Environment Canada

Fraser Basin Council

Southern Interior Beetle Action Coalition

Fostering Collaborative Responses to Hydrological Changes in the Nicola Watershed

30-31 March 2011
Merritt, BC

Workshop Summary as at 6 April 2011

Photo courtesy of Ministry of Forests, Lands and Natural Resource Operations

Prepared by: Mike Simpson, MA, RPF
Senior Regional Manager, Cariboo-Chilcotin and Thompson
Fraser Basin Council
250-392-1400 Williams Lake | 250-314-9660 Kamloops
msimpson@fraserbasin.bc.ca | www.fraserbasin.bc.ca

1. Introduction

What are researchers finding out about hydrological changes caused by the Mountain Pine Beetle (MPB) infestation in the Nicola watershed? What are the real-world impacts that we are and will be dealing with? How can we enhance collaboration to respond to, and minimize these impacts?

Following up from the March 2010 workshop *Hydrological Impacts of Mountain Pine Beetle in the Fraser Basin* held in Kamloops, one of the recommendations was to focus future work on a watershed smaller than the entire Fraser basin. The Nicola watershed was chosen for a follow-up workshop due to the history of water availability issues, multiple values at risk, a significant portion of pine with limited alpine terrain, and an existing watershed committee or round table.

Fifty people including ranchers, agrologists, hydrologists, engineers, foresters, elected leaders, students, concerned citizens, elders and the general public representing first nations, the agriculture sector, the forest industry, non-profit organizations, the consulting sector, academia, local, provincial and federal governments participated. This document summarizes the workshop held in Merritt on 30-31 March 2011. Also distributed with this meeting summary are copies of presentations that some individuals gave; they are named as the presenters' last name.pdf. Note that not all presenters had visual presentations.

2. Welcome

Mike Simpson, Senior Regional Manager, Cariboo-Chilcotin and Thompson Regions for Fraser Basin Council, welcomed participants. He reviewed the agenda (included in Appendix 1), and introductions were made around the room (see list of participants in Appendix 2). Environment Canada and the Southern Interior Beetle Action Coalition (SIBAC) were acknowledged as financial contributors to the workshop.

Mike acknowledged the **context** within which this workshop was taking place:

- Long history of water conflicts in the Nicola
- Past recommendations haven't always been implemented
- Water Use Management Plan (WUMP) was created
- MPB is just one of many factors affecting hydrology in the Nicola watershed
- Water is a common commodity, however interests and rights are colliding
- Water Act Modernization process is underway, new legislation is coming
- Aboriginal rights and title are asserted, and are evolving in the courts and legislation
- There are multiple perspectives and realities on the importance of water

Given the context, the **objectives for the workshop** were outlined as follows:

- Increase level of knowledge about the science-based hydrological impacts of Mountain Pine Beetle (MPB) and the changing climate in the Nicola watershed
- Establish positive and ongoing working relationships among research and extension organizations, federal agencies, provincial ministries, local governments, first nations and the private sector
- Identify information gaps and priorities for research and further collaboration in the watershed, how to improve decision making, and how to support implementation of the Nicola Water Use Management Plan (WUMP)

3. Current status of knowledge and research of MPB impacts and a changing climate on hydrology of the Nicola watershed and other similar Interior watersheds in BC

The focus of the first day was to share information about the science-based hydrological impacts of MPB and the changing climate, either specifically from the Nicola watershed or in similar Interior ecosystems.

Effects of MPB on snow and spring run-off

Rita Winkler, hydrologist, Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) gave a presentation on snow accumulation and ablation in forested ecosystems, the impacts of MPB on forest cover, and a summary of post-MPB and post-wildfire research. See *Winkler.pdf* for the presentation slides. Her conclusions were:

- Snow accumulation and ablation are highly variable, spatially and temporally
- Forest cover has a significant effect on snow accumulation and ablation
- Snow accumulation and ablation depend on interrelationships between the weather, snowfall pattern, and cover
- Initial changes in snow accumulation and ablation post MPB and fire may continue to change with loss of stand structure over time
- Depending on the extent of natural disturbance, the watershed and the year, changes in snow generated water yield may or may not be measureable at the watershed scale

