

Planning Solutions Inc.

Planning Solutions Inc. is an Ajax, Ontario based firm offering stakeholder engagement, planning and resource management services. Planning Solutions Inc. (PSI) is recognized for its ability to leverage social capital at the community level and for producing documents that reflect consensus perspective. Karen Wianecki, Director of Practice, is a Registered Professional Planner and Member in good standing with both the Canadian Institute of Planners and the Ontario Professional Planners Institute. She is a qualified mediator and professional facilitator who specializes in stakeholder engagement. Planning Solutions Inc. has been providing professional planning expertise to public and private sector clients since 2000. PSI believes in providing a customized approach to address the needs of individual clients and promotes a whole team approach to project management. As a former provincial planner responsible for approving Official Plans and Zoning By-laws on behalf of the Province, and as the former Municipal Plan Input & Review Coordinator for the Ministry of Natural Resources, Karen has a broad base of experience in municipal, provincial and resource management policy development and implementation.

PSI's key strength is an ability to develop strong collaborative processes and partnerships. Karen Wianecki, Director of Practice is a seasoned facilitator, mediator, expert communicator, professional planner who has worked with many communities to develop plans for the future while honouring the diverse and at times diverging perspectives of participants. As a leader in collaborative process and co-creative planning, PSI has partnered with public agencies and communities. PSI works collaboratively with communities - municipalities, government, private sector, First Nations and citizens to develop policies, plans and programs by advancing effective and successful civic engagement in public sector decision-making processes. A Company Profile has been included in Appendix B.

Some of our most recent and particularly relevant projects include the following:

Recent & Relevant Experience	
Karen Wianecki	<ul style="list-style-type: none">• Currently working with Baird Engineering and Dr. Larry Hildebrand to develop a Nearshore Framework for the Great Lakes. Under contract to Environment Canada.• Facilitated hundreds of community meetings.• Designed multiple community and stakeholder engagement processes, working with upper levels of government, municipalities and Conservation Authorities across Ontario.• Developed Strategic Plans for KRCA, GRCA, Grand River CA, NVCA, LPRCA.• Currently developing Strategic Plans for CLOCA and LSRCA.• Developed watershed planning and regulation policy manuals for CVC, KRCA and ORCA.• Facilitated workshops for MNR to address coastal process and climate change in the Great Lakes.



Karen Wiancki, M.Pl., MCIP, RPP

EDUCATION

MASTER OF URBAN AND REGIONAL PLANNING

Queen's University, Kingston, Ontario 1985

HONOURS BACHELOR OF ARTS (SPECIALIST) DEGREE, GEOGRAPHY

University of Toronto, Scarborough, Ontario 1981

PROFESSIONAL AFFILIATIONS

Canadian Institute of Planners, Full Member

Ontario Professional Planners Institute, Full Member

Ontario Bar Association, ADR Sector Member

Ontario Waterpower Association, Member

National Association for Dialogue & Deliberation

National Roster & Native Sub-Roster, U.S. Institute for Environmental Conflict Resolution, Tucson Arizona, Roster Mediator

PROFESSIONAL EXPERIENCE

DIRECTOR OF PRACTICE, Planning Solutions Inc.

Founder and Director of Practice of Planning Solutions Inc., a professional consulting firm specializing in multi-party stakeholder engagement and conflict resolution, complex project management and resource-based planning. Service offering and clients are outlined below:

Public Consultation & Stakeholder Engagement: Applying Systems Thinking to Stakeholder Engagement

Stakeholder Engagement Strategy Development & Training

- Northern Ontario School of Medicine. Stakeholder Engagement Strategy. 2014.
- Environment Canada. Toward A Nearshore Framework for the Canadian Portion of the Great Lakes. Stakeholder Engagement Strategy. 2013.
- City of Toronto. Moore Park Ravine Private Property Owners Engagement Project. 2013/2014.
- Infrastructure Ontario. Muskoka Regional Centre Opportunity Study. Community Engagement Strategy. 2013.
- Ministry of Aboriginal Affairs. Negotiations & Reconciliation Division. October 2011.
- Ontario Waterpower Association. May 2011.
- Ontario Ministry of Natural Resources, Species at Risk Branch. April 2011.
- Nottawasaga Valley Conservation Authority. 2010.
- Ontario Public Service. 2009.

Federal Government:

- Environment Canada. Advancing a Canadian Nearshore Framework for the Great Lakes. A Collaborative Initiative with Baird & Associates and Dr. Larry Hildebrand, 2013/2014.
- Environment Canada. Development of a Project Charter & Project Plan for an Integrated Nearshore Assessment & Management Framework. 2012/2013.
- Fisheries & Oceans Canada. Aligning & Harmonizing Federal & Provincial EA Regulatory Policy, Procedures & Process. Inter-Agency & Intergovernmental Workshop. January 2012.
- Fisheries & Oceans Canada. Developing a New Business Agreement with the Saugeen Ojibway Nation. 2012.
- Parks Canada. Developing a Business/Governance Agreement with the Saugeen Ojibway Nation. In Development. 2012, 2013.

Provincial Government:

- Infrastructure Ontario. Muskoka Regional Centre. Opportunities Assessment & Optimal Use Study. Community Engagement and Outreach. MHBC Planning Lead. 2013/2014. (Ongoing)
- Hydro One. Clarington Transformer Station. Community Consultation & Public Information Centre. 2012.
- Ontario Ministry of Natural Resources:
 - Lake Simcoe Stewardship Network. Facilitation. 2013, 2014.
 - Endangered Species Act Minister's Advisory Panel. Facilitation. 2013.
 - Provincial Stakeholder Consultations – Polar Bear & Lake Sturgeon. February – March 2012.
 - Biodiversity & Climate Change – A Series of MNR Workshops. March – April 2012.
 - Climate Change Vulnerability Assessment & Adaptation Options for the Northeast Clay Belt. January 2012.
 - Stakeholder Consultation – Habitat Regulations for 7 Species (Bent Spike-rush; Common Five-lined Skink, Eastern Foxsnake (Carolinian & Georgian Bay populations), Gray Ratsnake (Carolinian & Frontenac Axis population) & Rapids Clubtail. January 2012.
 - Bobolink Working Group – Action Planning Session. December 2011.
 - Proposed Habitat Regulations & Development Guidance Document. Workshop Facilitation with the Development Industry. March 2011.
 - Stakeholder Consultations. Caribou Conservation Plan. & Habitat Regulations. 2008, 2009, 2011.
 - State of the Aggregate Resource in Ontario, Advisory Committee & Technical Expert Panels. 2009.
 - Species At Risk Program Advisory Committee Inaugural Meeting. 2008.
 - Lakes & Rivers Improvement Act Technical Advisory Committee Facilitation. 2006 – 2009.
 - Great Lakes Charter Annex Advisory Panel Facilitation.
 - Great Lakes Charter Annex Intra-Basin Transfer Facilitation.
 - Renewable Energy Education Advisory Committee.
- Saskatchewan Industry & Resources. Intergovernmental Working Group on Mining Efficiency & Effectiveness.

First Nations: Respecting Aboriginal Way of Life

- Northeast Superior Regional Chiefs' Forum. Comprehensive, Collaborative and Co-Creative Community Planning. 2013.
- Eagle's Earth Cree & Ojibway Historical Centre, Hearst, Ontario. Economic Opportunities Study. First Nations Engagement & Facilitation. Undertaken with Malone Given Parsons. 2009.
- Facilitated the Aboriginal Traditional Knowledge Focus Group for the Ontario Ministry of Natural Resources designed to develop a Statement of Aboriginal Perspectives on the Use & Application of Way of Life Knowledge in Resource Management Decision Making.
- Facilitated the Aboriginal Traditional Knowledge Focus Group responsible for providing direction and guidance to Ontario Parks on the updated Provincial Parks & Protected Areas Planning Manual.

Municipal & Regional Government: Creating a Sense of Ownership - Engaging Communities & Community Members.

- Oak Ridges Moraine Foundation Board of Directors. Provincial Position on the 2015 Provincial Review of the Oak Ridges Moraine Conservation Plan. Facilitation. 2014.
- City of Burlington. Transportation Master Plan. A Project Undertaken with Cole Engineering Group Ltd. 2012.
- Ajax, Carruthers Creek Flood Mitigation Study (Class EA). Community Consultation. A Project Undertaken with Cole Engineering Group Ltd. 2010, 2011.
- Peterborough, Sanitary Sewer EA Mitigation. Stakeholder Consultation. A Project Undertaken with Cole Engineering Group Ltd. 2010, 2011.
- Regional Municipality of York:

- Transportation Services Division. Operationalizing the Transportation Master Plan. Staff Workshop. 2011.
- Transportation Services Division, Lands & Natural Heritage. Stakeholder Workshop to Advance the Greening Strategy. October 2011.
- Transportation Services Division. Context Sensitive Solutions. Internal Staff Workshop. October 2011.
- Transportation Services Division. South Yonge Street Corridor Master Plan. Undertaken with The EDA Collaborative Inc. 2011.
- Township of Georgian Bay:
 - Honey Harbour Master Plan – Civic Engagement Process Design & Facilitation. Undertaken with The EDA Collaborative Inc. 2010, 2011.
 - MacTier Master Plan – Civic Engagement Process Design & Facilitation. Undertaken with The EDA Collaborative Inc. 2010, 2011.
 - Port Severn Master Plan – Civic Engagement Process Design & Facilitation. Undertaken with The EDA Collaborative Inc and J.H. Stevens Planning Consultants. 2008, 2009.
- Township of East Garafraxa. Visioning Exercise. 2008.
- City of Hamilton. Windermere Basin Design Charette. Undertaken with Cole Engineering. 2008.
- Town of Whitby. Toward a Heritage Designation for Downtown Whitby. 2013.

Industry: Building Effective Partnerships

- Ontario Waterpower Association
 - Waterpower Summit: Bilateral Meeting of Industry & Government: Advancing Hydroelectric Power in Ontario. 2008.
 - Developing an Industry, Government & First Nations Hydropower Community of Practice. Inaugural Meeting. 2008.
- Canadian Dam Association. Strategic Plan & Business Plan Review. 2007.

Conservation Authorities: Promoting Productive Dialogue

- Conservation Ontario. Source Protection Planning Implementation Workshop Facilitation. March 2014. Ongoing.
- Conservation Ontario. Aligning for Excellence. Governance Options & Opportunities Project. 2013.
- Conservation Halton. Fisheries Management Plan – Community Advisory Committee Inaugural Workshop. Design & Facilitation. 2011.
- Credit Valley Conservation:
 - Sustainable Funding Project. 2011, 2012.
 - Planning Services Enhancement Project. 2011.
 - Towards A Natural Heritage System. Focused Dialogues With Stakeholders and Watershed Residents. 2009.
 - Development Review Policies Update. 2008, 2009.
 - Strategic Plan Review. 2008.
 - Black Creek Subwatershed Study. Inaugural Advisory Committee Meeting. 2008.
- Lake Simcoe Region Conservation Authority:
 - Source Water Protection Municipal Partners Workshop. 2012.
 - Source Water Protection for the South Georgian Bay Lake Simcoe Source Protection Region. Facilitation of the Policy & Planning Working Group. 2009, 2010, 2011, 2012.
 - Lake Simcoe Environmental Management Strategy (LSEMS) Governance Model. Facilitation of the LSEMS Working Group and Steering Committee. A Partnership between the LSRCA, MNR and MOE. 2007.
- South Georgian Bay Lake Simcoe Source Protection Region. Facilitation of Planning Working Group. Commenced: September 2009.

