



Preliminary Report on the Little Saskatchewan River and Watershed Ecological Corridor



WORKING DRAFT

Should the Little Saskatchewan River be recognized as a wildlife corridor?

Manitoba Liberal Caucus report prepared by Sheva Schwartz

Executive Summary

The Little Saskatchewan River, which is on Treaty 4 territory, is a unique and important corridor for the migration of various species, particularly birds. It has a distinctively wide valley containing forested areas, due to its glacial meltwater channel. Forested areas make up 29.9 percent of the total watershed area at 308,000 acres, rendering it an important ecological corridor with wildlife habitat. The river is a latitudinal linkage between Riding Mountain National Park and the Assiniboine River. Along with the substantial tree coverage, the watershed contains 74,000 acres of grassland. These features mark it as valuable ecological land that is significant to the biodiversity and preservation of wildlife. Furthermore, it is used by humans in many ways, such as irrigation, recreation, and a source of drinking water. Effective stewardship of this ecological corridor will require that there be a working together of First Nations, Metis, landowners, municipalities, the watershed district, the provincial and the federal government. It is hoped that the creation of a “Friends of the Little Saskatchewan River” group will involve many local residents and organize support.

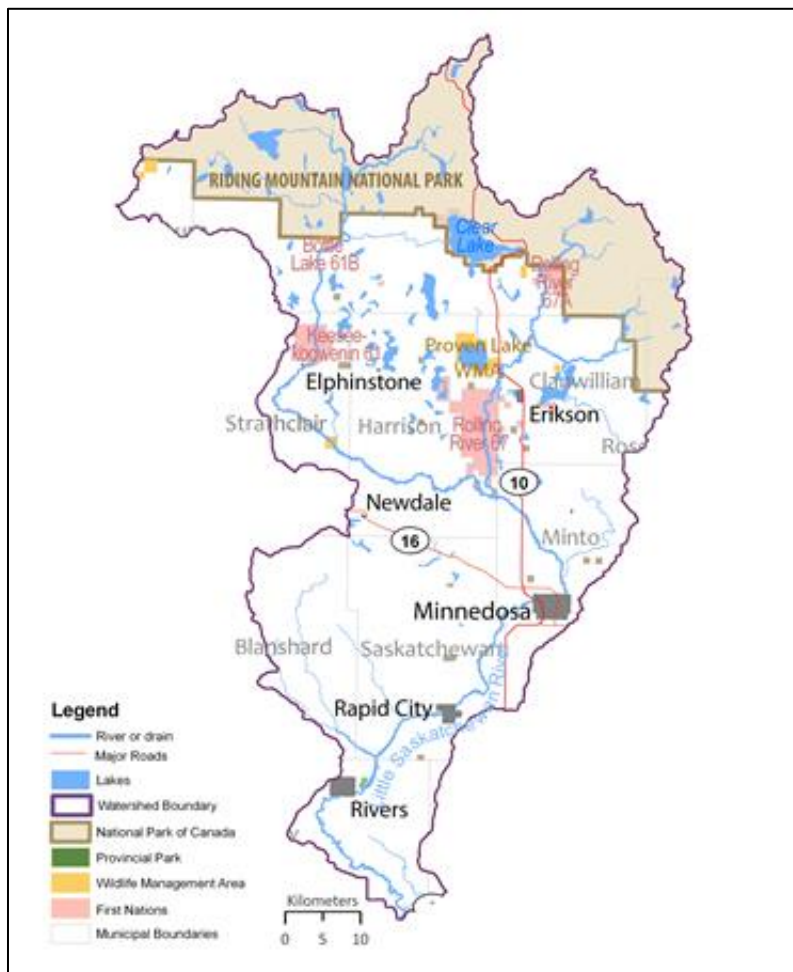


Figure A. Map of the Little Saskatchewan River Watershed. Little Saskatchewan River Integrated Watershed Management Plan, May 2011.

Land Acknowledgement:

We acknowledge that the Little Saskatchewan River and its watershed are on Treaty 2 territory, that it includes Rolling River First Nation which is a signature to Treaty 4, and that it is on the Homeland of the Metis Nation. Further, we acknowledge that Manitoba is located on the ancestral lands of the Anishinaabeg, Anishinewuk, Dakota Oyate, Denesuline and Nehethowuk nations. We acknowledge northern Manitoba includes lands that were and are the ancestral lands of the Inuit. We respect the spirit and intent of the treaties and treaty making and remain committed to working in partnership with First Nation, Inuit and Metis people in the spirit of truth, reconciliation and collaboration.

The Opportunity:

