

THE UNIVERSITY OF MANITOBA

THE LEGAL AND INSTITUTIONAL FRAMEWORK GOVERNING
FLOOD PLAIN MANAGEMENT:

A CASE STUDY OF THE FLOOD PLAIN OF RIVER PARK,
SOUTH OF ESTEVAN, SASKATCHEWAN

by

LORNA MCKERNESS

A Practicum

Submitted to the Faculty of Graduate Studies In
Partial Fulfillment of the Requirements for the Degree of
Master of Natural Resource Management

Natural Resource Institute

Winnipeg, Manitoba

September, 1976

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ABSTRACT

Flood plains are inherently attractive places for man to settle. Flood plains are also the natural extension of river beds and are utilized in this capacity when the flows in the river bed exceed its carrying capacity. The almost inevitable result of flood plain occupancy is flood damage to property located on the flood plain and possibly the loss of life.

In the past flood damage reduction measures have been limited, almost entirely, to emergency action, disaster assistance, and structural measures (eg. dykes). A wider range of alternatives is needed in order to ensure the greatest compatibility of benefit-cost ratios and environmental consequences of flood reduction with community goals. This wider range of alternatives should be viewed within the framework of a comprehensive flood plain management program.

The development of a comprehensive flood plain management program can only proceed within a legal and institutional framework. A case study of the River Park area was undertaken to illustrate the effect of the legal and institutional framework on a flood plain in southern Saskatchewan.

All relevant legislation was reviewed in order to determine the institutional arrangements for the management of flood plains. Overlaps and deficiencies in the delegation of responsibility amongst the institutional bodies were determined. A concept of a new institutional body was proposed which could lead to a more comprehensive management of flood plains in southern Saskatchewan

ACKNOWLEDGEMENTS

The author is indebted to Environment Canada for providing; access to their files and reports, typographical services and advice on the selection of the study topic.

Special thanks are due the practicum advisors, Mr. H. Mills, Environment Canada; Mr. D. Young, Lombard North Group; and in particular, Mr. R. L. Kellow, Environment Saskatchewan for their invaluable contribution of constructive criticism during the course of the research and in the editing of the manuscript.

The staff of the Souris River Basin Study, in particular Mr. D. Ramsey and Mr. G. Mills, provided valuable assistance in obtaining needed data on the Souris River Basin.

The author acknowledges with thanks, the numerous individuals of the federal government, the provincial government of Saskatchewan and the local government of rural municipality number five (only a few of whom are footnoted in Chapter 3) for their unlimited co-operation and patience in providing useful information.

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CHAPTER 1

Introduction

1:1 Background

Floods are a naturally occurring phenomena, an intergral part of the natural forces which shape the landscape. The most prevalent type of flooding in Canada is that which occurs when the volume of water transported by a water course exceeds the carrying capacity of that watercourse and overflows onto the adjacent land. Flooding can also be caused by heavy rains, sewer back-up and tidal action. Although flooding can potentially occur at any time of year excluding winter, the most common time for heavy flooding is in the spring. Flood waters can also vary in velocity, sediment load and depth of water levels.

Land masses which are adjacent to water courses and subject to flooding are referred to as flood plains. Flood plains are flat or nearly flat land surfaces which are extensions of river beds. The delineation of a boundary between the flood plain and the surrounding non-flood prone land can not be drawn with any exactness. A flood plain can only be specified in terms of the probability of its susceptibility to inundation by a flood of a given (return) frequency. For example, location A, at a point one-half mile from the river's edge, could be inundated by every flood with a return frequency of one in fifty years or more, whereas location B, at a point one mile from the river's edge, would only be inundated by every flood with a (return) frequency of one in one hundred years or more. The susceptibility of a location to flooding depends on the topography of the area and the characteristics of the water-course (eg width and depth of channel bed and the shape of the watercourse). Hence the geographical boundaries and area of a flood plain will be a function of the return flow used to designate each flood plain.

Flood plains are inherently attractive places for man to settle. The ground is flat and as a result easily farmed or built upon. Flood plains provide an excellent source of water, often good tree cover and in the early

history of Canada provided close proximity to the major transport routes in the country. Attracted by the many amenities offered by flood plains, man has developed villages, towns and major cities as well as agricultural pursuits in these areas.

Flood damages result when man's use and occupation of the flood plain comes into conflict with its natural use. The results of this conflict are documented throughout recorded history by accounts of loss of life, personal injury, property damage and social disruption. In Canada, hundreds of communities are periodically threatened by floods, and the potential for damage is steadily escalating as increased development takes place on the flood plain.

In the past, the principal programs governments have employed to deal with flood hazards have been limited almost exclusively to the construction of flood control works and the provision of disaster assistance and emergency action. However, structural measures are not always the most appropriate method of flood damage reduction. These measures can have adverse environmental effects and often are costly to construct, maintain and eventually reconstruct. Furthermore the presence of these structures generates a false sense of security which encourages further development on the flood plain.

The provision of flood damage assistance and emergency action are only partial solutions. While they do reduce the consequences of flooding, they, like structural measures, can serve to encourage further development. Furthermore, the payment of compensation does not reduce the amount of damages, it merely spreads the loss over a greater number of people.

Because the three above alternatives have been unsuccessful in reducing flood damages, the range of flood damage reduction measures should be expanded to include but not be limited to:

- a) non-structural alternatives such as flood risk mapping, flood warning and forecasting, maintenance of flood channel cross sections through property easements, land use adjustments through zoning and acquisitions, flood proofing of structures, flood insurance as well as;
- b) structural alternatives such as upstream storage, channel straightening,

flood by-passes and dykes.

This wider range of alternatives should be viewed within the framework of a comprehensive flood plain management program. Such a program would encompass an assessment of each structural and non-structural alternative and combinations thereof. Such an assessment should consider the effectiveness, benefits and costs, environmental consequences and compatibility with community needs and goals of each alternative. In this way the resulting flood plain management plan would constitute the most appropriate combination of alternatives, including allowing some losses to occur.

1:2 Need For This Study

The development of a comprehensive flood plain management program can only proceed within a legal and institutional framework. The implementation of any specific course of action must conform with the law. It must be carried out by administrative bodies created under, and whose actions are bound by, a particular structure of laws and regulations. Therefore before any decision can be made, it is necessary to establish the scope and effect of the existing legal and institutional framework on future management options for flood plains.

The legal and institutional framework is comprised of two main components: federal and provincial. As will be shown in Chapter two, a clear separation of the duties and responsibilities between federal and provincial jurisdictions is not possible. This point will be discussed further in Chapter two.

Local governments also play an important role in flood plain management. They derive their legal powers from the provincial governments. The power vested in the provincial governments can follow two paths:

- 1) it can remain vested in the provincial government, or
- 2) it can be delegated to local governments and agencies.

An investigation of the legal and institutional aspects of flood plain management is not a clear-cut endeavour, since legislation which deals specifically with floods does not exist in Canada. In fact until quite recently

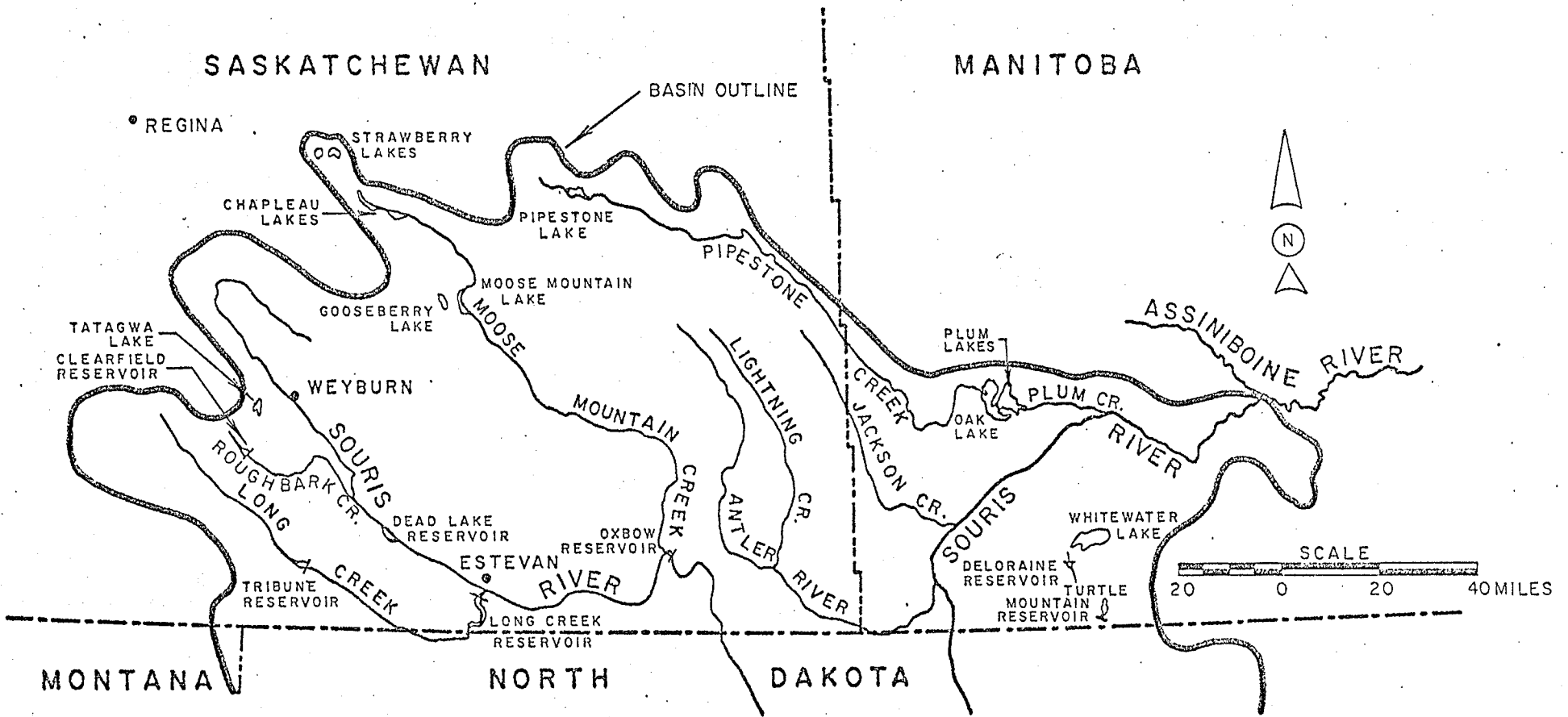
legislation which even in part recognized the importance or the necessity for special treatment for flood problems did not exist. Therefore in the treatment of the legislative and institutional aspects relating to flood plain use and management, it is necessary to review all pertinent legislation in the hope of obtaining a relatively complete and accurate picture of the present legislation and institutional constraints and avenues with which any present and future flood plain management plan must comply.

Due to the rapidly escalating flood damages incurred throughout Canada and the desire of governments to adopt a more comprehensive approach to flood damage reduction, there is a need to develop a comprehensive policy for flood plain management. This policy can be developed only through a knowledge and understanding of the legislative and institutional framework which currently exists with regard to all aspects of flooding. As far as this author is aware, no study of the legislative and institutional framework as it pertains to flooding in Canada has previously been undertaken.

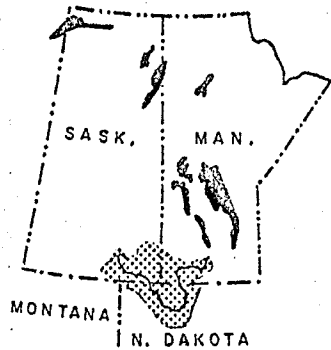
1:3 The Study Area

It is the intent of this paper to provide a detailed examination of the role that legislative and institutional factors have played in the utilization of flood plains. To illustrate this role in a concrete manner one flood plain in particular was chosen for study. The selected study area encompasses portions of Souris River, Long Creek and un-named small tributaries through the Rural Municipality of Estevan No. 5, Township 2, Range 8, Sections 10 - 15 inclusive. These six sections lie within the approximate area of the flood of record in this area.

This flood plain is located immediately adjacent to and south of the Urban Municipality of Estevan, Saskatchewan. This flood plain was selected since it has the advantages of being small and compact, while at the same time embodying a multiplicity of flood problems and legal and institutional jurisdictions. A locational map which shows the position of the study area in Saskatchewan is included as Map 1.



MAP I - LOCATION MAP



Since the study area is located in Saskatchewan, the legislative and institutional framework which exists in Saskatchewan was used as the basis for discussion of provincial involvement in flood plains. No attempt has been made to examine any provincial legislation other than that which exists in Saskatchewan.

1:4 Objectives and Scope

The objectives of this paper are threefold.

- 1) A comparative review of the legal and institutional factors affecting flood plain management in Southern Saskatchewan will be undertaken. In particular, this review will consist of an examination of the existing legislation which may be relevant to any aspect of floods, flood damages and/or flood damage mitigation.
- 2) The above mentioned legislation is administered by various federal and provincial departments. The existing or potential conflicts or overlaps with regard to flood plain management in Southern Saskatchewan which have resulted from this delegation of responsibility will be determined.
- 3) A concept of a new institutional body will be proposed which could lead to the development of a comprehensive approach to flood plain management for the flood plains of southern Saskatchewan.

The pertinent legislation will be discussed in a broad context and will focus on the direction or intent, rather than the detail of each law or piece of legislation. The application of the existing legislation by the responsible government department and its subsequent effect upon the study area will be the main focus of this paper. Possible future applications or modifications to existing legislation will be examined only if they can substantially affect the management of flood plains.

1:5 Report Format

Chapter two examines the basis for the division of powers between the federal and provincial jurisdictions. It begins with a general discussion of law, in particular administrative law, and then continues with an examination of the sections of the British North America Act which are pertinent to the delegation of responsibilities between the federal and provincial governments in the field of water resources.

Chapter three discusses the federal, provincial and municipal governments and the legislation on any aspect of floods that are administered by each. This chapter also contains a section on the mechanism and importance of federal-provincial co-operation as a means for effective flood plain management.

Chapter four focuses on the study area of River Park. It examines the social, economic and physical characteristics of the area. It describes the water regimes of the two main watercourses in this area, the Souris River and Long Creek. Finally a discussion of land use and value, and the number and use of the structures both on land and in the river channel is provided.

Chapter five focuses on the legislative and institutional framework which is in operation in the study area. The discussions is divided into sections, each of which focuses on a key management issue. The gaps and/or overlaps of the legislative and institutional framework with relation to each issue are highlighted.

Chapter six discusses the requirements of a flood plain management board which could eliminate or reduce the gaps and/or overlaps of the legislative and institutional framework which were identified in Chapter 5.

CHAPTER 2

THE LEGISLATIVE BASIS OF FEDERAL AND PROVINCIAL JURISDICTION IN FLOOD PLAINS¹

The present and possible future roles of the federal and provincial governments in the management of flood plains are constrained by the legislative responsibilities assigned to each level of government by the British North American Act. The British North American Act, which was given royal assent in 1867, created the Dominion of Canada and specified the duties and responsibilities of the newly created country and the provinces therein. A brief discussion of law, in particular administrative law, is presented, along with a discussion on the difficulties of interpreting statutes, in order that the provisions of the British North American Act, as they relate to the legislative aspects of flood plain management can be clearly understood.

2:1 What is Law?

The dictionary defines laws in the general sense, as rules of action which have been laid down or established or found to exist in one way or another, to govern and control all manner of conduct. The laws of concern to this paper are those regularly established laws which govern human conduct in society. The ends and means of the laws which govern human conduct have changed throughout the history of mankind and vary, even in the present, from one location to another in the world.

Of the three overall systems of law which are found throughout the world, the one used by Canada (with the exception of the province of Quebec) is referred to as the Common Law System. There are three sources of law in the Common Law System and historically they have been more or less important as the decades pass in the following order:

- 1) established legal customs
- 2) judicial decisions
- 3) statutes

Not much of Canadian law remains or comes to us any longer in the form of established legal customs. One example of a legal custom which persists is the practice of a wife to take her husband's surname.

With respect to judicial decisions, it must be appreciated that there are many courts and administrative tribunals, in Saskatchewan and in Canada as a whole, handing down decisions each day. These decisions may be simply applying settled laws, or they may be developing existing law or, in effect, creating new law. Two criteria must be met in order that judicial decisions may be used as a sources of law:

- 1) a quality controlled means of reporting the significant decisions and
- 2) a means of sorting out conflicting decisions and keeping them to a minimum

The reporting of judicial decisions is accomplished by means of a large variety of series of what are called law reports. The sorting out of conflicting judicial decisions is accomplished, to some extent, through the application of a doctrine called "stari decisis" (to stand by things decided).

A popular belief exists that judicial decisions comprise most of Canadian law, however, in fact, more law is made by the federal and provincial legislatures in the form of statutes. This major source of Canadian law will be discussed in the next section entitled Administrative Law.

2:1:1 Administrative Law

The term "administrative law" is a functional designation. It is a combination of statutes, prerogative rules, case law, parliamentary laws and customs, conventions and administrative practice and procedures; it prescribes the structure and function, and describes the activities, primarily of the administration (Ministers of the Crown, Government Departments, and

individual officials, regulating tribunals, boards and commissions and various units of local government) as well as other entities such as trade unions.

The difficulty with formulating a definition of administrative law is to obtain one which can describe its wide range and still describe with precision the exact boundaries of administrative law. The problem of definition becomes even more acute when dealing with that portion of administrative law which deals with any aspect of floods, whether it be a comprehensive view, such as the management of flood plains or a narrower point of interest, such as the construction of flood control structures. There is no central unified body of administrative law which deals with all aspects of floods and flood damages. Instead flood problem solutions have been attempted through the use of legislation which were primarily formulated for other purposes. As a result, the formulation of a definition of administrative law which is concerned with the problem of flood damages is impossible.

To determine what administrative law was applicable in the treatment of flood problems in Saskatchewan, a review of those statutes known or thought to be of any relevance was undertaken. A description of these pieces of legislation and the responsible agency or department is the subject of Chapter three.

Each year the various provincial legislatures and the parliament of Canada pass numerous statutes, some which amend statutes previously enacted, some which codify laws that have existed only in the form of judicial decisions, and some which create new law. Periodically, the various provincial and the federal governments revise and consolidate the statutes which they have enacted in the previous few years.

Some legislation provides for the right of an appeal. An appeal deals with the facts used to reach a decision as well as the exercise of power. Every exercise of statutory power can be subject to a judicial review. In a review, the jurisdiction of the court is very much more confined than for an appeal. The court on a review cannot, as it does on an appeal

look at the rightness or wrongness of the exercise of the powers from the point of view of the merits; the court on a review can only examine whether the power was exercised properly from a legal point of view.

2:1:1:1 Statutory Interpretation

There are two main approaches to statutory interpretation used by the legal structure in Canada today. One is called the Literal or Plain Meaning Approach, the other is called the Mischief Approach.

The literal approach is probably accepted by most judges as the approach to take or at least the approach that should be taken at the outset. By this approach, in ascertaining the meaning of the statute or section in question, or the intention of the legislature, one sticks strictly to the words that have been used by the legislative in drafting the statute or section in question. However, the words are not used in a vacuum - they are read in context; that is, in the light of the subject matter with which the statute deals, including the other parts of that statute. The point is that with the literal approach it does not go beyond or behind the statute to try and ascertain its meaning. It's in the words used that the meaning must be found. Thus it can be said that it is irrelevant what the legislature might have intended to say - all that is relevant is what indeed the legislature did say.

By the Mischief Approach the meaning or intention of the legislature is not derived strictly from the words used. One goes behind the statute and seeks out the ruck in the law that the legislature was trying to iron out. What is important is not what the legislature actually said, but what it means to say if its true intention is not accurately expressed in the words used. Thus, in order to ascribe the meaning to any statute it is required to go beyond the literal interpretation by ascertaining the events and conditions leading up to the passage of that statute.

The difference between the two approaches is clearly seen in the gap situation. A literalist would refuse to fill the gap (and thus apply the

statute) thinking that to do so would be to usurp the function of the legislature. The mischevist would not hesitate to fill the gap and apply the statute by speculating upon how the legislature would have dealt with the gap situation legislatively had it been forseen.

In summary, of the three main sources of common law, the statute, is the most important source of Canadian law. Some statutes are subject to appeals, all can be subject to a judicial review. The two methods of interpretation of statutes illustrate the complexity of ascertaining the exact meaning of each statute. Throughout this paper, a common-sense approach to the interpretation of legislation has been used. That is, a non-legal, face-value interpretation of each relevant section of the legislation discussed in this paper was deemed sufficient for the purposes of this paper.

Before discussing the basis of federal and provincial jurisdiction contained in the British North America Act, one additional source of law of particular importance to the field of water resources will be briefly discussed; riparian rights.

2:2 Riparian Rights

A riparian right is a property right to the water and is obtained directly from ownership of land which adjoins a water course. The land adjoining a water course may be lateral as in a river or vertical as in a waterfall. The land has to adjoin the water course in the ordinary course of nature on a regular basis; not as a result of flooding.

A watercourse consists of the bed, banks and water therein. While the flow of water need not be continuous or constant, the bed and banks must be defined and distinct enough to form a channel or course that can be seen as a permanent landmark on the ground.

The concept of riparian ownership was established under the Napoleonic code. It wasn't until approximately 1840 that riparian ownership was

incorporated into the laws of England. Since then, riparian rights have comprised a part of the common law system.

There are four basic rights to which a riparian owner is entitled under common law. The most basic right is the right of access. If he does not have access to the water the riparian owner is unable to enjoy the other rights. Under the right of access the riparian owner is entitled to be able to go in a direct line from every point of frontage of his property to the water.

The right of drainage of his land into the watercourse is another right enjoyed by the riparian owner. It appears that the speed of drainage must be made with consideration for the carrying capacity of the waterway in order to protect the rights of the down stream riparian owners.

Riparian owners are also entitled to unchanged flows past their land with respect to the quantity and quality of the water. In addition the right of flow provides that the riparian owner is entitled to have water flow in its natural channel. Although a riparian owner is entitled to divert the water as it passes his land, the water must be returned to the normal water course before it leaves his land. A riparian owner is also entitled to protect his land from inundation even to the point of preventing removal of the natural protection that exists against flooding.

2:3 The Basis of Federal Power²

Section 91 of the BNA act - Taking Section 91 on face value gives the impression that the federal parliament has a general power to legislate over any matter not exclusively falling within the provincial legislative field and that the particular headings are merely instances of the general powers that are to be exercised not-with-standing that they might otherwise fall within provincial power. In a word, section 91 was intended as a residual source of legislative power. In fact, this residuary role of section 91 or as the BNA act

has been interpreted, have been confined to a relatively narrow role. For most purposes, the powers given to the provinces over local and private matters by section 91 (13) and (16) of the Act have served as residual clauses. The "Peace Order and Good Government" clause also gives Canada at least some measure of authority over international and interprovincial rivers.

The "Peace Order and Good Government" clause has also been used to develop an "emergency" power. Where a matter falling primarily into section 91 (13) and (16) attains such dimensions as to affect the body politic of Canada and becomes a matter of national concern, it may be categorized as falling within the "Peace Order and Good Government" clause.

One further word should be added about the residual portions of section 91. Even though the words "notwithstanding anything in this Act" refer solely to the specific heads of power, the courts have established a doctrine of paramoury of all valid federal legislation where there is conflict between federal and provincial legislation, federal law prevails. In other words the federal government has the "last word" in areas of conflict between federal and provincial legislation.

Thus it can be seen that the power vested in the federal government by the BNA Act is very substantial. As the damages incurred from floods increase it could become an issue of national concern. The federal government could theoretically pass legislation giving it jurisdiction over flood plains, especially those of interprovincial or international streams. While this route appears to one that is legally open to the federal government, it is the opinion of this author that the political realities would likely preclude this option - especially since another route, that of federal-provincial co-operation is available.

Section 91 (3) - This subsection provides Canada with the authority to raise money by all or any means of taxation. This then begs the question can Canada, when it has raised the money, use it in any way it wishes (since

it is public property) and thereby enter into what ordinarily would be solely within provincial power? In a practical sense if the courts unequivocally answered this question in the affirmative, it would mean that Canada could legally do anything it wished so long as it framed its legislation carefully. But the courts have not answered the question in an unqualified affirmative manner. In a broad way, the courts will permit the combined use of the taxing and property powers to influence, but not to regulate.

While Canada cannot legislate on matters that fall within provincial jurisdiction, it can nonetheless influence action in these areas. The day-to-day occurrence of this possibility can be seen in the signing of federal-provincial agreements. Canada can also lend its money, subject to compliance with certain conditions, as it does, for example, under the National Housing Act.

Section 91 (10) - The "Navigation & Shipping" power, as the name implies authorizes Canada to regulate navigation or shipping in a very broad way. This includes power to regulate navigation, to improve the navigability of water and to prevent the erection of works that might impede navigation, either absolutely or on condition of obtaining a license or permit.

Though there may be room for some doubt, it would appear that Canada may expropriate (riparian land and control structures) for navigation purposes. Assuming this is so, the power could not be used as a cloak for permitting expropriation of even closely related work. The use of the navigation and shipping power to effect other purposes, such as hydro-power development or flood control, has not been subject to intensive judicial scrutiny, but so far as the authorities go there is an indication that any attempt to use Section 91 (10) for this purpose would be kept within a narrow ambit.

It may be, of course that works for the improvement of navigation, for example by means of storage, might incidentally serve to control flooding as well as to improve navigation; however it is open to doubt if the navigation and shipping power could be used more extensively as a lever for federal exercise of jurisdiction over flood control. Therefore while Section 91 (10) does give Canada a broad and substantial interest in waterways, the use of the section for any but a very limited aspect of flood management appears to be excluded.

Section 91 (24) - Section 91 (24) of the British North America Act gives Canada power to administer Indian Lands. The Indians continue to enjoy a usufructuary title to lands reserved for them before confederation, but the underlying title continues to belong to the provinces. The nature of the Indian title, though never precisely defined, seems to be related to the Indian mode of life, and if so, Canada would not appear to have any power to initiate water development projects on these lands without provincial co-operation. Nor would the provinces alone be able to do so because this would interfere with the usufructuary title of the Indians which falls within federal legislative jurisdiction. Canada may accept a surrender of, or otherwise abolish the Indian title, but when they do so title vests completely in the province which then may legislate respecting these lands as it does with any other public property.

Section 91 (27) - This section gives Canada the power to make criminal law. That is, Canada may prohibit certain activities for the protection

of the public health, safety and morals. Accordingly it could make some aspect of flood plain development a criminal offense; however, this would be a rather extreme measure to take.

2:4 The Basis of Provincial Power

Section 92 (2) and (3) - The provinces can also exercise spending and lending powers. The power to spend money that can be obtained through these two subsections flows either as a result of the residual power left to the provinces or from legislative power over the province's property and civil rights within that province. In any event this permits the provinces to exercise influence, for example, by conditional grants, over areas of federal concern such as the development of fisheries and the improvement of navigation.

Section 92 (5) - Another important provincial power is section 92 (5) which gives the provinces power over the management and sale of public lands. As in the case of federal jurisdiction over its property, this enables a province to do anything in respect of its lands that a private person may do, and to enact legislation in regard thereto. This permits it entry into what otherwise may fall exclusively within the federal domain. In relation to water, for example, it may deal with fisheries or improve navigation on its lands. This is, of course, of the highest importance because the public domain is vested in the provinces and most provinces still have vast areas of ungranted lands.

Section 92 (10) - This section gives the provinces the exclusive legislative power over local works and undertakings. The interpretation of exactly what constitutes a work or undertaking is extremely complex. It appears that an undertaking has been described as not being a physical thing, but rather an arrangement under which physical things are used. However, the question of what constitutes part of the undertaking, once it has been determined that an operation is such, has given rise to even greater uncertainty.

The application of the power delegated to the province in this section is further complicated by the existence of one notable exclusion to this power

in subsection 92 (10) (c). This sub-section permits the federal parliament, by a simple declaration that if a work, although wholly located within the province, is for the general advantage of Canada or for the advantage of two or more provinces to extend its legislative jurisdiction over such work. However an enterprise does not, by the very fact of its extensiveness and importance to Canada and/or that it has many interrelated operations, become ipso facto an undertaking extending beyond the province. The use of declaratory power granted to the federal Parliament under sub section 92 (10) (c) is entirely within the discretion of Parliament; the courts cannot sit in judgement over its decisions. Items declared to be for the general advantage of Canadians that pertain to water resources include dams, canals, bridges, aqueducts, docks and harbours.