Resource Management & Municipal Planning: Balancing the Interests of Uses & Users

- City of Toronto, Moore Park Ravine - Private Ravine Property Owners Engagement Project. Developing Resource Materials & Engaging the Community. 2013/2014. Ongoing.
- Environment Canada. Lessons Learned Report on the Zero Discharge Demonstration Project. PSI is working with EC & the US Michigan Pollution Control Agency to Complete Key Informant Interviews & Review the Final Report. 2014. Ongoing.
- Grand River Conservation Authority. Water Management Plan. Steering Committee Facilitation. 2009.
- Kawartha Region Conservation Authority. Watershed Planning & Regulation Policies. 2010. 2011.
- Otonabee Region Conservation Authority. Watershed Planning & Regulation Policies Update. 2012.
- Ministry of the Environment:
 - Lake Simcoe Priority Stormwater Management Works. Lake Simcoe Protection Plan Workshop. 2011.
 - Lake Simcoe Climate Change Adaptation Strategy. Facilitation of Science Panel Meeting & Production of Report Used to inform the EBR Posting Submitted by MOE. 2011.
- Ministry of Natural Resources:
 - Development of the Alternative Dispute Resolution Process for Resource Stewardship Agreements, associated with Forest Management Planning in Ontario
 - MNR Negotiating Team Member, Extraction of Aggregate Below the Water Table on Prime Agricultural Lands (Position Negotiated with the Ministry of Agriculture & Food)
 - Municipal Plan Input & Review Coordinator.
 - Coordinated MNR Response to Ontario Hydro Demand/Supply Plan Hearings.
- Township of Georgian Bay:
 - Master Plan, MacTier. A Joint Venture with The EDA Collaborative. 2011.
 - Master Plan, Honey Harbour. 2011.
 - Master Plan. Port Severn. A Joint Venture with The EDA Collaborative. A Joint Venture with The EDA Collaborative. 2009/2010.
- York Region. South Yonge Street Corridor Master Plan. Completed with the EDA Collaborative Inc.

Fact Finding & Program Evaluation: Doing Things Right & Doing the Right Things.

- Credit Valley Conservation. Planning Program – Customer Service Enhancement Initiative. 2011.
- Durham Family Court Clinic. Program Evaluation. Interim Assessment of the Mediation & Information Services Provided to the Superior Court of Justice (Family Division), Durham Region.
- Environment Canada. Lessons Learned & Achievements Report of the \$30 Million Lake Simcoe Clean Up Fund. 2011.
- Ministry of Municipal Affairs & Housing. Program Evaluation Plan for Ontario's Land Use Planning Program. 2009.
- Ministry of Natural Resources:
 - Program Evaluation. Evaluation of Ontario's Water Resource Management Strategies & Flood Damages.
 - Assessment of Forest Management Plans in Ontario & the Recognition of Resource Based Tourism Values
- Nottawasaga Valley Conservation Authority – Planning Program Review. 2010.
- Saskatchewan Environment. Corporate Policy & Planning Realignment. 2008.

Report Writing: Providing Clarity & Guidance

- Association for Conflict Resolution. Co-Writer. The Native Dispute Resolution Network: A Bridge Between Native Peoples, Agencies and Other Interests in Environmental Conflicts. 2008.
- CEATI Technology Review Report. Prepared for CEA Technologies Inc. Hydropower Full Environmental Cost Accounting. Undertaken with MOBEC Engineering & P. Norris. 2007.
- CEATI Report. Hydroelectric Generation Water Resource Management Roadmap. Undertaken with MOBEC Engineering & P. Norris. 2006.

- Environment Canada. Lessons Learned & Achievements Report for the Lake Simcoe Clean-Up Fund. Spring 2011.
- Ontario Waterpower Association. Renew. “Splendid Isolation Is Out...Collaboration Is In.” October 2008.
- Saskatchewan Environment Forest Service. Provincial Standards for Road Construction & Stream Crossings. 2008. Undertaken with Water’s Edge, Merin Forest Management & FRI Ecological Services
- Editor, Lakes & Rivers Technical Guidelines Update. 2006-2009.

Strategic Planning: Embarking On The Path of Progress

- Northern Ontario School of Medicine. Updated Strategic Plan for 2015-2020. A Collaborative Effort with JD & Associates. 2014. (Ongoing)
- Canadian Dam Association. Strategic Plan & Business Plan Review. 2006.
- Centre for Excellence in Mining Innovation. Developing a Strategic Research & Development Framework for Sustainable Mines and Sustainable Mining.
- Conservation Ontario:
 - The Future of Water & Watershed Management. Effective Positioning of Ontario Conservation Authorities. 2012.
 - Strategic Visioning Workshop. 2009.
- Credit Valley Conservation Agency. Strategic Plan Review. 2007.
- Grand River Conservation Authority. Strategic Plan Review. 2008.
- Kawartha Region Conservation Authority. Strategic Plan Update. 2011.
- Lac La Ronge Indian Band Strategic Plan. 2006.
- Long Point Region Conservation Authority. Strategic Planning Retreat. September 2009.
- Ministry of the Environment. Draft Strategic Plan, 2008/09.
- Ministry of Municipal Affairs & Housing. Enhancing the Planning Services Delivery System from a Strategic vantage point.
- Ministry of Natural Resources. Species At Risk Strategic Visioning & Priority Setting Workshop. 2010.
- Nottawasaga Valley Conservation Authority. Strategic Plan Review. 2013.
- Northumberland County Domestic Violence Monitoring Committee. Critical Priority Setting & Governance Model Development. 2012.
- Nottawasaga Valley Conservation Authority. Strategic Plan.
- Ontario Waterpower Association:
 - Strategic Plan Update. Strengths, Challenges, Opportunities & Pressures Analysis Using Electronic Survey Data. Input to be utilized in the new OWA Strategic Plan. March 2012.

Environmental Mediation & Adjudication: Specializing in Multi-Party, Public Policy Disputes

- Ontario Energy Board. Union Gas 2011 Earnings Sharing & Disposition of Deferral Accounts and Other Balances Settlement Conference. 2012.
- Ministry of Natural Resources & Canadian Boreal Forest Agreement. Abitibi River Forest. Options to Address the Caribou Conservation Plan. 2012.
- Ministry of Natural Resources – Low Water Response Workshop. Mediation, Negotiation & Issues Management: A Primer. 2009.
- Saskatchewan Forest Service. Co-Mediator with Frank Handy, SFH Group – Multi-Party Stakeholder & First Nation Issue in North-Central Saskatchewan. 2008
- Staff Support to the Ontario Forest Industry & Resource-Based Tourism Sector, Resource Stewardship Agreements Memorandum of Understanding.
- Victim Offender Reconciliation Program. Community Mediator.

1999 – 2002 **PROJECT COORDINATOR** - Alternative Dispute Resolution Program, Forest Management Branch, Ministry of Natural Resources

1997 – 1999 **POLICY ADVISOR** - Lands & Waters Policy Branch, Ministry of Natural Resources, Toronto

- 1994 – 1995** **A/MANAGER, STRATEGIC PLANNING** - Corporate Policy & Planning Branch, Ministry of Natural Resources, Toronto
- 1990 – 1994** **POLICY OFFICER** - Corporate Policy & Planning Branch, Ministry of Natural Resources, Toronto
- 1987 – 1990** **PROGRAM COORDINATOR** - Plan Input & Review Program, Ministry of Natural Resources, Toronto
- 1987** **POLICY ADVISOR** - Ontario Buildings Branch, Ministry of Housing, Toronto
- 1986 – 1987** **PROJECT PLANNER** - Plans Administration Branch, Ministry of Municipal Affairs, Toronto
- 1983 – 1986** **COMMUNITY PLANNER** - Plans Administration Branch, Ministry of Municipal Affairs, Toronto

Aqua Solutions 5 Inc. (AQ5)



Mary Judith (Judy) Sullivan, (P. Eng.) has over 32 years of experience working across the province and offers a variety of professional engineering and project management services including: coastal engineering, coastal zone, shoreline management. Judy Sullivan, P. Eng. is the President of Aqua Solutions 5 Inc. and is a professional civil engineer with over thirty two years experience, bringing in a unique expertise in the fields of coastal, river and geotechnical engineering, adaptive integrated shoreline and watershed management, assessment, policy, technical guidelines and standards development. Ms. Sullivan has conducted numerous structural assessments for coastal structures and has been project manager for many shoreline construction projects over her 32 year career as a coastal engineer. She has been an expert witness in several litigation cases related to coastal engineering issues, Provincial Policy and CA Regulations. Ms. Sullivan is involved in projects which integrate the physical processes, engineering, planning, and environmental aspects of ecosystem management along coastal environments and watershed systems. She is involved various in multi-disciplinary team projects, integrating the natural hazard issues with planning, physical processes, environmental, social and economic aspects of project management.

Aqua Solutions 5 Inc.
Judy Sullivan, P. Eng.
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**COASTAL ENGINEERING, INTEGRATED
SHORELINE MANAGEMENT, POLICY &
TECHNICAL GUIDELINE DEVELOPMENT,
SHORELINE MUNICIPAL CLASS EA**

EDUCATION & MEMBERSHIPS

- Bachelor of Applied Science (Civil Engineering), Queen's University, Kingston, ON, 1983
- Professional Engineers Ontario (PEO), Member
- Canadian Coastal Science and Engineering Association (CCSEA), Board of Directors
- Coastal Zone Canada (CZC), Member
- Certified (NAUI) diver
- Newbury Hydraulics (March 2009) 2 day Stream Restoration Design Course by Bob Newbury

EMPLOYMENT HISTORY

- May 2009 – Present
Aqua Solutions 5 Inc., President
- 2008 – April 2009
Water's Edge Environmental Solutions Team Ltd. Senior Project Manager
- 2006 – 2008
The Jones Consulting Group,
Senior Project Engineer
- 2006
Ontario Ministry of Natural Resources (OMNR),
Source Water Protection, Senior Policy Advisor
- 1997 – 2006
Aqua Solutions, President
- 1992 – 1997
Ontario Ministry of Natural Resources (OMNR),
Coastal and River Engineer
- 1985 – 1992
Toronto & Region Conservation Authority
Coastal and River Engineer
- 1984
Public Works Canada & Canadian Coast Guard
Coastal Engineer
- 1983
Johnson Sustromk Weinstein + Associates,
Jr. Coastal Engineer

REFERENCES AVAILABLE UPON REQUEST

Ms. Sullivan has been an 'expert witness' for various litigation on shoreline issues related to the Provincial Policy Statement (PPS) and the CA's "Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses" legislation (Flooding, Erosion & Dynamic Beaches).

On behalf of the Ministry of Natural Resource (MNR) Ms. Sullivan developed and provided the Technical Shoreline Training (Flooding, Erosion & Dynamic Beaches) for the Great Lakes, Large Inland Lakes and St. Lawrence River to all of the Conservation Authorities Staff across the Province.