After some discussion and questions, it was agreed:

- Climate has always been variable both year-to-year, and spatially. Trend of a changing climate is warmer winters, less precipitation as snow…but the current variability appears more significant than the long term trend
- Watershed research is done on a relatively small scale with controlled variables – it is difficult to scale-up to sub-basin or watershed level

Surface water-groundwater interaction between the Coldwater and Nicola Rivers and the Merritt aquifer

Kevin Bennett, groundwater hydrologist, MFLNRO gave an overview of work he completed that mapped the aquifer under the City of Merritt, and the relationship with the Coldwater and Nicola Rivers. Kevin presented the concepts of how surface water and groundwater are connected, including gaining, losing and disconnected stream reaches, and the impacts that extraction of groundwater has on the natural system. See *Bennett.pdf* for the presentation slides.

Kevin's conclusions were:

- Recharge to Merritt aquifer is dominated by river loss.
- Aquifer health is dependent on river flow.
- River health in summer is influenced by aquifer health.
- Climate change has resulted in earlier freshet and a longer dry season.
- Key challenge is how do we manage aquifer to increase recharge, reduce late summer river losses?
- Water management plans need to understand & consider groundwater and surface water relationships

Impacts of changes in stream peak flows

Don Dobson, consulting hydrologist with Urban Systems Ltd., gave an overview of the sources of flows in the Nicola watershed, impacts of changes to forest cover and in stream peak flows, including some studies in the Coldwater River. Don noted that although approximately 40% of

the watershed area is upstream of Nicola Lake, only 20% of the contribution to the entire watershed is from upstream of Nicola Lake. In contrast, Spius Creek and Coldwater Rivers in the southwestern part of the watershed contribute approximately 80% of the total volume of the Nicola system as measured at the outflow at Spence's Bridge, and yet comprise only 25% of the larger Nicola watershed area. There is a smaller component of pine in these 2 sub-basins. See *Dobson.pdf* for the presentation slides.

Don concluded that in sub-basins with decreases in forest cover due to MPB:

- There will be more snow accumulation in dead forests, and in clearcut areas
- There will be earlier snowmelt, and therefore runoff will be faster, earlier and increased
- Runoff will not be synchronized at different elevations (i.e., in a natural system, low elevations melt and have runoff earlier than high elevations; with increased dead forest and clearcuts at high elevations, runoff is no longer synchronized)

Don made the following more general conclusions:

- As the forest recovers and a live forest is re-established, snow accumulation and runoff will return to more natural conditions, and stream peak flows will be slower, be later in the season, and be of decreased quantity compared to current levels
- For the entire Nicola watershed, increases in stream peak flow will be negligible due to the majority contributions of Spius and Coldwater sub-basins and the minor component of pine forest
- Sub-basins with more pine forest such as Guichon, Quilchena and Upper Nicola will have more noticeable impacts on stream peak flows
- Climate is the wildcard, as Rita indicated – the variability has significant impacts on year-to-year changes in snowpack. Also, whether soils are dry or wet in the fall, and when the frost hits the ground in the fall will determine whether runoff replenishes soil moisture in the spring, or whether it runs off and fills up streams, rivers and lakes

Compendium of forest hydrology and geomorphology

Rob Scherer, Watershed Management Extension Specialist with FORREX (Forum for Research and Extension in Natural Resource Management) described the compendium which was released in December 2010 as a joint publication between the provincial government and FORREX. The compendium is a comprehensive synthesis of what we know about forest hydrology and watershed management in BC. Hundreds of authors contributed, and all articles were peer-reviewed. Topics are divided into 19 chapters.

The compendium can be downloaded by volume or chapter from the following website: http://www.for.gov.bc.ca/hfd/pubs/docs/Lmh/Lmh66.htm

4. Local knowledge, observations, responses, perspectives and impacts of MPB and hydrological changes in the Nicola watershed

The focus of the second day was to share information about the impacts of these hydrological changes on different economic sectors, the impacts from a first nations perspective, and the local responses to these challenges including the development of the Nicola WUMP. It was acknowledged that one person cannot give an accurate perspective on an entire economic sector or for the many different first nations; this was just an introduction.

