

**Education**

*B.Sc. Biology (Honours),  
Trent University,  
Peterborough, Ontario,  
1996*

**Golder Associates Ltd. – Burnaby****Employment History*****Golder Associates Ltd. – Burnaby, BC***

*Aquatic Biologist (2003 to Present)*

Environmental Assessment aquatic biologist with experience in fisheries and aquatic resources on impact assessment projects for mining, power, transportation, land development and municipal infrastructure sectors. Project manager and experienced riparian, fisheries and fish habitat inventory specialist. Project specialist in planning and implementation of mitigation and compensation techniques in aquatic habitats. Skills include GPS and GIS inventory techniques.

***Hatfield Consultants Ltd. – West Vancouver, BC***

*Environmental Biologist (2000 to 2003)*

Environmental biologist involved in EEM projects for pulp and paper mills, environmental monitoring of construction projects, impact assessments, and fish and fish habitat inventories.

***R. L. & L. Environmental Services Ltd. – Prince George, BC***

*Biological Technician (1997 to 2000)*

Technician in the Nechako Fraser River sturgeon studies, fish and fish habitat inventories, and smolt migration studies. Provided database management and map production using GIS for various projects.

***Trent University – Peterborough, ON***

*Research Assistant (1996 to 1996)*

Assisted in field data collection and laboratory analyses of fisheries and biological data for zebra mussel infestation research in a variety of lakes in the Kawartha Region, including a joint study with the Ontario Ministry of Natural Resources of Rice Lake.

***Trent University – Peterborough, ON***

*Research Assistant (1995 to 1995)*

Assisted in field data collection and laboratory analyses of fisheries and biological data for macrophyte population and fish behaviour research.



## **PROJECT EXPERIENCE – FISHERIES RESEARCH**

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| <b>BC Hydro</b><br>Squamish, BC                             | Coordinated and conducted an assessment of resident fish populations downstream of Daisy Lake Dam as part of the Water Use Plan developed for the Cheakamus River. Project involvement also included coordination with and training of First Nations fisheries technicians.   |
| <b>Fisheries and Oceans Canada</b><br>Squamish, BC          | Provided technical input into the Squamish watershed salmon assessment framework.   |
| <b>District of North Vancouver</b><br>North Vancouver, BC   | Developed a program to install boulder clusters in the Seymour River as compensation structures for impacts caused to the Seymour River by the construction of a new Dollarton Highway bridge. Designed and implemented a monitoring program to determine pre- and post-development fish use of the area where the boulder clusters were installed. |
| <b>Habitat Conservation Trust Fund</b><br>Prince George, BC | Assisted in collection of data involved in monitoring habitat use and spawning behaviour of white sturgeon in the Nechako and Fraser River in central British Columbia.   |
| <b>BC Hydro</b><br>Lillooet, BC                             | Assisted in monitoring smolt migration from Seton Lake and the effectiveness of an experimental fish diversion technique at a hydro facility located at the outlet of Seton Lake.   |
| <b>Trent University</b><br>Peterborough, ON                 | Assisted professors and graduate students in the collection and analysis of data related to zebra mussel infestation research of lakes in southern Ontario, and fish and fish habitat research in Hamilton Harbour, Ontario.  |

## **PROJECT EXPERIENCE – ENVIRONMENTAL ASSESSMENT**

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| <b>City of Surrey</b><br>Surrey, BC | Project Manager and Fisheries Biologist responsible for the preparation of an environmental assessment for proposed alterations of a watercourse in Cloverdale, BC and development of aquatic habitat compensation designs. The assessment involved characterization of existing wildlife and fish habitat, fish presence and distribution, and surface water conveyance and drainage for the watercourse. Habitat compensation planning included development of conceptual plans and detailed designs for an off-site location on the Serpentine River to achieve no net loss of aquatic habitat. Provided liaison with regulatory agencies during environmental review and approvals for the project. |
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**Southern Railway of  
British Columbia Ltd.**  
Surrey, BC

Project Manager and Fisheries Biologist responsible for the preparation of an environmental assessment to satisfy environmental review and permitting requirements. The environmental assessment involved evaluation of existing wildlife and fish habitat, fish presence and distribution, and surface water conveyance and drainage for watercourses adjacent to a railway as part of a railway expansion project in Cloverdale, BC. Developed mitigation strategies and design considerations to avoid construction impacts. Designed detailed off-site compensation plans to achieve no net loss of aquatic habitat. Provided project coordination, environmental monitoring, and technical expertise and inspections for the construction of the aquatic habitat.

