

# The River Current

Summer 2008



*Our Mission: Promoting watershed sustainability through awareness, linkages and stewardship.*

## **North Saskatchewan River Museum**

*by Billie Milholland*

In early June, 2008 a handful of people launched a North Saskatchewan River Museum Society. Dr. Denis Wall, currently residing in Ottawa, based the idea from a documentary on the Cascapedia River which has its own virtual museum. He set up a virtual museum test website to see what could be accomplished. He then contacted Sharon Skage at Mandolin books in Edmonton to see if she had a copy of the North Saskatchewan Watershed Alliance's river guide. Their conversations gave birth to a river museum idea for the mighty North Saskatchewan

The idea is to create an online educational and research resource for the whole North Saskatchewan River from the Saskatchewan Glacier in the Columbia Ice fields to the 'Forks' in Saskatchewan. As society treasurer, Tim Marriot puts it, "The River is like a TV in a bar; it's always on, but nobody's paying attention." This new society hopes to change that.

Despite the limited amount of time spent on publicity, Cheryl Mahaffy, one of the writers on the project, has already fielded dozens of requests for membership and offers of support.

Another writer and founding member, Billie Milholland, feels the timing is right for this project. In her experience, interviewing people along the river for many different projects, "Everybody has a river story." There are stories of river adventures and stories of grandparents' struggle to settle along the banks. There are Métis stories, First Nation stories, European settling stories and new immigrant stories. There are fishing stories and stories about gold panning, and coal mining and steamboats and dams. Then there is the story of the river itself; a sudden and frigid beginning at the end of the last glaciation; cutting a winding path across what would become two Prairie Provinces and eventually separating boreal forest from Great Plains. The River was a gathering place for early people seeking good tool making sites, good hunting, root gathering and berry picking. It was a major transportation route for over 300 years.

In the 21st Century, this magnificent river has been diminished to the status of a commodity. River water use, water demand, water quality are the topics of countless power point presentations at countless conventions and forums. The North Saskatchewan River Museum Society wants to revive the cultural, historical and recreational value of the river. Anyone interested in contributing in any way to this new initiative can email [billie.milholland@edmonton.ca](mailto:billie.milholland@edmonton.ca).



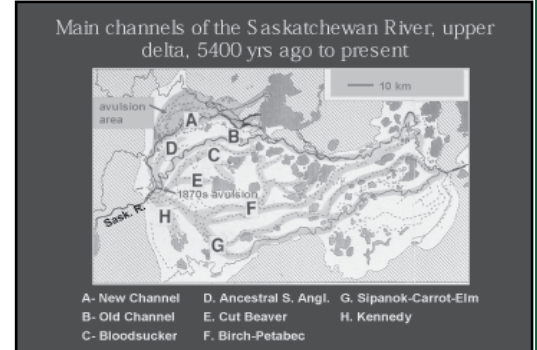
## **PROPOSED CHANGES TO THE PARTNERS FOR THE SASKATCHEWAN RIVER BASIN BYLAWS**

***Various changes have been proposed to the Partners FOR the Saskatchewan River Basin bylaws. These changes will be reviewed and voted upon at the October 29th AGM to be held from 4:00 - 4:30 at the Radisson Hotel in Canmore AB. The bylaws and the proposed changes will be available for viewing after October 1, 2008 on the Partners web page at [www.saskriverbasin.ca/bylawsREVISED.pdf](http://www.saskriverbasin.ca/bylawsREVISED.pdf).***

# Evolution of the Upper Saskatchewan River Delta

by Dr. Norman D. Smith, University of Nebraska

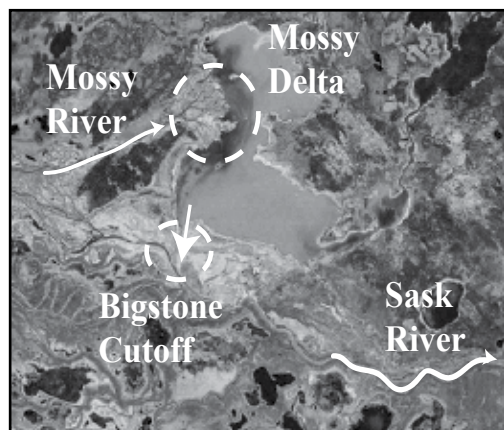
The Saskatchewan River delta (SRD) is a major wetland and wildlife production area that straddles the border between east-central Saskatchewan and west-central Manitoba. Currently terminating in Cedar Lake MB, it has been forming more or less continuously since the last continental ice sheets withdrew from the region approximately 9,000 years ago. A prominent glacial moraine--- the The Pas Moraine on which sits the village of The Pas--- divides the delta into two parts, approximately one third lying downstream of the moraine ("lower delta", bordering Cedar Lake) and two-thirds lying upstream ("upper delta"). Covering a total of nearly 10,000 km<sup>2</sup>, it is Canada's largest inland delta. The SRD has long served as a travel way and locus of gathering centers for aboriginal peoples as well as a major transport route for early European exploration, fur trading, and commerce. Today, it is one of Canada's richest fishing, hunting, and trapping areas. Large portions of the delta are currently managed by Ducks Unlimited Canada to enhance migratory waterfowl production. River flows are regulated at both ends of the SRD system by hydroelectric power dams--- the E.B. Campbell dam upstream, operated by SaskPower and impounding Tobin Lake, and the Grand Rapids dam below the delta, operated by Manitoba Hydro and controlling the level of Cedar Lake. Both have been in operation since the 1960s.



