

Martin Carver

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Nelson, BC V1L 6X4 CANADA

I am a hydrologist and geomorphologist drawing on over 20 years of experience in water resources. I provide a bridge between science and policy in guiding sustainable land management for the protection of water values such as drinking water and aquatic habitats. Land-use planning through environmental risk assessment and other technical knowledge provides the basis for applying sustainability principles, in the development and implementation of strategies and policies for sustainable communities and biodiversity conservation, particularly in response to climate change. I have worked in Canada, Nepal and Ecuador.

PERSONAL INFORMATION

Citizenship: Canada, United Kingdom
Languages: English, Spanish, French, some Nepali

EDUCATION

Ph.D. University of British Columbia (Resource Management Science, Interdisciplinary Studies),
1990-1997 Vancouver, BC; thesis entitled *Diagnosis of Headwater Sediment Dynamics in Nepal's Middle Mountains: Implications for Land Management*.

M.A.Sc. University of Waterloo (Mechanical Engineering), Waterloo, Ontario; thesis in
1985-1988 Environmental Fluid Mechanics (atmospheric dynamics) entitled *An Experimental Investigation of the Behaviour of Plumes Merging in a Cross-flow*.

B.Sc. University of Manitoba (Mechanical Engineering), Winnipeg, Manitoba; Degree with
1980-1984 Distinction, Dean's Honour List. A focus in energy and fluid mechanics.

PROFESSIONAL POSITIONS

2009-present **Principal Aqua Environmental Associates**, Nelson, BC

2008 – 2009 **A/Director of Source Water Protection BC Ministry of Healthy Living and Sport**,
Victoria, BC. Built new group within the Health Protection Branch responsible for setting
new provincial policy directions to protect water source areas affecting human health.
Worked closely with other ministries/partners. Led MHLS implementation of
commitments under Living Water Smart, BC's new provincial water strategy.

2005 – 2008 **Watershed Hydrologist and Aquatic Risk Assessment Modeller BC Ministry of**
Environment, Water Stewardship Division, Victoria, BC. Led the creation of a program of
provincial aquatic risk assessment modelling focused on the water and aquatic-related
consequences of climate change for communities, biodiversity, agencies, and industry
with initial emphasis on the effects of the mountain pine beetle and associated salvage.

1998 - 2005 **Principal Aqua Environmental Associates**, Nelson, BC

1996 –1998 **Hydrology and Terrain Specialist BC Environment**, Nelson, BC

1984 –1985 **Energy Consultant E.J. Faraci and Associates Ltd.**, Winnipeg, MB

1984 **Researcher Solar Energy Program, National Research Council**, Ottawa, ON

PROFESSIONAL REGISTRATIONS

- Registered as a *Professional Geoscientist* (P.Geo.) in the Province of British Columbia with the Association of Professional Engineers and Geoscientists of British Columbia (since 2003).
- Registered as a *Professional Engineer* (P.Eng.) in the Province of British Columbia with the Association of Professional Engineers and Geoscientists of British Columbia (since 1997).
- Registered as a *Professional Agrologist* (P.Ag.) in the Province of British Columbia with the British Columbia Institute of Agrologists (since 1997).

AQUATIC RISK ASSESSMENT AND LAND-USE PLANNING

- Development & application of aquatic environmental/ecological risk assessment (ERA) frameworks & risk mgmt
- Analysis and integration of implications of global climate change in ERA
- Creation of expert systems and physically-based models including linkages to habitat-supply modelling
- Application of scenario development and decision systems for risk management in decision analysis
- Environmental stressor/threat classification and aintegration of environmental values affected by stressors
- Review and analysis of Environmental Impact Assessments in resource sector with focus on water and land values

Selected Publications

- Dubé, M, P Duinker, L Greig, M Carver, M Servos, M McMaster, B Noble, H Schreier, L Jackson, K Munkittrick 2012 (submitted). *A Framework for Assessing Cumulative Effects in Watersheds*. Journal of Integrated Environmental Assessment and Management
- Athabasca-Chipewyan First Nation, Mikisew Cree First Nation, M Carver, C Candler and T Boag 2010. *Athabasca-Chipewyan First Nation, Mikisew Cree First Nation Review of the Phase 2 Framework Committee Recommendations: Synthesis Report*. Submitted to Alberta Environment and Canada Department of Fisheries and Oceans, July 2010, 63 p plus appendices.
- Pike R, M Feller, J Stednick, K Rieberger and M Carver 2010. Water quality and forest management. Chapter 12 in: *Compendium of Forest Hydrology and Geomorphology in British Columbia*, p 401-440.
- Carver, M and M Gray 2010. BC Assessment Watersheds for Regional Level Applications *Streamline*, 13(2) Spring 2010.
- Carver M, M Weiler, C Scheffler, K Rosin 2010. *Development and Application of a Peak Flow Hazard Model for the Fraser Basin, British Columbia*. Report to Natural Resources Canada, MPBI Project #7.29, 39 p.
- Carver M, M Weiler, K Stahl, C Scheffler, J Schneider, JAB Naranjo 2010. *Development of a Low Flow Hazard Model for the Fraser Basin, British Columbia*. Report to Natural Resources Canada, MPBI Project #7.29, 30 p.
- Carver M, M Weiler, et al. 2007. *Hydrologic Risk Assessment: Preliminary Modelling Results*. Paper presented at Mountain Pine Beetle and Watershed Hydrology Workshop: Preliminary Results of Research from BC, Alberta and Colorado, Kelowna, BC, Canada, 4 p.

