESSA Technologies Ltd., Vancouver, BC.
2005–2006	Marine Biologist , Jacques Whitford Environmental Ltd., Vancouver, B.C.
2005–2006	Teaching Assistantship , Simon Fraser University, School of Resource and Environmental, Burnaby, B.C.
2003–2004	Assistant to the Director , Neuroscience Research Unit, University of Montreal, Montreal, Quebec
2003	Field Biologist , Intern, Parque Natural Metropolitano, Panama
2002	Research Assistant , Project Seahorse: Advancing Marine Conservation, Olhao, Portugal

Relevant Project Experience

Environmental indicator, monitoring, and reporting

Sacramento River Basin, Feather River Watershed report card- Sacramento River Watershed Program, 2010. We developed a report card for the Sacramento River Basin to provide a description of conditions relative to our expectations and goals for the Basin. It is a science-based solution to a social and management need. The Report Card measures aspects of the whole integrated system relative to stakeholder goals. It reports on the system using regionally-important and science based indicators. Because the indicators are assessed using transparent reference points, they provide a measurement of health that can be assessed in future report cards.

Skaha sockeye reintroduction hatchery program overview - Okanagan Nation Alliance, 2009. Facilitated a 2 day workshop focusing on the ONA's Hatchery General Management Plan. Monitoring needs and requirements, as well as, performance measures were discussed at length. The potential effect of hatchery fish on wild populations was also a focus of the workshop.

Fisheries Sensitive Watershed (FSW) monitoring and sampling design framework – BC Ministry of Environment, 2008 - 2009. Developed a monitoring frameworks and two year workplan detailing the steps and information required for the development of a sampling and monitoring program to evaluate the efficacy of FSW designations with respect to protecting fish habitat.

Life cycle modeling and data management support for the Skaha sockeye reintroduction program – Okanagan Nation Alliance, 2008. Developed a two year work plan that lays out the steps required to meet the life cycle modeling and data management needs of the program. The workplan focused on the development of a centralized database to house all the program's data and identified the information and analyses needed to answer key monitoring questions on hatchery sockeye-kokanee interactions, potential impacts of hatchery fish on wild Okanagan sockeye, and habitat availability.

Habitat capacity modeling to determine fish distributions in BC – BC Ministry of Environment, 2008. Used habitat and barrier information for the province and provincial fish occurrence/abundance datasets to build empirical models to predict the distribution of key fish species (bull trout, Chinook, coho, rainbow trout) and the relative quality of rearing habitat within a defined pilot area – the Thompson Ecological Drainage Unit (EDU) – of BC's southern interior region. The intent was to generate information and modeling approaches that can assist broad-scale planning processes for forest management and help optimize associated field inventories.

Trinity River Restoration Program (TRRP), monitoring and sampling design – *Trinity River Management Council, 2007 – ongoing*. To develop a monitoring and sampling design to determine the progress of Trinity River habitat restoration and the status wildlife and aquatic populations, particularly Chinook, coho, and steelhead.

Collaborative, System-wide, Monitoring and Evaluation Project (CSMEP), analyses of hydrological impacts on listed salmon species, steelhead, and bulltrout - *Columbia Basin Fish and Wildlife Authority, 2007 - ongoing*. To evaluate the impacts of dam operations on listed Chinook and steelhead populations we examined the performance of four indicators under different monitoring design scenarios and assessed the effectiveness of hydrosystem recovery actions in the Columbia River Basin (ESSA – CBFWA).

Refining habitat indicators for the Wild Salmon Policy – *Department of Fisheries and Oceans, 2007*. To help evaluate whether the Wild Salmon Policy is succeeding in the protection of salmon habitat Fisheries and Oceans Canada (DFO) intends to use “habitat indicators” to assess and monitor the status of and pressures on stream, lake, and estuarine habitats in British Columbia and Yukon. Data sources applicable to this end were identified and the practicality of using these data were evaluated.

Environmental monitoring program using amphibians as an indicator of ecosystem health – *Parque Natural Metropolitano (PNM), 2003*. Designed and implemented a monitoring program of amphibian populations and habitat in order to assess environmental health of the study site (PNM) and its respective water systems. Concurrently, organised an initiative between Panamanian high school youths and PNM in order to continue the amphibian monitoring program to observe long-term population trends as well as promote environmental awareness and education..

