

Red River Waters



MANIT^{BA}
CLEAN ENVIRONMENT COMMISSION

**Proposed
Classification
of Surface Water
Quality In Manitoba's
Red River Principal
Watershed Division
and Certain Red River
Tributaries**

**A non technical presentation of the data
contained in the August 1980 technical report
submitted to The Clean Environment Com-
mission by the Environmental Management
Division, Department of Consumer and Cor-
porate Affairs and Environment.**

**The Clean Environment Commission
Government of Manitoba
November 1980**

The Red River Watershed / Basin

The Manitoba Clean Environment Commission will be holding a series of public hearings throughout the province - December - January - to provide an opportunity for interested people, groups and organizations - anyone with a valid interest or concern - to present their ideas and opinions as to what 'present and future use' should be protected in individual surface watercourses; to determine which of the proposed classifications should be accepted, rejected or modified. The background information given herein will provide some insight into the present status of the surface waters of the Red River Watershed. This is the second of nineteen Manitoba watersheds to be examined.

These hearings will be well advertised.

Red River near Lockport



The Red River Basin

In August 1980, the Environmental Management Division released a "Proposed Classification of Manitoba's Surface Water, Red River Principal Watershed Division", in which a number of proposed classifications are made for various sections of this watershed. This is a summary of that report, which does go into the technical details complete with water quality objectives data and the like. The full report may be obtained from the Clean Environment Commission.

