

LAND USE CONFLICTS IN THE PLUM LAKES
AREA OF SOUTHWESTERN MANITOBA

By

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ABSTRACT

In the Plum Lakes area of Manitoba, agriculture and wildlife are influenced annually and seasonally by variable water levels. There is dispute concerning the optimal water regime for the Lakes among local farmer groups, government agencies, and private organizations. Four farmer groups are involved: the Water Table Preservation Association; Farmer-Rancher Association; Trappers Association; and Plum Creek residents. The first two groups represent the dominant opposing viewpoints.

A primary step toward resolving the conflict is to identify the interests of local residents. The objectives of this study were to assess farmers' attitudes regarding water management and land use, and to design approaches that would resolve the conflicts and aid in the development of a water management plan for Plum Lakes. Research consisted of a review of related literature, including previous water regulation proposals, and a questionnaire survey of local farmers attitudes regarding agriculture, trapping, wildlife, and water management.

The study highlighted the present lack of information that is essential to the understanding and management of Plum Lakes (ie. information on soils, salinization, groundwater flow, aquifers, water table, topography, and wildlife). Information presently available is often misunderstood by farmers and misinterpreted by resource professionals.

Exchange of information between provincial agencies, private organizations, the Rural Municipality of Sifton, and local associations is important to the development of a water management plan. A board should be established that provides representation from all involved local groups and government advisors. It would provide 5 purposes: to examine potential water management alternatives and recommend a preferred water regime; to provide advice to the Minister of Natural Resources regarding the proposed management of Plum Lakes; to coordinate Plum Lakes management as one component of the overall management of Plum Creeks watershed; to enhance communication among proponents; and, to ensure all interest groups are represented.

The Departments of Natural Resources and Agriculture should coordinate development of a Plum Lake management proposal. Important components are to determine water regulation methods and provincial policy regarding dual use of Crown land for both agriculture and wildlife.

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CHAPTER I

INTRODUCTION

1.1 Preamble

In many parts of the Prairie Provinces, wetlands constitute an important component of the prairie ecosystem. Wetlands, which are complex, biologically productive and hydrologically important, are of particular interest to farmers, resource managers and conservationists.

Because of their complex nature, wetlands offer a combination of resource uses. Wildlife managers regard them as wildlife production areas. Farmers see them as an agricultural entity providing water and forage for livestock. The allocation of wetlands between the agriculture and wildlife sectors has the classical characteristics of a resource distribution problem: one resource with two alternative uses (Goldstein, 1970).

Plum Lakes in southwestern Manitoba (Fig. 1) is a marsh complex where agricultural and wildlife land use is a contentious and unresolved issue. Solving this conflict and developing a cooperative management plan is important to both the farming community and Manitoba in general.

1.2 Problem Statement

Two major concerns regarding land use conflict in the Plum Lakes area are:

- (1) Lack of communication among interest groups, and;

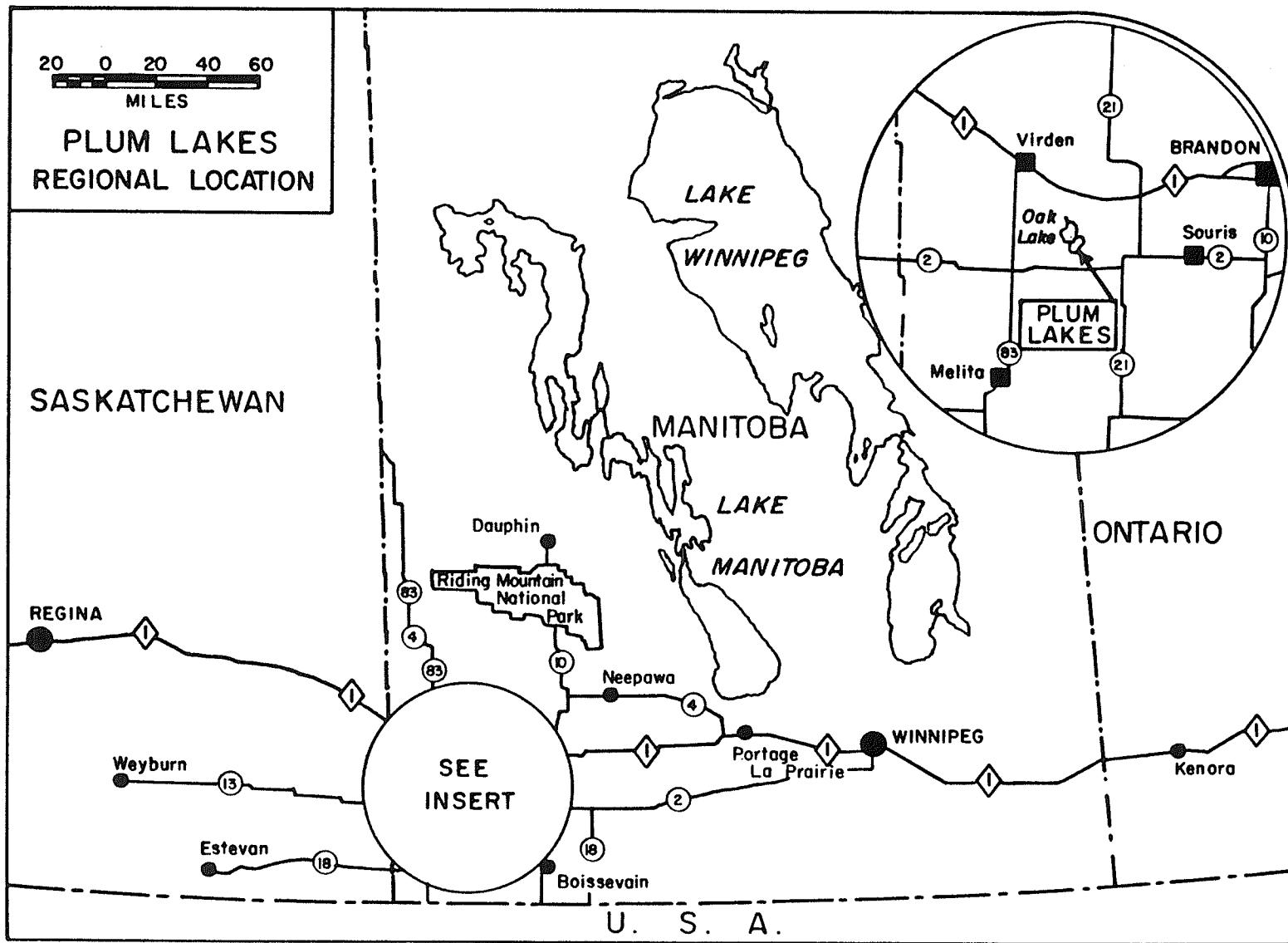


Figure 1. Regional Setting of Plum Lakes, Manitoba.

- (2) Clarification of resident landowner attitudes regarding regulation of Plum Lake water levels.

Hopcraft (1979) highlighted the first concern:

There have been a number of conflicting ideas and proposals for Plum Lakes future development or non-development, reflecting different interest groups and there is at present a serious lack of communication between these groups. It is important that this conflict be resolved and an acceptable long-term plan be agreed upon that allows for a degree of multiple uses within the best interests of Plum Lakes.

Rakowski (1980) stated the second concern:

There is currently no set plan for Plum Lakes ... a marsh complex within a region having the highest waterfowl capability in Manitoba ... Plum Lakes is presently vulnerable to loss as a result of agricultural activities. No proposals or commitments regarding Plum Lakes can be made until the interests and intentions of groups and associations involved in the Plum Lakes area have been clarified.

The level at which Plum Lakes should be maintained is the root of the problem. Local farmers and the provincial government have not resolved this and both agriculture and wildlife are suffering because of it. An initial step in resolving the problem is to clarify the attitudes of Plum Lake farmers. This may facilitate communication among local farmer associations and ultimately aid in the development of a management plan for the area.

1.3 Objectives

The primary objectives of this study were to assess the attitudes of Plum Lake farmers and assist in the development of water management and land use plans for the Plum Lakes area. Specific objectives were:

- (1) To provide an overview of previous land use proposals and resource management studies regarding Plum Lakes.
- (2) To identify and clarify present attitudes of Plum Lake farmers regarding:
 - a. agriculture
 - b. trapping
 - c. wildlife
 - d. water level requirements
- (3) To design approaches which would:
 - a. promote communication among local farmer associations;
 - b. outline areas of common management interest to agriculture and wildlife proponents;
 - c. propose guidelines for the development of a multiple use management proposal for Plum Lakes.

1.4 Methods

Methods employed in this study involved a literature review and a questionnaire survey of Plum Lake and Plum Creek residents. The literature review encompassed agriculture, wildlife and water resource information. Principle literature sources included Manitoba's Department of Natural Resources, Canadian Wildlife Service, Ducks Unlimited (Canada) and the University of Manitoba.

A questionnaire survey was conducted to identify farmers' attitudes regarding local agricultural practices, trapping, wildlife and water management. It was administered by personal interview during July and August, 1981. Farmers received no prior notification and were assured complete confidentiality. Due to the nature of information required, open ended questions were used (Oppenheim, 1966). Editing was provided by professionals from the University of Manitoba, Department of Natural Resources, and Ducks Unlimited.

Thirty-four of 37 land owner/operators in the study area were interviewed. Approximate study area boundaries are illustrated in Figure 2.

Questionnaire respondents were categorized as to four groups: Water Table Preservation Association (WTPA); Farmer-Rancher Association (F&RA); Plum Lake Trapper Association (TA); and Plum Creek farmers (PC). Percent frequencies of responses were calculated for each group. Where categorization into groups was not possible or necessary, responses were evaluated by percent frequency for the population.

1.5 Description of the Study Area

1.5.1 *Location*

The study area was located in the Rural Municipality of Sifton. It encompassed approximately 75 square miles (194 sq. km), including land north and south of Plum Lakes and east along Plum Creek in townships 7 and 8, and ranges 23,

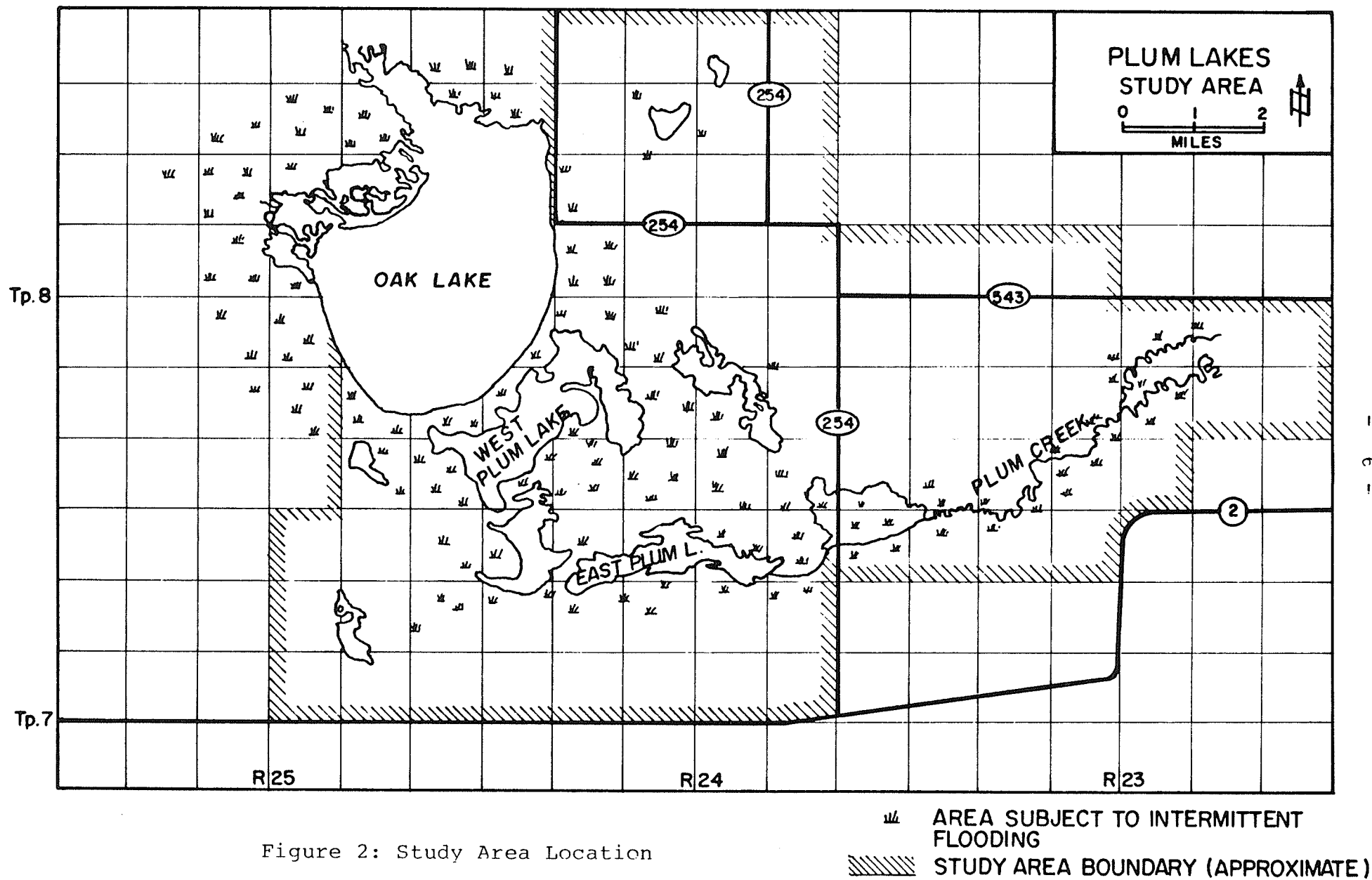


Figure 2: Study Area Location

24 and 25 (Fig. 2). Provincial Trunk highway 21 and PTH 2, delineated east and south boundaries, respectively. North and west boundaries were variable due to land ownership.