Ms. Sullivan was co-author with the MNR staff of the **OMNR Understanding the Hazards document: OMNR. (2001) . Understanding Natural Hazards. Great Lakes – St. Lawrence River System and large inland lakes, river and stream systems and hazardous site. An introductory guide for public health and safety policies 3.1 provincial policy statement. Published by Queen's Printer for Ontario. Copyright © 2001 The Queen's Printer for Ontario.**

The Provincial Natural Hazards Training Manual – 'Understanding the Hazards' included the following area requirements;

- Great Lakes - St. Lawrence River System (Flooding, Erosion & Dynamic Beach),
- Large Inland Lakes (Flooding, Erosion & Dynamic Beach),
- River and Stream Systems (Flooding & Erosion),
- 'Technical Guide for River and Stream Systems: Erosion Hazard',
- 'The Hazardous Sites Technical Guide',
- 'Stable Slopes - Geotechnical Principles' for the Province of Ontario',

Ms Sullivan worked as a team member (one of the authors) in the development of the PPS Section 3.1: Public Health and Safety Policy and the final production of the following technical documents:

OMNR (200) . Great Lakes — St. Lawrence River System and Large Inland Lakes Technical Guides for flooding, erosion and dynamic beaches in support of Natural Hazards Policies 3.1 of the Provincial Policy Statement (1997) of the Planning Act. Published by Watershed Science Centre, Copyright © 2001 The Queen's Printer for Ontario.

OMNR (2001). Dynamic Beach's for the Great Lakes – St. Lawrence River. Published by Watershed Science Centre, Copyright © 2001 The Queen's Printer for Ontario.

Ms. Sullivan was part of the team which developed and produced the technical guides. It was a multiyear project where coastal engineering processes were detailed and procedures



outlined on what the hazards were and the requirements on how to address the flooding, erosion and Dynamic Beach hazards could be considered. This involved research, identification of needs, criteria development and refinement of the policy and the supporting technical documentation for coastal shorelines. A procedure to ensure and promote the integration of a decision-making process between addressing the physical coastal hazards, while ensuring the protection and enhancement of the environment (aquatic and terrestrial) was developed. Currently the Municipalities, Townships, Regional and County governments use these Guidelines to carry out their PPS responsibilities, and the Conservation Authorities also use them to assist them in carrying out their new "Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses" Regulations throughout the province.

Coastal Engineering and Hazard Management Assessments (Flooding, Erosion and Dynamic Beach) for numerous private shoreline sites along the Great Lakes, Large and Small Inland Lakes (e.g., Lake Ontario, Lake Huron, Georgian Bay, Lake Erie, Lake Simcoe, etc.). Site and structure assessments, evaluations, reports, construction works inspection and management, recommendations on approaches to satisfy the various approval agencies (e.g. Federal Department of Fisheries and Oceans (DFO), Ontario Ministry of Natural Resources (MNR), Transport Canada (TC), local Conservation Authorities (CA), Municipalities & Townships) have been carried out. A variety of sites conditions involve coastal; erosion processes, flooding, dynamic beach, slope stability issues, design of shoreline structures, assessment of existing shoreline structures, dredging, docking and boathouse construction and approvals.

Ms. Sullivan carried out the Credit Valley Conservation (CVC) Shoreline Inspection and Inventory Assessment: Structural Assessment Version 1.2 Final Report (Nov 2014) as part of the CVC LOISS Assessment of Coastal Engineering Structures Report. Just over 6 km of the CVC shoreline was assessed; consisting of conducting field investigations and evaluations, shoreline characterization, maintenance and monitoring priorities. She developed an evaluation criteria and a ranking system, evaluating site conditions and characteristics of the shoreline and protection works was carried out. Priority sites were identified and ranked for {1-Risk of Damage, 2-Structre Failure, 3-Personal Safety, 4- Material Condition 5- Environmental Considerations). Recommendations for the future restoration/rehabilitation opportunities and future shoreline construction were also made.

Ms. Sullivan is currently conducting site inventory assessments of the shoreline characteristics, shoreline structure conditions, and erosion for 15 Islands along of shoreline of the St. Lawrence River. Ms. Sullivan also carried out a general assessment of the shoreline structures and erosion, along with a literature review on ship erosion.

Conducted evaluations of Shoreline Structures for The Town of Oakville in 2005-06 and again in 2011-12. The project consisted of conducting field investigations and evaluations, shoreline characterization, development of evaluation

criteria and ranking system, evaluation of current conditions and characteristics of the shoreline and protection works. Priority sites were identified which will need immediate protection works, potential recommendations for the shoreline construction and rehabilitation projects, which will meet the requirements of the various agencies. Project costs were estimated for the high priority sites that will need immediate attention. Development of an evaluation scale for Risk of Damage, Personal Safety, Material Condition, Material performance, and Environmental Factors was carried out. Based on the assessment of the conditions and the evaluation scale, the sites were prioritized outlining; immediate or potential construction/rehabilitation, and/or monitoring. The data was compiled into a GIS-based database containing the inventory as well as a summary of the existing conditions

Conducted numerous assessments of shoreline structures throughout the province; reviewed life expectancy of the structures, make recommendations for maintenance, repairs and/or reconstruction of structures. Associated liabilities (risk of Failure), risk management options and costing are routinely carried out throughout these assessments. Ms. Sullivan has been project manager for numerous shoreline construction projects over her 30 year career as a coastal engineer.

Ms. Sullivan provided assistance as the Adaptive Management Coordinator to the International Joint Commission (IJC) for the Upper Great Lakes Study. This involved review of various aspects of the Adaptive Management Technical Working Group (AMTWG) which focused on many aspects of the Upper Great Lakes Study; Elements of AM Strategy, Risk Evaluation & Plausibility analysis for future scenario's (e.g. climate change models, Stochastic, Paleo etc.), Coping Zones, Multi-lake Regulation, Governance & Institutional Analysis, Outreach, and AM Findings and Recommendations. She assisted the AMTWG in review of documentation to support the AM areas of study and compiled their findings and recommendations to the Study Board for the Outreach Section of the Study Board Report. She also provided assistance to the Coastal Technical Working Group, coping zone, monitoring and Performance Indicator reports.

Provided an initial coastal engineering assessment and recommendations for the development of a Master Plan for Lafontaine Beach Park on Lake Huron, in the Township of Tiny. As part of the multi-disciplinary design team; identify the Dynamic Beach hazards setback and assist the design team in prioritizing areas for the development of the waterfront plan while maintain the protection of the natural features of the park.

In conjunction with Coldwater Consulting Ltd. and NRSI Inc. the next phase of the project moved forward with the Class EA process for Lafontaine Park. Determination of the approval requirements, feasibility for the possible options and opportunities for improvement to the water quality and recreational swimming at the park was the main focus of the study. Ms. Sullivan is currently the Project Manager and conducting a Municipal Class EA project for this project. The public has been involved throughout the development of various Phases of the project.



Provided an initial coastal engineering assessment and recommendations for the development of a Master Plan for Lafontaine Beach Park on Lake Huron, in the Township of Tiny. As part of the multi-disciplinary design team; identify the Dynamic Beach hazards setback and assist the design team in prioritizing areas for the development of the waterfront plan while maintain the protection of the natural features of the park.

In conjunction with Coldwater Consulting Ltd. and NRSI Inc. the next phase of the project moved forward with the Class EA process for Lafontaine Park. Determination of the approval requirements, feasibility for the possible options and opportunities for improvement to the water quality and recreational swimming at the park was the main focus of the study. Ms. Sullivan is currently the Project Manager and conducting a Municipal Class EA project for this project. The public has been involved throughout the development of various Phases of the project.

Ms. Sullivan in conjunction with Coldwater Consulting Ltd., carried out a study for the MNR for Lake Ontario and The St. Lawrence River shorelines. The IJC study which recommended a new regulation plan (referred to as Plan 2007) and this was the basis for the MNR study. The proposed IJC approach was examined and the existing Ontario policy instruments, programs and their effectiveness along with the implications of a long-term monitoring and adaptive management program, the shoreline management and shoreline policy issues and how they affect the province of Ontario were reviewed.

The study also reviewed current shoreline practices and made further recommendations on possible approaches on how the Province can assist in addressing the IJC development of an adaptive management and monitoring program. The study included a review and identification of issues from policy/planning, science/research and integration/government perspectives and identified approaches which could be considered to support the future development of an integrated adaptive management and monitoring approach for Lake Ontario and The St. Lawrence River shorelines.

Ms. Sullivan provided coastal engineering peer review services for the proposal 'Review for Sediment Management & Dredging Strategy' in the Municipality of Port Hope. Ms Sullivan assisted the Ganaraska Region Conservation Authority (GRCA) engineering staff in the review and assessment of several coastal proposals for a project which was to assess the dredging issues along Port Hope Harbour.

Provided coastal engineering peer review services for the Maitland Valley Conservation Authority (MVCA) for a revetment design along the Lake Huron shoreline. An assessment of the project consisted of a review of the MVCA Regulation, Provincial Planning Policy and Technical Guides (review of the key aspects of addressing the hazards, the slope stability assessment, interpretation of the policy and resulting setbacks), which support the MVCA Regulation, along with the coastal aspects of the project. Ms. Sullivan provided recommendations to the MVCA on adherence to the technical requirements with respect to the Provincial Policy

Statement (PPS) documents and the design of the revetment structure which also support the Authority's shoreline regulation. She also has provided review for the revetment construction, site inspection, maintenance and continuing monitoring program.

Conducted a Coastal Flood Damage Study for Central Lake Ontario Conservation Authority (CLOCA) along the Port Darlington Shoreline. This study assessed shoreline characteristics, the type and degree of hazards (flooding, erosion, dynamic beach along Lake Ontario & Mouth of Creeks). An evaluation ranking system was developed; a field evaluation of current conditions and characteristics of the shoreline was also conducted. The high priority sections of the shoreline were identified, planning and policy recommendations were made on how to deal with these hazard sections along the shoreline. Existing development that is within the Hazardous areas were evaluated and recommendations were made following the Provincial Policy Technical Guidelines. Planning options were proposed on possible directions, which the Conservation Authority and Municipality could take for future and existing development proposals within the high priority hazard areas. Emergency evacuation routes were also recommended in accordance with Provincial Recommendations.

Provided coastal engineering assessment and recommendations for the; review, updating and redevelopment of the City of Orillia Waterfront Master Plan. Recommended repairs and the reconstruction of existing structures and possible future development sites. Reviewed and recommended docking and alternative boat launching facilities across the City waterfront park systems. As part of the multi-disciplinary team; prioritized areas for the development of the waterfront plan, identified areas in which traffic and public walkway where public safety was an issue, identified problems and recommended options to address the safety issues

Ms. Sullivan developed and provided the Technical Shoreline Training (Flooding, Erosion & Dynamic Beaches) for the Great Lakes, Large Inland Lakes and St. Lawrence River to all of the Conservation Authorities Staff across the Province on behalf of MNR (March 2011).

Presentations have been made at numerous public meetings, open houses, council meetings and training sessions (e.g., Canadian Coastal Science and Engineering Conference, International Natural Channel Conference, Guelph and Queen's University, Seneca College, International Polish delegation, engineering seminars, Conservation Authorities, Urban Development Industry, planning groups, Canadian Association of Montessori Teachers Conference, and a variety of local schools).

Topics on coastal, river and geotechnical engineering, watershed management strategies, and municipal, environmental, ecosystem planning, Class Environmental Assessments were designed and presented.

Speaker at the "Your Watersheds Our Great Lakes," A.D. Latornell Conservation Symposium. The session was entitled "Applications of the New Generic Shoreline Regulations" and discussed the issues related to the applications of slope stability, average annual recession rates, flooding, erosion and dynamic beach criteria along shorelines for the CA's Shoreline Regulations.



Robin G.D. Davidson-Arnott

CONTACTS

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POSITIONS HELD:

2009-	Professor Emeritus	Geography, University of Guelph
1992-93	Scientist	Ontario Ministry of Natural Resources (seconded)
1988-2009	Professor,	Geography, University of Guelph.
1980-88	Associate Professor,	Geography, University of Guelph.
1976-80	Assistant Professor,	Geography, University of Guelph.
1975-76	Assistant Professor,	Geography, University of Toronto (visiting)
1989 (and 4 subsequent occasions)	Acting Chair,	Geography, University of Guelph.

