

**Stantec**

**DIGBY WIND POWER PROJECT ENVIRONMENTAL ASSESSMENT**

Appendices

# **APPENDIX G**

CVs OF STUDY TEAM MEMBERS

Ms. Giddens is a Project Manager and Team Leader of Jacques Whitford's Environmental Permitting and Planning Group in Dartmouth, NS. Since joining Jacques Whitford in 1998, Ms. Giddens has managed or been involved in various environmental management projects including environmental impact assessment reports, regulatory permitting, environmental protection plans, environmental management systems, baseline studies, and waste management studies for several private and public sector clients including onshore and offshore projects.

## EDUCATION

Master of Environmental Studies, Dalhousie University, Halifax, Nova Scotia, 1998

Thesis: Conflict in the Countryside: Agricultural Land Use Disputes in Kings County, Nova Scotia

Bachelor of Science (B.Sc.), Honours, Biology  
Acadia University, Wolfville, Nova Scotia, 1996  
Thesis: An Interdisciplinary Approach to Community-Led Decision Making: The Key to Local Sustainability

Jacques Whitford Leadership Program, Queens School of Business, 2007-ongoing  
Project Management Essentials, 2005, 2006  
Leaders and Managers Program, 2001-2003  
Cumulative Effects Assessment Training, 2001  
Orientation to the Canadian Environmental Assessment Act and Regulations, 2000  
Project Management Breakthroughs, 2000  
Priority Manager and Priority Planning Program, 1999

## PROJECT EXPERIENCE

### Environmental Assessment and Regulatory Approvals

Deep Panuke Offshore Gas Development Project-Regulatory Approvals and Environmental Support for Onshore Pipeline Construction, Halifax, NS, 2008-2009 (Project Manager)

North Dartmouth Trunk Sewer EA and Regulatory Approvals, Dartmouth, NS, 2008 (Project Manager)

Lake Banook Canoe Course Improvements Projects EA and Regulatory Approvals, Dartmouth, NS, 2008 (Project Manager)

Highway 102 Environmental Approvals, Halifax, NS, 2008-2009 (Project Manager)

Highway 101 Twinning Environmental Assessment Report, Halifax, NS, 2007-2009 (Project Manager)

Environmental Issues and Regulatory Roadmap for Tidal Power Project, United States. 2008 (Project Manager)

MARLANT Environmental Assessment Guidance Document for Routine Projects, Halifax, NS, 2008 (Project Manager)

Highway 104 New Glasgow to Sutherlands River Twinning Project CEAA Screening, Antigonish, NS 2004-2005 (Environmental Analyst)

Highway 104 Antigonish Federal/Provincial Environmental Assessment, Antigonish, NS 2002-2005 (Environmental Analyst/Project Coordinator)

Highway 101 Digby to Weymouth North Environmental Assessment, Digby, NS, 2001-2002 (Environmental Analyst/Project Coordinator)

Beaver Bank Bypass Environmental Assessment Registration, Sackville, NS, 2000-2001 (Environmental Analyst/Project Coordinator)

New Minas Interchange/ Connector and North Collector Environmental Assessment Registration, New Minas, NS, 1999-2000 (Environmental Analyst/Project Coordinator)

Deep Panuke Offshore Gas Development Project Environmental Assessment Report, Halifax, NS, 2006-2007 (Project Coordinator and Biophysical Team Lead)

EnCana Corporation Deep Panuke Offshore Gas Development Project, Halifax, NS, 2001-2002 (Environmental Analyst/Project Coordinator)

Sovereign Resources Quarry Modification Project Environmental Assessment Registration, Bedford, NS, 2004-2005 (Environmental Analyst)

Halifax Harbour Solutions Project, CEAA Environmental Screening, Halifax, NS, 2000-2002 (Environmental Analyst/Project Coordinator)

Sheet Harbour Gypsum Loading Terminal CEEA  
Environmental Screening, NS, Sheet Harbour, NS,  
2001-2002 (Environmental Analyst)

Environmental Assessment of Offshore Exploration  
Drilling on Cortland and Empire Licenses, Halifax, NS,  
2002-2003 (Project Manager/Environmental Analyst)

Environmental Assessment of Offshore Exploration  
Drilling on EL 2381/EL 2382, Halifax, NS, 2002-2003  
(Project Manager/Environmental Analyst)

Environmental Assessment of Offshore Exploration  
Drilling on EL 2378/EL 2379, Halifax, NS, 2002-2003  
(Project Manager/Environmental Analyst)

Offshore Seismic Exploration Screening Assessment,  
Halifax, NS, 2003, (Project Manager/Environmental  
Analyst)

Environmental Assessment of Deepwater Exploration  
Drilling on Torbrook, Weymouth, Barrington, Caledonia,  
Plympton and Highland, Halifax, NS, 2003 (Project  
Manager/Environmental Analyst)

Environmental Screening for Offshore Exploration  
Drilling on Mahone Block, Halifax, NS, 2001 (Project  
Manager/Environmental Analyst)

Environmental Screening for Offshore Exploration  
Drilling in Annapolis Block, Halifax, NS, 2001  
(Environmental Analyst)

Halifax Lateral Pipeline Project Comprehensive Study  
Report, Halifax, NS, 1999 (Environmental Analyst)

Various Environmental Screenings for Department of  
National Defence, Halifax, NS, 2000-2005 (Project  
Manager/Environmental Analyst)

CEEA Screening for Sable Island Helicopter Refueling  
Facility, Halifax, NS, 2001 (Environmental Analyst)  
Sackville River Bridge CEEA Environmental Screening,  
Sackville, NS, 2000  
(Environmental Analyst)

Aulds Cove Quarry Expansion Environmental  
Assessment Registration, Aulds Cove, NS, 2000  
(Environmental Analyst)

## Environmental Management Planning

Natural Resource Management Plans for Select  
MARLANT Properties in NS, Halifax, NS, 2008 (Project  
Manager)

Natural Resource Management Plans for MARLANT  
Properties in Newfoundland, Halifax, NS, 2007 (Project  
Manager)

Deep Panuke Onshore Construction Environmental  
Protection Plan. Goldboro, NS, 2008 (Project Manager)

Bear Head LNG Environmental Protection Plan, Bear  
Head, NS, 2004-2005 (Environmental Analyst)

Sable Offshore Energy Inc Offshore/Onshore  
Environmental Protection Plans and Waste  
Management Plan, Goldboro, NS, 2001 (Environmental  
Analyst)

Halifax Lateral and Point Tupper Lateral Pipeline  
Projects, Environmental Protection Plans, Halifax, NS,  
1999-2000 (Environmental Analyst)

Chevron Canada Resources Offshore Waste  
Management Plan, Halifax, NS, 2002 (Environmental  
Analyst)

Marathon Canada Limited Offshore Waste Management  
Plan, Halifax, NS, 2001 (Environmental Analyst)

Environmental Management System for J.D. Kline  
Water Supply Plant, Halifax, NS, 2000-2001  
(Environmental Analyst)

Rapporteur for 5-Year Review of the Canadian  
Environmental Assessment Act , Halifax, NS, 2000

Robert Federico is a Principal and senior project manager who has been with Jacques Whitford for over 17 years managing numerous environmental studies including impact assessments, waste management studies, environmental management systems, public and stakeholder consultants and policy studies. He is currently leads the environmental impact assessment and permitting practice for Jacques Whitford in Nova Scotia. He has been responsible for or participated in major environmental assessments and regulatory reviews (federal and provincial) for such projects as: Lower Churchill Hydroelectric Project; the Sydport Marine Terminal; Eider Rock Refinery; the Bear Head LNG Project and associated pipeline project; Grassy Point LNG; Sydney Tar Ponds Clean-up; Deep Panuke Project; the Fundy Tidal Power Strategic Environmental Assessment; the Blue Atlantic Project; Hudson Energy Project; Rockingham Container Terminal; the Halifax Harbour Solutions Project; development of numerous highways in Nova Scotia; Halifax Lateral Pipeline Project; the Point Tupper Lateral Project; numerous quarries including the Sovereign Quarry; and the Sheet Harbour gypsum loading facility.

Mr. Federico has made numerous presentations and published papers on environmental impact assessment and environmental management.