1.5.2 *Water Supply*

Plum Lakes consist of two semi-permanent bodies of water: West Plum Lake and East Plum Lake (Fig. 3). They lie immediately south of Oak Lake which is controlled by a dam with a full supply level (fsl) at 1410.0 feet elevation. Pipestone Creek is the main source of inflow and Plum Creek carries the outflow eastward to the Souris River.

1.5.3 *Surface Geology*

Plum Lake and Plum Creek soils are developed on moderately calcareous, coarse to moderately coarse textured lacustrine sediments. Soils have a loamy, very fine sand surface texture, moderate permeability and slow surface runoff (Eilers et al., 1978). Some soils may be prone to salinization.

Pipestone soils, located west of Plum Lake, are black gleysolics developed on deep, weakly to moderately calcareous, fine textured lacustrine and alluvial sediments. Pipestone soils portray level topography, light clay surface texture, very slow permeability and slow surface runoff (Eilers et al., 1978). Some of these soils may be saline.

1.6 Historical Review

Agricultural and wildlife groups are concerned about fluctuating water levels of Plum Lakes. In 1956, the

Prairie Farm Rehabilitation Administration (PFRA) undertook flood prevention works in and along Pipestone Creek (Water Resources Division, 1972) and cleaned and deepened four miles of the uppermost end of Plum Creek (Grower and Kabaluk, 1973). This scheme was intended to limit maximum levels of Oak and Plum Lakes to elevation 1410.0' a.s.l.¹

In 1958, Ducks Unlimited attempted to secure Plum Lakes as waterfowl habitat and constructed the "Kansas City Oak and Plum Dam" at Plum Lakes outlet with a sill elevation of 1401.86' a.s.l. Ducks Unlimited proposed a water control level of 1407.86' f.s.l.² A few landowners opposed a controlled water level and refused D. U. flood easements. Consequently, the dam has never been operated (Burns, 1971).

The Province of Manitoba purchased 5,400 acres (2186 ha) of flood prone land in the Oak-Plum Lake area in 1959. It was secured as a Crown game bird refuge to provide nesting habitat and improve waterfowl production (Hildebrand, 1968). Presently, 7,400 acres (2996 ha) is Crown owned and is leased to local farmers for hay or grazing.

In 1964, the Manitoba government constructed a dam at the outlet of Oak Lake with a crest fixed at elevation 1410.0' f.s.l. (Figure 3). It was to provide a water level range

¹a.s.l. - above sea level

²f.s.l. - full supply level

necessary for recreation activities on the lake.

Brandon University established a Biological Research Station at Plum Lakes in 1969 (Stewart, pers. comm.). Research emphasis included waterfowl, muskrats and vegetation studies.

In 1976, a Federal/Provincial government proposal recommended that:

- (1) 16,600 acres (6720 ha) of privately owned land in the Plum Lake area be expropriated;
- (2) water levels be manipulated and stabilized at a level that would cause the least overall detriment to agriculture while maximizing benefits to wildlife;
- (3) the Plum Lake region be established as a Wildlife Management area.

This proposal was opposed by local farmer groups. As a result of the opposition and a change in provincial party government, the proposal was never implemented (Rakowski, pers. comm.).

In 1978, fourteen quarter sections of land in the Plum Lakes area were purchased by the Nature Conservancy of Canada (Figure 3). This group acquires and preserves lands which are representative of natural ecological reserves. A local non-profit conservation organization, The Calumet Nature Foundation was established in 1979 to coordinate various interests and foster concern about the quality, fragility and needs of nature on the Nature Conservancy Land. However,

Sifton Municipality was not in favor of the proposal put forward by the Nature Foundation and Calumet was put into abeyance.

Ducks Unlimited was approached by Sifton Municipality in 1979 to prepare a water control proposal for Plum Lakes. The Farmer-Rancher Association indicated they would not be receptive to the proposal. They opposed a 21-year easement which would commit landowners to a given water level or range of water levels. They also opposed control of Plum Lakes by an outside agency. Accordingly, Ducks Unlimited discontinued preliminary engineering studies.

In 1981, Sifton Municipality passed several motions involving Plum Lakes. One motion (1981-36) requested the Province of Manitoba re-examine the advisability of regulating Plum Lake at a level that was satisfactory to both wildlife and agricultural interests; and that adequate groundwater and contour information be gathered for the purpose of this study. Another motion (1981-37) resolved to construct a road east of Section 31, Township 7, Range 24. The local Water Table Preservation Association was concerned that a drainage channel would be constructed adjacent to the road which would improve drainage of Plum Lakes by bypassing the "Narrows". The "Narrows" is a natural drainage channel between West Plum Lake and East Plum Lake that is presently overgrown with vegetation to the extent that it restricts water flow (Figure 3). This controversy has been publicized by the Brandon Sun (Appendix 2).

1.7 Organization of the Study

Chapter 1 presents an introduction to Plum Lake land use and outlines methods of the questionnaire survey. Chapter II comprises the review of related literature concerning water, agriculture and wildlife of Plum Lakes. Chapter III presents results from the questionnaire survey and discusses important topics and Chapter IV outlines conclusions and recommendations.

CHAPTER II

REVIEW OF RELATED LITERATURE

2.1 Introduction

Literature on Plum Lakes water, agriculture and wild-life resources were reviewed. Three water regulation studies, one groundwater study, water level data and Plum Creek's Drain Classification were assessed. Literature concerning effects of water, soils, salinity, pasture and Crown land use on agricultural productivity were reviewed. Finally, information on the biological and ecological requirements of waterfowl and muskrats and their water requirements was analyzed.

2.2 Water

Plum Lake land use conflict is based on fluctuating water levels. In response to the conflict, Manitoba's Department of Natural Resources, Water Resources Branch, prepared several water regulation reports. These included:

1. Plum Lake Regulation Study. 1967. Water Resources Division, Dept. of Natural Resources, Manitoba.
2. Revised Report on Plum Lake Regulation Study. 1972. Water Resources Division, Dept. of Natural Resources, Manitoba.
3. Plum Lakes Water Regulation Benefit-Cost Study. 1973. Mines, Resources and Environmental Management, Manitoba.

The Manitoba Water Resources Branch also prepared a

groundwater report:

4. Groundwater Resources in the Souris Basin in Manitoba. 1976. Water Resources Division, Dept. of Natural Resources, Manitoba.

2.2.1 *Review of Water Regulation Studies*

Water Resources Division (1967) assessed preliminary costs and effectiveness of flood control measures in the Plum Lakes area and determined means of regulation for ranching interests. Flood control schemes evaluated effects of three full supply levels (f.s.l.) at the Kansas City Oak-Plum Dam (1406.0', 1407.0', 1407.86'). The study noted water levels higher than 1407.0' a.s.l. in spring are desirable because of beneficial effects of flood irrigation, however, regulation above 1407.0' f.s.l. in early summer is detrimental because potential hayland is flooded.

Water Resources Division (1972) updated and revised the 1967 regulation study to determine a control level for Plum Lakes that would provide maximum economic benefit to Manitoba. It recommended:

1. the Kansas City Oak-Plum Dam provide a fixed control level of 1409.0' f.s.l.;
2. all private land surrounding Plum Lakes below elevation 1411.0' be purchased by the province;
3. four miles of the upper end of Plum Creek be improved to 1956 conditions (i.e. 1401.0' f.s.l.) and,
4. ameliorative measures be examined to lessen detrimental impacts on native hay production.

This report also discussed the effects of the recommended water control scheme #8.

With scheme #8, Plum Lakes will virtually remain above 1406.0 feet and it is this elimination of the near drying that benefits wildlife. Hay lands will be flooded substantially more frequently up to elevation 1409.0 feet and hay supply ... will be less reliable ... Lands along the upper end of Plum Creek will have a decreased incidence of flooding and will be drained more quickly ... Soil salinity problems along the western edge of Plum Lakes might increase with control. Accessibility in interior hay lands will decrease moderately.

Hjorleifson (1972) noted the inferences of scheme #8 were difficult to accept because of lack of precision in the basic data and methodologies employed. He further commented that Water Resources not attempt to financially justify the project.

Grower and Kabaluk (1973) prepared a Plum Lake Regulation Benefit-Cost Study. Objectives were:

1. to outline proposals for controlling Plum Lakes water regime and establish a feasible alternative in view of potential impact on agricultural production and wildlife habitat.
2. to provide methodology for resolving conflict between wildlife and agricultural resource users.

They recommended:

1. a 1408.0' f.s.l. water control level at Kansas City Oak-Plum Dam.
2. the Plum Creek bed be restored to 1956 conditions (1401.0' f.s.l.).

3. a cost sharing agreement whereby two agencies, Canadian Wildlife Service and Ducks Unlimited, provide 75 percent financing with a 25 percent provincial share.

The Plum Lakes Planning Committee (1973), affiliated with the Manitoba Department of Natural Resources, provided a critique of the Grower-Kabaluk Report:

The basic information in the Grower-Kabaluk report could be evaluated in a number of ways to arrive at different conclusions and there are differences of opinion how the facts might be interpreted.

2.2.2 *Groundwater Study Review*

Water Resources Division (1976) provided general information on geology and groundwater in the Souris Basin. Aquifers in the basin are formed by sand, gravel, shale and sandstone. West and south of Oak Lake are areas of thick sand and/or gravel aquifers at the surface with a saturated thickness greater than 30 feet (10 m). Water quality of surface sand and gravel aquifers is rated good to excellent. Aside from surface aquifers, extensive sand and gravel aquifers occur in buried bedrock valleys and outwash deposits. Little is known about their boundaries and at present they are not as important as surface aquifers for groundwater. Some are saline.

Water Resources Division (1976) outlined the relationship between groundwater and surface water in the Souris

Basin:

Water levels in Oak and Plum Lake correspond to the water table in sand and gravel aquifers at surface adjacent to the Lakes. During periods of high groundwater it is likely there is discharge from the aquifers into the lakes. Flow direction would be reversed during periods when the water table is lower than lake levels. Hence, intensive groundwater development adjacent to Oak and Plum Lake could cause lowering of lake levels. It should be noted, flow from lakes into aquifers may be severely retarded by clay and silt sediment on lake bottom.

Water Resources Division maintains six groundwater level observation stations in the Plum Lakes area. Levels are lowest in February and highest during April and May and correlate strongly with Plum Lakes levels.

2.2.3 *Plum Lakes Water Levels*

Water Resources Division recorded water levels on a portion of Plum Lakes near Findlay from 1954 to 1975 and Water Survey of Canada since 1975 (Edgars, pers. comm.). Hydrographs were constructed of Plum Lakes levels from 1928 to 1967 by reconstructing Pipestone Creek flows (Water Resources Division, 1967).

Mean monthly levels of Plum Lake are summarized in Appendix 3. Low water years (averaging less than 1406.5 feet in July) include 1959, 1961, 1968, 1973 and 1980. High water years (averaging greater than 1409.5 feet in July) include 1954, 1955, 1970, 1975 and 1976.

2.2.4 *Plum Creek Drain Classification*

Plum Creek drains an area extending into Saskatchewan (Appendix 4) and is classified as a fifth order drain (Appendix 5). Provincial authorization is required for engineering work on waterways above class two. Sifton Municipality retains responsibility over first and second order drains.

2.3 Agricultural Resource

Cattle ranching and hay production predominate in the Plum Lakes area. Ranchers are concerned about the local water table, fluctuating water levels, soil salinity, and Crown land.

2.3.1 *Agriculture and Water*

Production of native hay is generally improved by some flooding in spring, with subsequent lowering of water in time to harvest (Water Resources Division, 1972). Flooding benefits vary depending on elevations. Whereas high water benefits upland areas, low water benefits lowlands. The terrain is extremely flat (Barto and Vogel, 1978), therefore, large areas are influenced by minimal water level fluctuations.

Landowners in low-lying areas suffer periodic losses of harvestable hay through early summer flooding. They require that the water level be lowered to 1406.0' a.s.l. before harvest time (Department of Natural Resources, 1973). Low levels (less than 1406.0' a.s.l.) increase hay acreage, however, a decreased water table results in reduced production

of native grasses in upland areas (Water Resources Division, 1972). This relationship was suggested by Sloan (1972) who noted that by lowering the water table, the depth to the capillary zone (zone where water is available for plant growth) may be increased sufficiently to cause moisture stress in crops on localized upland areas.

Ehrlich et al., (1956) outlined the relationship between agriculture and water:

Wet meadow and sandy, imperfectly drained soils of ... Plum Lakes ... are not suitable to arable culture. Surplanting suitable grasses in wet meadow areas require special investigation. The possibility of controlled drainage whereby the height of the water table can be regulated deserves consideration.

Canada Land Inventory (1966) rated 45 percent of the Plum Lakes area as 6W, denoting an area of very poor agricultural capability (1 - excellent; 7 - very poor). Thirty-five percent of the area is rated 5W. The major limitation was excess water.