DEGREES:

B.A. Geography,	University of Toronto 1970.
M.A. Geography,	University of Toronto 1971.
Ph.D. Geography,	University of Toronto 1975.

CAREER INVOLVEMENT IN GRADUATE STUDENT SUPERVISION

MSc. Thesis	supervisor	35
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Doctoral Thesis	supervisor	6
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RESEARCH FUNDING RECEIVED

My research until retirement was funded through grants from the Natural Sciences and Engineering Research Council of Canada (Discovery grants; Special Opportunities Research grant and Equipment grants); Parks Canada, and in 2011 as a Co-investigator on a National Science Foundation (USA) research grant (D. Sherman and J. Ellis Principal Investigators).

CONSULTING AND ADVISORY ACTIVITIES

While I am gradually winding down my research following retirement in 2009, I continue to be active as a consultant and advisor to various government organisations as well as working with groups and individual property owners in the Great Lakes and east coast of Canada on issues related to coastal erosion, coastal management and the effects of climate change.

Recent and relevant activities include:

Consultant to the Ausable Bayfield Conservation Authority on updating their Shoreline Management Plan, 2015-2016. (with Judy Sullivan, Coastal Engineer, Aqua Solutions; Karen Wianeki, Facilitator and Moderator, Planning Solutions Inc.; and Ryan Mulligan, Coastal Engineer, Queens University, Ontario – my primary role was to advise on dynamic beach and dune systems, erosion of cohesive bluff shorelines and determination of long-term recession rates for incorporation in setbacks for new development. Shoreline Management Plan, Consultant Recommendation Report, Ausable Bayfield Conservation Authority, August 2016. 126pp. + 5 appendices.

Consultant to Parks Canada, PEI National Park, July-September, 2016. Locating a new Dune Crossing Structure at Cavendish's Main Beach: Geomorphic Considerations. 7 pages (with Dr. Jeff Ollerhead, Mount Allison University).

Consultant to Regional Municipality of Halton, City of Burlington and Halton Conservation, 2014-2015 to develop a new Master Plan, Environmental Monitoring and Restoration Plan, Implementation Plan and Communication Strategy for the Burlington Beach Regional Waterfront Park. (with Brook McIlroy Landscape Architects, in association with: SENES/Arcadis, Cole Engineering Group Ltd – my primary role was as the beach/dune expert working with SENES).

Advisor to Long Point Provincial Park on coastal dune restoration Fall, 2014 – replanting of marram and development of a virtual fence system to guide access to the beach

Consultant to Parks Canada, PEI National Park – remediation of beach and dune resources, Cavendish Beach, June, 2014 – development of a virtual fence system, improved walkway access to the beach and replanting of marram.

Consultant to the Geological Survey of Colombia at their First International Technical Workshop on the Marine Geology and Coastal Engineering of the Caribbean Coast of Colombia, November 13-16, 2013. Presented 4 lectures on: Dynamics of Sand and Gravel Beaches; Dynamics of Coastal Sand Dunes; Dynamics of Sand and Gravel Barriers; Shoreline Management Planning – the Ontario Experience.

Advisor to the Lake Huron Centre for Coastal Conservation –

Advisor to the Long Point Conservation Authority on Coastal Processes 2012-

Advisor to Credit Valley Conservation Authority on the development of their Lake Ontario Integrated Shoreline Strategy (LOISS) - 2012-

Consultant to Parks Canada, PEI National Park - development of a Coastal Dune Integrity Measure for Ecological Monitoring. - January, 2012.

Consultant to Parks Canada, PEI National Park on strategies for redesigning dune crossings and beach access boardwalks in the face of sea level rise and coastal erosion - Spring, 2011

Coastal Erosion Issues - a review in support of the Atlantic Provinces Regional Adaptation Collaboration. Report prepared (with Dr. J. Ollerhead, Mount Allison University) for Prince Edward Island Department of Natural Resources and Forestry, 45 pages, March, 2011

Expert witness Ontario Municipal Board Hearing into the potential impact of a proposed condominium development at Crystal Beach, Fort Erie, Canada - Fall, 2010

Canadian Member Coastal Zone Technical Working Group of the International Joint Commission's International Upper Great Lakes Study, 2008-2011.

Member of consulting committee for evaluation of proposed strategies for addressing erosion of Gibraltar Point, Toronto Island (Toronto Region Conservation Authority), 2010-2011.

Peer review of development proposal, Lake Huron (Maitland Valley Conservation Authority), November 2006-June 2009 (with J. Sullivan, Aqua Solutions).

Shoreline mapping and recession rates based on historical aerial photography 1956-2005, Prince Edward Island National Park. Parks Canada, 2006

Shoreline mapping Burloak Park, Lake Ontario. Halton Region Conservation Authority, 2005.

Development of Shoreline Management Policy and Technical Guidelines for Ontario Great Lakes (Ontario Ministry of Natural Resources - 1992-1995. Seconded to Ministry 1992-93)

International Joint Commission (Canada/USA) Great Lakes Water Levels Reference Study Phase 1, 1987-89. Environmental Features, Processes and Impacts. (Environment Canada). Member Technical Working Group

PUBLICATIONS

Books and Chapters in Books

Davidson-Arnott, R.G.D., 2013. Nearshore Bars. In: John F. Shroder (ed.) Treatise on Geomorphology, Volume 10, pp.130-148. San Diego: Academic Press.

Davidson-Arnott, R.G.D., 2011. Wave-dominated Coasts. Chapter 5 in Treatise on Estuaries. Elsevier Scientific, October, 2011.

- Davidson-Arnott, R.G.D., 2010. Introduction to Coastal Processes and Geomorphology. Cambridge University Press, Cambridge, England. 442pp.
- Reed, D.J, Davidson-Arnott, R and Perillo, G.M.E., 2009. Estuaries, coastal marshes, tidal flats and coastal dunes. In, Slaymaker, O., Spencer, T. and Embleton-Hamann, C. (eds) Geomorphology and Global Environmental Change. Cambridge: Cambridge, University Press, 130-157.
- Ollerhead, J., Davidson-Arnott, R.G.D. and Scott, A., 2005. Cycles of saltmarsh extension and contraction, Cumberland Basin, Bay of Fundy, Canada. In, Sanjaume, Eulalia and Mateu, Joan F. (editors), Geomorphologia Littoral I Quaternari: Homenatge al Professor V.M. Rossello I Verger, Publicacions Universitat de Valencia, 293-305.
- Davidson-Arnott, R.G.D., 2005. Beach and nearshore instrumentation. In Schwartz, M.L. (editor) Encyclopedia of Beaches and Coasts, Springer, Holland, 130-138.
- Davidson-Arnott, R.G.D. and Greenwood, B., 2003. Waves and sediment transport in the nearshore zone. In, Encyclopedia of Life Support Systems (EOLYSS) Section 1.2 in chapter 2.6 Coastal Zone and Estuaries, UNESCO, 14 pp.
- Davidson-Arnott, R.G.D., 2003. Lakebed erosion. In, Keillor, P. (editor), Shore Protection for Great Lakes Property Owners, University of Wisconsin Sea Grant Institute and US Army Corps of Engineers, 3 pp.
- Davidson-Arnott, R.G.D. (Editor), 1991. Proceedings Canadian Symposium on Coastal Sand Dunes. National Research Council of Canada, Ottawa, Canada, 471 pp.
- Davidson-Arnott, R.G.D., 1990. "Sandy Beaches and Nearshore Bars," in C.L. Amos, "Modern Sedimentary Processes," Chapter 11 of The Geology of the Continental Margin of Eastern Canada, Geology of Canada, No. 2 (Ottawa: Geological Survey of Canada), pp. 642-645.
- Davidson-Arnott, R.G.D. and Law, M.N., 1990. Seasonal patterns and controls on sediment supply to coastal foredunes, Long Point, Lake Erie, In, Nordstrom, K.F., Psuty, N.P. and Carter, R.W.G. (editors), Coastal Dunes: Form and Process, John Wiley and Sons: 177-200.
- Davidson-Arnott, R.G.D., W.G. Nickling and B.D. Fahey (editors), 1982. Research in Glacial, Glacio-fluvial and Glacio-lacustrine Systems, Proceedings of the 6th Guelph Symposium in Geomorphology (Norwich: GeoAbstracts, 1982), 318 pp.
- Davidson-Arnott, R.G.D. and G.F. Pember, 1980. Morphology and sedimentology of multiple parallel bar systems, Southern Georgian Bay, Ontario in S.B. McCann (editor), The Coastline of Canada, Geological Survey of Canada Paper 80-10, pp. 417-428.
- Davidson-Arnott, R.G.D. and W.G. Nickling (editors), 1978. Research in Fluvial Systems, Proc. 5th Guelph Symposium in Geomorphology, (Norwich: GeoAbstracts, 214 pp.
- Davidson-Arnott, R.G.D. and B. Greenwood, 1976. Facies relationships on a barred coast, Kouchibouguac Bay, New Brunswick, Canada. in R.A. Davis, Jr., and R.L. Ethington, (editors), Beach and Nearshore Sedimentation. Society of Economic Paleontologists and Mineralogists Special Publication No. 24, pp. 149-168. Reprinted in R. A. Davis Jr. (editor), Beach and Nearshore Sediments and Processes. Society of Economic Paleontologists and Mineralogists Reprint Series No. 11, (1987), pp. 71-90.
- Greenwood, B. and Davidson-Arnott, R.G.D., 1975. Marine bars and nearshore sedimentary processes, Kouchibouguac Bay, New Brunswick, Canada. In, Hails, J. and Carr, A. (eds), Nearshore Sediment Dynamics and Sedimentation, London, John Wiley & Sons, 123-150.