## EDUCATION

M.P.A. Graduate Program in Public Policy and Administration, Columbia University, School of International and Public Affairs, New York, New York, 1986

B.A. Philosophy, State University of New York, College at Purchase, Purchase, New York, 1978

## AWARDS

Jacques Whitford Award for Technical Excellence, 2002

Jacques Whitford Award for Project Management, 2004

## PROJECT EXPERIENCE

Background Report for the Fundy Tidal Energy Strategic Environmental Assessment, Offshore Energy Environmental Research Association (OEER) and Province of New Brunswick. 2007-2008, Bay of Fundy, NB (Project Manager)

*This report is a background study on ocean renewable energy which is intended to facilitate a Strategic Environmental Assessment (SEA) of potential tidal energy development projects in the Bay of Fundy.*

Lower Churchill Hydroelectric Project, Newfoundland and Labrador Hydro, 2007-2008 (Co-EIS Lead)  
*Federal-Provincial assessment (CEAA Panel review) currently underway.*

Environmental Assessment for Sydport Container Terminal and Channel Dredging, Sydney Marine Group, 2007-present, Sydney, NS (Project Manager)

*Federal/provincial assessment conducted according to the CEAA and Nova Scotia Environment Act. This project, in Sydney Harbour, Nova Scotia, also included provision of regulatory advice and coordination and preparation of environmental applications.*

Environmental Impact Assessment and Permitting, Bear Head Liquefied Natural Gas (LNG) Terminal, Access Northeast Energy Inc., 2003-present, Goldboro, NS (Project Manager)

*Federal/provincial assessment conducted according to the CEAA and Nova Scotia Environment Act. Also included input on site selection and development of a regulatory roadmap, as well as development and implementation of a public consultation program, development of environmental management plans and permitting.*

Environmental Assessment Bear Head Pipeline, Maritimes Northeast Pipeline, 2005-2007, Goldboro, NS (Project Manager)

*Federal/provincial assessment of natural gas pipeline from Bear Head LNG facility to main transmission pipeline at Goldboro.*

\*Environmental Impact Assessment for Sydney Tar Ponds Clean-up, 2005-2006, Sydney, NS (Co-lead)  
*Prepared assessment reports for CEAA Panel Review as well as preparation for Panel hearings.*

Environmental Impact Statement, Deep Panuke Offshore Gas Development, PanCanadian/EnCana, 2001-2002;2006-2007 (Task Leader and Senior Advisor)

*Included the preparation of an Environmental Impact Statement and a Comprehensive Study Report.*

\* denotes projects completed with other firms

Environmental Assessment for In-Situ Leach Mining Project at Silver Mine, Cape Breton, 2005-2006 (Project Manager)

Environmental Assessment and Permitting Sovereign Resources Quarry Modification, 2005-present (Project Manager)

Comprehensive Study Environmental Assessment for the Halifax Lateral Pipeline Project, Maritimes & Northeast Pipeline Management Limited, 1998-1999, Halifax, NS (Project Coordinator)  
*Included the preparation of an Environmental Report, a Comprehensive Study Report, and a Supplementary Information Report, and a Field Studies Report.*

Environmental Assessment for the Point Tupper Lateral Pipeline Project, Maritimes & Northeast Pipeline Management Limited, 1999, Mulgrave, NS (Project Coordinator)  
*Included the preparation of an Environmental Report and a Supplementary Information Report. Project details in italics (grey). Details in italics, in grey. Details in italics, in grey. Details in italics, in grey.*

Environmental Impact Statement, Blue Atlantic Transmission System Project, El Paso, (Task Leader)  
*Involves the construction and operation of a subsea natural gas pipeline and onshore processing facilities and will likely require a federal/provincial assessment conducted according to the CEAA and Nova Scotia Environment Act. Applications under the National Energy Board Act will also be required.*

Environmental Impact Statement, Hudson Energy Project, GenPower, 2001-2002 (Task Leader)  
*Involves the construction and operation of a natural gas power generation facility and high voltage direct current subsea cable for energy export and will likely require a federal/provincial assessment conducted according to the CEAA and Nova Scotia Environment Act. Applications under the National Energy Board Act will also be required.*

Industrial Facility EIAs, Trinidad Tobago, 2006 (Peer Review)  
*Conducted two peer reviews of EIAs for Government of Trinidad and Tobago for: proposed aluminium complex in the Union Industrial Site, LaBrea; and the proposed steel complex at Point Lisas.*

Environmental Screening, Jetty NJ/NK Reconstruct, DND, 2000 (Project Manager)  
*Environmental assessment under CEAA for the demolition and reconstruction of a major military wharf in Halifax Harbour.*

Environmental Assessment for Marine Bulk Loading Terminal, Tusket Mining Inc., Sheet Harbour, NS, (Project Manager)  
*Federal/provincial assessment of the development of a gypsum loading facility.*

Environmental Assessment for Return of Boat Harbour to a Tidal Estuary, Pictou County, NS, 2003-ongoing (Project Manager)  
*CEAA screening level assessment for the decommissioning of a portion of a wastewater treatment facility associated with the Kimberly-Clark pulp and paper mill. Also includes the development and implementation of a public consultation program.*

Environmental Assessment for Halifax Harbour Solutions Project, Halifax, NS 1998-2002 (Project Manager)  
*CEAA screening level assessment for the development of a regional wastewater treatment system including: three sewage treatment plants; collector sewers; marine outfalls; and a sludge composting facility.*

Environmental Screening Report for the Development of the Rockingham Container Terminal, Halifax, NS, 2000-2002 (Project Manager)  
*Prepared pursuant to the CEAA and related guidelines.*

Environmental Assessment, Highway 104, New Glasgow to Sutherlands River, North, NS, 2003-2005 (Project Manager)  
*CEAA assessment of a highway twinning project with potential bypass option. A community impact study including a full-day community workshop and several newsletters has been undertaken to assist with route options evaluation.*

Class II Environmental Assessment, Highway 104 (Project Manager)  
*Federal/provincial assessment of the development of 15 km of new highway.*

Class II Environmental Assessment, Highway 101 (Project Manager)  
*Federal/provincial assessment of the development of 26 km of new highway.*

Environmental Registration for the New Minas Interchange/Connector and North Collector Highway, New Minas NS (Project Manager)  
*Provincial assessment of a new highway development.*

Environmental Assessment Report for the Beaverbank By-pass Highway, Beaverbank, NS (Project Manager)

Highway 103 Barrington By-pass, Environmental Assessment Report, Barrington, NS (Project Coordinator)  
*Coordinated socioeconomic studies and report preparation for impact assessment of 8.2 km of new highway.*

Radial Heredia Highway, San Jose, Costa Rica (Environmental Assessment Trainer)  
*Provided environmental assessment training to a local consulting team conducting the environmental impact assessment of a new highway near San Jose, Costa Rica.*

Presented at the 17th Canadian Waste Management Conference, Quebec City, September, 1995.

Federico, R. and S. Fudge. 1995. Conducting Waste Minimization Audits. Presented at the Regional Workshop on Chemical Control and Waste Minimization in CARICOM states. January, 1995.

Haley, D., and R. Federico. Halifax Harbour Source Control Implementation Strategy. Presented at the Canadian Pollution Prevention Roundtable, Halifax, May, 1997.

Charles, M., and R. Federico. Environmental Management Guidebooks for Small and Medium Size Organizations. Presented at the Canadian Pollution Prevention Roundtable, Halifax, May, 1997.

## PUBLICATIONS/PRESENTATIONS

R. Federico. "Environmental Approvals for Large Projects in Atlantic Canada: A Consultant's Perspective." Presented at Environmental Law in Atlantic Canada, Halifax, May 16, 2006.

R. Federico, S. Murphy. "Environmental Approvals for Bear Head LNG Terminal and Other Projects: A Consultant's Perspective." Presented to the national conference of provincial environmental assessment administrators, Halifax, August 17, 2006.

R. Federico. "No Surprises" – A Practical Approach to Successful EIAs. Presented at IAIA '05 Conference, Boston, June 2005.

R. Federico. Deep Panuke: Facing Environmental Challenges Posed by Offshore Oil and Gas Projects. Published in Thirty Years of Solutions, 2002.

Hurley, G., D. Fanning, R. Federico. Waste Management for Sable Offshore Energy Inc. Presented at the Canadian Waste Management Conference, Halifax, September 2000.

Fanning, D., R. Federico, T.E. Hickey and C. Moore. 1995, Highway 101 Landfill Environmental Audit and Health Risk Assessment, Sackville, Nova Scotia.

**John Walker PhD**  
Principal and Senior Project Manager  
Eastern Regional Practice Director, Air Quality  
National Practice Director, Noise



Dr. Walker is a Principal of the firm Senior Project Manager in the JWEL Dartmouth office, and has 26 years experience in the environmental consulting industry. He has been involved in environment, industrial hygiene and other industrial studies for such diverse clients as Michelin (Canada), Uniroyal, Nova Scotia Power, INCO, El Paso Corporation, Shell Brunei, Harvard School of Public Health, Environment Canada, Nova Scotia Department of Environment, Transportation and Public Works, and General Motors. Dr. Walker has assisted many of these organizations to adapt and benefit from changes in the policy and regulatory environments. His international work has included World Bank and private sector clients in China, Kazakhstan, Iran, Syria, Brunei, Brazil, Chile, and Argentina. He earned his doctorate in air pollution meteorology and environmental physics from the University of Guelph in 1980.