When a declaration is made the effect is the same as if the work subject to the declaration were expressly enumerated in section 91. It then falls within the exclusive legislative jurisdiction of the federal government. The mere fact that a work comes within federal legislative control does not take it out of the province, hence it will be subject to provincial legislation and taxation. Furthermore the federal Parliament may at any time, vary or repeal a declaration, in which case provincial jurisdiction revives accordingly.

Section 92 (13) and (16) - The principal basis of provincial power over water development are the powers under section 92 (13) and (16) to legislate respecting property and civil rights in the province and matters of a local or private nature. These two sources of power in effect constitute a residuary legislative power and under these, a province may, in relation to water development, exercise jurisdiction over water supply, power development, water conservation, flood control, pollution and recreation. This gives the provincial government legislative authority over irrigation and land reclamation for agricultural purposes, in conjunction with federal legislation.

Section 95 - Under this section each province can pass legislation, subject to federal legislation, on any aspect of agriculture including water useage. This is particularly important in Saskatchewan and provides the basis for some important provincial acts such as the Conservation And Development Act.

Section 109 and 117 - These 2 sections are of great importance in the field of water resources. Their effect is to give to the province the bulk of the public domain not previously granted including the beds of rivers, even those of navigable rivers. Provincial ownership also carries with it the power to act in respect thereof in the same way as an ordinary landowner. The province could grant water rights in the lands subject to their own imposed conditions, for it is clear that water rights such as riparian rights and rights related to the ownership of the beds like other ordinary entitlements to land belong to the provinces by virtue of their retention of their lands.

2:5 Summary

The British North America Act assigns two basic types of rights to both the federal and provincial governments. These two types of rights are proprietary rights and legislative rights. A proprietary right is that which flows directly from having ownership of an item. A legislative right is the power to pass and enforce legislation which could govern the use, management or any other aspect of the item in question.

The province, through section 109, has the exclusive ownership of all natural resources within its boundaries except those which are located on federal crown land. In the case of water resources, the province owns the beds of all water courses and can issue licenses for the use of the water flowing in them. All non-federal public lands within the province are owned by the province. Hence the province has proprietary rights in floodplains due to both their ownership of public flood prone lands and their qualified ownership of provincial waters.

The proprietary right of the federal government in flood plains is limited

to their ownership of any federal land located in flood prone areas. Such lands could include Indian reserves, national parks, or land which has been purchased by the federal government for their use.

The legislative powers of the federal government are more extensive than are those of the provincial government. Any legislative authority not expressly provided for in the BNA Act can be assumed by the federal government under the residual power delegated to it in section 91. Furthermore in the event of a conflict of federal and provincial legislation in a matter of common jurisdiction (as is possible in the concurrent assignment of authority for agriculture), the federal legislation would prevail over that of the province.

The legislative powers of the federal government in flood plains include three very strong powers; the power of collecting and spending money, legislative authority for matters which have not been otherwise delegated in the BNA Act and for matters which are of national concern. The present and proposed legislation, agreements and programs of the federal government which have resulted from the three broad powers assigned to the federal government will be discussed in Chapter three.

The legislative powers of the provincial government in flood plains include the collection and spending of money and the responsibility for matters of a local nature, and property and civil rights in the province. The provincial legislation affecting flood plains will also be discussed in Chapter three.

Footnotes to Chapter Two

1) Much of the material used in Sections 2:1, 2:2 and 2:5 is based on the lecture notes from a course given at the University of Manitoba in the winter session of 1973 entitled Natural Resources Administration and Law.

2) Much of the material used in sections 2:3 and 2:4 is based on a book written by G.V. LaForest, Natural Resources and Public Property Under The Canadian Constitution (University of Toronto Press, 1969)

CHAPTER 3

FEDERAL AND PROVINCIAL LEGISLATION AND AGENCIES

This chapter provides a brief description of:

- 1) the legislation which can have significant effect on the management of flood plains and
- 2) the agency responsible for the administration of each piece of legislation.

The discussion in this chapter is divided into four main segments, federal legislation and agencies, provincial legislation and agencies, local government administrative responsibilities and the mechanism of federal-provincial co-operation. A knowledge of the present legislative and institutional framework is required in order that the gaps and overlaps in the management of the flood plain in the study area can be determined.

3:1 Federal Legislation and Agencies

3:1:1 Department of Indian and Northern Affairs (DINA)¹

The department of Indian and Northern Affairs (DINA) administers the Indian Act and hence is responsible for the general welfare of native people and the administration of Crown lands reserved for Indians.

The ownership of Indian lands is a complex issue. It appears that the Indian title to reserve land is that of an usufructuary nature. The land is for Indian use and, for the length of time that the crown land is reserved for their use, the federal government through DINA has exclusive jurisdiction over it. However should the land cease to be an Indian reserve, it would no longer be federal crown land but rather provincial land in accordance with section 109 of the British North America Act.

DINA is involved with flood problems in Saskatchewan. In

particular, reserves along the Qu'Appelle River have been subjected to high water levels in recent years.

Unfortunately flooding is not the only problem facing native people today. As a consequence the resources and talents of DINA are strained to meet the demands of more critical problems facing Indians than the periodic occurrence of floods. Hence the treatment of flood problems has been on an ad-hoc, after-the-fact basis.

The planning of preventive measures against flooding of Indian lands is further complicated by the fact that the terms of treaties signed with each tribe are different. An application of a policy of flood preventive measures would necessarily have to take into account any relevant treaty conditions. This would make the development of a uniform policy, should one be desired, extremely difficult.

In the Regina office of DINA a community planner has recently been appointed. One of his functions would be to assist the native people in obtaining the best utilization of their resources. It is possible that the utilization of flood prone land could be given new consideration.

The relationship between DINA and the Indian people have undergone changes in recent years. At one time DINA adopted a paternalistic approach towards native people. However as some of the Indian leaders became better educated and as the white man's quest for resources encroached on Indian lands, the Indian has assumed a stronger identity and desires more direct control of his affairs. DINA has consequently assumed the role of advisor especially in matters where technical expertise is required.

In summary, flood plain management of Indian reserves is a complex problem due to the necessity of solving more urgent problems, of dealing with divided powers and having basically an advisory role assumed by DINA.

There is no Indian reserve in the study area at present. Because of the large native population in Saskatchewan and the location of some reserves on flood plains, DINA has an interest in flood plain management in Saskatchewan. Their input into any future federal approach to flood problems may influence policy decisions which would be implemented in the study area.

3:1:2 Central Mortgage and Housing Corporation (CMHC)²

The Central Mortgage and Housing Corporation (CMHC) which was incorporated under the CMHC Act is the federal agency concerned with all aspects of housing including insured mortgage loans, home improvement and home extension loans, housing for rental purpose and land assembly, housing research and community planning, and public housing.

CMHC administers the National Housing Act. CMHC exercises and performs all rights, powers, duties, liabilities and functions of the Minister under the Housing Act or under any contract entered into under these Acts, except the authority of the Minister under those Acts to pay money out of the Consolidated Revenue Fund.

The following sections of the National Housing Act are of particular importance in the management of flood plains for they provide a mechanism whereby CMHC can limit the amount and type of future development in flood plains and help reduce flood damages which result from present development.

Section 6 - This section describes the conditions under which a mortgage loan is insurable. Sub sections j and h state that the terms, conditions, and regulations governing the issuance of mortgage loans are to be agreed upon between the approved lender and the Corporation. Presumably CMHC could require that these terms, conditions and regulations include a guarantee of protection of the building from flooding either through location in a non-flood prone area or through

such protective measures as flood proofing or minimum elevations for structures constructed in an area which is recognized as a flood plain.

Sections 13 and 16 - These sections provide a further safeguard of CMHC insurance funds by requiring CMHC approval of the site location and that construction be done in accordance with CMHC approved standards. Again this presents another opportunity for CMHC to limit unprotected development on flood plains.

Part IV, Housing Branch and Community Planning provides authorization for the expenditure of CMHC funds on research into improved housing accommodations and the understanding and adoption of community plans in Canada. Section 35 of Part IV specifically provides for investigation into housing conditions in Canada and the distribution of information leading to improved housing accommodation and the understanding and adoption of community plans. Section 37 of Part IV enables the Corporation to enter into agreements with federal, provincial or private agencies for the purpose of obtaining information on any factor involved in the construction or provision of improved housing accommodation in Canada.

Reduction of flood damages to homes would result in improved housing accommodation. Research into such areas as the economics, feasibility and effectiveness of flood proofing techniques would appear to be within the scope of Part IV of the National Housing Act. The knowledge obtained from the research, once widely disseminated, could substantially reduce flood damage from present and possible future development in flood plains.

Section 45 permits the Corporation to enter into an agreement with the federal or provincial government to undertake a project for the planning of new communities. CMHC could help insure that no new communities are located on flood plains, however if no other site location is available their experience in housing could help prevent flood damages in the community.

Although the National Housing Act appears to provide the legislative mechanism for CMHC to assume an active role with respect to minimizing flood damages in housing, CMHC has not utilized this opportunity to its fullest extent.

To date there is no central CMHC policy regarding the selection of criteria for the determination of what constitutes a flood plain. That is, CMHC has not specified that an area subjected to flooding from floods of a return frequency of one in a hundred years (or one in five hundred years etc.) constitutes a flood plain. In fact, CMHC has not even specified that flood plains should merit special considerations.

However, knowledge as to whether a selected site is susceptible to flooding is obtained by each branch when they investigate any factors which may jeopardize their investment (such as slumping, flooding, etc.) Each branch acts on its own in determining whether each particular investment is advisable, since it is felt that the branch would be the most familiar with local conditions.

The Regina office of CMHC, during the course of its investigations into the security of their investments, utilizes all available information, such as the recently prepared flood hazard maps for Moose Jaw. Precautions such as this are one of the reasons why no homes in this region have suffered damages to the extent that they have been abandoned by their owners and reclaimed by CMHC.

There is one additional way in which the policies of CMHC can have an influence on flood plain development. Provincial agencies and private firms often follow the lead of CMHC. At present CMHC's involvement in flood plain management has been at an informal decentralized level. If however CMHC should assume an active role in the controlled development of flood plains, it is likely that the private and provincial housing

authorities would also give active consideration to the prevention of future flood damages in their projects and houses.

3:1:3 Department of Regional Economic Expansion (DREE)³

The Department of Regional Economic Expansion facilitates economic growth and social adjustment in Canada, through a series of federal-provincial agreements, special programs and other activities designed to increase and improve access to development opportunities in the various regions of the country.

DREE is responsible for administration of the Prairie Farm Rehabilitation Act (PFRA) which was passed by Parliament in 1935 to assist in the reclamation of agricultural lands seriously affected by drought and soil drifting in Manitoba, Saskatchewan and Alberta. Subsequent amendments to the Act widened the scope of PFRA activities, extended indefinitely the life of the original legislation, and relaxed the PFRA boundaries to include all agricultural areas of the three prairie provinces.

Water conservation and development and land use adjustment, have long been major concerns of PFRA. Its activities have included the development of large-scale irrigation, reclamation and community pasture operations. These large scale operations have implications for flood control.

PFRA designs and constructs irrigation, water supply and storage projects upon request from the provincial government, and provides 50% assistance on the financing of the project. Each structure is designed to satisfy the requirements of the principal use of the impounded water (eg. irrigation). Any benefits that a structure may have for flood control are incidental.

Present PFRA policy states that once a structure is completed, it be turned over to the provincial government for operation. The operation of the control structure for impoundments can be carried out with consideration for flood control benefits. That is, the water could be drawn down in the fall in the anticipation that winter snows and spring run-off will replenish the reservoir. However these draw-downs are only done if there is a high level of certainty that water will be available in the impoundment when required for the principal use (e.g. irrigation).

Because of their expertise in the field of water resources, especially the construction of control and storage structures, PFRA is often called upon to act as a consultant in programs that involve the planning and management of water reservoirs. For example PFRA is acting in a consultant role in the production of flood hazard maps for the Souris River Study.

DREE is one of the federal signatories in the Canada-Saskatchewan Subsidiary Agreement in the Qu'Appelle Valley. (This agreement will be discussed in section 3:4:3.) One of the objectives of this agreement is to implement adjustments to the flood hazard in the various flood prone lands of the Qu'Appelle Valley.

In summary, DREE is actively involved in programs which affect the flood susceptibility of lands. DREE's involvement is as a result of

- 1) the expertise of PFRA in the field of water resources, especially the design and construction of structural controls and
- 2) DREE's mandate to facilitate economic growth and social adjustment in Canada.

3:1:4 Emergency Planning Canada (EPC)⁴

Emergency Planning Canada (EPC) is the federal agency which is responsible for the co-ordination of federal activities required as a result of a peacetime disaster. In addition they keep the federal departments informed on the situation and changes in the situation of peacetime disasters.

In Saskatchewan, Emergency Planning Canada is actively involved in flood problems. The extent of the involvement of Emergency Planning Canada is greatest during the spring when floods are imminent or have occurred. In fact it is estimated that in April, 75% of the staff time and resources are spent in flood related activities.

Emergency Planning Canada maintains close liaison with the Saskatchewan Emergency Measures Organization. EPC provides assistance and guidance to provincial governments and municipalities in respect of the preparation of civil emergency measures in matters that are not the responsibility of any department agency or Crown Corporation of the Government of Canada.

EPC and the Saskatchewan Emergency Measures Organization (EMO) are active components in flood compensation boards. Saskatchewan EMO assesses the amount of damage suffered as a result of flooding and presents this information to the Provincial Disaster Financial Assistance Agency (PDFAA).

PDFAA administers the payment of compensation to those who have suffered eligible damages. Compensation payments are cost shared under a program between the provincial government (administered by PDFAA) and the federal government (administered by EPC). The formula used to determine cost sharing ratios is as follows;

<u>Provincial Expenditure Per</u>	<u>Federal</u>
<u>Capita Eligible for Cost Sharing</u>	<u>Share</u>
First One Dollar	0
Second and Third Dollar	50%
Fourth and Fifth Dollar	75%
Excess	90%

A general description of the guidelines for financial assistance to victims of flooding is given later in this chapter under the heading of Provincial Disaster Financial Assistance Agency.

EPC is also responsible for the co-ordination of civil emergency planning and training by departments, agencies and Crown corporations of the federal government.

EPC provides a valuable service by reducing the social and economic upheaval which normally accompanies a flood. However their preventive policies are limited to protection of life and property in the event of flooding including flood warning. In other words, their perspective is based on the assumption of the occurrence of a flood (or other peacetime disaster). Their mandate does not include measures to facilitate a more rational use of flood plains.

3:1:5 Agriculture Canada⁵

Section 95 of the British North America Act provides for the concurrent powers of legislation respecting agriculture. The federal department of agriculture has assumed the responsibility for 1) inter-provincial and inter-national marketing of agricultural produce; 2) research into such factors as seed characteristics; and 3) quality control. The federal department of Agriculture is also involved in crop insurance including protection against losses due to flooding.

A program of crop insurance was started in Saskatchewan in 1961. It was not until 1971 that this program "got off the ground". The delay was due in part to a high percentage of the premium being charged to the farmer.

In 1973 the premium schedule was modified. At present, 50% of the premium is paid by the farmer and 50% is paid by the federal government. The province administers the program and pays administrative costs.

The premium rates are determined by sound actuarial procedures. The premiums are a function of the "productivity index" - and the history of the insured land. This "productivity index" relates value of harvest to such parameters as soil type, cropping procedures and type of crop grown.

Insurance coverage is available for all farm crops except hay and foliage crops and market gardens. Insurance coverage also is not available for lands which have been designated as flood prone.

Fifty-five per cent of all eligible farmers in Saskatchewan purchase this crop insurance package. One-third of the fifty-five percent also purchase an endorsement to this total package which provides coverage for losses suffered from spring flooding. Under this endorsement package, farmers are compensated up to twenty dollars an acre for land which is too wet to seed. The two qualifications on the payment for compensation are: 1) it was not possible to seed the land by June 25 and 2) there must be a minimum of twenty acres which were unseedable.

The crop insurance program, funded in part by the federal Department of Agriculture is designed to provide coverage to farmers who suffer periodic losses as a result of flooding. It neither helps to perpetuate nor encourages the agricultural use of flood prone lands.

3:1:6 Environment Canada

3:1:6:1 Departmental Organization Section 5 of the Government

Organization Act of 1970 specifies that the duties, powers and functions of the Minister of the Environment shall extend to and include all matters over which the federal government has jurisdiction relating to;

- a) sea coast and inland fisheries
- b) renewable resources
- c) water
- d) meteorology
- e) the protection and enhancement of the quality of the natural environment.
- f) technical surveys
- g) the rules and regulations of the International Joint Commission relating to boundary waters and questions arising between the United States and Canada so far as they relate to pollution control.

The department is organized into three components to facilitate the discharge of its responsibilities. The three components are Fisheries and Marine Service, Planning and Finance and Environmental Services. Environmental Services is further subdivided into the Atmospheric Environment Service, the Environmental Management Service and Environmental Protection Service. The Environmental Management Service is further divided into four components, one of which is the Inland Waters Directorate.

The Inland Waters Directorate (IWD) has the objective of improving all Canada's inland water resources for the social and economic benefit of all Canadians. Its goals include: to promote the formulation and co-ordination of integrated national policies and programs to ensure the

optimum management and use of water resources; and to minimize the undesirable effects of water resource development, and of floods, droughts, erosion and other natural processes involving water.

3:1:6:2 Canada Water Act(CWA)

One of the vehicles by which IWD hopes to achieve its objectives is the Canada Water Act. The Canada Water Act, which was given royal assent in 1970, provides for the management of the water resources of Canada including research and the planning and implementation of programs relating to the conservation, development and utilization of water resources.

Part one of the Canada Water Act provides the mechanism where by programs directed towards the attainment of comprehensive water resource management may be undertaken. In particular, the following provisions are made:

1) the federal government may enter into an agreement with any province(s) for the purpose of establishing priorities, policies and purposes on the planning, conservation, development and utilization of water resources (section 2).

2) The federal government may enter into an agreement with any province(s) with respect to any waters where there is a significant national interest in the water resource management thereof, to provide programs for the planning, financing and implementation of comprehensive water resource plans, taking into account views expressed by persons likely to be affected (section 4).

3) section 5 makes provision for unilateral action by the federal government with respect to any federal water, international or boundary water and those waters of national importance for which all reasonable efforts to reach an agreement with the province have failed.

4) Section 7 stipulates the provisions to be included in the

agreements including the proportions of the cost of the respective parts of the program that are to be paid by the federal and provincial governments. At present the federal policy in cost sharing of Canada Water Act Studies is for a maximum federal contribution of 50% of the total costs.

Under the auspices of the Canada Water Act the federal government has established senior level consultative committees with the governments of each of the provinces. The periodic meetings of these consultative committees provides a forum whereby officials of the federal and provincial government can present, discuss and modify their programs in order to better realize their common objective of sound management of the water resources within or otherwise affecting the province.

Topics discussed at the October 8, 1974 Canada Saskatchewan Consultative Committee meeting included the Souris River Study and Flood Policies. Planned topics of discussion for the May 12, 1976 meeting include drainage of low lying areas and the Flood Damage Reduction Program.

3:1:6:3 Flood Damage Reduction Program (FDRP)

The federal government is actively pursuing the signing of accords with each province to reduce potential flood damages in Canada.

Until the enactment of the Canada Water Act in 1970 the principal federal program employed to deal with the flood hazard had been limited to the construction of flood control works and the provision of disaster assistance. The federal government alone has spent some \$40 million on disaster assistance and \$70 million on flood control works during the period 1948 to 1970 and damages from floods in Canada in 1974 are estimated to have been well over \$100 million.

With the enactment of the Canada Water Act, the federal government can participate in comprehensive planning and the implementation of study agreements to examine all water resources uses and problems in

river basins, including flooding and flood damages.

The Canada Water Act does not detail specific requirements for federal - provincial planning. To fill this vacuum with respect for flood related problems and mitigation measures, the federal government has developed guidelines for federal involvement to reduce flood damages.

Accords between the federal and provincial governments are required to put these principles into practise. Such an accord would set out the intent, principles and usage of programs and policies a flood damage reduction program could embody. Specific flood plain management programs and projects could then be negotiated in the form of specific sub-agreements or annexes to the general accord.

The sub-agreements would cover a wide range of programs and projects. An important sub-agreement, and likely the first, to be negotiated is one on flood risk mapping. Maps would be drawn for those areas jointly designated as requiring attention as a result of severe or frequent flood problems. The maps would show which portion of the designated area is inundated by floods of varying frequencies (eg 1 in 100 year return frequency, 1 in 500 year).

Once the extent of the flooding in each designated area is known, further sub-agreements would be negotiated for study and implementation of possible mitigation measures. These alternatives include structural alternatives such as upstream storage, stream straightening, flood by-passes and dykes and non-structural alternatives such as flood forecasting and warning, flood routing through property easements, flood proofing of structures and land-use adjustments through acquisition and zoning.

Federal provincial accords (including annexes) will commit both governments to a basic, common approach to solve the problems of reducing

flood damages. This approach is in the early stages of formulation and negotiation. It will take the resources and willing co-operation of the federal and provincial governments and affected municipal governments to create an effective, long-range solution.

3:2 Provincial Legislation and Agencies

3:2:1 Department of the Environment

3:2:1:1 Departmental Organization

The provincial department of the Environment is responsible for the management, protection and enhancement of the province's air, water and land resources. It is divided into five main branches. Water Management Service; Environmental Protection Service; Policy, Planning and Research Branch; Administrative Branch and Public Information and Education Branch.

The Administrative Branch provides support services for the department. The Public Information and Education Branch is responsible for undertaking an information and educational program on environmental programs and policies and provides the public with a knowledge of the department's activities.

The Policy, Planning and Research Branch is responsible for assessing long run trends in environmental quality and the preparation of comprehensive plans for the management of air, water and soil resources. This branch is cognizant of the importance of a comprehensive policy for the management of flood plains. Although there is no legislation proposed by this branch that is directed towards comprehensive flood plain management it has drafted a flood plain management policy to act as a guide for possible future legislation.

The Water Management Service is responsible for a co-ordinated program concerning the allocation and use of provincial water resources.

This service includes the Hydrology Branch which conducts hydrology studies, prepares project operation plans and carries out stream flow forecasting, and the Water Rights Branch which is responsible for the administration of three acts including the Water Rights Act. The latter branch licenses all diversion or storage projects concerning surface and ground water. The Water Rights Act is an important piece of legislation with respect to flood plain management and will be discussed later in section 3:2:1:3.

Much of the case load of the Water Rights Branch is concerned with water use or drainage that is affected by or in turn affects agricultural use. The branch also sends a member to the Technical Advisory Committee of the Wetlands Committee. This committee will be discussed in section 3:2:7:2.

The Environment Protection Service is responsible for a co-ordinated program to protect and enhance the air, water and soil resource of the province. It is composed of three branches, one of which is the Land Protection Branch. This branch is responsible for the administration of the Water Resources Management Act regulations affecting the use of land surrounding designated reservoirs such as Lake Diefenbaker and Blackstrap Reservoir. This branch has been assigned the lead provincial role in the negotiation of a Canada-Saskatchewan Flood Damage Reduction Program and its subsequent implementation.

3:2:1:2 Water Resources Management Act⁶

This Act was given royal assent in 1972. This act provides a mechanism whereby a program for the planning, development and use of the water and related land resources of Saskatchewan can be implemented. In particular the following sections are of interest.

Section 10. This section enables the Minister of the Environment to integrate and co-ordinate plans to guide in the development and use of the water and associated resources within the river basins of Saskatchewan. The Minister may advise on the best sequence of development within the plan, evaluate and advise on specific projects proposed for development and consider possible

interprovincial, federal and provincial or international implications of any plan or proposed project.

Section 11. This section states that the Minister may enter into agreements with the federal government or any other body for the purpose of conducting research, investigation, surveys or studies relating to the availability and development of, or any other aspect, respecting any source or sources of a supply of water for Saskatchewan.

Sections 13 and 14 enable the provincial government to designate a river basin or any part thereof or works thereof as a referred project. The Minister of the Environment shall advise on the negotiation and implementation of agreements with the federal and other provincial and local governments respecting the planning, development and operation of a referred project.

Section 22 of this Act is especially important in the consideration of legislation which can have a significant influence on the management of flood plains.

Section 22 (1)(a)(iii) states that the Minister may make regulations designating all or any portion of the area adjacent to or surrounding a reservoir as a reservoir development area to ensure that the land in the reservoir development area will be used in such a manner as to reduce as much as is practicable any damage that may be caused to the land or any buildings or other structures thereon, by flooding, periodic water action, bank slides, erosion or siltation.

Section 22(4) states that no person shall, within a designated reservoir development area, construct, locate or structurally alter a building or other structure or change the purpose for which land is being used on the day of which the notice of intention is given designating the land as a reservoir development area, without the written approval of the Minister.

Section 22(6) provides for the suspension in whole or in part within the designated reservoir development area of zoning and building by-laws.

To summarize, the Water Resources Management Act provides a very comprehensive approach to the planning and implementation of programs designed to take into account the special, fragile relationship between water and the bordering land resources, ie the land-water interface.

At present the land-water interface relationships are restricted to those for which the water resource have been artificially controlled. The term reservoir is defined, in section 22, as a body of water, whether on private or public lands, created or effected as a result of the construction and maintenance of water control works includes a river, stream, creek, watercourse, lake or previously existing body of water that is enlarged, reduced or otherwise affected as a result of the construction and maintenance of water control works. This definition appears to exclude bodies of water in their natural state. In addition it is not clear whether this definition could be applied to a body of water in its natural state at location x but is controlled along its course, say at location y. Therefore it appears that not all water-land interfaces in Saskatchewan are included in the scope of the Water Resources Management Act.

Section 22 provides for a limited approach to the prevention of flood damages. Sections 22 (4) and 22 (6) in particular discuss provisions which could lead to a reduction in flood problems through non-structural alternatives.

While the Water Resources Management Act was not specifically designed to obtain a comprehensive provincial management policy for flood plain development it does provide a good start in that direction. In fact the Department of the Environment is considering amendments to this act which will facilitate any future implementation of plans jointly agreed upon with the federal government under the terms of a federal-provincial accord.

The proposed amendments are in the early stages of the process whereby they, or a modified version of them, can be incorporated into the Water Resources Management Act. Two basic modifications to the Act are under consideration.

One possible modification could be an extension of the applicability of section 22 of the Act to make it possible to apply reservoir development area legislation and regulations to bodies of water which are not reservoirs. This modification is a result of the recognition that serious land use and environmental problems (including flood problems) exist at lakes and other bodies of water, some of which are not reservoirs under existing legislation.

The second possible modification is the incorporation of specific provisions for the management of designated flood hazard areas. These provisions include: designation of land use district by regulation which specifies permitted uses and limitations on permitted uses within the district; objectives for the encouragement of positive plans for the use of flood prone areas as well as the prevention of injury, damage, disruptions and unnecessary expense; financial assistance to municipalities for the construction and maintenance of flood control works, installation of flood proofing measures or devices, the purchase of property where existing property owners will move to locations outside the flood hazard area, etc; assistance to municipalities in preparing plans for the orderly and safe use of flood hazard areas by providing expert planning and engineering advice; and the extension of some of the regulations (eg appeal procedures) applicable to reservoir development areas to flood hazard areas.

The intent of these modifications appears to be to provide a mechanism whereby the province can assume a more comprehensive approach to flood plain management. The proposed modifications would enable the province

to better fulfill commitments that appear likely upon the signing of a federal-provincial accord for the reduction of flood damages. Therefore, although the modifications as outlined briefly in this section may be altered, it is likely that the general intent or purpose of these proposed modifications will not be changed substantially.

3:2:1:3 The Water Rights Act⁷

The Water Rights Branch of Environment Saskatchewan administers the Water Rights Act. This act provides for the orderly development of water use in Saskatchewan. This development is based on certain constraints as outlined in the Water Rights Act. In particular, section 7 states that the property in and the right to the use of all ground water and all surface water is, and is deemed always to have been, vested in the province of Saskatchewan.

Sections 8 and 9 state that no person shall divert or use any water or construct any structure which impounds water unless authorized by or under the Water Rights Act or its regulations.

Section 12 states that no right to the permanent diversion or to the exclusive use of surface water shall be acquired by any riparian owner or any other person by length of use or otherwise unless conferred under this act or by grants prior to 1931.

Section 14 provides for the establishment of boards or commissions for the purpose of regulating and controlling the use of waters that flow through the province.

