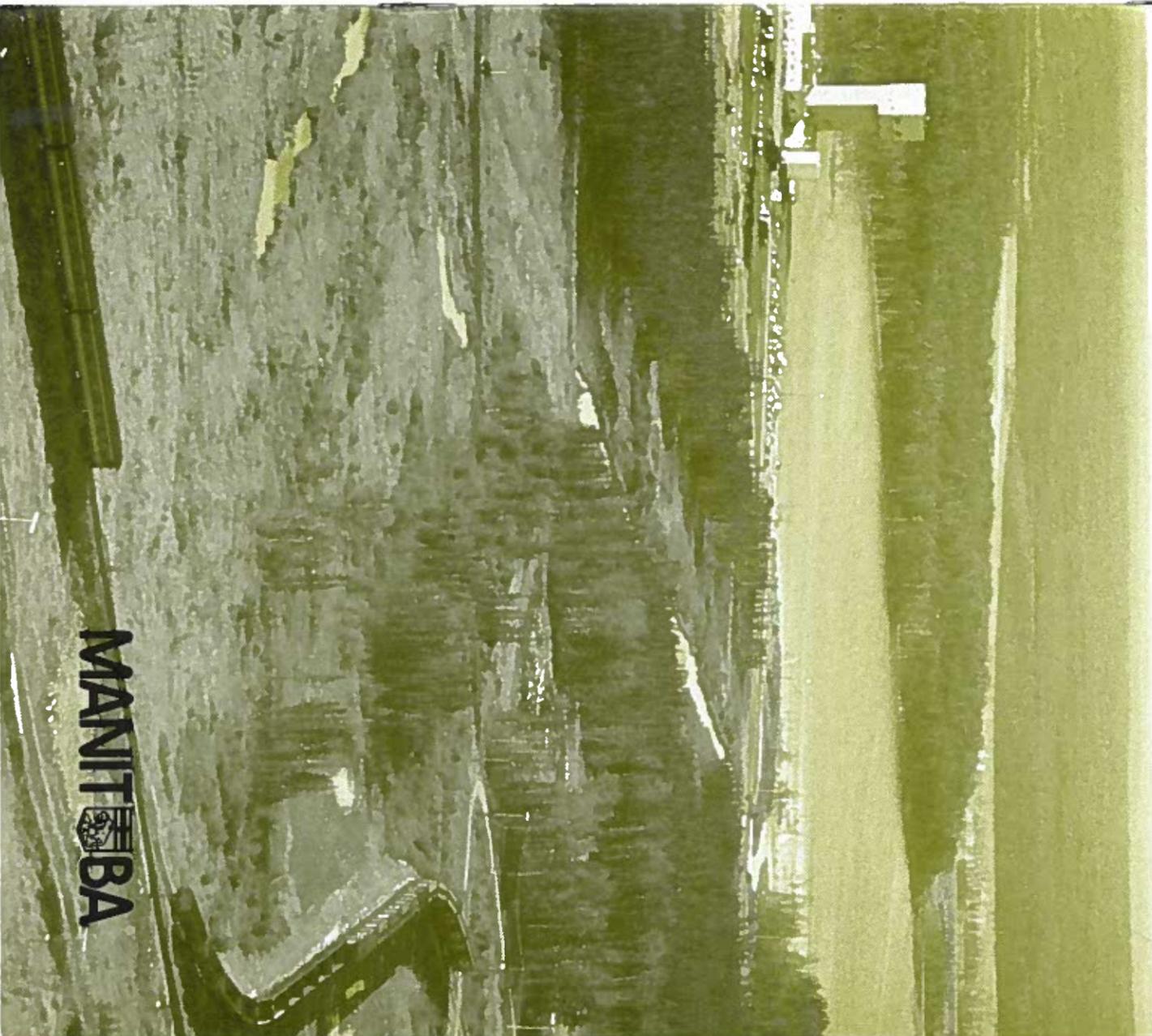


# **Proposed Grass-Burntwood Rivers Classification of Water Quality**



**MANITBA**

**Proposed  
Classification  
of Surface Water  
Quality In Manitoba's  
Grass-Burntwood  
Rivers Principal  
Watershed Division**

A non-technical presentation of the data contained in the June, 1981 technical report prepared by the Environmental Management Division, Department of Consumer and Corporate Affairs and Environment.

**THE CLEAN ENVIRONMENT COMMISSION  
GOVERNMENT OF MANITOBA  
OCTOBER, 1981**

# The Grass-Burntwood Rivers Watershed / Basin

The Manitoba Clean Environment Commission will be holding public hearings in October, 1981, 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 water courses within the Grass-Burntwood Rivers watershed in terms of water quality.

