THE UNIVERSITY OF MANITOBA

WHEAT BOARD QUOTA AND PROPERTY TAX INCENTIVES: AN INVESTIGATION OF LANDOWNER ATTITUDES TOWARDS A PROPOSED NATURAL LAND CONSERVATION PROGRAM

by

© Robert D. Milani

A thesis submitted to the Faculty of Graduate Studies in Partial Fulfillment of the Requirements for the Degree of Masters of Arts.

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A thesis submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements of the degree of

MASTER OF ARTS

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ABSTRACT

Current Wheat Board quota and municipal property tax policies have been widely criticized for inadvertently promoting the conversion of marginal and sensitive natural areas to cultivation on Canada's prairie farmland. The primary objective of this study is to assess the attitudes of farm operators towards the concept of receiving combined quota and property incentives for conserving natural areas and returning marginal cropland to native cover.

Fifty randomly selected landowners from each of the Rural Municipalities of Albert and Argyle in southwestern Manitoba were interviewed using a standardized attitudinal questionnaire during January - March 1986.

Sixty % of the sample landowners had either drained or totally cultivated some wetlands on their property during the last ten years (1976-86). Sixty % and 25 % had cleared some woodland and grassland acreage respectively. Total natural area converted was approximately 4,700 acres. Over half of the respondents who had converted natural areas indicated that they were at least partially motivated to do so by existing quota and property tax regulations. A great deal of the land conversion motivation caused by the tax system appears to be the result of landowners' misconceptions regarding the per acre assessment rates of their natural acreages. Most respondents felt they were familiar with these rates, yet 55 % cited rates that were higher than they actually are.

Ninety-one % of the surveyed landowners indicated that they were in favor of the proposed Wheat Board quota and property tax incentive package.

Twenty-five % of the respondents indicated that they planned to convert an average of 24 acres of wetlands each, over the next five years (1986-91). Thirty-four % and 9 %, planned to convert an average of 34 acres of woodland and 111 acres of grassland respectively, over the same period. Implementation of the proposed incentives would apparently motivate over 60 % of these landowners to retain at least a portion of the natural land they originally intended to convert. Based on a rough estimate procedure, approximately 1126 acres (41 %) of the 2776 acres of natural land originally designated for conversion would be retained. Additionally, nearly one-third of the respondents indicated that the proposed incentives would motivate them to return a total of 1100 acres of marginal cropland to native cover.

The proposed incentives would apparently not target a specific subset of the farm population, but would instead have a general influence on conservation throughout the farm community.Thirteen recommendations pertaining to the effective implementation of the proposed incentives resulted from the study.

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Chapter 1

INTRODUCTION

The farmlands of Canada's Prairie Provinces are rapidly undergoing a transition from a rich mosaic of natural grasslands, woodlands, wetlands, croplands and pastures, into a landscape dominated by monoculture croplands (Cowan 1984, Environment Canada 1985). Paralleling society's growing awareness of the environmental functions that a diverse landscape performs has been a growing interest in the development of landowner oriented habitat[1] conservation programs. This study investigates the potential of one such program. More specifically, it investigates landowner attitudes towards hypothetical modifications to existing property tax and Wheat Board quota regulations that are designed to provide incentives to conserve natural areas on privately owned farmland. In order to properly set the stage for this study a rather thorough presentation of background information relating to the current "crisis of natural habitat destruction" is required.

1.1 BACKGROUND

Privately owned farmland occupies nearly eighty percent[2] of the land area in the agricultural zone of the Canadian Prairie Provinces (Map 1.1). Although more than two-thirds[2] of this privately owned land has been cultivated for use as croplands and tame pasture, the remaining uncultivated areas constitute the largest and the most productive supply of wildlife habitat in the region (McCuaig and Manning 1982). Consisting primarily of wooded-bluffs, sloughs, small potholes, ravines and native pasture; the uncultivated or natural areas of a farm also perform a variety of protective functions (see Greeson et al. 1979, Richardson 1981) which are critical to maintaining the long-term health of the entire prairie land base. Despite a growing awareness of these wildlife and landbase functions, a paradoxical situation exists in that natural lands continue to be subjected to drastic change through the indiscriminate breaking, clearing and draining of areas that are at best marginal for agriculture (Sawatzky 1979). Since 1951, nearly fifteen million acres[3] of privately

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[1] The term habitat will be used interchangeably with the term natural land, and refers to the "unimproved" or uncultivated portion of a farm.