Refereed journal articles

- Walker, I.J., Davidson-Arnott, R.G.D., Bauer, B.O., Hesp, P.A., Delgado-Fernandez, I, Ollerhead, J., and Smyth, T.A.G., 2016. Scale-dependent perspectives on the geomorphology of beach-dune systems. Submitted to Earth Science Reviews, June, 2016
- Manson, G.K., Davidson-Arnott, R.G.D. and Ollerhead, J., 2016. Attenuation of Wave Energy by Nearshore Sea Ice: Prince Edward Island, Canada. *Journal of Coastal Research*, 32, 253-263.
- Manson, G.K., Davidson-Arnott, R.G.D., Forbes, D.L., 2016. Modelled nearshore sediment transport in open-water conditions, central north shore of Prince Edward Island, Canada. *Canadian Journal of Earth Science*, 53, 101–118 dx.doi.org/10.1139/cjes-2015-0090.
- Bernard O. Bauer, B.O., Hesp, P.A., Walker, I.J., Davidson-Arnott, R.G.D., 2015. Sediment transport (dis)continuity across a beach–dune profile during an offshore wind event. *Geomorphology* 245, 135–148.
- Hesp, P.A., Smyth, T. A.G., Nielsen, P, Walker, I.J., Bauer, B.O. and Davidson-Arnott, R.G.D., 2015. Flow deflection over a foredune. *Geomorphology*, 230, 64-74
- Bauer, B.O. and Davidson-Arnott, R.G. D., 2014. Aeolian particle flux profiles and transport unsteadiness. *Journal of Geophysical Research, Earth Surface*, 119, doi:10.1002/2014JF003128
- Hesp, P.A, Walker I.J., Chapman, C.A, Davidson-Arnott, R.G.D.,and Bauer, B.O., 2013. Aeolian dynamics over a coastal foredune, Prince Edward Island, Canada. *Earth Surface Processes and Landforms*, DOI: 10.1002/esp.3444.
- Chapman, C.A., Walker, I.J., Hesp, P.A., Bauer, B.O., and Davidson-Arnott, R.G.D.and Ollerhead, J. 2013. Reynolds Stress and sand transport over a vegetated foredune, *Earth Surface Processes and Landforms*, DOI: 10.1002/esp.3428
- Delgado-Fernandez, I., Davidson-Arnott, R.G.D., Bauer, B.O., Walker, I.J., Ollerhead, J. and Rhew, H., 2012. Assessing aeolian beach-surface dynamics using a remote sensing approach. *Earth Surface Processes and Landforms*, 37, 1651-1660. doi:10.1002/esp.3303.
- Davidson-Arnott, R.G.D., Bauer, B.O, Walker, I.J. Hesp, P.A., Ollerhead, J. and Chapman, C., 2012. High-frequency sediment transport responses on a vegetated foredune. *Earth Surface Processes and Landforms*, 37, 1227-1241. DOI: 10.1002/esp.3275.
- Ollerhead, J., Davidson-Arnott, R.G.D., Walker, I.J. and Mathew, S., 2012. Annual to Decadal Morphodynamics of the Foredune System at Greenwich Dunes, Prince Edward Island, Canada. *Earth Surface Processes and Landforms*, 38, 284-298. DOI: 10.1002/esp.3327.
- Bauer, B.O., Davidson-Arnott, R.G.D., Walker, I.J., Hesp, P.A and Ollerhead, J., 2012. On the importance of wind direction as a primary control on sediment transport response across a beach-dune system. *Earth Surface Processes and Landforms*, 37, 1661-1677. doi:10.1002/esp.3306.
- Chapman, C.A., Walker, I.J., Hesp, P.A., Bauer, B.O., and Davidson-Arnott, R.G.D., 2012. Turbulent Reynolds Stress and quadrant event activity in wind flow over a coastal foredune, *Geomorphology*, 151-152, 1-12: doi: 10.1016/j.geomorph.2011.11.015
- Holland, Tara L, Romero, José Mariscal, Davidson-Arnott, Robin and Cardille, Jeffrey, 2011. Landscape changes in a coastal system undergoing tourism development: implications for Barra de Navidad Lagoon, Jalisco, Mexico. *Investigaciones Geográficas, Boletín del Instituto de Geografía*, UNAM, 74, 7-18.
- Delgado-Fernandez, I. and Davidson-Arnott, R.G.D., 2011. Meso-scale aeolian sediment input to coastal dunes: The nature of aeolian transport events. *Geomorphology*, 126, 217-232.

- Mathew, S., Davidson-Arnott, R.G.D. and Ollerhead, J., 2010. Evolution of a beach/dune system following overwash during a catastrophic storm: Greenwich Dunes, Prince Edward Island, 1936-2005. *Canadian Journal of Earth Sciences*, 47, 273-290.
- Delgado-Fernandez, I., Davidson-Arnott, R.G.D. and Ollerhead, J., 2009. Application of a remote sensing technique to the study of coastal dunes. *Journal of Coastal Research*, 25, 1160-1167.
- Walker, I.J., Hesp, P.A., Davidson-Arnott, R.G.D., Bauer, B.O. and Ollerhead, J., 2009. Response of three-dimensional flow to variations in the angle of incident flow and profile form of dunes: Greenwich Dunes, Prince Edward Island, Canada. *Geomorphology*, 105, 127-138.
- Davidson-Arnott, R.G.D. and Bauer, B.O., 2009. Aeolian sediment transport on a beach: Thresholds, intermittency and high frequency variability. *Geomorphology*, 105, 117-125.
- Bauer B.O., Davidson-Arnott R.G.D., Hesp P.A., Namikas S.L., Ollerhead J. and Walker I.J., 2009. Aeolian sediment transport conditions on a beach: Surface moisture, wind fetch, and mean transport rate. *Geomorphology*, 105, 106-116.
- Darke, I., Davidson-Arnott, R.G.D. and Ollerhead, Jeff, 2009. Measurement of beach surface moisture using surface brightness. *Journal of Coastal Research*, 25, 248-256.
- Davidson-Arnott, R.G.D., Yang, Yanqi, Ollerhead, Jeff, Hesp, P.A. and Walker, I. J. 2008. The effects of surface moisture on aeolian sediment transport threshold and mass flux on a beach. *Earth Surface Processes and Landforms*, 33, 55-74.
- Walker, I.J., Hesp, P.A., Davidson-Arnott, R.G.D. and Ollerhead, J., 2007. Topographic effects on airflow over a vegetated foredune: Greenwich Dunes, Prince Edward Island, Canada. *Journal of Coastal Research*, 22, 1278-1291.
- van Proosdij, D., Ollerhead, J. and Davidson-Arnott, R.G.D., 2006. Seasonal and annual variations in the sediment budget of a temperate, macro-tidal saltmarsh, Bay of Fundy. *Marine Geology*, 225, 103-127.
- van Proosdij, Davidson-Arnott, R.G.D. and Ollerhead, J., 2006. Controls on the spatial patterns of sediment deposition across a macro tidal salt marsh surface over single tidal cycles. *Estuarine, Coastal and Shelf Science*, 69, 64-86
- Masselink, G., Kroon, A. and Davidson-Arnott, R.G.D., 2005. Intertidal bar morphodynamics - a review. *Geomorphology*, 73, 33-49.
- Davidson-Arnott, R.G.D., 2005. A conceptual model of the effects of sea-level rise on sandy coasts. *Journal of Coastal Research*, 21, 1166-1172.
- Yang, Yanqi and Davidson-Arnott, R.G.D., 2005. Rapid measurement of surface moisture content on a beach. *Journal of Coastal Research*, 21, 447-452.
- Davidson-Arnott, R.G.D., McQuarrie, K. and Aagaard, T., 2005. The effects of wind gusts on aeolian sediment transport on a beach. *Geomorphology*, 68, 115-129.
- Hesp, P.A, Davidson-Arnott, R.G.D., Walker I.J., and Ollerhead, J., 2005. Flow dynamics over a foredune at Prince Edward Island, Canada. *Geomorphology*, 65, 71-84
- Aagaard, T., Davidson-Arnott, R., Greenwood B. and Nielsen, J., 2004. Sediment supply from shoreface to dunes: linking sediment transport measurements and long term morphological evolution. *Geomorphology*, 60, 205-224.
- Christiansen, M. and Davidson-Arnott, R.G.D., 2004. The effects of dune ramps on sediment supply to coastal foredunes, Skallingen Denmark. *Geografisk Tidsskrift (Danish Journal of Geography)*, 104, 29-41.

- Davidson-Arnott, R.G.D. and van Heyningen, A., 2003. Migration and sedimentology of longshore sandwaves, Long Point, Lake Erie, Canada. *Sedimentology*, 50, 1123-1137.
- Bauer, B.O. and Davidson-Arnott, R.G.D., 2003. A general framework for modelling sediment supply to coastal dunes including wind angle, beach geometry, and fetch effects. *Geomorphology*, 49, 89-108.
- Dawson, J.C., Davidson-Arnott, R.G.D. and Ollerhead, J., 2002. Low-energy morphodynamics of a ridge and runnel system. *Journal of Coastal Research Special Issue*, 36, 198-215.
- Davidson-Arnott, R.G.D., van Proosdij, D., Ollerhead, J. and Schostak, L.E., 2002. Hydrodynamics and sedimentation in saltmarshes: Examples from a macrotidal marsh, Bay of Fundy. *Geomorphology*, 48, 209-231.
- Schostak, L.E., Davidson-Arnott, R.G.D., Ollerhead, J. and Kostaschuk, R. A., 2000. Patterns of flow and suspended sediment concentration in a macrotidal saltmarsh creek, Bay of Fundy, Canada. In, K. Pye and J.R.L. Allen (editors), Coastal and Estuarine Environments. *Journal of The Geological Society, Special Publication*, 175, 59-73.
- van Proosdij, D, Ollerhead, J., and Davidson-Arnott, R.G.D., 2000. Controls on suspended sediment deposition over single tidal cycles in a macrotidal saltmarsh, Bay of Fundy, Canada In, Pye, K. and Allen, J.R.L. (editors), Coastal and Estuarine Environments. *Journal of The Geological Society, Special Publication*, 175, 43-57.
- Davidson-Arnott, R.G.D. and Langham, D.R.J., 2000. The effects of softening on nearshore erosion of a cohesive shoreline. *Marine Geology*, 166, 145-162.
- van Proosdij, D., Ollerhead, J., Davidson-Arnott, R.G.D. and Schostak, L., 1999. Allen Creek Marsh, a macrotidal temperate saltmarsh. *Canadian Geographer (Canadian Landform Examples)*, 43, 316-322
- Aagaard, T, Nielsen, J., Davidson-Arnott, R., Greenwood, B. and Nielsen, N., 1998. Coastal morphodynamics at Skallingen, SW Denmark: High energy conditions. *Geografisk Tidsskrift (Danish Journal of Geography)*, 98,20-30.
- Davidson-Arnott, R.G.D., White, D.C. and Ollerhead, J., 1997. The effect of artificial pebble concentrations on eolian sediment transport on a beach. *Canadian Journal of Earth Sciences*, 34, 1499-1508.
- Amin, S.M.N. and Davidson-Arnott, R.G.D., 1997. A statistical analysis of the controls on rates of bluff recession, Lake Ontario. *Journal of Coastal Research*, 13, 1093-1101
- Lawrence, P.L. and Davidson-Arnott, R.G.D., 1997. Alongshore wave energy and sediment transport on south-eastern Lake Huron, Ontario, Canada. *Journal of Coastal Research*, 13, 1004-1015
- Davidson-Arnott, R.G.D. and Law, M.N., 1996. Measurement and prediction of long-term sediment supply to coastal foredunes. *Journal of Coastal Research*, 12, 654-663.
- Gares, P.A., Davidson-Arnott, R.G.D., Bauer, B.O., Sherman, D.J., Carter, R.W.G, Jackson, D.W.T. and Nordstrom, K.F., 1996. Alongshore variations in aeolian sediment transport, Carrick Finn Strand, Ireland. *Journal of Coastal Research*, 12, 673-682
- Bauer, B.O., Davidson-Arnott, R.G.D., Nordstrom, K.F., Ollerhead, Jeff and Jackson, N.L., 1996. Indeterminacy in aeolian transport across beaches. *Journal of Coastal Research*, 12, 41-653.
- Nordstrom, K.F., Bauer, B.O., Davidson-Arnott, R.G.D., Gares, P.A., Carter, R.W.G., Jackson, D.W.T. and Sherman D.J., 1996. Offshore aeolian sediment transport across a beach: Carrick Finn Strand, Ireland. *Journal of Coastal Research*, 12, 664-672.