The background information given herein will provide some insight into the present status of the Grass-Burntwood Rivers watershed, including a proposed classification of the surface water. This is the third of nineteen Manitoba Watersheds to be examined.

In June, 1981 the Environmental Management Division released a report, “Proposed Classification of Manitoba's Surface Water Grass-Burntwood Rivers 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. The full report may be obtained from The Clean Environment Commission.

At earlier hearings of The Clean Environment Commission in 1977, the classification basis was established whereby surface waters could be classified according to specific uses (domestic, industrial, fisheries, recreational, agricultural, navigation and waste disposal). The report resultant from these hearings identified water quality objectives that would ensure that the particular use would be protected. The proposed classification for the Grass-Burntwood rivers watershed has been based upon this system of acceptable quality for the end use and not necessarily upon maximum water quality achievable.

It is the function of the Commission based upon the information contained in this report and from presentations made by individuals and groups to the hearings and otherwise, to recommend to the Minister of Consumer & Corporate Affairs and Environment a water quality classification for the Grass-Burntwood Rivers principal watershed.

At present, waters in the Grass-Burntwood Rivers Watershed are of high quality. Waters in the Upper Divisions of both the Grass and Burntwood Rivers are superior to any specific end uses and therefore a non-degradation objective is proposed.



*Enjoying the grandeur of the waters.*

## Proposed Stream Classification -- Grass-Burntwood Rivers Watershed

### NON-DEGRADATION

Water quality superior to any end use:  
Upper Divisions of both the Grass and Burntwood Rivers.

### DOMESTIC CONSUMPTION

A - Water meeting the acceptable limits of the Canadian Drinking Water Standards and Objectives, 1968:

No section of the Grass-Burntwood Rivers Watershed carries this classification.

B - Water meeting the above requirements with approved disinfection:

Wekusko Lake, Setting Lake and Lower Grass River Divisions.

C - Similar to B with the addition of treatment by coagulation, clarification, filtration and so on:  
Nelson House and Lower Burntwood River Divisions.

### FISHERIES AND RECREATION

A - Water suitable for warm or cold water sport or commercial fisheries and aquatic recreation including bathing:

Wekusko Lake, Setting Lake and Lower Grass River Divisions.

B - Water suitable for cool or warm water sport or commercial fisheries and aquatic recreation including bathing:  
Nelson House and Lower Burntwood River Divisions.

### INDUSTRIAL CONSUMPTION

A - Water suitable for most industrial purposes without chemical treatment, except food processing:  
Wekusko Lake, Setting Lake and Lower Grass River Divisions.

B - Same as above except that moderate treatment may be necessary:  
Nelson House and Lower Burntwood River Divisions.

### AGRICULTURE AND WILDLIFE

A - Good quality irrigation water:  
Not applicable in this watershed.

B - Acceptable quality irrigation water:  
Not applicable in this watershed.

C - Water that can be used by livestock and wildlife without injury:  
Wekusko Lake, Setting Lake, Nelson House, Lower Grass River and Lower Burntwood River Divisions are in this classification.

### NAVIGATION AND WASTE DISPOSAL

Water suitable for enjoyment of scenery and to avoid interference with navigation or damage to property:  
The total watershed.

The watershed classification is pictorially summarized on pages 6 and 7.

## The Grass-Burntwood Rivers Watershed

The Grass-Burntwood Rivers are totally within Manitoba and drain to the northwest portion of the Nelson River principal watershed division.

The region is underlain with Precambrian rock, predominantly granite and gneisses and includes several pockets of sedimentary rocks, mainly greywacke and quartzite.

Surface deposits came from streams flowing into glacial Lake Agassiz. Clays and silts, with bog and rock outcrops, occupy the central region with the periphery composed mainly of glacial drift, predominantly granitic materials. Relief within the region varies between 213-274 meters above sea level.

The soils, mainly grey wooded podzol, are low in available nutrients and tend to be stony and poorly drained. Approximately twenty-five percent of the soils are well drained. A very small portion of the region is suitable for agriculture, its use further restricted by the limited availability of hardy crop varieties and the relatively short 70 to 90 day frost-free period. Annual precipitation is approximately 44 cm with snowfall levels above 110 cm from November to April. Temperatures vary considerably during the year. The average June temperature ranges between 9.4 to 11.7° C; the January range being -23 to -26.7° C. There are usually short term temperature extremes.

