

Nicola Water Use Management Plan: Case Study

Prepared by Tanis Douglas, RP Bio

for

Watershed Watch

&

The 17th *Speaking for the Salmon* workshop on Groundwater and Salmon

Droughts, climate change, and economic and population growth are predicted to intensify competition and conflict between users of scarce water resources – including both humans and fish. A successful community-led process in the Nicola Valley is addressing water conflicts in order to plan sustainable choices for the use and conservation of groundwater and surface water. Addressing groundwater availability and use is important in the Nicola watershed, where, in addition to extensive surface water licenses, an increasing amount of water is being taken using wells that tap into alluvial aquifers – the valley-bottom aquifers that supply the Nicola River and tributaries with base flows and thermal refugia for salmon. Yet, as is the case elsewhere in the province, new wells can be constructed with no requirements for permits.

In the fall of 2004, Nicola watershed residents initiated a water use management planning process to address concerns related to water, fish flows, and the Nicola Dam. The planning was initiated by the Nicola Stockbreeders Association, and included a public workshop hosted with the help of the Nicola Watershed Community Round Table. The key concern of residents was water quantity – having enough water for surface water license holders, other water users, and fish, particularly with the current and impending problems associated with climate change (Nicola WUMP 2006). The local effects of climate change are already seen in higher summer temperatures (BC MWLAP 2002), changing snow depths (BC MOE 2002), earlier and smaller spring freshets and longer duration low flow periods (Hatfield 2006), and mountain pine beetle infestations. Before the mountain pine beetle (MPB) epidemic runs its course by 2013, a significant amount of forest cover in the watershed is predicted to be lost, both to the beetle and to salvage harvesting. More than 50% of the forest stands in the Merritt Timber Supply Area consist primarily of lodgepole pine that is susceptible to MPB (Forsite *et al.* 2006). The changes underway to these landscapes have major implications for the timing and quantity of stream flows (Fenger *et. al* 2006).

With additional increases in population and economic activity – and a lack of integrated planning that takes water into account – there was a concern whether there would be adequate water to sustain existing and projected uses (Nicola WUMP 2007). Development pressures are intense and are driving much of the concern over sustainable water supplies. As the planning was initiated a consensus emerged that better information

and understanding was required regarding water supply/demand, storage (e.g. completing the Nicola Dam), redistribution, and groundwater resources. Water quality was also identified as important, and participants expressed the desire to maintain clean, high quality water suitable for the intended uses (Urban Systems Ltd. 2004).

Fish in the Nicola Watershed

The Nicola watershed is one of the biggest tributaries to the Thompson River, and is home to some of BC's important Upper Fraser Chinook runs, an endangered coho salmon population, a small pink salmon run, and the exceptionally large Thompson River steelhead, among other species. Surface water licenses have been issued in the watershed since 1871, and extensive withdrawals – mainly for irrigation – have had major effects on fish habitat in this important drainage (Rosenau and Angelo 2003). An overview of fisheries concerns and stream flows indicates that stream flows are naturally and critically low during important life history periods for local fish stocks.

There has been a lengthy history of water-related conflicts in the watershed, with fisheries professionals and advocates pointing to inadequate fish flows and declining fish stocks as evidence that all is not well with management of flows. Extensive water extraction intensifies low flows, and there appear to be fundamental trade-offs between fish and human uses, in that increased allocation for one will de facto imply a loss for the other. (Hatfield 2006). In dry years in the late 1970's and early 1980's, water shortages brought the conflict between fish and agriculture to a head. In 1983, a Nicola Basin Strategic Plan was drafted to address these issues, and contained provisions for the protection and recovery of salmon and steelhead. This had the effect of slowing further surface water allocations in the basin (Rosenau and Angelo 2003), though contradictory information exists on whether in fact further water allocation did proceed. While the Water Stewardship division of the Ministry of the Environment (MOE) has indicated that no new licenses have been allocated (John Anderson, Nicola WUMP, personal communication), a review of web-based water license information for the Pacific Salmon Foundation concluded that licenses were issued in several Nicola watershed sub-basins in recent years (Hatfield 2006). This is a discrepancy that needs to be resolved.

Storage on the Nicola mainstem was to be increased to the benefit of fish and agriculture in 1985, by constructing a new replacement dam at the outlet of Nicola Lake. However, the dredging required to fully realize the benefits of this new dam was not properly completed. Subsequently, in 2001, a recovery plan was developed for the Coldwater River (Nelson *et al.* 2001), a major tributary with a history of water use conflicts. Yet demand to allocate additional surface water for both development and agricultural purposes remains intense (Rosenau and Angelo 2003). Because surface water is fully allocated, it is likely that many users are turning to unregulated groundwater to meet their needs.