## EDUCATION

Ph.D., Air Pollution Meteorology, University of Guelph, Ontario, 1980

M.Sc., Geography (Climatology), Queen's University, Kingston, Ontario, 1976

B.Sc., Geography (Hons.), Queen's University, Kingston, Ontario, 1975

## PROFESSIONAL ASSOCIATIONS

Air and Waste Management Association – Immediate Past Chair, Atlantic Section

## PROJECT EXPERIENCE

### QUALITY/METEROLOGY

**NPRI and Greenhouse Gas Studies (Project Manager)**  
*Managed the update of the NPRI reporting and greenhouse gas inventory for Neenah Paper, Pictou, NS.*

**Air Quality Strategy (Project Manager & Technical Director)**  
*Study to develop an air quality strategy for the Halifax Regional Municipality.*

**Michelin (Canada) Project Manager**  
*A series of projects for Michelin, including training programs in air quality regulations and compliance for environmental staff of all Michelin (Canada) facilities; source testing at Waterville facility; dispersion modelling and permitting assistance at Waterville, Granton, and Bridgewater plants.*

**Maritime Steel (Manger of source testing, dispersion modelling and consultation for the repermitting of the facility in New Glasgow)**

### Province of Nova Scotia (Project Manager)

*Designed (in conjunction with Environment Canada and the Nova Scotia Department of Environment) and managed the implementation of the air quality monitoring program for the Sydney Tar Ponds Clean-Up*

### World Bank (Consultant)

*Retained by the World Bank in 2002 as an expert consultant to design an approximately \$10 million (capital cost), air quality monitoring program for major cities in Iran, including Tehran, Masshad, Arak, and Isfahan.*

### EIPaso Corporation (Project Manager)

*Set up air quality programs including modelling and monitoring for the Blue Atlantic Transmission System and the Sable Offshore Energy Program.*

### Brunei Shell Refinery (Project Manager)

*Designed the air quality monitoring program, meteorological monitoring station, and odour management system for the Sungai Bera Remediation Joint Venture at the Shell Petroleum Refinery, Brunei.*

### Cavendish Farms (Project Manager)

*Project Manager of air quality monitoring program for the Cavendish Farms processing plant in New Anaan, Prince Edward Island.*

### Voisey's Bay Nickel (INCO) (Project Manager)

*Designed two meteorological and air quality stations for installation in northern Labrador during the Voisey's Bay Environmental Assessment.*

\* denotes projects completed with other firms

### **Air Quality Studies - Industrial**

Air quality assessment of numerous gypsum, gravel, and other quarries and bulk shipping operations.

Manager of air quality assessments for many industrial plants, including the Trigen-PEI waste to energy plant in Charlottetown, PEI, an energy-to-waste plant in North Bay, and energy-to-waste plant in Kitchener, three Michelin plants in Granton, Waterville, and Bridgewater..

Project manager in an investigation and measurement program to determine odour emissions from the Acadian Seaplants facility in Nova Scotia.

Performed air quality modelling for the Voisey's Bay smelter/refinery complex at Argentia

Performed air quality assessment of the Voisey's Bay mine and mill project in Labrador

Testified as an expert witness for General Motors during a trial relating to changes under the Environmental Protection Act

Project Manager, cooling tower impact study, IBM T.J. Watson Research Center, Yorktown Heights, New York

Project Manager, air quality and noise monitoring programs for Cavendish Farms, New Annan, Prince Edward Island

### **Air Quality Assessment**

Project Manager, wind tunnel air quality study of University of Maryland at Baltimore - Health Sciences Facility, Biomedical Research Division and the Penn Street Pharmacokinetics Building

Project Manager, dispersion modelling (EPA ISC) and wind tunnel modelling for the National Institutes of Health, Bethesda Maryland.

Project Manager, Harvard University School of Public Health - Francois Xavier Bagnold Building and Building No. 2, study of the dispersion from fume hoods and laboratory exhausts.

Project Manager, wind tunnel study of exhaust reconfiguration at the Roswell Park Cancer Cell Center, Buffalo, New York

Project Manager, wind tunnel study to investigate the aerodynamic drag of a US Navy Icebreaker, and testing to ensure that main engine exhausts were not reingested by the air intakes.

Project Manager for a numerical study of ventilation design for the proposed US Navy Surface Warfare Center, Ship Materials Testing Facility, Bethesda, Maryland.

Camp Hill Medical Centre – Problem Investigation

Project Manager – L'Anse aux Meadows, Newfoundland – study of recurring air quality buildings in national park buildings.

### **Noise Studies**

ConocoPhillips Surmont Project (Project Manager and Principal Scientist)

*An assessment of noise impacts for the ConocoPhillips Noise Impact Assessment, Fort McMurray, Alberta.*

Sydney Tar Ponds Agency (Principal scientist)

*Noise and air quality for the environmental assessment of the Sydney Tar Ponds Clean-Up.*

Bilicon Nova Scotia (Project Manager)

*Noise and air quality impact assessment for the Whites Point Quarry, Nova Scotia.*

Petro Canada Sturgeon Upgrader (Principal Scientist and Task Manager)

*An assessment of noise impacts for the PetroCanada Sturgeon Upgrader Project, Fort Saskatchewan, Alberta.*

Turbine Generator Project (Project Manager)

*A study of baseline noise during operation and shutdown modes of the Maritime Electric Company Limited plant in Charlottetown, Prince Edward Island, and Principal Scientist for acceptance testing and verification.*

Nova Scotia Transportation and Public Works (Project Manager)

*An assessment of noise and noise barrier design for Highway 104 at Salt Springs Provincial Park, NS*

Halifax-Dartmouth Bridge Commission (Project Manager)



**John Walker PhD**  
Principal and Senior Project Manager  
Eastern Regional Practice Director, Air Quality  
National Practice Director, Noise



*An assessment of potential construction noise impacts of the Third-Lane Project for the Macdonald Bridge, Halifax-Dartmouth, NS*

Jacques Whitford Environment (Project Manager)  
*Noise Impact Study for the Fixed Link Crossing at Borden, Prince Edward Island*

### **Environmental Impact Studies**

Air quality and noise issues related to:

- Voisey's Bay mine/mill project in Labrador and the smelter/refinery project in Argentina
- Potential impacts of nuclear powered vessels berthing in Canadian ports
- Assessment of environmental impacts of offshore training activities by DND

Project Manager, study of the air quality issues with respect to the Prince Edward Home wood-fired system, Charlottetown, Prince Edward Island

Conducted air quality and noise background measurement programs and impact assessment for the Halifax Harbour Sewage Treatment Plants.

Project Manager, Air Quality and Noise studies, Environmental Baseline Study, CFB Trenton

### **Environmental Studies – International**

Member of the Project Appraisal Mission of the World Bank to the Syrian Arab Republic to develop a project to test alternate vehicle technologies in Syria as a Global Environment Facility project.

Developed and presented a series of workshops on Urban Air Quality Management and Vehicle Emission Reduction in the cities of Xiamen, Haikou, and Chongqing, P.R. China as part of an Environment Canada project.

Technical Director of the project for the People's Municipality of Shanghai to investigate the air quality and noise impacts of the Inner Ring Road

Assisted World Bank in the direction of the environmental assessment of urban transport projects in three cities, Shenyang, Fushun, and Anshan in Liaoning province of P.R. China

Participated in World Bank project identification mission to the Republic of Kazakhstan, CIS, to develop strategies to improve urban air quality. This involved meeting with the Ministry of Environment and agencies in Almaty to review air quality monitoring activities and data.

Provided technical assistance and review to the World Bank and Xinjiang Environmental Technology Assessment Center for the Urumqi Urban Transport Improvement Program.

Retained by the World Bank to assist the Municipality of Shijiazhuang, China, in the conduct of urban airshed modelling and other components of the Environmental Assessment of urban transport projects.

Contracted to compile a handbook for the World Bank on the conduct of environmental assessments with a focus on the noise and air quality aspects.

### **Electric Power Sector Studies**

Project Manager, dispersion modelling study to assess the impacts of flue gas desulphurization on the ground level impacts of the Lingar Thermal Generating Station, Cape Breton, Nova Scotia.