[2] Estimated using land use statistics from the most recent (1986) Agricultural Census of Canada, Statistics Canada

[3] Since farmland is surveyed according to the Township - Range System,and since the Canadian Wheat Board Quota System is acreage based, the English System of

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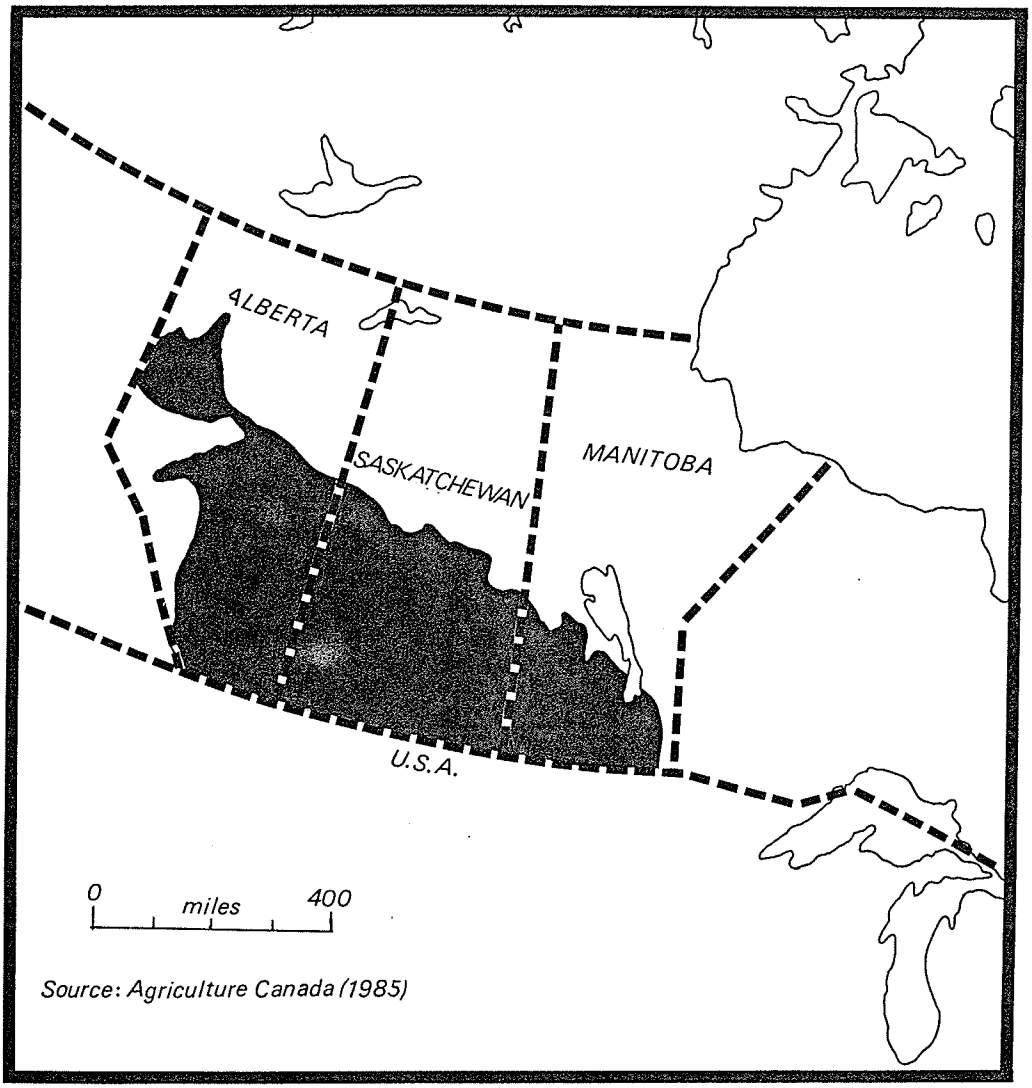

MAP 1.1 Agricultural zone of the Canadian Prairie Provinces

owned natural areas have been lost to agricultural encroachment on the Prairies (Statistics Canada 1986). This loss, which represents a one-third reduction in only thirty-five years, has had serious negative impacts on prairie wildlife and together with poor land management practices has resulted in serious land degradation problems which now threaten the long-term viability of the entire agricultural industry(Simpson-Lewis et al. 1983, Bircham and Bruneau 1985). Alarmingly, the current rate of natural land destruction has been accelerating since the early 1960's (Cowan 1984).

