

The Kinbasket Reservoir

Foot print issues have always been pushed to the back of what might or could be done to enhance the local conservation and or recovery efforts. Numerous environmental studies (appendix #1) dating back to the time of flooding began to identify problems that would require attention. (It is interesting to note no studies precede flooding). Understanding that the past cannot be undone, we as a people are now looking into more of how the natural world functions, have readily studied and identified “Rain Forests” as one of the key sources of biodiversity and reviewed and studied many of the environmental concerns of the reservoir. The central area of the reservoir being one of those Interior Rain Forest regions on earth and needs to be viewed in that light today.

Misty mountains clad in cedar, hemlock and spruce, towering peaks and deep valleys, glaciers, rushing streams, and rich old-growth ecosystems, brings to mind the well supported, studied and protected west coast of British Columbia. Less known and recognized is that this term applies equally to the areas of Interior Rain Forest found in deep valleys and eastern slopes through the Rocky Mountain Trench, that run’s from the USA Border into the Prince George district, a region more than 500km from the ocean.

Climate of the Interior Rain Forest shares some of the same features as the coastal rain forests. Summer temperatures though lower than coastal are still higher than variable low temperatures seen in Boreal forest that covers much of the province. Winter temperatures are much colder than coastal with precipitation falling as snow, this being the key in creating the moisture requirements of a rain forest. Snow packs in the area often exceed several meters depth and lay upslope of the rain forest zone. Prolonged melt of this deep snow pack over the summer months and subsequent groundwater flow maximizes soil moisture content. This combined with rain fall at higher elevations and foggy mornings creates the humid conditions necessary to minimize water loss over the dryer summer periods.

The ecology of the inland rain forest is shaped by the distinctive climate and location along the lower slopes of the mountains. The natural disturbance regimes, the type of events that kill or damage trees are infrequent, insect damage and fires being key, with neither occurring frequently. Thus stands are naturally dominated

by older stands. Forest regeneration is by gap dynamics, a process of plant succession within small openings. Over time these stands develop characteristics of old forests, with large diameter trees, standing and or having fallen trees create a canopy that's shades the understory, plant species become specific to the humid low light conditions, offering a variety of niches for plants, animals, fungi, lichens and microbes.

It is the domain of numerous animal species reliant upon the very wet sub zone of the Sub-Boreal spruce zone, the moist, wet and very wet subzones of the interior coastal hemlock zone, and adjacent higher elevation ecosystems. Wildlife that moves from zone to zone, depending upon the season and food supplies. The distribution of Mountain Caribou is so closely associated with the interior wet belt that they have been considered as the marker species for the area and as an indicator or the health of the ecosystem.

During much of the 20th century these old western red cedar and western hemlock forests were considered to have little commercial value. The Provincial Gov't actively encouraged the forest industry to derive whatever economic benefits it could from the old stands and replace them with rapidly growing young trees. (One can still find large log dumps along the western side of the reservoir). The oldest and largest stands now lay in the bottom of the reservoir. Not only does the public know little about our interior rain forests but those who have made decisions about land use have done so without adequate access to scientific information about the ecosystems. A key component of ecosystem management is attempting to maintain the range of variability of those past patterns resulting from natural disturbances, from small treefall gaps to large wild fires.

The climate and even the geomorphology of the inland rain forest have changed over time and will continue to change. As the earth is currently in an era of accelerated climate change, we look at the potential future climate of the rain forest as being projected in climate change models.

Reservoirs come under the responsibility of our government and all require attention as a people as we go forward but there is a responsibility of gov't to recognize and step forward in regards to the Kinbasket before it is allowed to completely revert to something other than what the area once was.

What Happened

In 1948 flooding of the Columbia River resulted in loss of life and substantial damage to the city of Portland and Trail in BC. In the expansionist period following the 2nd World War the regulation of the Columbia River through the construction of dams was seen as not only a means to control flooding but create the opportunities to construct power generation facilities. This in anticipation of increased industrialization and coming populations along the coastlines. Thus the Columbia River Treaty came into being. A Treaty that paid Canada for the construction of three dams within BC on the Columbia River, originally for the storage and regulation of spring snow melts and potential flood situations.

In America the Grand Coulee, one of several dams first erected, fell short in the capacity to regulate flood waters but ended the migration of Salmonid species from upstream migration. The end of an era.

Thus the Hugh Keenleyside dam with storage of 7.1 Maf and the flooding of the Arrow Lakes, followed by the Duncan Dam with storage of 1.4 Maf and flooding of the Duncan River. Then the Kinbasket with flood storage of 8.63 Maf and an additional Non Treaty Storage of 5.0 Maf. The Libby dam on the Kootenay River in America a separate agreement. Included in but never mentioned is that the Kinbasket Reservoir contains at the bottom 8 Maf of storage that is inaccessible today and forever. Thus storage in Kinbasket exceeds 20 Maf.