In April of 2022, Minister Stephen Guilbault announced that the government of Canada is interested in promoting ecological corridors (Appendix with announcement) and that the government of Canada has allocated \$60 million over 5 years for the support of Ecological corridors across Canada. The Government of Canada has further indicated a particular support for ecological corridors which link to National Parks. The Little Saskatchewan River Ecological Corridor thus fits well with the plans of the federal government for supporting ecological corridors. During the period from June to September of 2022, Jon Gerrard and Jocelyn Beever (Rivers) have met with Councillor Tom Dowsett (Minnedosa) and Doug Dowsett, Reeve of the RM of Minto-Odana. Jon Gerrard has met with Minister Stephen Guilbault, and written a follow up letter. Minister Guilbault has replied and has been encouraging in his words (Appendix). The meeting and correspondence has been followed up by meetings of Jon Gerrard and Jocelyn Beever with Terry Duguid, Member of Parliament and Parliamentary Secretary to Minister Guilbault. This was followed by a meeting with Jon Gerrard, Jocelyn Beever and Tom Dowsett with representatives from the Minister's Department and from Riding Mountain National Park. In November 2022, Jon Gerrard met with Chief Wilfred McKay and Councillors Derrick McKay, Melissa Greywish and Claude Shannacappo of Rolling River First Nation, Councillor Brad Burns of Keeseekowenin First Nation and with Colleen Culelier, Regional Manager Oak River of the Assiniboine West Watershed District. All have been encouraging and supportive. It has been emphasized that the effort will need broad participation from individuals and groups along the length of the Little Saskatchewan River. A proposal for support from the federal government will need to come from an organization or organizations along the Little Saskatchewan River which can include, but is not necessarily limited to First Nation, Metis, Municipalities and/or Watershed Districts as examples. The broader the coalition the better the effort will be seen. A collaboration among First Nation, Metis, Municipalities and Watershed Districts working with representatives from Riding Mountain National Park would be optimal.

Background:

The recognition of wildlife corridors along rivers is an essential part of what is needed in a twenty-first century approach to the stewardship of natural habitat in Manitoba. Already we have examples of such efforts such as the designation of the Bloodvein River in Manitoba as a Canadian Heritage River. There are other approaches to recognizing critical river habitat—as for

example the Riverkeepers movement to help preserve or restore habitat along the Hudson River, and the Atchafalaya National Heritage Area in Louisiana. This report looks at the Little Saskatchewan River as a potentially critical river in South-Western Manitoba.

The Little Saskatchewan River and its watershed, located in the Assiniboine West Watershed District, flows for approximately 185 km through Western Manitoba. A water control structure is located at the outlet of Lake Audy in Riding Mountain National Park. From there the river runs south. The watershed is located within the Aspen Parkland ecoregion and contains deciduous forest (Zoladeski et al., 1995). Along the Little Saskatchewan River are the Minnedosa dam and reservoir, the Rapid City dam and reservoir, and the Rivers dam and reservoir, Lake Wahtopanah. The latter is a popular recreational site and public water source.



Image A. The wide, forested valley of the Little Saskatchewan River. Photo courtesy of Dr. Jon Gerrard.

The Aspen Parkland ecoregion of Manitoba is home to a diverse array of bird species. The Little Saskatchewan River valley contains habitat that is used as a breeding place by more than a hundred bird species in a year. Another hundred bird species use this habitat as a source of food and for staging and stopping during migration (Donetz, 1998). Several of the birds present face the threat of extirpation in the region and extinction nationally. Residents of the watershed have spotted endangered or threatened birds such as Baird's Sparrows, Bobolinks, Loggerhead Shrikes, Short-eared Owls, and Red-headed Woodpeckers. Furthermore, local observers have spotted many waterfowl along the river, either as residents or during migration, including many ducks, geese, Sandhill Cranes and Great Blue Herons. The Minnedosa Lake Game Bird Refuge protects migratory game, such as waterfowl, from hunting over the 1,800 hectares of private and Crown land that it encompasses. More details of the bird species present are found in Donetz (p. 11 of Background report). The forested areas of the river's valley provide natural water management and mitigation of climate change and erosion.

During the Late Prehistoric and Early Historic periods, resources were obtained from Riparian and Aspen Parkland areas within South-Western Manitoba, such as Elk and abundant Waterfowl (Nicholson, 1988). This corresponds with current Elk and Waterfowl presence within the Little Saskatchewan River watershed, which contains Riparian and Aspen Parkland areas. Models of subsistence strategies of human populations during these time periods all include mobility (Nicholson, 1988). This information corresponds to local knowledge of historical usage of the River for hunting and fishing.

Why is it important to ensure habitat preservation in wildlife corridors?

Wildlife corridors are important for maintaining biodiversity and safeguarding against species extirpation. Animals use linear corridors of habitat in dispersal and migration routes (Rosenberg et al., 1997). Increased movement of a species results in greater gene variance which improves

the fitness of a species (Lande, 1995). Animals in the Little Saskatchewan River Watershed, such as the White-tailed deer, increase their home range based on the amount of livable habitat available to them. In the winter, White-tailed deer bed during nights underneath forest cover, and are in open, sunny areas during the day (Armstrong, et al., 1983). This frequent movement underscores the need for connectivity between habitat areas.

What are the threats to the LSR and watershed and its corridor?

The Integrated Watershed Management Plan prepared by the Little Saskatchewan River Water Planning Authority identified five common concerns through public consultation, namely: surface water quality, natural areas, surface water management, drinking water, and groundwater. These concerns overlap with the findings of this report and will consequently be targeted through recommendations made.

‘Little Saskatchewan River Watershed Analysis’ (1998) by John Donetz highlights two specific threats to the River and its watershed. The deterioration of the River’s water quality causes detrimental algal growth, and important vegetation of riparian areas is threatened by topographical modification. The loss of this vegetation reduces its function as a barrier to runoff, a habitat for wildlife, and a bulwark against erosion. Figures B, C, and D map out the classification of riparian areas along the river, pointing to the buffering capabilities of these areas.