The Nicola watershed and the Nicola WUMP

Elizabeth Salomon-de-Friedberg, Coordinator, Nicola Watershed Community Round Table, gave an overview of the Nicola watershed and the 10 sub-basins, the types of activities in each, and the water license allocations and flows. She also gave an overview of the Nicola WUMP, the process used to create it, and the current status of the plan. See *Salomon-de-Friedberg.pdf* for the presentation slides.

The Nicola watershed is comprised of 10 sub-basins that range from open grasslands and mixed forest, heavy agricultural use and rolling topography in the east and north, to more heavily forested and less developed in the south and west. In contrast to Dobson's presentation which suggested that the Coldwater and Spius Creek watersheds contribute the most significant volume to the Nicola River outflow at Spence's Bridge, those 2 watersheds only account for 12% of the water license allocations. In contrast, the Guichon, Upper Nicola and Lower Nicola each have approximately 20% of the water license allocations of the entire watershed. Annual licensed water quantity is 99 million m^3/year, with between 76% and 81% of allocation, demand and actual use by the agriculture sector. Water budget for a normal year, calculated as supply less demand, is only slightly positive in the drier sub-basins of the east and north such as Clapperton, Guichon, Moore. Water budget for a normal year is the highest in the Lower Nicola, Coldwater, Spius, Middle and Upper Nicola sub-basins. Climate change projections for water budget in 2020 and 2050 show a general decreasing trend over time.

The Nicola WUMP was an initiative led by a multi-stakeholder committee, administered by the NWCRT, that after many meetings over 5 years that culminated in the finalization of the plan in March 2010. The multi-stakeholder committee is frustrated that the plan has not been endorsed by any level of government. The plan and numerous technical reports are available on the website http://www.nwcrt.org/wump_overview.htm

Cattlemens' perspective

Judy Guichon, local rancher and President, BC Cattlemens' Association, summarized that water and grass are needed to support the cattle industry. The Nicola watershed is an amazing place that grows bunchgrass, and cattle are self-sufficient for most of the year. Judy observed that in 40 years, she hasn't seen 2 years that are the same. Judy discussed some of the benefits resulting from the MPB infestation including providing new grassland areas. She mentioned that the climate has always been changing and that we need to adapt to whatever climate scenarios are thrown at us, and to address our fear, and to not fear change.

First Nations perspective

Scotty Holmes, Upper Nicola Band member and Coordinator, Water Stewardship and Management, Coldwater Indian Band spoke about Aboriginal rights as they relate to water, the role of traditional ecological knowledge, and first nations perspectives on hydrological changes. Scotty stated that while Western science is not so different from traditional ecological knowledge

and the role of experts in Aboriginal culture, the first nations perspective is to look at systems as a whole rather than individual components. Impacts such as MPB are symptoms that the ecosystem as a whole is not being looked after properly. Title and rights from a first nations perspective is not the same as a fee-simple approach that non-natives might take; their perspective of title and rights arises from the responsibility to take care of the land, and that caring for the land is a continual process.

Forest industry perspective

Christian Guay, Area Forester, BC Timber Sales described the issues that forest licensees must consider in their timber harvesting operations. See *Guay.pdf* for the presentation slides.

Christian relayed the many issues and considerations that the industry and forest professionals must consider before harvesting timber. Current challenges due to MPB and hydrological changes include weather and operational constraints, cumulative impacts of other resource management activities, equivalent clearcut area (ECA) thresholds being reached in many watersheds, salvage of dead timber value, and managing with limited information.

Neil Todd, Nicola Watershed Stewardship Fisheries Authority, was scheduled to speak about the fisheries and ecosystems perspective. He was unavailable due to meetings the previous day and a tight travel schedule to return to Merritt. It was agreed that Scotty Holmes addressed many of the ecosystem issues in his presentation.