**Interior to Lower  
Mainland Transmission  
Reinforcement Project**  
BC, Canada

Participated in the fisheries program as a component of the Environmental Assessment Certificate Application for a 500 kV transmission line for the Interior to Lower Mainland (ILM) Transmission Project. Project included RISC standard fish sampling and stream habitat assessments of important stream crossings for proposed alignments.

**BCTC Central  
Vancouver Island  
Transmission Line**  
Nanaimo BC, Canada

Participated in the fisheries assessment component of a CEEA screening level assessment and environmental constraints analysis conducted for the British Columbia Transmission Corporation's proposed CVI transmission line alignment options. Project included stream habitat assessments of identified stream crossings.

**City of Port Coquitlam**  
Port Coquitlam, BC

As Project Fisheries Biologist, prepared environmental assessment report to satisfy CEEA screening-level requirements for the Coast Meridian Overpass Project. Environmental assessment included evaluation and detailed mapping of aquatic resources and critical environmental issues. Recommended and designed mitigation and compensation measures for the design/build construction phases of the project enhancement and compensation planning. Developed and designed detailed off-site fish habitat compensation plans to achieve no net loss of aquatic habitat.

**TransLink**  
Maple Ridge, BC

As Project Fisheries Biologist, carried out environmental assessment of three lots proposed for rezoning and development by TransLink and the British Columbia Institute of Technology to house a joint large vehicle maintenance and training facility. Environmental assessment included evaluation and detailed mapping of aquatic, wildlife, and vegetation resources, critical environmental issues, and enhancement and compensation planning. The environmental assessment was used to meet District of Maple Ridge rezoning requirements and identify potential fisheries and wildlife issues and constraints associated with development of the lots. Potential mitigation measures and compensation and habitat improvement strategies were identified within the environmental overview report.

**Private Industrial Lot  
Owner**  
Surrey, BC

Assessed aquatic impacts of a lot development by a private owner and conducted fish habitat compensation planning to meet regulatory requirements. Proposed lot development included the infilling of a watercourse. Deliverables included preparation of an assessment report and detailed fish habitat compensation designs for submission to Fisheries and Oceans Canada and City of Surrey, as part of regulatory review and environmental permitting requirements.



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| <b>Metro Vancouver</b><br>Vancouver, BC  | Prepared an assessment of aquatic habitat impacts of a large-scale water main installation project, and identified mitigation measures and design considerations to mitigate habitat loss. Project activities included crossing beneath a large urban stream system, with construction options including open trenching and tunnelling. Prepared an assessment report for submission to Fisheries and Oceans Canada, as part of regulatory review and environmental permitting requirements.   |
| <b>Katabatic Power Inc.</b><br>Prince Rupert, BC   | Fisheries Biologist for fish habitat assessments and fisheries effects assessment for a large wind power development project as part of the environmental assessment submissions under CEAA/BCEAA.   |
| <b>UMA Engineering Ltd</b><br>Surrey, BC   | Developed and implemented an aquatic habitat assessment program for the widening of Highway 10 and replacement of the Serpentine River Bridge. Involvement included facilitating an Authorisation under the Fisheries Act and undertaking an environmental assessment meeting CEAA requirements.   |
| <b>Gateway Program, BC<br/>Ministry of<br/>Transportation</b><br>Lower Mainland, BC            | Developed and implemented a baseline aquatic habitat inventory program and conducted a historical information review for two highway corridors as part of the Gateway Project in the Lower Mainland. Prepared a baseline aquatic habitat report to document and summarise the habitat inventory and existing information compiled. Assessed the aquatic impacts of the proposed highway upgrades, identified mitigation measures and design considerations to avoid habitat loss, and identified compensation opportunities. Prepared an assessment report for inclusion as part of the environmental assessment submission to CEAA. |
| <b>Private Home Owner</b><br>Port Moody, BC  | Completed an environmental assessment and prepared environmental permit applications for a proposed development of a single family residential ocean frontage lot. The proposed development involved riparian setback reductions and the installation of a pool in close proximity to Burrard Inlet. A Sediment and Erosion Control Plan was prepared for the development and environmental monitoring was also provided during construction.  |
| <b>Austeville Properties<br/>Ltd.</b><br>Richmond, BC  | Developed and implemented a field program to assess the aquatic impacts of land development of a property. Collected biological data for watercourses in the vicinity of the property, summarised fisheries values in a report, and presented results and compensation concepts to regulatory agencies as part of receiving authorisation.   |
| <b>Marine Harvest Canada</b><br>Prince Rupert, BC  | Co-developed an assessment of potential impacts from a proposed land-based salmon hatchery development on water quality of an adjacent stream in northwestern British Columbia.  |
| <b>Greater Vancouver<br/>Regional District (now<br/>Metro Vancouver)</b><br>West Vancouver, BC | Aided in the assessment of potential impacts of proposed spoil disposal sites on wildlife and aquatic resources in the Capilano and Seymour River Watersheds.  |
| <b>Greater Vancouver<br/>Regional District (now<br/>Metro Vancouver)</b><br>West Vancouver, BC | Completed an assessment of ramping rate requirements to protect fish resources in the Capilano River and presented guidelines to protect these resources. The assessment involved field counts of stranded fish at several stations in the river during several ramp down events.  |