The lack of comprehensive oversight of the water flow of the Little Saskatchewan River presents a threat to residents and wildlife of the watershed. During dry years, residents along the river have experienced shortages of well water that they depend on for supply. Water supply that is overallocated also has the potential to imperil aquatic and riparian ecosystems. Fifteen out of thirty-six years, fish survival is threatened by short supply of water through the Rivers dam (Pryzner, 2012). Low water levels in the reservoirs of the dams along the river worsen the water quality, which poses a health concern as well as potential devaluation of nearby homes. The absence of oversight of water flow also impacts effective management of an excess of water with floods. The Little Saskatchewan River experienced “unprecedented flow” in June 2020 and the Rapid City Dam was damaged (Dacey, 2020). And the severe floods which occurred at Minnedosa in the spring of 2022 further emphasize the need for flood prevention measures along the Little Saskatchewan River (see photos next page). Principle among the measures needed is preserving forested areas as an important step in decreasing the runoff into the Little Saskatchewan River.

Furthermore, the threat of invasive species in the freshwater of the river and its reservoirs is worsened due to the absence of an overarching management approach. Zebra Mussels, known as the “most aggressive freshwater invader in the Northern Hemisphere” (Karatayev et. al, 2015), have not yet been found in Lake Wahtopanah, but if adequate care is not taken they could arrive and pose a health risk leading to toxic algal blooms, increases in pathogenic bacteria, avian botulism, and localized anoxia . The current fragmented approach to environmental licensing does not protect downstream habitats. Plant distribution is influenced by warming of the climate, but this process requires availability of dispersal area (Kelly and Goulden, 2008). A lack of habitable land for propagation may contribute to reduced population sizes of native plant species. The effects of warming temperatures on plant life in riparian areas may be exacerbated by insufficient water supply due to overdevelopment.

Severe flooding in Minnedosa in the spring of 2022



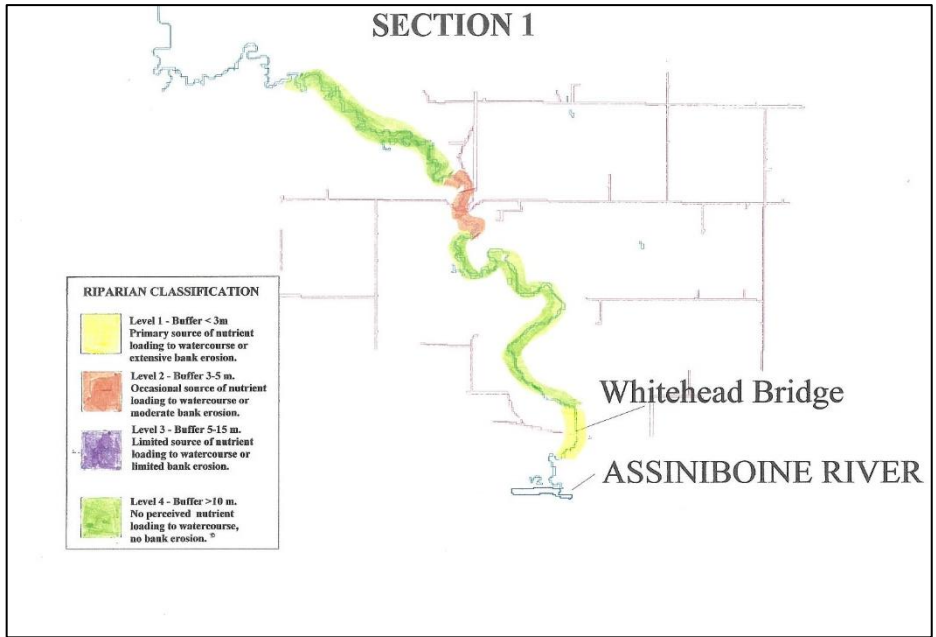


Figure (Donetz, 1998).

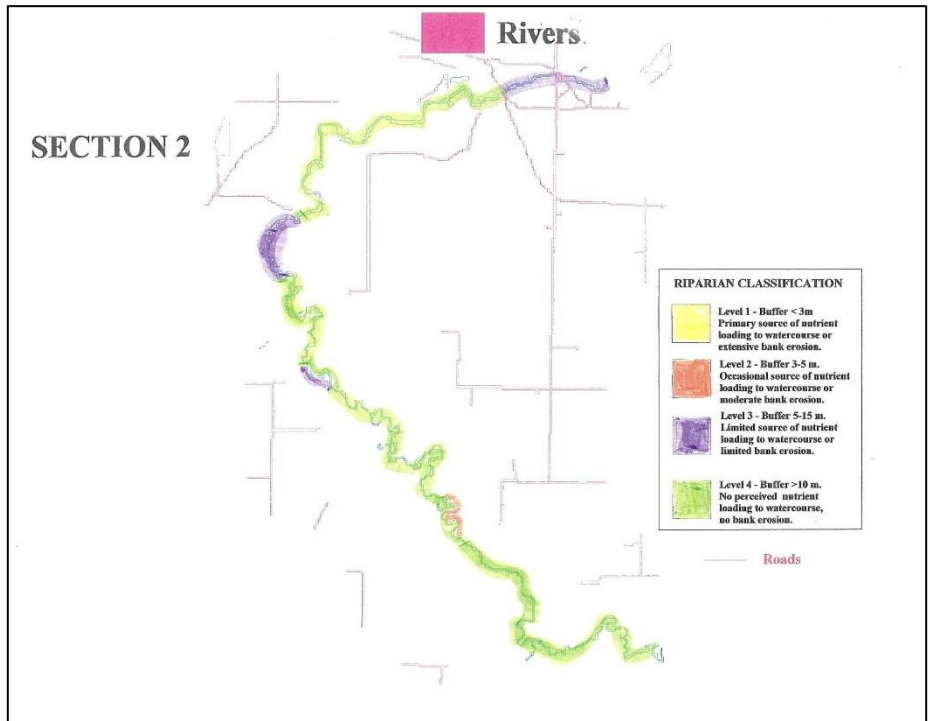


Figure C (Donetz, 1998).