The combination of poorly drained soils, cool temperatures and a short growing season are reflected in the vegetative cover including the northern coniferous forest, composed mainly of black spruce, white spruce and balsam fir.

The region originally valued for its fur production has in recent years experienced significant growth in tourism.

The major commercial resources are minerals such as gold, lead, copper, zinc, and nickel; forestry; and fishing, mainly whitefish and pickerel.

## Hydrology

The headwaters of the Burntwood River lie in the tributaries to Burntwood Lake over the height of land south of Flatrock Lake on the Churchill River. The Grass River starts with the Cranberry Lakes in the Grass River Provincial Park north of The Pas, Manitoba.

The operation of the Churchill River Diversion increased the mean annual flow in the Burntwood River. The annual volume of flow of the Grass River remains unaffected as there are no man-made dams. Daily flow rates in both rivers can vary greatly depending on precipitation and season of the year.

The Burntwood River is regulated by the Notigi Control Structure, which was constructed in 1975 at the south end of Notigi Lake on the Rat River. Manitoba Hydro is presently examining five potential sites for hydro-electric generating stations, including Early Morning Rapids, Wuskwaim, Kepuche, Manasan and First Rapids. When this study concludes, some of these sites may be discarded from further consideration or all may be retained for more detailed design work, depending on the study results.

With the abundance of fresh water from the rivers, streams and lakes, groundwater is and probably will remain an untapped resource at least for major users of this region.

## People

Approximately 26,000 people live in the Grass-Burntwood Rivers watershed basin. Thompson is the major community with over 81% of the region's population.

Traditional settlements such as Nelson House have a very young population, and resource settlements such as Thompson have a high percentage of working age males. The population of this area has been growing at an annual rate of 2.4% since 1971.

## Economic Conditions

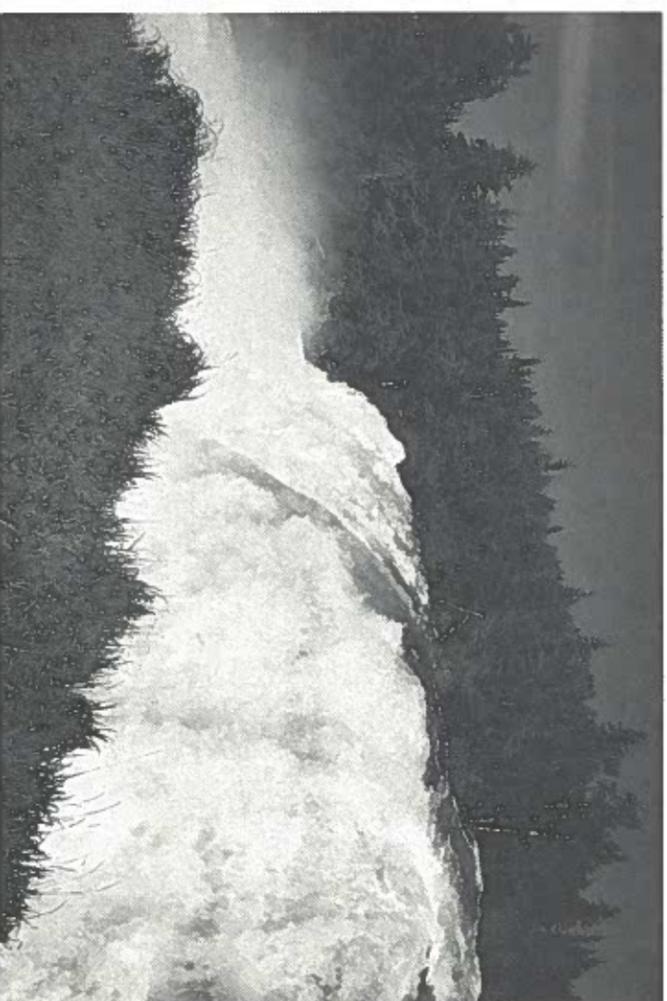
Discovery and development of natural resources has increased availability of employment and educational levels of younger native peoples have increased.

However, employment or unemployment vary widely with job location and season. In some communities traditional pursuits such as hunting and fishing take priority over occasional wage employment. Declining renewable resources and the encroachment of industrialization and development have made it difficult to maintain an economy based solely on traditional activities; hence many residents rely on a combination of traditional enterprises coupled

with seasonal wage employment and transfer payments.