**TransCanada Pipelines**  
Fort Nelson, BC

Collected fish and fish habitat data at stream crossing sites along a proposed pipeline corridor in northern British Columbia.

## PROJECT EXPERIENCE – ENVIRONMENTAL MONITORING

**Metro Vancouver**  
Vancouver, BC

Acted as the owner's project environmental auditor for the installation of a large-scale water main installation. Verified that the contractor adhered to contractual and legislative obligations for environmental protection.

**Hyde Creek  
Stormwater Diversion  
Project**  
Coquitlam, BC

Environmental monitor for the City of Coquitlam. Provided site evaluation of environmental protection procedures, mitigation measures, and water quality sampling as part of the stormwater, water main, and sanitary sewer pipe installations along Victoria Drive and Coast Meridian Road.

**Single Lot Housing  
Development**  
Port Moody, BC

Provided environmental monitoring for house construction and development of a single lot. The lot development involved demolition of a building over a stream, and construction of a new house in close proximity to a stream and ocean foreshore. Responsible for providing recommendations for environmental protection and mitigation measures on-site during construction.

**Dollarton Highway  
Bridge**  
North Vancouver, BC

Environmental monitor for the District of North Vancouver responsible for monitoring of boulder clusters installed in the Seymour River as compensation structures for impacts caused to the Seymour River by the construction of a new Dollarton Highway bridge. Designed and implemented a monitoring program to determine pre- and post-development fish use of the area where the boulder clusters were installed.

**Capilano Reservoir  
East Abutment  
Seepage Control  
Project**  
West Vancouver, BC

Environmental monitor for the Greater Vancouver Regional District. Carried out an evaluation of downstream effects, implemented environmental protection procedures, mitigation measures, and water quality sampling attributed to construction.

**Capilano Fish Hatchery  
Weir Rehabilitation  
Project**  
West Vancouver, BC

Environmental monitor for the Greater Vancouver Regional District. Carried out site evaluation of environmental protection procedures, mitigation measures, and water quality sampling attributed to rehabilitation construction of Capilano Fish Hatchery Weir.

**Groundwater Well  
Cleaning**  
West Vancouver, BC

Environmental monitor for the Greater Vancouver Regional District. Carried out site evaluation of environmental protection procedures, mitigation measures, and water quality sampling attributed to cleaning of groundwater wells by the Greater Vancouver Regional District in the Capilano watershed.

## PROJECT EXPERIENCE – MINING

**BC Gold Corp.**  
Tagish Lake, BC

Conducted a preliminary environmental review and evaluation of environmental assessment and regulatory requirements for resuming gold exploration and mining activities at the historical Engineer Mine in Northern British Columbia.