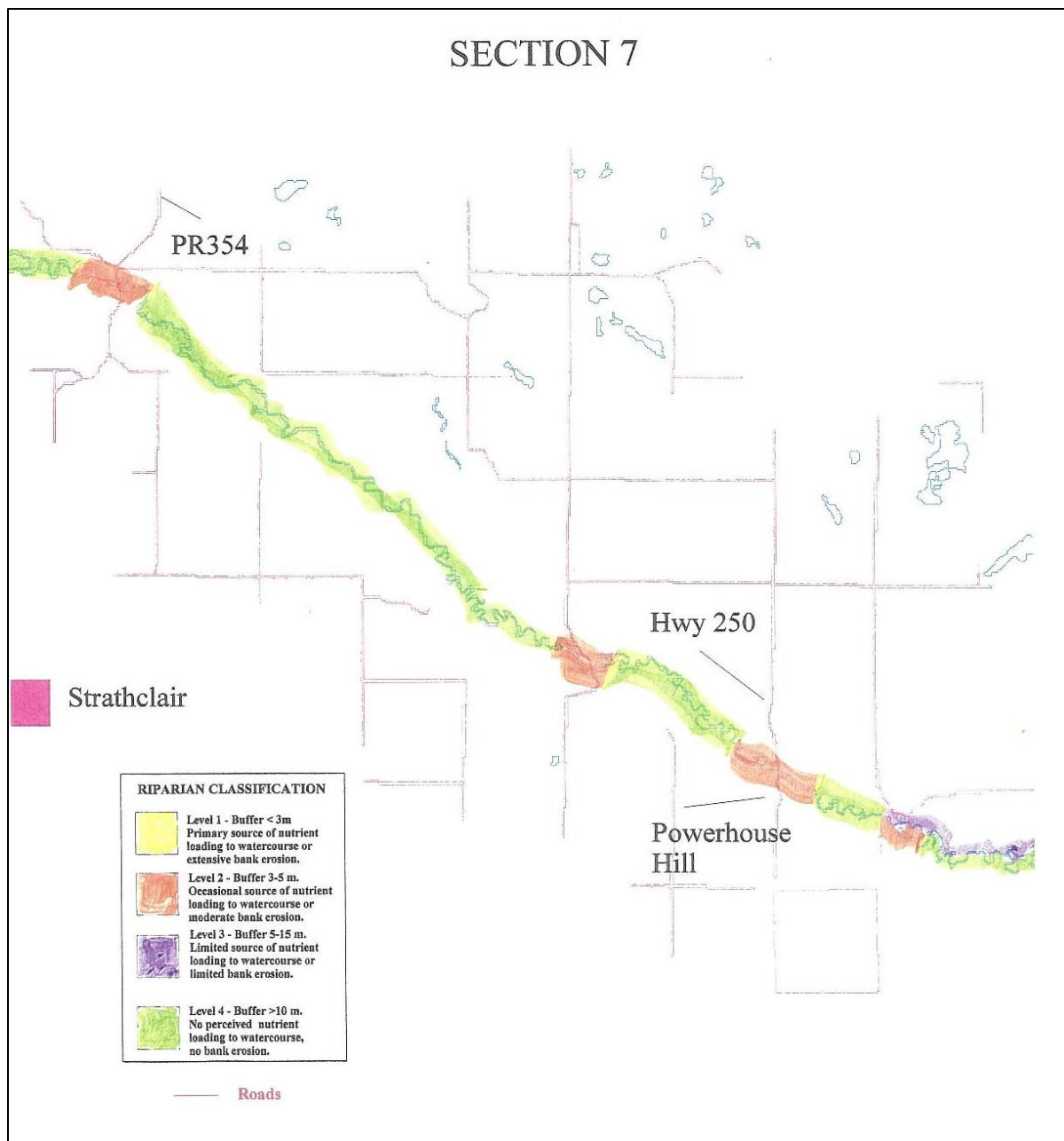


Figure D (Donetz, 1998).

What should be the vision for the future of the river and corridor and how can it be achieved?

The Little Saskatchewan River and its watershed should be valued as an important Manitoban ecological and historical corridor. Optimally, this will require shared stewardship that protects the habitats of native species while enabling safe human utilization. Encouragement of recreational usage of the river and its reservoirs must be balanced with firm conservation and water quality standards.

The Integrated Watershed Management Plan lists forty-seven implementation actions to address its stated areas of concern (as mentioned above). These recommendations are classified by appropriate agencies of application.

Three possibilities for the achievement of this vision are: designation of the Little Saskatchewan River and watershed as a Provincial Park, a public-private joint stewardship initiative, and a watershed district effort.