2.3.2 *Salinity*

Soil salinity is associated with high water levels and a corresponding high water table (Robertson, 1967), especially west of Plum Lakes (Water Resources Division, 1972). The number of acres prone to salinization has not been determined. In a series of publications "The Health of the Land", Ducks Unlimited (1980) have stated the cause and cure of salinity:

Soil salinity problems result from water movement through the soil. When sub-soil moisture containing dissolved salts moves upward and evaporates, the salts are left on the surface. As the process continues, salt concentrations increase until white deposits begin to show and crop yields drop. The solution to salinity is as straight forward as the cause -- prevent the upward movement of salt-laden moisture to the soil surface.

2.3.3 *Crown Land*

In 1959, Manitoba purchased 5,400 acres (2,186 ha) of flood prone land (below 1410.0' a.s.l.) in the Oak-Plum Lake area, additional to 2,000 acres (810 ha) previously acquired (Fig. 4). Crown lands are leased by renewable hay permits, long term forage leases and casual hay permits (Cotton, pers. comm.). Renewable hay permits are long term permits renewed annually by the same lessee. Long term forage leases are issued on areas utilized by livestock. Casual hay permits are annual permits issued on a first come, first served basis.

Several concerns have been raised regarding Crown land in the area (Colpitts, pers. comm.). These include provincial policy regarding the sale of Crown land to local farmers, accessibility, apportionment of hay leases to farmers, and management by the lessee (Appendix 6).

2.3.4 *Oak-Plum Lakes Associations*

The Oak-Plum Lakes Farmer-Rancher Association is composed of farmers primarily earning income from marginally productive land. Members realize the importance of spring

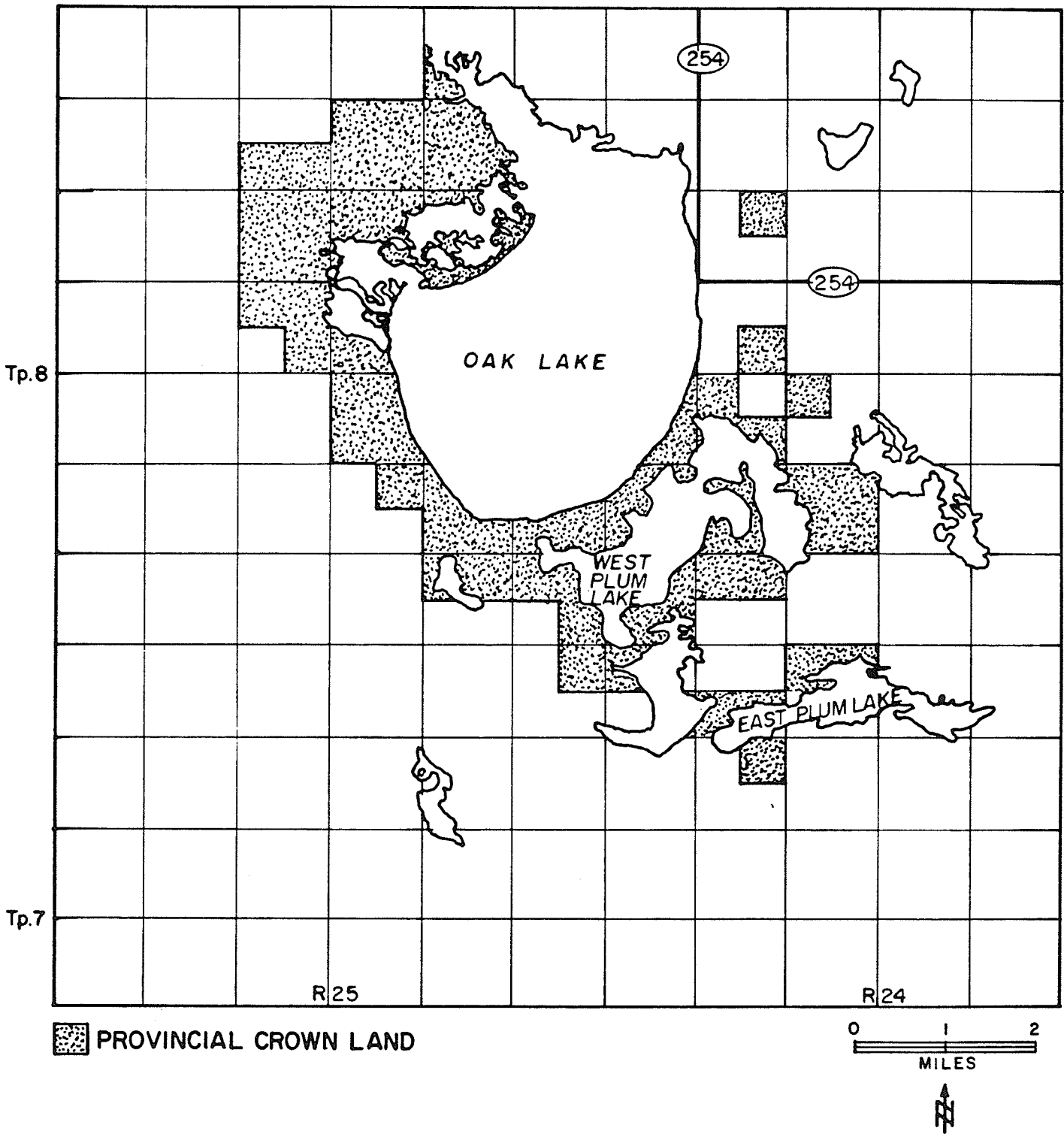


Figure 4. Crown Owned Land in the Plum Lakes Area.

flood waters to initiate native pasture growth. However, they stress the need to remove excess water to allow hay cutting on low-lying land in early summer. Flooded lands are an obstacle to native grass production and revenue. Members disapprove of water regulation schemes affecting privately owned land that provide benefits to wildlife (muskrats, waterfowl) and disbenefits to agriculture.

The Water Table Preservation Association (WTPA) was formed by a group of Plum Lakes and Plum Creek farmers who were concerned about the absence of a water management plan for Plum Lakes, water table regulation and drainage. They stress the negative impacts of low water levels to agricultural production.

The Water Table Preservation Association involved 32 farmers who were directly affected by Plum Lakes and Plum Creek water levels and water table. Their position was outlined in a letter to the Rural Municipality of Sifton:

The WTPA is opposed to any and all further dredging, digging or draining on the Plum Creek, until such a time that all landowners affected have agreed on a water control level for the Plum Lakes and that a water control structure or structures have been erected and placed into operation to guarantee such a water level.

2.4 Wildlife Resource

Plum Lakes provide exceptional wildlife habitat especially for waterfowl and muskrats (Carreiro, 1972). Past management plans estimated annual wildlife benefits from

Plum Lakes exceeded \$100,000, however, water control is essential to maintain them (Bossenmaier, 1972).

2.4.1 *Waterfowl*

Southwestern Manitoba is the principle waterfowl production region in the province (Water Resources Division, 1972). Marshes of Plum Lakes rank second only to Whitewater Lake as the most important waterfowl staging area in southwestern Manitoba (Department of Natural Resources, 1973). Plum Lakes constitute a haven for waterfowl migrating along Mississippi and Central flyways, particularly in dry years (Water Resources Division, 1972). Canada Land Inventory (1970) rated 90 percent of Plum Lakes as 2S, denoting an area of very good habitat for waterfowl production and also an important migration stop. In 1959, 5275 acres (2135 ha) of Crown land in the Plum Lakes area was secured as a game bird refuge to provide nesting habitat and improve waterfowl production (Hildebrand, 1968).

Robertson (1967) estimated a minimum Plum Lakes waterfowl population of 70,000 (census date - August 15, 1967). This is considerably higher than the 19,450 breeding population estimated by Rusch and Bossenmaier (1972).

It is important to control timing and location of native hay cutting for maintaining upland cover for nesting waterfowl. To ensure adequate time for waterfowl broods to be hatched and allow some plant regrowth for nesting cover the following spring, Manitoba's Department of Natural Resources suggested hay cutting should not occur prior to

July 15, nor later than August 30. Specific cutting schedules are stipulated in some hay permits issued on Crown lands surrounding Plum Lakes. Dense nesting cover within 100 feet (30 m) of the water's edge should not be cut (Cotton, pers. comm.). This uncut vegetation would provide protection from predators to ground nesting ducks.

2.4.2 *Botulism*

Botulism results from a toxin that is produced by soil-borne bacteria under anaerobic conditions, and if ingested, affects the nervous system causing paralysis and death (Frobisher, et al., 1974). It is associated with large areas of de-oxygenated water less than one foot deep in late summer. At a level of 1406.0' a.s.l. on Plum Lakes, approximately 3,300 acres (1,336 ha) have water depths less than one foot (Water Resources Division, 1972). Levels lower than this were prevalent during the summer of 1980 and approximately 12,000 ducks were killed by botulism (Andrews, pers. comm.). Affected ducks were found around East Plum Lake, while few duck carcasses were found on marshes east of Oak Lake.

2.4.3 *Oak-Plum Lake Special Trapping Area*

Oak and Plum Lake trappers, represented as the Trappers Association, expressed concern to the Manitoba Department of Natural Resources regarding non-locals overharvesting furbearers from "locally" trapped areas (Bidlake, pers. comm.). The result was formation of the Oak Lake Special

Trapping Area. The area included Oak and Plum Lakes and surrounding marshes and was divided into individual trapper zones to minimize conflict (Appendix 7).

2.4.4 *Furbearers*

Muskrats are the most abundant furbearer inhabiting Plum Lakes (Robertson, 1967). Other furbearers include ermine, fox, coyote and mink. Local trappers claim 100 muskrats can be harvested per quarter section of marsh under ideal conditions. Over 12,000 muskrats can be harvested annually from the Plum Lakes area (Hopcraft, 1979).

Fluctuating water levels are a major factor that affect muskrat populations. Four feet (1.2 m) of water is required to overwinter muskrats (Robertson, 1967). From the Trapper Association viewpoint, water level control is essential to stabilize muskrat populations and harvest.

CHAPTER III

RESULTS AND DISCUSSION

3.1 Introduction

A questionnaire survey was conducted with Plum Lakes and Plum Creek farmers (Appendix 1). The total number completed was 34. Of these, 20 were from the Water Table Preservation Association, 10 from the Farmer-Rancher Association and 4 did not belong to an association. Eight farmers were members of the Trapper Association of which 6 also belonged to the Water Table Preservation Association. Only one of the Farmer-Rancher Association members belonged to the Trapper Association. Six of 8 Plum Creek members belonged to the Water Table Preservation Association.

3.2 Agriculture

Section one of the questionnaire referred to livestock, native hay production, pasture management and soil salinity (Appendix 1).

Question #1: What is your main source of income?

- (a) cattle ranching*
- (b) selling hay*
- (c) other*

Ninety-one percent of all farmers surveyed listed cattle ranching as their main source of income and 6% stated hay sales. Three percent reported honey sales as an income source.

Question #2: Do you have a feedlot operation?

Yes _____ No _____

Eighty-eight percent do not have feedlot operations, whereas 12% do. Cow-calf ranching operations dominate. Several farmers stated they feed cattle grain to fatten them prior to selling for slaughter.

Question #3: When do you start your cattle grazing on native pasture within the study area?

Month _____ Week _____

Sixty-nine percent stated that they start their cattle grazing on native pasture approximately the second week of May; 31% in the first week of June. Studies by Manitoba's Department of Agriculture indicated native pasture is just beginning to green up by May 20 (Gramiak, 1977). Grazing native pasture at this time severely limits production and tends to deplete desirable species of native grass while encouraging growth of less palatable species (Gramiak, 1977; Temanson, 1975). Gramiak suggested native pasture grazing should be delayed until the third week of June.

Question #4: Do you rotate grazing on tame and native pastures?

Yes _____ No _____

Fifty-five percent of Plum Lakes farmers use rotational grazing systems, however, few farmers used a system of cross-fencing and pasture rotation comparable to the Southwest Grasslands Project (Gramiak, 1977). Forty-five percent use continuous grazing. Zittlau (1979) noted three

factors explaining the reluctance of farmers to adopt rotational management:

1. it requires intensive management;
2. rotation of cattle off pastures which have some grass remaining is considered wasteful;
3. the cost of cross-fencing is too high.

Question #5: How many cattle (cows, bulls, calves, yearlings) do you pasture within the study area?

The average number of cattle per farm was 189; the range was 18 to 450 head. The survey did not provide the acreage of pasture land. Consequently, the number of cattle per acre was not determined. The carrying capacity of native pasture in the Plum Lakes area is approximately 5 to 8 acres per head of cattle (Sawatzky, pers. comm.).

Question #6: When do you begin cutting native hay?

Month _____ Week _____

The majority of Plum Lake farmers (71%) begin cutting native hay during the second week of July, 26% in the first week of August and 3% in September.

Question #7: Do you have any "upland" native hay areas within the study area? Upland refers to 1410-1412 feet elevation or above maximum flood levels.

Yes _____ No _____

If yes, what was the quality of native upland hay in 1980?

- 1) good
- 2) average
- 3) poor

Ninety-seven percent of farmers within the study area own or lease some native upland hay acreage. All agreed the quantity of the hay in 1980 was poor. Quality as perceived by local farmers, is outlined in Table 1.