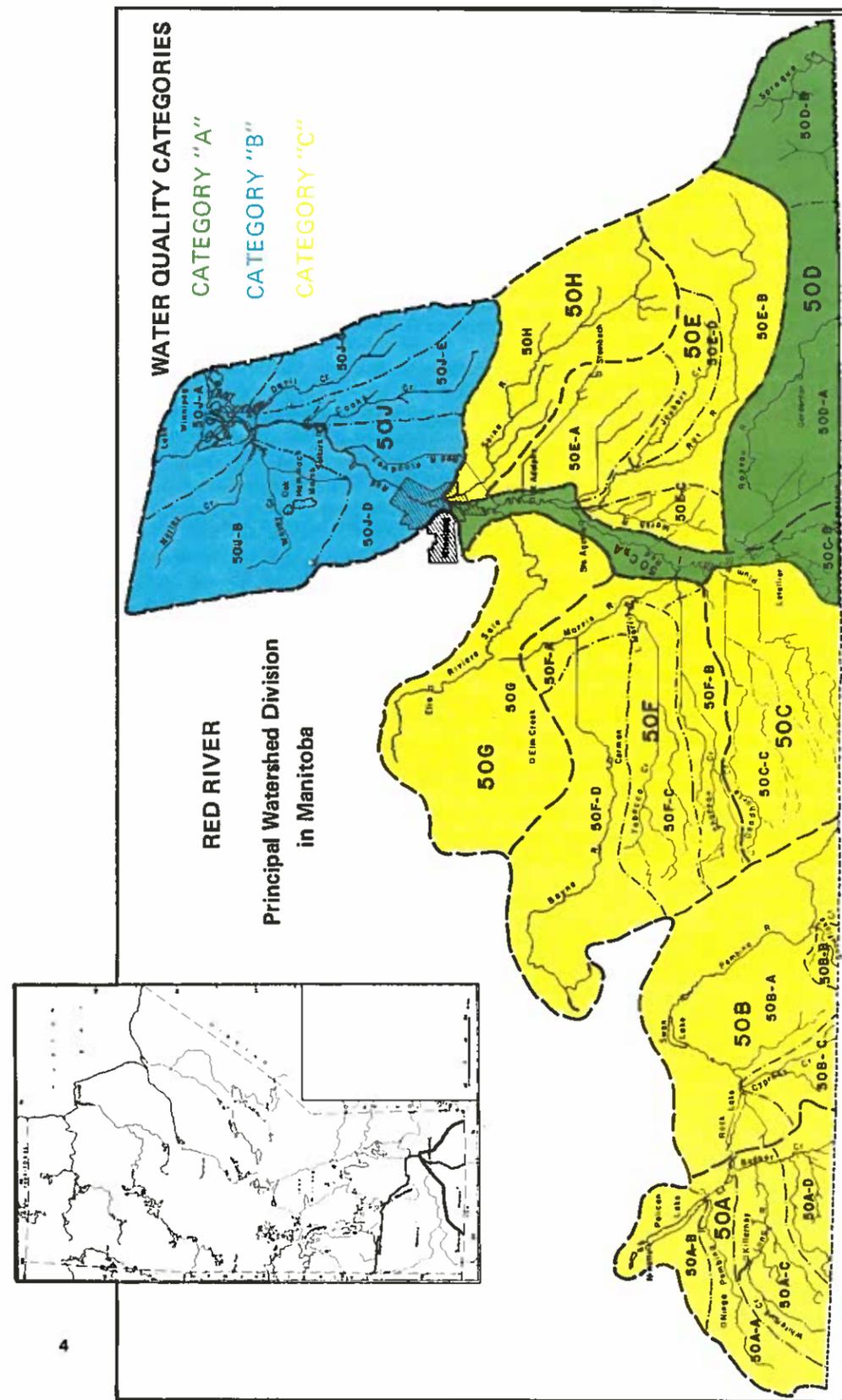
Water Use Classifications

The proposed classification has been based upon acceptable quality for the end use (domestic, industrial, recreational, agricultural, navigation and waste disposal) and is not based on the maximum quality achievable.

To achieve a certain classification, specific water quality objectives must be met. In some cases, this may be economically unsound or impractical or even impossible. Hence, some end uses may have to be altered and with it, the classification. These approvals or changes will come about as a result of the Clean Environment Commission hearings and subsequent recommendations.

Proposed Stream Classification - Red River Watershed

- 1A - Generally, water meeting the acceptable limits of the Canadian Drinking Water Standards and Objectives, 1968.
No section of the Red River Watershed carries this classification.
- 1B - This water will meet the above requirements with approved disinfection.
No section of the Red River Watershed carries this classification.
- 1C - This water will again meet the above requirements, provided it is disinfected and treated with coagulation, clarified, filtered, and so on.
The Red River from the U.S. border to Winnipeg south limits qualifies as 1C.
- 1D - Same as 1C but even more treatment.
The Red River in the region below South Winnipeg qualifies.
- 2A - Waters suitable for warm and cold water sport or commercial fisheries and aquatic recreation. (Including bathing).
None of the waters in the watershed qualify.
- 2B - Water suitable for cool or warm sport or commercial fisheries and aquatic recreation including bathing.
All portions of the watershed are in this category except the Red River below Winnipeg which is not suitable for bathing.
- 3A - Suitable for most industrial purposes, except food processing without chemical treatment.
None of the waters in the watershed qualify.
- 3B - Same as above except that moderate treatment may be necessary.
The Red River from the U.S. border to Delta, and the Roseau River.
- 3C - Water suitable for industrial cooling and materials transport with treatment to avoid scaling, corrosion or other undesirable conditions.
The Red River tributaries except the Roseau River and the Red River from the U.S. border to Delta.
- 4A - Good quality irrigation water.
None of the waters in the watershed qualifies.
- 4B - Acceptable quality irrigation water.
The entire Red River watershed.
- 4C - Water that can be used by livestock and wildlife without injurious effects.
The entire Red River watershed excluding the Red River from the south end pollution control centre to Delta.
- 5 - Water suitable for enjoyment of scenery and to avoid interference with navigation or damage to property.
The total watershed.



The Red River Watershed

The Red River principal watershed division includes parts of Manitoba in Canada, North Dakota, South Dakota and Minnesota in the United States and is part of the large Hudson Bay drainage system. The current proposal deals only with the Canadian section excluding the Assiniboine River.

The watersheds are underlain almost exclusively by bedrock composed of limestone.

The surface deposits are mainly clay and silt with bog and rock outcrops. The Red River valley plain is almost level.

Once large areas of this watershed were swampy. However, artificial drains have improved soil conditions and reduced flooding in some areas.

Soils are mainly black-fine textured type. These soils are very fertile and considered the best agricultural soils of Manitoba.

The climate is subhumid to humid continental with warm summers and cold winters.

Precipitation generally increases as one moves eastward in the area. (Mean annual precipitation ranges from 38 cm/year (15 in./year) in the west to 71 cm/year (28 in./year) in the east). On the average, approximately 77% of the precipitation occurs during the months of April through September and almost two-thirds of this comes during May, June and July. The months of November through February are the driest. The average annual snowfall is approximately 127 cm (50 in.).

Hydrology

Most run off from the watershed occurs in spring. Rains, when combined with melting of accumulated snow, have been responsible for major floods.