- Designation of the River and watershed as a Provincial Park is unrealistic as much of the land along the river and throughout its watershed is privately owned. Furthermore, this would require the creation of a management plan in accordance with the Provincial Parks Act (1993). While this plan, with allowance for public input, would consider environmental factors specific to the geographic area as well as the interests of those who would use the park, it is highly unlikely such a large area would ever be designated a Provincial Park.
- A public-private joint stewardship initiative would facilitate conservation by bridging public imperatives, such as water flow or biodiversity, with private concerns, such as air quality or home value. The Atchafalaya National Heritage Area in Louisiana is an example of stewardship which includes roles for the federal government in the United States, the state government of Louisiana, local governments and the Chitimacha tribe. The federal government, through the Army Corps of Engineers has a primary role in water management and flood control. Grants from federal state and local governments promote stewardship and heritage activities in the region.
- As of January 1st, 2020, the Little Saskatchewan River Conservation District joined with the Lake of the Prairies and Upper Assiniboine River Conservation Districts to form the Assiniboine West Watershed District. This district has carried out an incentive program for protection of wetlands, which may serve as an example of the way in which future conservation efforts can be carried out. The district's board consists of members from across the Watershed.

What is the next step?

A logical next step would be to put in an application to the federal government in support of the planning, stewardship and future of the Little Saskatchewan River Ecological Corridor. It will be very important to have the involvement of and discussions with people all along the Little Saskatchewan River to provide a basis for public support and input into the concept of a designated "Ecological Corridor" along the river. The Little Saskatchewan River corridor is of particular value because the river is within a glacial meltwater channel and has forested habitat and open prairie along much of its length. The concept of a "Ecological Corridor" along the Little Saskatchewan River is also appealing as it



*Image B. The banks of the Little Saskatchewan River.
Photo courtesy of Dr. Jon Gerrard.*

would link the protected area of the Riding Mountain National Park to the Assiniboine River Corridor and do this in a north-south corridor which is of particular value not just for resident species but also for migrating species, particularly birds. Since there is not a formal process for designating Ecological Corridors and for their stewardship in Manitoba, this may need legislation.

A cost-benefit overview of a wildlife corridor along the Little Saskatchewan River

While the benefits of wildlife diversity and of ecological corridors are increasingly studied and understood, each particular circumstance is unique and this section will deal with the general concepts which have been developed.

The costs for action are modest. The effort will be largely community based – involving people living in the Little Saskatchewan River corridor. There is no intent to establish a provincial park which would involve more costs. There may need to be support for those in the corridor to maintain forested land. Such support could come from carbon credits, or from a government subsidy.

On the benefit side, there are large benefits from ensuring diversity. This has been shown in human organizations as well as in situations involving wildlife. The preservation of a larger genetic pool enhances resilience and improves the adaptability of species. These aspects of maintaining and/or improving diversity are particularly important when the planet is going through a period of major climate change. The benefits of diversity in wildlife populations are not just to the wildlife. Significant benefits can accrue to human populations including aspects like a more balanced ecosystem with improved control of pests to humans.

A second major benefit to establishing an ecological corridor along the Little Saskatchewan River is that it has the potential to make a significant difference in terms of flood control. The continued presence of significant forested area along the Little Saskatchewan River will help. Forests can have a major impact to slow runoff and to decrease flooding. Cutting down forests may have contributed to the flood of 2022.

Third, from a planetary perspective, preserving wildlife corridors will enhance species richness, and also result in enhanced carbon sequestration. These are important attributes. It is thus important in our approach to addressing climate change.

Fourth, there are significant direct benefits to humans including the pleasure from seeing and enjoying the diversity in nature. Bird watching and the photography of birds and natural environments, as an example, has become one of the most frequent pastimes or hobbies of people. Gathering wild plants (berries for food and varied other plants for nutritional and/or medicinal uses), and hunting wild species are enjoyed by many in Manitoba. The advantage of spending time in nature to human health are increasingly recognized.

Fifth, enhanced local stewardship of the corridor may have many benefits to people along the Little Saskatchewan River including a feeling of cooperative action in working together and improved local stewardship of a very important wildlife corridor in Manitoba.

At some point, a more detailed cost-benefit analysis may be needed for the Little Saskatchewan River wildlife corridor. For the moment, it is enough to provide an overview of the many benefits. We welcome further comments on costs and benefits from individuals along the corridor so that more can be included in the final report.

Following discussions with the Reeve and Council of the Rural Municipalities of Riverdale and Yellowhead, and Harrison Park, Councillor Tom Dowsett of Minnedosa, Reeve Doug Dowsett of Minto-Odanah, Chief and Council of Rolling River First Nation, Councillor Brad Burns of Keeseekoowenin and Colleen Cuvelier Regional Manager for the Assiniboine West Watershed District, we have added the following:

The Purpose of the Wildlife Corridor

- 1) Ensuring long-term connectivity for wildlife migration, dispersal and adaptation to climate change
- 2) Restoring wildlife movements that have been disrupted by habitat loss, degradation or fragmentation.

The Principles for Stewardship of the Corridor

- 1) Local participation: Stewardship of the corridor depends on the interest and participation of local landowners working in partnership with governments (First Nation, Metis, municipal, provincial and federal) and non-governmental organizations.
- 2) Consultation: Consultation with and involvement of those who live and work along the corridor in decision making to ensure that there is an ability to continue with agricultural activities and with recreational activities including hunting along the corridor.
- 3) Innovation: Wildlife Corridors and their stewardship is new and needs a framework which allows for new ideas and new processes which can provide effective stewardship which can adapt to the local situation.
- 4) Public Awareness: Public awareness is vital to the public acceptance and public enthusiasm which will be needed to make the corridor last.