The present character of the SRD reflects both its natural developmental history and, more recently, the effects of man. The delta has been able to attain its large size because the principal river channels, which carry and deposit the sediment that forms the delta, change courses from time to time. At least nine major channel diversions, called "avulsions", have occurred in the upper delta over the past 5500 years. Remnants of these avulsions can be seen today as abandoned tree-lined channels scattered over the marshy delta surface. The most recent avulsion occurred in the northwest portion of the delta in the 1870s when the main channel diverted northward, annexing part of the Torch River to form the present New Channel and dumping huge quantities of sand and mud into the adjoining floodplain, producing a complex network of small interconnected channels that migrated eastward toward Cumberland Lake. The area directly affected by this avulsion is called the breakout area. Today, most of the diverted flow is channelled through the breakout area, now occupying about 500 km<sup>2</sup>, before rejoining the original channel at Cumberland House SK. Although the avulsion initiated over 130 years ago, the channel from which the river diverted, today called the Old Channel, still carries small flows.

Older residents of the delta remember when most of the numerous interconnected channels of the breakout area were navigable by small boats, and intervening wetlands were rich in waterfowl and muskrats. This is no longer the case as the channels have become gradually abandoned with time. The principal reason for this lies in the natural evolution of multi-channel river systems whereby channels tend to become fewer and larger as flows are captured from smaller channels, eventually ending with a single dominant channel at the expense of all others. This stage has been essentially attained for the upper two-thirds of the breakout area where most flow is now carried by the contiguous New Channel/Centre Angling Channel. Although this is a natural consequence of evolving rivers, the change has probably been exacerbated by upstream water withdrawals that have resulted in long-term reductions of flow through the delta.

The 1870s avulsion has significantly modified Cumberland Lake, the largest lake in the delta. Earlier, the lake was up to 6 meters deep in places, but today, it is only about 1.5 meters deep due to sedimentation from the avulsion. The lake is also shrinking in area--- over 20% since the 1950s.



This shrinkage has at least three causes: (1) enlargement of the delta at the mouth of the Mossy River, one of the two principal distributaries exiting the breakout area; (2) lowering of average lake level (approximately 1 meter in the past 50 years) due to long-term inflow reductions and, probably also, vertical erosion at the main outlet at Bigstone Cutoff; and (3) encroachment of fringing vegetation accompanying the shallower depths. Interestingly, there has been little new deposition in Cumberland Lake since it was last surveyed in the 1950s, due mainly to the effectiveness of shallow-water waves in resuspending and removing lake-bottom sediment during windy periods.

Of concern to many people is the effect of the E.B. Campbell dam (EBC) on the delta. Virtually all dams have two well-recognized effects on the downstream river: (1) disruption of the normal discharge variations to which the river is adjusted and (2) impoundment of sediment ordinarily borne by the river flow. The large reservoir behind EBC (Tobin Lake) serves as a flood control sink during high-discharge periods, with the result that overbank flooding below the dam is now less frequent. This of course has the positive side of reducing flood damage to downstream communities, but a downside is the disruption to floodplain ecosystems that depend on periodic replenishment of flood-borne nutrients for their health and survival. The second factor, sediment starvation in downstream channels, greatly reduces the amounts of nutrient-bearing clay particles supplied to floodplains during the now-infrequent floods, resulting in increasing dominance of organic rather than mineral detritus in the delta wetlands. Sediment starvation also causes the river flow to be excessively erosive because it no longer needs to expend energy in transporting sediment. The result is that channels downstream of a dam tend to enlarge by deepening and/or widening. In the past 50 years, the channel 10 km below EBC has deepened by approximately 2 meters due to sediment starvation. Incision diminishes with downstream distance until disappearing some 40 km from the dam. However, at the Old Channel divergence 25 km downstream below EBC, the New Channel has deepened by over 1 meter, significantly increasing its flow capacity and effectively undercutting the entrance to the Old Channel. This reduces the proportion of flow entering the Old Channel, which is currently the main source of river water feeding the Ducks Unlimited management area to the south.