The remainder of the background section summarizes the wildlife and land impacts associated with the accelerating loss of natural lands, explains the factors responsible for the loss, and finally, reviews past failures and new initiatives in the formulation of landowner-oriented habitat conservation programs.

1.1.1 Wildlife Impacts of Natural Land Conversion

Central Canada's prairie wetland complexes, which consist of a diverse mixture of shallow temporary ponds, larger permanent ponds and upland nesting cover (Stewart and Kantrud 1982, Brace and Pepper 1985), produce nearly two-thirds of North America's waterfowl (Jahn 1969, Bellrose 1980). The drainage and/or cultivation of these complexes, and the resultant impacts on waterfowl, have long been recognized as the most serious wildlife impact of natural land conversion (Lynch-Stewart 1983). More than 40 percent of Canada's original prairie wetlands have been permanently eliminated by drainage or cultivation (Roberts 1980). The majority of the remaining wetland complexes have been affected by transitory impacts such as grazing, haying and edge cultivation (Lynch-Stewart 1983, Manitoba Department of Natural Resources 1986[a]). Rakowski and Jurick (1984) stress that not only has the wetland habitat base been drastically reduced, but so has the ability of the remaining habitat to produce waterfowl. Nesting success, one of the best indicators of habitat quality, declined from an estimated 55 percent in 1948, to only 15 percent in 1975. Taking into consideration the overwhelming importance of Canada's prairie wetlands to breeding waterfowl, the two-pronged attack of reductions in habitat area and reductions in habitat quality could spell disaster for North America's waterfowl.

Although statistics for the entire agricultural zone of Prairie Canada are lacking, the elimination of natural areas on privately owned farmland is also affecting most other wildlife habitats. Since 1960, over 40 percent of Manitoba's farmland wooded areas

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measurement is used throughout the text. Use of both measurements would become awkward and cumbersome.

(particularly those identified as white tailed deer winter range) have been lost to agricultural encroachment. Considering that 60 to 70 percent of Manitoba's deer herd is produced on privately owned farmland, this trend does not bode well for this species (Goulden 1980).

Upland gamebirds such as the greater prairie chicken (Tymphanuchus cupido) now virtually extinct, as well as a variety of other species, have also been negatively affected by agricultural encroachment (Kirsch et al. 1983). Excessive breaking and cultivation of native grassland and pastures poses the greatest threat to these species. In the Hamiota region of Manitoba, native grassland was reduced on estimated 31 percent during a ten year period beginning in 1964 (Adams and Gentle 1978). Swenson (1985) notes that biologists agree that the conversion of native grassland to cropland has been the major factor leading to the decline of sharp-tailed grouse (Tymphanuchus phasianellus), in many parts of its range. Excessive conversion of native fescue grasslands to cultivation in a southern Alberta study area, resulted in the elimination of virtually all previously existing avian species (Owens and Myers 1972).

Although the trend of accelerating habitat loss has had serious impacts on wildlife, declining wildlife populations are symptomatic of a much wider environmental decay to the entire land base itself (Karr 1981).

1.1.2 Land Base Impacts of Natural Land Conversion

Land degradation problems such as soil erosion, loss of organic matter and soil salinization now affect over seven million acres of agricultural land on the Prairies, and are costing farmers approximately $550 million annually in reduced yields and higher input costs (Prairie Farm Rehabiliation Administration 1983, Anderson and Knapik 1984). The Standing Senate Committee on Agriculture, Fisheries and Forestry (1984), accurately describes the urgency of the situation, reporting that the Canadian Prairie Region is facing the most serious environmental crisis in its history and unless action is taken quickly, will lose a major portion of its agricultural capability.