- Amin, S.M.N. and Davidson-Arnott, R.G.D., 1995. Toe erosion of glacial till bluffs: Lake Erie south shore. *Canadian Journal of Earth Sciences*, 32, 829-837.
- Ollerhead, Jeff and Davidson-Arnott, R.G.D., 1995. Buctouche Spit, New Brunswick, Canada. *Canadian Geographer* (Canadian Landform Examples), 39, 274-282.
- Ollerhead, Jeff and Davidson-Arnott, R.G.D., 1995. The evolution of Buctouche Spit, New Brunswick, Canada. *Marine Geology*, 124, 215-236.
- Davidson-Arnott, R.G.D. and Ollerhead, Jocelyn, 1995. Nearshore erosion on a cohesive shoreline. *Marine Geology*, 122, 349-365.
- Davidson-Arnott, R.G.D. and Conliffe Reid, H.E., 1994. Sedimentary processes and the evolution of the distal bayside of Long Point, Lake Erie. *Canadian Journal of Earth Sciences*, 31, 1461-1473.
- Davidson-Arnott, R.G.D. and Fisher, J.D., 1992. Spatial and temporal controls on overwash occurrence on a Great Lakes barrier spit. *Canadian Journal of Earth Sciences*, 29, 102-117.
- Davidson-Arnott, R.G.D. and Pyskir, N.M., 1989. Morphology and formation of an holocene coastal dune field, Bruce Peninsula, Ontario. *Geographie Physique et Quaternaire*, 42, 163-170.
- Davidson-Arnott, R.G.D. and McDonald, R.A., 1989. Nearshore water motion and mean flows in a multiple parallel bar system. *Marine Geology*, 86, 321-338.
- Davidson-Arnott, R.G.D., 1988. Temporal and spatial controls on beach/dune interaction, Long Point, Lake Erie. *Journal of Coastal Research Special Issue 3*, 131-136.
- Stewart, C.J. and Davidson-Arnott, R.G.D., 1988. Morphology, formation and migration of longshore sandwaves; Long Point, Lake Erie, Canada. *Marine Geology*, 81, 63-77.
- Boczar-Karakiewicz, B. and Davidson-Arnott, R.G.D., 1987. Nearshore bar formation by non-linear wave processes: A comparison of model results and field data. *Marine Geology*, 77, 287-304.
- Davidson-Arnott, R.G.D., 1987. Controls on the formation and form of barred nearshore profiles. *Geographical Review*, 78, 185-193.
- Davidson-Arnott, R.G.D., 1986. Rates of nearshore erosion in glacial till. *Earth Surface Processes and Landforms*, 11, 53-58.
- Davidson-Arnott, R.G.D. and R.D. Kreuzwiser, 1985. Coastal processes and shoreline encroachment: implications for shoreline management in Ontario. *The Canadian Geographer*, 29, 256-262.
- Davidson-Arnott, R.G.D. and S.M.N. Amin, 1985. An approach to the problem of coastal erosion in Quaternary sediments. *Applied Geography*, 5, 99-116.
- Greenwood, B., Davidson-Arnott, R.G.D., Hale, P.B and P.R. Mittler, 1984. A Klovian-type box corer for use with SCUBA. *Geomarine Letters*, 4, 59-62.
- Davidson-Arnott, R.G.D. and Randall, D.C., 1984. Spatial and temporal variations in spectra of storm waves across a barred nearshore. *Marine Geology*, 60, 15-30.
- Davidson-Arnott, R.G.D. and H.I. Keizer, 1982. Shore protection in the town of Stoney Creek, Southwest Lake Ontario, 1934-1979: Historical changes and durability of structures. *Journal of Great Lakes Research*, 8, 635-647.
- Davidson-Arnott, R.G.D., 1981. Computer simulation of nearshore bar formation. *Earth Surface Processes and Landforms*, 6, 23-34.
- Askin, R.W. and Davidson-Arnott, R.G.D., 1981. Micro erosion meter modified for use underwater. *Marine Geology*, 40, M45-M48.

- Davidson-Arnott, R.G.D. and W. Pollard, 1980. Wave climate and potential longshore sediment transport patterns, Nottawasaga Bay, Ontario, *Journal of Great Lakes Research*, 6, 54-67.
- Greenwood, B. and Davidson-Arnott, R.G.D., 1979. Sedimentation and equilibrium in wave-formed bars: a review and case study. *Canadian Journal of Earth Sciences*, 16, 312-332.
- Davidson-Arnott, R.G.D. and Greenwood, B., 1974. Bedforms and structures associated with bar topography in the shallow-water wave environment, Kouchibouguac Bay, New Brunswick, Canada. *Journal of Sedimentary Petrology*, 44, 698-704.
- Greenwood, B. and Davidson-Arnott, R.G.D., 1972. Textural variation in the sub-environments of the shallow-water wave zone, Kouchibouguac Bay, New Brunswick, *Canadian Journal of Earth Sciences*, 9, 679-688.
- Greenwood, B. and Davidson-Arnott, R.G.D., 1972. Quaternary history and sedimentation: a summary and select bibliography *Maritime Sediments*, 8, 88-100.

Published Conference Proceedings

- Sherman, Douglas J., Houser, Chris, Ellis, Jean T., Farrell, Eugene J., Li, Bailiang, Davidson-Arnott, Robin G.D., Baas, Andreas C.W. and Luis Parente Maia, 2013. Characterization of aeolian streamers using time-average videography. Proceedings International Coastal Symposium, Plymouth, England, 1331-1336.
- Delgado-Fernandez, Irene, Davidson-Arnott, Robin, Bauer, Bernard, Walker, Ian and Ollerhead, Jeff, 2013. Evaluation of the optimal resolution for characterizing the effect of beach surface moisture derived from remote sensing on aeolian transport. Proceedings International Coastal Symposium, Plymouth, England, 1277-1282.
- Davidson-Arnott, Robin, Bauer, Bernard, O., Walker, Ian J., Hesp, Patrick A., Ollerhead, Jeff and Delgado-Fernandez, Irene, 2009 Instantaneous and mean aeolian sediment transport rate on beaches: an intercomparison of measurements from two sensor types. *Journal of Coastal Research*, **SI 56**, (Proceedings of the 10th International Coastal Symposium), 5 pp.
- Delgado-Fernandez, Irene and Davidson-Arnott, Robin, 2009. Sediment input to foredunes: description and frequency of transport events at Greenwich Dunes, Prince Edward Island, Canada. *Journal of Coastal Research*, SI 56 (Proceedings of the 10th International Coastal Symposium), 5pp.
- Hesp, P.A., Walker, I.J., Namikas, S.L., Davidson-Arnott, R., Bauer, B.O., and Ollerhead, J., 2009. Storm wind flow over a foredune, PEI, Canada. *Journal of Coastal Research*, SI 56 (Proceedings of the 10th International Coastal Symposium), 5pp.
- Walker, I.J., Davidson-Arnott, R.G.D., Hesp, P.A., Bauer, B.O., and Ollerhead, J., 2009. Mean flow and turbulence responses in airflow over foredunes: Has new instrumentation improved our understanding? *Journal of Coastal Research*, SI 56 (Proceedings of the 10th International Coastal Symposium), 5 pp.
- Graham, Matt and Davidson-Arnott, Robin, 2005. Shoreline change and sediment transport patterns in the vicinity of Pointe-aux-Pins, Lake Erie: Implications for past and future evolution. *Proceedings Canadian Coastal Conference*, Halifax, Nova Scotia, CCSEA, 10pp.
- Davidson-Arnott, R.G.D., Bauer, B.O., Hesp, P.A., Namikas, S.L., Ollerhead, J.W. and Walker I.J., 2005. Moisture and fetch effects on aeolian sediment transport rates during a fall storm, Greenwich Dunes, Prince Edward Island. Proceedings Canadian Coastal Conference, Halifax, Nova Scotia, CCSEA, 10pp.

- Mathew, S., Davidson-Arnott, R.G.D., Ollerhead, J.W. and Yang, W., 2005. Quantifying coastal evolution using historic aerial photographs and digital photogrammetry. Proceedings Canadian Coastal Conference, Halifax, Nova Scotia, CCSEA, 11pp.
- Ollerhead, J., Johnson, P., Davidson-Arnott, R.G.D., Walker, I. and Hesp P., 2003. Sediment supply to coastal foredunes, Greenwich Dunes. Proceedings Canadian Coastal Conference, Kingston, Ontario, CCSEA, 12pp.
- Yang, Y, Davidson-Arnott, R.G.D., Ollerhead, J., Hesp, P. and Walker, I., 2003. The effects of surface moisture on instantaneous aeolian sediment transport, Greenwich Dunes, Prince Edward Island Proceedings Canadian Coastal Conference, CCSEA, (abstract).
- Walker, I.J., Hesp, P.A., Davidson-Arnott, R.G.D. and Ollerhead, J., 2003. Topographic effects on airflow over a vegetated foredune: Greenwich Dunes, Prince Edward Island, Canada. Proc. Coastal Sediments '03, American Society of Civil Engineers, 14pp.
- Davidson-Arnott, R.G.D., Ollerhead, J., Hesp, P.A. and Walker I.J., 2003 Spatial and temporal variability in intensity of aeolian transport on a beach and foredune. Proc. Coastal Sediments '03, American Society of Civil Engineers, 11pp.
- van Proosdij, D., Davidson-Arnott, R.G.D. and Ollerhead, Jeff, 2003. Conceptual model of the seasonal and spatial controls on suspended sediment dynamics in a Bay of Fundy saltmarsh. Proc. Coastal Sediments '03, American Society of Civil Engineers, 11pp.
- Dawson, J.D., Davidson-Arnott, R.G.D. and Ollerhead, J, 2001. Morphodynamics of an intertidal sand bar system, Northumberland Strait, Nova Scotia. Proceedings Canadian Coastal Conference, CCSEA, 281-292.
- Parry, J.E., Ollerhead, J. and Davidson-Arnott, R.G.D., 2001. Spatial and temporal variation of suspended sediment concentration in the Cumberland Basin, Bay of Fundy. Proceedings Canadian Coastal Conference, CCSEA, 377-389.
- Davidson-Arnott, R.G.D. and Dawson, J. D., 2001. Moisture and fetch effects on rates of aeolian sediment transport, Skallingen, Denmark. Proceedings Canadian Coastal Conference, CCSEA, 309-321.
- Davidson-Arnott, R.G.D., van Proosdij, D., Ollerhead, Jocelyn, and Langham, D., 1999. Rates of erosion of till in the nearshore zone on Lakes Huron and Ontario. Proceedings Canadian Coastal Conference, CCSEA, 627-636.
- Dawson, J., van Proosdij, D., Davidson-Arnott, R.G.D. and Jeff Ollerhead, 1999. Characteristics of saltmarshes in the Cumberland Basin, Bay of Fundy. Proceedings Canadian Coastal Conference, CCSEA, 267-280.
- Ollerhead, J., van Proosdij, D. and Davidson-Arnott, R.G.D., 1999. Ice as a mechanism for contributing sediments to the surface of a macro-tidal saltmarsh, Bay of Fundy. Proceedings Canadian Coastal Conference, CCSEA , 345-358.
- van Proosdij, D, Ollerhead, J. and Davidson-Arnott, R.G.D., 1999. The use of Optical Backscaterrance Sensors for predicting sediment deposition on saltmarshes. Proceedings Canadian Coastal Conference, CCSEA,
- Davidson-Arnott, R.G.D., Nielsen, J., Aagaard, T. and Greenwood, B., 1997. Alongshore and onshore aeolian sediment transport, Skallingen, Denmark. Proceedings Canadian Coastal Conference, Canadian Coastal Science and Engineering Association, 463-476.
- Davidson-Arnott, R.G.D. and Langham, D.R.J., 1995. The role of softening in erosion of the nearshore profile on a cohesive coast. Proceedings Canadian Coastal Conference (Halifax, October, 1995), pp. 215-224.