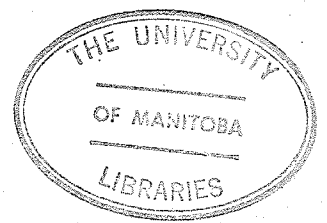
Section 15 states that water may be used for certain purposes and section 15(3) states that precedence for use will have the following order:

first, domestic purposes; second, municipal purposes; third, industrial purposes; fourth, irrigation purposes; fifth, other purposes; sixth, mineral water purposes; and seventh, mineral recovery purposes.

Basically the Water Rights Act provides that no consumptive use of any water in Saskatchewan may be allowed without a license from the Water Rights Branch. These licenses are issued with two considerations in mind, priority and precedence. Precedence refers to the order which was established in section 15(3). Some exceptions, on a stream basis, may be made by the Lieutenant Governor-In-Council. Priority refers to the date on which a request for a license is received. Within each precedence category, the earlier dated license receives preference.

Riparian rights as they exist under common law do not exist in Saskatchewan. The free domestic use of water (without the need to obtain a license) by riparian land owners is the only riparian right to which they are entitled. They are not entitled to any guarantees as to quality of water, total volume or minimum flows. The riparian land owner is expected to make his own provision for storage of water, in times of excess, that would be required to satisfy his needs during low flows.

The abolition of riparian rights as they are known under common law has important ramifications for flood plain management. If, for example, a diversion is proposed, the only requirement is that any riparian land owner who lives in the area from which diversion is to take place must be supplied with enough water for domestic purpose. If this condition is satisfied, the riparian land owner cannot oppose the diversion on the basis of loss of riparian rights. It appears that structural modification to water courses would be simplified, legally, as a result of the very limited right of riparian land owners.



3:2:2 Office of the Ombudsman⁸

The ombudsman is an independent officer of the Legislature whose function is to investigate complaints about unfair or unjust acts, decisions or omissions by departments or agencies of the provincial government.

His powers extend to investigations of any item that has by statute been assigned as a responsibility of a particular provincial agency or department. During the course of the investigation, the ombudsman's office examines all available material, including departmental files, relating to the issue of concern and reaches a conclusion and any subsequent recommendation.

The ombudsman's jurisdiction is limited to an examination of the exercise of the duties and responsibilities which have been specifically assigned to a provincial department or agency. As a result, investigation into any action committed by municipal bodies is excluded, although the ombudsman can investigate complaints made by any municipal body against a provincial department or agency.

If a complaint is received and there is no legislation which delegates responsibility for the area that would concern the complaint (eg a violation of the Water Rights Act is the concern of the Department of Environment), then the ombudsman is unable to conduct an investigation. If a gap in the legislation exists and that gap leads to problems, the ombudsman is powerless to investigate.

The ombudsman could play a role in the more effective management of flood plains by ensuring that the provincial government completely fulfills the responsibilities it has assumed in the field of flood damage reduction. However the direct responsibility for flood damage reduction assumed by the provincial government under existing programs is limited. As a consequence of the limited degree of legislation affecting problems of flood damages, the office of the ombudsman, while potentially a factor in flood plain

management, can be of only limited value for the resolution of existing problems.

3:2:3 Department of Highways⁹

The aim of the Department of Highways is to provide a comprehensive transportation system that will contribute to the economic development of Saskatchewan, and improve the quality of life in urban and rural areas. A comprehensive transportation system includes not only extensive coverage of the populated regions of Saskatchewan but in addition a year round usage of all but winter roads. Part of the transportation system involves the provision of crossings over water courses.

The construction of bridges and highways near and over water courses must be made with two main considerations:

- 1) the safe design and protection from water damage of the structure to be constructed and
- 2) the impact of the structure on neighbouring lands.

To the extent possible, highway and bridge construction takes into consideration the possibility and consequences of floods, both on the structure and its effect on neighbouring lands. Economic constraints and the amount of available data limit the possibility for the construction of the optimal bridge in terms of the above considerations for floods.

Economic considerations determine the size and capacity of each proposed bridge. It may be less costly to construct a bridge designed to pass a flood with a return frequency of one in a hundred years and bear the cost of reconstruction and damages caused by a flood of greater magnitude than the one in a hundred year flood, than it would be to construct a bridge designed to pass a flood with a return frequency of one in five hundred years.

The availability of historic records may limit the data required to

ascertain the characteristics of a flood of given return frequency. This is an especially critical point with smaller water courses. Often historical data does not exist for a long period of time on these streams. The effect of limited data is more pronounced on prairie streams since often the amount of water carried by these water courses assumes a high degree of variation. In the summer many tributaries and creeks become almost dry and in the spring, especially those preceded by wet winters and falls, these same dry water courses can become a torrent of disaster.

Every water course crossing is unique. Each has its own special considerations, whether it be excessive soil erosion or regular flooding. As a result, the site chosen for the river crossing can affect flood damages. For example, it would not be advisable to locate a bridge at a location where there is a bend in the river.

The height of the bridge above the channel, the construction materials and the substructure of the bridge all influence the extent of damages suffered to the bridge as a result of a flood greater than that for which the bridge was designed to pass. The head loss at the bridge will affect the extent of backwater flooding. All things being equal the greater the extent of backwater the greater the flood damages suffered by those people who are located upstream of the bridge.

Economics, construction feasibility and the flow characteristics of the water course at the bridge site are all considerations in the wise site selection and design of highways and bridges through flood plains.

3:2:4 Department of Tourism and Renewable Resources (DTRR)¹⁰

The powers and duties of the Department of Tourism and Renewable Resources (DTRR) as stated in the DTRR Act include: the conservation, development, management and utilization of the renewable resources of the province; the development of provincial parks, recreation sites and historic sites; and the promotion and development of tourism within the province.

The Minister of DTRR is responsible for the administration of the Regional Parks Act. One of the purposes of this act is to assist local government agencies in the establishment of regional parks with a view to making some of the natural and recreational resources of Saskatchewan available to every member of the public. One or more municipalities may apply to the Minister for the establishment of a regional park authority. The regional park authority is responsible for the administration of a regional park created under the Regional Parks Act.

Section 9 of the Regional Parks Act states that the Minister may enter into an agreement with a regional park authority for a term of not more than five years to provide for the establishment and operation of a regional park. The agreement may contain provisions respecting the land to be used for the purpose of or in connection with the park and, subject to subsection (2), such provisions respecting planning, management, maintenance and financial arrangements as may be deemed necessary. Subsection (2) states that where an agreement is entered into under subsection (1) the Minister shall, upon such terms and conditions as he considers desirable, undertake to pay sixty per cent of the capital cost of the development of the park.

In practice, formal arrangements between DTRR and the regional park authority, which is a body corporate, are limited to financial arrangements. While DTRR advises on such matters as the desirability of a site based on topographic considerations and probable degree of usage, the department does not have a formal input into the planning and management of each park. The role of DTRR with respect to regional parks is primarily that of financial backer and advisor.

Section 19 of the Regional Parks Act stipulates only two conditions under which a regional park can be dissolved. They are: 1) where the Lieutenant-Governor in Council is satisfied that the regional park authority has failed to carry out its responsibilities and 2) where the authority

requests that it be dissolved. The responsibilities referred to in 1) are basically of an administrative nature such as election of chairmen, appointment of secretary, etc.

The prime responsibility for the location, planning and management of a regional park rests with the respective regional park authority. Controlling the use of land within a regional park to insure compatibility with the occurrence of flooding is a function of the management capabilities of the regional park authority. Application of a uniform policy of flood plain management within the affected regional parks could be undertaken, if DTRR were to exercise the full prerogative of powers granted to it under section 9 of the Regional Parks Act.

3:2:5 Saskatchewan Emergency Measures Organization (EMO)¹¹

The Saskatchewan Civil Defense Branch was formed in 1951 under the Provincial Civil Defense and Disaster Act. On April 1, 1961 this branch was designated the Saskatchewan Emergency Measures Organization (EMO). The director of EMO reports to the Minister of Municipal Affairs.

EMO's main functions involve the planning of preventive action and preparations for disasters and emergencies, and the provision of assistance during actual disaster conditions. In addition to its operational activities, EMO also provides training programs for municipal officials. These courses are designed to meet the training requirements in such activities as communications, public information and community health planning. An additional aspect of its educational role is the provision of advice to local government authorities to help ensure that they are adequately trained and equipped to meet any peacetime disaster which might hit their community, including flooding. This pre-planning

involvement is at the discretion of the municipality, and is usually implemented by naming a local official as co-ordinator and assigning responsibility to him to insure that the community is prepared for peacetime disasters.

Saskatchewan EMO is often actively involved during the course of a disaster, such as flooding. Neither EMO or the provincial government departments are in charge of community disaster operations. Their presence at this level is to provide guidance and accelerate all possible government departmental and private organization's assistance to the community in preventing or in controlling the emergency.

EMO co-ordinates their emergency plans with the federal government through Emergency Planning Canada. Contact with EPC is done through the regional directors of both organizations in Regina. The relationship between EMO and EPC is that of a mutual advisory role.

EMO at both provincial and municipal level is not involved in the rehabilitation of the disaster area, (eg. financial assistance to the disaster victims, settling damage claims, or work programs in re-building the stricken area.) With regard to flood damages, EMO does have an indirect role in the aftermath of the occurrence of the disaster by assessing the extent of flood damages for eventual payment of compensation by Provincial Disaster Financial Assistance Program (see section 3:2:8)

EMO's role is similar to that of EPC in that it is directed towards the prevention of damage and the provision of assistance to a community once a disaster is imminent or has occurred. Although EMO's work has been largely flood related in recent years, its role is limited. Their work is based on the premise that disasters will occur and that people and structures

will be affected. This premise does not lead to a more rational development of flood plains, nor does it appear that their knowledge of the potential for damage in flood plains and the most effective means of prevention of damages has led to a mechanism whereby the public at large is informed of the potential for flooding or the location of flood hazard areas and encouraged to act accordingly.

EMO plays a vital role in maintaining property damage and loss of life in Saskatchewan due to all peacetime disasters, including floods, at a minimum. However their role is not conducive to a reduction of possible future damages, other than by emergency measures.

3:2:6 Department of Municipal Affairs¹²

This Department performs a range of services which include: providing an advisory service to urban and rural municipalities on such matters as administrative problems and accounting and audit procedures; providing technical and analytical studies and reports concerning complex statistical data; and providing the services of a local government authority in the Local Improvement Districts. The Community Planning Branch of this department provides technical advice and assistance to communities undertaking community planning programs and maintains up-to-date plans of rural and urban municipalities. This branch also administers the Urban and Rural Planning and Development Act which was given royal assent in 1973.

At present the Urban and Rural Planning and Development Act (PDA) provides four basic tools for planning a community; municipal development plans, zoning by-laws, subdivision regulations, and district plans.

A municipal development plan is prepared by the council of a municipality for the direction of the future physical, social and economic development and improvement of the municipality or any part thereof. If a development plan is passed it is legally binding and no development can be carried out that is contrary to the municipal development plan. Zoning controls are the designated

means for implementing development plans.

Zoning by-laws are a means of providing regulation of specific items (eg location and width of roads, height of buildings etc.) which when implemented would satisfy wholly or in part the objectives of a comprehensive development or management plan. Zoning by-laws are flexible since they enable changes or alterations on an individual basis for each item of regulation which is governed by the by-law. Unless the by-law is designed as part of a broader management tool such as a development plan, they can offer only an ad-hoc piece-meal solution to a multi-dimensional problem such as flooding.

Section 12 of the regulations under the PDA deals with the suitability of land and sub-division, with specific reference being made to the possible occurrence of floods. Item d of section 12 provides that all land proposed to be sub-divided and the sub-division thereof should be minimally suitable with regard to the danger of flooding, subsidence, landslides and erosion. Item (a) 6 of section 10 of the regulations requires that all drainage channels and creek beds, open bodies of water with the land and the level of the water at the date of survey be shown in a plan of the proposed sub-division. These sub-division regulations do not appear to do more than recognize the importance of topographic features in the selection of a sub-division site.

District plans are an extension of the concept of the municipal development plans. Section 84 of the PDA provides that the councils of two or more municipalities may enter into an agreement providing for the establishment of a planning district and the definition of the regulated area. Section 88 authorizes the district planning commission to prepare and adopt an approved district development plan.

Each of the above four management tools is utilized by the rural and urban municipalities. While direct control over local affairs is a prerogative which can be exercised by the Minister of Municipal Affairs,

this has not been done. The Department of Municipal Affairs has to date assumed the role of advisor as opposed to that of a central body by which local plans can be co-ordinated.

It appears that section 193 of PDA, which provides for the establishment of special planning areas, could enable the Department of Municipal Affairs to be more actively involved in matters which are of interest to more than one local municipality. In particular this section gives the Minister of Municipal Affairs the authority to establish special planning areas for reasons relating to district development control and environmental and resource management. Special planning area (SPA) legislation provides a flexible framework for land use planning, dealing with the issues of preservation, conservation and economic development.

Subsection 193 (2) of PDA lists the interests for which the Minister may declare an area to be a special planning area. These interests include the orderly development of parks, the protection of dams and other works for which public money may be expended, the protection and conservation of natural resources, the preservation of the landscape and natural beauty of the area and other such items. Although this list is not exhaustive, the prevention of flood damages is not one of the interests mentioned for which the minister may wish to designate an area as a special planning area.

To summarize, the provisions of the PDA as they relate to urban and rural planning and development take precedence over all similar provisions contained in any other act. These provisions provide a mechanism for the formulation and implementation of a comprehensive approach to land use in developed areas. While a recognition of the possible consequences of permitting development close to a water course is made in the sub-division regulations, a policy which would provide restricted developments in flood prone areas is not part of the PDA. A modification in the application of and in the decision-making authority assigned by section 193 of PDA could lead to a restriction

to flood compatible uses in flood plains. The possible modification of section 193 to provide a mechanism for flood plain management will be discussed in section 3:4:3 of this chapter.

3:2:7 Department of Agriculture¹³

The Department of Agriculture is responsible for administering all acts of the Legislature relating to agriculture, promoting the agricultural interests of the province, encouraging production and facilitating the marketing of field and garden crops, live stock and live stock products and promoting and encouraging co-operation among agriculturalists.

3:2:7:1 Acts Administered by the Department

Agriculture is a major industry in Saskatchewan and since water usage is an integral part of agriculture, the Department of Agriculture is involved in water resources. In particular, they administer the five following acts, all of which are subject to the provisions of the Water Rights Act; The Conservation and Development Act, The Watershed Associations Act, The Drainage Act, The Water Users Act, and The Irrigation District Act.

The bulk of the work done by the Department of Agriculture in the field of water resources is done under the guidance of the Conservation and Development Act (C&D). Under this act an area authority is elected with much of the same kind of powers as that of a rural municipality. The difference is that while rural municipalities are primarily concerned with roads the C&D authorities are concerned with the efficient utilization of water resources.

The primary function of the C&D authorities is in the construction and maintenance of works that are deemed necessary to save, conserve or develop any land or water resources within a C&D area. The boundaries of each C&D authority are agreed upon following the requirements set out in the C&D Act. These areas may or may not correspond to the boundaries of rural municipalities. The construction of works are financed by levying

an annual rate against those lands that may benefit from the C&D activities.

The Watershed Associations Act provides for the establishment of Watershed Associations. These associations are concerned with any work proposed or developed under the Water Rights Act or any act which provides for the improvement, utilization or control of water or land resources. The association is comprised of two or more agencies which have an interest in matters relating to the objectives of the association.

Two or more C&D area authorities often join to form a watershed association in order to treat resource issues of a large geographical nature or of too large a scope for C&D authorities. The costs of administering and conducting the affairs and business of a watershed association are financed by levying, annually, a sum against each of the agencies constituting the association. The agencies comprising a watershed association must be capable of obtaining revenue; a power which C&D area authorities possess.

The Department of Agriculture, under the terms of their water control policy which expired March 31, 1976, provided financial assistance for project construction to both C&D area authorities and Watershed Associations in the following manner:

<u>Type of Project</u>	<u>Local Share</u>	<u>Department's Share</u>
Flood Control and Drainage	33 1/3%	66 2/3%
Backflood Irrigation	15%	85%

The Drainage Act sets out the required procedures for the provision of works for drainage purposes. These works are defined as the construction of a drain and includes the deepening, straightening, widening of, the cleaning of obstructions from, or otherwise improving a stream, creek or water course, the lowering of the waters of a lake or pond and the construction of necessary guards in connection therewith. The work is undertaken by the council of a municipality and they can levy the cost of the proposed work(s) against the lands which may benefit.

The Water Users Act and the Irrigation Districts Act are both primarily concerned with irrigation. The Water Users Act is concerned with relatively small irrigation projects on private lands. Water Users Districts exists primarily in the south-west corner of Saskatchewan. Irrigation Districts are designed for large scale operations and at present only one irrigation district is in existence, located just east of Outlook, Saskatchewan.

These five acts, especially the first three described in this section, can lead to a substantial alteration of the existing water courses through impoundments and extensive drainage. Each of the acts is administered in terms of the fulfilment of the purpose for which the act was established (eg drainage). There is no provision for an examination of the total effect of all the works on the water regime or the land-water interface. The cumulative effect of works constructed under the auspices of these five acts in a specific area could influence the probability and extent of flooding. Yet, it appears that the only provision for a consideration of large scale effects is through the Watershed Associations Act and their considerations are more of a financial nature (eg financing of large control structures) rather than of an effect of all the works on the environment, including flooding.

3:2:7:2 Wetlands Committee

The Wetlands Committee is composed of the Deputy Ministers from each of the Departments of Environment, Agriculture, and Tourism and Renewable Resources. The principal purpose of the Wetlands Committee is to provide a forum for debate and resolution of conflicting plans for an area that is a wetland. Conflicting plans would develop if an agricultural interest group wished to drain the wetland for agricultural production and a wildlife interest group wished this area to remain as suitable habitat for water fowl.

The work of the Wetlands Committee is done through two working committees; the Technical Advisory Committee (TAC) and the Public Advisory Committee (PAC). The resource base of the area under consideration and the development plans for it are discussed within the TAC. If this committee is unable to reach a consensus on the future use and development of the area, the subject is referred to the parent committee, who in turn refers it to the PAC. The PAC usually attempts to obtain public input and then refers its judgement to the parent committee for a decision. If the decision should be appealed, the final say rests with the Minister of Agriculture.

The Wetlands Committee is a senior level government group whose decisions can affect water levels, drainage, and indeed the economic activities of localized areas. Its approval must be obtained for all projects initiated in wetland areas by the Watershed Associations and C&D area authorities. While the Wetlands Committee can have a significant impact on the water resources of Saskatchewan, its jurisdiction is limited to areas which are considered to be wetlands. In addition its decision on the use of wetland areas appear to be based on considerations which do not include the potential use of wetland areas to reduce flood damages in surrounding areas through retention of some of the spring run off.

3:2:8 The Provincial Disaster Financial Assistance Program (PDFAP)¹⁴

The Provincial Disaster Financial Assistance Program (PDFAP) has been administered since the spring of 1976 by the Saskatchewan Government Insurance Office. However it is the Minister of Mineral Resources who is responsible for the policy decisions of this program (such as the designation of disaster areas).

This program marks the initiation of a defined policy of compensation

and financial assistance both during and after the occurrence of a disaster. In the past this assistance has been largely on an ad-hoc basis. Each event had been treated separately with guidelines and programs for compensation being drawn up each time.

For the purposes of the PFDAP, a disaster is defined as "a situation" or the threat of an impending situation which abnormally affects the lives and/or property of the citizens of a community and which is clearly beyond the physical and/or financial capability of the community."

Under this program guidelines are established for financial assistance to victims. The guidelines for assistance to flood victims are very similar to the guidelines used in 1974 and 1975, and are similar to those of the federal government, thereby facilitating a smooth liaison between federal and provincial programs.

The program consists of two main components 1) assistance to individuals both during and after the flood event and, 2) payment to municipalities both during and after the flood event.

At the request of the municipality and after subsequent investigation by Emergency Measures Organization an area can be designated as a disaster area and become eligible for financial assistance. With some exceptions, assistance is provided on the basis of that which is required to restore the area to conditions which existed before the flood, plus the cost of services and relocation that are required during the flood.

The Hon. Ed Whelan, the Minister in charge of the Provincial Disaster Financial Assistance Agency addressed a letter on October 2, 1975 to the City and Town Clerks, and the Village and Rural Municipality Secretary-Treasurers. In it he stated that "If the decision is made to continue the program, serious consideration will be given to excluding claimants who have insurance available, but made no effort to purchase it."

To summarize, the effect of this provincial program in flood plains is reactive rather than preventive. Once a flood has occurred

or is known to be imminent, measures are taken to provide assistance to reduce the social disruption and economic loss. However, the provision of flood insurance which can be operated in a manner that would serve as a prevention against future damages, as well as compensation for damages incurred, has to date, not been incorporated into this program.

3:2:9 The Saskatchewan Housing Corporation¹⁵

The Saskatchewan Housing Corporation Act was given royal assent in 1973. The Saskatchewan Housing Corporation was established under this act with the objectives of promoting and carrying out the construction and provision of more adequate and improved housing, of improving the quality of housing and of improving the quality of amenities related to housing.

The prime interest of this department is in projects involving more than individual homes and in the obtaining of land assemblies. A "common sense" approach is the policy by which they approve housing projects in flood prone lands. Flooding is considered to be one of the possible potential risks to their investments.

Section 25 of the Saskatchewan Housing Corporation Act enables this corporation to undertake research which could include studies into the provisions necessary for damage free occupation of flood prone areas.

In summary, the Saskatchewan Housing Corporation works in close co-operation with its federal counterpart, the Central Mortgage and Housing Corporation, and their approach to investment in flood prone areas appears to be similar.

3:3 Local Government

The Rural Municipality Act and the Urban Municipality Act provide the basis for the organization and administrative responsibilities of local government. Each of these acts gives a detailed description of the operations of the municipal government, the powers and duties of the elected council, the procedures to be followed for holding elections, the financial arrangements

which are permitted, and the methodology to be used for assessment and taxation.

A paradoxical situation exists with regard to the relationship between the provincial and local governments. While the administrative procedures and range of jurisdiction for municipal governments are strictly defined by the provincial government, the municipal governments operate on a highly autonomous level. The planning and development of the area within its jurisdiction rests almost entirely with the local government. The nature of this paradox can be clearly illustrated through an examination of some of the provisions of the Urban and Rural Planning and Development Act (PDA).

Sections 53 to 74 of the PDA are concerned with the process for establishing zoning by-laws by local governments. Specific details to be followed in this process are provided. For example, section 56 (3)(c) states that the council of a municipality has only six months in which to make a decision as to whether or not an individual can carry out development in an area that will be affected by a proposed zoning bylaw; section 62(1) states that the districts established in the zoning bylaw shall be shown on a map or plan attached to and forming part of the bylaw...and; section 73(1) states that a zoning bylaw may provide that when an application is made to the council for an amendment to the bylaw it shall be accompanied by an application fee not exceeding \$50.

Although specific details are provided regarding the administrative aspects of the zoning, the actual context of these zoning bylaws is left to the discretion of the council, including those subjects which extend beyond a local interest. For example section 60(5)(G) states that a zoning bylaw may establish districts and within those districts, or any part of them, prohibit the erection of any building or other structure on land that is subject to flooding. The criteria to be used for the designation of flood prone land

and whether or not development would be limited in these areas are subjects which are to be decided upon by the local council.

The present allocation of powers to the local governments has important ramifications for the development of flood plain management policies. The provincial government is limited to methods which would not usurp existing local decision-making authority. While flooding in Saskatchewan occurs to the extent whereby it has become a large provincial concern, flooding is also a large local concern. It would therefore be advisable that the provincial government solicit the co-operation of the local governments in any proposed policy of flood damage reduction.

The local governments are a powerful political group in provincial politics. The rural municipalities have formed an association entitled The Saskatchewan Association of Rural Municipalities (SARM) and the urban municipalities have their association called the Saskatchewan Urban Municipalities Association (SUMA). These associations hold annual conventions at which resolutions are passed and forwarded to the appropriate federal and/or provincial agency for their information and possible action. These resolutions can cover a wide variety of subjects. Some of the resolutions passed at the 1976 annual convention of SARM and to be presented to the provincial Department of the Environment included 1) that all ditching and draining to natural waterways or creeks and roadway ditches be made illegal unless such ditching is part of a Conservation and Development Project and 2) that the provincial government be urged to legislate preventative measures to control the movement of surface water by introducing provisions into the legislation which would compel those responsible to restore the offending channels and basins to their original courses and levels without the affected individual having to sue his neighbour.

To summarize, the local governments have a very important role to play in flood plain management. Flooding is a local concern and many of the

measures which could be implemented to reduce flood damages, such as restrictive zoning, are the prime responsibility of the local governments. To ensure a successful program of flood damage reduction, the federal and provincial governments will have to work in close co-operation with the municipal governments. A summary of the legislation affecting flood plain management in Saskatchewan is given in Table 3:1.

3:4 Federal-Provincial Co-operation

As was shown in Chapter two, neither the federal nor the provincial government has a clear mandate in the administration of natural resources. The policies and programs of each level of government have an impact on those of the other levels of government. To avoid working at cross-purposes or in ignorance of the other's objectives, the departments of each level of government which are concerned with the same subject matter should work in co-operation for the mutual benefit of both.

The development of a comprehensive means of co-operation is not an easy task. Historical precedents and tradition, differences in priorities, fragmentation of responsibilities within as well as among different levels of governments, the complexity of the social and political realities and organizational jealousies all tend to work against effective co-operation, not only between federal and provincial organizations, but between different departments of the same government. The federal government and the provincial government in Saskatchewan have been able to work effectively together. Three examples of their co-operative action in the field of water resources will be discussed in this section. However we shall first examine the development of a comprehensive approach to the management of water and related resource in Saskatchewan including co-operative aspects with local governments.

3:4:1 History of Water Resource Management in Saskatchewan

The construction of the reservoir for the South Saskatchewan River Project,

known as Lake Diefenbaker, marks the beginning of the institutional history of water resource management in Saskatchewan. The federal government was responsible for the design and construction of the physical facilities of the project, while Saskatchewan was to undertake the planning and the development of the project benefits; irrigation, hydroelectric power, flood control, domestic and industrial water supply and recreation. To co-ordinate the two government's involvement in the project, The South Saskatchewan River Development Board, with provincial and federal members, was established. In addition, to fulfill its responsibilities in the project, the province established the South Saskatchewan River Development Commission.

The original intention behind the establishment of the Commission was that provincial policies for development around Lake Diefenbaker would be implemented by encouraging municipalities in the area to pass local by-laws which could establish land-use plans drafted by the Commission. This attempt failed, due to the difficulty of co-ordinating the activities of a large number of small rural municipalities, and in 1960 the South Saskatchewan River Development Commission Act was amended to enable the Commission itself to undertake land-use planning and to control development at lake Diefenbaker. During this period the more general province wide water resources were managed either by the Saskatchewan Department of Agriculture or by the Prairie Farm Rehabilitation Administration.

In 1964, the Saskatchewan Water Resources Commission was established and the South Saskatchewan River Development Commission disbanded. Most of the functions of the old Commission were transferred to the new one, with the exception that the South Saskatchewan River Development Board continued to coordinate provincial and federal activities around Lake Diefenbaker. The Saskatchewan Water Resources Commission was given authority over water-resource development in the entire province. The Saskatchewan Water Resources Commission could initiate river-basin studies and water resource conservation and development plans anywhere in the province, and it could

designate any water development site as a multi-purpose project, thereby co-ordinating all provincial government research, investigation, planning and development in such a designated area.

Another major shift in water resources planning and administration occurred in 1972 when the Saskatchewan Department of the Environment was established. Once again, riparian land-use planning authority was transferred, this time from the Saskatchewan Water Resources Commission Act to the new Water Resources Management Act of 1972.

Two distinct steps may be noted in the history of water resource management in Saskatchewan. The first step was a widening of authority; from water resources management around one large project, Lake Diefenbaker, to water resources management throughout the province. The second step was a widening of responsibility; from province wide administration of water resources, to province-wide administration of environmental issues concerning natural resources in general, including water.

3:4:2 Prairie Provinces Water Board (PPWB)

The Prairie Provinces Water Board (PPWB) is an excellent example of the effectiveness of federal-provincial co-operation in the field of water resources. The Prairie Provinces Water Board was established in 1948 by Canada, Alberta, Saskatchewan and Manitoba. The function of PPWB as expressed in the Agreement of July 28, 1948 is to "recommend the best use to be made of interprovincial waters in relation to associated resources in Manitoba, Saskatchewan and Alberta and to recommend the allocation of water as between each such province of streams flowing from one province into another province."