**Miramar Giant Mine Ltd.**  
Yellowknife, NT

Led field work investigating affects of arsenic loading from arsenic affected soils, historical tailings deposits, and tailings impoundment on the environment at Miramar Giant Mine Ltd./DIAND. The study examined the affects of the arsenic loading on groundwater, surface water, and sediment quality in an embayment of Great Slave Lake as part of a monitoring program and risk assessment. Prepared a report summarising results of the study.

**Environmental Effects Monitoring (EEM)**  
Fraser Lake, BC

Assisted in the completion of a historical information review, baseline fisheries inventory, and study design related to the Environmental Effects Monitoring of Endako Mine in central British Columbia. Assisted in the completion of the Cycle I fish survey and benthic invertebrate survey.

**Environmental Monitoring and Risk Assessment**  
Oregon

Coordinated and conducted field work, and assisted in data analyses and report production components of an environmental study examining bioaccumulation of metals in freshwater mussels at a historic mine site in Oregon. The study also collected data on water quality, sediment quality, benthic invertebrate communities present. The study was completed for a confidential client as part of mine remediation efforts.

**Environmental Effects Monitoring**  
Logan Lake, BC

Aided in collection of water quality, sediment quality, benthic invertebrate community, and fish population data as part of the environmental monitoring program for Highland Valley Copper Mine.

**Habitat Assessment and Restoration**  
Logan Lake, BC

Participated in a study evaluating several options for rerouting surface water flowing through a drainage pipe to an open channel to enhance fish habitat and drainage at Highland Valley Copper Mine.

## PROJECT EXPERIENCE – FORESTRY AND PULP & PAPER

**Reconnaissance (1:20 000) Fish and Fish Habitat Inventories**  
Mackenzie, BC

Participated in a multi-year project to complete several stream and lake inventories to provide fisheries and habitat data in support of forest development planning for Abitibi Consolidated Inc. The study encompassed project areas within the Mackenzie TSA, located in the vicinity of Williston Lake. Standard methodologies developed by the Resource Inventory Committee were used for the habitat and fisheries assessments.

**Reconnaissance (1:20 000) Fish and Fish Habitat Inventories**  
Fort Nelson, BC

Participated in a multi-year study, which commenced in 1996, to provide fisheries and habitat data to support forest development planning in the Fort Nelson Forest District for Slocan Forest Products (Fort Nelson Division). Standard methodologies development by the Resource Inventory Committee was used for the habitat and fisheries assessments. Information summaries, photographic documentation, and classification and distribution maps were developed for the study areas.



**Reconnaissance (1:20  
000) Fish and Fish  
Habitat Inventories**  
Omineca/Peace, BC

Participated in a reconnaissance fish and fish habitat inventory of streams and lakes to provide fisheries and habitat data to support forest development planning in the Omineca River and Driftwood River watersheds for Canadian Forest Products Ltd. (Prince George). Standard methodologies developed by the Resource Inventory Committee was used for the habitat and fisheries assessments. Information summaries, photographic documentation, and classification and distribution maps were developed for the study areas.

**Fish Stream  
Identification**  
Mackenzie, BC

Participated in work for an ongoing project that provided riparian management area classifications for streams in or adjacent to a cutblock or road as required by the Local Area Agreement currently in place in the Mackenzie Forest District for Abitibi Consolidated Inc., in accordance with the Forest Practices Code. Standard methodologies developed by Resource Inventory Committee in association with the specification of the Local Area Agreement regarding fish stream identification were used for the habitat and fisheries assessments.

**Quality Assurance  
Audits**  
Chetwynd, BC

Conducted quality assurance audits of fish and fish habitat inventories. This included audits of the pre-field phases of the final project deliverables.

**Environmental Effects  
Monitoring (EEM)**  
Various sites and  
projects, BC

Conducted aquatic environmental effects monitoring (EEM) programs for a total of six inland and three coastal pulp and paper mills in British Columbia, located in Howe Sound, Crofton, Campbell River, Prince George, Quesnel, Castlegar and Kamloops. EEM programs involved monitoring of water quality, sediment chemistry, benthic invertebrate communities, and fish health assessment in marine and freshwater environments. Work included refinement of study design, completion of field surveys, data analyses and summary reporting as part of Cycle III.

## PROFESSIONAL AFFILIATIONS

Registered Professional Biologist (R.P.Bio.), College of Applied Biology of British Columbia

Member, Association of Professional Biology of British Columbia