- Ollerhead, Jeff, Davidson-Arnott, R.G.D. and van Proosdij, D., 1995. mapping bottom composition and characteristics in Rondeau Bay, Lake Erie, Ontario. Proceedings Canadian Coastal Conference (Halifax, October, 1995), pp. 679-693.
- Sullivan, J and Davidson-Arnott, R.G.D., 1995. Hazards and regulatory standards: Great Lakes-St. Lawrence River System shorelines. Proceedings Canadian Coastal Conference (Halifax, October 1995), pp. 799-814.
- Sherman, D.J., . ., Bauer, B.O., Carter, R.W.G., Jackson, McCloskey, J., Davidson-Arnott, R.G.D Gares, P.A., Jackson, N.L. and Nordstrom, K.F, 1994. The aeolus project: measuring coastal wind and sediment systems. Proceedings Coastal Dynamics '94, American Society of Civil Engineers, 476-487.
- Ollerhead, Jocelyn. and Davidson-Arnott, R.G.D., Vertical Erosion of the Beach and Inner Nearshore on a Cohesive Shoreline. Proceedings Canadian Coastal Conference (Vancouver, 1993), pp. 715-727.
- Gares, P.A., Nordstrom, K.F. Sherman, D.J., Bauer, B.D., Davidson-Arnott, R.G.D., Carter, R.W.G., Jackson, D., and Gomes, N., 1993. "Aeolian Sediment Transport Under Offshore Wind Conditions: Implications of Aeolian Sediment Budget Calculations," Proceedings Coastal Zone '93 North Carolina, U.S.A., ASCE, pp. 1-14.
- Carter, R.W.G., Bauer, B.O., Sherman, D.J., Davidson-Arnott, R.G.D., Gares, P.A., Nordstrom, K.F. and Ordord, J.D., "Dune Development in the Aftermath of Stream Outlet Closure: Examples from Ireland and California. In R.W.G. Carter, T.G.F. Curtis and M.J. Sheehy-Steffinton (eds.), Coastal Dunes: Proceedings of the Third European Dune Congress Northern Ireland: Balkemia Press, 1992, pp. 57-70.
- Nickling, W.G. and Davidson-Arnott, R.G.D., 1991. Aeolian sediment transport on beaches and coastal sand dunes. Proc. Symposium on Coastal Sand Dunes, Sept., 1990, Guelph, Ontario. National Research Council of Canada, pp. 1-35.
- Law, M.N. and Davidson-Arnott, R.G.D. 1991. Seasonal controls on aeolian processes on the beach and foredune. Proc. Symposium on Coastal Sand Dunes, Sept., 1990, Guelph, Ontario. National Research Council of Canada, pp. 49-68.
- Saunders, K.E. and Davidson-Arnott, R.G.D., 1991. Coastal dune response to natural disturbances. Proc. Symposium on Coastal Sand Dunes, Sept., 1990, Guelph, Ontario. National Research Council of Canada, pp. 321-346.
- Davidson-Arnott, R.G.D., 1990. The effect of water level fluctuations on coastal erosion in the Great Lakes. Ontario Geographer, Vol.:23-39.
- Davidson-Arnott, R.G.D. and Stewart, C.J., 1987. The effect of longshore sandwaves on dune erosion and accretion, Long Point, Ontario. Proceedings Canadian Coastal Conference, 131-144.
- Davidson-Arnott, R.G.D.1986. Erosion of the nearshore profile in till: rates, controls and implications for shoreline protection. *Proceedings Symposium on Cohesive Shores*, National Research Council of Canada, Ottawa, Canada, 137-149.
- Davidson-Arnott, R.G.D. and Askin, R.W., 1980. Factors controlling erosion of the nearshore profile in overconsolidated till, Grimsby, Lake Ontario. Proc. Canadian Coastal Conference, 1980. National Research Council of Canada, Ottawa, Canada, pp. 185-199.

PERSONAL PROFILE

- Organized and detail-oriented GIS and remote sensing specialist
 - Proven teaching skills across a variety of disciplines
 - Develop and implement GIS and remote sensing methodologies for environmental management and assessment, mostly in support of higher education and research
-

PROFESSIONAL EXPERIENCE

GEOMATICS SUPPORT SPECIALIST

2006 – PRESENT

Department of Geography, University of Guelph, Guelph, ON

- Advise on spatial analysis, remote sensing, and survey methods and techniques for faculty and students
- Primary author of Introduction to ArcGIS and Introduction to Spatial Analyst in ArcGIS course tutorials
- Development of “GIS for Public Health” online curriculum; successful course launch W15
- Design and update lab assignments for geomatics courses (ArcGIS, Idrisi, Geomatica)
- Guide the design and implementation of GIS-based research projects (graduate/undergraduate students; various departments)
- Write batch processing scripts (Python, EASI)
- Research geomatics equipment purchases and set-up
- Liaise with other departments that implement geomatics technologies

SESSIONAL INSTRUCTOR

2009 – 2015

Department of Geography, University of Guelph, Guelph, ON

- GEOG 2480 – Mapping and GIS (F14, F13, W12, F11, F09)
 - Lectures, labs, and formal written examinations to teach theory and practice of thematic cartography and introduce concepts of GIS
 - Supervise multiple Graduate Teaching Assistants
 - Earn positive student evaluations
- GEOG 4480 – Applied Geographic Information Systems (W15, W14, W09)
 - Lectures and informal meetings to guide students through the design and implementation of GIS-based research projects
 - Supervise multiple Graduate Teaching Assistants
 - Earn positive student evaluations

SPATIAL ANALYSIS CONSULTANT & CARTOGRAPHER

2006 – PRESENT

- Cartographic services for academic articles, reports, and posters
- Design GIS methodology to calculate distances, by road, between ~225,000 features
- Prepare spatial data inputs for hydrologic and wind erosion modelling
- Spatial and temporal analysis of urban growth in Ontario
- Classification of SPOT imagery to identify riparian zones
- Research and report on remote sensing technologies to estimate atmospheric aerosols
- Delineate watersheds and analyze landcover in contributing areas
- Digitize spatial database from historic landuse map of Guelph

TEACHING ASSISTANT

2004 – 2006

Department of Geography, University of Guelph, Guelph, ON

- GEOG 4480 – Applied Geographic Information Systems, and
- GEOG 3480 – Geographic Information Systems
 - Taught practical application of GIS technologies
 - Guided students with one-on-one technical GIS advice for their research projects
 - Provided constructive feedback to students on assignments and examinations
 - Consistently earned high student evaluations

RESEARCH ASSOCIATE

2003 – 2004

Applied Geomatics Research Group, Centre of Geographic Sciences (COGS)
Nova Scotia Community College, Middleton, NS

- Processed and validated raw LiDAR data of the Annapolis Valley, NS
- Conducted independent multi-day field work (including at backcountry locations)
- Collected and processed real-time kinematic GPS and total station data
- Updated validation scripts (EASI, AML)

APPLICATIONS PROGRAMMER, WATER RESOURCES GROUP

2003

ESRI Intern Program

Environmental Systems Research Institute, Inc. (ESRI), Redlands, CA

- Extended algorithm that interpolates streambeds from channel bathymetric data to work for streams/rivers with islands or multiple channels (VBA, ArcObjects)
- Programmatically tested spatial and non-spatial query methods on the ArchHydro data model TimeSeries table (VBA, ArcObjects)

OUTDOOR EDUCATOR & ADVENTURE TRIP LEADER

1999 – 2002

Chingachgook YMCA, Glens Falls, NY

- Taught Environmental Education curriculum: ecology; canoeing and hiking; corporate teambuilding; facilitated High Ropes program
- Designed, planned, and provided safe leadership for backcountry canoeing, hiking, and cycling trips lasting 1 – 3 weeks each

INSTRUCTOR

1998

Gould Lake Outdoor Centre, Harrowsmith, ON

- Provided safe leadership for extended wilderness hiking, canoeing, and sea kayaking trips

CANOE INSTRUCTOR & CABIN COUNSELLOR

1997

Camp Kandalore, Minden, ON

- Taught Ontario Recreational Canoeing Association Basic Canoe Levels; supervised campers; provided safe leadership for multi-day wilderness canoe trips

EDUCATION

MASTER OF SCIENCE, GEOGRAPHY

2006

University of Guelph, Guelph, ON

- Cumulative GPA: 84/100
- Developed object-oriented landcover classifications that identify major agricultural crops from Landsat TM imagery
- Analyzed how spatial and temporal land management changes effect hydrologic and economic modelling to target agricultural conservation
- Thesis: *Environmental and economic implications of land management changes in agricultural watersheds*

ADVANCED DIPLOMA, APPLIED GEOMATICS RESEARCH

2004

Applied Geomatics Research Group, Centre of Geographic Sciences (COGS)
Nova Scotia Community College, Middleton, NS

- Graduated with Honours
- Studied the potential application of high-resolution LiDAR data for hydrologic modeling
- Applied GIS, remote sensing, and data management skills

ADVANCED DIPLOMA, GEOGRAPHIC INFORMATION SYSTEMS

2003

Centre of Geographic Sciences (COGS)
Nova Scotia Community College, Lawrencetown, NS

- Graduated with Honours
- Focused on GIS and remote sensing skills relating to environmental applications
- Conducted analysis using raster and vector data models; image orthorectification, enhancement, mosaicing, terrain analysis, and classification; developed data management skills; processed satellite, air photo, and LiDAR data

BACHELOR OF SCIENCE, ENGINEERING (WATER RESOURCES)

2001

University of Guelph, Guelph, ON

- Graduated with Honours
- Designed hydrologic systems such as flood control dams and structures, water supply and treatment systems, and soil erosion control devices
- Completed design work for the Town of Oakville incorporating storm water management facilities data into a GIS

MANUALS, REPORTS, AND PRESENTATIONS (SPEAKER IN BOLD)

Bonnycastle, A., J. Mersey, and W. Yang. 2014. Introduction to ArcGIS: Version 10.2. 158 pages.

Bonnycastle, A., W. Yang, and J. Mersey. 2012. Introduction to Spatial Analyst in ArcGIS: Version 10.0. 95 pages.

Yang, W., A. Bonnycastle, Y.B. Liu, L. Boychuk, S. Gabor, and P. Badiou. 2011. Examining Water Quantity and Quality benefits from wetland conservation and restoration in the Smith Creek Watershed. A research report to Ducks Unlimited Canada. 99 pages.

Yang, W., Y.B. Liu, C. Ou, and A. Bonnycastle. 2011. Examining water quantity and quality effects of wetland loss and restoration scenarios in the Black River sub-watershed of the Lake Simcoe Basin: A research report submitted to Ducks Unlimited Canada. 125 pages.

Yang, W., Y.B. Liu, A. Bonnycastle, P. Badiou, L. Boychuck, and B. Page. 2010. Spatial allocation of wetland conservation and restoration in the Broughton's Creek watershed: A research report submitted to Ducks Unlimited Canada. 134 pages.

Yang, W., Y.B. Liu, P. Boxall, K. Packman, M. Weber, and A. Bonnycastle. 2009. Integrated modelling for examining cost effectiveness of wetland restoration scenarios in the South Tobacco Creek watershed: A research report submitted to Ducks Unlimited Canada and Agriculture and Agri-Food Canada. 21 pages.

Berg, A., A. Bonnycastle, and W. Yang. 2008. Assessing streamflow sensitivity to crop changes. Canadian Meteorological and Oceanographic Annual Congress. Kelowna, BC, Canada.