Policy implementation and decision support

Incorporation of Traditional and Local knowledge and values in fisheries management – *The Pacific Fisheries Conservation Council, 2008- ongoing*. A recently initiated project investigating the barriers to and opportunities for the successful use of Traditional and local knowledge in fisheries management in British Columbia. The objective of this work is to create an implementation strategy that will allow fisheries managers to meaningfully incorporate different types of knowledge into their decision making process with the ultimate goal of improving fisheries management. The focal fisheries for the implementation strategy are the salmon fisheries of British Columbia.

Developing an ecological flow tool to quantify environmental flows in the Sacramento-San Joaquin Delta – *The Nature Conservancy, 2008- ongoing*. Developing a decision analysis tool to evaluate the ecological consequences of alternative flow management scenarios in the Sacramento-San Joaquin Delta, California. Scenarios were evaluated in terms of their effects on and tradeoffs among tidal wetland and floodplain features, Delta channel condition, invasive species, and sensitive estuarine biota (e.g., Delta smelt, Sacramento splittail, Chinook, and sturgeon).

Implementing a collaborative approach to quantifying environmental flows for the Sacramento River – *The Nature Conservancy, 2008- ongoing*. Refinement of a decision analysis tool to evaluate the ecological consequences of alternative flow management scenarios on the Sacramento River, California. Scenarios were evaluated in terms of their effects on and tradeoffs among riparian habitat features, river channel condition, and freshwater biota. Ecological and physical indicators are drawn from available models.

Integrated planning and the Wild Salmon Policy – *David Suzuki Foundation, 2007*. Identified opportunities for integration across and cooperation between different levels of government, NGOs, community groups, and First Nations for the successful implementation of the Wild Salmon Policy in BC.

Evaluating fleet dynamic models for the conservation of British Columbia's groundfish fishery – *Simon Fraser University, 2006-2008*. Compared two methods of modelling harvesters' choice of fishing location. The first method used an ideal free distribution based on profitability and the second method used a statistical method, a generalised linear model, to determine which variables account for the variation in fisherman fishing location choice. Using behaviourally based simulation modelling, I evaluated the reliability of the two methods by comparing the predicted effort distribution from each method to the known, true distribution of effort determined from my virtual world after the regulatory change took effect. The purpose of these simulations was to evaluate each model's ability to predict the magnitude and extent of change in the distribution of effort. These findings will equip fisheries scientists with a method that they can use in the development of fisheries control systems that are most effective for groundfish conservation.

Evaluating US fisheries management for data rich and data poor fisheries: a look at the 40-10 rule – *Simon Fraser University, 2006*. Evaluated the 40-10 harvest control rule, presently used to manage US West Coast groundfish fisheries, using simulation modelling. The control rule was assessed under two population scenarios: a long lived fish (e.g., Gadidae (cod)) and a short lived fish (e.g., Clupeidae (herring)). In the model, catch and effort data, as well as independent estimates of biomass, were generated during a pre-management phase. An effort dynamics sub-model was included to simulate the interaction between the variability in catch and the profit-driven behaviour of the fleet. Each scenario was run over 500 trials, where each trial included a stochastic pre-management phase of 20 years and 100 year stock projections. The performance of the 40-10 control rule was evaluated using economic performance measures related to catch; effort dynamics; biomass; and implications for IUCN depletion classification.

Marine fisheries policy in a warming Arctic – *Simon Fraser University, 2006*. Explored five policy options for management of new marine resources in the Arctic because of climate change: (1) status-quo; (2) local subsistence fisheries only; (3) harvest moratorium; (4) adaptive management; and (5) adaptive management with stock enhancement. We compared these policies using a list of diverse criteria including biologic, economic, and social factors. Our analysis suggested that an adaptive approach is the most robust policy, but the most difficult to implement under the current institutional framework of the Department of Fisheries and Oceans.

Documentation of life history characteristics of two seahorse species in Southern Portugal – *Project Seahorse, 2002*. Conducted dive surveys collecting information on *Hippocampus hippocampus* and *Hippocampus guttulatus*. Information collected included data on behavioural and physiological characteristics of the two species, as well as habitat preference and vegetation inventories. Designed and implemented a mark recapture program to track individual movement and home range, as well as garner estimates of abundance.

Environmental vulnerability and adaptation

Fraser River freshwater ecology and status of sockeye salmon Conservation Units – *Cohen Commission, Federal Government of Canada, 2011*. We investigate several aspects of Fraser sockeye ecology, including the status of sockeye Conservation Units, a review of industrial and urban impacts on freshwater ecology and salmon life history, and an expert assessment of potential impacts from industrial and urban activities on Fraser River sockeye during the past 30 years.