Initially the Board considered requests from the provinces for allocations to specific projects and made recommendations which were acted upon by the four governments. In the late 1960's it became apparent that the allocation of water by project was becoming increasingly difficult to administer. In 1966 a committee established by the Board recommended that apportionment of interprovincial waters be made on a stream basis rather than for specific projects. This recommendation led to the signing of a master agreement between Canada and the three Prairie Provinces and the reconstitution of the Prairie Provinces Water Board in 1969.

Since the reconstituted Board has been in existence it has, among other things, undertaken comprehensive studies on water quality in the Prairie Provinces and has formed a committee on hydrology to determine natural flow for apportionment purposes and to develop forecasting techniques. A budget of approximately \$150,000. per year is required to enable PPWB to finance their work. These funds are cost shared on a basis of one-half share paid by the federal government and one-sixth share paid by each of the three prairie provinces.

3:4:3 Qu'Appelle Implementation Program

In October 1975, a Canada-Saskatchewan Subsidiary Agreement on the Qu'Appelle Valley was signed. The objectives of the agreement are:

- a) to ensure the long-term productivity of the Qu'appelle Valley's recreation and tourism resource base,
- b) to increase the benefits from utilization of this resource base, and
- c) to improve the management of the land and water resources of the Qu'Appelle Valley.

The Qu'Appelle Implementation Program is a Canada-Saskatchewan undertaking designed in part to implement the recommendations of the

Qu'Appelle Basin Study Board. This Board made sixty-four recommendations with respect to water quality, water supply, adjustment to the flood hazard, and land and water use. The Implementation Program is under the direction of the Management Board which is composed of four members from the federal government and four members from the provincial government. The total funds allocated to this program is approximately thirty-four million dollars.

An Interim Implementation Board directed the work on a number of high priority projects which were initiated before the agreement was signed. These works included the purchase of highly flood prone agricultural lands in the Qu'Appelle Valley and the construction of flood protection works for Moose Jaw, Regina, Lumsden and Tantalton.

Part of the Qu'Appelle Implementation Program includes the establishment of six Special Planning Areas (SPA). It is anticipated that each SPA will be represented by a Special Planning Area Commission to be established for the purpose of expressing local and provincial interests in the planning and decision making process. At present, section 193 of the Planning and Development Act enables only the Minister of Municipal Affairs to have decision-making authority for Special Planning Areas. The SPA commissions could only be established if an amendment to section 193 was made to allow the minister to delegate some of his decision-making authority.

This modification of the special planning areas legislation would provide senior government and local authorities with a mechanism through which they can express their particular concerns and ideas and over time share in decision making authority. In this manner, local governments can protect their decision-making authority and senior governments can protect their monetary investment in the Qu'Appelle.

3:4:4 Flood Damage Reduction Program (FDRP)

As was discussed in Section 3:1:6:3 the federal government is actively pursuing the signing of accords on flood damage reduction with each province. Negotiations are currently in progress for a flood damage reduction program with the province of Saskatchewan.

Specific responsibilities for the development and implementation of a flood plain management plan will be assigned between the federal and provincial governments, by mutual consent, in a formal flood damage reduction agreement and sub-agreements. Saskatchewan is currently assessing its present legislation, in particular the Water Resources Management Act, to ensure that it does have the necessary legal grounds on which to fulfill their obligations under a joint flood damage reduction program. After this assessment has been completed, and any weaknesses strengthened by amendments to their legislation, Saskatchewan will very likely sign a flood damage reduction agreement with Canada.

The focus of the current negotiations has been on a flood hazard mapping sub-agreement and a flood plain land use planning sub-agreement. The flood hazard mapping sub-agreement will likely involve the mapping of all urban areas in Saskatchewan which are subject to floods of a return frequency of one in five hundred years or more. The flood plain land use planning sub-agreement will facilitate the development of a local land use planning concept for designated flood risk areas.

Footnotes to Chapter Three

Part of the material used in the discription of the legislative and administrative responsibilities of each department were based on my understanding of conversations with an official of each department. The conversations were:

- 1) Department of Indian and Norther Affairs,
Mr. A. Markuson, February 18, 1976 (office)
- 2) Central Mortgage and Housing Corporation,
Mr. R. Nichol, February 23, 1976 (office)
- 3) Department of Regional Economic Expansion,
Prairie Farm Rehabilitation Assistance,
Mr. G. Brown, March 25, 1976 (office)
- 4) Emergency Planning Canada,
Mr. L. French, April 7, 1976 (telephone)
- 5) Agriculture Canada,
Mr. G. W. Gorrell, April 7, 1976 (telephone)
- 6) Environment Saskatchewan,
Lands Protection Branch,
Mr. J. Brickwell, March 9, 1976 (office)
- 7) Environment Saskatchewan,
Water Rights Branch,
Mr. S. Stan, March 9, 1976 (office)

- 8) Office of the Ombudsman,
Mr. E. Malynk, February 16, 1976 (office)
- 9) Department of Highways and Transportation,
Mr. W. Sheard, February 18, 1976 (office)
- 10) Department of Tourism and Renewable Resource,
Mr. R. Kelarski, February 16, 1976 (office)
- 11) Emergency Measures Organization,
Mr. A. Auser, February 18, 1976 (office)
- 12) Department of Municipal Affairs,
Mr. L. Sully, February 16, 1976 (office)
- 13) Saskatchewan Department of Agriculture,
Mr. H. Pelech, February 25, 1976 (office)
- 14) Department of Finance,
Mr. G. Brandt, March 10, 1976 (office)
- 15) Saskatchewan Housing Corporation,
Mr. K. Sherlie, March 5, 1976 (telephone)
- 16) R. Jackson "Riparian Land Management in Saskatchewan and Ontario.
Institutional Arrangements for Water Management: Canadian Experiences,
Bruce Mitchell (ed) (University of Waterloo, 1975) pgs. 173-181

FLOOD PLAIN MANAGEMENT

Subject	Act	Responsible Agency	Relevant Points
Housing	The National Housing Act	Central Mortgage and Housing Corporation	-research into matters affecting the provision of adequate housing -provision of mortgage insurance -community planning
	Saskatchewan Housing Corporation Act	Saskatchewan Housing Corporation	-provision of adequate and improved housing -improvement of the quality of amenities related to housing
Emergency Measures	Civil Emergency Measures Planning Order	Emergency Planning Canada	-co-ordination of federal activities required as result of peacetime disaster
	The Civil Defense Act	Emergency Measures Organization	-prevention of damage and provision of assistance to community in the event of a peacetime disaster
Structures	Office Consolidation 1969. The Highway Act	Department of Highways and Transportation	-construction of bridges
	Prairie Farm Rehabilitation Act	Prairie Farm Rehabilitation Branch, Department of Regional, Economic Expansion	-construction of control structure to impound water
Planning and Development	The Urban and Rural Planning and Development Act	Department of Municipal Affairs	-criteria for zoning by-laws and subdivision regulations -creation of municipal development plans and district plans -concept of special planning areas
Agriculture	The Department of Agriculture Act	Saskatchewan Department of Agriculture	-crop insurance -conservation and development projects and Watershed association projects -wetlands committee
Compensation		Department of Mineral Resources	-guidelines for the provision of compensation from peacetime disasters

TABLE 3:1 CONTINUED

<u>Subject</u>	<u>Act</u>	<u>Responsible Agency</u>	<u>Relevant Points</u>
Parks	The Regional Parks Act	Department of Tourism and Renewable Resources	-provincial responsibilities in the management and financial support of regional parks
Native People	The Indian Act	Department of Indian and Northern Affairs	-management of reserve lands
Water Resources	Canada Water Act	Environment Canada	-river basin studies -Flood Damage Reduction Program
	Water Resources Management Act	Environment Saskatchewan	-reservoir land use -river basin studies

CHAPTER 4

RIVER PARK AREA

4:1 Introduction

The River Park Area was chosen as a case study for this paper. The selected study area has the advantages of being small and compact while at the same time embodying a multiplicity of problems and legal and institutional jurisdictions. The material used in this chapter is the result of a field trip to the area in the fall of 1975, background reports entitled a "Sociological Analysis of the Souris River Basin" prepared by the Souris River Basin Study Office and "The Canadian Portion of the Souris River Basin, Background Notes" prepared by R.A.Hale, Environment Canada and numerous conversations with officials from all levels of government.

4:1:1 Study Area Location

The study area encompasses portions of the Souris River, Long Creek and unnamed small tributaries through the Rural Municipality of Estevan No. 5, in Sections 10-15 inclusive, Township 2, Range 8. These six sections lie within the approximate area of the flood of record as indicated by the City Engineer of Estevan.

This area lies immediately adjacent to and south of the Urban Municipality of Estevan. The urban municipality is situated at an elevation some 45 feet higher than the River Park area and is thus not subject to Souris River flooding. The study area is located in the mid west region of the Souris River Basin as indicated in Map 1.

The description which follows is based on characteristics which pertain to Census Division 1 of which the R.M. of Estevan No. 5 is a part, to the Souris River basin as a whole, while the remaining description is specific to the study area.

4:1:2 Physical Characteristics

4:1:2:1 Climate

The climate of the Souris basin is termed continental which means that compared with the world average at that latitude, the summer temperatures are higher (July mean ranges from 62 to 68 degrees F), the winter temperatures are lower (January mean ranges from 1-7 degrees F), and the mean annual range is greater. Temperatures in the immediate Estevan area range from January averages of 14°F max and -14°F min. to July averages of 81°F max and 56°F min. The mean annual precipitation varies across the basin. The southwest receives an average of 16" per year, of which about 11" falls as rain during the growing season. The effectiveness of this precipitation is reduced by relatively high evaporation loss. The total precipitation, but more importantly the moisture efficiency, increases to the north and east across the basin until in the Moose Mountain Upland an average of 18" of precipitation falls. The moisture efficiency pattern is paralleled by an increasing abundance of shrubs and trees from the southwest to the northeast.

The average frost-free period for different districts varies from 90 to 110 days and the growing season averages more than 160 days.

4:1:2:2 Physiography

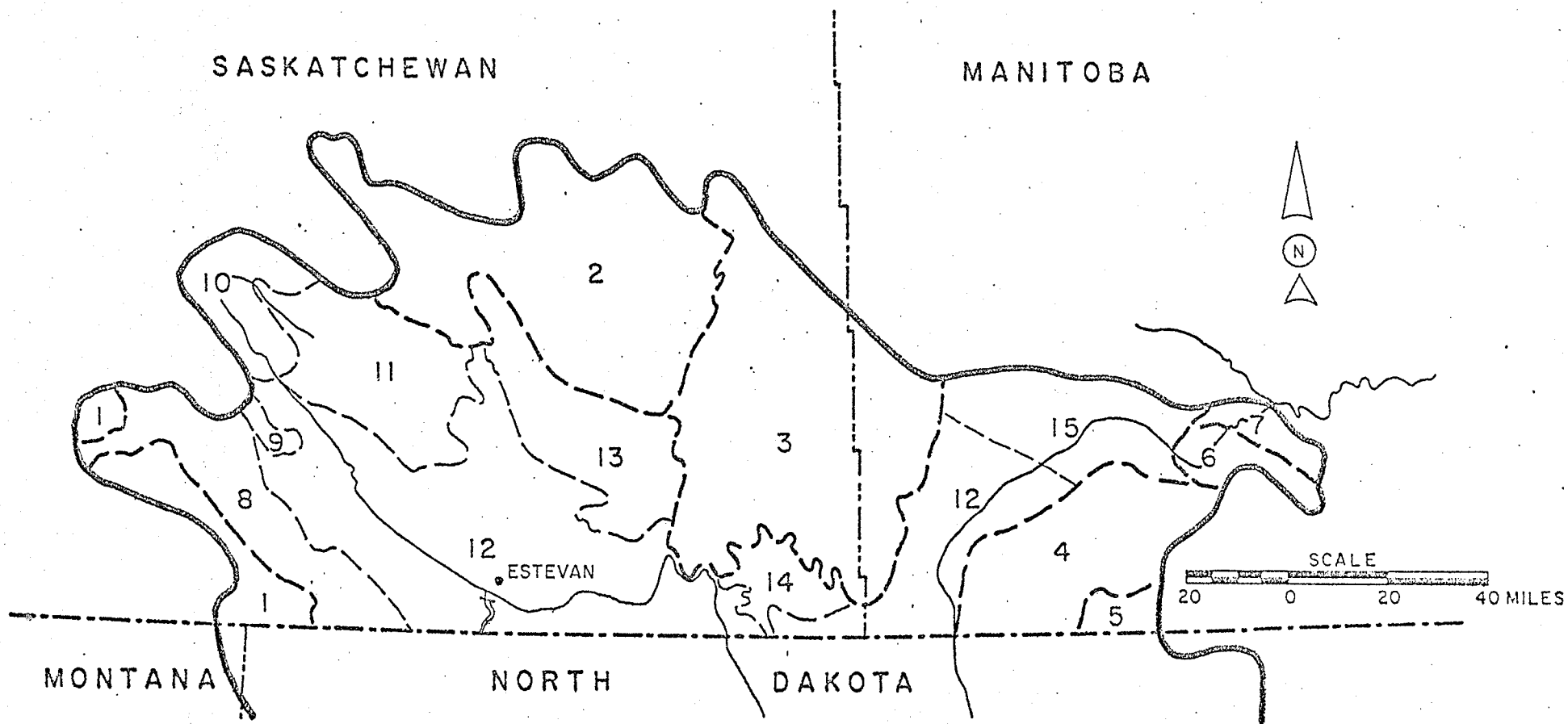
The Souris River, which meanders in a broad valley, provides the major drainage of the basin. Other streams and intermittent glacial channels dissect the plain and drain southeastward into the Souris River. A few of the more permanent streams are Pipestone, Stoney, Jackson and Gainsborough Creeks and the Antler River.

The Canadian portion of the Souris River Basin covers an estimated 15,700 square miles in southeastern Saskatchewan and southwestern Manitoba adjacent to the U.S. border. The basin virtually spans the Second Prairie Steppe (Saskatchewan Plain) from the Missouri Coteau of the Third Prairie Steppe (Alberta Plateau) in the west to the Upper Assiniboine Delta which lies just west of the First Prairie

Steppe (Manitoba Lowlands) in the east. The basin ranges in altitude from about 1200' ASL at the Assiniboine River to about 2700' ASL in the Moose Mountain Uplands but undulates for its most part between 1500' and 1900' ASL.

Depending upon the literature referenced, the Souris Basin is comprised of eight to sixteen physiographic regions. The discrepancy arises when the Souris Plain, which constitutes the majority of the area, is broken down into sub-regions. From west to east the eight major divisions are the: Missouri Coteau, Souris Plain, Moose Mountain Upland, Minnedosa-Reston or Oxbow or Oxbow-Ryerson Till Plain, Waskada or Boissevain Till Plain, Turtle Mountain, Tiger Hills and Upper Assiniboine Delta, (map 2). The Souris Plain is subdivided further as follows: Ceylon Long Creek Plain, Yellow Grass Marsh, Regina Plain, Souris Plain, Talmage Plain, Arcola-Browning Plain, Carievale Outwash Plain and Newdale Plain. The River Park area, chosen as the case study of this paper is located in the Souris Plain.

The Souris Plain, and its subdivisions, make up roughly 50 - 60% of the Souris River Basin. It is a level to gently undulating basin of glacial Lake Souris and occupies the area between the Missouri Coteau and Moose Mountain Uplands in the west and between the Oxbow and Waskada Till Plains in the east. It is a broad expanse of various types of glacial drift with infrequent trees and subsurface shales. The various sub-divisions are based primarily upon the surficial deposits; till in the southwest (Ceylon-Long Creek Plain); hummocky moraine in the east-central part; glacial lake deposits near Weyburn (Yellowgrass marsh) and east of Estevan (Souris Plain); glacial outwash south of Carlyle (Arcola-Browning) and east of Oxbow (Carievale Outwash Plain); and ground moraine in the northeast (Newdale Till Plain).



LEGEND

- REGIONAL BOUNDARIES
- REGIONAL SUBDIVISIONS
- - - APPROXIMATE BOUNDARY

- 1 MISSOURI COTEAU
- 2 MOOSE MOUNTAIN UPLAND
- 3 OXBOW TILL PLAIN
- 4 WASKADA TILL PLAIN
- 5 TURTLE MOUNTAIN
- 6 TIGER HILLS
- 7 UPPER ASSINIBOINE DELTA
- 8 CEYLON-LONG CREEK PLAIN

- 9 YELLOW GRASS MARSH
- 10 REGINA PLAIN
- 11 TALMAGE PLAIN
- 12 SOURIS PLAIN
- 13 ARCOLA-BROWNING PLAIN
- 14 CARIEVALE OUTWASH PLAIN
- 15 NEWDALE TILL PLAIN

MAP 2 : PHYSIOGRAPHIC REGIONS

Trees, which are sparse over much of the area, become more common to the north and east where bluffs are in association with sloughs and potholes. In the Souris River Valley, which provides the major drainage for the area, bedrock exposures of sands, silts and lignite coal are locally prominent. The western half of the plain is within the Dark Brown Soil Zone while the eastern half is within the Black Soil Zone.

The major lakes on the Souris Plain are Gooseberry and Moose Mountain, both at the "foothills" of the Moose Mountain Upland region.

The basin contains soils of three major zones. Generally, the area south and west of Moose Mountain Creek is in the Dark Brown Soil Zone except for a small intrusion into the Brown Soil Zone on the extreme western side of the basin. The area north and east of Moose Mountain Creek is generally within the Black Soil Zone (Map 3).

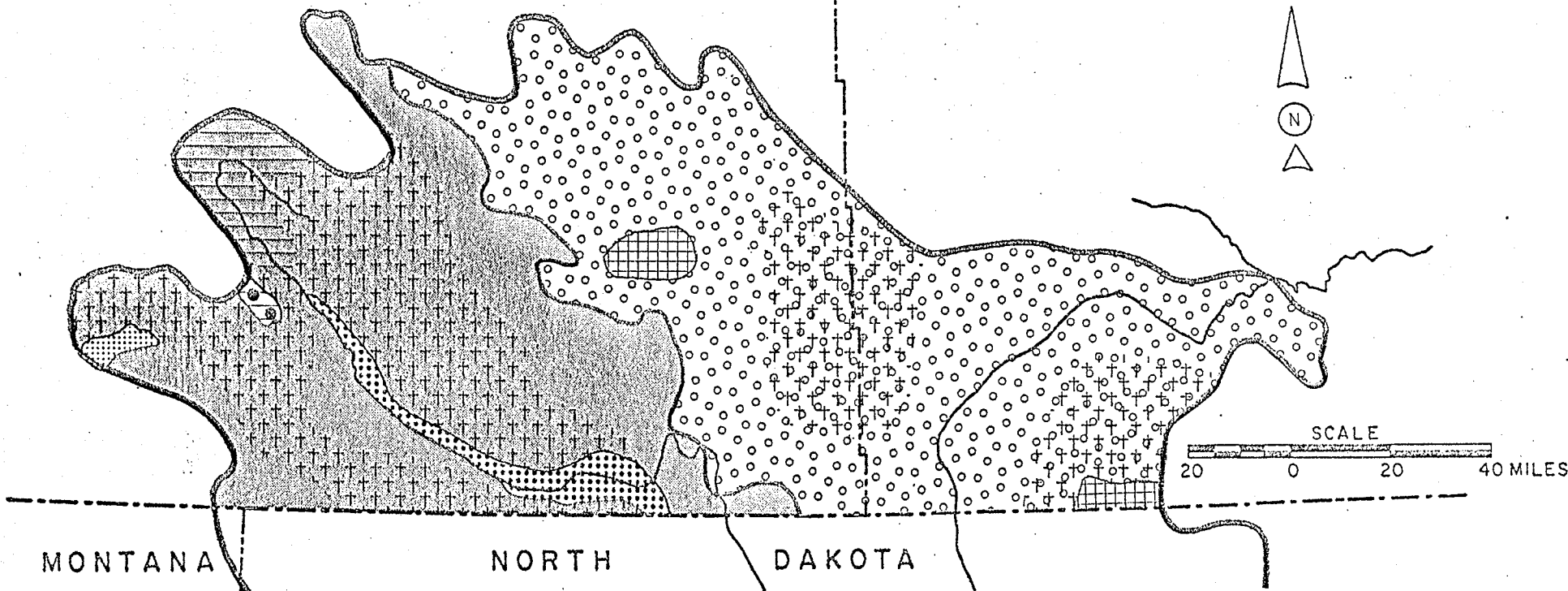
4:1:2:3 Vegetation

The natural vegetation of the basin is closely associated with the climatic and soil conditions. The highest temperatures and lowest precipitation occur in the southwest where short grass and medium-tall grass once dominated. As the moisture efficiency increases towards the north and east, the vegetation gradually trends through parkland to aspen forests. Although there are still areas of native vegetation, primarily located in the less suitable agricultural areas, much of the original landscape has been altered through the influence of man. Since settlement, cultivation, drainage, suppression of prairie wild fires, and the disappearance of bison, have influenced the present conditions.

Generally, pre-settlement conditions varied from mixed-grass prairie of the south-central area to parkland in the east, north and west to dense stands of broad-leaved and coniferous trees in the Turtle Mountain Forest Reserve. The dominant mixed-grass prairie was invaded by tree cover only in the morainic hills and sand dunes and in the wetter river valleys and draws.

SASKATCHEWAN

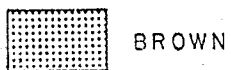
MANITOBA



LEGEND

DOMINANT SOILS

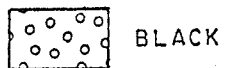
CHERNOZEMIC
(DARK COLOURED GRASSLAND SOILS)



BROWN



DARK BROWN



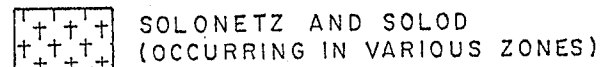
BLACK

PODZOLIC
(LIGHT COLOURED FOREST SOILS)



GRAY WOODED

SOLONETZIC
(HARD, POORLY STRUCTURED SOILS)



SOLONETZ AND SOLOD
(OCCURRING IN VARIOUS ZONES)

REGOSOLIC
(WEAKLY DEVELOPED SOILS)

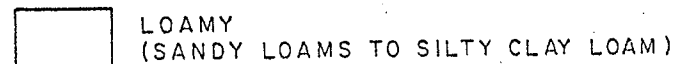


UNDIFFERENTIATED



VALLEY COMPLEX

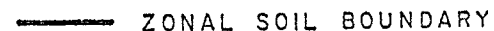
SOIL TEXTURE



LOAMY
(SANDY LOAMS TO SILTY CLAY LOAM)



CLAYEY
(SILTY CLAY TO HEAVY CLAY)



ZONAL SOIL BOUNDARY



SOIL BOUNDARY

MAP 3: SOIL REGIONS

The present vegetation pattern is shown on Map 4. West of the ancient Lake Agassiz basin, the Souris Plain in which the study area is located, shows a type of plant community not commonly found in the other areas of the Basin. This is the floodplain hardwood community of American elm, balsam, poplar, green ash, Manitoba maple, bur oak, and associated shrubs found along the major tributaries and on western and southern slopes of hills and valleys. The bur oaks in this area are usually small, scrubby and scattered.

4:1:3 Social Characteristics of the Study Area

The city of Estevan is the focal point for the social activities of the residents of the study area. Estevan with a population of 9,150 (1971 census) is located 127 miles southeast of Regina, 195 miles southwest of Brandon and 9 miles north of the Canada-United States border. The city is a source of news services, health services, churches and education and training facilities. Access to other major centers is provided by a daily bus service from Estevan to Regina and air services from Regina. Highway 47, running north to the Trans-Canada Highway and south to the United States, passes through the study area and the city of Estevan, thereby providing an additional transportation route.

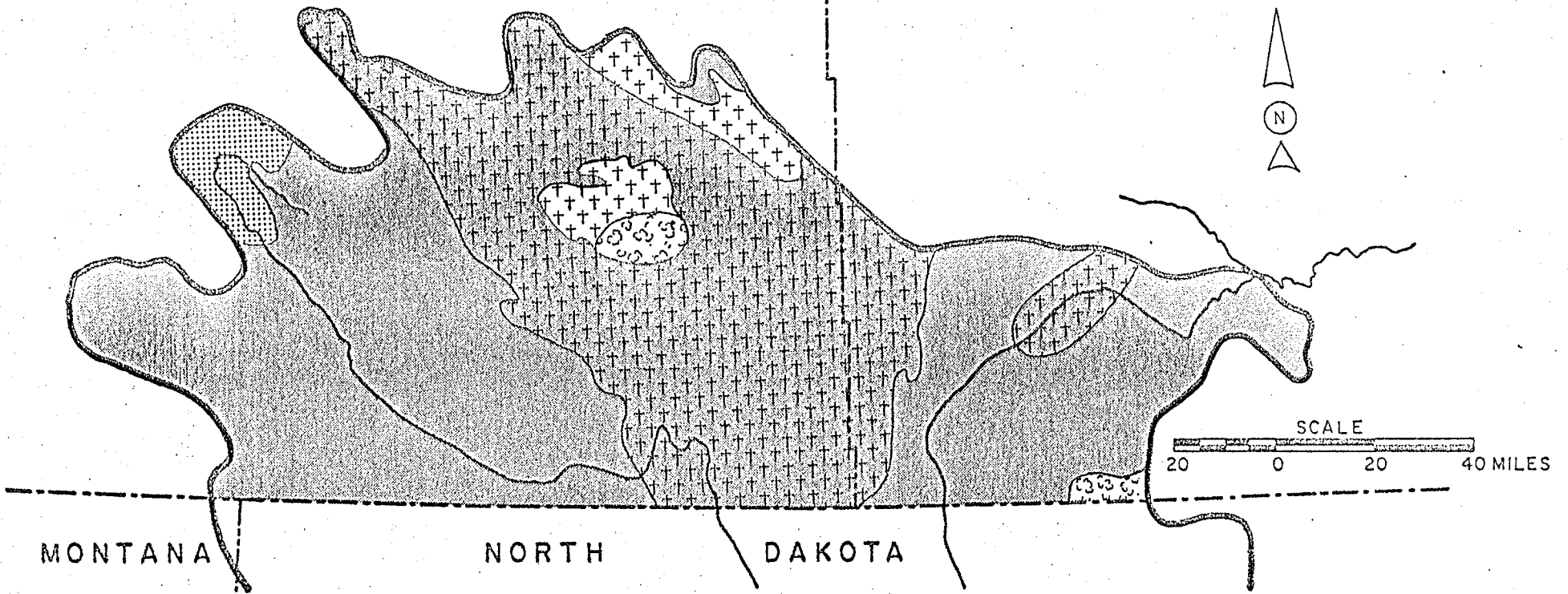
Recreational facilities are plentiful in the study area as the result of the existence of Woodlawn Regional Park. It offers swimming, camping, golf, baseball and football facilities. In addition there is a Rotary Club active in the study area. In the northeast quarter of section 11, near the location of the Centennial bridge, is a building owned by the Woodlawn Regional Park, however all the functions and activities which operate out of the club house are booked by the Rotary Club.

4:1:4 Economy

The discussion on the economy consists of two main parts a) the regional economy and b) the study area economy. A summary of the regional economy is required in order to obtain a proper perspective of the economy of the study area.

SASKATCHEWAN

MANITOBA



MONTANA

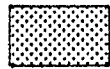
NORTH

DAKOTA

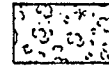
LEGEND

GRASSLAND AND PARKLAND REGION

FOREST REGION



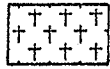
WHEAT GRASS - JUNE GRASS



ASPEN



SPEAR GRASS - WHEAT GRASS



ASPEN PARKLAND

MAP 4: VEGETATION REGIONS

The study area economy is specific to the area of Sections 10-15 inclusive in Township 2, Range 8 of of RM#5.

4:1:4:1 Agriculture

The regional economy is based mainly on agriculture. Most farming is of the mixed variety with wheat growing and cattle raising the major sources of income. Barley, oats, rye and hog production are of lesser importance. The average amount of improved land per farm is 638 acres. These farms are not highly lucrative concerns; 1971 statistics for the region show that 65 percent of all farms had gross incomes of less than \$10,000.

In the study area the agricultural pursuits include a nursery and market gardens as well as mixed farming. A more detailed description of land use in the study area will be provided in section 4:3:4.

