

NATHAN L. PELLETIER, BSc., MES, PHD.

CURRICULUM VITAE

Principal Consultant
Global Ecologic Environmental Consulting and Management Services

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PERSONAL DETAILS

Date of birth : February 20, 1976
Citizenship : Canadian
Languages : English and French

EDUCATION

Dalhousie University	2010	Interdisciplinary Ph.D. (Ecological Economics)
Thesis Title:		What's at Steak? Ecological Economic Sustainability and the Ethical, Environmental, and Policy Implications for Global Livestock Production
Dalhousie University	2007	Master of Environmental Studies
Thesis Title:		Life Cycle Measures of Biophysical Sustainability in Feed Production for Conventional and Organic Salmon Aquaculture in the Northeast Pacific
University of Victoria	2004	Bachelor of Science (Biology and Environmental Studies)

ACADEMIC INTERESTS

Areas of research interest relate to the theory and application of ecological economic instruments in sustainability planning, with an emphasis on food system sustainability and food security considerations across spatial scales. Ecological economists acknowledge three conditions necessary to sustainable economic activity: appropriate scale (relative to biocapacity), eco-efficient allocation, and just distribution. I advance an ecological communitarian ethical platform in support of the normative prescription for distributive justice in ecological economics. Scale and efficiency considerations are evaluated using accountancy frameworks including Environmental and Social Life Cycle Assessment, Energy Analysis and Ecological Footprint Analysis. I scenario-model the social and environmental dimensions of alternative development trajectories in food systems, and how they impact on food security objectives, as influenced by population, affluence and technological variables. Outcomes are couched as scale-relevant policy prescriptions compatible with sustainability objectives. Specific domains of interest include climate change, energy use, biomass appropriation, reactive nitrogen mobilization, food security, policy and governance, and the externalization of social risk.

PUBLICATIONS

REFEREED JOURNAL ARTICLES AND REPORTS:

Pelletier, N. and A. Leip.

2013 Quantifying anthropogenic mobilization, flows (in product systems) and losses of fixed nitrogen in process-based environmental life cycle assessment: Rational, methods and application to a life cycle inventory. *International Journal of Life Cycle Assessment*. *In press*.

Pelletier, N., Allacker, K., Pant, R. and S. Manfredi, S.

2013 Towards a European Commission Organisation Environmental Footprint methodology: Review of existing methodologies and recommendations. *International Journal of Life Cycle Assessment*. *In press*.

Pelletier, N., Ibarbaru-Blanc, M. and H. Xin.

2013 Life cycle assessment of greenhouse gas emissions for contemporary intensive egg production systems in the Upper Midwestern United States. *Journal of Cleaner Production*. <http://dx.doi.org/10.1016/j.jclepro.2013.04.041>.

Henriksson, P., **Pelletier, N.,** Troell, M. and P. Tyedmers.

2012 Life cycle assessment and its application to aquaculture production systems. *In* Meyers, R. (ed.). *Encyclopaedia of Sustainability Science and Technology*. Springer, pp. 5893-5909.

Pelletier, N. and P. Tyedmers.

2012 Response to Weinzettel. *Journal of Industrial Ecology* 16(3):456-458.

Ford, J., **Pelletier, N.,** Ziegler, F., Scholz, A., Tyedmers, P., Sonesson, U., Kruse, S. and H. Silverman.

2012 Developing local ecological impact categories and indicators for life cycle assessment of salmon aquaculture. *Journal of Industrial Ecology* 16(2):254-265.

Pelletier, N., Audsley, E., Brodt, S., Garnett, T., Henriksson, P., Kendall, A., Kramer, K., Murphy, D.,

2011 Nemecek, T. and M. Troell. Energy intensity of agriculture and food systems. *Annual Review of Environment and Resources* 36:233-246.

Pelletier, N. and P. Tyedmers

2011 An ecological economic critique of the use of market information in life cycle assessment research. *Journal of Industrial Ecology* 15(3):342-354.

Rudd, M., **Pelletier, N.** and P. Tyedmers.

2011 Willingness to pay for health and environmental attributes of farmed salmon amongst southern Ontario salmon consumers. *Aquaculture Economics and Management* 15(1):18-45.

Pelletier, N. and P. Tyedmers.

2010 Forecasting potential global environmental costs of livestock production 2000-2050. *Proceedings of the National Academy of Sciences USA* 107(43):18371-18374.