Table 1

Farmers' Perception of the
Quality of Native Upland Hay in 1980

QUALITY	% Response	
	WTPA*	F&RA**
Good quality	15	50
Poor quality	85	50

* Water Table Preservation Association

** Farmer and Rancher Association

Fifty percent of the Farmer-Rancher members stated 1980 upland hay quality was good and attributed this to early harvesting. The majority of Water Table Preservation members stated

it was poor. They felt lack of precipitation was the principle explanation, however, they mentioned low water table effects frequently. Comments such as "once mowed, there was nothing to rake", and "not worth cutting" were common.

Question #8: In 1980, what was the average buying or selling price of a ton of native hay?

The price for a ton of native hay averaged \$42 and ranged from \$25 to \$80 depending on the quality of hay. Prices were high due to general prairie drought and lack of supply. Comments revealed little hay was sold from the area in 1980.

Question #9: On the land you farm in the Plum Lake area, how would you rate native hay production in the last five years?

Good _____ Average _____ Poor _____

Farmer-Rancher members rated native hay production as poor in 1976, whereas, Water Table Preservation, Trapper Association and Plum Creek farmers rated 1976 as a good year (Table 2). Plum Lakes water levels in July, 1976 averaged 1410.3' a.s.l., representing flood conditions. Discrepancy in 1976 ratings may have been due to lack of specification between "upland" and "lowland" native hay. For example, Farmer-Rancher members referring to flooded "lowland areas" rated native hay production as poor. Conversely, Water Table Preservation members referring to

dry "upland areas" rated hay production as good. A farmer survey in the Strathcona and Odanah Municipalities of Manitoba indicated crops grown on knolls were better than those in low lying areas during wet years and that this relationship was reversed in dry years (Zittlau, 1979).

Table 2

Farmer's Perception of Native Hay Production from 1976 to 1980

Year	WTPA%			F&RA%			TA%			P.C.***		
	Good	Avg.	Poor	Good	Avg.	Poor	Good	Avg.	Poor	Good	Avg.	Poor
1976	68	11	21	10	10	80	65	25	10	63	0	37
1977	58	37	5	30	30	40	50	38	12	37	50	13
1978	25	75	0	50	40	10	12	88	0	37	63	0
1979	10	60	30	60	20	20	12	38	50	13	74	13
1980	0	5	95	30	20	50	0	12	88	0	13	87

* Trappers Association

** Plum Creek Farmers

Farmers from all associations perceived 1978 as an average to good year for native hay production. Average monthly Plum Lake water levels for June, July and August in 1978 were 1407.7', 1407.6' and 1407.2' a.s.l., respectively (Appendix 3). This might signify a water control level that all associations could agree upon.

The majority stated 1980 native hay production was poor (Table 2). Thirty percent of Farmer-Rancher Association members stated 1980 was a good year for native hay production and attributed this to early harvesting (ie. June 20).

Question #10: Does any of your land in the Plum Lakes area contain areas with saline or alkaline soils?

Yes _____ No _____

If yes,

- a) where do salt spots occur?*
- b) when are they more noticeable, in wet or dry years?*
- c) what in your opinion caused them?*

Eighty-five percent of Plum Lake farmers surveyed, stated that saline soils existed on their land. Robertson (1967) noted the presence of saline soils southwest of Plum Lakes. This region was predominantly occupied by Farmer-Rancher Association members.

Eighty-four percent assessed low lying land, depressions and land bordering the water's edge as sites possessing salinity problems. Several noted the presence of salinity on the sides of slopes. Saline soils often develop in concentric rings around sloughs and occur where there is a change of slope (Luken, 1962). This may explain the occurrence of saline soils on hillsides.

Forty-six percent of all farmers believed salinity was more noticeable in wet years and 54% noticed salinity more in

dry years. Robertson (1967) noted farmers southwest of Plum Lake associated salinity with high water levels. Salinity problems are the result of temporary high water tables which contribute to capillary movement of water and dissolved salts to the surface (Luken, 1962). As the water evaporates, the salts it carried are concentrated at the surface. Cultivation and over-grazing can compound salinity problems.

Question #11: Do you belong to any groups or associations involved with Plum Lakes?

Within the study area, 34 farmers completed questionnaires. Of these, 20 were from the Water Table Preservation Association, 10 were from the Farmer-Rancher Association and four did not belong to an association. The majority of the Water Table Preservation members lived north and east of Plum Lakes. The majority of Farmer-Rancher members lived south and west of Plum Lakes. The distributional location of these associations may be reason enough to suggest the existence of dissimilar conditions (groundwater flow, soils) north and south of Plum Lakes.

3.3 Trapping

Muskrats are the most abundant furbearer inhabiting Plum Lakes. Consequently, section two of the questionnaire was oriented toward muskrat trapping and water management affecting muskrat production (Appendix 1).

Question #1: Do you or any family member trap the marsh?

Yes _____ No _____

Forty percent of Water Table Preservation Association members and 30% of Farmer-Rancher Association members trap in the Oak and Plum Lakes area (Table 3). Individuals answering "yes" to question number one did not necessarily belong to the Oak-Plum Lakes Trapper Association. Association members have registered trapping zones that restrict others from trapping within specified boundaries (Appendix 7). Several non-members stressed concern over being restricted from trapping in these zones.

Table 3

Percentage of Farmers that Trap in the Plum Lakes Area

	WTPA%	F&RA%	TA%
Traps	40	30	100
Does not trap	60	70	0

Question #2: Would you like to see Plum Lake water levels managed for muskrat production?

Yes _____ *No* _____

Obvious differences of opinion existed between Water Table Preservation and Farmer-Rancher members regarding Plum Lake water management for muskrat production (Table 4). Farmer-Rancher members opposed management because high water levels might flood private and leased Crown land. Water Table Preservation members supported management for muskrat production although

it was a secondary concern. Their principle motive was stabilization of water table levels.

Table 4

Farmer's Response Toward Water Management for Fur Production

	WTPA%	F&RA%	TA%
Yes	85	10	88
No	15	90	12

Question #3: Since 1976 (flood year), which years stand out in your mind as good trapping years?

Three years were mentioned as good trapping years: 1976, 1977 and 1978. Trapping in 1977 was referred to as "exceptional". Individual harvests numbering 2000 muskrats in ten days were reported. Average monthly Plum Lake water levels in 1977 for April, May, June and July were 1407.8', 1407.9', 1407.7' and 1407.6' a.s.l., respectively (Appendix 3).

Farmers from all associations perceived 1978 as an average to good year for native hay production (Table 2). Trapper Association members noted 1978 as a "good" year for muskrats. Average monthly Plum Lake water levels for June, July and August in 1978 were 1407.7', 1407.6', and 1407.2' a.s.l., respectively (Appendix 3). Although conditions other than water levels may have affected muskrat and hay production in 1978, this regime seems to indicate a control level that is

compatible to all interests.

Question #4: How was trapping in 1980-81?

Seventy-five percent of Trapper Association members said they did not trap in 1980-81. The remaining 25% said muskrat trapping was poor. This was due to low water levels and winter freeze-outs. The trappers claimed 40,000 muskrats could be harvested from the Oak and Plum Lakes area under managed conditions. Hopcraft (1979) estimated 12,000 muskrats are trapped annually in the Plum Lakes area.

3.4 Wildlife

Section three of the questionnaire involved wildlife in the Plum Lakes area (Appendix 1). Questions were oriented toward manageable wildlife including deer, muskrats, waterfowl and fish.

Question #1: Have you used Plum Lakes for any of the following recreational pursuits?

Hunting, trapping, fishing, canoeing, photography, wildlife observation, plant collecting and snowmobiling.

The majority of farmers from all associations enjoyed observing wildlife (Table 5). Water Table Preservation and Trapper Association members hunt, trap and fish more than Farmer-Rancher Association members. Thirty percent of Water Table Preservation members surveyed, belonged to the Trappers Association. This may explain the agreement between the two groups.

Table 5
Recreational Use of Plum Lake Area by Local Farmers

Activity	WTPA%		F&RA%		TA%		P.C.%	
	Yes	No	Yes	No	Yes	No	Yes	No
Hunting	55	45	20	80	75	25	50	50
Trapping	55	45	20	80	100	0	25	75
Fishing	50	50	30	70	75	25	25	75
Canoeing	35	65	10	90	37	63	12	88
Photography	15	85	30	70	25	75	12	88
Wildlife observation	80	20	70	30	75	25	75	25
Plant collecting	40	60	40	60	50	50	75	25
Snowmobiling	70	30	50	50	100	0	50	50

Question #2: How do you feel about the presence of the following wildlife on your land?

Deer, muskrats, waterfowl, prairie chickens, blackbirds, fox, coyote, fish.

Approve (Ap) _____ Oppose (Op) _____
Indifferent _____

In general most wildlife species were appreciated by Plum Lake residents (Table 6). Deer, prairie chicken, fox and coyote are approved by all factions. Comments revealed prairie chickens (Pedioecetes phasianellus) are "a favorite" because they stay through winter and do little harm.

Table 6

Farmers Attitudes toward Wildlife Presence on Their Land

Species	WIPA%			F&RA%			TA%			P.C.%		
	Ap.	Op.	Ind.	Ap.	Op.	Ind.	Ap.	Op.	Ind.	Ap.	Op.	Ind.
Deer	100	0	0	90	0	10	100	0	0	100	0	0
Muskrats	95	0	5	40	30	30	88	0	12	88	12	0
Waterfowl	90	10	0	70	20	10	88	0	12	100	0	0
Prairie Chicken	100	0	0	100	0	0	100	0	0	100	0	0
Blackbirds	10	65	25	0	70	30	12	38	50	12	76	12
Fox	85	10	5	90	0	10	100	0	0	88	0	12
Coyote	85	10	5	90	0	10	100	0	0	88	0	12
Fish	80	0	20	50	30	20	100	0	0	50	25	25

* Ap - Approve; Op - Oppose; Ind - Indifferent

Farmer-Rancher members' attitudes toward waterfowl and muskrats were not as favorable as Water Table Preservation or Trapper Association members' attitudes. They disapproved of high water levels associated with management of these species and detrimental effects of flooded hayland. Nesting Canada Geese were in high favor with all farmers.

Varied comments regarding specific wildlife species included: dislike of gophers and blackbirds, disapproval of snowmobiles pursuing foxes and coyotes, threat of bears to livestock and beehives in the Plum Creek area, and observation of elk throughout the area.

Question #3: *In your opinion, should the production of the following wildlife species be encouraged on Plum Lakes?*

- a) *deer*
- b) *muskrats*
- c) *waterfowl*

Water Table Preservation and Trapper Association members were more in favour of encouraging wildlife production than were Farmer-Rancher members (Table 7). The Farmer-Rancher Association was completely opposed to enhancement of waterfowl and muskrat production because of the high water levels required to manage them.

Table 7

Farmers' Responses toward Encouragement of Deer, Muskrat and Waterfowl Production in the Plum Lakes Area

Species	WIPA%			F & RA%			TA%		
	Yes	No	Ind.	Yes	No	Ind.	Yes	No	Ind.
Deer	40	10	50	10	40	50	50	12	38
Muskrats	50	10	40	0	60	40	38	38	24
Waterfowl	40	20	40	0	50	50	38	24	38

Many farmers among all groups were indifferent toward encouraging wildlife production. Members from all associations remarked, "wildlife can look after itself if left alone". One farmer, however, noted natural habitat has been altered so drastically due to man's influence (diking, ditching and

road building), that wildlife has to be managed.

*Question #4: In the last five years (1977-1981),
have you noticed any changes in:*

- a) muskrat populations*
- b) waterfowl populations*

The perceived trend is decreased muskrat and waterfowl populations (Table 8). Trapper Association members noted drastic muskrat population decreases from 1977 to 1981 due to drought. They emphasized the need for water regulation to stabilize muskrat populations, benefit agriculture, and enhance the local economy. Robertson (1967) also noted this viewpoint.

Table 8

Farmers' Awareness of Decreases in Muskrat and Waterfowl Populations from 1976 to 1981

Species	WIPA%		F&RA%		TA%	
	Yes	No	Yes	No	Yes	No
Musk rats	100	0	70	30	100	0
Waterfowl	100	0	90	10	100	0

The majority of Plum Lake farmers noted nesting waterfowl populations had decreased since 1976 and attributed this to drought (Table 8). Several farmers suggested ducks go to bigger marshes to nest when local marshes are dry.

Bossenmaier (1971) noted the major drawback to development of Plum Lakes for wildlife is that its sources of water is seasonal and unreliable. He further noted the idea behind development of Plum Lakes was to improve its natural water level regime, thereby enhancing and stabilizing the Lakes wildlife values. Maximum total wildlife value (benefits) would be experienced at 1409.0' f.s.l., while maximum value per acre would be achieved at 1408.0' f.s.l. (Bossenmaier, 1971).

Question #5: Can you identify any benefits or disbenefits to yourself from:

- a) muskrats*
- b) waterfowl*

Responses to question number five did not vary between associations. Muskrat benefits included enjoyment of traditional spring trapping, income and aesthetics. Muskrat disbenefits included road and hillside damage by muskrat burrows, muskrat runs on hay land (damage machinery) and high water required for overwintering.

Waterfowl benefits included bird-watching (especially Canada Geese and Snow Geese) and sport hunting. Disbenefits included crop depredation and "urban" hunters leaving gates open and driving over swaths. Principle crop depredation areas were located in the north half of township 24, range 8.