OTHER EXPERIENCE

CYCLIST

2001

Bike for Cancer

- Cycled across Canada from Vancouver, BC, to St. John's, NL, with two friends, as a fundraising event for the Canadian Cancer Society (www.bikeforcancer.ca)

RESPONDER

1999 – 2001

University of Guelph First Response Team, Guelph, ON

- Provided first aid to the campus community through an emergency on-call service and special event coverage

COMPUTER SKILLS

PROFICIENT

- ArcGIS, ArcInfo Workstation, ArcView 3.x
- Idrisi
- PCI Geomatica
- Python scripting
- ArcSWAT, AVSWAT
- MS Office
- Internet for research applications

MODERATE

- ArcHydro
- Kinematic GPS and Total Station surveying
- Adobe Illustrator, Photoshop
- Corel Draw, Photo-Paint
- EASI scripting

BASIC

- ArcObjects, AML, Visual Basic, VBA, VB Script
- ArcPad
- MapInfo, Vertical Mapper
- Oracle 8
- AutoCAD
- Flash MX Studio, MS FrontPage, HTML

CERTIFICATES

- Lifesaving Society National Lifeguard Service (2006)
- Lifesaving Society Bronze Cross, Standard First Aid, and CPR (2006)
- ESRI ArcHydro (2003)
- Wilderness Medical Associates Canada Wilderness First Responder (2003)
- Wilderness Medical Associates Canada Anaphylaxis Workshop (2003)
- NSCC Workplace Hazardous Materials Information System (2003)
- NSCC Occupational Health & Safety (2003)
- American Red Cross Lifeguard Training, CPR, First Aid (2002)
- ORCA Tripping Level II and Moving Water Level I (1996, 1995)

REFERENCES

Excellent references are available upon request

Ryan P. Mulligan, Ph.D., P.Eng.
CURRICULUM VITAE

Personal Information

Ryan P. Mulligan, Ph.D., P.Eng.
Assistant Professor
Department of Civil Engineering, Queen's University
Kingston, ON, Canada K7L 3N6
Phone: 613-533-6503, email: mulligar@queensu.ca
Website: <http://www.civil.queensu.ca/Research/Hydrrotechnical/Ryan-Mulligan/>

Education

Postdoctoral Fellowship
Bedford Institute of Oceanography, Dartmouth, NS, 2009

Degrees

Ph.D., Dalhousie University (Halifax NS), Oceanography, 2008
M.A.Sc., University of British Columbia (Vancouver BC), Civil Engineering, 1999
B.A.Sc., Queen's University (Kingston ON), Geological Engineering, 1997

Professional Credentials

Professional Engineer registered in Ontario (P.Eng. since 2002)
American Geophysical Union (member since 2000)
Canadian Society for Civil Engineering (member since 2013)

Recognition

Outstanding Contribution Award, American Society of Civil Engineers, Coastal Engineering Research Council, International Conference on Coastal Engineering (ICCE) in Santander, Spain, 2012.

NSERC Visiting Fellowship in a Canadian Government Laboratory, Bedford Institute of Oceanography, Dartmouth, NS, 2008-2009.

Kathy Ellis Memorial Prize, Department of Oceanography, Dalhousie University, highest grades in graduate courses in oceanography, 2004.

APEGBC Environmental Award, Association of Professional Engineers and Geoscientists of British Columbia, outstanding achievement in environmental engineering, 2002.

Employment History

Assistant Professor, Department of Civil Engineering, Queen's University, Kingston, ON, 2011-.

Assistant Professor, Department of Geological Sciences, East Carolina University, Greenville, NC, 2009-2011.

Post-doctoral Fellow, Bedford Institute of Oceanography, Fisheries and Oceans Canada, Dartmouth, NS, 2008-2009.

Research Assistant, Department of Oceanography, Dalhousie University, Halifax, NS, 2003-2008.

Coastal Engineer, Hay & Company Consultants Inc., Vancouver, BC, 1999-2003.

Research and Teaching Assistant, Department of Civil Engineering, University of British Columbia, Vancouver, BC, 1997-1999.

Junior Civil Engineer, Deardon & Stanton Limited, Orillia, ON, summer 1997.

Junior Geological Engineer, Aur Resources Inc., Flin Flon, MB, summer 1996.

Research and Teaching Assistant, Department of Geological Engineering, Queen's University, Kingston, ON, 1995-97.

Peer-Reviewed Journal Publications

Mulligan, R.P., Walsh, J.P., and Wadman, H., (2014). Storm Surge and Surface Waves in a Shallow Lagoonal Estuary during the Crossing of a Hurricane. Invited paper, J. Waterway, Port, Coastal, Ocean Eng., A5014001, 11pp, doi: 10.1061/(ASCE) WW.1943-5460.0000260.

McCombs, M.P., Mulligan, R.P., and Boegman, L. (2014). Offshore Wind Farm Impacts on Surface Waves and Circulation in Eastern Lake Ontario, Coastal Engineering, 93, 32-39, doi: 10.1016/j.coastaleng.2014.08.001.

Tao, J., Hill, P.S., Mulligan, R.P., and Smith, P.C. (2014). Seasonal Variability of Total Suspended Matter in Minas Basin, Bay of Fundy. Estuarine, Coastal and Shelf Science, 151, 169-180, doi: 10.1016/j.ecss.2014.10.005.

McCombs, M.P., Mulligan, R.P., Boegman, L., and Rao, Y.R. (2014). Modeling surface waves and wind-driven circulation in eastern Lake Ontario during winter storms. J. Great Lakes Research, 13 pp, doi: 10.1016/j.jglr.2014.02.009.

Brown, M.M., Mulligan, R.P., and Miller, R.L. (2014). Modeling the transport of freshwater and dissolved organic carbon in the Neuse River Estuary, NC, USA following Hurricane Irene (2011), Estuarine, Coastal and Shelf Sci., 139, 148-158, doi: 10.1016/j.ecss.2014.01.005.

McNinch, J.E., Brodie, K.L., Wadman, H.M., Hathaway, K.K., Slocum, R.K., Mulligan, R.P., Hanson, J.L., and Birkemeier, W.A. (2012). Observations of wave run-up, shoreline hot-spot erosion, and sound-side seiche during Hurricane Irene at the Field Research Facility, Journal of the American Shore and Beach Preservation Association, 80(2): 19-37.

- Leorri, E., Mulligan, R.P., Mallinson, D., and Cearreta, A. (2011). Sea-level rise and local tidal range changes in coastal embayments: An added complexity in developing reliable sea-level index points, *Journal of Integrated Coastal Zone Management*, 11(3): 307-314.
- Mulligan, R.P., Perrie, W., Toulany, B., Smith, P. Hay, A.E., and Bowen, A.J. (2011). Performance of nowcast and forecast wave models for Lunenburg Bay, NS. *Atmosphere-Ocean*, 49(1), doi:10.1080/07055900.2011.558468.
- Mulligan, R. P., Hay, A. E., and Bowen, A. J. (2010). A wave-driven jet over a rocky shoal. *Journal of Geophysical Research*, 115, C10038, doi:10.1029/2009JC006027.
- Mulligan, R.P., Perrie, W., and Solomon, S. (2010). Dynamics of the Mackenzie River plume on the inner Beaufort Shelf during an open water period in summer. *Estuarine, Coastal and Shelf Science* (89), 214-220.
- Mulligan, R.P., Hay, A.E., and Bowen, A.J. (2008). Wave-driven circulation in a coastal bay during the landfall of a hurricane. *Journal of Geophysical Research*, 113, C05026, doi:10.1029/2007JC004500.
- Mulligan, R.P., Bowen, A. J., Hay, A.E., van der Westhuysen, A. J., and Battjes, J.A. (2008). Whitecapping and wave field evolution in a coastal bay. *Journal of Geophysical Research*, 113, C03008, doi:10.1029/2007JC004382.

Book Chapters

- Miller, R.L., López, R., Mulligan, R.P., Reed, R.E., Liu, C.-C., Buonassissi, C.J., and Brown, M.M., (2014) Examining material transport in dynamic coastal environments: an integrated approach using field data, remote sensing and numerical modeling. In C.W. Finkl and C. Makowski (eds.), *Remote Sensing and Modeling: Advances in Coastal and Marine Resources*, Coastal Research Library 9, doi: 10.1007/978-3-319-06326-3_14, Springer International Publishing, Switzerland.
- Leys, V. and Mulligan, R.P., (2011). Modelling coastal sediment transport for harbour planning: selected case studies, In *Sediment Transport*, S.S.Ginsberg (Ed.), ISBN: 978-953-307-189-3, InTech.

Michael Tanos, P.Eng.

PROFESSIONAL EXPERTISE

- Geotechnical Engineering
- Materials Testing
- Construction Inspection & Supervision
- Technical Policy Development
- Peer Review and Expert Consultations

EDUCATION

B.A.Sc., University of Toronto, 1975
Department of Geological Engineering and Applied Earth Science
Geotechnical Division

Post-graduate Courses, University of Toronto, 1977-1981
Department of Civil Engineering (part time studies)
Geotechnical Division

AFFILIATIONS

Registered Professional Engineer, Province of Ontario
Designated Consulting Engineer, Province of Ontario
Member, Canadian Geotechnical Society
Member, American Society of Civil Engineers
Member, American Society for Testing and Materials

PRESENT RESPONSIBILITIES

Responsible for senior review and guidance of geotechnical and materials projects; and for administration of head office and branch offices.

PROFESSIONAL HISTORY

1983 - present	Terraprobe Limited - Brampton, Ontario Principal, Geotechnical Engineer
1982 - 1983	Dominion Soil Investigation Inc. - London, Ontario Branch Manager, Geotechnical Engineer
1980 - 1982	Golder Associates - Mississauga, Ontario Geotechnical Engineer
1977 - 1980	Terraprobe Limited - Brampton, Ontario Manager, Geotechnical Engineer
1975 - 1977	F.J. Reinders & Associates Limited - Brampton, Ontario Geotechnical Engineer

B. (Billy) Singh, M.A.Sc., P. Eng.

PROFESSIONAL EXPERTISE

- Geotechnical Engineering & Design
- Slope Stability & Streambank Erosion Studies
- Slope Stabilization & Rehabilitation
- Design & Evaluation of Retaining Walls
- Pavement Design and Evaluation
- Construction Project Management
- Shoreline Slope Risk Assessments
- Slope Stability Training Seminars to Conservation Authorities, Businesses, and Guest Lectures at University of Waterloo
- Construction Materials Engineering/Quality Control
- Transportation, Tunnels and Infrastructure Projects
- Buildings & Land Development Projects
- Construction Inspection & Supervision
- Environmental Site Assessment/Remediation
- Peer Review and Expert Witness/Consultations
- Stable Slopes Policy Interpretation & Application

EDUCATION

Master of Applied Science (M.A.Sc.),
University of Waterloo, 1996
Geotechnical and Geoenvironmental Engineering

Bachelor of Engineering (B.E.), Civil Engineering
University of Jodhpur, India

CONTINUING EDUCATION

Construction Project Management
Design of Mechanically Stabilized Earth Structures, Retaining Walls
Slope Stability and Streambank Erosion, Slope Stabilization
Pavement Design and Asphalt Technology
Concrete Testing and Quality

PROFESSIONAL AFFILIATIONS

Registered Professional Engineer, Province of Ontario

Past Chair, Canadian Geotechnical Society
Southern Ontario Section, Toronto Group

PROFESSIONAL DESIGNATIONS

Ontario Building Code Qualification

Examinations: Designer Legal Process (OBC)
Designer Structural (OBC)

Qualified Person - Ontario Ministry of Environment, Ontario Regulation 153

PRESENT RESPONSIBILITIES

Responsible for project management, review and guidance of geotechnical, environmental, construction materials & engineering, inspection and testing projects.

PROFESSIONAL HISTORY

1997 to Date **Terraprobe - Brampton, Ontario**
Senior Geotechnical Engineer, Principal

1997 **Toyota Motor Manufacturing Company (TMMC) - Cambridge, Ontario**