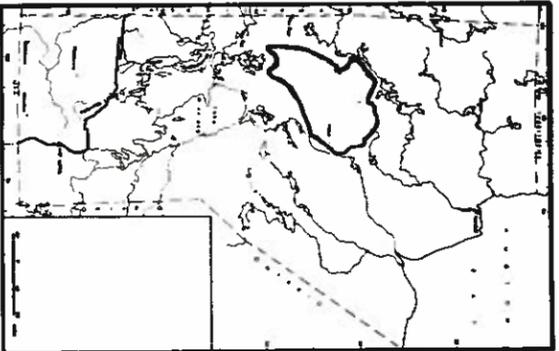
Agriculture plays no significant role in this area although some crop production is carried out in the Wabowden area on the fields of a former Dominion Agricultural Experimental Substation.

The mining industry and Manitoba Hydro are the major employers of the area. This concentration of employment into two major fields exposes the work force to dramatic fluctuation in employment, dependent upon the current price and demand for minerals and electrical power.



Pisew Falls on the Grass River.

# GRASS - BURNTWOOD RIVERS - CLASSIFICATION



## WATER QUALITY CATEGORIES

- Category "A" — Water quality superior to any specific use.
- Category "B" — Good for use as a municipal water supply provided disinfection is practised; suitable for warm or cold water sport or commercial fisheries, aquatic recreation including bathing; suitable for most industrial uses without chemical treatment; water suitable for livestock and wildlife.
- Category "C" — Good for use as a municipal water supply provided coagulation, sedimentation, filtration and disinfection are practised; suitable for cool or warm water sport or commercial fisheries, aquatic recreation including bathing; suitable for industrial purposes with moderate treatment; can be used by livestock and wildlife.

## Fisheries

The Grass-Burntwood Rivers System is a major fisheries area for the Northwest Region of Manitoba. Adequate information on all the lakes and tributaries of the Grass-Burntwood system is not available. Many of the unnamed, small lakes and creeks play a significant role in the life cycle of fish present in the system, acting as spawning/nursery areas during spring and fall fish migrations. As it is impossible to identify all the critical habitat areas individually, the maintenance of the system as a whole at its present level of water quality is essential.

Present recreational, commercial or industrial use of the Grass-Burntwood System in the western part of the drainage basin is such

that minimal, if any, fishery habitat deterioration is occurring. A Federal Fisheries research station is located on Heming Lake (Separation Creek region). Both Heming Lake and Wapun Lake have been set aside as "experimental waters" and no commercial or recreational fishery is permitted on these lakes. Research work has also been carried out by Federal Fisheries on Demarch and Quigley Lakes in the Separation Creek chain. Recent forestry developments along Limestone Creek have opened up new, formerly remote areas. This has resulted in some alteration of Limestone Creek shoreline from its natural state.

The diversity and abundance of cool and warm water species suggests a high level of water quality.



Some of the many lakes and rivers in the watershed.

### a) Grass River System

Several areas above Setting Lake in the Grass River and associated lakes have previously been identified as sensitive areas that should be protected. Lake trout are found in Reed and 2nd Cranberry Lakes in this area. Lakes range upward to 52 meters in depth.

From the Setting Lake Region and on, the lakes along the Grass River are typical shield lakes, with lots of islands and rock outcrop shorelines. Fish production is high on these lakes because of the abundance of spawning and nursery areas. The lakes are no deeper than 18 meters, averaging between 3 and 6 meters. Game species present are: pike, walleye, sauger and perch. Commercial species are in order of importance: whitefish, walleye, pike and tullibee. Other species present are: burbot, white suckers, long nose suckers, shorthead redborse suckers. Natural trout are not present. Paint Lake, Setting Lake, the Grass River and tributaries between these lakes are very important angling waters in this area. In addition, there are a dozen lakes that are commercially fished on a regular basis. The value of the fisheries resource in this drainage area is extremely high.

### b) Burntwood River System

The Rat-Burntwood Lakes are not typical of other shield lakes for two reasons: (i) These lakes are located on a thick layer of glaciolacustrine clays left from glacial Lake Agassiz. As a result they have high nutrient loads from weathering of these clays and the shorelines are more regular due to the fact that the bedrock is covered by overburden. (ii) The elevation of the lakes along the Rat-Burntwood have been increased as a result of the Churchill River Diversion. The control structure at Notigi has led to the formation of the Rat-Notigi reservoir. Even downstream of the Notigi control structure, water levels have risen; e.g. Wapsu Lake more than 4 meters, Threepoint Lake close to 5 meters, Footprint Lake more than 3 meters, and Wuskwatin Lake 4 meters. The cause of this flooding is due to the diversion of the Churchill River from Southern Indian Lake into the Rat-Burntwood River system. The flow throughout the Rat-Burntwood diversion route has been increased approximately tenfold to increase the flow in the Nelson River for purposes of Hydro generation.