- Pelletier, N., Lammers, P., Stender, D. and R. Pirog.**
 2010 Life cycle assessment of high- and low-profitability conventional and deep-bedded niche swine production systems in the Upper Midwestern United States. *Agricultural Systems* 103(9):599-608.
- Pelletier, N.**
 2010 Environmental sustainability as the first principle of distributive justice: Towards a communitarian-based normative foundation for ecological economics. *Ecological Economics* 69(10):1887-1894.
- Pelletier, N., Rasmussen, R. and R. Pirog.**
 2010 Comparative life cycle impacts of three beef production strategies in the Upper Midwestern United States. *Agricultural Systems* 103(6):380-389
- Pelletier, N. and P. Tyedmers.**
 2010 A life cycle assessment of frozen Indonesian tilapia fillets from lake and pond-based production systems. *Journal of Industrial Ecology* 14(3):467-481.
- Pelletier, N.**
 2010 Of laws and limits: An ecological economic perspective on redressing the failures of contemporary global environmental governance. *Global Environmental Change* 20(2):220-228.
- Jacquet, J., Hocevar, J., Lai, S., Majluf, P., **Pelletier, N.**, Pitcher, T., Sala, E., Sumaila, R. and D. Pauly.
 2010 Conserving wild fish in a sea of market-based efforts. *Oryx* 44:45-56.
- Pelletier, N., Tyedmers, P., Sonesson, U., Scholz, A., Zeigler, F., Flysjo, A., Kruse, S., Cancino, B. and 2009 H. Silverman.** Not all salmon are create equal: Life cycle assessment (LCA) of global salmon farming systems. *Environmental Science and Technology* 43(23):8730-8736.
- Pelletier, N., Arsenault, N. and P. Tyedmers.**
 2008 Scenario-modeling potential eco-efficiency gains from a transition to organic agriculture: Life cycle perspectives on Canadian canola, corn, soy and wheat production. *Environmental Management* 42:989-1001.
- Pelletier, N. and P. Tyedmers.**
 2008 Life cycle considerations for improving sustainability assessments in seafood awareness campaigns. *Environmental Management* 42:918-941.
- Pelletier, N.**
 2008 Environmental performance in the US broiler poultry sector: Life cycle energy use and greenhouse gas, ozone depleting, acidifying and eutrophying emissions. *Agricultural Systems* 98:67-73.
- Pelletier, N. and P. Tyedmers.**
 2007 Feeding farmed salmon: Is organic better? *Aquaculture* 272:399-416.
- Pelletier, N., Ayer, N., Tyedmers, P., N., Kruse, S., Flysjo, A., Robillard, G., Ziegler, F., Scholz, A., and 2007 U. Sonesson.** Impact categories for Life Cycle Assessment research of seafood production: Review and prospectus. *International Journal of Life Cycle Assessment* 12(6):414-421.

- Ayer, N., Tyedmers, P., **Pelletier, N.**, Sonesson, U., and A. Scholz.
 2007 Allocation in Life Cycle Assessments of seafood production systems: Review of problems and strategies. *International Journal of Life Cycle Assessment* 12(7):480-487.
- Tyedmers, P., **Pelletier, N.**, and N. Ayer.
 2007 Marine aquaculture and the biophysical sustainability of seafood production systems: A comparative analysis. A report to the United States Marine Aquaculture Taskforce, convened by the Woods Hole Oceanographic Institute.
- Tyedmers, P. and **N. Pelletier.**
 2006 Biophysical accounting in aquaculture: Insights from current practice and the need for methodological development. A technical report to the United Nations Food and Agriculture Organization, Rome.
- Pelletier, N.**
 2004 Conspecific injury fluids induce an electrophysiological response in the clonal tunicate *Clavelina huntsmani*. *Marine Biology* 145(6):1159-1165.

PUBLICATIONS

NON-REFEREED:

- Pelletier, N.**, Ibarbaru, M., and H. Xin
 2013 A comparative assessment of the environmental footprint of the U.S. egg industry in 1960 and 2010. *Developed under contract for* American Egg Board, United Egg Producers and Egg Industry Center.
- Pelletier, N.**, Tyedmers, P. and D. Robb.
 2012 Ecological Footprint modeling of EWOS feeds Phase IV: UK, Norway, Canada, Chile and Vietnam. *Developed under contract for* EWOS Innovation, Scotland.
- Pelletier, N.**, Ibarbaru-Blanc, M. and H. Xin.
 2011. Carbon footprinting for contemporary egg production and processing supply chains in Iowa. *Developed under contract for* the American Egg Board, USA.
- Tyedmers, P., **Pelletier, N.** and D. Robb.
 2009. Ecological Footprint modeling of EWOS feeds Phase III: UK, Norway, Canada and Chile. *Developed under contract for* EWOS Innovation, Scotland.
- Tyedmers, P., **Pelletier, N.**, Garret, A. and S. Anton.
 2007. Greenhouse gas emissions for selected seafood species supplied to UK processors. *Prepared in cooperation with* SeaFish Industry Authority, UK.
- Pelletier, N.**
 2004 Going organic: A new wave in aquaculture. Aquaculture Association of Canada Special Publication No. 8:77-79.