5. Small group discussions on collaboration and improved decision making

Mike facilitated a discussion of the impacts, challenges and decisions that will need to be made as a result of not only these changes resulting from MPB, but as a result of hydrological changes from climate change as well. These impacts and challenges have been categorized in 3 groups below, with participants input. Participants divided into these 3 groups based on their interests, and had further discussion. The small group work is summarized as follows:

Water Allocation (n = 14 in group)

- Domestic and agricultural
- Infrastructure associated with intakes, and concerns of operation of intakes in peak flows, and low flows, as well as storage
- Quantity, quality and allocation of water (competing demands)

For water allocation, what are the specific impacts or challenges? By sub-basin?

- Seasonal sensitivity of water sources
- Surface water relied on as primary source for irrigation, wells as back-up
- Dairy pressures moving into the Nicola
- Currently don't have a clear understanding of impacts on ground water development
- Need to regulate groundwater
- Water quality concerns from industry, recreation, seasonal influences

For water allocation, what are the decisions that will be affected? How will they be affected?

- Decisions to locate and develop dams and storage capacity
- Development of new irrigation systems
- Strategic timber harvesting to manage snowpack and run-off
- Allocation decision on new water licenses, and management of existing ones

What are the key information gaps to improve decision making?

- Aquifer supply and demand
- Need water quality objectives and improved capacity for monitoring

What kind of collaboration exists between governments, industry, First Nations, and others?

- Nicola Watershed Community Round Table (NWCRT) exists
- Nicola Similkameen Innovative Forestry Society (NSIFS) exists
- Sharing of water resource information from research projects

How can collaboration be improved? Beyond today's workshop? Beyond asking for money?

- Continue to utilize and promote NWCRT and NSIFS
- More collaborative workshops such as this one

What are some pilot projects to bridge science, policy and decision making?

- Higher efficiency irrigation systems
- Agriculture water reserves as proposed in the draft *Water Sustainability Act* – pilot this concept in an area such as the Nicola watershed or a sub-basin
- Monitoring of groundwater and aquifer use

How do we proceed? What are the next steps?

- Follow up on reviewing and using water quantity and quality data for establishing objectives, and supporting water resource issues
- Apply pressure to government to address these issues

Who has what resources to proceed?

- Websites exist for NWCRT and NSIFS to share information

Land Use Planning (n = 10 in group)

- Land use planning and activities
- Flood management
- Water storage, water quality

For land use planning, what are the specific impacts or challenges? By sub-basin?

- Short work windows due to limited flows
- Different needs in different sub-basins (e.g., drought management in upper watershed, flooding in lower elevation areas)
- Various human impacts on water
- Groundwater supply for communities, and resources for information sharing or communication are not well developed or understood
- Lack of a strategic land use/land and resource management plan for the region, results in a partial view of the entire watershed when looking at one of the sub-basins
- Lack of follow-through on enforcement

For land use planning, what are the decisions that should be affected? How will they be affected?

- Decisions on land use by city, regional district, and the province (e.g., development applications, official community plans)
- Development and maintenance of infrastructure (e.g., wells, well casings)
- All decisions will be affected by the presence of too many authorities, or decision making bodies that can make inappropriate decisions that have negative impacts on hydrology

What are the key information gaps to improve decision making?

- Effect of MPB timber harvesting and related impacts on groundwater and drinking water from subsequent increases in flows and liberation of contaminants
- Management plan direction to statutory decision makers
- Ecological health is not well understood
- Lack of resources to meet information needs

What kind of collaboration exists between governments, industry, First Nations, and others?

- Nicola WUMP was created
- Old Growth Management Areas are established, in absence of higher level land use plan
- New Relationship Accord and partnership arrangements
- Web sites exist to share information

How can collaboration be improved? Beyond today's workshop? Beyond asking for money?

- Get the appropriate experts and people together to identify where the key information gaps and risks exist, and to develop a plan of action for a defined area
- Focus the work at an appropriate scale
- Experts to include non-government people, such as first nations elders and others

What are some pilot projects to bridge science, policy and decision making?