4:1:4:2 Natural Resources

Strip mining of low sulphur, lignite coal is pursued near the city of Estevan, mainly for use by local thermal power generating facilities. Fields north and east of Estevan produce gas and light gravity crude oil. Local clay deposits are utilized for brick making. Coal mining is a major activity in sections 13 of the study area.

4:1:4:3 Other Economic Activities

Food and beverage processing, oil and gas field servicing, coal mining and electrical power generation are the major industrial employers in the Estevan area. While secondary manufacture is largely limited to the processing of agricultural products, the manufacture of bricks and plastics also occurs. The main economic activities in the study area (excluding agricultural interests) are the River Park resort complex (which includes a drive-in, hotel, dance hall, cabins and trailer court); a commercial nursery; coal mining, power generation and a trucking firm.

4:1:4:4 Labour Force

Agriculture and the service industries provide most of the employment for the Estevan area. Significant seasonal layoffs occur in the agriculture (winter), coal mining (summer) and construction (winter) industries. The area continues to experience a net decline in population.

In the study area agriculture and the service industries provide most of the area's employment. As much of the economy of this area is based on agriculture and recreation oriented services, a large portion of the labour force is unemployed during the winter months.

A temporary but significant seasonal disruption of the economy occurs in the spring whenever the run-off from melting snow is sufficient to cause flooding. The flood waters cause disruption in the local economy by two principle means. During the period of inundation flood waters impede transportation within the area and direct local attention away from their normal activities to those of flood protection. In addition, some of the economic activities of the study area are sensitive to the length of time of inundation (eg. commercial nursery). Secondly, once the flood waters have receded, time and energy are required to restore the landscape to as close to its pre-flood state as possible. The more severe the flood, the greater the possibility of significant disruption to the local economic and social pattern of life.

4:2 Water

Flooding is a function of the volume and velocity of stream flow and the capacity and shape of the channel. The capacity of the channel is affected by the topography of the area and soil composition. Most prairie streams are characterized by a channel with a surrounding flood plain which is only at a

slightly higher elevation than the river bed. This flood plain will often extend over a wide area before there is an appreciable increase in elevation of the land (Fig. 1).

The volume and velocity of a stream are determined by the size of the drainage basin which feeds the stream and the rate at which the water enters the channel. The greatest volume of water in a prairie stream will almost inevitably occur during the spring as a result of the run-off from melting snow. The prevalent weather conditions will determine the rate at which the snow melts and hence the velocity of stream flow. Therefore a (relatively short) period during the spring months will be the time during which the volume and velocity of a prairie stream are apt to be at their maximum.

Comparison of the stream's volume and velocity during a given time period with the capacity of that channel will enable a reasonably accurate prediction of the possibility of a flood occurring. Other factors contributing to flood conditions include blockage of channel (eg. ice jams) and the shape of the channel. A channel with many sharp turns is more likely to have bank overflow during high flows and velocities than a straight channel of equal capacity carrying equivalent flows. In this section the characteristics of the two major water courses within the study area, the Souris River and Long Creek, will be examined in order to provide a partial understanding of the probability of flood occurrence in the study area.

4:2:1 Long Creek

Long Creek flows into the study area at the south west corner of the S.W. quarter of section 10 and meanders in a north-easterly direction until it meets the Souris River in the north end of the N.W. quarter of section 10. A compilation of data is presented from the records of the Water Survey of Canada Station on Long Creek, Station No. 05NB001. This station is located at latitude $49^{\circ} 06' 15''$ W and longitude $103^{\circ} 00' 48''$ W (Map 5). The drainage area for the flows recorded

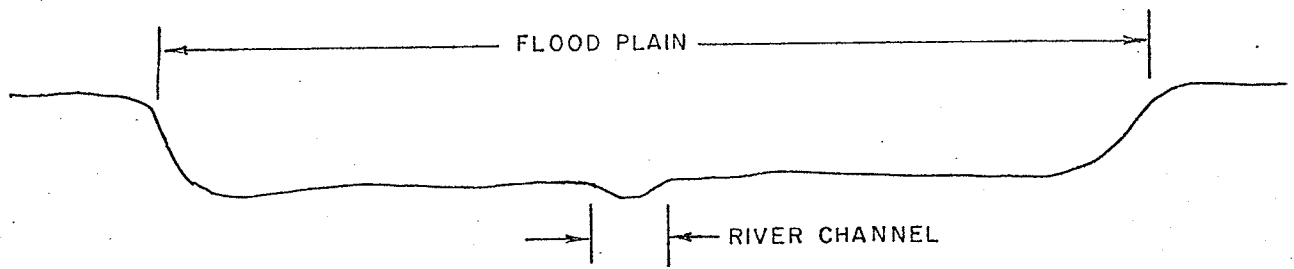
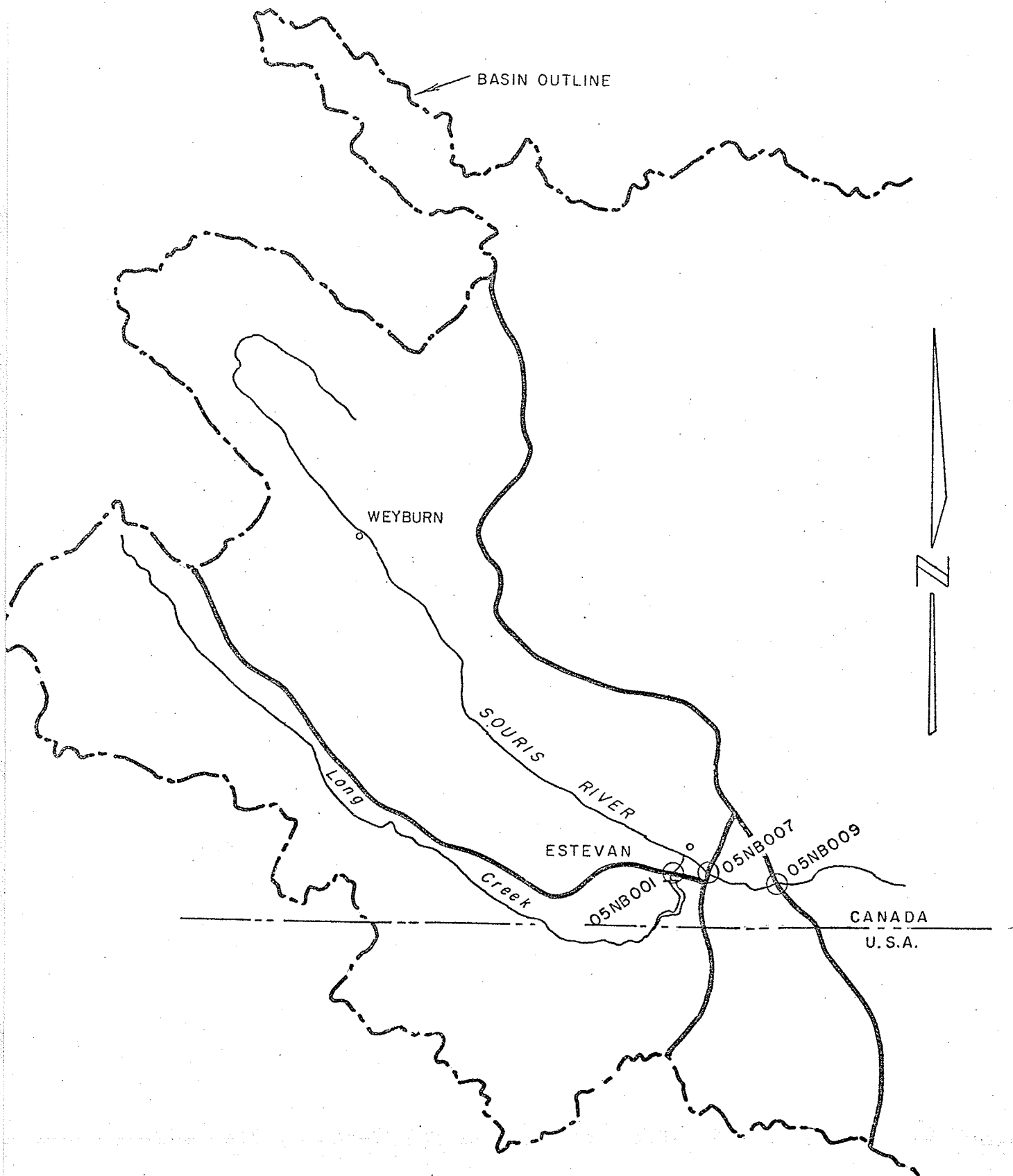


FIGURE 1
TYPICAL HYPOTHETICAL CROSS SECTION OF A PRAIRIE STREAM



MAP 5 - LOCATION OF HYDROMETRIC STATIONS

at this station is 1,870 square miles.

The magnitude of flow in Long Creek is subject to wide variation as is seen in tables A:1 and A:2. For the period of record shown in table A:1 the following extremes were recorded: 3990 cfs for maximum daily discharge occurred on April 11, 1969; 0 cfs for minimum daily discharge on numerous occasions; and a total annual discharge of 70,100 acre feet in 1969. The data in table A:2 shows that while the flows recorded in 1974 were high they were not the record.

For the period of record the maximum daily discharge almost always occurred in the spring (March-May). The minimum daily discharge (of 0 cfs) occurred at almost any time of the year, including spring.

4:2:2 Souris River

The Souris River enters the study area at the middle of the western edge of the S.W. quarter of section 15 and meanders in a south-easterly direction until it exits the study area at the southern edge of the S.E. quarter of section 12.

In tables A:3, A:4, and A:5, a compilation of data is presented from the records of two Water Survey of Canada stations on the Souris River, Station No. 05NB009 and Station No. 05NB007. (Map 5) Station No. 05NB007 is located at latitude 49 06 05 N and longitude 102 56 10 W which is near Estevan. Unfortunately this station was closed in 1970. Station No. 05NB009 is located at latitude 49 04 34 N and longitude 102 45 53 W which is near Roche Percee. The drainage area for the flows recorded at station no. 05NB009 is 5,067 square miles and for station no. 05NB007, it is 4,549 square miles. Station no. 05NB009 is further downstream than station no. 05NB007. A knowledge of the flow characteristics of the Souris River in the study area can be obtained from the data recorded at these two stations.

The magnitude of the flow in the Souris River is subject to wide variation as is seen in tables A:3, A:4, and A:5. For the period of record shown in table A:3 for station no. 05NB007, the following extremes were recorded; 7,580 cfs for maximum daily discharge occurred on April 24, 1948; 0 cfs for minimum daily discharge on numerous occasions; and a total annual discharge of 145,000 acre feet in 1943.

For the period of record shown in table A:4 for station no. 05NB009, the following extremes were recorded; 7190 cfs for maximum daily discharge was recorded on April 15, 1969; 0 cfs for minimum daily discharge occurred on numerous occasions, and a total annual discharge of 224,000 acre feet which occurred in 1974.

As was the case with Long Creek the maximum daily discharge of the Souris River recorded at both stations almost always occurred in the spring (March-May). The minimum daily discharge (of 0 cfs) occurred at almost any time of the year, including spring.

4:2:3 Channel Capacity

As noted earlier a knowledge of the volume and velocity of stream flow is only part of the information needed to determine the likelihood of bank overflow. It is also necessary to have a knowledge of the capacity and shape of the channel.

As Map 8 shows, both the Souris River and Long Creek follow a highly meandering course through the study area. This increases the chances of bank overflow as compared to a channel which follows a straighter course.

Approximate figures for the carrying capacities of the two channels were supplied by Water Survey of Canada and Environment Saskatchewan and are as follows:

Area	Carrying Capacity
Immediate vicinity of Station No. 05NB001	approximately (approx) 5,000 cfs (unless back water occurs from Souris River).
Reach of Long Creek in the vicinity of Station No. 05NB007	approx. 5,000 cfs.
Immediate vicinity of Station No. 05NB007	approx. 1,000 cfs.
Reach of Souris River in the vicinity of Station No. 05NB007	approx. 3,000 - 4,000 cfs.
Immediate vicinity of Station No. 05NB009	approx. 3,400 cfs.
Reach of Souris River in the vicinity of Station No. 05NB009	approx. up to 7,000 cfs. (before serious flooding occurs)

A comparison of the above figures to those of the maximum daily discharges recorded for each of the three stations shows that the carrying capacity of the Souris River in the immediate vicinity of Station No. 05NB007 has been exceeded on numerous occasions, although the period of record shows that the flows in the reach of the Souris River near Station No. 05NB007 has exceeded the carrying capacity of that reach on only a few occasions (eg. 1969). An analogous situation has occurred at Station No. 05NB009. Only Long Creek has not had flows sufficiently high relative to its carrying capacity to make flooding an occurrence. However, it should be noted that the carrying capacities quoted above are theoretical and do not allow for any temporary reduction in carrying capacity due to blockages such as ice jams or fallen trees.

4:3 Land

The following discussion will be on the value of land, rate of ownership, zoning, land use and the legal and institutional factors affecting sections 10-15 inclusive of Township 2, Range 8 of RM #5. The four quarter sections of N.E. section 10, N.W. section 11, S.W. section 14 and S.E. section 15 have been singled out for extra attention because they have suffered the worst flooding of all

the sections located in the study area.

4:3:1 Value of the Land

Two methods were used to obtain an approximate value for the lands located in the study area. The first method was based on the values obtained from the assessment rolls of R.M. #5, which are kept on file in the rural municipality office. The second method was based on the value recorded on the certificates of title which are registered in the Land Titles Office. Market values were not used as this would have involved a large expenditure of time with a marginal increase in benefits for the purposes of this study.

4:3:1:1 Assessment Rolls

These rolls state the location of the property, the name of the person to whom the land is assessed and either a taxable valuable or a total assessment which is subdivided into assessment for land, improvements and for business. The difference between taxable valuation and total assessment is that the figure used in the total assessment column is based on a rigorous assessment of the property, whereas the figure used in the taxable valuation column is obtained by means of an estimate of the value of the property. A property tax is then based on whichever of these two figures is available for that particular piece of property. Table A:6 shows the assessment for each of six sections within the study area for the year 1976. Table A:7 shows the assessments for quarter sections N.E. Section 10, N.W. Section 11, S.W. section 14 and S.E. section 15 (here after referred to as the four quarter sections).

The total assessed values for the study area were as follows: land, \$18,720; improvements, \$476,880; business, \$109,660; total, \$605,260; and the total taxable valuation was \$10,350. In table A:8 a comparison is made of the assessment values for each section with the total obtained by summing the assessed values for the four quarter sections. The four quarter sections comprise 50.8% of the assessed value for land, 11.54% of the assessed value for improvements and 7.27%

of the assessed value for business in the study area. This suggests that in comparison to the study area as a whole the four quarter sections are not as developed. A detailed description of the development in the four quarter sections and the study area as a whole will be provided in section 4:3:4. However it may be noted that the above information clearly suggests a sizeable investment in an area that is subject to inundation.

4:3:1:2 Certificate of Title Valuation

The certificate of title states the location of the land, the owner, the date of transfer, the value of the land, plus other pertinent information to a land owner such as easements, caveats, liens, right-of-ways, etc. When a property is transferred the new owner makes the following declaration.

That the within described parcel ___ of land together with all buildings and other improvements thereon is in my opinion, of the value of ___ dollars and no more.

The sum of dollars appearing in this statement is then shown as the value of that parcel of land. Table A:11 shows these values plus the date at which the transfer occurred for each piece of land registered in the Land Title Office that lie within the study area.

The total value for the study area as shown on the certificates of title is \$617,414. The four quarter sections have a stated value of \$168,995 or 27.37% of the total study area. The value derived from the certificates of title show an even larger percentage of investment in the four quarter sections than is the case when the assessment values are used. Thus the investment in the highly flood plain area is shown to be even more substantial than indicated previously.

4:3:1:3 Comparison of Two Methods of Land Valuation

Values for a larger portion of the land of the study area are provided by the certificates of title than by the assessment rolls. This is as a result of the fact that not all parcels of land in the study area have been assessed,

either rigourously or approximately. However, the value obtained from the certificate is that which was given at the date of transfer and is therefore not a current value. As the valuation is based on buildings which can improve or deteriorate with time and as the original value is based on opinion, it is not possible to derive a value for the properties based on current dollars.

While it is quite difficult to ascertain the exact parcels of land which have not been, in any manner, assessed, a comparison of some of the land descriptions from the assessment rolls with those obtained from the certificate of title indicate that the assessment rolls, while providing up-to-date values, do not provide a complete coverage of the area.

Although the assessment rolls and certificates of title do not measure the same entity, both figures have been reported in order to show the extent of investment on the study area and, in particular, the four quarter sections. As the assessment portion of table A:8 shows the largest portion of the value of the properties in the study area is as a result of improvements and business operations and not the value of the land. To summarize development of the study area accounts for the largest portion of the value of the properties in the study area, including the four quarter sections which have been subject to frequent flooding.

4:3:2 Rate of Change of Ownership

Portions of the study area have experienced flood conditions five out of seven years since 1969. In order to ascertain the familiarity of the residents with flood conditions, the percentage change in ownership of the land was determined from the assessment rolls. The assessment rolls indicate that most of the transfer of ownership that have occurred recently (since 1970) have been to people who are already residents of the area and hence likely knowledgeable of

the flood susceptibility of portions of the study area.

Nevertheless the availability of land for purchase increase the chances that people will move into flood prone areas without adequate knowledge of its flood susceptibility.

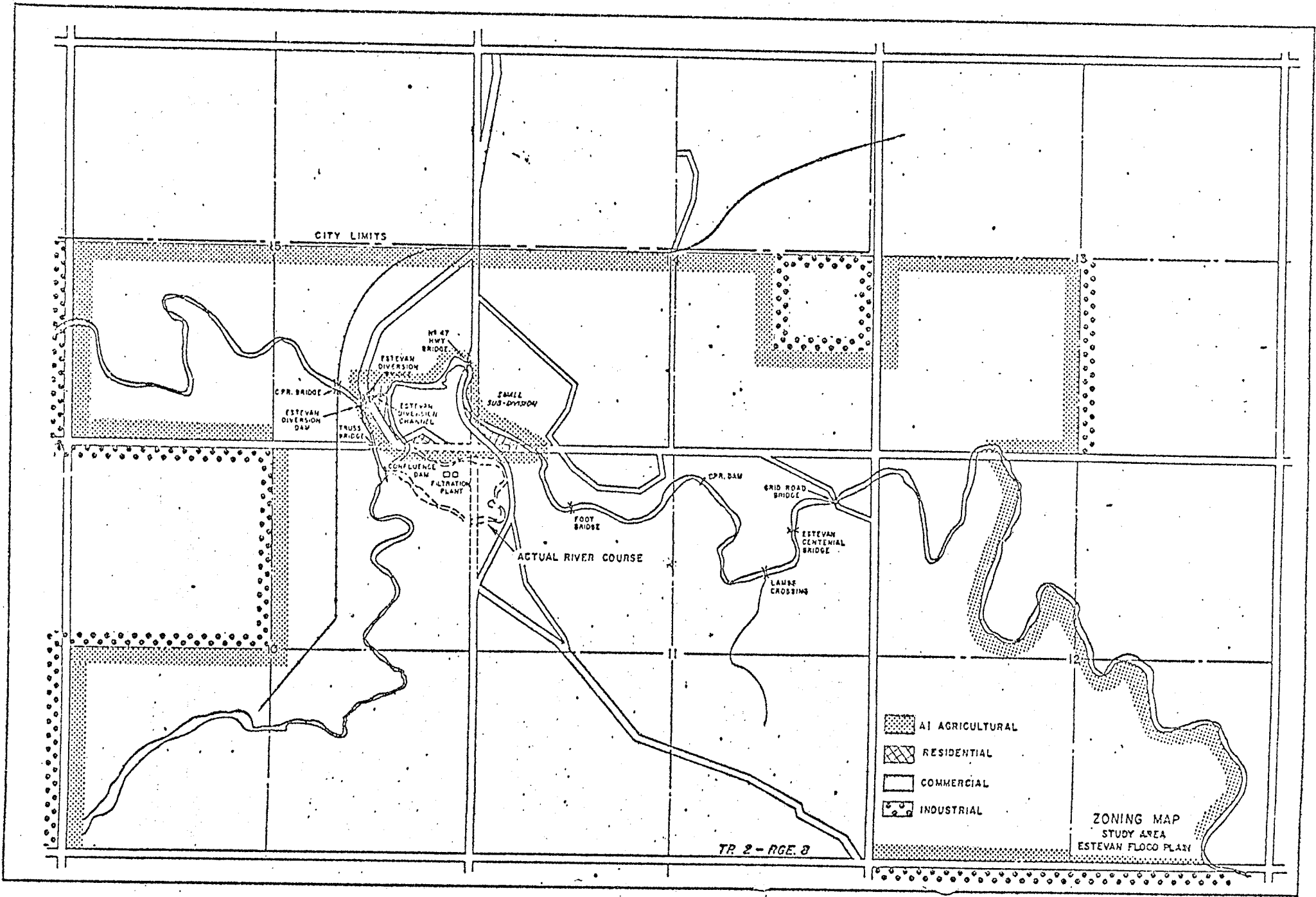
Tables A:9 and A:11 provide information on the number of changes in ownership of properties in the study area since 1970. The percentage change in ownership since 1970, as recorded in the assessment rolls varied from a low of 20.0% for section 15 to a high of 57.1% for section 11. The percentage change in ownership since 1970 as recorded on the certificate of title varied from a low of 37.5% for section 11 to a high of 62.5% for section 12. A high rate of change in ownership appears to be characteristic of the study area. The significance of this fact will be discussed in section 5:1.

4:3:3 Zoning

The Estevan Planning District Zoning Commission passed By-law No. 47-1971 "to regulate the use of land and the location and use of buildings and other structures in the Estevan Planning District so as to provide for the amenity of the district and the health, safety and general welfare of the inhabitants." This bylaw which is applicable to the study area was approved by the Deputy Minister of Municipal Affairs on the 30th of June, 1972.

The Estevan Planning District is composed of five members; two from the rural municipality of Estevan No. 5, two from the city of Estevan plus one member from outside the boundaries of the rural municipality.

A map showing the zoning as stated in bylaw no. 47-1971 is available at both the Department of Municipal Affairs and the Rural Municipality Office. A copy of a portion of this map showing the zoning for sections 10 - 15 is reproduced here as Map 6. Most of the study area has been zoned agricultural with some industrial zoning occurring at the outer limits



of the study area. Some residential and commercial zoning has been allowed in the southern portion of sections 15 and 14. As was noted earlier this area is subject to the heaviest flooding in the study area.

The permitted uses in each of the zoning districts include:

A1 Agriculture

1) agricultural - field crops; dairy farming; animal and poultry raising; ranching; grazing; tree nurseries; and other similiar use including sale of produce.

2) institutional

3) recreational - golf courses; park and other similiar uses

4) accessory

A2 Agriculture

1) residential - single family dwelling

2) institutional

3) recreational

4) accessory

R Residential District

1) residential - one family dwelling

2) institutional

3) recreational

4) accessory

C Commercial District

1) commercial - motels; hotels; service stations; restaurents; confectionaries; drive-ins; trailer parks; commercial recreational establishments; dance halls

2) accessory

M Industrial District

- 1) industrial - warehouses; airports; grain elevators; manufacturing; processing and packing plants
- 2) accessory

The base map used in drawing the zoning map has incorrectly shown the location of a portion of the Souris River. The zoning map shows the horseshoe portion of the Souris River as being completely contained within section 10, whereas in fact it extends into the N.W. quarter of section 11. Discussion with an employee of the Department of Municipal Affairs suggest that this drawing error would not affect the legality of the bylaw.

Regulation no. 18 of bylaw no 47-1971 takes into account the flood susceptibility of the study area. The regulation states that: "No building or structure shall be located on the flood plain of the Souris River at an elevation of less than 1774.5 feet unless the site and access thereto are protected from flooding to an elevation of 1774.5 feet."

The responsibility for the administration of this bylaw rests with the clerk of the city of Estevan. A permit from the clerk must be obtained by any person who wished to erect, move or alter a building or accessory building within the Planning District.

The bylaw provides for reasonable exemptions to the provisions of the bylaw and provide for the right of appeal. The bylaw is also subject to the exemptions provided for non-conforming uses by section 56 of the Community Planning Act (which has since been repealed by the PDA act).

The bylaw has been declared to be complementary to the Estevan Planning District zoning Bylaw No. 71-580 for the City of Estevan as is required by section 89 (2) of the Urban and Rural Planning and Development Act.

4:3:4 Land Use

The determination of land use was partially done by visual inspection. This inspection was done during a field trip in the fall of 1975, and concentrated primarily on the five quarter sections of N.W. and N.E. section of 11, N.E. Section 10, S.E. section 15 and S.W. section 14. Land use was also estimated from the name of the registered land owner on the certificates of title (eg Manalta Coal Ltd.-mining). Unfortunately the certificates of title do not provide any information on the buildings on a piece of property nor on the use of the land. In addition, the assessment rolls were used to obtain information on land use. By noting the owner and the proportion of the assessment attributable to improvements, land and business it was possible to make an educated guess on the use of the land.

Unfortunately none of these three methods yield a figure on the number of acres in a section that is utilized for any given purpose. While the assessment rolls do show, in many cases, the number of taxable acres, the coverage of the study area by the assessment rolls is incomplete. Therefore it is not possible to show the relative importance of each land use accurately. Instead an overview of the land use in each of the six sections of the study area will be provided.

4:3:4:1 Section 10

Approximately fifty per cent of the land in section 10 which is under cultivation requires irrigation. These users are a nursery and a market garden. Other agricultural pursuits also occur in the southern portion of this section.

The remaining land is utilized by SPC, by the Water Treatment Plant and in the north east corner of this section, there is residential development. Approximately 80 acres in this section are registered in the title of the Director of the Veteran's Land Act. The use of this land was not ascertained.

A topographic map produced by the Surveys and Mapping Branch, Department of Energy, Mines and Resources from aerial photographs taken in 1970 shows eight structures in section 10.

There are some high quality homes in the N.E. quarter of section 10 and some abandoned shacks near the Water Treatment Plant. Although there is limited residential development in this section, the most valuable structures are those situated directly beside Long Creek and the Souris River.

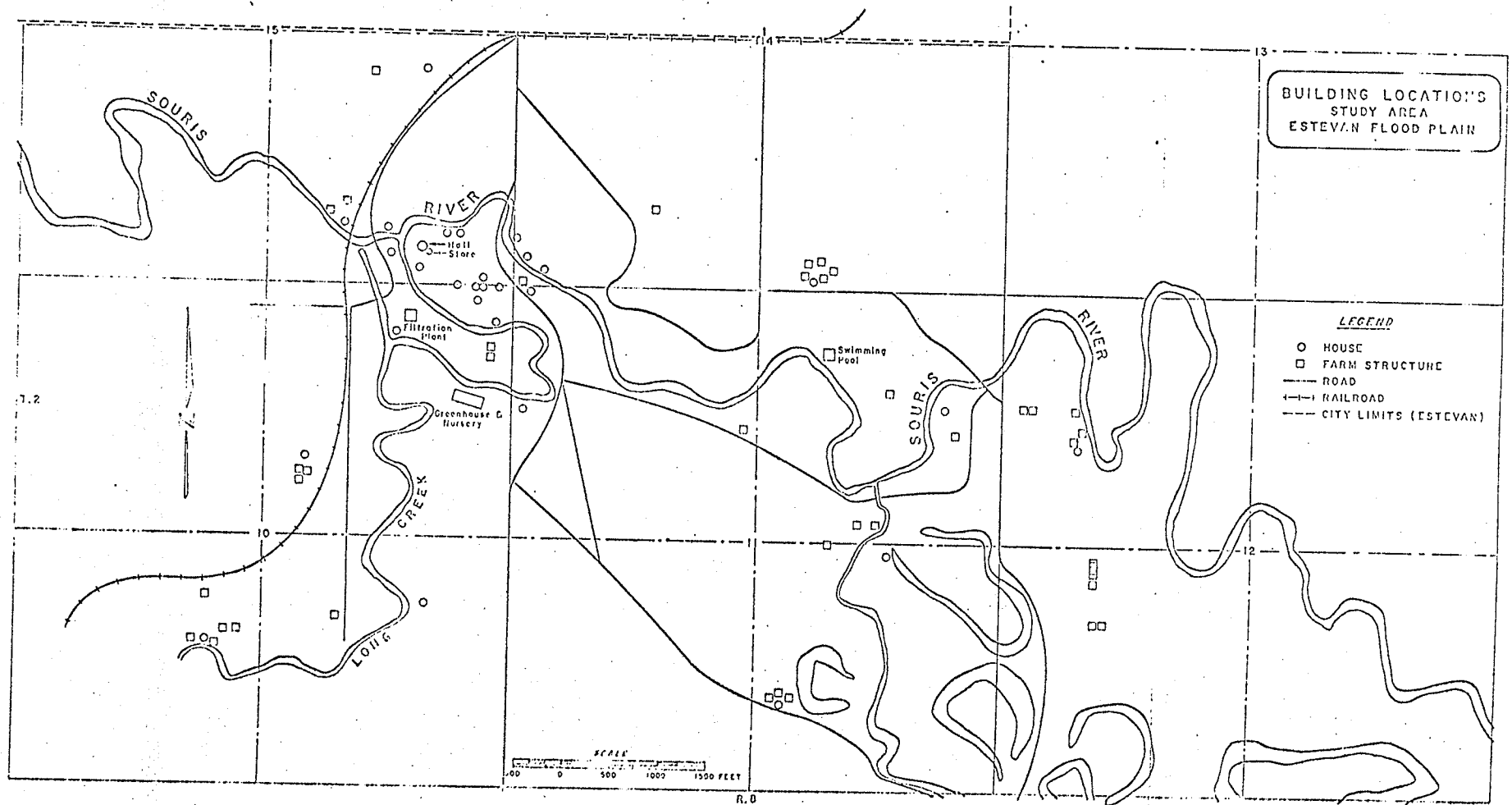
4:3:4:2 Section 11

Most of the land in this section is used for non-residential, non-agricultural purposes. Some of the land is owned by SPC, some by the City of Estevan and some by the nursery, however the biggest land area in section 11 is used for the Woodlawn Regional Park. The size of the park is approximately 260 acres. The Regional Park Authority also administers the adjoining golf course which comprises perhaps another 100 acres.