Pelletier, N.

2004 Going organic: A new wave in aquaculture. *Eco Farm and Garden* 7(1):48-50.

SELECTED REPORTS FOR GOVERNMENT

Pelletier, N., Maas, R., Goralcyk, M. and M.-A. Wolf.

2012 Towards a life cycle-based European Sustainability Footprint framework. *Produced for* Directorate General – Joint Research Centre, European Commission.

Nita, V., Benini, L., Ciupagea, C., Kavalov, B. and **N. Pelletier.**

2012 Bio-economy and sustainability: A potential contribution to the Bio-economy Observatory. *Produced for* Directorate General – Joint Research Centre, European Commission.

Baranzelli C., Vandecasteele, I., Barranco, R. and **N. Pelletier.**

2012 Towards spatially-resolved assessment of land water use scenarios for shale gas development in Poland. *Produced for* Directorate General – Joint Research Centre, European Commission.

Kavalov, B. and **N. Pelletier.**

2012 Shale gas for Europe: Main environmental and social considerations. *Produced for* Directorate General – Joint Research Centre, European Commission.

Pelletier, N., Chomkamsri, K., Manfredi S. and R. Pant.

2013 Organisation Environmental Footprint Guide. Institute for Environment and Sustainability, European Commission Joint Research Center, Ispra, Italy. *Produced for* Directorate General – Environment, European Commission.

Chomkamsri, K., **Pelletier, N.,** Manfredi S., Allacker, K. and R. Pant.

2013 Product Environmental Footprint Guide. Institute for Environment and Sustainability, European Commission Joint Research Center, Ispra, Italy. *Produced for* Directorate General – Environment, European Commission.

Chomkamsri, K., **Pelletier, N.** and R. Pant.

2011 Analysis of existing environmental footprint methodologies for products and organizations: Recommendations, rational and alignment. Institute for Environment and Sustainability, European Commission Joint Research Center, Ispra, Italy. *Produced for* Directorate General – Environment, European Commission.

Pelletier, N.

2003 Understanding proposed organic certification standards for farmed salmon. BC Ministry of Agriculture, Food and Fisheries, Victoria, BC.

Pelletier, N.

2003 Invertebrate type specimens of the Royal British Columbia Museum. Royal British Columbia Museum, Victoria, BC.

Pelletier, N.

2001 Natural history profiles and life tables of BC wildlife species: A risk assessment tool for contaminated sites. Contaminated Sites Unit, Pollution Prevention and Remediation Branch, BC Ministry of Environment, Lands and Parks, Victoria, BC.

INVITED PAPERS / PRESENTATIONS / PANELS

- Invited presentation – “Energy prices and (sea)food security: Can fisheries and aquaculture adapt?” Putting Fisheries in the Food Bowl Expert Workshop, University of Tasmania. February 2013.
- Invited presentation – “The Forgotten Fish – The Role of Aquaculture in Livestock Production.” *Presented in Water and Livestock: Interactions, Trade-offs and Opportunities.* World Water Week, Stockholm, August 2012.
- Invited presentation – “Integrated Sustainability Assessment: Providing Scientific Support for Sustainability Policies.” *Presented in the SETAC-Sustainability Connection: The Role of Environmental Science in Developing Sustainability Strategies,* SETAC World Congress, Berlin, May 2012.
- Invited presentation – “Resolution in LCA Models: Matching Methods and Motivations.” Putting Fisheries in the Food Bowl Expert Workshop, University of Tasmania. February 2012.
- Invited presentation – “Sustainability Boundary Conditions: Relevance for Assessing Livestock Production Systems” - Developing a Partnership on Benchmarking and Monitoring the Environmental Performance of Livestock Food Chains. United Nations Food and Agriculture Organization. Rome. March 2011.
- Invited panellist – “Assessing Food System Sustainability from Farm to Fork: Insights from LCA Theory and Practice” – American Society for Horticultural Science Annual General Meeting. St. Louis. July 2009.
- Invited speaker – “A Life Cycle Perspective on Food System Sustainability: Lessons from the Field” – Leopold Center for Sustainable Agriculture Summer Lecture Series. Iowa State University. July 2008.
- Invited speaker – “Calories in Context: A Life Cycle Perspective on Industrial Food Production” – Agricultural Sustainability Institute Symposium on Energy Use and Greenhouse Gas Emissions in the US Food System. University of California, Davis. October 2007.
- Invited panellist – “Sustainability and Feed Production: A Life Cycle Perspective on Salmon Aquaculture. Seafood Summit. Jacksonville, Florida. March 2007.
- Invited panelist – “Feeding Farmed Salmon: Is Organic Better?” – American Association for the Advancement of Science Annual Meeting: Science and Technology for Sustainable Well-Being. San Francisco, California. February 2007.
- Invited speaker – “Opportunities and Constraints for Organic Shellfish Certification in British Columbia” - BC Shellfish Growers Association Annual General Meeting. Qualicum, BC. 2003.
- Invited speaker – “Understanding Proposed Standards for Organic Aquaculture in British Columbia” - Certified Organic Associations of British Columbia Annual General Meeting. Naramata, BC. 2003.