Climate Change

Discussion to date have highlighted the importance of adaptation to climate change. Not only do mammals and birds move along the Little Saskatchewan River corridor, but with climate change there will need to be the ability of plants to adapt to the warming climate. Animals and birds moving along the corridor can be important in spreading seeds along the corridor which will enable plants from regions further south to move northward as the climate warms. Additionally, to this, the role of forests and grasslands in the storage of carbon has been emphasized. Maintaining existing forests and increasing the number of trees have been repeatedly emphasized as important ways of reducing carbon dioxide in the atmosphere. There is the potential for carbon credits for increasing carbon storage in forested areas. Local residents are interested in this potential and see that being able to generate income from a forested area could help in the preservation and enhancement of forests along the corridor and thus help reduce carbon dioxide in the atmosphere. Other areas, for example in Costa Rica, are already reaping the rewards of carbon credits in this fashion and seeing major benefits to landholders. It is likely that this will be possible in the foreseeable future. It should be added that preserving or enhancing the number of trees along the corridor can also be important in terms of water management. Treed areas take up considerable amounts of water, decrease run off and stabilize soils and thus decrease flooding and erosion.

Stewardship of the Corridor – models for Partnership between local landowners and governments.

The wildlife or ecological corridor will need stewardship which includes local management and decision-making. While there needs to be a provincial framework, including legislation, under which stewardship of the corridor occurs, there also needs to be local management. There is not a precise example of this in Manitoba. Perhaps the closest would be the stewardship of the South Tobacco/Steppler Creeks by the Deerwood Soil and Water Management Association which has been in operation since 1984. This organization has been very successful in the construction of 27 small dams, in adding wetlands, in reducing water runoff and improving agricultural conditions in the watershed which is all under private ownership. The focus has been on agriculture and water management, not on sustaining an ecological corridor, but it may have lessons for the formation of a stewardship group involved in the stewardship of the Little Saskatchewan River.

In the United States, the Atchafalaya National Heritage Area involves a mix of private land owners and government owned lands. Here fields of cotton and sugarcane exist side by side with ecologically preserved areas in what is among the most culturally rich and ecologically varied regions in the United States. It is the largest “river swamp” in the United States, larger than the Everglades and very important for many species. It contains the largest contiguous bottomland hardwood forest in North America. There may be lessons to be learned from the stewardship of a mixture of public and private lands which could be applied to the stewardship of the Little Saskatchewan River Ecological Corridor.

Recommendations for action

- 1) Move forward with a proposal to the Government of Canada for support for establishing and continuing a designated Ecological corridor along the Little Saskatchewan River.
- 2) Determine which species live within the watershed out of those listed as imperiled/vulnerable within Manitoba’s Conservation Data Centre.
- 3) Conduct a Heritage Resources Characterization Study to determine the archeological record of the watershed.
- 4) Conduct an instream flow study to determine if water supply is sufficient to be licensed for further use in irrigation.
- 5) Create an updated watershed study that builds off of the work of John Donetz’s ‘Little Saskatchewan River Watershed Analysis’ (1998).
- 6) Determine how many projects from the Donetz report have been carried out, and explore methods of carrying out incomplete projects.
- 7) Conduct new water sampling to update the water quality findings of the Donetz report.
- 8) Assess opportunities for further educational or recreational utilization of the Little Saskatchewan River, its reservoirs, and the watershed.
- 9) Consider the establishment of a multi-jurisdictional committee to oversee proposals to the federal and provincial government in relation to the Little Saskatchewan River ecological corridor.

Table 1: Conservation Status of Bird Species Native to Aspen Parkland

Species	Provincial Status¹	Federal Status²	Ecoregion Status³
Baird's Sparrow	Endangered	Special Concern	Critically Imperiled
Burrowing Owl	Endangered	Endangered	Critically Imperiled
Ferruginous Hawk	Endangered	Threatened	Critically Imperiled
Lark Bunting	Not Listed	Threatened	Critically Imperiled
Loggerhead Shrike	Endangered	Threatened	Critically Imperiled
Piping Plover	Endangered	Endangered	Critically Imperiled
Trumpeter Swan	Endangered	Not at Risk	Critically Imperiled
White-Faced Ibis	Not Listed	Not Listed	Critically Imperiled
Cattle Egret	Not Listed	Not Listed	Imperiled
Chestnut-collared Longspur	Endangered	Endangered	Imperiled
Chimney Swift	Threatened	Threatened	Imperiled
Least Bittern	Endangered	Threatened	Imperiled
Sprague's Pipit	Threatened	Threatened	Imperiled
Great Egret	Not Listed	Not Listed	Vulnerable
Short-Eared Owl	Threatened	Special Concern	Vulnerable
Canada Warbler	Threatened	Threatened	Vulnerable
Common Nighthawk	Threatened	Special Concern	Vulnerable
Gold-winged Warbler	Threatened	Threatened	Vulnerable
Grasshopper Sparrow	Not Listed	Special Concern	Vulnerable
Olive-sided Flycatcher	Threatened	Special Concern	Vulnerable
Red-headed Woodpecker	Threatened	Endangered	Vulnerable
Say's Pheobe	Not Listed	Not Listed	Vulnerable
Willow Flycatcher	Not Listed	Not Listed	Vulnerable
Yellow Rail	Not Listed	Special Concern	Vulnerable