The Regional Park Authority consists of twelve members; six from the City of Estevan, three members from rural municipality No.5 and three members from rural municipality No. 35. The authority administers its holdings in accordance with the Regional Park Act.

As of December 1975 there was a total investment of approximately \$500,000. in the Woodlawn Regional Park of which about \$300,000. has been

MAP 7 - BUILDING LOCATIONS



SOURCE: 1975 Aerial photographs under contract to PFRA

invested by the provincial government and approximately \$200,000. by local interests. The facilities available in the park include a swimming pool, baseball diamonds, football field, horseshoe playing grounds, picnic facilities, outhouses and a clubhouse run by the Rotary Club.

The topographic map referred to previously shows six structures in this section. Approximately half of these structures are in the uppermost north west corner of the section. As was the case in section 10, a significant portion of the limited residential development in this section is adjacent to the water courses.

4:3:4:3 Section 12

It is difficult to determine what the dominant land use is in this section. It appears that small farmstead holdings owned and operated by married couples account for a sizeable portion of the land holdings in this section. This conclusion is partly verified by the large number of structures shown on the topographical map for this section. Fifteen structures are shown and again a large percentage of these structures are along the water's edge.

Other land owners in this area include SPC, Prairie Nurseries and Manalta Coal Ltd.

4:3:4:4 Section 13

This section is non-residential, non-agricultural with the emphasis on industrial uses.

Approximately fifty per cent of the land is owned by Manalta Coal Ltd. In addition to mining there are gravel pits which are owned by the Department of Highways. Other land owners in this section include SPC, the railways, the city of Estevan (approximately one-quarter of the land in this section is within the city limits), and a trucking firm which apparently is a

subsidiary of Estevan Brick Ltd.

The topographical map shows only one structure in this section and it is a transformer station.

4:3:4:5 Section 14

The entire north half section of section 14 is within the city limits.

The south half section has multiple uses. There are some small farmsteads, property owned by the city of Estevan and a small game reserve which is operated by the Department of Tourism and Renewable Resources.

The topographic map shows eight structures in this area of which six are located in the south west corner near the Souris River.

4:3:4:6 Section 15

The entire north half section of section 15 is within the city limits.

There is some residential development in the S.W. quarter of this section. The topographical map shows fourteen structures for this section of which eight are near the Souris River. The principal land users of this section are Prairie Nurseries and the River Park Resort area.

The River Park Resort area is a commercial recreational use of the land. This development consists of a drive-in, hotel, cabins, dance hall and a trailer park. As shown in table A:6 this resort contributed one-quarter of the total assessment for this section just in business assessment. The assessment for land and improvements comprised close to an additional half of the total assessment for this section. Once again a very valuable use of the land occurs adjacent to the water course.

4:3:5 Legal and Institutional Factors

The two principal institutional bodies interested in the utilization of the land in the study area are the City of Estevan and the Rural Municipality of Estevan, No. 5. The rural municipality has an interest since the study area is within its municipal boundaries. The City of Estevan's interest stems from its proximity to the city and hence the likelihood that any future expansion

of the city could result in the study area being annexed to the city limits. At present the city also shares an interest in the recreational capacity of the study area. Both of these groups are represented on the two administrative bodies which are charged with the management of the study area or a portion thereof; the Estevan Planning District Zoning Commission and the Woodlawn Regional Park.

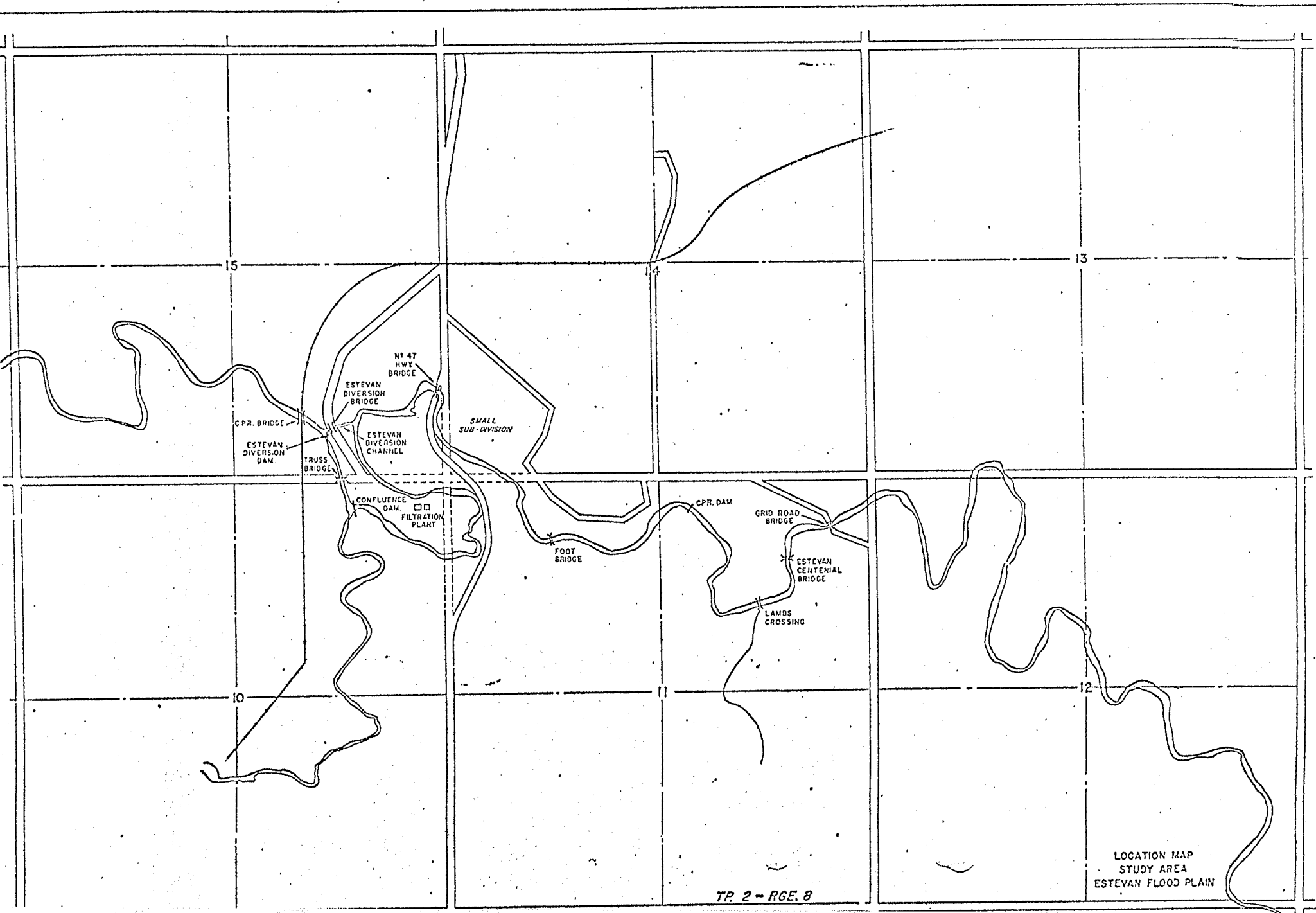
As noted in the discussion on the zoning bylaw no. 47-1971, the administration of this bylaw is the responsibility of the clerk of the city of Estevan. Regulation 18 specifically prevents unprotected development below 1,774.5 feet in the flood plain. Strict enforcement of this regulation has not been the case. This is due partly to the other responsibilities of the city clerk and to the fact that although close the flood plain is outside the city limits. Prevention or removal of a structure already under construction or completed could likely require a court order. Although in theory no unpermitted development in the flood plain can occur, in practice this has not been the case.

The other principal administrative body, Woodlawn Regional Park, has a more solid control of development within its boundaries. Although subject to the provisions of the Regional Park Act, these provisions are basically financial procedures which ensure that the park complies with the regulation of the Department of Tourism and Renewable Resources for cost sharing. The actual planning and management of the park is in practice completely in the hands of the Regional Park Authority. The only legal limitation on its control is the fact that since they are a body corporate it can be sued. Hence it is obligated to ensure that the practices of the park are not the direct cause of any impairment to others.

4:4 Water Structures

Throughout the study area there are twelve man-made structures either

MAP 8 - LOCATION OF WATER STRUCTURES



TP. 2 - RGE. 8

LOCATION MAP
STUDY AREA
ESTEVAN FLOOD PLAIN

in or over Long Creek and the Souris River. These twelve structures include foot and highway bridges, dams, diversion channel and weirs.

A description of these structures is given since they can affect the flood potential of the study area by constricting or altering the direction of the river channels. The following description includes: location of structure; date of construction; purpose of construction; maintenance; and a discussion of some of the legal and institutional factors involved. Table 5:1 provides some detailed information on those water uses within the study which are licensed under the Water Rights Act.

4:4:1 Grid Road Bridge

There is a road that runs diagonally across the north east corner of the N.E. quarter of section 11. A picture of the bridge which is located at the spot where the road crosses the Souris River is photograph number one in appendix B.

The original structure was constructed in 1932 and consisted of a thirty foot timber span and a fifty foot steel span. This was replaced in 1959 by one span of twenty foot treated timber. Finally the present three - twenty foot span of treated timber was constructed in 1970.

As is evident from the span length, the height of the structure has changed over time. The present structure is not high enough to pass flood waters from a flood with a frequency of one in twenty-five years. In addition the support mechanism for this bridge can serve as a trap for floating debris and as a result lead to further reduced water passage.

The road is a grid road and hence any maintenance work required for the bridge is eligible for cost sharing in accordance with the current policy of the Municipal Grid Road Authority.

For any municipal bridge of a length greater than one hundred feet, the Municipal Grid Road Authority pays 100% of the maintenance costs upon request for maintenance work from the rural municipality. For municipal bridge of less than one hundred feet in length the maintenance is cost shared. The rural municipality pays the first two hundred dollars and the remaining cost is shared on the basis of a formula. This formula is a function of the assessment value of the rural municipality and the number of bridges which are the responsibility of the rural municipality. The cost-ratio is updated yearly on the basis of this formula.

Currently the rural municipality of Estevan No. 5 has to pay 65% of the maintenance. Since this bridge is less than one hundred feet the rural municipality is responsible for the first two hundred dollars plus 65% of the remaining cost.

Although the province, through the Municipal Grid Road Authority will share in the financial costs of municipal bridges, the responsibility for these bridges rests solely with the rural municipality. For example, if the bridge were the cause of some damage it would be the rural municipality which is liable.

This municipal bridge in the N.E. quarter of section 11 is within the boundaries of the Woodlawn Regional Park. Although the original structure was erected before the creation of the park in 1962 the present structure has been erected since then. Since regional park authorities are bodies corporate, the liability for this bridge may rest with the park authority.

It is not clear whether the Woodlawn Regional Park Authority or the rural municipality is the institutional body which is legally responsible for this structure. The maintenance of the bridge appears to have been assumed by the rural municipality. This is partly as a result of the fact that the

Municipal Grid Road Authority does not deal with regional parks and partly because three of the twelve members on the regional park authority are selected from the rural municipality.

To summarize, although the maintenance work for this bridge appears to have been assumed by the rural municipality, it is not clear whether the legal responsibility for this structure rests with the rural municipality or with the regional park authority.

4:4:2 Estevan Centennial Bridge

This foot bridge is located near the centre of the N.E. quarter of section 11. (picture number 2, appendix B). It is slightly upstream from the grid road bridge and like the grid road bridge it is within the boundaries of the regional park. The purpose of this foot bridge is to provide access from the camp ground to the club house in Rotary Park. The Municipal Grid Road Authority did some engineering work for this bridge in 1966, but they did not cost share in it. It appears that the construction of this bridge took place in 1967.

This foot bridge would likely not be of sufficient height to pass the flood waters from a flood with a frequency of one in twenty-five years. However, unlike the grid road bridge, this foot bridge does not have a support structure in the channel that could further impede flood waters.

It appears that this foot bridge is the responsibility solely of the regional park authority.

4:4:3 Lamb's Crossing

This control structure is located just south of the centre of the N.E. quarter of section 11, just slightly upstream of the Estevan Centennial Bridge. It is located at the confluence of the present mainstem of the Souris River and a former channel. (Picture number 3, appendix B).

The former channel is now used by SPC as a cooling channel. The control structure, erected around 1955, is operated and maintained by SPC and is used to control the return flows into the Souris River. Under normal conditions (ie. non-flood), the water in this channel travels upstream relative to the conditions existing before the control structure was erected. Under flood conditions the return flow is swept away by the flood waters.

As is shown in picture B3, a vehicle crossing exists above the control structure. This roadway is used primarily as an access road by one of the local farmers. Some construction work on this crossing was done in the early to mid-sixties. This structure is considered to be a public crossing.

It would appear that there is more than one institutional body which is responsible for this crossing. The actual control structure is the responsibility of SPC, however the roadway above is public and is either the responsibility of the regional park or the rural municipality.

4:4:4 CPR Dam

This structure is located in the north west corner of the N.E. quarter of section 11. A picture of this dam is included as photograph # 4 in appendix B.

This dam was built by CPR many years ago in order that they may obtain water for one of their water towers. This use has been discontinued. It appears that a license, as required by the Water Rights Act, was issued in 1910 as an industrial use for the CPR dam and was cancelled in 1974. At the moment this dam provides the only access for foot traffic across the Souris River from the campground to the swimming pool area. The main value of the water held by this dam is for aesthetic purposes but the Regional Park Authority feels that the water table which is maintained in the area is to the benefit of the trees in the park.

The present structure is very unsightly and dangerous to the users of the park. It is difficult to ascertain who is responsible for the maintenance of this dam since the ownership of the structure appears to be in question.

As stated earlier, CPR was the original owner. However when they are no longer had a requirement for this dam they turned the title over to the city who in turn turned it over to the regional park in 1969 for their use. Conversation with an official of the City of Estevan indicates that the ownership of this dam is in question and will be the subject of an up-coming review.

4:4:5 Foot Bridge

In the north central area of the N.W. quarter of section 11 there are the remnants of a foot-bridge as can be seen in picture 5 of appendix B.

Discussion with an official of the regional park authority reveals that a vehicle bridge used to exist in this location. When it broke, about fifteen - twenty years ago, it was replaced by a foot-bridge since the amount of traffic using the original bridge did not warrant the reconstruction of a full bridge. Until it was washed out as a result of the 1974 flood, this foot-bridge was used to provide access to the golf course.

Since the foot-bridge was within the boundaries of the regional park, the responsibility for the remnants of this bridge rests with the regional park authority.

4:4:6 Highway Bridge

This bridge is located at the border of sections 14 and 15 where Highway 47 crosses the Souris River (see picture number 6 in appendix B). The bridge was built around 1947 and is approximately one hundred to one hundred and twenty five feet long. Since its construction there has been little maintenance required.

The only maintenance work which has been done is protection for the bridge against flood water and the resultant erosion.

This bridge is the responsibility of the Department of Highways. Its policy for the design of bridges in Saskatchewan which cross water ways other than the North and South Saskatchewan Rivers is to provide for the passage of flood waters for floods of a frequency up to one in fifty years. This bridge was built almost thirty years ago and it is unlikely that the present structure could provide passage for a one in fifty year flood.

4:4:7 Estevan Diversion Channel

This channel is located in the S.E., quarter of section 15. (picture number 7 in appendix B). Before the construction of this channel the Souris River flowed in a horseshoe shape through the bottom of section 15, into the top of section 10, through a portion of section 11, and back through sections 10 and 15. With the construction of this channel (and the concurrent construction of two dams to be discussed later), the Souris River now flows directly through section 15 and down into section 11.

The construction of this channel was requested by the City of Estevan around 1930. Its purpose is to prevent the Souris River water from mixing with the water from Long Creek at the natural influence of these two water courses. Construction of this diversion channel (and dams) prevented (under normal conditions) the flow of the relatively less pure water of the Souris River into the treatment plant. In the centre of the natural horseshoe of the Souris River is the Estevan Water Treatment Plant.

Although the original water treatment plant has been replaced, the present building is in the same location as the original plant.

The City of Estevan is responsible for maintenance of the channel and is legally responsible for it.

4:4:8 Estevan Diversion Dam

In the S.E. quarter of section 15 near the Estevan diversion channel is the Estevan diversion dam (picture number 8 in Appendix B). It was built in conjunction with the diversion channel, and is located just downstream of the channel at the entrance to the former natural horseshoe portion of the Souris River. The purpose of the dam is to enable the water in the Souris River to flow into the diversion channel instead of down its former natural water course.

As was the case with the diversion channel, the City of Estevan is the institutional body which is responsible for this dam.

4:4:9 Estevan Diversion Bridge

A bridge was constructed over the diversion channel in 1931 (picture number 9 in Appendix B). Its purpose is to provide a means of access to the water treatment plant. The original structure consisted of a one twenty foot span of treated timber. In 1941 some repair work was done. In 1963 some minor repairs were done to the deck and backwalls to improve the safety of it. As can be seen from picture B:9, the condition of this bridge is poor. Not only is this bridge very dangerous, but it also provides an obstruction to flow during high flow periods. For example, the head loss in 1975 was approximately 0.6 feet at flows between 3,000 cfs and 4,000 cfs.

Conversation with an official of the Municipal Grid Road Authority suggests that the responsibility for this bridge rests with the rural municipality.

4:4:10 CPR Bridge

A CPR railway bridge is located in the S.E. quarter of section 15 just upstream of the fork in the Souris River created by the construction of the diversion channel (picture number 10 in Appendix B). This bridge was constructed around 1956. The branch line, of which this bridge is a part, was constructed for SPC to serve as a supply route for heavy material for their generating plant at Boundary Dam. In the last year this branch line

has been heavily utilized as a result of expansion which is occurring at Boundary Dam.

Maintenance on this bridge is done by the CPR under a work order from SPC. Thus it appears that SPC is the institutional body which is responsible for this structure.

4:4:11 Steel Truss Bridge

This one hundred and four feet bridge was built in 1912. It is located at the border of sections 10 and 15, over that portion of the former Souris River which lies between the diversion dam and the confluence dam (picture number 11 in Appendix B).

The road leading to the bridge was the old provincial highway 18. When a new highway 18 was finished this road way and hence the bridge became the responsibility of the rural municipality. Since the bridge is over one hundred feet in length, the cost of any repairs requested by the rural municipality is completely financed by the province, however the responsibility for this bridge rests with the rural municipality.

4:4:12 Confluence Dam

This dam is located at the confluence of Long Creek and the Souris River in the N.E. quarter of section 10 (picture number 12 in Appendix B).

It appears that this dam was built to store water from Long Creek for use in the water treatment plant. As can be seen from the picture of this dam, it is not a high-level structure. It is not clear whether the responsibility and maintenance for this dam rests with the City of Estevan or the rural municipality.

CHAPTER 5
THE LEGISLATIVE AND INDUSTRIAL FRAMEWORK OF THE
RIVER PARK AREA

This paper has discussed some of the principles of Canadian law, the basis for the division of powers between the federal and provincial jurisdictions and the responsibilities delegated to each jurisdiction. It has provided a description of those acts administered by the various federal and provincial departments which have a possible application in the management of flood prone lands. The paper then proceeded into a description of the study area with an emphasis on land use details, and the details of each of the man-made structures in the river channel.

In this chapter the legislative and institutional framework which is in operation in the study area will be examined. The discussion will be divided into sections, each of which will focus on a key issue. The gaps and/or overlaps of the legislative and institutional framework with relation to each issue will be highlighted.

5:1 Land Purchase

There are two means of controlling land use; one method is through legislative control and the other method is through the acquisition of land.

Legislative control will be discussed in section 5.2. The acquisition of land can occur both on an ad-hoc basis and as part of a comprehensive planned approach to the problem of flooding. A precedent for the acquisition of flood prone land in Saskatchewan has been established both on an ad-hoc basis and as part of a planned approach.

An example of an ad-hoc approach to the acquisition of flood prone land occurred in Moose Jaw. As a result of the 1974 flood in Moose Jaw, twenty of the twenty-four homes which suffered flood damages were purchased by the Provincial Disaster Financial Assistance Agency. This purchase was not part of a larger program designed to purchase flood prone lands, but rather an ad-hoc solution to an immediate problem.

The guidelines for the provincial disaster financial assistance program have been reformulated and redefined since 1974. At present these guidelines are concerned with the provision of financial aid both during and after the occurrence of a disaster such as a flood. The purchase of flood prone land, although often implemented as a result of a flood event, is a preventative measure for dealing with possible flood damages. The future purchase of flood prone land by this agency is an unlikely possibility given its present operating framework.

A planned program for land acquisition is part of the Qu'Appelle Implementation Program. The Qu'Appelle Implementation Program has allocated four million dollars for the purchase of flood prone land in the Qu'Appelle valley. The aim of this purchase is to obtain agricultural lands which have experienced frequent flooding in the past. After purchase, these lands may be leased to a farm operator, provided he has a viable operating unit without the use of such lands. The first option for lease is given to the farm owner. Any lease would contain a provision indemnifying government from any responsibility for flood damage however caused. The Qu'Appelle Implementation Board is also seriously considering a recommendation for the long term acquisition of residential lands that are in the flood prone areas of the City of Moose Jaw.

Unlike the Qu'Appelle valley there is no central body authorized to purchase flood prone lands in the River Park area with the expressed purpose of utilizing these lands in ways which would result in less flood damages. Nor is there any provincial department with a mandate for acquisition of flood prone lands.

Should it be deemed favourable to purchase flood prone lands in the River Park area there is no institutional body in a position to make the purchase. Lack of this body has two even more significant ramifications. First, there is no mechanism by which a decision on the merits of purchase of flood prone lands can be made, and second, there is no mechanism by which the future use of the

purchased land can be determined. It may be that the present system of private ownership is the most favourable state for the study area, however, lack of the above mentioned institutional body has meant that the present system of ownership is the only one that has been possible.

As shown in Table A.8, there has been a high rate of change in ownership in the study area in the past six years. A summary of the percentage change in ownership is presented in the following Table.

<u>Location</u>	<u>River Park Area</u>	<u>Four flood prone quarter sections</u>
<u>Source of information</u>		
Certificate of title	37.5% to 62.5%	20.0% to 50.0%
Assessment rolls	20.0% to 57.1%	50.0% to 62.5%

The high rate of change of ownership will be a prime consideration in any future development of a flood plain management plan for the study area.

5:2 Legislative Control of Land Use

As was noted in the discussion in section 3:2:6 there are four main tools for the management of an area. Three of these four tools: a district planning board; zoning by-laws and sub-division regulations are in operation within the study area.

5:2:1 District Planning Board

The Estevan Planning District Zoning Commission has been charged with the formulation of a district development plan for an area around the City of Estevan which includes the study area of this paper. In the fulfillment of its duties, the Board has passed zoning by-law number 47-1971. This by-law is the only control over land use in the study area which has been enacted by the Board.

5:2:2 Zoning By-Law No. 47-1971

This by-law along with the accompanying zoning map (a portion of which is reproduced in this paper as map 6), stipulates the designated land use in the study area. Regulation 18 further defines the allowable uses on the flood plain of the Souris River located within the study area by not allowing the construction of any buildings or structures below an elevation of 1774.5 feet, unless the site and access thereto are protected from flooding to an elevation of 1774.5 feet.

It is interesting to note that the only residential and commercial uses which have been permitted in the study area are located on the most flood prone land within the study area. Residential and commercial use of flood prone land normally results in higher flood damages suffered by the inundated area than what would have been the case had the area been zoned for other uses. The result is that the most flood susceptible land use has been permitted in the most flood prone land within the study area.

The rationale used in the designation of these flood prone lands for commercial and residential uses was likely the existence of residential and commercial structures in the flood prone lands at the time of enactment of the by-law. Designation of these lands for commercial and residential users permits the further development of such structures within the flood plain. If however, these flood prone lands had been designated for some other use, such as agriculture, with provision for the existing structures to remain as a non-conforming use, then future flood-susceptible development in this area would have been prevented. The prevention of future development could result in a reduction in flood damages from that which is presently incurred on the flood plain.

An alternative for the reduction of flood damages in an area where residential and commercial uses has been permitted is to permit construction of structures that are flood proofed (or are built at elevations above expected flood levels). Regulation 18 of Bylaw 47-1971 is designed to allow only protected development in the flood prone area. However, as was noted in chapter 4) enforcement of regulation 18 does not appear to be very strong. The net result has been the continued construction of inadequately flood protected structures on the flood plain.

5:2:3 Subdivision

As seen in map 6 there is a small subdivision located south east of the highway 47 bridge over the Souris River.

The Subdivision Regulations made under The Planning and Development Act states that all lands proposed to be subdivided shall be eminently suitable with regard to the danger of flooding. It also states that all drainage channels and creek beds, open bodies of water with the bank, and the level of the water at the date of survey shall be shown on a plan of the proposed subdivision.

Flooding has occurred in the area of the subdivision in five of the seven years since 1969. It maybe that the subdivision was approved before the enactment of the subdivision regulations in May, 1973. If it was approved since 1973, then it was approved despite the fact that the land is not eminently suitable with regard to the danger of flooding, since by 1973 it was obvious that flooding was a definite hazard in this area.

5:2:4 Summary

Legislative control over land use in the study area has not been an effective means for developing a rational policy for the use of flood prone lands.

While the Department of Municipal Affairs is the body which approves the formation of district planning boards, the passing of by-laws and the plans for

subdivisions, the main decision-making involved in development plans is left to the local governments.

Although flooding has been recognized as a problem, it has been given little consideration in the formation of plans within the study area. A more effective mechanism for legislative control (or better enforcement) over the use of flood prone lands is required if the damages and disruption caused by flooding are to be reduced in the study area in the future.

5.3 Woodlawn Regional Park

The existence of Woodlawn Regional Park can affect the extent of flood damage within the study area in two ways. Any flood susceptible structures in the park will augment the amount of damages incurred within the study area. Secondly, the bridges and dams located within the park will have an effect on the flow capacity of the channel and hence may cause additional flooding due to backwater effects.

The planning and management of the park is an important aspect of the preconditions in the study area which affect the total flood damages incurred. Development of the park has involved mainly open space uses such as baseball and football fields, with the only substantial structure being a clubhouse. The susceptibility of the park to flood damages appears to be small - especially in relation to its large size.

As noted in an earlier chapter, there are five structures in the channel within the boundaries of the regional park, although not necessarily within their jurisdiction.

The Regional Park Authority is not charged specially with the responsibility of ensuring that a structure within its boundaries does not cause any ill effect on surrounding areas. However, it does have a responsibility as a body corporate to manage this park in a reasonable manner.

Section 9 of the Regional Parks Act provides a mechanism whereby the provincial government , in conjunction with the Woodlawn Regional Park Authority, can plan and manage the park through five year development agreements. However, in practice the five year agreements make provisions only for financial arrangements.