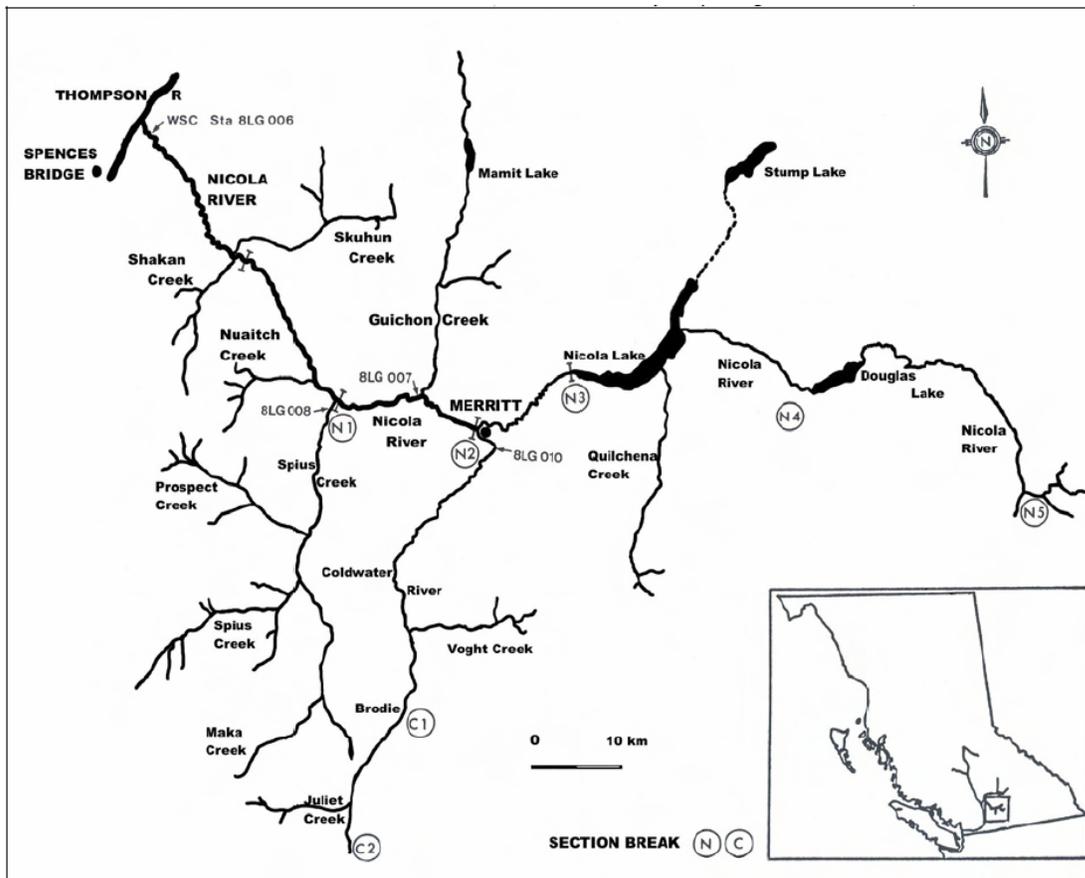


Figure 1: The Nicola Watershed (Rosenau and Angelo 2003)

Water temperature is a major fisheries issue in the Nicola watershed. When flows are reduced, the remaining water is more quickly heated by solar radiation. This problem is exacerbated by loss of cooling groundwater flows, and by extensive removal of riparian vegetation that results in a loss of shade. Stream temperatures often exceed optimal levels for salmonids, and even reach lethal levels ($25^{\circ}\text{C}+$) on a fairly routine basis. Fisheries experts believe that short-term survival is often possible due to colder water refugia provided by groundwater. However, groundwater extraction and depletion is a concern in the Nicola watershed, bringing into question the long-term survival of fish stocks. In addition to providing for short-term survival during extreme conditions, cooler groundwater flows are often necessary for salmon stocks to survive in freshwater long enough to spawn. Fisheries and Oceans personnel (Richard Bailey, personal communication) have been monitoring Chinook in the Nicola River since 1995. They have found that spring Chinook adults likely survive only because of thermal refugia created by groundwater, and that the locations of these adults are predictable based on depth and temperature. They also note that juvenile Chinook burrow into the streambed during the hottest portion of the day, in areas where incoming groundwater temperatures are $16\text{-}17^{\circ}\text{C}$ (compared to ambient river temperatures of $23\text{-}25^{\circ}\text{C}$). Continued development-related groundwater extraction puts this stock in significant jeopardy (Richard Bailey, personal communication).



Figure 2: The Coldwater River seen from the Coquihalla Highway. Note the removal of riparian vegetation (Rosenau and Angelo 2003). Photo: Marvin Rosenau

The WUMP Process

In developing and implementing the planning process, the local community took the lead role, with government representatives playing an important but subordinate role (Nicola Watershed Community Round Table 2005). Participants were united in their view that the whole community should be involved and consulted, including First Nations communities. As a result, there are regular multi-stakeholder committee meetings, subcommittees that allow every individual to participate in plan development, a planning team supporting the multi-stakeholder committee, and public education meetings with guest speakers. The pre-existing Nicola Watershed Community Round Table assists the process by providing capacity and support. Decisions are made by consensus, and the only criteria for inclusion is a willingness to abide by the principles set out in the Terms of Reference (Nicola WUMP 2007).