Table 2: Conservation Status of Bird Species Sighted Within the Little Saskatchewan River Watershed

Species	Provincial Status	Federal Status	Ecoregion Status
Baird's Sparrow	Endangered	Special Concern	Critically Imperiled
Loggerhead Shrike	Endangered	Threatened	Critically Imperiled
Red-Headed Woodpecker	Threatened	Endangered	Vulnerable
Short-Eared Owl	Threatened	Special Concern	Vulnerable

¹ *The Endangered Species and Ecosystems Act, 2018*

² *Canadian Wildlife Species at Risk, October 2020. Committee on the Status of Endangered Wildlife in Canada.*

³ *Manitoba Conservation Data Centre, Subnational Conservation Status Rank.*

Bobolink	Not Listed	Threatened	Apparently Secure
Goldfinch	Not Listed	Not Listed	Not Listed
Meadowlark	Not Listed	Not Listed	Not Listed
Orchard Oriole	Not Listed	Not Listed	Not Listed
Purple Finch	Not Listed	Not Listed	Not Listed
Sandhill Crane	Not Listed	Not at Risk	Not Listed
Yellow-Headed Blackbird	Not Listed	Not Listed	Not Listed

Figure B: Little Saskatchewan and Roy Greer Wildlife Management Areas

The Little Saskatchewan Wildlife Management Area sees White-tailed deer, Moose, Black bear, Sharp-tailed grouse, Ruffed grouse, and Coyote. Deer, Grouse, and Waterfowl are protected in the management area. The ravines of the Roy Greer Wildlife Management Area are forested with aspen-oak. It also provides habitat for neo-tropical birds migrating north.



Figure B. Map of the Little Saskatchewan Wildlife Management Area and the Roy Greer Wildlife Management Area(right).

Figure C: Harrison Wildlife Management Area

The deciduous forest of the Harrison Wildlife Management Area, within the Watershed, provides habitat for White-tailed Deer and, less often, Elk. It contains deciduous forest and two forage fields.



Figure C. Map of the Harrison Wildlife Management Area.

Figure D: Proven Lake Wildlife Management Area

The Proven Lake Wildlife Management Area within the watershed is one of North America's "most productive breeding areas" for waterfowl because of its wetland. It also provides nesting area for Black-crowned Night Herons, Gulls, Terns, Grebes, and various Duck species. It also serves as a stop-over for migrating birds.

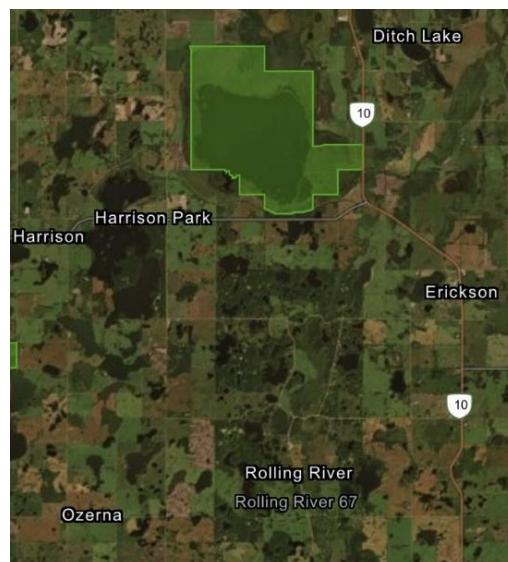


Figure D. Map of the Proven Lake Wildlife Management Area.

Appendix A: Municipalities, Towns, and First Nation Communities along the River

Located alongside the Little Saskatchewan River are: Horod (Harrison Park Municipality), Keeseekoowenin 61, Elphinstone (Rural Municipality [RM] of Yellowhead), Rolling River 67, Clanwilliam (RM of Minto-Odanah), the Town of Minnedosa, Rapid City (RM of Oakview), and Rivers (Riverdale Municipality).

Appendix B: First Nations which are in or near the Little Saskatchewan River Watershed

The Rolling River First Nation borders Rural Municipalities Harrison, Clanwilliam, and Minto. This First Nation, located in Treaty 4 territory within the Watershed, also contains a smaller geographic area located near the South of Riding Mountain National Park. Its total population of registered band members is under 1000.

The Keeseekoowenin First Nation consists of over 1,200 people across three reserves (61, 61A, and 61B), all of which are located within the Watershed. The main reserve area is in the path of the Little Saskatchewan River. This First Nation's governance consists of both administration and an economic development officer. The Keeseekoowenin First Nation cites land stewardship as a central Ojibway belief.

Appendix C: Irrigation along the Little Saskatchewan River

On July 5th, 2012, the Daly Irrigation Development Group (DIDG) was granted Environmental License #3010 to use water supply from the LSR for irrigation. Many appeals were made, but the DIDG was licensed to begin irrigating before these were reviewed. The Wilderness Committee found the DIDG to be conducting irrigation outside of the parameters of the license in 2013. The DIDG provides yearly water flow monitoring reports as required by the license, which are publicly available. The most recent report can be viewed at the following link:

https://www.gov.mb.ca/sd/eal/registries/5577/2020_didg_monitoring_report.pdf

Appendix D: Ecology of the Aspen Parkland

Forest Ecosystem Classification for Manitoba shows that the ecosystem of much of the watershed is Aspen Parkland. Manitoba's Conservation Data Centre lists 26 species of plants out of 122 found in Aspen Parkland ranked S1 ("Critically Imperiled— At very high risk of extirpation in the jurisdiction"). The Great Plains Toad is ranked S2 ("Imperiled— At high risk of extirpation in the jurisdiction"). 25 out of 38 bird species are ranked between S1B and S3B ('B' refers to breeding populations [S3 is defined as "Vulnerable— At moderate risk of extirpation in the jurisdiction"]). 7 out of 11 insect species are ranked S1, as is the Long-Tailed Weasel (naturereserve.org, Subnational Conservation Status Rank).