- Package parts of the Nicola WUMP and deliver to Thompson Nicola Regional District in a form that can be incorporated into land use planning, that does not consume many resources on their part

Fisheries and Ecosystems (n = 7 in group)

- Fisheries, ecosystems and ecosystem functioning
- Water storage, water quality

For fisheries and ecosystems, what are the specific impacts or challenges? By sub-basin?

- Water quantity in streams, rivers and lakes will detrimentally impact fisheries and aquatic life, and water temperature will rise as volumes decrease
- Wide variety of ecosystems and habitats in the Nicola watershed, all are affected by MPB differently
- Other forest health issues beyond MPB, and other impacts such as interface fire risk
- Nicola Lake and siltation impacts at the mouth, impacting fisheries
- New dairy industry in the watershed with outsiders who do not understand the local issues around hydrology and drought
- New well drilling is occurring, with no regulation
- The need to identify the cumulative effects is extremely challenging

For fisheries and ecosystems, what are the decisions that will be affected? How will they be affected?

- Linkage between land use decisions and the impacts on ecosystem values and fisheries
- How broad land use policies consider and "scale up" local values and address cumulative impacts on ecosystem diversity and water quality
- Green energy proposals on Nicola Lake

What are the key information gaps to improve decision making?

- Local impacts on streams, riparian areas and fisheries and ecosystems are more easily understood than the cumulative impacts on a sub-basin, or the entire Nicola watershed
- Proactive planning – most planning is reactive, whereas the Nicola WUMP is proactive
- Proactive planning is needed for regional/local sensitive ecosystem mapping and planning; groundwater recharge/input zones; utilizing this groundwater info in decision making and allocation; understanding thresholds of groundwater sustainability
- Local indicators and criteria for watershed health
- Continual communication and collaboration, information sharing, and understanding how to work together

What kind of collaboration exists between governments, industry, First Nations, and others?

- Good local collaboration at regional and provincial levels, with local representatives
- Good information sharing (e.g., Compendium of Forest Hydrology and Geomorphology)

How can collaboration be improved? Beyond today's workshop? Beyond asking for money?

- Continue to improve communication between levels of government
- Continued involvement of various economic sectors operating in the watershed
- Leveraging funds from various organizations

What are some pilot projects to bridge science, policy and decision making?

- Nicola Lake water quality monitoring
- Study to identify sensitive habitats and areas of first nation significance or spiritual value
- Cumulative effects pilot project
- Restoration activities on riparian habitat

How do we proceed? What are the next steps?

- Involve and influence local politicians
- Outreach and education in the community across all sectors
- ID and inventory areas where restoration work is required in the watershed
- Consider setting up a water board similar to the Okanagan Basin Water Board

Who has what resources to proceed?

- Federal funding sources include Environmental Defense Fund, ecoAction funds

6. Next Steps

Throughout the workshop, Mike Simpson reminded people that the role of Fraser Basin Council is to bring people together to address sustainability issues that cross multiple jurisdictions. The Council acts as a catalyst to help individuals, organizations, industry sectors, first nations and orders of government to find ways to work together to improve decision making and share resources. However, the Council has no mandate to implement recommendations from this or other workshops with a relatively limited staff throughout the province.

It is up to the participants to build on the relationships developed at the workshop, carry forward the ideas generated in the small group sessions, and work together to address the hydrological issues in the Nicola watershed.

7. Evaluation

Participants verbally evaluated the workshop, the following were some comments:

- 2 day format was good, with research and science-based knowledge sharing on day 1 to inform discussions on day 2 was good
- After the long WUMP process, it's rejuvenated interest in the topic and re-inspired many of the participants
- Good collaboration opportunity to bring folks together that may not have participated in WUMP
- Name of workshop was cumbersome, didn't draw attention
- Raising awareness of the workshop could have been improved, many participants came across the registration form by accident
- Not everyone present agreed to release their contact info in an appendix of a meeting summary, therefore only names and organizations will be distributed

Appendix 1 – Agenda

Fostering Collaborative Responses to Hydrological Changes in the Nicola Watershed
Final Agenda as at 28 March 2011