Project Manager, dispersion modelling for the peaking power turbines at Burnside, Victoria Junction, and Tusket, Nova Scotia.

Managed an air quality and noise assessment, including dispersion modelling, for a gas turbine power station in Halifax Regional Municipality.

Developed and presented training programs in air pollution meteorology to staff on Electricity Generating Authority of Thailand

Modelled air quality impacts for the Bruce Nuclear Energy Centre

Air quality modelling for the cogeneration project at Abitibi-Price, Stephenville, NF.

Developed a series operational air quality computer model for the Nova Scotia Power Corporation

Provided expert review and testimony at hearings for the proposed Burnside energy from waste incinerator in Dartmouth NS

*\* denotes projects completed with other firms*

**John Walker PhD**  
Principal and Senior Project Manager  
Eastern Regional Practice Director, Air Quality  
National Practice Director, Noise



Coordinated environmental assessment for a proposed energy from waste plant in North Bay, Ontario, including assessment of existing landfill conditions

Preliminary air quality analysis for a proposed energy from waste facility at Ship Point, Nova Scotia

Long-range transport air pollution model development and testing for Nova Scotia Power.

Assessment of feasibility of Flue Gas Desulphurization options using dispersion models for Lingan Thermal Generating Station, Nova Scotia.

Conducted preliminary environmental assessment for an energy from waste plant in Kitchener, Ontario

Probable Maximum Precipitation Study for Manitoba Hydro in support of the dam safety program for the Lower Nelson River

Long-Range Transport model development and studies for Ontario Hydro, including preparation of evidence for National Energy Board hearings.

Water quality model development for the Dock Street Power Station, Philadelphia.

### **Oil & Gas Sector Studies**

Designed and coordinated a technological assessment and permitting program for low temperature thermal desorption of petroleum hydrocarbon soil contaminants

Coordinated the environmental assessment and testified at the Ontario Energy Board Hearings for the 50 km Georgian Bay Reinforcement Pipeline

Assessed life cycle effects of sour gas treatment and disposal options for offshore energy projects of Pan Canadian (now EnCana).

### **Climate Change, Meteorology, Climatology and Extreme Event Studies**

Performed Probable Maximum Precipitation study for the Lower Nelson River drainage basin, Manitoba

Performed climatological analysis relating the anomalous sequences of a 10 year period to the projected impact of climatic change as predicted by the CSU, GISS and GFDL models

Developed and tested wind forecast techniques for the Beaufort Sea and Canadian Arctic Waters

Developed wind forecast methods based on ship buoy and ship observations on the Great Lakes and compared the two development bases as input to wave models

### **Waste Management**

Performed landfill gas characterization/quantification (US EPA Scholl Canyon Model) and odour dispersion modelling (US EPA ISC2) from the Highway 101 Landfill, Sackville Nova Scotia

Supervised the development of an emergency response model for Project Swiftsure, the project to incinerate Canada's chemical weapons

Expert advisor to counsel for the Regional Municipality of Niagara for the OWMC Waste Disposal Site Environmental Assessment

Project Manager for air quality and noise impacts of the proposed Waste Diversion Facility, City of Kingston

Advised in the development of landfill gas monitoring protocol for the Eastview Landfill Guelph, Ontario oil project.

### **PUBLICATIONS**

Role of Agrometeorology in Predicting Crop Injury by Air Pollution, Presented at the O.A.C. Agriculture Conference, University of Guelph, Guelph, Ontario, 1977 (Co-author)

A Note on Temperature and Humidity Profile Measurement Over Forests Using Diodes, J. App. Meteor - 16, 106-109, 1977 (Co-author)

Ozone Uptake and its Relationship to Damage in Corn, Final Report to A.E.S. for D.S.S. Contract KM601-7-19045, 1979 p. 52 (Co-author)

Ozone Uptake by Corn, Ph.D. Thesis, University of Guelph, Ontario, 1980

Ozone Uptake by Corn, Presented at the 75th Annual Meeting of the Air Pollution Control Association, New Orleans, 1982, June.

\* denotes projects completed with other firms

## John Walker PhD

Principal and Senior Project Manager  
Eastern Regional Practice Director, Air Quality  
National Practice Director, Noise



Experiments in the Development of Marine Weather Forecasting Techniques off the East Coast, Presented at the 18th Annual Congress of the Canadian Meteorological and Oceanographic Society, 1 Halifax, 1984, June (Co-author).

Conference on Urban Air Quality, March 2005, Valencia, Spain.

Urban Air Quality and Vehicle Emissions. Presented at the First Sino-Canadian Workshop on Climate Change, Beijing, April 1999.

Software Design for the Development of Marine Weather Forecast Techniques, Presented at the 18th Annual Congress of the Canadian Meteorological and Oceanographic Society, Halifax, 1984, June (Co-author).

PAH in the Air of Sydney, Nova Scotia. Presented at the Conference of Chemical Institute of Canada, Atlantic Chapter, 1993.

Pollution Prevention in Action: Green Industry Analysis of a Guelph Industry. 40th Ontario Conference on the Environment, June 1993, (Co-author).

Urban Air Quality, Greenhouse Gases, and Motor Vehicle Emissions. Proceedings Sino-Canadian Workshop on Climate Change, Beijing, April 12-13, 1999.

Motor Vehicle Control Strategies for Urban Air Quality Management. Presented at the International Conference on Urban Pollution Control Technology, Hong Kong, 13-15 October, 1999.

Competition and Compromise – Environmental Factors in Waste Management. Presented at the 22nd Canadian Waste Management Conference, Halifax, 25-27 September, 2000.

Air Quality Monitoring Programs at the Onshore Facilities of Sable Offshore Energy Inc. Presented at the Offshore Technology Association of Nova Scotia, October 6, 2000.

Comparison of AERMOD, ISC3 and CALPUFF in the Environmental Assessment of a Sour Gas Plant (coauthor). Presented at the Guideline on Air Quality Models Conference (US EPA/AWMA) Mystic Connecticut, October 2003.

On-Road Vehicle Emissions in Santiago de Chile, Sao Paulo and Buenos Aires, Presented at the 5th

*\* denotes projects completed with other firms*

Gillian Asche, M.A.Sc., B.Sc., is a scientist in the Environmental Planning and Permitting group with the Jacques Whitford Dartmouth office. With her background in Environmental Biology and Environmental Engineering, her academic training includes environmental site assessment, groundwater dispersion modeling, risk assessment, and site remediation. Since joining Jacques Whitford team in the summer of 2007, Ms. Asche has been involved in numerous projects including air dispersion modeling, sound pressure level modelling, source emissions testing, ambient air and sound quality monitoring, source emissions inventory and environmental assessments. As well Ms. Asche has successfully completed training related to GHG Verification Using ISO 14064, orientation to the Canadian Environmental Assessment Act, and sound pressure level modelling using Cadna.

## EDUCATION

Master of Applied Science, Environmental Engineering,  
Memorial University, St. John's, Newfoundland, 2005

Bachelor of Science, (Environmental Biology), Sir  
Wilfred Grenfell College, Memorial University, Corner  
Brook, Newfoundland, 2004

## REGISTRATIONS

Basic Seminar, Cadna A, DataKustik, 2008  
Advanced Seminar, Cadna A, DataKustik, 2008  
Orientation to CEAA 101, Canadian Environmental  
Assessment Agency, 2008  
Greenhouse Gas Verification using ISO 14064,  
Canadian Standards Association, 2008  
WHMIS Training, Jacques Whitford, 2007

Year Award Name, Project Name

## PROJECT EXPERIENCE

### Air Quality

Maritime Steel Industrial Approval Assistance, New  
Glasgow, NS (Air Quality Scientist)  
*Preparation of a Pollution Prevention Plan and a Solid  
Waste Management Plan, Maritime Steel and Foundries  
Limited (2008)*

Environmental Assessment Sydport, Sydney, NS (Air &  
Noise Quality Scientist)  
*Atmospheric Environment Value Ecosystem Component  
for the Environmental Assessment, Marine Terminal,  
Sydney, NS*

Air Quality Services, Industrial Approval Assistance,  
New Glasgow, NS (Air Quality Scientist)  
*Air Dispersion Modelling Study, Air Emissions Inventory,  
Source Emissions Testing and Compilation of the 2007*

*National Pollutant Release Inventory, Neenah Paper  
(2008)*

Dispersion Modelling, Bridgewater, NS (Air Quality  
Scientist)  
*Air Dispersion Modelling Study, Michelin Bridgewater  
(2008)*

Air Quality Monitoring, Bedford, NS (Air Quality  
Scientist)  
*Ambient Air Monitoring Program, Sovereign Resources  
(2007-2008).*