The major river is the Red. It enters into Manitoba at Emerson and flows in a northerly direction for approximately 250 km (155 mi.) before emptying into Lake Winnipeg at the Netley Marshes. It begins at the confluence of the Ottertail and Boise de Sioux Rivers near Wahpeton, North Dakota and flows north forming the boundary between North Dakota and Minnesota until it enters Manitoba. The Red River has a fairly uniform continuous descent northward, averaging less than 0.09 m/km (0.5 ft./mi.).

In Manitoba, the Roseau, Rat and Seine Rivers enter the Red River from the east while the Sale, Morris and Assiniboine Rivers enter from the west. The Assiniboine River is excluded from this report, but it enters the Red River at Winnipeg.

There are five major flood control impoundments located in the United States portion of the basin. The Red River floodway at Winnipeg is the only major works in the Manitoba portion of the basin.

Within the Red River watershed, there are seven basins: Pembina, Red, Morris-Boyer, Rat, Roseau, Sale and Seine.

Category A — Good for use as a municipal water supply provided coagulation, sedimentation, filtration and disinfection is practised; suitable for cool or warm sport fishery and bathing; moderate chemical/physical treatment required for industrial purposes; acceptable quality irrigation water and can be used by livestock.

Category B — Same as category A for municipal purposes but with additional treatment; suitable for cool or warm sport fishery but not bathing; suitable for industrial cooling and materials transport and of an acceptable quality for irrigation.

Category C — Good for use as a municipal water supply provided coagulation, sedimentation, filtration and disinfection is practised; suitable for cool or warm water sport fishery and bathing; suitable for industrial cooling and materials transport; acceptable quality irrigation water and can be used by livestock.

People

About 601,900 people live in the Red River watershed; that is, 59% of the total Manitoba population. The average annual population growth for the region is .58%.

478,339 people or 79% of this population live in Winnipeg, Selkirk and Steinbach. The remaining population of 123,525 or 21% live in rural areas. Of this, 104,218 persons or 84% are scattered in rural municipalities, incorporated towns and local government districts. 19,307 or 16% reside in Killarney,



Dam, Roseau River at Dominion City

Morden, Winkler, Altona, Morris, Carman, Stonewall and Ste. Anne, towns ranging between 1,000 - 4,000 in population size.

Economic Conditions

In 1970 the Winnipeg area had 82.4% of the Manitoba employment in the manufacturing of non-durable and durable goods. In service industries, finance, insurance and real estate, Winnipeg had 81.5% of the provincial employment.

Agriculture

Livestock operations, mainly dairying, are commonly found near and south of Winnipeg; sugar beets are extensively produced in the south in the Altona and Winkler areas; market gardening flourishes along the Red River north of Winnipeg; and mixed farm operations, wheat and mixed grains, are prevalent in other areas of the watershed.

The land area in the Red River watershed represents a significant portion of Manitoba's agricultural sector with 22% of the total farmland in the province and supporting 31% of Manitoba's farms. Agriculture is the predominant land use within the area. The largest and most important function of the watershed is agricultural land drainage.

Surface water is primarily used as on-farm domestic and livestock water supply with a limited amount of irrigation for cash crops and market gardens.

Spring flooding limits agriculture as well as other industries. Summer flooding can reduce crop yields.

There is an abundance of water in the bedrock limestone underlying the valley but the poor quality of the water in the western portion of the limestone formation makes the water unsuitable for domestic use and restricts livestock production.



Pilot Creek below Pilot Dam



Centre pivot irrigation system near Glenora

Fisheries

Existing fish stock status in all waters of the Red River basin is not well known or documented.

Red River

Because of the Lockport Dam, the level in the Red River is normally sufficient to maintain fish population year round. Occasionally water levels may become critical to aquatic life during the late summer and winter.

The Red River between Emerson and Lockport is used to some extent by both locals and people from nearby areas for angling. Fisheries managers are attempting to promote greater use of the Red River, particularly within the City of Winnipeg limits, for angling purposes. The species angled are primarily sauger, walleye, channel catfish, freshwater drum, burbot, sucker and bullhead, with some pike and carp.

The Red River immediately below the Lockport Dam is the most heavily angled area in Manitoba, particularly in summer; winter angling is becoming more popular. The Red River from Lockport to Lake Winnipeg also provides excellent angling opportunities and produces trophy-sized walleye.

It also supports a viable bait fishing industry. About 3/4 of the total Manitoba bait fish production comes from this area. The gross value of the 1978 bait fish production was approximately \$250,000.

Roseau River

Fish species in the Roseau River are pike, walleye, sauger, rock bass, freshwater drum, burbot, black bullhead, yellow perch and two species of sucker. Lake sturgeon at one time occurred in the river. Six species of minnows, three darters, and several other small fish species including lamprey may also be found in the Roseau River.