The introduction of a dam affects every living thing in the surrounding area, both up and downstream. Upstream change is obvious as water levels rise and submerge nesting grounds and migration routes for water fowl. As water levels in storage reservoirs change throughout the year, aquatic habitat and food source availability become unreliable. Plankton, a main staple of salmon and trout's diet, is especially sensitive to changes in water level. Nutrient rich sediment, that would previously have flowed downstream, becomes trapped in the reservoirs above dam, resulting in changes in water properties and temperatures on either side of the barrier.

The additional height of the Mica dam and creation of the 5 Maf of Non Treaty Storage was an opportunity to good to miss but changed the area flooded to encompass the north Canoe River Wet Lands and all of the area south of the Surprise Rapids, which included Bear Island, the surrounding wet lands, Bush River and Bush Lakes. Thus ended one of the main staging areas for the spring and fall bird migrations (the birds that perished in the first years of flooding are incalculable). The Rocky Mountain Trench being a natural route, with the wetlands south of Donald/Golden to Columbia Lake being a lush environment not only for nesting but the slow northward/southward staging of bird migrations. Then finally north, flowing out of the trench, spreading across the Boreal forests of northern BC.

The disruption of traditional Caribou seasonal migration routes from the summer highlands of the Purcell Mountains on the west side of the trench to the wintering grounds of the high wet forest valleys of the Cummings, Wood river, Sullivan, Valencian and Bush River systems. The reservoir divided and flooded a wildlife corridor that had been active for thousands of years. (The initial flooding with the amount of debris that floated on the reservoir prevented or drowned any ungulate that attempted to cross).

Thus was lost; 15,500 ha of riparian lands, 5,900 ha of wetlands and 550 ha of shallow ponds, less than 2% of which remain.

In the late 1940s, the BC Fish and Wildlife Branch began studying the impacts the dams were having on the area's animal inhabitants. Their findings resulted in a small sum being designated for further research and harm mitigation. BC Hydro, in partnership with the Province of BC and Fisheries and Oceans Canada, has also been contributing to the Columbia Basin Fish and Wildlife Compensation Program (FWCP) since 1988, then established to offset footprint impacts of BC Hydro dams and reservoirs on fish and wildlife in the basin. A fund originally set at monies proportionate to flooded volumes but eventually blended into a singular fund. An annual fund now of \$5.9 million(?) (set at 1994 purchasing power indexed to inflation). This figure was to take into account the estimated costs of three major ongoing fisheries projects in the basin, other existing compensation activities, and new compensation projects expected to be established in the near future, (unfulfilled).

Over the years only minor studies and or recovery efforts have been designated to the Kinbasket Reservoir, the majority of funds applied to the enhancement of Kokanee fish stocks in Arrow and Kokanee Lakes. Overall the effectiveness of the Fish and Wildlife Compensation Program has been an ineffective, with a mandate too large to be impacted by funds available and management that though inclusive to public, aboriginal and government representation unable to decisively address foot print issues.

In the interest of future compensation efforts to offset foot print issues it is suggested that the Water Comptroller consider revisiting the scope and purpose of the FWCP for the Kinbasket Reservoir. Review and make considerations taking into account recommendations made through the various reports (appendix) previously prepared over the years, utilizing the data and information gathered from the Columbia Water Use Plans. Reviewing and recognizing the impacts to key ecological systems and what can be done to maintain and or enhance to preserve what remains.

It is requested that annual funds of a minimum of \$2M/yr. be established for the reservoir.

In conjunction to ecological compensation, that \$1.5M as a onetime outlay is set aside in the first year for development of Provincial Recreational facilities and guidelines for the Bush Harbor Boat Ramp and general area. (Note that the Provincial Gov't has no public use recreation sites in Area A, the only public use facilities lying within the National Parks and the only region in the Province with no Provincial facilities).

Appendix One

Support documentation

- Appendix J Mica, Revy Environmental Study
- Final Overview Paper Benefits Sharing Agreements
- FWCP Impacts Study
- Inland Rainforest (Susan K. Stevenson)
- NCC Spring Migration Map
- Hydro & Community Engagement Overview
- Penfold report
- Fargensen Report
- Kinbasket Reservoir Community Recreation Opportunities Report
- Valmount Opportunities Analysis
- Columbia Water Use Plan and sub documents

It is interesting to note that each of these reports either recognizes the need for or details the need for action to be taken to preserve what remains of the Interior Rain Forest that provides the resource (space and water) to the benefit of many. An old axiom is correct in saying “what gives up the most, contributes the most and requires the most attention”.

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