Boiler 7 Source Emissions Testing, Corner Brook, NL  
(Air Quality Scientist)  
*Source Emissions Testing, Corner Brook Pulp and  
Paper Ltd. (2007).*

Air Quality Services, Goldboro, NS (Air Quality Scientist)  
*Air Emissions Inventory, Air Dispersion Modelling and  
Environmental Assessment of the air quality impacts of  
the proposed Petrochemical Plant in Goldboro, NS  
(2007)*

Environmental Assessment Highway 101, Windsor, NS  
(Air & Noise Quality Scientist)  
*Air quality component of the Environmental Assessment  
of the Highway 101 Twinning (Phase Four) (2007).*

Source Emissions Testing and Air Dispersion  
Modelling, Waterville, NS (Air Quality Scientist)  
*Source Emissions Testing and Air Dispersion Modelling,  
Michelin Waterville (2007)*

### Acoustic Environment Studies

Noise Modelling, Lameque, NB (Air & Noise Quality  
Scientist)  
*Sound Pressure Level Modelling Wind Turbine Farm,  
Lameque, NB*

Acoustic Technical Study, Saint John, NB (Air & Noise  
Quality Scientist)

\* denotes projects completed with other firms

**Gillian Asche MAsc**  
Air and Noise Quality Scientist



---

*Sound Pressure Level Modelling, (Cadna A) Project  
Eider Rock, Irving Oil (2008)*

**Ambient Noise Monitoring, Bedford, NS (Air & Noise  
Quality Scientist)**  
*Baseline Ambient Noise Quality Monitoring Program,  
Sovereign Resources, (2007-2008)*

**Acoustic Environment Services, Goldboro, NS (Air &  
Noise Quality Scientist)**  
*Baseline Ambient Noise Quality Monitoring and  
development of Noise Monitoring Plan, Keltic  
Petrochemicals (2007)*

**Noise Assessment, Dartmouth, NS (Air & Noise Quality  
Scientist)**  
*Neighbourhood Study of Sound Pressure Levels, Tufts  
Cove, Nova Scotia Power Inc (2007)*

Michael Crowell, M.Sc. is a terrestrial ecologist with over 22 years experience with Jacques Whitford. He is a highly experienced botanist and plant ecologist having conducted numerous botanical surveys and plant community studies in a wide range of habitat types throughout Atlantic Canada. Mr. Crowell is also an experienced wildlife ecologist. He has conducted breeding bird surveys, aerial raptor and waterfowl surveys, aerial large mammal surveys, small mammal trapping, general mammal surveys, reptile surveys and amphibian surveys for a wide variety of projects throughout Atlantic Canada. His terrestrial ecological skills are used mainly in environmental assessments to assess the effects of various anthropogenic activities on rare or endangered species and sensitive habitats. As part of this process Mr. Crowell develops mitigative measures to eliminate or reduce the adverse effects of these activities. Mr. Crowell has been responsible for designing and implementing a variety of environmental monitoring programs for rare or endangered species as well as terrestrial and wetland habitats. He is also experienced in conducting wetland evaluations and wetland functional analyses. Mr. Crowell is also experienced in air photo interpretation and plant community mapping from air photos as well as the description of plant communities. He has used these skills to prepare ecological land classifications for various areas in Atlantic Canada

## EDUCATION

Master of Science, Dalhousie University, Halifax, Nova Scotia, 1988

Bachelor of Science (Honours), Terrestrial Ecology, Joint Degree awarded by Mount St. Vincent University and Dalhousie University, Halifax, Nova Scotia, 1981

## PROJECT EXPERIENCE

Highway 104 Follow-up Studies, New Glasgow, NS. 2008-ongoing (Senior Wetland Ecologist)  
*Developed and implemented a program to salvage and relocate Blunt-leaf Pondweed (Potamogeton obtusifolius) in a wetland infilled as a result of highway twinning.*

Vegetation Control Program for CFB Gagetown, NB, 2007 (Senior Terrestrial Ecologist)  
*Conducted plant community mapping and habitat descriptions for maneuvering and target areas at CFB Gagetown.*

Department of National Defence Wetland Functional Analyses, NS, 2004-2005 (Senior Wetland Ecologist)  
*Conducted wetland functional analyses for wetlands found on six DND properties in Nova Scotia*

Department of National Defence Wetland Biophysical Inventories, NS, 2004-2005 (Senior Wetland Ecologist)  
*Conducted rare plant, bird, mammal, reptile and amphibian surveys for 37 wetlands on six DND properties in Nova Scotia.*

Nova Scotia Department of Natural Resources Protected Beaches Biophysical Inventories, NS, 2005-2006 (Senior Terrestrial Ecologist)

*Compiled vascular plant inventories and plant community descriptions for dune and wetland habitats at 11 provincially protected beaches in Nova Scotia.*

New Brunswick Department of Transportation TransCanada Highway Twinning, Woodstock, NB, 2003 (Terrestrial Ecologist)  
*Conducted breeding bird, vascular plant inventories and aerial deer and moose surveys for the rerouting of the Trans-Canada Highway between Woodstock and Grand Falls, NB.*

Project Eider Rock Environmental Assessment, St. John, NB, 2007 (Terrestrial Ecologist)  
*Conducted rare plant and wetland vegetation inventories for the environmental assessment for an oil refinery.*

Bear Head LNG Project, Bear Head, NS, 2005-2006 (Senior Terrestrial Ecologist)  
*Conducted rare plant and breeding bird surveys as part of the environmental assessments for the Bear Head LNG plant and associated natural gas pipeline, Port Hawkesbury, NS*

Halifax Stanfield International Airport Rare Plant Monitoring Program, Enfield, NS, 2004-ongoing (Senior Terrestrial Ecologist)  
*Conducted monitoring of a population of Southern Twayblade orchid (Listera australis).*

Strait Crossing Inc. Terrestrial Monitoring Program, Cape Jourimain, NB and Borden, PE, 1993-1997 (Senior Terrestrial Ecologist)  
*Designed and implemented rare plant, waterfowl, seabird, and terrestrial bird monitoring for the Confederation Bridge project.*

Michael Crowell MSc  
Principal



---

Loblaws Wetland Compensation Program, Yarmouth, NS, 2006-ongoing (Senior Wetland Ecologist)  
*Designed and implemented a plant community monitoring program to monitor the recovery of a wetland following cessation of ATV trampling disturbance.*

Highway 101 Phase 4 Twinning Environmental Assessment in Antigonish, NS  
Client: Nova Scotia Transportation and Infrastructure Renewal

Client Reference Contact: Elizabeth Pugh,  
Environmental Engineer  
TEL: (902) 424-6418

EMAIL: pughel@gov.ns.ca

Contract Duration: Summer 2008

Role: Senior Terrestrial Ecologist

*Project scope for Highway 101 Phase 4 Twinning Environmental Assessment included conducting rare plant surveys, breeding bird survey, shorebird surveys and wetland functional analyses plus preparation of text for the EA which was done in 2007. It also included the design and implementation of a shorebird monitoring study conducted in 2008.*

Permitting of Hydro-electric Reservoirs in Nova Scotia  
Client: Nova Scotia Power Inc.

Client Reference Contact: Dan Thompson,  
Environmental Specialist, Environmental Operations Approvals

TEL: (902) 428-7589

EMAIL: dan.thompson@nspower.ca

Contract Duration: Summers 2006, 2007, 2008

Role: Senior Terrestrial Ecologist

*Project scope for Permitting of Hydro-electric Reservoirs in Nova Scotia included conducting rare plant surveys and wetland biophysical surveys for 18 NSPI reservoirs. Surveys were conducted in 2006, 2007 and 2008.*

Nathan is a member of the company-wide sustainability initiative out of the Dartmouth office. Nathan has strong research and analytical skills developed through project work experience in the private, public, and non-profit sectors. Nathan brings to Jacques Whitford Stantec particular expertise in the application of Life Cycle Assessment (LCA). He has conducted a number of comprehensive LCAs, published peer-reviewed articles on LCA in respected industry journals, and given presentations and lectures on LCA at conferences and to a wide range of interested groups and organizations. In addition to these areas of expertise, Nathan has expertise in Carbon Footprinting and Environmental Impact Assessments.

## EDUCATION

Masters of Environmental Studies, Dalhousie University, Halifax, Nova Scotia, 2007

Bachelor of Arts, Mount Allison University, Sackville, New Brunswick, 2003

## PROFESSIONAL ASSOCIATIONS

Co-Editor, Journal of Cleaner Production, Special Issue on the Sustainability of Seafood Production and Consumption, published in 2009.

Member, Food Climate Research Network, U.K., 2006-present.