Workshop:	Wednesday March 30, 2011, 1:00pm to 4:30pm and Thursday March 31, 2011, 8:30am to 1:30pm
Location:	Merritt Civic Centre, rooms 2+3, 1950 Mamette Ave., Merritt, BC

Workshop Objectives

- Increase level of knowledge about the science-based hydrological impacts of Mountain Pine Beetle (MPB) and the changing climate in the Nicola watershed
- Establish positive and ongoing working relationships among research and extension organizations, federal agencies, provincial ministries, local governments, first nations and the private sector
- Identify information gaps and priorities for research and further collaboration in the watershed, how to improve decision making, and how to support implementation of the Nicola Water Use Management Plan (WUMP)

Day/time	Topic	Who
March 30 12:00pm	Lunch (provided)	
1:00pm	Welcome, objectives, introductions, expectations	Mike Simpson, Senior Regional Manager, Fraser Basin Council
1:15pm	Current status of knowledge and research of MPB impacts and a changing climate on hydrology of the Nicola watershed and other similar Interior watersheds in BC ▪ Excercises/small group dialogue on what key research findings are of most value to your organization/your sub-basin ▪ Nicola watershed maps available on table	Mike Simpson
1:30pm	Effects of MPB on snow and spring run-off	Rita Winkler, Research Hydrologist, Ministry of Natural Resource Operations, Kamloops
2:00pm	Surface water-groundwater interaction between the Coldwater and Nicola Rivers and the Merritt aquifer Sample water budget	Kevin Bennett, Groundwater Hydrologist, Ministry of Natural Resource Operations, Kamloops
2:30pm	Coffee and networking break	
3:00pm	Impacts of changes in stream peak flows	Don Dobson, Senior Water Engineer, Urban Systems Ltd.
3:30pm	Compendium of Forest Hydrology and Geomorphology	Kevin Bladon, Assistant Professor, Thompson Rivers University (TBD)
4:00pm	Reporting back from participants ▪ What research findings did you find most interesting? Are of the most value? For what particular issues or sub-basins?	Mike Simpson to facilitate
4:30pm	Adjourn	
6:30pm to 8:30pm	Public forum – see separate agenda	Open to public, not just people registered for the workshop

Day/time	Topic	Who
March 31, 8:30am	Welcome, overview of Day 1, objectives for Day 2, introductions ▪ Exercise for research organizations and government agencies – what research or support opportunities do you see?	Mike Simpson, Senior Regional Manager, Fraser Basin Council
8:45am	The Nicola Watershed ▪ Description of watershed, sub-basins, land use, water licence allocation by sub-basin, etc. ▪ Brief history of Nicola WUMP	Elizabeth Salomon-de-Friedberg, Coordinator, Nicola Watershed Community Round Table
9:15am	Cattlemens' perspective ▪ Local knowledge and observations about changes due to MPB and changing climate ▪ Impacts on the agriculture industry	Judy Guichon, President, BC Cattlemens' Association
9:30am	First Nations perspective ▪ Traditional ecological knowledge ▪ Aboriginal rights and water ▪ Local knowledge and observations about changes due to MPB and changing climate – narratives or data	Scotty Holmes, Coordinator, Water Stewardship and Management, Coldwater Indian Band
9:45am	Forest industry perspective ▪ Local knowledge and observations about changes due to MPB and changing climate ▪ Impacts on the forest industry and management of forests	TBD
10:00am	Ecosystems and fisheries perspective ▪ Local knowledge and observations about changes due to MPB and changing climate ▪ Impacts on fisheries and ecosystem processes	Neil Todd, Nicola Watershed Stewardship Fisheries Authority
10:15am	Coffee break	
10:30am	Small groups to discuss opportunities for collaboration and improved decision making in the following topic areas: ▪ consumptive uses of water; and ▪ fisheries/ecosystems: ▪ other?	Small groups
12:00pm	Lunch (provided)	
12:30pm	Reporting out from small group sessions	
1:15pm	Wrap up, next steps, evaluation	