OPERATIONAL ANALYSIS IN SUPPORT OF SUSTAINABLE RESOURCE DEVELOPMENT

- Watershed, channel, wetland, & riparian assessments particularly associated with forestry and mining activities
- Regional hydrologic analysis and water quality monitoring design, assessment, and analysis
- Site hydrologic assessment for protection of water supplies, aquatic habitats, infrastructure, & other values

Selected Publications

- B Carson, D Maloney, S Chatwin, M Carver and P Beaudry 2009. Protocol for Evaluating the Potential Impact of Forestry and Range Use on Water Quality (Water Quality Routine Effectiveness Evaluation). Forest and Range Evaluation Program, BC MFR & MoE Victoria, BC <http://www.for.gov.bc.ca/ftp/hfp/external/!publish/frep/indicators/Indicators-WaterQuality-Protocol-2009.pdf>
- Carver M. 2006. Watershed Assessment – Sullivan Creek. Report prepared for the Creston Valley Forest Corporation, Creston BC. <http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=8764>
- Carver M. 2003. *Watershed Assessments for the Buffer Zone of Podocarpus National Park (Ecuador)*. Report prepared for Fundacion Ecologica Arcoiris, Loja, Ecuador.
- Carver M. 2003. *Hydrologic Opportunities for Enhancing Environmental Condition – Connor Creek and Vicinity*. Report prepared for Aquila Networks Canada, 24 p. <http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=8762>
- Carver M., G. Utzig, and D. Putt 2001. *Watershed Assessment & Reconnaissance Stability Assessment of Structure Locations – Glade Creek*. Prepared for KRM Associates Inc. (for West Kootenay Power Ltd.) Nelson, BC, February, 46 p. <http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=8767>
- Carver M. and G. Utzig 1999. *Hydrologic Assessments – Arrow Creek, Arrow Mountain, and Adjacent Areas*. Report prepared for Creston Valley Forest Corporation, Creston, B.C., 60 p plus maps and appendices. <http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=9248>

POLICY DEVELOPMENT AND SUSTAINABILITY ANALYSES

- Facilitation, consultation, and public education in pursuit of consensus around environmental issues
- Evaluation of ecological goods & services, drought & water supply planning, watershed planning techniques
- Water strategy development, precautionary management, leadership/coaching, vision development
- Hydrology and geomorphology assessment and analysis for watershed health diagnosis
- Forest certification, stewardship initiatives, biodiversity conservation, wetland policy development

Selected Publications, Presentations, and Initiatives

- Howard SG & M Carver 2011. *Central Interior Ecoregional Assessment: Freshwater Analysis*. BC J. of Ecosystems and Mgmt 12(1): 72-87. <http://jem.forrex.org/index.php/jem/article/viewFile/30/61>
- Carver M. 2010. *Incorporating Water into Food Security by Expanding on the Concept of Virtual Water*. Draft report prepared for the University of Saskatchewan (Saskatoon) for UNEP/GEMS (Nairobi), p 33.
- Created new policy group (2008-2009) within the Health Protection Branch of the BC Ministry of Healthy Living and Sport responsible for setting new provincial policy directions to protect water source areas affecting human health. Scope included hiring and training personnel, setting provincial source water protection policy priorities, and application of health stewardship principles
- Member (2001-2012) of the BC Wetland Stewardship Partnership, a multi-agency group improving policies and tools for BC wetlands.
- Carver, M. 2006. *Changes to British Columbia's Aquatic Environments from Global Climate Change*. Paper presented at annual conference of Association of Professional Engineers and Geoscientists of BC, Victoria, BC, Oct 12-14, 2006.
- Carver, M. 2004. *Wetland Stewardship in British Columbia*. Paper presented at the INTECOL 7th International Wetlands Conference, Utrecht, Netherlands, July 25-30, 2004.
- Carver M. 2001. *Riparian Management for Protection of Aquatic Values – Literature Review and Synthesis*. Prepared for Forest Stewardship Council British Columbia Regional Standards Team (Riparian Sub-Committee), 48 p.
- Schreier, H., S. Brown, and M. Carver 1998. Linking land degradation to nutrient and sediment transport in a Middle Mountain watershed in Nepal. In: *Headwater Control IV: Hydrology, Water Resources and Ecology in Headwaters*. Headwater'98 Conf, Apr 20-23, Italy.