Although destructive farming practices such as summerfallowing and excessive tillage are to a major degree responsible for the degradation of prairie farmland (Coote et al. 1981, Simpson-Lewis et al. 1983) the indiscriminate breaking and draining of agriculturally marginal natural lands and the resultant loss of the protective functions they perform, has magnified the severity of many land degradation problems (Agriculture Canada 1984). For instance, the elimination of wetlands and wooded prairie bluffs, which collectively act to temporarily capture local water surplus created by spring runoff and intense prairie storms, has increased down slope flooding and erosion of croplands (Rannie

1980, Brun et al. 1981, Hubbard and Linder 1986). Increased runoff from croplands, in turn reduces downstream water quality by increasing the silt load of rivers, as well as the concentration of pollutants originating from agricultural chemicals and fertilizers (Boto and Patrick 1978, Van der Valk et al. 1978). Wetland drainage and the clearing of wooded areas may also reduce the quantity and quality of groundwater supplies (Kloet 1971), accelerate the problem of wind induced soil erosion (Prairie Farm Rehabilitation Administration 1983), and may ultimately be related to the consistency of crop production (Kiel et al. 1972). Finally, drainage of wetlands and the breaking of adjacent edge vegetation can lead to the expansion of cropland salinity from naturally ocurring saline areas (Osborne 1979).

Clark (1985) stresses that the "off-farm" impacts of natural land conversion such as sediment deposition in roadside ditches and drains; agricultural pollution of municipal water supplies; flood damage to bridges, culverts and townsites; declining commercial fish stocks (eutrophicaton of lakes and silting over of spawning areas); and lost recreational opportunities; are in all likelihood even more costly than "on-farm" damages.

1.1.3 Factors Responsible for the Loss of Natural Lands

The loss of uncultivated natural areas in the agricultural zone of Canada's Prairie Provinces has almost exclusively been the result of private land clearing and drainage "improvements"[1] undertaken by individual farms operators (Kiel et al. 1972, Rakowski and Chabot 1983). Since farmers have the final say as to the fate of their natural areas, it follows that the reasons for the decline of such areas can ultimately be traced to a variety of factors which bias farmers' land-use decision-making process (McCuaig and Manning 1982). The factors which motivate farm operators to drain and clear natural areas have been reviewed in several studies (Goldstein 1971, Leitch and Danielson 1979, Zittlau 1979, Burger and Teer 1981, Sugden 1984, Napier et al.1986) and can be catergorized as follows:

[1] The terms improve and improvement are commonly used by the agricultural community to describe the process of draining or clearing natural areas for cultivation. However, since most of the remaining natural areas in the Prairie Region are of marginal agricultural capability, the process can usually be more accurately described as mutilation. In recognizing the short-comings of these terms, they are presented as "improve" and "improvement" throughout the text. The term convert is also used to describe the process of "improving" natural areas.

1. short-term economic pressures
2. technological change
3. environmental education inadequacies
4. governmental policy and regulation inadequacies

Short-term economic considerations are often considered the most important factors motivating farmers to "improve" agriculturally marginal natural areas (Leitch and Danielson 1979, Bishop 1981, Manning 1986). Farmers' perception of the value of natural lands has depended primarily on the land's conversion to more "productive" uses (Lynch-Stewart 1983). The monetary value of an extra acre of cultivated land, an extra tonne of grain, or the immediate reduction in operating costs associated with the removal of a straight-line-tillage obstacle, is easy to quantify and provides the farmer with a direct and immediate source of income (Shabman 1980). On the other hand, the value of the environmental functions that natural areas perform are usually almost completely ignored since they do not provide the farmer with an immediate and realizable source of income. Furthermore, the environmental costs associated with the conversion of natural areas are not reflected in farmers' land improvement decision making processes, since the greatest portion of the costs occur over larger geographic areas and consequently are costs which the farmer does not bear when the conversion is made (Sayler et al. 1984).

Since short-term economics assigns a greater value to a drained wetland or cleared bluff than to one in its natural condition, it follows that in face of high production costs and low commodity prices, farmers have become almost intolerant of any acre not producing an immediate source of income (Beattie et al. 1981). In response to this cost-price squeeze, farmers have attempted to capture economies of scale by increasing the percentage of land under cultivation, expanding the size of fields, and abandoning ecologically-oriented mixed grain and livestock operations in favor of resource consuming monocultural grain operations (The Standing Senate Committee on Agriculture, Fisheries and Forestry 1984). In order to accommodate the trend towards larger and more specialized operations, agriculturally marginal natural lands and pastures are often being converted or "improved" in ways that can be more accurately described as mutilation (Sawatzky 1981). In turn, the trend towards larger farms has been accompanied by a dramatic increase in the size of farm machinery, which in turn, has accelerated the destruction of small habitat features such as potholes, bluffs and fenceline cover, since field practices can no longer be finely tuned to the natural details of the landscape (Sawatzky 1979). Unfortunately, increased reliance on borrowed capital to finance the expansion of agricultural operations, in combination with rising interest rates, has only served to exacerbate the cost-price squeeze crisis and further intensify short-term economic pressures to develop agriculturally marginal natural lands.