Appendix 2 – List of Participants

The following were present for at least a portion of the 2 day workshop:

First Name	Last Name	Organization
William	Abbott	Shackan Indian Band
Harold	Aljam	Coldwater Indian Band
Breck	Alward	Forsite Consultants Ltd.
Mary	Archachan	
Neil	Archachan	
George	Armstrong	
Dave	Baker	City of Merritt
Kevin	Bennett	Ministry of Forests, Lands & Natural Resource Operations
Dalyce	Brandt	Southern Interior Beetle Action Coalition
Alan	Caverly	Ministry of Forests, Lands & Natural Resource Operations
Bob	Cavlek	BC Timber Sales
Lou	Cooke	BC Cattlemens' Association, BC Agriculture Council, Nicola Stock Breeders' Association
Don	Dobson	Urban Systems Ltd.
Marlon	Dosch	Ministry of Forests, Lands & Natural Resource Operations
Erika	Doyon	Tolko Industries Ltd.
Hector	Fountain	
Katherine	Gizikoff	Taseko Mines Ltd.
Gwyn	Graham	Environment Canada
Christian	Guay	BC Timber Sales
Judy	Guichon	BC Cattlemen's Association
Scotty	Holmes	Coldwater Indian Band
Marc	Imus	Ministry of Jobs, Tourism and Innovation
Barb	Jackson	Thompson Nicola Regional District
Liis	Jeffries	Nicola Watershed Community Round Table
Harold	Joe	Nicola Watershed Community Round Table
Harry	Kroeker	City of Merritt
David	Lawrence	Coldwater Indian Band
Jack	Madryga	Nicola Watershed Community Round Table
David	Maloney	Ministry of Forests, Lands & Natural Resource Operations
Bruce	McFarlane	Ministry of Forests, Lands & Natural Resource Operations
Gloria	McGovern	Nicola WUMP
Randy	Murray	Thompson Nicola Regional Dist

Ranger	Oppenheim	Shackan Indian Band
Ginny	Prowal	City of Merritt, Water Resources Advisory Committee
James	Quesnel	Nicola WUMP
Mayor Susan	Roline	City of Merritt
Elizabeth	Salomon-de-Friedberg	Nicola Watershed Community Round Table
Mary	Sandy	
Gerry	Sanford	Nicola Watershed Community Round Table
Rob	Scherer	FORREX
Lee	Seymour	Shackan Indian Band
Doug	Shackelly	Shackan Indian Band
Mike	Simpson	Fraser Basin Council
Marc	Solomon	Fraser Basin Council
Christian	St. Pierre	
Glenn	Thiem	Forsite Consultants, Nicola-Similkameen Innovative Forestry Society
Stan	Thiessen	Ardew Wood Products
Ruth	Thomas	Neskonlith Indian Band
Kim	Vizl-Carmen	Pinerock Ridge Graphic Art & Design
Rita	Winkler	Ministry of Forests, Lands & Natural Resource Operations
Sarina	Wood	Neskonlith Indian Band

Appendix 3 – Information Sources and Resources

British Columbia Drought Response Plan http://livingwatersmart.ca/drought/response.html

BC River Forecast Centre http://bcrfc.env.gov.bc.ca/bulletins/watersupply/current.htm

Compendium of Forest Hydrology http://www.for.gov.bc.ca/hfd/pubs/docs/Lmh/Lmh66.htm

Environment Canada http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=65EAA3F5-1

FORREX http://forrex.org

FORREX Streamline publication http://forrex.org/publications/streamline/streamline.asp

Fraser Basin Council http://www.fraserbasin.bc.ca/

Nicola Watershed Community Round Table http://www.nwcrt.org/index.htm

Nicola WUMP http://www.nwcrt.org/wump_overview.htm

Nicola Similkameen Innovative Forestry Society http://www.nsifs.bc.ca/

Okanagan Basin Water Board http://www.obwb.ca/

Southern Interior Beetle Action Coalition http://sibacs.com/

Water Act Modernization http://livingwatersmart.ca/water-act/