Question #6: Do you feel there is potential for managed recreational fish populations in the Plum Lakes? (i.e. sport fishing)

Yes _____ No _____

If yes; in your opinion, what management is necessary to produce a harvestable fish population in Plum Lakes?

The majority of association members felt the potential for development of managed fish populations in Plum Lakes was not possible because of unstable, fluctuating water levels (Table 9). They did not advocate sport fishing for fear of people littering, damaging hayland, and disturbing waterfowl with boats.

Table 9
Farmers' Response toward Managed
Sport Fish Populations in Plum Lakes

	WTPA%	F&RA%	TA%
Yes	35	0	37
No	50	100	63
Indifferent	15	0	0

Residents acknowledged Plum Lakes as a valuable fish spawning site. However, they felt a fish ladder was required for fish to obtain access into Oak Lake.

3.5 Water

The history of land use conflicts in the Plum Lakes area has been based on the water resource. Section four of the questionnaire was oriented toward water levels, water management, salinity, irrigation and groundwater.

Question #1: According to the Manitoba Department of Agriculture, native hay production was poor in 1980. What factors affected reduced native hay production in the Plum Lakes area in 1980?

- (a) lack of precipitation
- (b) reduced water levels on Plum Lakes
- (c) lowered local water table
- (d) drainage

Lack of precipitation was perceived to be the major factor that affected native hay production in 1980 (Table 10). Water Table Preservation Association, Trapper Association and Plum Creek residents felt a combination of factors contributed to the poor hay production. Water Table Preservation members felt water control could maintain a stable water table and provide protection against poor hay crops in drought years.

Table 10

Attribution of Factors Affecting Low Level 1980 Native Hay Production in the Plum Lakes Area

Factors	WTPA%		F&RA%		TA%		PC%	
	Yes	No	Yes	No	Yes	No	Yes	No
Lack of Precipitation	100	0	100	0	100	0	100	0
Reduced Water Levels on Plum Lake	95	5	20	80	88	12	75	25
Lowered Local Water Table	100	0	20	80	88	12	75	25
Drainage	90	10	0	100	88	12	50	50

Farmer-Rancher Association members felt Plum Lakes water levels had little effect on 1980 native hay production and drainage had no effect. They stressed the importance of precipitation, and several cited flourishing growth in 1981, when both Plum Lakes and the water table were low.

The effects of water levels and water table on hay production may vary locally within the Plum Lakes study area. Different physical conditions (soils, elevation, geology) may exist north and south of Plum Lakes which affect ground water movement, water tables and ultimately, hay production.

Question #2: Do you feel low water levels on Plum Lakes have contributed to:

(a) salinity problems yes _____ no _____
(b) weed infestation yes _____ no _____

Water Table Preservation and Trapper Association members had a different opinion than Farmer-Rancher Association and Plum Creek farmers regarding the relationship between low water levels and salinization (Table 11). Luken (1962) noted salinization is primarily the result of a temporary high water table which contributes to the capillary movement of salt-laden water toward the surface. Since water levels in Oak and Plum Lakes correspond to the local water table (Water Resources Division, 1976), high water levels should contribute to increased salinization. Farmer-Rancher Association and Plum Creek farmers agreed with this viewpoint.

Table 11

Farmers' Perception regarding
the Existence of a Direct Relationship
between Low Plum Lake Water Levels and Salinity

	WTPA%	F&RA%	TA%	P.C.%
Yes	40	10	38	13
No	40	70	50	75
Undecided	20	20	12	12

Water Table Preservation, Trapper Association and Plum Creek farmers felt low water levels contributed to increased weed infestation (Table 12). Their rationale was as follows:

When Plum Lakes are low, dry conditions prevail and annual weed species which require less moisture than native grasses, invade and infest the fields.

Several Farmer-Rancher Association members felt high water levels contribute to weed infestation. Their scenario was as follows:

When Plum Lakes water levels are high, water drowns the root structures of native grasses. This places native grasses at a disadvantage and weed species invade.

Table 12

Farmers' Attitudes regarding the Perceived
Relationship between Low Plum Lakes
Water Levels and Increased Weed Infestation

	WTPA%	F&RA%	TA%	P.C.%
Yes (increase)	85	30	75	63
No	15	70	25	37

Question #3: Did the 1980 Plum Lakes water levels have any adverse effects on native hay production?

Yes _____ No _____

Water Table Preservation members living north of Plum Lakes related low water levels to a low water table and adverse implications for hay crops (Table 13). Farmer-Rancher members living south of Plum Lake desired low water levels because of increased accessibility to hay land.

Table 13

Attributed Adverse Effects of Plum Lakes Water Levels on Native Hay Production, 1980

	WTPA%	F&RA%	TA%	P.C.%
Yes	95	0	88	63
No	5	100	12	37

Low Plum Lakes water levels had adverse effects on Water Table Preservation Association members north of PTH 254 (Twp 8 - Rge 24). They stated high water levels were necessary to backflood water from Plum Lakes through two culverts under PTH 254 to fill their sloughs. In the summer of 1981, Plum Lakes water levels were below 1406.0' a.s.l. and no water passed through the culverts.

The majority of Plum Creek farmers stated hay crops were good when Plum Lakes were high and Plum Creek was full. However, several farmers stated high Plum Lakes water levels

caused water to backflood small ravine tributaries of Plum Creek and when it receded, stagnant water became trapped in low-lying areas ruining hay land.

Question #4: Do you believe Plum Lake water levels affect the local water table?

Yes _____ No _____

Water Table Preservation, Trapper Association and Plum Creek farmers believed Plum Lakes water levels affected the local water table (Table 14). Water Table Preservation Association members north and east of Plum Lakes noticed their dug-outs fluctuated in accordance with Lake levels. Several farmers east of Plum Lakes experienced water in their basements with strong west winds. Water Resources Division (1976) noted water levels in Oak and Plum Lakes correspond to the water table in surface aquifers adjacent to the lakes.

Table 14

Perceived Connection between Plum Lakes Water Levels and the Local Water Table

	WTPA%	F&RA%	TA%	P.C.%
Yes	100	50	88	100
No	0	30	0	0
Undecided	0	20	12	0

Several Farmer-Rancher Association members questioned the effect of Plum Lake on the water table. Members living south of Plum Lake found their dug-outs did not fluctuate in accordance with Lake levels. They suggested a water impervious clay soil exists south of the Lakes which acts as a seal that restricts groundwater flow. This clay lens may be an extension of the Pipestone Clay Soil Series (Figure 5).

Question #5: Do you feel there is potential for the use of irrigation in the Plum Lakes area?

Yes _____ No _____

The majority of Plum Lake farmers in all associations agreed that the potential for irrigation exists (Table 15). However, they cautioned against the negative impacts of irrigation.

Table 15

Anticipated Potential of Irrigation
in the Plum Lakes Area.

	WTPA%	F&RA%	TA%	P.C.%
Yes	75	80	88	63
No	20	0	12	25
Undecided	5	20	0	12

Soil Map Oak and Plum Lake Area

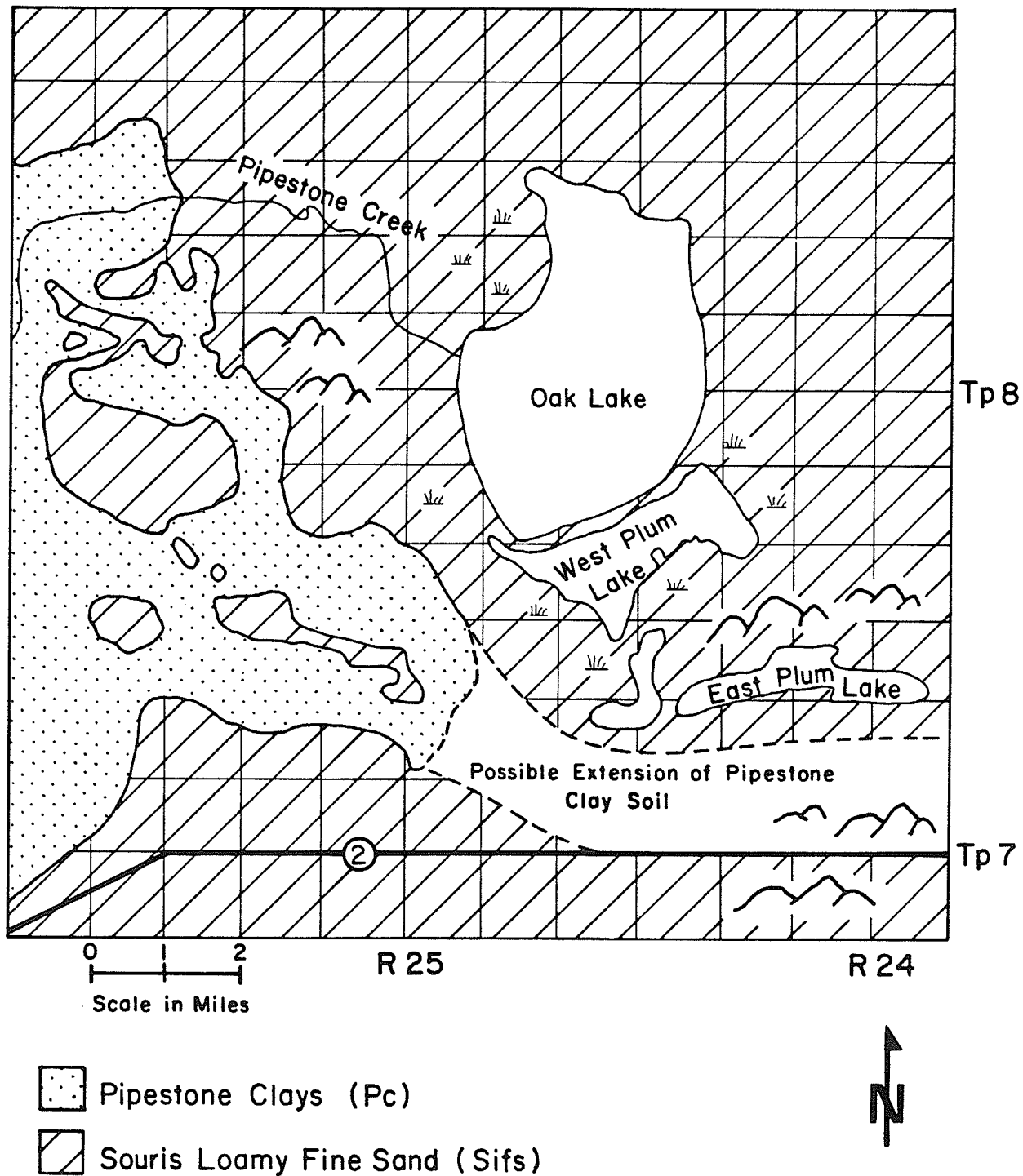


Figure 5. Possible Extension of Pipestone Clay Soil Series, South of Plum Lakes.

Water Resources Division (1976) cited an abundant supply of good quality groundwater was available for irrigation from surface sand and gravel aquifers in the Oak Lake area. They noted that some water could be mined from deep, buried aquifers, however, little is known of their boundaries.

Question #6: Are you in favour of the use of irrigation systems?

Yes _____ No _____

Attitudes were unfavourable toward irrigation developments in the Plum Lakes area (Table 16). Primary concerns involved long terms effects of irrigation, water tables and implications for future farming generations. They suggested that initial irrigation systems should be of small scale, closely managed, and assessed before long term water leases and large scale systems are implemented.

Table 16

Favourability toward Irrigation in
Plum Lakes Area

	WPTA%	F&RA%	TA%	P.C.%
Yes	40	20	12	25
No	55	80	88	63
Undecided	5	0	0	12

Question #7: In the last two years (1980-81),
has the height of water in your
dug-outs;

- (a) increased
- (b) decreased
- (c) remained the same
- (d) fluctuated

Plum Lakes farmers generally agreed that dug-out water levels decreased in 1980 and 1981 (Table 17). Water Table Preservation members attributed this to a low water table. Members felt the water table would not be low if Plum Lake water control existed.

Table 17

Farmers' Perception of Dug-out
Water Levels in 1980 and 1981.

	WTPA%	F&RA%	TA%	P.C.%
Increase	0	0	0	0
Decrease	95	67	88	100
Remain Same	0	0	0	0
Fluctuated	5	33	12	0

Farmer-Rancher Association members attributed low dug-out water levels to lack of snow-melt and rain. They felt precipitation was a major factor affecting the water table and consequently dug-outs. Under normal conditions, the recharge of surface sand and gravel aquifers is mostly from

snowmelt and precipitation in the spring months (Water Resources Division, 1976).

Farmers estimated water levels in dug-outs were four or five feet (1.4 m) below **normal** in 1980 and 1981. Cleaning aided groundwater flow and resulted in increased water levels in several cases.

South of West Plum Lake, water levels in several dug-outs did not appear to be connected to water fluctuations in the Lake. It was suggested a lens of impermeable clay soil existed that restricted groundwater flow (Figure 5).

Question #8: Listed below are six possible water management alternatives for Plum Lakes. If you had your choice, how would you manage Plum Lake water levels?