Participatory scenario development for costing climate change adaptation – climate visioning.

World Bank – Social Development Group, 2009. Designed and implemented participatory scenario development (PSD) workshops as part of the World Bank's Economics of Adaptation to Climate Change (EACC) Study. The EACC study focused on five countries: Ghana, Mozambique, Bolivia, Ethiopia, and Bangladesh. We implemented workshops in Ghana, Mozambique, and Bangladesh and provided remote support to Ethiopia. The overall objective of the EACC Study is to help decision-makers in developing countries better understand and assess the risks posed by climate change, and to better cost, prioritize, sequence and integrate robust adaptation strategies to their development plans and budgets in a context of high uncertainty, competing needs and potentially high future costs.

Identifying instream flow-needs (IFN) for fisheries and ecosystem processes in the Okanagan Basin

– Okanagan Basin Water Board, 2008-2009. Identified and implemented IFN methods and indicators for evaluating future water supply and issues affecting fisheries or ecosystem maintenance that could result from changes in the governing conditions (e.g., climate and land use).

Helping salmon to survive impacts of climate change – Pacific Fisheries Resource Conservation Council, 2007.

Climate change is expected to have significant impacts on freshwater habitats and Pacific salmon. For instance, changes in water temperature can affect survival of critical life stages, while reductions in summer flows can impede access to habitats. We explored an approach and researched key elements to help government decision makers and local communities decide upon appropriate actions to help salmon adapt to climate change. This approach involves four steps: 1) Identify Issues of concern; 2) Assess Vulnerability; 3) Summarize Assets; and 4) Describe Adaptation Strategies.

A comprehensive review of the conservation status of Eastern Arctic bowhead whales – Jacques Whitford, 2005.

Reviewed the primary and grey literature in order to compile an annotated bibliography detailing the present level of scientific information available on Eastern Arctic Bowhead whales in Canada. Information was used to compile of an integrated management plan of Eastern Arctic Bowhead whales and vulnerability assessment.

Environmental assessment

Technical review of potential impacts of Yukon Queen II operations on salmon – Yukon

Environmental and Socio-Economic Assessment Board, 2008. Performed an independent review of studies to assess the potential impacts of catamaran operations on salmon within the upper Yukon River. In particular, work provided opinion statements about a variety of impact pathways related to catamaran operations, and applied more scientifically rigorous methods to develop more defensible mitigation strategies for catamaran operations.

Program Evaluation

Program evaluation of the Wild Salmon Ecosystem Initiative (WSEI) – Gordon and Betty Moore

Foundation, 2009. Working with a team of salmon and program evaluation experts, we performed an independent evaluation of a \$129.1 million dollar program to determine the degree to which WSEI was meeting its stated goals. This work entailed: an in-depth review of all program documentation; interviews and site visits with grantees to determine what had actually been done; and interviews with independent experts in the salmon conservation world to assess whether WSEI's work was achieving its objectives.

Ecosystem modelling

Modelling the Peace River, BC ecosystem pre and post construction of Site C hydro project – BC

Hydro, ongoing. Working with a team of modellers, we are currently developing an ecosystem model of

the Peace River in its current condition, as well as several ecosystem models of alternative futures that may result post-construction of Site C.

Ecosystem Research Initiative - ecosystem model of the Beaufort Sea – *Fisheries and Oceans Canada, 2010*. Working with a team of ecosystem modellers, we developed a conceptual model of the Beaufort ecosystem, identified suitable ecosystem modelling tools, and drafted a three year work plan for the initiative to develop a functional ecosystem model that would enable managers to better manage competing fisheries and development projects in the Beaufort.

Conference Presentations

Wieckowski, K. 2010. Implications of climate change on habitat capacity. American Fisheries Society – BC / WA Chapter Annual Meeting. Nanaimo, British Columbia. (Oral presentation)

Wieckowski, K. 2009. Vulnerability and adaptation in British Columbia's freshwater ecosystems. Managing water resources and development in a changing climate. American Water Resources Association, Anchorage, Alaska. (Oral Presentation)

Wieckowski, K. 2007. Evaluating fleet dynamic models for the conservation of British Columbia's groundfish fishery. The future of fisheries science in North America. American Institute of Fishery Research Biologists. Seattle, Washington. (Poster Presentation)

Wieckowski, K. 2006. A comparative analysis of two fleet dynamic models: which is the better predictor of effort distribution? American Fisheries Society Annual Meeting. Lake Placid, New York. (Oral Presentation)