Rat River

A dam is located on the Rat River at St. Malo and poses an impassable barrier to the upstream movement of fish.

The fish fauna of the Rat River is very similar to that described for the Roseau River. Because of the upstream marshy areas, and more recently the area flooded by the St. Malo Dam, pike are important members of the fish community. Parasitic lamprey, some reaching 30 cm (1 ft.) in length are common in the Rat River.

Morris-Boyne River

Pike, walleye and yellow perch occur in the Stephenfield Reservoir, most likely from previous plantings.

Riviere Sale

Since the river is now subject to winterkill conditions and since the La Barriere Dam forms an effective block to the fish movements from the Red River, extensive populations of large fish do not exist in the river.

Seine River

Small fish such as minnow, darters and stickleback may be found in the deeper pools of the river where they can survive over winter.

Pembina River (Ninga Region)

The Boissevain reservoir has never suffered from winterkill and is the most significant fishery in this watershed division. Although trout had been stocked from 1957 to 1966, recent stockings have been changed, by local request, to perch, pike and walleye. Angling success has been erratic and recent tests show the reservoir is dominated by suckers. Trout have not persisted, while walleye and pike numbers appear to be low.

Pembina River (Pelican Lake Region)

Pelican Lake is a shallow non-stratifying and highly eutrophic lake that suffers fish winterkill of varying severity. Occasionally summer fish deaths occur but at lesser frequency and severity than in winter.

Pembina River (Long River Region)

Long, River, between Killarney Lake and Badger Creek, receives several small intermittent tributaries that provide limited spawning habitat for pike and sucker when flows are high and fish are available from Rock Lake.

Killarney Lake is the most stable fishery in this division. Since 1962, some degree of fish winterkill has occurred in 28% of the winters.

Pembina River (Badger Creek)

Gimby Creek (McGillis Creek) joins Badger Creek near Cartwright and is the major tributary supporting sporadic runs of spawning fish from Badger Creek.

A variable habitat along Badger Creek provides spawning potential for walleye, pike, bullhead and sucker while adequate flows in most years allow time for these species to return to Rock Lake. Other small fish species (stickleback, darter and fathead minnow) also occur in Badger Creek.

Seine River and Floodway Outlet, Red River below Lockport



Pembina River (Swan Lake Region)

Pike, sucker and occasionally a few walleye migrate upstream each year on their annual spawning run.

Swan Lake is a very shallow lake that varies markedly in size and depth with available inflow. The lake is too shallow to support a permanent game fish population but they pass through it in their upstream and downstream movements.

Pembina River (Snowflake Creek Region)

This region contains two significant fish spawning streams: Snowflake Creek and Mowbray Creek. Both flow into the Pembina River. Snowflake Creek flows usually end by mid-summer but this is sufficient time for sucker, and occasionally a few pike, to spawn and move back into the Pembina. Mowbray Creek is similar but attracts more pike.

Pembina River (Cypress Creek Region)

Cypress Creek and a major unnamed tributary from the west are the only significant spawning streams in this region. Cypress Creek is often dry by mid-summer but in high flow years pike and sucker frequent the flood plains and channel as far upstream as Clearwater.



Orienteering – Riviere La Sale

Recreation

The Red River is the largest single recreation resource for much of the Red River valley, even though its potential has not been realized in many locations between Emerson and Lake Winnipeg. About 100 campsites between Morris and Emerson use the river as a recreational focal point. Over 850 water-oriented campsites exist between Selkirk and Netley Lake. There are also 360 private cottages in the Selkirk-Netley area. The City of Winnipeg contributes its share of water-oriented recreational users, with five major marina/boat launching areas operating within the city limits. Riverboats from two commercial boat-touring operations regularly ply the waters of the Red as it winds its way through the city past more than 30 park and recreation areas between the north and south perimeter highway bridges.

Fishing is an extremely popular activity along the river north of Lockport to the lake, both summer and winter. On the wider and straighter stretches of the river water skiing is quite common; and rowing, canoeing and power boats are also common sights throughout the summer.

Future plans for recreation include multi-million dollar river-oriented expenditures by the Federal and Provincial governments, a major proposal by the town of Selkirk, and a large commercial complex proposed by a private group in the Selkirk area.

In the light of energy costs and future shortages, as well as the growing awareness of the importance of recreation opportunities within large cities, it would appear that the recreational importance and value of the Red River to Manitoba will steadily and greatly increase.