To summarize, the Woodlawn Regional Park is a large and important land user within the study area, however, management of the park with specific regard to flood damages occurring within the park or influenced by the existence of the park is not a major responsibility of the park authority or any other institutional body.

5:4 Licensing

Section 8 of the Water Rights Act provides that no diversion or impoundment of surface water shall occur without the authority to do so under the Water Rights Act. On this basis, five of the twelve man-made structures in the study area appear to require a license. These five are Lamb's Crossing, the CPR dam, the Estevan diversion channel, the Estevan diversion dam and the confluence dam.

A comparison of the location and license dates of the licensed uses (as of January 6, 1976) shown in Table 5:1 with the date of construction and location of the five man-made structures in the study area does not yield a clear picture of which structures have been licensed. However, it appears that the confluence dam may be the licensed use with the file number of 01047.

A copy of an agenda of a December 2, 1975 meeting with city and regional park representative in Estevan and the provincial department of the Environment suggest that the CPR dam is not licensed. However, Table 5:1 suggests that the licensed use with file number of 00149 may have been the CPR dam. No licenses appear to have been issued for the remaining three uses. It therefore appears that three of the five structures which legally require a license never received one.

TABLE 5:1 LICENSED WATER USE

Study Area													
File No.	Location				Authorization Date	Date of License	Purpose	Cancellation Date	Reservoir Capacity(ac-ft)	Diversion (ac-ft)	Losses (ac-ft)	Allocation (ac-ft)	Name
00076	NE	11-	02-	08	08-06-04	06-11-09	Industrial	21-11-74	426	67	11	56	City of Estevan
00149	NE	11-	02-	08	04-07-08	19-04-10	Industrial	21-11-74	550	-	-	72	City of Estevan
00223	NE	10-	02-	08	05-09-12	15-08-14	Other	21-11-74	-	-	-	724	City of Estevan
01047	NE	10-	02-	08	24-08-36	20-07-71	Municipal	-	428	1090	10	1080	City of Estevan
03561	NE	10-	02-	08	26-10-73	26-10-73	Irrigation	-	-	12	-	12	Prairie Nurseries
03562	SW	15-	02-	08	26-10-73	26-10-73	Irrigation	-	-	27	-	27	Prairie Nurseries
05047	SE	10-	02-	08	28-01-48	23-06-53	Irrigation	-	-	-	-	14	Pawson, J.M.
05125	NE	10-	02-	08	04-02-74	04-02-74	Irrigation	-	-	2	-	2	Fichtemann, W.
11675	NE	11-	02-	08	-	-	Irrigation	-	-	-	-	-	Woodlawn Regional P.
12425	NE	10-	02-	08	25-03-74	25-03-74	Irrigation	-	130	5	-	5	Fichtemann, W.
Boundary Dam													
05904	NE	04-	02-	08	21-02-57	-	Multiple	-	49,100	5900	1900	4000	Sask Power Corp
09093	NE	04-	02-	08	23-07-73	23-07-73	Municipal	-	-	1420	-	1420	City of Estevan

SOURCE: SASKATCHEWAN DEPARTMENT OF THE ENVIRONMENT, SURFACE WATER DATA REPORT, SOURIS BASIN, 06/01/76

The remaining seven structures in the study area are not required to obtain a license. The conditions which govern the construction and maintenance of these seven structures are dependent in part, on the institutional body which is responsible for them. The differences in design characteristic of bridges built for vehicle traffic are an example of the varying conditions governing the remaining seven structures. Bridges which are currently built by the Municipal Grid Road Authority are designed to pass a one in twenty-five year flood. Bridges built by the Department of Highways are designed to:

- a) pass a one in fifty year flood, and
- b) minimize head loss at the bridge

The return period of the flood used in the design of each bridge is primarily based on the economics of replacing the bridge as a result of damage incurred by a flood greater than the design flood.

There are at least three institutional bodies responsible for the three municipal road bridges and one highway bridge in the study area; the Department of Highways, the Municipal Grid Road Authority and the Rural Municipality. Yet, despite this large interest in these four structures and perhaps because of the split jurisdiction, there is little provision for any consideration other than minimal cost and maximum safety in the design of these structures.

Bridges have a significant impact on the present and future flood damages incurred in a flood plain. Present flood damages upstream of the bridge will be increased if a head loss occurs at the bridge resulting in an increased level of flooding. By providing a means of access, bridges also encourage development in the flood plain which can lead to increased flood damages in the future.

At present there is no institutional body which is charged with examining the need, design, construction, location and maintenance of bridges with a perspective of their role in the whole flood plain. A broader perspective in the planning and management of bridges (especially in flood plains) could be obtained by the creation of a body which would be responsible for authorizing construction of these structures in much the same manner as the Water Rights Branch. In summary, there are several water structures in the study area which legally require a license of which only one (or perhaps two) are licensed.

5:5 Ownership of Riparian Land

The owners of land adjoining water courses on the study area (and indeed in all areas of Saskatchewan) are not entitled to the four principal rights which exist under common law for riparian land owners. The free domestic use of the water is the only one of the riparian rights to which these land owners are entitled. As a result, the land owners in the study area are not able to play as significant a role in the planning and management of the water courses as they might have had they been entitled to the full rights of a riparian land owner. The province is the legal owner of the river bed and with the abolition of riparian rights, the management of the Souris River and Long Creek rests almost solely within the jurisdiction of the province. This concentration of rights within the provincial government facilitates any future development of a comprehensive framework plan for the management of the Souris and Long Creek within the flood plain of the study area.

Some property owners in the study area have certificates of title to their land showing the boundaries of their property being based on the location of the river. A problem could arise as to the determination of the new boundary location should the location of the river be altered as would be the case if portions of the channel were straightened. A similar problem is currently in

the process of resolution in the Qu'Appelle Valley as a result of the proposed straightening of certain portions of the Qu'Appelle River.

5:6 Inclusion Within City Limits

The study area is comprised of sections 10 - 15, inclusive, of Township 2 Range 8, W 2nd. As noted in the discussion on land use in Chapter 4, the north half sections of sections 14 and 15 are within the city limits, plus the city owns some land in Section 13.

In 1971 a study by the City of Estevan of the area within a three mile radius of the present city limits was made with regard to possible future annexation. The study area is within this radius. It is therefore a definite possibility that, within the immediate future, the study area could be annexed to the City of Estevan.

The procedure for annexation is quite straight forward. An application is made to the Minister of Municipal Affairs with a copy being sent to the rural municipality. In order that the owners of the land to be annexed are given an opportunity to be heard, a public meeting is held in accordance with Section 23 of the Urban Municipality Act. If it is satisfactorily shown that the limits of the municipality ought to be altered, a proclamation to that effect is issued.

It is unlikely that the residents of the study area would receive any benefits in terms of flood protection as a result of annexation to the city. While the city would like a permanent form of flood protection in the study area if it should be annexed to the city, economics dictate that expenditure of city revenues in the study area not be significantly different from the assessment received from the area. Furthermore, city revenues expended in the study area would have to include provision for police protection, upgrading of roads and other services which are traditionally made available to all city residents.

To summarize, there is a definite possibility that the study area could be annexed by the City of Estevan in the near future. If annexation should occur it is unlikely that increased flood protection would be one of the benefits received by the residents of the study area.

5:7 Support for Present Situation

Substantial development exists at present in the flood plain of the study area. Given the zoning designation for the flood plain, it is likely that development will increase within the flood plain in the future. The present and potential development within the study area is reinforced by the present policies of both federal and provincial governments to provide compensation for flood victims.

The compensation guidelines of the provincial government are based on the guidelines established by the federal government to facilitate cost sharing between the two levels of government. The discussion in Chapter 3 showed that compensation is paid for damages and protective measures that occur during and after the occurrence of a flood. The compensation policy does not encourage preventive measures. Item 2 of the guidelines specifies that the guidelines (for peacetime disaster costs eligible for financial assistance) do not refer to projects designed to reduce vulnerability in the event of recurrence of a disaster. The reason stated for this omission is that provision for preventive measures exist as part of the normal intergovernmental arrangements for which means of consultation are already available between the departments and agencies concerned.

In the past there has been intergovernmental co-operation in the financing and construction of structural works. However, the other components of a comprehensive flood plain management policy, such as relocation and zoning, have not been implemented through inter-governmental measures. The discussion

in Chapter 3 showed that the legislation providing for inter-governmental co-operation on flood plain management is limited; the principal vehicle for inter-governmental co-operation on preventive measures is the Canada Water Act. While of great importance this Act is relatively new and to date only negotiations and preliminary planning on flood protection and preventive measures has occurred.

The guidelines exclude provisions for preventive measures on the basis that an adequate mechanism exists for the incorporation of preventive measures into flood plain management. Although this mechanism does exist, it is new and has yet to reach an effective level.

Chapter 3 provided some of the details of the guidelines for compensation that is paid as a result of flood damages. It was noted that compensation is available for a very extensive range of damages.

Unfortunately, a total figure for the compensation paid in the study area as a result of flooding in five of the last seven years is not available. However, an idea of the magnitude of the provincial disaster financial assistance program can be obtained from the following figures. In 1974 and 1975 payments of approximately \$2,135,000 and \$6,500,00 respectively were made to local government authorities to provide aid for repairs to flood damaged public property. In 1974 about 27% of the total payment was made to the municipalities in southern Saskatchewan (i.e. south of the Trans-Canada Highway); in 1975 the comparable proportion was 20%.

One of the results of this large and fairly comprehensive coverage of flood damages has been to almost completely negate the disadvantages of locating within a flood plain. Although there are some flood damages which must be borne by the residents of the flood plain and although a disruption of the normal socio-economic activities of the study area does occur, the

receipt of compensation, coupled with the amenities enjoyed in the flood plain, encourages the continual development of this area.

Until quite recently, development in the flood plain of the study area was not only permitted but to a certain extent, encouraged as a result of government policies. With the inception of the Souris River Basin Study an informal moratorium has had the effect of putting under scrutiny all proposed development in the study area, provided that the local government and governmental proponents are in agreement.

5:8 Information

The most basic requirement for the development of a sound policy for the management of flood prone lands is a thorough understanding of the area. When sections 10 - 15 of Township 2, Range 8, W 2nd (of rural municipality number 5) were chosen as the study area, it was assumed that, due to its small geographical size and close proximity to Regina, the residence of the author, information would not be difficult to obtain. Unfortunately this did not turn out to be the case.

The nature of the difficulties encountered in obtaining information appear to be applicable to areas other than the one selected for study in this paper. Therefore a short discussion will follow on the difficulties encountered.

5:8:1 Buildings

The certificates of title did not specify the number, type, condition or any other information on the buildings located on a piece of property. The assessment rolls were a little more informative by specifying a value for improvements. It was assumed that all improvements were as a result of construction of a modification to buildings on the assessed property.

A topographic map prepared by the Federal Department of Energy and Mineral Resources referred to in Chapter 4 showed the existing structures

for the year in which the aerial photographs for the preparation of the map were taken.

All three sources combined yielded only a very sketchy description of the buildings located in the study area. In order to assess the flood vulnerability of these structures and the amount of damages they are likely to incur, a more detailed description or record of the buildings within this area is required.

5:8:2 Land

The limitations of the two methods used to obtain the value of the land in the study area have been described in an earlier chapter. Market values for flood prone land would provide a realistic estimate of the reduction in land value, in comparison to non-flood prone land of similar quality. This reduction in value is as a result of the restricted development required for a sound use of the flood plain (eg. only flood proofed structures permitted).

Another useful tool in the sound use of flood plain land would be the availability of material describing the physical characteristics of the land. These two tools would facilitate planning in the comprehensive management of the study area.

5:8:3 Structures

Chapter 4 provided a description of the dates of construction, location and jurisdictional responsibility for each of the twelve man-made water structures in the study area. A large number of institutional bodies are responsible for these structures. Should a development plan affecting the entire study area be implemented, co-ordination difficulties could be encountered due to the large number of interested parties.

5:8:4 Mapping

There is a pressing need for a detailed, accurate map of the study area. Basically this map would be an extension on the location map included in this report showing the individual buildings in the study area and the flood lines for floods of varying return frequencies. The map should also include a legend containing any pertinent information for management of the flood plain (eg. institutional bodies involved in the management of the area). The Flood Hazard Map being prepared by PFRA for the Souris River Basin Study will in part satisfy this need.

5:8:5 Fragmentation of Responsibilities

Throughout the course of researching material for this paper, there was never any problem in obtaining co-operation from all the various institutional bodies involved in the study area. However, it was often difficult to obtain the answers to certain questions due to a difference in perspective. The institutional bodies were accustomed to regarding issues on problems from a viewpoint of departmental interest and not as part of an overall problem in the management of a flood prone area.

In addition most departmental legislation has not been framed with a consideration for problems arising from flood situations. Although departments are often aware of the possible ramifications of their policies in terms of the effect on flooding, their mandate does not usually include any provision for dealing with these "externalities".

5:8:6 Public Awareness

There is no provision in any of the legislation affecting the study area to inform the general public of the flood hazards of the area. Only those people who are very familiar with the area are cognizant of the potential for flood damages in the area. As a result, it was impossible, at the time of this study, for people unfamiliar with the study area (such as the author of this paper) to accurately determine the extent and degree of flooding within the study area.

CHAPTER 6

FLOOD PLAIN MANAGEMENT BOARD

6:1 Introduction

The previous chapter focused on the key management issues which arose as a result of the frequent flooding within the study area. In particular the gaps and overlaps of the legislative and institutional framework with relation to each issue were highlighted.

The present legislative framework assigns specific responsibilities to each administrative body. A comprehensive approach to the management of flood plains was not given active consideration during the course of assignment of responsibilities to individual agencies. The result has been that in the study area some aspects of the total flood problem have received inadequate, incomplete or no attention.

This chapter will outline the problems which have existed and still exist with respect to flooding in the study area and the requirements of an institutional (management) body which could surmount some or all of these problems. Finally three proposals will be made for an institutional body which could, in varying degrees, satisfy these requirements.

6:2 Problems

6:2:1 Land Use

The underlying problem with respect to flood damage occurrence is the judicious use and development of flood prone land in the study area. That is, the high probability of the occurrence of floods within the study area has not been given active consideration. Such consideration would have resulted in flood protected or floods compatible uses solely occurring in the highly flood prone sections of the study area.

The passage of regulation 18 of the zoning by-law 47-1971 was an attempt to curb flood damages by stipulating a minimum elevation for all structures in flood prone sections. However due to the lack of rigorous enforcement

plus the existence of structures built before regulation 18 became effective, this attempt at flood damage mitigation has not been very successful.

As was noted in Chapter five, a large portion of the study area has been made available for purchase in the past six years. This fact has two significant ramifications. First, a valuable opportunity has been missed to ensure that only flood compatible uses of the flood prone land occur. A transfer of ownership would have been an opportune time for stipulating that future uses of the newly available land must be flood compatible. This could be done by means of a management body which would purchase the land and lease it to individuals with the stipulation that they must lease it only for flood compatible uses or, by legally obtaining a covenant against the land which would prohibit non-flood compatible uses. Secondly, a high transfer rate in land ownership increases the the possibility that flood prone land will be owned by an individual who is not familiar with the flood susceptibility of the area. (However in this particular flood plain it appears that much of the transfer of land has been between individuals who are already residents of the area).

The Woodlawn Regional Park Authority is responsible for the management of a large segment of land in the study area. However, as was noted in Chapter 5, the Authority does not manage the park with a specific regard to the possible flood damages which can occur within the park or elsewhere in the flood plain as a result of the development of the park.

6:2:2 Water Use Control

As was noted in section 5:4, only five of the twelve man-made water use control structures in the study area, appear to legally require a licence and of those five it appears that only two structures ever received a licence. These structures have the effect of altering the carrying capacity and direction of the two main courses within the study area. This, in turn has

significant ramifications on the present and future susceptibility of adjacent lands to flooding.

Each of these structures were constructed for a specific isolated purpose (e.g. water supply for trains, highway crossing, etc.). The one aspect which is common to all these structures is that the effect, either unilaterally or in combination with the other existing structures, that the structure had on the characteristics of the river channel, particularly in times of flooding was not given prime consideration. The net result has been, at best, uncertainty, as to their influence on the flow characteristics of the Souris River and Long Creek, especially in times of flooding.

6:2:3 Information

A central concern in the effective management of a flood plain is the availability of accurate, up-to-date, information on all aspects of the flood plain. This information would include records on the number of structures within the flood plain, their location, their state of repair and their value; records on the number and location of water structures and their maintenance requirements; an accurate map of the flood plain showing river location; land use and changes in the pattern of use; and, most importantly this information should be freely accessible to all interested parties. In the particular case of the study area of this report, due to the highly probable future incorporation of the study area into the City of Estevan, a special effort should be made to ensure that the citizens of Estevan, or at least their elected representatives, are knowledgeable of the flood problems of the study area.

6:3 Requirements of an Institutional Body for Flood Damage Mitigation

There is a pressing need for a comprehensive approach for the rational treatment of the factors contributing to flooding and the possible alternatives to flood damage mitigation in the study area. The objective of this approach

would be to ensure that only the most flood compatible uses are made of the flood plain. The establishment of an institutional body which is specifically charged with the management of the flood plain would be the most logical means of satisfying this need.

The objective of this body would be the regulation of existing and proposed land use and development in the flood plain (including construction of buildings, river crossings and obstructions and modifications to river channel capacity and direction) to ensure that only flood compatible uses are permitted. The actual constitution of this body can be one of three main types. The three options will be discussed later in this chapter. It is first necessary to examine the requirements which this body should fulfill.

The most basic requirement is that the management body be given authority to implement any required action to prevent or reduce flood damages as opposed to being only advisory in nature. The economic cost and social disruption caused by frequent flooding necessitate that all planning in areas designated as flood risk areas be done in a manner which actively considers the probability of inundation by floods. The very broad responsibility required for the effective operation of such a body raises two legitimate concerns; 1) their geographical area of responsibility and 2) the legal basis for the establishment and operation of such a body.

The area over which the body would extend its control is an extremely important component in developing a sound policy of flood plain management. If the boundaries of the area under the control of the management body do not enclose all lands subject to flooding then flood damages will still occur. If the area selected is so broad that lands subject to infrequent and very minor flood damages are incorporated, then possible lost opportunities may occur as a result of land being unnecessarily limited to flood compatible uses. The point here is that the determination of the geographical extent

of flood risk areas is extremely critical. This determination is the subject of a separate agreement under the federal-provincial Flood Damage Reduction Program entitled Flood Hazard Mapping. As part of the Souris River Basin Study, a flood hazard map of the study area is being prepared by the Prairie Farm Rehabilitation Administration (PFRA).

The second concern is that of the legal basis for the establishment of this institutional body. Due to the need for technical and financial resources (which will be discussed later in this section), the body must be composed of or have access to either federal and/or provincial expertise and funds. Both federal and provincial participation in a body whose objective is the rational management of a flood hazard area can be justified, on the basis of existing legislation.

To recapitulate earlier discussions the Canada Water Act, in Section 3 of part 1, provides for the establishment of an intergovernmental committee or other body in consultation with the provincial government to ensure the optimum use of water resources. The means to achieve this end include maintaining continuing consultation on water resource matters, advising on the formulation of water policies and programs and facilitating the co-ordination and implementation of water policies and programs.

Section 3 of the Federal-Provincial Agreement Act states that Saskatchewan may enter into agreements with Canada for any purpose of provincial interest. Section 5(c) of the Act enables the province to enter into agreements with municipalities, local governing authorities, persons or associations for the purpose of carrying out the terms of any agreement entered into with Canada under Section 3. Therefore, it appears that a body composed of members from provincial, local and federal governments, established for the purpose of the optimum use of water and inter-related resources (eg. surrounding flood plain) has a well founded legislative basis.

The sound management of a flood plain requires an understanding of the hydrology of the river (in this case Souris River and Long Creek); of the meteorological factors affecting the area; of the engineering feasibility of any structural flood damage mitigation measure which may be proposed; and of the social and economic impact of all purposed flood damage mitigation measures, including non-structural measures. In addition to the above requirement of technical expertise, the development of a comprehensive flood plain management policy will require substantial financial resources. Structural alternatives to flood damage reduction involve large expenditures over a relatively short period of time, expenditures as a result of the implementation of non-structural alternatives can vary from a large amount over short periods of time (such as expropriation) to large amounts over longer periods (such as acquisition of lands as they become available for purchase) to lower cost measures such as flood-proofing. Each flood plain will require its only unique mixture of alternatives to flood damage mitigation and it is not the intent of this paper to determine that mix for the study area. However, it is likely that the highest expenditures will be incurred during the early stages in the development of a comprehensive flood plain management plan. Therefore, any body which is established to manage the flood plain in the study area must have both technical expertise and financial resources available.

Two other desirable attributes of a flood plain management body are local knowledge and flexibility. The addition of local representatives to the management body would help ensure that interests of primarily local concern are given consideration (eg. possible relocation of points of local interest due to construction of structural flood damages mitigation measures). Knowledge of local concerns and their incorporation into the planning process

would facilitate the establishment of a local identity with the management body and eventually help vest prime responsibility for the management body with local government.

Flexibility in the activities of the management body appears to be an almost inevitable outcome. The role of this body would vary from initially being an active body charged with the development of plans and their enforcement, to later being almost a maintainer of the status quo by ensuring that the existing and proposed developments are flood compatible. This change in role could be achieved most efficiently by a flexible membership; that is, a change from a primarily federal-provincial oriented management body to one of predominantly local composition.

6:4 Available Options

Earlier sections have summarized the most central problems which currently exist under the present system of managing flood prone lands. A discussion then followed of the requirements for a newly established management body to regulate land use and development in the flood plain. There are three basic options which could be followed in establishing a management body which would satisfy the above-mentioned requirements. This section will describe the advantages and disadvantages of each of these options.

6:4:1 Central Management Board for Flood Plains in Saskatchewan

This option would involve the establishment of one central body which would be charged with the efficient management or development of policies for the management of all designated flood plains in Saskatchewan. It would be composed of appointed civil servants from provincial departments which have the required expertise (eg. Environment Saskatchewan). The life of this body would be of indefinite duration.

Advantages of this option include immediate access to provincial revenues as a source of financing for flood damage mitigation measures, access to a wide range of technical expertise, the application of experience gained in flood plain management techniques from one flood plain to others located in Saskatchewan, economic advantages of scale in such concerns as production of flood hazard maps, and the means of effecting close co-ordination and liaison with provincial departments which are responsible for planning and development in Saskatchewan including those areas subject to flooding. The disadvantages of this option would be a lack of local input and its subsequent flexibility in the role of the management body. As noted earlier local input is required in order to have access to information on matters of local knowledge. In addition, as the use of each flood plain became more adopted to the occurrence of flooding (or lack of flooding due to structural measures), the role of the management body would change to one which could be more aptly assumed by local government.

6:4:2 Local Flood Plain Management Board

This option would involve the establishment of a solely locally comprised flood plain management body. Its members would be the elected representatives of the existing local government. The life of this body would be of indefinite duration.

The advantage of this body would be its knowledge of local concerns. It would also vest the responsibility for wise use of the flood plain with the people who are using the flood plain. There are however, very substantial disadvantages to a purely local body.

A major problem is the fact that flood plains are not confined to within the boundaries of existing local governments. (The study area of this paper was unusual in that it laid completely within the jurisdiction of rural

municipality number 5). Effective flood plain management can not be accomplished without regarding the flood plain as one complete unit. Therefore, in order to surmount this difficulty, local governments would have to act in conjunction with any neighbouring local government whose jurisdiction included part of the flood plain in question. Although such bodies acting in areas of joint jurisdiction do exist in Saskatchewan (eg. Conservation and Development Area Authorities), this mechanism would likely be ineffective in flood plain management due to the disadvantage listed below.

As noted earlier, a heavy reliance on financial and technical resources would be required in any future attempt to develop and implement management plans for flood plains. The extent of this reliance would be beyond the resources of the local government. Hence the local governments would have to attempt to procure these resources from the provincial government. Hence the local governments would not only have to establish some formal mechanism amongst themselves to implement flood plain management practices but in addition a formal co-operative mechanism with the provincial government would be required in order to obtain financial resources and technical expertise both from the provincial government and the federal government. (as was noted in 3:4:3 the co-ordination of the activities of a large number of small rural municipalities is a difficult matter.)

6:4:3 Local-Provincial Flood Plain Management Board

As shown in the previous two sections there are advantages and disadvantages to either a purely provincially comprised management board or a purely locally comprised board. In this section joint local-provincial flood plain management boards will be examined. The concept of establishing a board with provincial and local representation has been proposed for managing the development and land use in designated areas of the Qu'Appelle Valley as part of the Qu'Appelle Implementation Program (see section 3:4:3). This concept of a joint body would also be of benefit as a management tool in flood prone

areas. Local governments are interested in the future of their community, provincial governments are interested in the utilization of their resources which would yield the maximum benefits for their residents and the federal government is interested in the obtainment of the highest possible quality of life for Canadian citizens. The interest of all three levels of government leads them to have a desire to participate in the management of flood plains.

This mechanism advocates the establishment of a local-provincial flood plain management board for each designated flood plain in the province. A separate local-provincial flood plain management board would be required for each flood plain, for although the occurrence of flood damages is a province-wide problem, the nature and extent of the flood problem varies from location to location. The actual number of members on each board would vary from flood plain to flood plain, depending on the geographical size of the particular flood plain and the complexities involved in its management. The life of this board would be of indefinite duration.

Provincial representation on this board would be especially important during the early stages of its life. It would be during this stage that the greatest need would exist for financial and technical resources. The provincial representatives would provide an immediate link to the resources available within the provincial government, and to a lesser extent (but still greater than that which is available to purely local authorities), a link to those resources available within the federal government. In addition the provincial representative would help ensure that the plans of all provincial government departments in the flood plain are consistent with the management strategies developed for that flood plain by the flood plain management board. The presence of provincial representatives would enable feedback to be

obtained from the management boards of other flood plains and thereby help ensure the dissemination of valuable information on the techniques of flood plain management.

The local representatives would contribute to the success of the board by their knowledge of local conditions and by helping to establish a local identity with the board and thereby facilitating a greater acceptance of the board's decisions. In addition, as the use of the flood plain became more compatible with its being a flood plain, the role of the provincial representatives would likely diminish and a larger share of the responsibility for the board would rest with local representatives. This transaction could only be effectively accomplished if the local representatives had been involved with the workings of the board from the time of its inception.

An integral part of this concept would be the establishment of a central provincial agency or department branch which would have two prime functions. One of these functions would be to act as the home base for the provincial representatives on the local-provincial flood plain management boards. This agency would have available technical people who would perform such functions as prepare flood hazard maps, design and construct flood control structures (eg. dykes) and estimate the economic and social costs of flood damage mitigation measures. This agency would also provide the man years for all required secretarial and clerical tasks.

The second function of this agency would be to serve as the main contact with federal departments. In this manner, cost-sharing agreements between the provincial and federal governments regarding flood damage reduction programs would be facilitated and matters of technical concern to one or more flood plain management board could be discussed with representatives of the federal government.

The main disadvantage to this option is its complexity. A concerted effort would be required by all parties to ensure its successful operation. The extent of flood damages in the past and its escalating nature warrant this effort.

6:5 Conclusion

The establishment of a local-provincial flood plain management board appears to be the most reasonable approach to flood plain management from a jurisdictional point of view. The local governments derive their authority from the provincial government and the provincial and federal governments derive their jurisdictional authority from the British North American Act. As was noted in Chapter two, neither the federal nor the provincial governments have a clear mandate in the management of natural resources. In order to effectively implement a comprehensive policy for flood plain management the co-operation of all three levels of government is required.

6:6 Application to River Park Area

No attempt has been made to suggest what flood damage reduction measures should be implemented in the study area. This decision should be made by the members of the local-provincial flood plain management board. This board would examine the particular problems encountered in the study area due to flooding, implement the measures which they feel would be most successful in eliminating or reducing these problems and develop a comprehensive management plan for future flood plain occupancy. It is only after a thorough examination has been made of the characteristics of the local flood problem that effective mitigation measures can be implemented and future management plans proposed.

The intent of this practicum was to examine the legislative and institutional framework which is operative in southern Saskatchewan and on the basis of this examination propose a mechanism whereby the most comprehensive

management of flood plains could occur. River Park area was examined in order to illustrate, in a concrete manner, the gaps and overlaps in the legislative and institutional framework which can and have existed in flood plain management. The local-provincial flood plain management board has been proposed as the mechanism which could lead to an efficient use of flood plains in southern Saskatchewan, including the River Park area.