Wieckowski, K. 2006. Evaluating US fisheries management for data rich and data poor fisheries: a look at the 40-10 rule. Fisheries and Marine Ecosystems (FAME) Conference. Crescent Beach, British Columbia. (Oral Presentation)

Selected Publications and Reports

Wieckowski, K.M., D.R. Marmorek, V. Christensen, D. Preikshot. 2010. Beaufort ERI: Integrated ecosystem modeling workshop proceedings (December 15 to 17, 2009). Prepared for Fisheries and Oceans Canada. Workshop proceedings prepared by ESSA Technologies Ltd., Vancouver, BC for the Arctic Aquatic Research Division, Fisheries and Oceans Canada, Winnipeg, Manitoba. 20 pp.

Wieckowski, K.M., D.R. Marmorek, V. Christensen, D. Preikshot. 2010. Beaufort ERI: Integrated ecosystem modeling synthesis report. Prepared for Fisheries and Oceans Canada. Workshop proceedings prepared by ESSA Technologies Ltd., Vancouver, BC for the Arctic Aquatic Research Division, Fisheries and Oceans Canada, Winnipeg, Manitoba. 30 pp.

Nelitz, M., K. Wieckowski, M. Porter, K. Bryan, F. Poulsen, and D. Carr. 2010. Evaluating the vulnerability of freshwater fish habitats to climate change and identifying regional adaptation strategies in the Cariboo-Chilcotin. Report prepared for Fraser Salmon and Watersheds Program by ESSA Technologies Ltd.

Wieckowski, K., M. Porter, D. Marmorek, and D. Pickard. 2009. A Framework for monitoring Fisheries Sensitive Watersheds (FSW), Report prepared by ESSA Technologies Ltd., Vancouver, BC. for BC. Ministry of Environment (MOE), Victoria. 11 pp.

Pickard, D., M. Porter, K. Wieckowski, and D. Marmorek. 2009. Workplan to Implement the Fisheries Sensitive Watershed (FSW) Monitoring Framework. Report prepared by ESSA Technologies Ltd., Vancouver, BC. for BC. Ministry of Environment (MOE), Victoria. 15 pp.

- Porter, M., C. Alexander, K. Bryan, D. Carr, D. Marmorek, R. Smith, **K. Wieckowski**, and T. Hatfield. 2009. Instream flow needs analysis for the Okanagan Water Supply & Demand Project. Report prepared by ESSA Technologies Ltd. and Solander Ecological Research for the Okanagan Basin Water Board (OBWB), Coldstream, BC. 142 pp.
- 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.
- Bizikova, L. and **K. Wieckowski**. 2009. Report of First Mission to Mozambique. Report prepared by ESSA Technologies Ltd. and The International Institute for Sustainable Development for World Bank, Washington, D.C. 30pp.
- Wells, M.P, G. Knapp, R.T. Lackey, D.L. Lajus, D.R. Marmorek, M.A. Nelitz, **K.M. Wieckowski**. 2009. Independent Evaluation of the Wild Salmon Ecosystem Initiative for the Gordon and Betty Moore Foundation. Report prepared for the Gordon and Betty Moore Foundation's Board of Directors.
- Wells, M.P, G. Knapp, R.T. Lackey, D.L. Lajus, D.R. Marmorek, M.A. Nelitz, **K.M. Wieckowski**. 2009. Annexes for the Independent Evaluation of the Wild Salmon Ecosystem Initiative for the Gordon and Betty Moore Foundation. Report prepared for the Gordon and Betty Moore Foundation's Board of Directors.
- Wieckowski, K.** 2008. A comparative evaluation of two fleet dynamic models. Master's research project. Simon Fraser University, Burnaby, B.C.
- Alexander, C.A., **K. Wieckowski**, and D. Marmorek. 2008. Life cycle modelling and data management support for the Skaha Lake experimental sockeye salmon reintroduction project: Workplan FY09+. Report prepared by ESSA Technologies for Okanagan Nation Alliance, Westbank, BC. 62 pp.
- Wieckowski, K.**, D. Pickard, M. Porter, and C. Schwarz. 2008. A conceptual model for the Fisheries Sensitive Watersheds (FSW) monitoring framework. Report prepared by ESSA Technologies Ltd. for B.C. Ministry of the Environment (MOE), Victoria, B.C.
- Pickard, D., D. Robinson, M. Porter, and **K. Wieckowski**. 2008. Fisheries Sensitive Watershed (FSW) Monitoring Framework and Workplan. Report prepared by ESSA Technologies Ltd. for B.C. Ministry of the Environment (MOE), Victoria, B.C.
- Nelitz, M., **K. Wieckowski**, and D. Pickard. 2008. Technical review of potential impacts of Yukon Queen II operations on salmon. Draft report prepared by ESSA Technologies Ltd., Vancouver, B.C. for the Yukon Environmental and Socio-Economic Assessment Board, Dawson City, YT. 48 pp.
- Porter, M., D. Pickard, **K. Wieckowski** and K. Bryan. 2008. Developing Fish Habitat Models for Broad-Scale Forest Planning in the Southern Interior of B.C. Draft report prepared by ESSA Technologies Ltd. and B.C. Ministry of the Environment (MOE) for B.C. Forest Science Program, PricewaterhouseCoopers, Vancouver, BC. 92 pp.
- Nelitz, M., C. Murray, and **K. Wieckowski**. 2008. Returning Salmon: Integrated planning and the Wild Salmon Policy in BC. Report prepared by ESSA Technologies Ltd. for David Suzuki Foundation, Vancouver, B.C.
- Marmorek, D.R., M. Porter, D. Pickard and **K. Wieckowski**. 2007. Collaborative Systemwide Monitoring and Evaluation Project (CSMEP) Snake River Basin Pilot Study: Volume 2. Prepared by ESSA Technologies Ltd., Vancouver, B.C. on behalf of the Columbia Basin Fish and Wildlife Authority, Portland, OR. 216 pp.
- Nelitz, M., C.A.D. Alexander, and **K. Wieckowski**. 2007. Helping Pacific salmon survive the impacts of climate change on freshwater habitats: Case study perspectives from the Okanagan, Quesnel, Nicola,