- | | |
|---|--------------------|
| 1. Maintain its natural cycle | Yes _____ No _____ |
| 2. Drain it completely | Yes _____ No _____ |
| 3. Drain it to a lower level than the long-term average (and control flooding). | Yes _____ No _____ |
| 4. Dam it at a height near the long-term average and control flooding. | Yes _____ No _____ |
| 5. Compartmentalize and backflood with managed drawdown. | Yes _____ No _____ |
| 6. System of dykes and spillways. | Yes _____ No _____ |

Water Table Preservation Association members preferred water management option #4 (Table 18). Farmer-Rancher Association members preferred that Plum Lakes be allowed to maintain its natural cycle, however, water management at a level lower than the long-term average may be acceptable. Plum Creek residents and the Trappers' Association appeared to be split between water management alternatives

#1 and #4. The preferred water management scheme overall was damming Plum Lakes at a height near the long term average, combined with flood control. The next best solution was to allow it to maintain its natural cycle.

Table 18

Farmers' Response to Water
Management Alternatives for Plum Lakes

Alternatives	WTPA%	F&RA%	TA%	P.C. %	Overall Average
1. Maintain natural cycle	20	50	38	38	37
2. Drain completely	0	0	0	0	0
3. Drain to a lower level than the long-term average (and control flooding)	0	30	0	0	7
4. Dam at a height near the long-term average & control flooding	65	10	50	38	41
5. Compartmentalize & backflood with managed drawdown	10	0	12	12	8
6. Systems of dykes and spillways	5	10	0	12	7

Water Table Preservation members preferred to regulate and maintain a water table consistent with good agricultural hay production and opposed unmanaged draining of Plum Lakes. Members felt a water control structure was essential in order to regulate the water table. Involvement of Sifton Municipal Council in water control decisions and the inability of council to agree on a control level was a concern of the

Water Table Preservation Association.

Farmer-Rancher Association members stressed opposition to high water level control of Plum Lakes (i.e. > 1407.0' f.s.l.) They preferred to allow natural cycles of high and low water levels. However, members noted Plum Lakes cannot maintain its natural cycle because of large inlet drains west of Oak Lake and obstructions on Plum Creek outlet (sandbars, vegetation, beaver dams). The Farmer-Rancher Association felt water control decisions should involve Sifton Municipal Council.

Additional comments by the Farmer-Rancher Association revealed a general mistrust of the Manitoba Water Resources Branch and Ducks Unlimited. They felt that the Manitoba Water Resources Branch with-held certain information regarding water management plans for Plum Lakes and that water level information Water Resources did supply was erroneous. These actions raised suspicion.

The Farmer-Rancher Association does not approve of Ducks Unlimited involvement in the Plum Lake area. Four concerns members stressed were:

1. the 21-year water control lease on private land that Ducks Unlimited requires before it will commence with a major development project is too long;
2. high water conditions necessary for water-fowl production might reduce the acreage of potentially harvestable hay;

3. operation and control of Plum Lakes by a large outside company is not approved of;
4. Ducks Unlimited's perceived mandate to produce ducks in "unlimited" numbers; not for conservation, but for American hunters.

Question #9: Have you drained water bodies on your land?

Yes _____ *No* _____

Very few farmers have drained water from their land (Table 19). No Farmer-Rancher Association member drained water, yet they have been referred to as "drainers". Responses to question #9 did not include municipal constructed drains on private land.

Table 19

Percentage of Farmers who have
Drained Water on Their Land

	WTPA%	F&RA%	TA%	P.C.%
Yes	5	0	12	0
No	95	100	88	100

Question #10: Do you feel a complete hydrologic survey and surface elevation study is needed for the Plum Lakes area?

Yes _____ *No* _____

The majority of Plum Lake farmers felt a hydrologic survey and surface elevation study would be beneficial (Table 20). Many of those who responded "no" felt enough studies had been completed and to do more would be a waste of money. A hydrologic survey would provide information on groundwater, water tables and aquifer size. Topographic studies would provide contour maps which would be valuable in water management discussions involving private and Crown land.

Table 20

Farmers' Attitude toward Hydrologic
Survey and Surface Elevation Study

	WTPA%	F&RA%	TA%	P.C.%
Favor	95	70	100	88
Does not favor	5	30	0	12

CHAPTER IV

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

4.1 Summary

Resident farmers have conflicting viewpoints on the proper management of Plum Lakes. The four farmer associations involved have varied stances concerning fluctuating water levels, water management, water tables, and to some extent, use of wildlife.

The Water Table Preservation and Farmer-Rancher associations represent the two dominant opposing viewpoints. The former group's objective is to see implemented water management to regulate the water table and stabilize hay production. The Farmer-Ranchers want to remove excess water to allow hay cutting on low-lying land in early summer.

The main objectives of this study were to assess farmers' attitudes regarding water management and land use, and to aid in the development of a water management plan for the area. Five recommendations were made.

4.2 Conclusions and Recommendations

Conflicting viewpoints on the proper management of Plum Lakes have continued for almost a century. During this time, developments such as roads, dykes, dams, and drains have been constructed without consideration of their long term effects on the various resources of the area. Personality conflicts have added to local discord. Local associations

do not communicate or cooperate and little is being resolved. It is recommended:

1. The Department of Natural Resources initiate the establishment of an advisory board. It should include representatives from the Water Table Preservation and Farmer-Ranchers Associations, the Plum Creek area, and Sifton Municipality. Government resource specialists should serve as board advisors on behalf of the Manitoba public. The purpose of the board would be to:
 - a. ensure all interests are represented in planning and management of the water resource;
 - b. promote communication among local associations;
 - c. exchange and interpret applicable information;
 - d. provide advice, guidance and approval for water management proposals;
 - e. ensure individual developments such as roads, culverts, drainage channels, dams or dykes are coordinated as part of the overall management of the water, soil and related resources within Plum Creeks watershed.

Previous Plum Lakes regulation proposals recommended water control levels of 1409.0' f.s.l. that maximized wildlife values and another of less than 1407.0' f.s.l. that maximized ranching benefits. These recommendations were derived without adequate surface elevation, hydrologic survey or soils information. Consequently, neither private landowners nor government resource personnel have fully understood the effects of these proposals on the water table, soils and hay production. It is recommended that:

2. The advisory board should request that a complete resource inventory of Plum Lakes and Plum Creek be completed to supply information for development of a water management plan. This would involve topographic studies to provide contour maps of the area, groundwater location and water table assessment, soil studies to delineate soil types, permeability, and potential areas of salinization, and wildlife studies.

A different situation regarding natural surface and groundwater movement may exist north and south of Plum Lakes. A sub-surface lens of water-impervious Pipestone Clay Soils may restrict groundwater flow on the south side. Consequently, alternatives for water management between areas north and south may differ substantially. It is recommended that:

3. The Department of Agriculture, in cooperation with Manitoba's Water Resources Branch, pay particular attention to a comparison of soils and groundwater flow in the areas south and north of Plum Lakes, as an important component of a resource inventory.

Several provincial departments should be involved in the development of a water management plan (ie. Water Resources Branch, Wildlife Branch, Department of Agriculture). Ducks Unlimited might be approached to assist the provincial government in design and construction of regulation structures. The Water Table Preservation Association would support Ducks Unlimited's involvement in order to achieve a regulated water table, however, the Farmer-Rancher Association may be opposed. They fear losing control over

future water management decisions and are concerned that they might be restricted in some way that is not to their benefit. Thus, it is recommended:

4. The provincial government should develop a water management plan for the area based on the resource inventories. It should be implemented only after review and approval by the Rural Municipality of Sifton and the advisory board. It may include a provision for cost-sharing with advocate agencies such as Ducks Unlimited and Nature Conservancy of Canada.

Crown land in the Plum Lakes area provides two uses: long-term native hay leases are issued to local farmers; and a game bird refuge whose purpose is to improve waterfowl production and provide nesting habitat. All hay leases have a provision that hay should not be cut within 100 feet (40 m) of the water's edge, presumably to provide nesting cover. However, marsh water levels characteristically fluctuate, making this regulation ambiguous and impossible to enforce. Since the provincial government recognizes the dual values of agricultural and wildlife land use of Crown lands, it is recommended:

5. The Provincial Wildlife Branch, in conjunction with the Department of Agriculture, review Crown land use in the Plum Lakes area in relation to present regulations. Regulations for wildlife management should be more clearly defined and operative. They should specify provisions for wildlife habitat, provide delineation of non-agricultural zones, and ensure compliance.

LITERATURE CITED

- Barto, W.P. and C.G. Vogel. 1978.
Agro-Manitoban information package. Land and
Surveys Division, Department of Mines, Natural
Resources and Environment, Winnipeg, Manitoba.
Technical report No. 78-9. 325 pp.
- Bossenmaier, E.F. 1971.
Development of Plum Lakes for wildlife. Department
of Mines, Resources and Environmental Management,
Winnipeg, Manitoba. Unpublished report. 5 pp.
- . 1972.
The Plum Lake dilemma. Department of Mines,
Resources and Environmental Management, Winnipeg,
Manitoba. Unpublished report. 2 pp.
- Burns, A.C. 1971.
Ducks Unlimited easements: landowners affected
around Plum Lake and along Plum Creek. Ducks
Unlimited, Winnipeg, Manitoba. Unpublished report.
7 pp.
- Canada Land Inventory, 1966.
Soil capability for agriculture. Virden Map Sheet
62 F. Department of Regional Economic Expansion,
Canada. Queen's Printer, Ottawa.
- . 1970.
Land capability for wildlife-waterfowl. Virden
Map Sheet 62 F. Department of Regional Economic
Expansion, Canada. Queen's Printer, Ottawa.
- Carreiro, J.F. 1972.
A proposal to acquire migratory bird breeding and
staggering habitat, Plum Lakes co-operative wild-
life area, Oak Lake, Manitoba. Canadian Wildlife
Service, Winnipeg, Manitoba. 30 pp.
- Department of Natural Resources. 1973.
Plum Lakes - an economic review of development al-
ternatives. Economic Research Section, Department
of Mines, Resources and Environmental Management,
Winnipeg, Manitoba. 20 pp.
- Department of Natural Resources. 1975.
A proposal for the development and management of
Plum Lakes. Department of Mines, Resources and
Environmental Management, Winnipeg, Manitoba. 17 pp.

- Ducks Unlimited (Canada). 1981.
The health of the land: Salinity. Ducks Unlimited
(Canada), Winnipeg, Manitoba.
- Ehrlich, W.A., L.A. Hopkins, and R.E. Smith. 1978.
Soils of the Boissevain-Melita area. Manitoba
Department of Agriculture, Winnipeg, Manitoba.
Report No. 20. 204 pp.
- Frobisher, M., R. Hinsdell, K. Crabtree, and C. Goodheart.
1974. Fundamentals of microbiology. W. B.
Saunders Company, Toronto. 850 pp.
- Goldstein, J.H. 1970.
Competition for wetlands in the midwest. Resources
for the Future, Inc., Baltimore, Maryland.
- Gramiak, M.J. 1977.
Southwest grasslands society report, 1977. Agri-
culture Extension Centre, Manitoba Department of
Agriculture, Brandon, Manitoba. 10 pp.
- Grower, D. and R. Kabaluk. 1973.
Plum Lakes Water Regulation Benefit-Cost Study.
Department of Mines, Resources and Environmental
Management, Winnipeg, Manitoba. 100 pp.
- Hildebrand, P.R. 1968.
Oak Lake game bird refuge. Manitoba Department of
Mines and Natural Resources, Winnipeg, Manitoba.
Unpublished file. 3 pp.
- Hjorleifson, G.R. 1972.
Plum Lakes study review. Inter-departmental memo-
randum, Department of Mines, Resources and Environ-
mental Management, Winnipeg, Manitoba. Unpublished
report. 7 pp.
- Hopcraft, J. 1977.
Oak/Plum Lakes and marshes. Unpublished report.
7 pp.
- . 1979.
Calumet Nature Foundation report, July 1979. Un-
published report. 7 pp.

- Luken, H. 1962.
Saline soils under dryland agriculture in southern Saskatchewan and possibilities for their improvement. Plant and Soil 17 (1):1-65.
- Oppenheim, A.N. 1966.
Questionnaire design and attitude measurement. Basic Books, New York.
- Plum Lakes Planning Committee. 1973.
Conceptual and management plans for the development of Plum Lakes, Manitoba. Unpublished report. 17 pp.
- Rakowski, P.W. 1980.
A proposal to establish a cooperative wildlife management area at Plum Lakes, Manitoba. Canadian Wildlife Service, Winnipeg, Manitoba. Unpublished report. 3 pp.
- Robertson, R.J. 1967.
Evaluation of wildlife benefits provided by the Oak-Plum marsh complex. Wildlife Branch, Department of Mines and Natural Resources, Winnipeg, Manitoba. 27 pp.
- Rusch, D.H. and E.F. Bossenmaier. 1972.
Derivation of goals and programs for waterfowl utilization in Manitoba. Department of Mines, Resources and Environmental Management, Winnipeg, Manitoba. 12 pp.
- Sloan, C.E. 1972.
Groundwater hydrology of prairie potholes in North Dakota. U.S. Geological Survey, Professional Paper 585-C. Washington, D.C.
- Sommers, G.T. 1972.
Report on agricultural benefits related to control of water on Plum Lake or Plum Creek. Soils Division, Manitoba Department of Agriculture, Winnipeg, Manitoba. Unpublished report. 6 pp.
- Temason, A.R. 1975.
He manages his range to meet any emergency. Soil Conservation 40(11):7 pp.
- Water Resources Division. 1967.
Plum Lake regulation study. Water Resources Division, Department of Natural Resources, Winnipeg, Manitoba. 18 pp.

Water Resources Division. 1972.