PEER-REVIEWED CONFERENCE PAPERS / PRESENTATIONS / PANELS

- Life Cycle Assessment of Lake and Pond-Based Tilapia Production in Indonesia. World Aquaculture Society 2010. San Diego, CA.
- Life Cycle Assessment: Applications for Aquaculture. World Aquaculture Society 2010. San Diego, CA.

- Environmental Sustainability as the First Principle of Distributive Justice: Towards an Ecological-Communitarian Normative Basis for Ecological Economics. Canadian Society for Ecological Economics 2009. Vancouver, BC.
- What's at Steak? Planning Dinner around the Carbon Content of Protein Sources. American Association for the Advancement of Science Annual General Meeting 2009: Bridging Science and Society. Chicago, Illinois.
- The Use of Market Information in LCA: Rearranging Deck Chairs on the Titanic? International Life Cycle Assessment/Life Cycle Management 2008: Calculating Consequences Beyond the Box. Seattle, Washington.
- Calories in Context: Life Cycle Perspectives on Sustainability in Industrial Food Production. International Life Cycle Assessment/Life Cycle Management 2007: From Measurement to Investment. Portland, Oregon.
- Life Cycle Measures of Sustainability in Feed Production for Salmon Aquaculture: Is Organic Better? Aquaculture Association of Canada Conference 2006: Culturing Quality and Confidence. Halifax, Nova Scotia.
- Life Cycle Measures of Sustainability in Seafood Production: Implications for Eco-labeling, Certification, and Consumer Education Initiatives. International Life Cycle Assessment & Management 2006: Business and Government Moving Ahead. Washington, DC.
- Life Cycle Measures of Sustainability in Salmon Aquaculture. Globe 2006 Biennial Conference on Business and the Environment. Vancouver, BC.
- Going Organic: A New Wave in Aquaculture. Aquaculture Association of Canada Conference 2004. Victoria, BC.

PROFESSIONAL AND ACADEMIC CONTRIBUTIONS

External Advisor	SENSE: Harmonised Environmental Sustainability in the European food and drink chain. 7 th Framework Programme project, European Commission
Session Organizer	“Recent advances in life cycle sustainability assessment”. Society for Environmental Chemistry and Toxicology World Congress 2012. Berlin, Germany
Panel Co-Organizer	“Life cycle assessment and aquaculture.” World Aquaculture Society Conference 2010. San Diego, CA.
Session Chair	Dalhousie University Centre for Learning and Teaching Conference 2009. Halifax, NS.
Panel Co-Organizer	“Food for Thought: Feeding Ourselves, Feeding the Climate Crisis.” American Association for the Advancement of Science Annual General Meeting 2009. Chicago, IL.
Session Chair	Dalhousie University Centre for Learning and Teaching Conference 2008. Halifax, NS.
Session Chair	International Life Cycle Assessment/Life Cycle Management 2007. Portland, OR.

Conference Organizer Going Organic: A New Wave in Aquaculture. 2003. Nanaimo, BC.

PROFESSIONAL ASSOCIATIONS

- International Society for Ecological Economics
- Canadian Society for Ecological Economics
- American Centre for Life Cycle Assessment
- Society of Environmental Toxicology and Chemistry
- International Society for Industrial Ecology

EMPLOYMENT HISTORY

January 2011 – present Post-doctoral Research Fellow. Sustainability Assessment Unit, Institute for Environment and Sustainability, European Commission Joint Research Centre.