Cowichan, Nass, and Englishman River watersheds. Final report prepared by ESSA Technologies Ltd., Vancouver, B.C. for the Pacific Fisheries Resource Conservation Council, Vancouver, B.C.

Nelitz, M., **K. Wieckowski**, D. Pickard, K. Pawley, and D.R. Marmorek. 2007. Helping Pacific salmon survive the impacts of climate change on freshwater habitats: Pursuing proactive and reactive adaptation strategies. Final report prepared by ESSA Technologies Ltd., Vancouver, B.C. for the Pacific Fisheries Resource Conservation Council, Vancouver, B.C.

Nelitz, M., **K. Wieckowski**, and M. Porter. 2007. Refining habitat indicators for Strategy 2 of the Wild Salmon Policy: Identifying metrics and benchmarks. Final report prepared by ESSA Technologies Ltd. for Fisheries and Oceans Canada, Kamloops, B.C.

Nelitz, M., **K. Wieckowski**, M. Porter, and C. Perrin. 2007. Refining habitat indicators for Strategy 2 of the Wild Salmon Policy: Practical assessment of indicators. Final report prepared by ESSA Technologies Ltd. and Limnotek Research and Development, Vancouver, B.C. for Fisheries and Oceans Canada, Kamloops, B.C.

Awards

- EOS Travel Award, American Fisheries Society (2006)
- IPS Award, Natural Sciences and Engineering Research Council of Canada (2005 – 2006)
- Faculty of Applied Sciences Graduate Fellowship, Simon Fraser University (2004)
- Principal's Academic Honour Role, McGill University (2003)
- CIAU Academic All-Canadian, Royal Bank of Canada (2000-2002)

Leadership and volunteering

CIBC Center for Families and Patients Advisory Committee, Vancouver	Sep 2007 – Present
Coastal Health Authority, Board Member	
Vancouver General Hospital, TLC Volunteer	Jun 2006 – Present
North Vancouver Vipers Field Hockey, U18 Girls Coach	Apr 2008 – Jun 2008
North Vancouver Vipers Field Hockey, Team Member	Sep 2004 – Apr 2008
Graduate Health Plan Negotiation Committee, Simon Fraser University	Feb 2007 – Sep 2007
Graduate Health Plan Appeals Committee, Simon Fraser University	Apr 2006 – Sep 2007
Graduate Issues Committee, Dept. Rep., Simon Fraser University	Jan 2006 – Sep 2007
Project Genesis, Volunteer Advisor	Jun 2003 – Jul 2004
Santropol Roulant, Volunteer	Jun 2001 – Dec 2003
McGill Varsity Field Hockey, Team Member	Sep 1998 – May 2002