Revised report on Plum Lake regulation study.
Water Resources Division, Department of Natural
Resources, Winnipeg, Manitoba. 12 pp.

Water Resources Division. 1976.

Groundwater resources in the Souris Basin in
Manitoba. Planning Branch, Water Resources
Division, Department of Natural Resources,
Winnipeg, Manitoba. 22 pp.

Zittlau, W.T., 1979.

An environmental assessment of agricultural
practices and policies: implications for water-
fowl management. Natural Resources Institute,
University of Manitoba, Winnipeg, Manitoba. 282 pp.

PERSONAL COMMUNICATION

1. Andrews, R. February 1981. Biologist, Ducks Unlimited. Brandon, Manitoba.
2. Bidlake, L. May 1981. Regional Wildlife Specialist, Wildlife Branch, Department of Natural Resources. Brandon, Manitoba.
3. Colpitts, L. November 1981. Chief of Habitat Management, Wildlife Branch, Department of Natural Resources. Winnipeg, Manitoba.
4. Cotton, L. April 1981. Land Representative, Manitoba Department of Agriculture. Brandon, Manitoba.
5. Edgars, F. April 1981. Water Records, Water Resources Division, Department of Natural Resources. Winnipeg, Manitoba.
6. McLeod, B. April 1981. Engineering Technologist, Water Resources Division, Department of Natural Resources. Winnipeg, Manitoba.
7. Rakowski, P. May 1981. Senior Biologist, Canadian Wildlife Service. Winnipeg, Manitoba.
8. Sawatzky, J. March 1982. Livestock Technician, Manitoba Department of Agriculture. Brandon, Manitoba.
9. Stewart, D. September 1980. Professor, Department of Zoology, Brandon University. Brandon, Manitoba.

APPENDIX 1
QUESTIONNAIRE



THE UNIVERSITY OF MANITOBA

NATURAL RESOURCES INSTITUTE

Winnipeg, Manitoba
Canada R3T 2N2

(204) 474-8373

June 9, 1981

Dear Sirs:

Wayne Hildebrand is a graduate student working towards a Masters Degree in Natural Resources Management at the University of Manitoba. In completing his degree, Wayne is required to present a practicum (an applied research project).

Wayne has selected the Plum Lakes for his research as he is familiar with the area and his interests include rural land use. Wayne is being funded by the University of Manitoba as a research assistant.

If you have any inquiries regarding Wayne's study, please feel free to call the Natural Resources Institute at 474-8373.

Sincerely,

W. R. Henson
Director

WRH/mk

LAND USE QUESTIONNAIRE

Section 1: Agriculture

1. What is your main source of income?
 - (a) cattle ranching
 - (b) selling hay
 - (c) other
2. Do you have a feedlot operation?
Yes _____ No _____
3. When do you start your cattle grazing on native pasture within the study area?
Month _____ Week _____
4. Do you rotate grazing on tame and native pastures?
Yes _____ No _____
5. How many cattle (cows, bulls, calves, yearlings) do you pasture within the study area?

6. When do you begin cutting native hay?
Month _____ Week _____
7. Do you have any "upland" native hay areas within the study area? Upland refers to 1410-1412 feet elevation or above maximum flood levels.
Yes _____ No _____
If Yes, what was the quality of upland hay in 1980?
 1. good
 2. average
 3. poor

What do you attribute your selection to?
8. In 1980, what was the average buying or selling price of a ton of native hay?

LAND USE QUESTIONNAIRE

Page 2

9. On the land you farm in the Plum Lake area, how would you rate native hay production in the last five years?

Good _____ Average _____ Poor _____

10. Does any of your land in the Plum Lakes area contain areas with saline or alkaline soils?

Yes _____ No _____

If Yes,

- (a) where do salt spots occur?
- (b) when are they more noticeable, in wet or dry years?
- (c) what in your opinion caused them?

11. Do you belong to any groups or associations involved with Plum Lakes?

If you have comments to add on any of the questions in this section on agriculture, please feel free to do so.

Section 2: Trapping

1. Do you or any family member trap the marsh?

Yes _____ No _____

2. Would you like to see Plum Lake water levels managed for muskrat production?

Yes _____ No _____

The next two questions refer to trappers.
If not a trapper, please proceed with
Section 3 on wildlife.

LAND USE QUESTIONNAIRE

Page 3

3. Since 1976 (flood year), which years stand out in your mind as good trapping years?
4. How was trapping in 1980-1981? (ie. muskrat, fox, coyote, mink)

Section 3: Wildlife

1. Have you used Plum Lakes for any of the following recreational pursuits?

Hunting, trapping, fishing, canoeing,
photography, wildlife observation,
plant collecting, or snowmobiling?
Others?

2. How do you feel about the presence of the following wildlife on your land?

Deer, muskrats, waterfowl, prairie
chickens, blackbirds, fox, coyote,
fish.

Approve _____ Oppose _____ Indifferent _____

3. In your opinion, should the production of the following wildlife species be encouraged on Plum Lakes?

- (a) deer
- (b) muskrats
- (c) waterfowl

4. In the last five years (1977 -1981), have you noticed any changes in:

- (a) muskrat populations
- (b) waterfowl populations

5. Can you identify any benefits or disbenefits to yourself from:

- (a) muskrats
- (b) waterfowl

LAND USE QUESTIONNAIRE

Page 4

6. Do you feel there is potential for recreational fish populations in the Plum Lakes?

Yes _____ No _____

If Yes, in your opinion, what management is necessary to produce a harvestable fish population in Plum Lakes?

If you have any comments to add on any of the questions in this section on wild-life, please feel free to do so.

Section 4: Water

1. According to the Department of Agriculture, native hay production was poor in 1980. What factors affected native hay production in the Plum Lakes area in 1980?

- (a) lack of precipitation
- (b) reduced water levels on Plum Lakes
- (c) lowered local water table
- (d) drainage

2. Do you feel low water levels on Plum Lakes have contributed to:

(a) salinity problems:	Yes _____	No _____
(b) weed infestation:	Yes _____	No _____

3. Did the 1980 Plum Lakes water levels have any adverse effects on native hay production?

Yes _____ No _____

If Yes, please explain.

4. Do you believe Plum Lake water levels affect the local water table?

Yes _____ No _____

LAND USE QUESTIONNAIRE
Page 5

5. Do you feel there is potential for the use of irrigation in the Plum Lakes area?

Yes _____ No _____

6. Are you in favor of the use of irrigation systems?

Yes _____ No _____

If Yes, reasons why?

If No, please explain.

7. In the last two years (1980-81), has the height of water in your dug-outs:

- (a) increased
- (b) decreased
- (c) remained the same
- (d) fluctuated

8. Listed below are six possible water management alternatives for Plum Lakes. If you had your choice, how would you manage Plum Lake water levels?

- | | | |
|---|-----------|----------|
| 1. Maintain its natural cycle. | Yes _____ | No _____ |
| 2. Drain it completely. | Yes _____ | No _____ |
| 3. Drain it to a lower level than the long-term average (and control flooding). | Yes _____ | No _____ |
| 4. Dam it at a height near the long term average and control flooding. | Yes _____ | No _____ |
| 5. Compartmentalize and backflood with managed drawdown. | Yes _____ | No _____ |
| 6. System of dykes and spillways. | Yes _____ | No _____ |

9. Have you drained water bodies on your land?

Yes _____ No _____

If Yes, please comment.

LAND USE QUESTIONNAIRE
Page 6

10. Do you feel a complete hydrologic survey and surface elevation study is needed for the Plum Lakes area?

Yes _____ No _____

11. Do you have any comments (recommendations) regarding the overall water situation in the Plum Lakes area?

* * * * *

APPENDIX 2

PLUM LAKES CONTROVERSY

Ministers join fray over marsh

by BART JACKSON
Sun Staff Writer

OAK LAKE — Two sides in a long-standing disagreement here over local water levels are suffering from a failure to communicate, two provincial cabinet ministers decided Thursday.

For years, area residents have bickered about water levels and land use in the Plum Lake marsh about 10 kilometres east of the resort-agricultural community. Some farmers want water levels held down in the 10-square kilometre marsh, where they either own land or lease provincial land for hay production. Other farmers, bolstered by naturalists, hunters and trappers, are determined that water levels remain high enough to protect the water table and abundant wildlife in the area.

Natural Resources Minister Harry Enns and Agriculture Minister James Downey stepped into the fray Thursday, meeting with spokesmen for the various groups at the town's municipal offices. After a two-hour tour of the disputed area, accompanied by thunderstorms and hail, the two soggy ministers concluded a solution to the dispute was just over the horizon.

Mr. Enns indicated he would return to the area in September to try to work out a compromise water management scheme. "We won't be able to satisfy all the interests," he said, "but at least we cleared the air by getting them together in one room and talking with each other. The biggest problem was a lack of communication."

Although no immediate solution was reached, "everybody walked away after the day feeling pretty good," said Betty Plaisir, who owns land and cottages around Oak Lake. "We don't always care for politicians, but we really did something worthwhile here today."

Many Oak Lake cottagers are concerned a too-meagre water level in the marsh will lower water levels in Oak Lake.

For the past two years, the argument over the water levels of Oak Lake and the marsh have been large-

ly academic. Sporadic drought conditions have caused water levels to decline to the lowest levels in recent memory. Farmers who lease marsh land from the province have used the increased dry area for hay production. Farmers who own land north of the marsh pray for rain to replenish their dwindling water tables.

"Without the table we're ruined," cattleman Leonard Legeot explained. Representing the members of the region's water table association, Mr. Legeot fought plans by the RM of Sifton council to build an access road into the area for farmers. When water levels increase, Mr. Legeot fears the road would block the water running along Plum Creek from Oak Lake which would replenish the swamp. In January, he told a reporter that the farmers he represented would "do something drastic" if their water security was threatened.

Farmers who hay the area have been opposed to the water table association and the naturalists led by Ducks Unlimited. The water level dispute is almost a century old, said their spokesman, Edgar Hardy.

Farmers used the land intensively for hay production during the dust bowl years of the 1930s.

"We made a start today in settling our differences," he admitted. "But it's an old problem, and its going to take quite a long time to settle the issue."

A provincial resources study completed in 1975 and favored by naturalists, proposed building a water management system of dams, dikes and runoffs that would maintain the marsh water level at 1,409 feet above sea level. The haying farmers favored a level three feet lower. Each foot can mean a loss of up to 5,000 acres of haying land on the flat terrain surrounding the swamp.

"I'm satisfied we can come back in two months and find a solution," said Mr. Enns after touring the area. He discounted the construction of a new access road to the hayfields from Highway Two to the south, saying that at high levels the road would act as a dam and disrupt any effective water management system. He also said the province would consider buying some private land that would be flooded during high water periods.

APPENDIX 3

PLUM LAKE WATER LEVELS

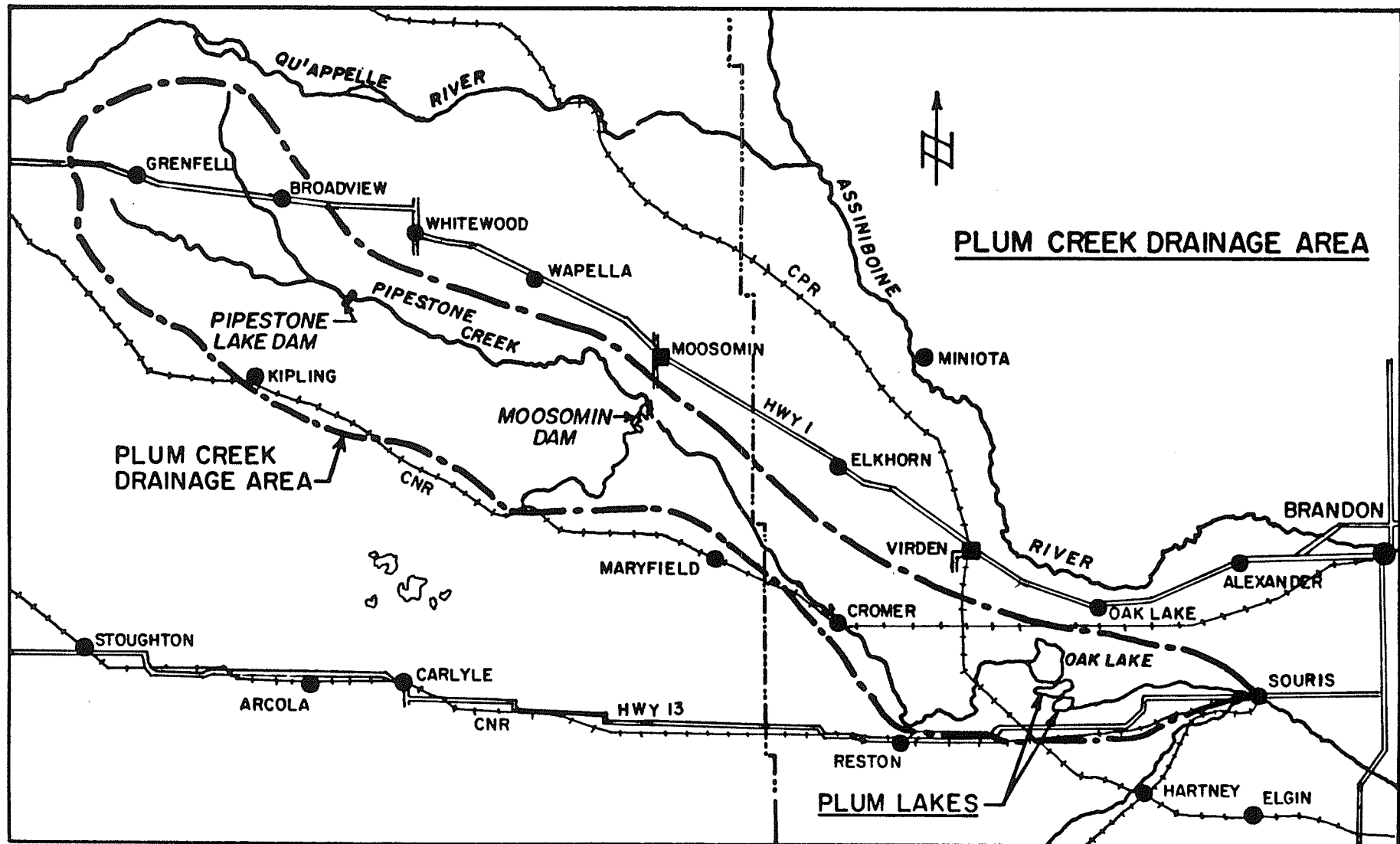
Plum Lake Average Monthly Water Levels in Feet, Findlay, Manitoba. (1954 to 1979)