ANNOTATED BIBLIOGRAPHY

REINER JAAKSON, Riparian Land Management in Saskatchewan and Ontario in Institutional Arrangements for Water Management; Canadian Experience, Bruce Mitchell (ed) (University of Waterloo, 1975)

In this paper, Jaakson examines the planning and management of lake and reservoir shorelines as important riparian interfaces. He presents two case studies of shoreline land use planning and land administration practices. He first analyzes the approach to managing riparian land adjacent to Lake Diefenbaker in Saskatchewan. From this experience, he then indicates how the Saskatchewan approach could be transferred, with some modification, to the recreation lakes in the Haliburton Highlands of Ontario.

His conclusions are:

- 1) Shorelines must be planned and managed as one continuous biosphere system.
- 2) A central agency with the authority for lake planning should be created with the role of first, planning the general framework of regional lake growth and establishing development policy and, second, co-ordinating the activities in lake development of other special purpose, government agencies, and
- 3) The solution of problems at any lake should no longer be confined to one area, but there should instead be considerably more compromises and trade off between different lakes and their diverse problems.

G.V. LaFOREST AND ASSOCIATES, Water Law in Canada, the Atlantic Provinces
(information Canada, 1973)

This book is a study intended to give a comprehensive analysis of the legal framework of water resources in the Atlantic Provinces. The scope of this study is limited to water as a resource (eg includes use of water for consumption and irrigation; but does not include the distribution of electric power). The study is divided into seven parts of which the first one entitled The Constitutional Position gives a broad treatment of the legislative factors affecting water resource management in Canada.

Chapter one is of particular interest since it provides a very exhaustive treatment of the basis of federal and provincial jurisdiction in the field of water resources in the British North America Act. While the remaining portions of this study are limited to a discription of concerns which exist in the Atlantic Provinces, they offer a valuable understanding into the framework of provincial administration and the differences in the legislative treatment of rivers, streams and lakes.

G. V. LaFOREST, National Resources and Public Property under the Canadian Constitution (University of Toronto, 1969)

This book is largely a reproduction of a series of lectures given at the Faculte de droit of the Univeriste de Montreal in the fall of 1962. The subject of this book is constitutional law, in particular that portion of constitutional law which directly affects the use and management of natural resources and public property. The book includes a discussion of: the distribution of resources before and since confederation; section 108 of British North Amercia Act; lands; federal legislative and executive powers and; provincial legislative and executive powers.

This book is largely confined to a study of the provisions of the BNA Act dealing specially with natural resources and public property, and the position of the federal and provincial authorities under these. The application of other parts of the constitution to natural resources is not examined. Non-constitutional statutes affecting natural resources and public property are studied when they substantially alter the general constitutional porition, but no attempt is made to canvass all statutes providing for local or minor variations.

Water Management, Basic Issues, Organization for Economic Co-operation and Development (IOECD, 1972)

From July 15th - 24th, 1970, a North American meeting of the Water Management Sector Group under the Environment Committee of the OECD was held to complete the preliminary phase of examination of management techniques being developed in OECD member countries.

This publication makes available, in edited form, the wide range of papers submitted for examination at the meeting. It provides a source book of the experience of water management authorities in North America and elsewhere on which OECD Water Management Sector Group has based its conclusions as to its future programme. The papers are grouped according to five main headings:

- 1) North American Water Policies and Programmes
- 2) Basin and Regional Programmes in North America
- 3) Water Resource Research in North America
- 4) Joint United States - Canadian Programmes
- 5) Illustrations of European and Japanese Approaches to Solving Basin Problems in Water Management

TOM JONES, A proposed Methodology For The Study of the Economics of Flooding (unpublished Master Thesis, University of New Brunswick)

This study reviews available literature on the economics of flooding with the purpose of bringing together the many strands of research that have developed over the past few decades. Included in this review is an evaluation of the adequacy of this literature for Canada with special reference to smaller flood plains. This is followed by a few proposals for the development of a more efficient methodology for studying the economics of flooding.

This report focus on methodology rather than generalized theory. The orientation is primarily directed towards how to approach the solution of a community's flood problem rather than towards making specific recommendations as what that particular solution should be.

APPENDICES

APPENDIX A

TABLES

TABLE A:1 HYDROMETRIC DATA

LONG CREEK DISCHARGE (CFS) NEAR ESTEVAN STATION NO. 05NB001, 1911-1973

Year	Annual Mean Discharge (cfs)	Maximum Daily Discharge (cfs)		Minimum Daily Discharge (cfs)		Total Discharge (ac-ft)
1911	-	-		-		-
1912	-	-		-		-
1913	-	-		-		-
1914	-	-		-		-
1915	1.1	5.3	Apr 25	0.02	Sept 2	763
1916	65.0	1360	Apr 14	0.39	Jan 1	47,200
1917	19.7	417	May 2	0.07	Feb 14	14,300
1918	9.6	185	Apr 26	0	Aug 1*	6,990
1919	21.5	660	Apr 5	0	Aug 25	15,600
1920	48.9	888	Apr 21	0	Jan 1	35,500
1921	13.0	388	Jun 29	0	Jan 1	9,390
1922	26.4	540	Apr 5	0	Jan 6	19,100
1923	-	-		-		-
1933	-	-		-		-
1934	-	-		0	Mar 6	-
1959	-	-		-		-
1960	0.91	15.6	Jul 25	0	Jul 11	659
1961	1.00	15.3	Aug 4	0	Jul 11	722

TABLE A:1 (CONTINUED)

Year	Annual Mean Discharge (cfs)	Maximum Daily Discharge (cfs)		Minimum Daily Discharge (cfs)		Total Discharge (ac-ft)
1962	2.7	118	May 16	0	Jul 1	1,980
1963	0.68	13.2	Aug 13	0	Jun 13	492
1964	13.7	550	Apr 12	0	May 28	9,940
1965	61.0	752	May 29	0	Apr 8	44,200
1966	19.8	815	Mar 19	0.20	Jan 1	14,300
1967	25.4	534	May 10	0.20	Mar 1	18,400
1968	2.3	7.4	Jul 14	1.5	Jan 1	1,640
1969	96.9	3990	Apr 11*	0	Apr 29	70,100
1970	77.6	1950	May 6	0	Oct 7	56,200
1971	43.6	765	Jul 14	0.25	Mar 4	31,500
1972	57.1	1470	Mar 21	0.21	Nov 21	41,500
1973	2.6	24.0	Mar 9	0.17	May 10	1,900
Mean	27.7					20,100

* Extreme recorded for the period of record.

Source: Historical Streamflow Summary
Saskatchewan to 1973
Water Survey of Canada, ENV CAN
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TABLE A:2 HYDROMERIC DATA

LONG CREEK DISCHARGE (CFS) NEAR ESTEVAN STATION NO. 05NB001, 1974

	<u>JAN.</u>	<u>FEB.</u>	<u>MAR.</u>	<u>APR.</u>	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>	<u>AUG.</u>	<u>SEPT.</u>	<u>OCT.</u>	<u>NOV.</u>	<u>DEC.</u>
Total	28.86	23.17	887.6	21764.0	2894.7	866.7	2942.0	122.9	144.9	160.8	83.1	110.2
Mean	0.93	0.83	28.6	725.	93.4	28.9	94.9	4.0	4.8	5.2	2.8	3.6
AC FT	57.2	46.0	1760.	43200.	5740.	1720.	5840.	244.	287.	319.	165.	219.
Max.	1.2	1.3	344.	1920.	149.	118.	596.	5.9	7.8	7.0	3.4	4.4
Min.	0.63	0.51	1.3	5.0	40.0	3.7	2.9	2.3	2.6	3.9	1.9	2.9

Summary for 1974

Mean discharge 82.3 cfs
 Total discharge 59600 ac ft
 Maximum daily discharge 1920. cfs on Apr. 13
 Minimum daily discharge 0.51 cfs on Feb. 6

Type of guage - recording
 Location Lat. 49 06 14 N
 Long 103 00 49 W
 Drainage area 2,680 sq. mi.
 Regulated

Source: Surface Water Data
 Saskatchewan 1974
 Water Survey of Canada, ENV CAN
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TABLE A:3 HYDROMETRIC DATA

SOURIS RIVER DISCHARGE (CFS) NEAR ESTEVAN STATION NO. 05NB007, 1911-1970

Year	Annual Mean Discharge (cfs)	Maximum Daily Discharge (cfs)		Minimum Daily Discharge (cfs)		Total Discharge (ac-ft)
1911	-	-		-		-
1912	-	-		-		-
1913	25.0	535.	Apr 5	0	Jan.7*	18,100
1914	44.4	613.	Jun 7	0.07	Jan.4	32,100
1915	1.1	8.9	Jul 10	0.01	Aug.30	806
1916	124.	2850.	Apr 18	0.45	Jan.9	90,200
1917	59.4	703.	May 2	0	Dec.20	43,100
1918	19.9	576.	Mar 24	0	Jan.4	14,400
1919	30.2	718.	Apr 5	0	Sep.24	21,800
1920	94.5	1760.	Apr 25	0	Jan.1	68,700
1921	31.8	819.	Jun 29	0.05	Feb.19	23,000
1922	66.5	1080.	Apr 11	0.03	Jan.13	48,100
1923	-	-		-		-
1933	-	1270.	May 31	0	Aug.17	-
1934	4.7	64.0	Mar 20	0	Jan.1	3,400
1935	6.5	182.	Apr 21	0	Jan.1	4,680
1936	39.8	1370.	Apr 19	0	Jan.1	28,900
1937	0.19	33.9	Jun 18	0	Jan.1	137

TABLE A:3 (CONTINUED)

Year	Annual Mean Discharge (cfs)	Maximum Daily Discharge (cfs)		Minimum Daily Discharge (cfs)		Total Discharge (ac-ft)
1938	32.5	1090	Mar 24	0	Jan 1	23,600
1939	51.7	1600	Mar 26	0	Jan 1	37,500
1940	0.24	3.5	May 7	0	Jan 1	172
1941	42.3	952	Apr 9	0	Jan 1	30,700
1942	48.7	933	Apr 9	0	Jan 8	35,200
1943	199.	4800	Apr 6	0	Feb 7	145,000
1944	25.0	595	Jun 29	0	Jan 8	18,100
1945	1.3	13.5	Apr 7	0	Aug 13	960
1946	19.3	35.8	Mar 15	0	Feb 10	14,000
1947	110.	1740	Apr 17	0	Jan 1	79,600
1948	209.	7580	Apr 24*	0	Sep 23	152,000
1949	33.6	1140	Apr 5	0	Sep 18	24,400
1950	62.0	1070	Apr 22	0	Mar 19	44,900
1951	152.	2540	May 2	0	Jan 1	110,000
1952	44.5	828	Apr 12	0	Jun 16	32,300
1953	-	1630	Jul 4	0	Jan 2	-
1954	-	214	Jun 8	0	Aug 11	-
1955	-	1900	Apr 8	0	Mar 1	-

TABLE A:3 (CONTINUED)

Year	Annual Mean Discharge (cfs)	Maximum Daily Discharge (cfs)	Minimum Daily Discharge (cfs)	Total Discharge (ac-ft)
1960	-	-	0 Jun 17	-
1961	-	0.80 Apr 20	0 Jun 21	-
1962	-	152 May 17	0 Mar 1	-
1963	-	411 Aug 26	0 Mar 1	-
1964	-	567. Aug 14	0.20 Mar 1	-
1965	-	1200. May 31		-
1966	-	900. Mar 19	0 Oct 26	-
1967	-	637 May 11	0 Mar 10	-
1968	-	24.2 Mar 6	0.05 Jun 26	-
1969	-	6940. Apr 15	0 Sept 4	-
1970	-	2450. May 9	0 Sept 20	-
Mean	54.5			39,500

* Extreme recorded for the period of record

Location Lat. 49 06 05 N

Long. 102 56 10 W

Drainage area 5,210 sq. mi.

Regulated

Source: Historical Streamflow Summary
Saskatchewan to 1973
Water Survey of Canada ENV. CAN
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SOURIS RIVER DISCHARGE (CFS) NEAR ROCHE PÉRCÉE STATION NO. 05NB009, 1956-1973

Year	Annual Mean Discharge (cfs)	Maximum Daily Discharge (cfs)	Minimum Daily Discharge (cfs)	Total Discharge (ac-ft)
1956	200.0	1430 Apr 14	0.10 Sept 21	97,100
1957	16.8	221 Mar 28	0 Mar 1*	8,170
1958	13.7	285 Apr 7	0 Mar 1	6,630
1959	16.1	408 Mar 19	0 May 11	7,820
1960	123.	1300 Apr 7	0 Mar 1	59,600
1961	2.2	90.0 Mar 17	0 Mar 1	1,060
1962	8.3	142 Mar 25	0 Mar 1	4,040
1963	15.5	218 Jun 7	0 Mar 1	7,520
1964	43.9	629 Apr 15	0 Mar 1	21,400
1969	389.	7190 Apr 15*	0.18 Aug 26	189,000
1970	275.	2640 May 10	0.01 Oct 6	133,000
1971	150	1300 Apr 15	4.0 Mar 1	72,700
1972	217.	2340 Mar 23	2.5 Mar 1	106,000
1973	6.6	74.4 Mar 10	0 Jul 13	3,220
Mean	106			51,300

* Extreme recorded for the period of record

Location Lat. 49 04 34 N

Long. 102 45 53 W

Drainage area 4,910 sq.mi.

Regulated

Source: Historical Streamflow Summary
Saskatchewan to 1973
Water Survey of Canada, ENV CAN
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TABLE A:5 HYDROMETIC DATA

SOURIS RIVER DISCHARGE (CFS) NEAR ROCHE PERCEE STATION NO. 05NB009, 1974

	<u>JAN.</u>	<u>FEB.</u>	<u>MAR.</u>	<u>APR.</u>	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>	<u>AUG.</u>	<u>SEPT.</u>	<u>OCT.</u>	<u>NOV.</u>	<u>DEC.</u>
Total	-	-	1161.5	65801	37377	4661.8	3376.8	200.87	48.12	98.4	-	-
Mean	-	-	37.5	2190	1210	155	109	6.5	1.6	3.2	-	-
AC FT	-	-	2300	13100	74100	9250	6700	398	95.4	195	-	-
Max.	-	-	200	4180	2870	443	495	26.0	4.1	4.1	-	-
Min.	-	-	1.5	270	506	25.0	7.5	0.70	0.52	2.1	-	-

Summary for the months March to October
 Mean discharge 460 cfs
 Total discharge 224,000 ac-ft
 Max. daily discharge 4,180 cfs on Apr. 25
 Min. daily discharge 0.52 cfs on Sep. 4

Source: Surface Water Data
 Saskatchewan 1974
 Water Survey of Canada, ENV CAN
 page 123

Max. instantaneous discharge 4,190 cfs on Apr. 25

TABLE A:6

THE 1976 VALUES OF ASSESSED PROPERTY IN R.M. #5, SECTIONS 10-15
 (IN DOLLARS)
Section 10

<u>LAND</u>	<u>IMPROVEMENTS</u>	<u>BUSINESS</u>	<u>TOTAL</u>	<u>TAXABLE VALUATION</u>
2,160	-	-	2,160	-
500	1,570	-	2,070	-
370	-	-	370	-
200	18,360	-	18,560	-
-	1,020	-	1,020	-
490	-	-	490	-
-	-	-	-	670
100	-	-	100	-
1,460	-	-	1,460	-
-	-	-	-	200
-	2,550	-	2,550	-
-	-	-	-	550
-	1,620	-	1,620	-
-	1,030	-	1,030	-
50	1,080	-	1,130	-
5,330	27,230	-	32,560	1,420

TABLE A:6 (CONTINUED)

Section 11

<u>LAND</u>	<u>IMPROVEMENTS</u>	<u>BUSINESS</u>	<u>TOTAL</u>	<u>TAXABLE VALUATION</u>
-	-	-	-	500
800	-	-	800	-
-	1,140	-	1,140	-
100	280	-	380	-
100	4,640	-	4,740	-
-	-	-	-	300
100	510	-	610	-
1,100	6,570	-	7,670	800

TABLE A:6 (CONTINUED)

Section 12

<u>LAND</u>	<u>IMPROVEMENTS</u>	<u>BUSINESS</u>	<u>TOTAL</u>	<u>TAXABLE VALUATION</u>
-	-	-	-	200
300	1,850	-	2,150	-
640	2,160	-	2,800	-
-	-	-	-	750
3,360	398,320	-	401,680	-
-	-	102,830	102,830	-
-	-	-	-	1,300
-	-	-	-	350
-	4,840	-	4,840	-
-	-	-	-	1,650
440	1,730	-	2,170	-
440	2,840	-	3,280	-
380	1,350	-	1,730	-
-	830	-	830	-
-	-	-	-	120
5,560	413,920	102,830	522,310	4,370

TABLE A:6 (CONTINUED)

<u>Section 13</u>				
<u>LAND</u>	<u>IMPROVEMENTS</u>	<u>BUSINESS</u>	<u>TOTAL</u>	<u>TAXABLE VALUATION</u>
-	-	-	-	1,200
-	-	-	-	500
670	-	-	670	-
670	-	-	670	1,700
<u>Section 14</u>				
470	-	-	470	-
-	-	-	-	800
-	-	-	-	600
300	5,750	-	6,050	-
100	3,770	-	3,870	-
50	-	-	50	-
170	1,620	-	1,790	-
300	340	-	640	-
100	-	-	100	-
200	-	-	200	-
1,690	11,480	-	13,170	1,400

TABLE A:6 (CONTINUED)

Section 15

<u>LAND</u>	<u>IMPROVEMENTS</u>	<u>BUSINESS</u>	<u>TOTAL</u>	<u>TAXABLE VALUATION</u>
-	-	-	-	660
-	1,190	-	1,190	-
2,530	-	-	2,530	-
340	-	-	340	-
1,100	8,060	-	9,160	-
-	-	6,830	6,830	-
-	4,040	-	4,040	-
150	1,480	-	1,630	-
150	2,450	-	2,600	-
100	460	-	560	-
4,370	17,680	6,830	28,880	660

Source: Assessment Rolls
Rural Municipality No. 5

THE 1976 VALUES OF ASSESSED PROPERTY IN R.M.#5, SPECIFIC SUBSECTIONS
(IN DOLLARS)

Sub Section	Land	Improvements	Business	Total	Taxable Valuation
N.E. of	2,160	-	-	2,160	
Section 10	500	1,570	-	2,070	
	370	-	-	370	
	200	18,360	-	18,560	
	-	1,020	-	1,020	
	490	-	-	490	
TOTAL	3,720	20,950	-	24,670	-
N.W. of	-	-	-	-	500
Section 11	-	-	1,140	1,140	
	100	280	-	380	
	100	4,640	-	4,740	
TOTAL	200	4,920	1,140	6,260	500

TABLE A:7 (CONTINUED)

<u>Sub Section</u>	<u>Land</u>	<u>Improvements</u>	<u>Business</u>	<u>Total</u>	<u>Taxable Valuation</u>
S. W. of	-	-	-	-	600
Section 14	300	5,750	-	6,050	
	100	3,770	-	3,870	
	50	-	-	50	
	170	1,620	-	1,790	
	300	340	-	640	
	100	-	-	100	
	200	-	-	200	
TOTAL	1,220	11,480	-	12,700	600
S. E. of	-	-	-	-	660
Section 15	-	1,190	-	1,190	
	2,530	-	-	2,530	
	340	-	-	340	
	1,100	8,060	-	9,160	
	-	-	6,830	6,830	
	-	4,040	-	4,040	
	150	1,480	-	1,630	
	150	2,450	-	2,600	
	100	460	-	560	
TOTAL	4,370	17,680	6,830	28,880	660

COMPARISON OF THE VALUES FROM THE 1976 ASSESSMENT ROLLS AND CERTIFICATES OF TITLE
(FROM VARIOUS YEARS) OF N.E. SECTION 10, N.W. SECTION 11, S.W. SECTION 14, S.E. SECTION 15
TO TOTAL SECTIONS 10-15 INCLUSIVE OF R.M. #5

ASSESSED VALUES					LAND TITLES			
\$ Land	\$ Improvements	\$ Business	\$ Total	\$ Tax Valuation	% Change in title since 1970	\$ Value	% Change in title since 1970	
3,720	20,950	-	24,670	-	33.3%	35,100	62.5%	NE. Sect. 10
200	4,920	1,140	6,260	500	50.0%	-	50.0%	NW. Sect. 11
1,220	11,480	-	12,700	600	37.5%	26,425	50.0%	SW. Sect. 14
4,370	17,680	6,830	28,880	660	20.0%	107,470	50.0%	SE. Sect. 15
9,510	55,030	7,970	72,510	1,760		168,995		Total 1
13.11%	75.89%	10.99%	100.0%					% of total 1
5,330	27,230	-	32,560	1,420	40.0%	104,075	55.0%	Sect. 10
1,100	6,570	-	7,670	800	57.1%	10,025	37.5%	Sect. 11
5,560	413,920	102,830	522,310	4,370	33.3%	323,860	62.5%	Sect. 12
670	-	-	670	1,700	50.0%	29,959	60.0%	Sect. 13
1,690	11,480	-	13,170	1,400	27.3%	42,025	41.6%	Sect. 14
4,370	17,680	6,830	28,880	660	20.0%	107,470	50.0%	Sect. 15
18,720	476,880	109,660	605,260	10,350		617,414		Total 2
3.09%	78.78%	18.11%	100.0%					% of Total 2
50.80%	11.54%	7.27%	11.98%	17.00%		27.37%		Total 1 as % of Total 2

Source: Land Titles Office
Regina, Saskatchewan

TABLE A:9

THE NUMBER OF CHANGES RECORDED IN THE ASSESSED PARTY FOR EACH ASSESSED
PROPERTY DURING 1968-1976, FOR SECTION 10-15 INCLUSIVE OF RM #5

Year of Record	Section 10			Section 11			Section 12			Section 13			Section 14			Section 15				
	C		N/C	C		N/C	C		N/C	C		N/C	C		N/C	C		N/C		
	1	2		3	1		2	3		1	2		3	1		2	3		1	2
1968	3	2	4	2		1	2	1	1	5	2		2	1	1	1	4	1	6	
1969																	1			
1970							1												1	
1971																				
1972																				
1973					1	1														
1974	1		5	1		1			4							3	1		1	
1975									1											
1976																				
TOTAL	4	2	9	3	1	3	3	1	1	10	2		2	1	1	1	8	1	1	8
% of changes to total	40.0%			57.1%			33.3%			50.0%			27.3%			20.0%				

C - the number of times a change was recorded in the assessed party for each assessed property

N/C - no change

TABLE A:10

NUMBER OF CHANGES OF "ASSESSED TO" ON THE ASSESSMENT
ROLLS OF R.M.#5, 1968-1974 SPECIFIC SUBSECTIONS

Year Of Record	N.E. OF SECTION 10			N.W. OF SECTION 11			S.W. OF SECTION 14			S.E. OF SECTION 15		
	C		N/C	C		N/C	C		N/C	C		N/C
	1	2		3	1		2	3		1	2	
1968	1		2	1		1	1	1	3	1		6
1969									1			
1970												1
1971												
1972												
1973					1							
1974	1		2			1			1	1		1
1975												
1976												
TOTAL	2		4	1	1	2	1	1	5	1	1	8

% of changes

to total 33.33%

50.00%

37.50%

20.00%

C = the number of times a change was recorded in the assessed party for each assessed property

N/C = no change

TABLE A:11

THE VALUE OF EACH RECORDED PROPERTY AS SHOWN ON THE CERTIFICATES OF TITLE,
SECTIONS 10-15, R.M.#5

<u>Section 10</u>			
<u>\$</u> <u>Value</u>	<u>Date</u>	<u>\$</u> <u>Value</u>	<u>Date</u>
17,500	15-10-58	26,500	10- 4-68
12,000	2- 3-72	5,000	2- 3-72
7,500	1- 9-71		
2,500	2- 3-72	104,075	
6,000	2- 3-72		
-	2- 3-72		
100	29- 5-62		
400	29- 5-62		
500	2- 3-72		
1,000	6- 7-62		
50	3- 9-69		
16,000	2- 3-72		
-	2- 3-72		
25	13- 5-70		
100	13- 8-65		
400	22 -3-60		
2,000	2- 3-72		
6.500	29- 6-64		

55% of the total recorded titles in this section have had a change in title since 1970.

TABLE A:11 (CONTINUED)

<u>Section 11</u> \$ <u>Value</u>	<u>Date</u>	<u>Section 12</u> \$ <u>Value</u>	<u>Date</u>
1	4- 4-62	9,250	13-12-65
24	4- 4-62	1,000	2- 3-72
-	22-11-62	590	1- 6-72
-	25- 9-68	200	28-12-66
-	2- 3-72	11,000	2- 3-72
10,000	11- 5-70	100,000	26- 5-75
-	24- 2-64	2,400	21- 3-63
-	23- 2-76	18,000	25- 7-74
<hr/>		18,000	5- 6-72
10,025		125,000	2- 3-72
		150	28-12-66
		350	2- 3-72
		10,000	22- 5-75
		20,000	4- 3-66
		1,920	2- 3-72
		6,000	21- 3-63
		<hr/>	
		323,860	

37.5% of the total recorded titles in this section have had a change in title since 1970.

62.5% of the total recorded titles in this section have had a change in title since 1970.

TABLE A:11 (CONTINUED)

<u>Section 13</u>			<u>Section 14</u>	
\$ Value	<u>Date</u>		\$ Value	<u>Date</u>
3,520	25- 5-72		8,800	10-11-59
-	18- 9-63		400	7- 3-72
3,000	10- 4-73		200	29- 7-69
-	2- 3-72		50	7- 3-72
-	2- 3-72		150	29- 7-69
99	13-12-71		14,500	28- 7-75
8,440	25- 5-72		6,000	18- 6-68
13,000	23- 6-65		800	31- 1-68
1,200	26- 7-63		1,000	16- 3-73
700	18- 1-60		50	13-12-66
-----			10,000	9- 2-67
29,959			75	7- 3-72

			42,025	

60% of the total recorded titles in this section have had a change in title since 1970.

41.66% of the total recorded titles in this section have had a change in title since 1970.

TABLE A :11 (CONTINUED)

Section 15

<u>Value</u>	<u>Date</u>
50	7- 3-72
25,000	20- 8-56
7,000	26-12-65
16,000	1- 5-75
50,000	17- 8-64
920	7- 3-72
5,000	1- 2-65
3,500	7- 3-72

107,470

50% of the total recorded titles in this section have had a change in title since 1970.

TABLE A:12
 THE VALUE OF EACH RECORDED PROPERTY AS SHOWN ON THE
CERTIFICATES OF TITLE, SPECIFIC SUBSECTIONS, RM#5

N.E. OF SECTION 10		N.W. OF SECTION 11		S.W. OF SECTION 14		S.E. OF SECTION 15	
<u>\$</u> <u>Value</u>	<u>Date</u>	<u>\$</u> <u>Value</u>	<u>Date</u>	<u>\$</u> <u>Value</u>	<u>Date</u>	<u>\$</u> <u>Value</u>	<u>Date</u>
17,500	15-10-58	-	25- 9-68	14,500	28- 7-75	50	7- 3-72
7,500	1- 9-71	-	<u>2- 3-72</u>	800	31- 1-68	25,000	20- 8-56
2,500	2- 3-72			1,000	16- 3-73	7,000	26-12-65
6,000	2 -3-72			50	13-12-66	16,000	1- 5-75
-	2- 3-72			10,000	9- 2-67	50,000	17- 8-64
100	29- 5-62			<u>75</u>	<u>7- 3-72</u>	920	7- 3-72
500	2- 3-72					5,000	1- 2-65
<u>1,000</u>	<u>6- 7-62</u>					<u>3,500</u>	<u>7- 3-72</u>
Total 35,100		-		26,425		107,470	
% change in title since 1970	62.5%		50.0%		50.0%		50.0%

APPENDIX B

PHOTOGRAPHS



GRID ROAD BRIDGE (B:1)



ESTEVAN CENTENNIAL BRIDGE (B:2)



LAMB'S CROSSING (B:3)



CPR DAM (B:4)



FOOT BRIDGE (B:5)



HIGHWAY BRIDGE (B:6)



ESTEVAN DIVERSION CHANNEL (B:7)



ESTEVAN DIVERSION DAM (B:8)



ESTEVAN DIVERSION BRIDGE (B:9)



CPR BRIDGE (B:10)



STEEL TRUSS BRIDGE (B:11)



CONFLUENCE DAM (B:12)