- Leading study of the externalisation of social risks associated with EU-27 consumption patterns
- Leading study of interactions between energy price increase/ volatility and food security outcomes
- Developing life cycle impact assessment method for quantifying the distribution of reactive nitrogen mobilization and losses, with application to EU food systems
- Developing methods and guidance documents for life cycle based product and organisation environmental footprint studies, to be used as the reference method for voluntary and mandatory applications associated with European Commission policies.
- Developing conceptual basis for the “European Sustainability Footprint,” an integrated sustainability assessment platform for policy support
- Contributing to development of Harmonized Framework Methodology for the European Food Round Table (life cycle based, food sector environmental accountancy methods)
- Contributing to the development of a farm-level GHG emissions calculator, to be used as the reference method for voluntary and mandatory applications associated with European Commission policies
- Contributing to spatially-resolved environmental risk assessment of potential shale gas development scenarios in the European Union, with a focus on water and land use conflicts

Sept 2010 – Dec 2010 Post-doctoral Research Fellow. National Water Research Institute. Environment Canada.

- Contributed to the development of a national reactive nitrogen inventory for Canada for the base-year 2006, along with a case study for the province of Ontario for the purpose of improving current methodologies

Jan 2006 – present Principal Consultant. Global Ecologic Environmental Consulting and Management Services.

- Conducting a combined social and environmental life cycle assessment of Canadian egg production supply chains, by housing system type, for Egg Farmers of Canada (in progress)

- Conducting a supply chain carbon footprint analysis for Regal Springs Honduran and Mexican tilapia production operations (in progress)
- Conducted an industry-wide comparative life cycle assessment of US egg production supply chains in 2010 compared to 1960 for the American Egg Board, United Egg Producers, and the Egg Industry Centre
- Constructed life cycle models to characterize the distribution of GHG emissions along contemporary commodity egg production supply chains in the Midwestern US for the American Egg Board
- Contributed to the development of the Canadian national nitrogen budget in cooperation with Environment Canada and Agriculture and Agri-food Canada
- Created activity data management template for calculating and reporting Scope 1 and Scope 2 greenhouse gas emissions under the Greenhouse Gas Protocol for Cermaq
- Developed a supply chain greenhouse gas accounting tool and profiled multiple agricultural, fisheries and animal husbandry product supply chains specific to operations in Norway, UK, Canada, Chile and Vietnam for EWOS Innovation, the R&D division of a major international aquafeeds producer
- Profiled the greenhouse gas intensity of high-volume seafood supply chains to UK markets for an industry authority
- Contributing author to a comprehensive report on opportunities and constraints to sustainable aquaculture development commissioned by the US Marine Aquaculture Task Force
- Provided life cycle impact assessment data and advice to Propeller Breweries to support strategic decision making for environmentally preferable product packaging (pro bono)
- Conducted exhaustive literature reviews and provided updated food product greenhouse gas intensity data and reports to Bon Appetit Management Foundation Company (a non-profit subsidiary of Compass Food Service, the world's largest food service provider), to be used in educating their institutional chefs as well as their on-line food product GHG calculator as part of the Low Carbon Diet Initiative

Jan 2006 – Dec 2008 Research Associate – Global Salmon LCA Research Consortium

- Chief biophysical systems modeler for international research team applying Life Cycle Assessment framework to evaluate biophysical, ecological and social sustainability in global salmon fisheries and aquaculture production systems (funded by Pew Charitable Trusts, Lighthouse, Oak and Esmee-Fairbairn Foundations).

May 2003 – May 2004 Organic Aquaculture Specialist – British Columbia Ministry of Agriculture, Food and Fisheries

- Facilitated multi-stakeholder process to develop organic aquaculture standards for the BC Certified Organic Program; researched and synthesized existing global standards; organized conferences; presented papers at regional and national venues; wrote ministerial briefs.

Jan 2003 – May 2003 Invertebrate Zoology Collections Assistant – Royal British Columbia Museum.

- Responsible for invertebrate specimen identification, preservation and cataloguing using FoxPro software; developed invertebrate type-specimen database and report for provincial collection.

Jan 2001 – May 2001 Science Writer – British Columbia Ministry of Environment, Lands and Parks

- Conducted literature reviews in order to develop comprehensive natural history profiles and vital statistics tables for twenty B.C. wildlife species (to be used as a risk assessment tool at contaminated sites).