Year	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1954				1408.2	1408.2	1408.7	1410.0	1410.3	1410.2			
1955				1410.8	1411.2	1411.0	1410.7	1410.2	1409.5	1410.0	1410.0	
1956					1410.2	1409.8	1409.4	1408.9	1408.4			
1957										1408.0	1407.9	
1958						1406.9	1406.7	1406.2				
1959							1404.9	1404.7		1405.7	1406.7	
1960					1407.8	1407.7	1407.3	1406.9	1406.7			
1961				1406.6	1406.6	1406.3	1405.5	1405.0		1406.3	1406.4	
1966							1408.7	1408.3	1408.0			
1967					1409.1	1408.5	1407.8	1407.2	1406.7	1407.6		
1968				1407.0	1407.0		1406.2	1405.6	1406.7	1406.7	1406.8	1406.9
1969					1410.1	1408.9	1409.2	1409.1	1408.7	1406.8	1406.4	1406.5
1970					1410.8	1410.2	1409.5	1409.1	1408.5	1408.5	1408.2	
1971				1409.0	1409.0	1408.8	1408.6	1408.1	1407.6	1408.3		
1972				1409.2	1409.1	1408.5	1408.0	1407.6	1407.3	1407.5		
1973					1406.8	1406.6	1406.5			1406.9		
1974				1409.2	1410.7	1409.6	1409.3		1408.3	1406.9		
1975					1410.4	1409.9	1409.5	1409.3	1409.1	1409.5		
1976				1411.9	1410.9	1410.4	1410.3	1409.5				
1977				1407.8	1407.9	1407.7	1407.6					
1978				1407.2	1407.5	1407.7	1407.6	1407.2				
1979				1407.1	1408.7	1408.8	1408.4	1407.6	1407.1		1406.6	

Source: Water Resources Branch, Manitoba.
Water Survey of Canada.

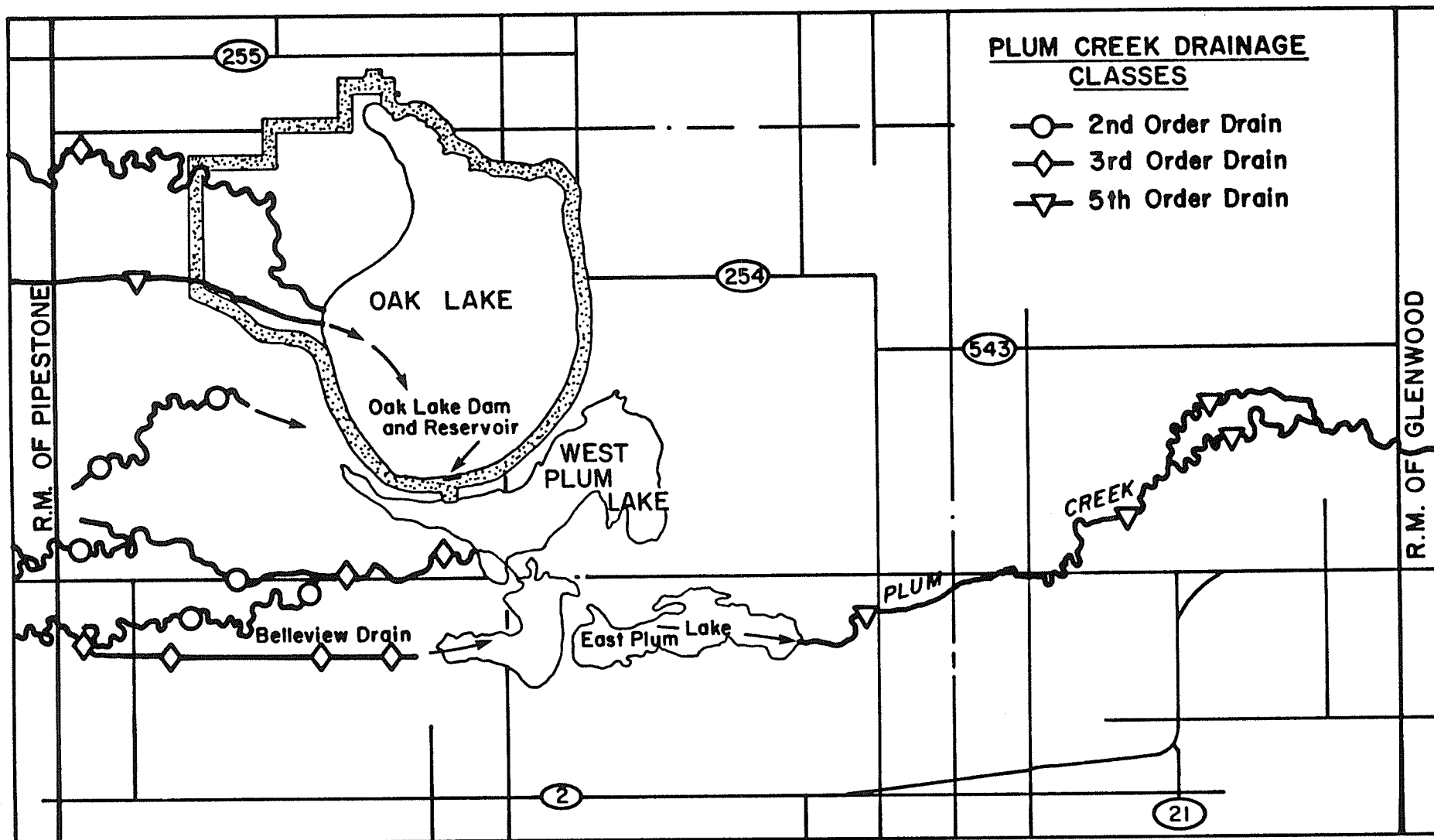
APPENDIX 4

PLUM CREEK DRAINAGE AREA



APPENDIX 5

PLUM CREEK DRAINAGE CLASSIFICATION



APPENDIX 6

CROWN LAND USE AND CLASSIFICATION

CROWN LAND USE AND CLASSIFICATION

Operational land use classifications have been determined for all Crown land in Manitoba. The majority of Crown land in the Plum Lakes area is coded as 7j (see land classification map, Sifton Municipality). This represents an agricultural area that can be developed for hay use only. No clearing, draining, breaking, spraying or seeding is allowed on these lands, except where specified under a given lease.

Most hay leases in the Plum Lakes area have no time restrictions. This means the land may be leased for 5 years, 20 years, or a lifetime. The Agricultural Crown Lands Section determines the lands ultimate disposition and tenure.

Farmers pay a flat rate for each ton of hay harvested from Crown land. Native hay rates for 1982 are \$3.90 per ton. Farmers claim the tonnage that they harvested and are charged accordingly. There are some inherent problems with this type of charge system.

APPENDIX 7

OAK-PLUM LAKES SPECIAL TRAPPING AREA

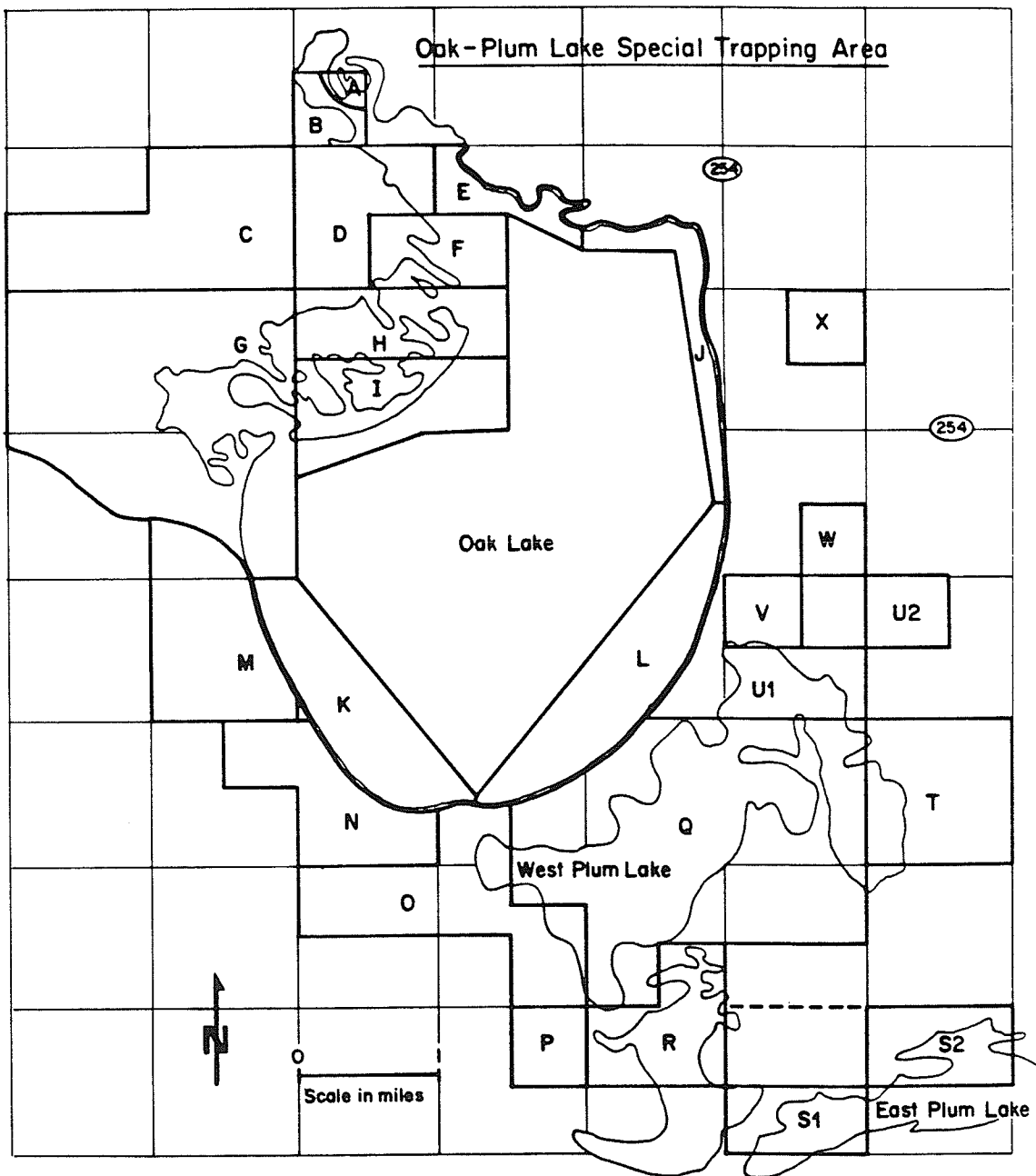
PROPOSED OAK LAKE SPECIAL TRAPPING AREA

Trapper Zones

A	Mike Mowez Tim Mowez	N	Fred Hutton
B	Chuck Plaisier Rene Plaisier	O	Rollie Henusette Cecil Hutton Randy Phillips
C	Morris Mangien Dennis Mangien Paul Mangien	P	Francis Hardy
D	George Sims	Q	Leonard Logeot Art Denbow Robert Masson
E	Darryl Gray	R	Bill Bertholet
F	Louis Sokol	S ₁ & S ₂	Ed Jiggins
G	Felix Nevramont Joe Charles George Higheagle John Starr	T	G & R Ducharme
H	Rick Gabrielle Dale Williams	U ₁ & U ₂	Fred Hutton
I	John Lifeso Jan Pic	V	G & R Ducharme
J	Ken Clark Keith Cameron	W	Gene Thirty
K	Ken Clark Keith Cameron	X	John Henderson
L	Leonard Gregoire		
M	G & R Ducharme		

PLUM LAKE TRAPPERS

Ed Jiggins - Deleau	Cecil Hutton - Virden
Lenord Logeot - Oak Lake	Rollie Henusette - Pipestone
Robert Masson - Oak Lake	Francis Hardy - Grand Clairiere
Art Denbow - Oak Lake	Bill Bertholet - Grand Clairiere
Gene Thirty - Oak Lake	Gilbert Ducharme - Portage la Prairie
Randy Phillips - Oak Lake	Roger Ducharme - Portage la Prairie
Fred Hutton - Virden	



Oak - Plum Lake Special Trapping Zones.