Such evolutionary effects are likely to continue into the foreseeable future. We can expect that further channel evolution will eventually convert the remaining multi-channeled portions of the breakout area into a single channel that will likely meander, as did its ancestors. The breakout area will become predominantly peatland. At a feature called the “Forks” some 75 km downstream from EBC, river flow is currently divided into two nearly equal portions, one part flowing northeast into Cumberland Lake via the Mossy River, the other routing southeastward to rejoin the Old Channel. Eventually, one channel will likely “win” over the other in the race to dominance. Smart money would predict the southeast route because it is the shorter and therefore steeper path back to the main channel. In such a scenario, Cumberland Lake would likely evolve into a broad, featureless, peat-filled floodplain, similar features of which can be found in the wetlands south of the Old Channel. Future avulsions? Ordinarily, these ultimately arise from the effects of river sedimentation, and with so much of

the sediment impounded by upstream dams, another major avulsion is unlikely to happen for a long time. Overall, however, deltas are dynamic and ever-evolving environments, and as the old saying goes, the only constant is change.



The Saskatchewan River delta is big (Canada’s largest inland delta), beautiful, rich in wildlife, relatively remote, and still little known, but is experiencing the increasing stresses of expanding populations and demands on its resources. It deserves care, attention, and especially, better understanding of how it works.

Photos courtesy Dr. Norman Smith

## ***Fred Heal Conservation Award - Applications now being accepted***

Partners FOR the Saskatchewan River Basin is accepting nominations for the 2008 Fred Heal Conservation Award. This award was established in memory of Fred Heal, the former executive director of the Meewasin Valley Authority and the driving force behind the establishment of Partners FOR the Saskatchewan River Basin. Applications will be accepted until October 1, 2008.

This award is to recognize a for-profit or a community organization that has taken a direct initiative in the preservation and/or the enhancement of the health of the Saskatchewan River Basin. This organization will have developed and implemented a program or policy that results in a direct benefit to the health of the basin. The organization will be able to show measurable results from the initiative and will show continued dedication toward environmental sustainability.

Additional information and application forms are available on line at [www.saskriverbasin.ca](http://www.saskriverbasin.ca).

## *We are ALL Upstream II – Making Connections*

*The Executive Royal Inn, Leduc AB*

*February 10 – 12, 2009*

The Saskatchewan River Basin covers over 400,000 km<sup>2</sup> and area larger than the country of Germany. The North Saskatchewan, Red Deer, Oldman, Bow, and Battle Rivers all feed the Saskatchewan River, which ultimately ends in Lake Winnipeg. When addressing watershed issues and concerns, there are many groups to engage from a federal, provincial, municipal, industrial, to other local stakeholders. Communications within the model of shared governance plays an important role in ensuring the success of watershed management on any scale. To accomplish this we need to make connections with those who are around us because we are all upstream of someone else.

Hosted by the Partners FOR the Saskatchewan River Basin and the North Saskatchewan River Watershed Alliance this conference will provide an opportunity to learn about the State of the Saskatchewan River Basin, current science and research going on in the basin, address issues in shared governance, oil and gas, municipal waste water, as well as engaging rural stakeholders in watershed planning.

- State of the Saskatchewan River Basin Report
- Communications within Share Governance
- Municipal Water Usage and Discharges
- Improving Understanding of Water Systems and Current Science and Research
- Oil and Gas Water Usage and Discharges
- Engaging Rural Stakeholders in Watershed Planning

For further details on the “We are All Upstream II” conference, please visit [www.saskriverbasin.ca](http://www.saskriverbasin.ca).

## *Conference Listings*

### **13<sup>th</sup> Canadian National Conference and 4<sup>th</sup> Policy Forum on Drinking Water**

October 4-7, 2008

[www.cwwa.ca](http://www.cwwa.ca)

Quebec City, QC

### **Partners FOR the Saskatchewan River Basin Annual General Meeting**

October 29, 2008

[www.saskriverbasin.ca](http://www.saskriverbasin.ca)

Canmore, AB

### **North American Lake Management Society, 2008 Lake Louise Symposium**

November 11-14, 2008

[www.nalms.org/Conference/2008LakeLouise](http://www.nalms.org/Conference/2008LakeLouise)

Lake Louise, AB

### **We are ALL Upstream II - Making Connections**

February, 10 - 12, 2009

[www.partners@saskriverbasin.ca](mailto:www.partners@saskriverbasin.ca)

Leduc, AB

*If you have an event you would like to include under our listings, please email us at [partners@saskriverbasin.ca](mailto:partners@saskriverbasin.ca)*

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