Appendix E: Elphinstone Ranch Historic Site

The Scottish Politician William Buller Fullerton Elphinstone established a ranch in 1879 along the Little Saskatchewan River. The nearby town of Elphinstone is named after him. Lord Elphinstone extolled the economic prospects of Western Canada in a newspaper in Scotland as the founding director of the Canada Northwest Land Company. His efforts centered on encouragement for increased settlement of farmers in Canada. The ranch also employed young men who came from overseas. A captain in the Royal Navy, Lord Elphinstone traveled widely—he visited Australia, New Zealand, and Canada. The ranch, which he stayed at during each of his trips to Canada, was comprised of many buildings and housed cattle. Most of the houses no longer stand, but stone remains from one building are still visible, along with a recently placed commemorative sign.

Appendix F: Rural Mental Health

Canada's rural populations face challenges in dealing with mental health issues, such as a dearth of specialized personnel, increased cost of travel, and a lack of anonymity (Boydell, 2007). Canadians living in rural and remote locations experience a higher rate of suicide than those living in urban areas (Smith, et al., 2008). Research conducted on places that foster mental well-being in rural men, conducted at Brandon University's Centre for Critical Studies of Rural Mental Health, found that natural landscapes are therapeutic (Ahmadu, et al., 2021). Furthermore, this research found that recreational usage of the natural environment provides people with social engagement as well as connection to the land.

Appendix G: Highlights of the John Donetz Report

'Little Saskatchewan River Watershed Analysis' (1998) was written by John Donetz for Friends of Rivers Lake.

The report provides a framework for rehabilitation projects of sites based on their potential to impact water quality, fish habitat, and fish migration (p. 7).

The report highlights that the vegetation of riparian areas along the river serves as naturally-occurring protection of the water. Firstly, the vegetation forms a barrier that reduces the amount of run-off entering the river. Next, the vegetation provides ideal habitat for various wildlife, as well as nutritional sources for fish. Lastly, topographical features of the river, such as water depth and levels of erosion, are regulated by the presence of this vegetation (p. 11).

The report identifies threats to the river such as loss of riparian areas to allow for crop growth, as well as livestock grazing. The water faces nutrient loading from residential septic systems (p. 11). Extreme weather conditions are more likely to occur due to varying elevation (p. 3). Coliform counts have reached high levels near lagoons and particularly the Minnedosa Lagoon discharge at over 100,000 per millilitre (p. 14). This coliform count may indicate the presence of other harmful bacteria in the water.

The report lists remediation that has been carried out along the river (p. 12).

Project sites for further remediation are listed by priority (p. 13). A potential recommendation to include is a determination of how many projects have been completed. Furthermore, an exploration of how incomplete projects may be carried out.

The report identifies Minnedosa Dam as the preferable area for a fishway to facilitate fish migration (p. 15). After the publishing of the report in 1998, a fishway was constructed in the fall of 1999 with designs prepared by KGS Group. The Minnedosa Fish Enhancement Committee was also involved, and it was sponsored by the Fisheries Branch of Manitoba Conservation.

The report calls for educational efforts to be put forth by the Department of Agriculture and Department of Rural Development, targeting topics such as cattle management in relation to the River (p. 16).

The report identifies areas where further research is required. The “life cycles” of reservoirs, as well as their “siltation patterns, macrophyte production, and alternative management strategies” is listed as an area of interest. Also mentioned is the need to assess types of recreational activity on the River and their associated barriers (p. 16).

- Unique physical features of the river are described (p. 19).
- Water chemistry of the river is described in detail (p. 20).
- Presence of fish in the river is described in detail (p. 23).

The report emphasizes that there are two forms of human-caused stressors to the river system:

- 1) algal growth is caused by decreasing water quality.
- 2) changes imposed on the topography of the river threaten the crucial habitat of its shores (p. 24).

Donetz concludes that improvements can be achieved through long-term projects, and that a small number of the projects implemented will result in a majority of the positive changes (p. 25).

The Donetz document includes a previous report of background information regarding the following topics: geology, soil, climate, vegetation, hydrology, water quality, fisheries, wildlife, land use, economy, and population.

The background information regarding land use of the watershed states that the land contains three distinct characteristics: 1) crop land, 2) trees, and 3) grasslands. The crop land is most prominent, constituting 360,000 acres, or 35.3 percent, of the watershed. The forested areas compose 29.9 percent of the total area with 308,000 acres, found most within the river valley. Grasslands represent 17.8 percent of the land, or 74,000 acres. Only 22,000 acres of the land (5 percent) have to do with water. There is also a presence of urban infrastructure, highways, and forage within the watershed (p. 13 of Background Report).

Following the background information there are maps of the river with zone divisions, project sites photographs, hydrological characteristics, river profiles, and water quality data (minerals, metals, bacteria, pesticide residue, water chemistry, etc.). A potential recommendation to include is an update on water quality through new sampling.

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