Best Methodological Contribution, InLCA/LCM 2006, Washington, D.C.

## PROJECT EXPERIENCE

### Recent Project Experience

Renewable Energy Asset Map, 2008, Cape Breton, NS (Research Analyst)

*As a research analyst on this project for a regional planning commission, provided research and analysis on the biophysical and economic potential for renewable resource development in the Cape Breton region. This included a literature and data review on the existing resource base in the region, consultation with renewable energy experts, development of a workshop for expert consultation, and working with GIS experts to develop renewable energy resource maps.*

Sustainable Product Assessment Framework, 2008 – 2009, Ottawa, ON (Lead Technical Researcher)

*As lead technical researcher, conducting screening level life cycle assessments of several key office supply products in order to determine the key life cycle environmental impacts of concern. Information from this*

*assessment will be used to develop a sustainable product assessment framework and will be incorporated into a supply chain management software program for an industry leading office supplies company.*

Digby Wind Farm Environmental Assessment, 2008 – 2009, Digby, NS (Research Analyst)

*Researching and analyzing data on migrating, overwintering, and breeding bird activity in the area of the proposed wind turbines. Preparing summary tables and summary chapter for the EA document to describe the potential impacts of the proposed turbines on birds using the area for various life cycle activities.*

SMART Report – Lignin and Cellulose Production, 2008 – 2009, Nova Scotia (Research Analyst)

*Using a life cycle assessment framework to assess the environment benefits of adopting a new technology for lignin and cellulose production in the pulp and paper industry. Results of the study will be used to inform a federal funding program for sustainable technology development.*

Sydport Channel Dredging and Marine Terminal Environmental Assessment, 2008 – 2009, Sydney, NS (Research Analyst)

*Coordinating, researching, and writing the chapters for each of the five marine valued ecosystem components (VECs), including commercial fisheries, marine fish and water quality, vessel navigation, benthic communities and sediment quality, and marine mammals and marine-related birds. Writing and providing research support as needed on other sections of the EA.*

Schefferville Iron Ore Mine Environmental Impact Statement, 2008 – 2009, Schefferville, NL (Research Analyst)

*Coordinating various chapters of this EIS, developing the Project Description, ensuring the EIS is compliant with the government guidelines, writing and providing research support as needed.*



Highway 101 Shorebird Monitoring, 2008 – 2009,  
Windsor, NS (Research Analyst)

*Conducted surveys of shorebirds in a marsh adjacent to the site of a proposed highway twinning project. Collected field data and summarized data in a GIS unit. Data collection is complete, and is now being summarized and analyzed to determine usage patterns of the marsh by shorebirds and to predict the environmental effects of the highway twinning project on these birds and their marsh habitat.*

LCA Framework – Strathcona County Environmental Sustainability Framework, 2008, Strathcona County, AB (Research Analyst)

*Provided life cycle assessment expertise to the development of a municipal decision-making framework. This included the development of a background report on life cycle assessment and life cycle management and providing recommendations for the application of these tools in a municipal setting.*

Analysis of Collaborative Software as a Tool for Environmental Sustainability, 2008, U.S. (Research Analyst)

*As lead technical researcher for this project, helped to develop a framework for the client to use to provide its customers with a quantification of the travel-related greenhouse gas emissions that are avoided by using online collaboration software. This project work included a review of existing methodologies, development of a novel, robust framework that could be applied to all of the client's customers, and collaboration with the client to test the framework on real-world data.*

Project Eider Rock Environmental Assessment, 2008, Saint John, NB (Research Analyst)

*Conducted research, analysis, and report preparation for various components of the environmental assessment of a new oil refinery, including the assessment of existing marine vessel traffic, the environmental effects of oil refineries on residential property values, and the environmental effects of the refinery on Aboriginal land and resource use.*

Nunavut Oil and Gas Strategic Environmental Assessment, 2008, Nunavut (Research Analyst)

*Developed an approach and criteria for selecting study areas for a strategic environmental assessment to be used for management of future oil and gas exploration and development in the Nunavut territory.*

Low-Carbon Diet for Bon Appétit Management Company, 2007-2008, Dartmouth, NS (Research Analyst)

*Provided consultation to a U.S. food distribution company on the life cycle greenhouse gas emissions associated with the production and distribution of their core menu items. Conducted a comprehensive literature review of life cycle assessment studies of global food production systems in order to estimate the GHG emissions for each life cycle stage of various food products and to determine areas where improvements could be made in their supply chain. Analyzed data, constructed reports, and provided methodological advice and recommendations on next-steps for the company.*

Life Cycle Assessment (LCA) of Salmon Fisheries and Aquaculture, 2005 -2007, Halifax, NS (Master's Research)

*Collaborated with colleagues at Dalhousie University in Canada, Ecotrust Knowledge Systems in the U.S., and the Swedish Institute for Food and Biotechnology (SIK) to deliver phase 1 of this international study comparing the life cycle impacts of salmon fishing and aquaculture systems in the North-East Pacific. Analyzed and compared the potential environmental impacts of four (4) Canadian salmon aquaculture systems using life cycle assessment, and helped develop the life cycle framework and life cycle inventory for a number of salmon fishing systems. Scoped and conducted a full LCA for each aquaculture system, and researched various methodological aspects of LCA and the ISO standards for LCA. Conducted literature reviews, primary research, constructed research reports and peer-reviewed journal articles, and presented results in a number of academic, government, and public forums. Details in italics, in grey.*

## PUBLICATIONS

Ayer, N., Tyedmers, P. Assessing Alternative Aquaculture Technologies: Life Cycle Assessment of Salmonid Culture Systems in Canada. *Journal of Cleaner Production* 17(3): 362-373. 2009.

Ayer, N., Cote, R. P., Tyedmers, P.H., Willison, J.H.M. Sustainability of seafood production and consumption: an introduction to the special issue. *Journal of Cleaner Production* 17(3): 321-324. 2009.

Ayer, N., Tyedmers, P., Pelletier, N., Sonesson, U., Scholz, A. Co-Product Allocation in Life Cycle

Assessments of Seafood Production Systems: Review of Problems and Strategies. Int J of LCA: 12(7), 480-487. 2007.

\*Selected as Best Methodological Contribution at the conference.

Pelletier, N., Ayer, N., Tyedmers, P., Kruse, S.A., Flysjo, A., Robillard, G., Ziegler, F., Scholz, A.J., Sonesson, U. Impact Categories for Life Cycle Assessment Research of Seafood Production Systems: Review and Prospectus. Int J of LCA: 12(6), 414-421. 2007.

Tyedmers, P., Pelletier, N., Ayer, N. Biophysical Sustainability and Approaches to Marine Aquaculture Development Policy in the United States. A Report to the Marine Aquaculture Task Force. School for Resource and Environmental Studies, Dalhousie University. 2007.

Ayer, N. Less Bad: Raising fish on land is not the eco-panacea some would have us believe. Alternatives, 32(3), p31. 2006.

## PAPERS PRESENTED

Canadian Society for Ecological Economics (CANSEE) 7th Biennial Conference, July 27, 2007, Halifax, NS. Presented the paper "Assessing Alternative Aquaculture Technologies: Life Cycle Assessment of Salmonid Culture Systems in Canada".

Nova Scotia Department of Environment and Labour, February 15, 2007, Halifax, NS. Presented the paper "Assessing Alternative Aquaculture Technologies: Life Cycle Assessment of Salmonid Culture Systems in Canada" as well as lecturing on general Life Cycle Assessment methodology.

University of New Brunswick, January 17, 2007, Fredericton, NB. Presented the paper "Assessing Alternative Aquaculture Technologies: Life Cycle Assessment of Salmonid Culture Systems in Canada" as well as lecturing on general Life Cycle Assessment methodology.

Environment Canada, January 9, 2007, Dartmouth, NS. Presented the paper "Assessing Alternative Aquaculture Technologies: Life Cycle Assessment of Salmonid Culture Systems in Canada" as well as lecturing on general Life Cycle Assessment methodology.

InLCA/LCM 2006, October 4-6, 2006, Washington, D.C.. Presented the paper "Co-Product Allocation in Life Cycle Assessments of Seafood Production Systems: A Review of Allocation Problems and Applied Strategies".