Phase 1 of the process was a scoping exercise to define how to proceed. Phase 2 is expected to be complete in 2007, and consists of studies to fill the information gaps identified in Phase 1. Three studies are underway or will be conducted to address: 1) present and future water demand, 2) additional storage sites, and 3) groundwater and surface water supply and interaction. Phase 2 will also produce a draft water management model and a drought strategy, and is exploring governance options. Phase 3 will see the evaluation and review of the plan by the public, and Phase 4 consists of plan implementation and evaluation (Nicola WUMP 2007).

Current Results and Next Steps

In 2006, a Phase 2 study (Urban Systems Ltd. 2006) found that the completion of the Nicola Lake Dam project is technically feasible and cost effective, and that additional storage would greatly benefit agricultural interests as well as the fishery. (However, the report did not detail the trade-offs to fish and wildlife values resulting from lake drawdown, or whether additional water supply would provide measurable benefits to fish habitat - Alan Caverly, MOE, personal communication.) The Nicola Stockbreeders are moving forward with a proposal to improve the dam. There was also research into existing governance models that could help with development of a model specific to the Nicola WUMP (Guichon 2006), and WUMP stakeholders used this information as a basis for dialogue. A great deal of activity is occurring in 2007: further work is being done on additional storage sites, the study on present and future water demand was due at the end of February, a further study looking into governance is due the end of March, and a surface and groundwater supply and interaction study is due the end of June, pending funding. The committee is also looking into water demand management, and into developing a water use management tool inspired by work done in the Okanagan Basin. If the entire WUMP process is carried out as planned, the total cost is expected to be \$1.3 million. This does not include any costs for ongoing water management. It is likely that there will be some sort of ongoing community management of water, and the form this will take is under study with the current exploration of governance options.

Coordinated community-based initiatives like this one are the only kind likely to succeed in managing water use and conflicts in water-scarce areas like the Nicola Valley. With this type of planning, the potential exists to improve conditions for fish, or to mitigate some of the impacts of increased development. Making a positive and lasting difference for fish will be challenging given the various pressures affecting fish habitat, but WUMP stakeholders are keen to succeed in addressing fisheries and other values. This kind of community input is key in making hard decisions and trade-offs to reflect the values of society as a whole.

References

BC Ministry of the Environment. 2002. Indicators of Climate Change for British Columbia 2002.

<http://www.env.gov.bc.ca/air/climate/indicat/index.html>

BC Ministry of Water, Land and Air Protection. 2002. Environmental Trends in British Columbia 2002. BC Ministry of Water, Land and Air Protection State of the Environment Reporting.

<http://www.env.gov.bc.ca/soerpt/997climate/temperatureglance.html>

Fenger, M., T. Douglas, D. Jones, and others. 2006. An Assessment of Mountain Pine Beetle Implications to the Kamloops Land and Resources Management Plan. Prepared for the Integrated Land Management Bureau, Kamloops BC, by Mike Fenger and Associates, May 2006.

Forsite Forest Management Specialists, Symmetree Consulting Group and Mike Fenger and Associates. 2006. Merritt TSA Type 1 Silviculture Strategy. Version 2.0. Prepared for the BC Ministry of Forests and Range, March 22, 2006.

http://www.for.gov.bc.ca/hfp/silstrat/pdffiles/05-06/Merritt/Merritt%20Silviculture%20Strategy-FINAL_Mar22-06.pdf

Guichon, A. 2006. A Study of Governance Models. Prepared for the Nicola Water Use Management Plan.

<http://www.nicolawump.ca/reports.htm>

Hatfield, T. 2006. Nicola River Watershed – Water Use Management Plan Instream Flow Needs for Fish. Prepared for the Pacific Salmon Foundation, Vancouver, BC.

Nelson, T, R. Bocking and M. Gaboury. 2001. Coldwater River Watershed Recovery Plan. Prepared for the Pacific Salmon Endowment Fund.

<http://www.psf.ca/04programs/coldwaterrecovery.pdf>

Rosenau, M. and M. Angelo. 2003. Conflicts between People and Fish for Water: Two British Columbia Salmon and Steelhead Rearing Streams in Need of Flows. Prepared for the Pacific Fisheries Resource Conservation Council.

http://www.fish.bc.ca/reports.php?report_id=48

Urban Systems Ltd. 2004. Charting Our Future: Overview of Workshop Results, December 2004. Prepared for the Nicola Watershed Community Round Table.

<http://www.nicolawump.ca/reports.htm>

Urban Systems Ltc. 2006. The Completion of the Nicola Lake Dam Project: Technical Feasibility Study. Prepared for the Nicola Stockbreeders Association.

<http://www.nicolawump.ca/reports.htm>

Nicola Watershed Community Round Table. 2005. Report on Phase 1 of the Process Leading to a Nicola Water Use Management Plan.

<http://www.nicolawump.ca/reports.htm>

Nicola WUMP. 2007. Website viewed January 24, 2007. <http://www.nicolawump.ca>