The river can play a role by providing a scenic background for recreational activities such as picnicking and other uses, high-lighted by Lower Fort Garry. Hunting and fishing are also major components of use of the river and its delta. Other recreational activities are boating, water skiing and swimming.

The river is presently used for all these purposes in spite of a discouraging water quality.

Municipal Water Supply

There are 43 public water systems with 23 utilizing groundwater sources and 20 surface sources. Many of the larger communities such as Emerson, St. Jean, Morris, Selkirk, Morden, Pilot Mound, Altona, Manitou and Killarney utilize surface sources whereas the smaller communities utilize groundwater sources. The public water systems serve an estimated 52,300 people of a total population of 139,400 in the basin (not including Winnipeg).

Problems with groundwater within the basin relate to quality and availability of water.



Rural Domestic Water Supply

Rural domestic water supplies service approximately 87,000 people. This includes private systems, small communal systems and community wells. Rural domestic water systems in almost all cases use groundwater where possible.

The community wells provide water or area haulage with some systems having direct pressure service to local premises.

The biggest problem is the non-availability of groundwater in the quality or quantity required for domestic purposes in certain areas. Where suitable groundwater is not available, surface water sources are sometimes developed. Water is hauled in areas where neither groundwater nor surface water is available or development practical.

The Garrison Diversion Study Board Report notes a rural domestic groundwater use of 85 million gallons per day.

Municipal and Industrial Discharges Municipal Waste Water

This includes municipal systems and non-municipal domestic sewage treatment systems serving trailer courts, schools, nursing homes, etc.

The major source of contaminant release is the effluent from the three facilities serving the City of Winnipeg. The effluent is generally of secondary quality; disinfection of the effluent is not practised. The city is also serviced with a storm drain system which discharges directly to the Red and Assiniboine Rivers. Some of the storm drains include raw sewage.

Industrial Waste Water

Five industrial operations discharge waste water to surface water courses within the Red River basin.

Environmental Considerations

None of the industrial effluents exert any significant effect on the water quality in this basin. Any new discharges would be required to meet the requirements of the Clean Environment Act and would be based on ambient water quality considerations arising from this water quality objective process.

The major problem in the Red River basin related to municipal water supply is the poor microbiological quality of the water in the Red River within and downstream of the City of Winnipeg. The condition of the water in this reach of the river makes mandatory the use of fail safe water treatment techniques. Still, there is a health hazard to consumers in the event of process failure or inadequate treatment of the water. The Town of Selkirk is the only known municipal system utilizing this reach of the Red River as a raw water source.

Another problem from the viewpoint of a municipal and industrial water user below a major urban centre is the presence of organic substances. Some of these products must be reduced or removed by water treatment.

Primary body contact sport is also risky due to the presence of pathogenic microorganisms of human origin in the Winnipeg reach of the river and below. It would be desirable to achieve a level of water quality that would reduce the risk to individuals engaged in water contact sports in this river reach.

There is also considerable truck farming below Winnipeg and river water is used by the gardeners for irrigation. The water quality objectives for irrigation based on fecal coliform bacteria is exceeded throughout most of the river reach below Winnipeg (fecal coliform objective is 1,000 per 100 ml).

Other surface water quality problems in the basin are intermittent in nature and relate, for the most part, to aesthetic considerations. These problems would include major algae blooms on the artificial impoundments and streams within or flowing into the basin, and accidental spills or releases of contaminants into surface waters within the basin.

Part of the problem of waste disposal to streams and rivers is related to low or non-existent flows. There is no assimilative capacity under these circumstances with the outcome being a water quality problem in the receiving stream.

It is the natural tendency of all water bodies to age but this process is accelerating in the Red River watershed. Fish habitat protection and improvement through improved land use practices, reduced organic loading, more constant stream flows, water level maintenance and increased flushing, would result in improved fish populations.

The actual degradation of surface waters caused by modern agriculture is difficult to quantify. Agricultural activities can and do influence the quality of waters within a watershed. The application of fertilizers, pesticides and animal wastes to the soil, as well as crop, soil and water management practices, alter the composition of water discharged from a watershed.

The disposal of animal wastes from confinement livestock production units possesses a pollution potential similar to that of chemical fertilization in terms of nutrients.

The use of pesticides in agriculture is now common. Agriculture and society in general are aware of these potential dangers.

Some pesticide residues do become absorbed to soil particles and are subject to movement into surface water supplies through soil erosion.