Mary Jane Keefe, a project scientist and a Project Manager-in-Training with the Environmental Permitting and Planning team in Dartmouth Nova Scotia, has five years experience working in the environmental field. Before joining Jacques Whitford, Ms. Keefe worked in Richmond, Virginia at a Site Design Engineering Firm conducting wetland delineations, Phase I and Phase II Environmental Site Assessments, stormwater management plans and stream assessments. Since joining Jacques Whitford, Ms. Keefe has played a key role on many large scale Environmental Assessments both at the federal and provincial level. Most recently Ms. Keefe worked on the Sydport Harbour Access Channel Deepening and the Proposed Sydport Container Terminal EA. In addition, she has coordinated, authored and reviewed sections of Natural Resource Management Plans and Training Area Management Plan prepared for three sites in Newfoundland and three sites Nova Scotia. Ms. Keefe has also completed smaller scale EAs and Environmental Protection Plans for private and public clients. Ms. Keefe is committed to working with the Jacques Whitford team to deliver professional results for the services requested.

## EDUCATION

Bachelor of Science, Environmental Science, Mount Allison University, Sackville, NB, 2002

Workplace Hazardous Materials Information System (WHMIS), 2007

## PROJECT EXPERIENCE

Preliminary Wetland Delineations completed in Chesterfield County, Virginia for various private and public clients.

Virginia Storm water Management Plans for private and public clients throughout Virginia.

Storm water Quality Testing During Construction Activities, Ashburn Golf Club, Halifax, Nova Scotia (November 2007)

Phase I Environmental Site Assessment of MediaView Blue Cross Office Building, Dartmouth, Nova Scotia (October 2007)

Phase I Environmental Site Assessment of 20 Titus Street, Halifax, Nova Scotia (October 2007).

Phase I Environmental Site Assessment of 1 Let bridge Road, Happy Valley-Goose Bay, Newfoundland and Labrador (November 2007).

Phase I and II Environmental Site Assessment of Moirés Chocolate Plant, Dartmouth, Nova Scotia (October/November 2007).

Phase II Environmental Site Assessment Eason's Transport, Kernville, Nova Scotia (October/November 2007).

Phase II Environmental Site Assessment CREIT Management 99 Wyse Road, Dartmouth, Nova Scotia (November 2007).

Phase I/II Environmental Site Assessments completed throughout Virginia and North Carolina for various private and public clients.

Natural Resources Management Plans (NRMPS), Cambria Rifle Range, Emerald Vale Training Area and Parkers Pond Training Area (January 2008)

EA Guidance Document for Routine Projects on Selected MARLANT properties (January 2008).

Integrated Pest Management Plan, CFB Halifax. (March 2008)

Range Training Area Management Plans (RTAMPS), Cambria Rifle Range, Emerald Vale Training Area and Parkers Pond Training Area (March 2008).

Halifax International Airport Voluntary CEAA Screening (October 2008).

Sydport Harbour Access Channel Deepening and the Proposed Sydport Container Terminal Environmental Assessment (in Draft December 2008).

Digby Wind Energy Project Environmental Assessment (in progress January 2009).

Beaver Mountain Wind Energy Project Environmental Assessment (in progress 2009).

Julianne Sullivan, an aquatic ecologist and project scientist, has several years experience working in various areas of the aquatics field including freshwater and marine ecosystems. Her areas of expertise include aquatic ecology, ichthyology, habitat studies, and watershed monitoring/inventories. She has worked for provincial and federal levels of government, in academics, with private industry and community groups, and as an educator. In her various roles as project lead, teacher, and scientist, she has focused on strong communication and attention to detail. Ms. Sullivan has been involved in public and stakeholder consultation (including interviews) for a variety of aquatic-environment projects including those related to aquatic species-at-risk studies as well as pipeline and highway construction aquatic habitat impact assessments. Her work has involved desk-top studies, lab and field based fish identification, and field investigations, including assessments on a wide range of aquatic habitat environments. She is technically proficient and focuses on accurate, efficient data collection, presentation and interpretation. Ms. Sullivan is committed to working with the Jacques Whitford team to deliver professional results for the services requested.

## EDUCATION

Master of Science, Aquatic Ecology, University of Toronto, Toronto, Ontario, 2003

Bachelor of Science (Honours), Biology, Mount Allison University, Sackville, New Brunswick, 2000

*Technical:*  
Certified Environmental Practitioner in Training (CEPIT).

Backpack Electrofishing Certificate Course, University of New Brunswick, 2007 (including First Aid-CPR)

Toastmasters, 2007 - present

Identification of Ontario Fishes, Royal Ontario Museum, 2002

## PROJECT EXPERIENCE

Conducted field survey data collection, including water quality and fish sampling for multiple Halifax Regional Municipality (HRM) monitoring programmes (including multi-year studies) in lakes throughout the HRM.

Conducted ocean-based water quality sampling for repeat monitoring of the Halifax Harbour.

Assessed and identified a historical collection of preserved fish, data and records as part of a collaboration between the Department of Fisheries and Oceans (DFO) and the Royal Ontario Museum (ROM) for a Species-At-Risk project.

Reviewed, researched and wrote biological component of socio-economic impact assessment reports for the proposed listing of various species under SARA.

Teaching assistant, laboratory demonstrator, science instructor: effectively communicated a broad range of scientific ideas in a stimulating environment.

Lead on-site crews for fish removals associated with pipeline and road construction (including electrofishing, site monitoring, and netting).

Provided technical and permitting environmental support for large municipal project to update a trunk sewer; project includes coordination of multiple provincial and federal approvals and attention to the interests of several public and not-for-profit groups.

Researched, developed, implemented and tested novel habitat quantification method for littoral zone fish and habitat assessment.

Assessed stream environments throughout Nova Scotia to establish baseline conditions, make watercourse determinations, and collect data for monitoring programmes (including water, fish, invertebrate and habitat sampling); often related to impacts from development.

Completed watercourse crossing assessments and a desktop review of the fish community for the Highway 101 Phase 4 Environmental Assessment Aquatic VEC (Valued Environment Component).

Modeled phosphorus loading potential of a lake (planned for flooding) as part of the Keltic Petrochemical Facility Project (Provincial Environmental Assessment approval conditions).

Facilitated Environmental Effects Monitoring (EEM) field data collection for multiple pulp and paper sites and mining sites, including fish population and health surveys, benthic, sediment and water sampling (marine and freshwater).

Lucie Kendell has been a GIS Specialist with Jacques Whitford Limited in Dartmouth NS since June of 2005. Her responsibilities include GIS Analysis, Cartography, Database Construction, and Data Management. Prior to Jacques Whitford, Lucie worked as an offshore navigator and has specific experience in ice scour mapping, interpretation, and database development for northern environments. She has over six years of industry experience and has been working with GIS software for eight years.

## EDUCATION

Advanced Diploma in Marine Geomatics (Honours),  
Centre of Geographic Sciences, Lawrencetown, NS  
2002

Bachelor of Arts, Major Geography; Minor Canadian  
Studies, (Graduated on the Dean's List), Mount Allison  
University, Sackville, New Brunswick, 2001

## AWARDS

Lucie has been awarded appreciation awards for her  
outstanding support at the Techsploration Alumnae  
Young Women's Conference (NSCC, Dartmouth, NS  
2003 & 2005), and at the Skills Energy Youth Quest  
(COGS, Lawrencetown, NS 2003).

In 2001, Lucie was awarded the CN Scholarship for  
Women for excellence in pursuing a non-traditional  
career path at Nova Scotia Community College.

In 2001, Lucie was awarded the Greco Scholarship  
Award for outstanding school and workplace proficiency,  
Sackville, NB.

In 2001, Lucie was awarded the David Blackwood Prize  
for her outstanding ability to combine scholarly  
excellence with a strong commitment to the support of  
student activities, Mt. Allison University, Sackville, NB.

In 2001, Lucie was awarded the Geography  
Departmental Award for her contribution and  
achievement during her years of study at Mt. Allison  
University, Sackville, NB.