The Rat-Burntwood Lakes support good populations of walleye, whitefish and pike as well as "rough fish" species such as tullibee, suckers, burbot, and mooneye. Burntwood Lake near the headwaters is an excellent walleye lake and Hassett and File Lakes offer good angling for lake trout. At the lower end of the Burntwood, sheephead, carp and sauger are also found. There have been some reports of sturgeon being taken years ago on the Burntwood River.

There is a concern over growing evidence of increased mercury levels in fish from the Rat-Burntwood part of this system.

## Forestry

Most of the land area of the Grass-Burnt-wood watershed is covered by boreal forest. Forest stands are of great importance to any watershed as they influence the water regime according to their water retention capacity, soil moisture conservation, and evapo-transpiration rates.

Intensive timber production activities have a potential of influencing water quality in various ways (increased sediment load, turbidity, nutrient transfer, etc.) generally leading to acceleration of the eutrophication process.

Commercial scale lumber cutting is carried out by Manfor (Manitoba Forestry Resources Ltd.). Present operations located in the Wekusko and Setting Lake Divisions have not caused any controversy regarding water quality effects to date.

## Trapping

Streams and lakes provide habitat for aquatic furbearers and serve trappers as access routes. In the Grass-Burntwood watershed, the total value of muskrat, beaver, otter, and mink furs taken during the 1978-79 trapping season was over 417 thousand dollars. Water quality in the watershed is not known to impact the furbearers.

## Recreation

The Grass-Burntwood Watershed presents diverse recreational opportunities. These water systems serve not only residents of Thompson, Wabowden and Snow Lake, but also many tourists.

There are four major Provincial Parks along the Grass River system – Grass River Provincial Park, Wekusko Falls Provincial Recreation Park, Pisew Falls Provincial Heritage Park and Paint Lake Provincial Recreation Park. These and other smaller park sites provide seven campgrounds and more than ten lodge and tourist outfitting operations and 320 cottages along the Grass River system.

While the Grass River is a well noted and historic canoe route, users also enjoy fishing, power boating, sailing, swimming, camping, picnicking and hunting as it is one of the most easily accessible waterways in Manitoba still able to provide a wilderness experience.

The recreational benefits and opportunities associated with the Grass River are dependent upon the quality of the natural environment. Present and future recreational use and the economic benefits associated with tourism can only be sustained if the natural qualities and features which attract visitors are maintained. And as indicated by the Natural Park and Heritage Park designations along its route, much of the Grass River has been dedicated to achieve this purpose.

The Burntwood River has much less recreational use. Over most of its course the river is not easily accessible and recreational use of the accessible portions is hampered at times by floating debris and water level fluctuations.

Objectives of water quality control for the Grass-Burntwood River system should reflect the requirements of the recreational uses: specifically to maintain the quality at or above the level required for the most demanding form of water recreation, but not as restrictive on the Burntwood River as on the Grass River portion of the watershed.

## Water Supply

Several communities and a number of mines depend on the lakes and streams of the area for their water supply. The treatment which this water receives differs from place to place.

Many individuals in the region consume drinking water directly from the lakes or streams without any treatment whatever.

## Wastewater Systems

Industrial facilities discharging waste water into this watershed are the Inco Metals Co. and the Hudson Bay Mining and Smelting Co. The principal discharges are located in the Thompson and Snow Lake areas involving the Burntwood River and Wekusko Lake. Constituents of most concern in mining wastes are heavy metals such as copper, zinc, cadmium and so on. These companies operate under existing Clean Environment Commission Orders.

There are eleven domestic sewage facilities within the area. The facilities at the communities of Wabowden and Nelson House, the school at Thicket Portage, and the Provincial Park at Paint Lake produce an effluent which can be considered of a secondary treatment quality. Snow Lake is serviced by two plants. One is a primary treatment plant; chlorinated effluent is discharged to Birch Lake with the overflow being returned to a nearby swamp which eventually drains to Snow Lake above the water intake. Tests conducted at the water intake have shown no public health implications. Another portion of the townsite is serviced by means of a chlorinated secondary sewage treatment plant. Effluent is also returned to Snow Lake. The City of Thompson is serviced principally by a primary sewage treatment plant which discharges chlorinated effluent to the Burntwood River. A portion of the south end of the city is serviced by a secondary sewage treatment plant which discharges chlorinated effluent to the Burntwood River via Thompson Lake.



*Typical River setting in the watershed.*