## PROJECT EXPERIENCE

### GIS Data Management/Environmental Analysis

Viewshed Analysis and 3D Rendering, 2008, Sydney,  
NS (3D Modeling, Cartography, Reporting)

*Compilation of proposed port infrastructure for viewshed  
analysis of surrounding area. Design of 3D rendering  
and photo montages for land use analysis.*

Geodatabase Hazard Assessment, 2008, Canadian  
Beaufort Sea/Greenland's Disko Bay/Orphan Basin  
(Data Compilation, Geodatabase Design/Construction,  
Cartography, Reporting)

*Compilation of geologic, geophysical, and  
environmental datasets for three offshore lease blocks;  
Beaufort Sea, Orphan Basin, and Disko Bay;  
Geodatabase development for application in site hazard  
assessment.*

Geodatabase for MARLANT GIS Data, 2006,  
Newfoundland/Nova Scotia (Geodatabase Construction,  
Metadata, Reporting)

*Compilation of geographic datasets for nearly fifty  
DND/DCC Sites located across the Maritime Provinces  
into three Geodatabases (topography, environmental  
thematic mapping, and aerial photography) with  
associated metadata and an explanative user guide.*

Salt Management Plan – Vulnerable Area Mapping,  
2005, Halifax, NS (Model Testing, Reporting,  
Presentation)

*Instructions to guide users through a GIS model  
developed by Jacques Whitford to identify and rank  
areas potentially vulnerable to road salt, in accordance  
with Environment Canada's Code of Practice for the  
Environmental Management of Road Salts (2004).*

\*Offshore Unexploded Ordinance Assessment, 2005,  
Newfoundland/Nova Scotia (Data Acquisition, GIS  
Cartography, Reporting)

*Offshore investigation of reported unexploded ordinance  
sites and GIS database compilation of all resultant data  
sets.*

\*Beaufort Sea Repetitive Ice Scour Mapping Programs,  
2004/2003/2001, Canadian Beaufort Sea (Data  
Acquisition, Interpretation, GIS Cartography, Statistics,  
Reporting)

*Analysis of new offshore ice scouring along repetitive survey lines, regional geologic assessment, sediment transport at artificial island sites.*

### Corridor/Constraint Mapping

Pipeline Route Land Classification Mapping, 2006/07, St. John's, NL (Data Acquisition and Analysis, GIS Cartography)  
*Ecological land classification mapping using satellite imagery for proposed transmission line route (Labrador).*

Gas Pipeline Routing and Constraint Mapping, 2005/06, Ontario & Quebec (Data Acquisition and Analysis, GIS Cartography)  
*Environmental constraint mapping for proposed and/or existing pipeline routes.*

\*Gros Cacouna LNG Terminal Project, 2004, Quebec, (2D Depth to Bedrock Profiles, Cartography, Reporting)  
*Bathymetry and geophysical investigation of proposed LNG terminal location.*

\*Sakhalin Pipeline Ice Scour Project, 2003, Sea of Okhotsk, Russia (Data Acquisition, Interpretation, GIS Cartography, Statistics, Reporting)  
*Offshore geophysical investigation and GIS mapping of ice scour events within proposed pipeline corridors.*

\*Boat Harbour Project, 2002, Dartmouth, NS (Data Acquisition, Cartography)  
*Bathymetry mapping of proposed pipeline corridor.*

\*Deep Lake Water Cooling Project, 2002, Lake Ontario, ON (Data Acquisition, Cartography, Reporting)  
*Offshore hazard investigation of proposed pipeline corridor.*

### SOFTWARE SKILLS

GIS, Drafting, Data Processing – ESRI ArcGIS ArcMap 9.x, ESRI ArcView 3.x, AutoCAD 2007/Map, CARIS 4.4a, Surfer v8, CARIS HIPS v5.3, CODA Playback

Graphics – CorelDRAW v10

Database, Statistics – MS Visual Fox Pro, Grapher v4

Navigation – HyPack Max v2.12a, CODA

### EQUIPMENT EXPERIENCE

Navigation – GPS (CSI DGPS Max, CSI DGPS Pro, Assorted Trimble Products)

Marine Surveying – Sidescan Sonar Towfish and Recorder (Klein 100/500kHz, Klein 595, Coda DA100/DA50); Echosounder (Odom EchoTrac, Knudsen, Elac); Sonardyne USBL; SG Brown Gyrocompass; TSS Motion Sensor; Topcon Total Station/Level, Marine Magnetism Magnetometer

Sampling – AML Sound Velocimeter; Coastal Ocean CTD; Coastal Ocean Turbidity Meter; VanVeen and Shipek Sediment Grab Samplers; Kammerer and Niskin Water Samplers

### ADDITIONAL TRAINING

ArcPAD Workshop – ESRI Canada, 2008

AutoCAD 2007 Essentials Course – CAD/CAM Systems, 2006

Safety Oriented First Aid – St. John's Ambulance, 2006

Learning to Use the Geodatabase – ESRI Canada, 2005

Pleasure Craft Operator Card – FNCC, 2003

PADI Open Water Diver Certification – Torpedo Rays Scuba, 2003

Marine Emergency Duties (MED) A1 – NS Nautical Institute, 2002

Trimble GPS Certification – COGS, 2001

WHMIS & OHS – COGS, 2001; WHMIS Refresher, 2005

---

Chris Shupe, Geomatics/Remote Sensing Analyst with Jacques Whitford Limited in Dartmouth, NS, is responsible for preparation, interpretation and analysis of satellite and air photo data to support various disciplines in preparing environmental assessments. He performs land cover identification and land use and disturbance classification to identify the impact of disturbances on the landscape. Before coming to Dartmouth, Chris held the role of senior analyst within Calgary's Geomatics department. As such, he has played a key role in the project planning, spatial analysis and mapping on key projects including Imperial Oil's Mackenzie Gas pipeline, Cold Lake and Kearl Lake SAGD projects and Altalink's Heartland 500kV transmission line project. With over 6 years of experience working in Alberta's Oil and Gas sector and with his strong background and education in both cartography and remote sensing, Chris has also played a significant role in the development and implementation of the company's cartographic/graphic and quality control standards.

## EDUCATION

Adv Diploma, Remote Sensing, Centre of Geographic Sciences (COGS)  
Lawrencetown, Nova Scotia 2003

Cartography, Digital Mapping, Centre of Geographic Sciences (COGS)  
Lawrencetown, Nova Scotia, 2001

Technical Photography, Algonquin College of Science and Technology  
Ottawa, Ontario 1995

## PROJECT EXPERIENCE

### **GIS Analyst/Data Management (Environmental, Energy, Traditional Knowledge) (e.g. Sector, Service Type, etc.)**

Mackenzie Gas Project Biophysical Baseline and Environmental Impact Assessment. Imperial Oil Resources Ventures Limited, Northwest Territories, Port Colborne Natural Environment and Human Health Risk Assessments, 2001-2005

Noel Major (Sweet and Sour) Gas Project Terrain and EIA Studies. BP Canada, Dawson Creek, British Columbia, 2006-2007

Kearl Oil Sands Project Environmental Impact Assessment. Imperial Oil Resources Ventures Limited, Fort McMurray, Alberta, 2004-2007

Scotford Upgrader Baseline Study and Environmental Impact Assessment. Shell Canada Limited, Fort Saskatchewan, Alberta, 2005-2007

Proposed Heartland 500Kv Transmission Project. Altalink/EPCOR, Edmonton, Alberta, 2007

Heartland Upgrader Baseline Study and Environmental Impact Assessment. Value Creation, BA Energy Inc., Fort Saskatchewan, Alberta, 2004

Shell Caroline Wildlife Survey and Environmental Management Plan. Shell Canada Limited, Caroline, Alberta, 2004

Bay of Fundy Strategic Environmental Impact Assessment, Offshore Energy Environmental Research Association, Nova Scotia, Canada - 2007

Highway 101 Twinning, Nova Scotia Department of Transportation and Infrastructure Renewal, Windsor, Nova Scotia - 2007

Lower Churchill HVDC ELC Classification. Newfoundland Hydro, Newfoundland and Labrador, 2007 - 2008

### **Dr. Ian A. McLaren, M.Sc., Ph.D.**

Dr. Ian A. McLaren, M.Sc., Ph.D., is a Professor Emeritus in the Department of Biology at Dalhousie University, where he has a broad interests in natural history, has done extensive research and writing on birds, and recently assisted with statistical analyses of potential impacts of wind turbines on birds. He has an extensive history of scientific involvement on potential impacts of the oil and gas industry and other developments in the Atlantic region including as scientific advisor to federal and/or provincial panels reviewing environmental assessments of the Confederation Bridge, and the Venture, Hibernia and Cohasset/Panuke projects. He was an expert witness for the Sable Offshore Energy Project before the Joint Federal/Provincial Panel and member of the Sable Environmental Effects Monitoring Advisory Group. Dr. McLaren has provided statistical analysis on bird surveys for various wind farms in Nova Scotia, including a proposed wind farm in Digby (Cullodon) and another in Antigonish (Glen Dhu). Dr. McLaren is a past President of the Canadian Nature Federation, Nova Scotia Nature Trust and past Chair of the Sable Island Preservation Trust.

### **Carl Haycock**

Mr. Haycock is a long time resident of Westport, Nova Scotia. A fisherman by trade and naturalist by interest, Mr. Haycock is well known as an experienced whale watching and birding guide in the Digby Area. Mr. Haycock was the founder of Brier Island Ocean Studies and established the first whale-watching enterprise there. Mr. Haycock is a member of the Nova Scotia Bird Society and is well respected within the birding community.