Morgan (1985) accurately summarizes the impact of intensifying economic pressures on natural land conversion:

> The result is that, to pay off high interest loans quickly, more marginal land is "improved", equipment and cropping units are purchased with borrowed money, causing further "improvements" to marginal lands to pay off these loans. This vicious circle has led many landowners to complete dependence upon financial institutions and governments. For some it has meant bankruptcy. In the process, wildlife habitat is destroyed, soils are degraded, family farms are gobbled up by corporate agri-businesses, and the long-term viability of the land base is threatened.

Farm equipment manufacturers reinforce the problem by focusing on techniques to increase production at the expense of more environmentally sustainable technologies (Agriculture Canada 1984), at the same time there is a tremendous lack of education in the minds of the general public and farm community insofar as habitat destruction and land degradation issues are concerned (Nowak 1984, The Standing Senate Committee on Agriculture Fisheries and Forestry 1984, Napier et al. 1986).

Although the steady decline of natural habitat is driven by economic pressures, technological change and the dismal state of environmental education, it has been suggested that the whole process is catalyzed by legislative policies and regulations that inadvertently provide incentives for farmers to incorporate agriculturally marginal lands into their operations (Sawatzky 1979, Zittlau 1979, Ryder and Boag 1981, Manitoba Environmental Council 1985). Policy reviews by Rakowski and Jurick (1980) and Weiss (1982), identified and described 12 federal and 16 provincial statutes that could potentially bias farmers land use decision making process (Tables 1.1 and 1.2). The overriding principle governing the programs and regulations associated with these statutes is the facilitation of land "improvements" such as wetland drainage and bush clearing. For example, provincial and federal cost sharing agreements, subsidy programs, as well as low interest loans and income tax deductions for land conversion,all serve to increase the profitability of marginal land conversion, thereby making it more attractive to farmers (Weiss 1982). Programs and policies such as the Feed Freight Assistance Program and Western Grain Transportation Policy, which promote single purpose grain farms as opposed to more diversified farming operations also contribute to the problem (Pidgeon 1984, The Standing Senate Committee on Agriculture Fisheries and Forestry 1984).

Although there has not been sufficient research to quantitively determine the impact of the various governmental policies (Pidgeon 1984), most researchers agree that the most

Table 1.1 Summary of federal legislation impacts on natural land conversion

Federal Department	Legal Instrument	Classification of Potential Impact on Natural Areas[1]
Agriculture	Dept. of Agriculture Act	Category 1
	Farm Credit Act	Category 3
	Farm Improvement Loans Act	Category 2
	Farm Syndicates Credit Act	Category 2
	Agricultural Stabilization Act	Category 1
Regional Economic	Dept. of Regional Economic Expansion Act	Category 3
	Agricultural and Rural Development Act	Category 3
	Prairie Farm Rehabilitation Act	Category 3
National Revenue	Income Tax Act	Category 3
	Excise Tax Act	Category 1
Transport	Canadian Wheat Board Act	Category 3
Industry, Trade and Commerce	Federal Business Development Act	Category 1

[1] Category 1 - Impact on natural areas not recognizable or recognizable but of very limited significance
Category 2 - Impact on natural areas recognizable but not readily quantifiable
Category 3 - Impact on natural areas observable, significant and possibly quantifiable

Modified from Weiss (1982)

Table 1.2 Summary of Manitoba legislation impacts on natural land conversion

Provincial Department	Legal Instrument	Classification of Potential Impact on Natural Areas[2]
Agriculture	Dept. of Agriculture Act	Category 1
	Land Rehabilitation Act	Category 2
	Agricultural Productivity Council Act	Category 1
	Agricultural Credit Corporation Act	Category 2
	Agricultural Societies Act	Category 1
	Agricultural Lands Protection Act	Category 1
Natural Resources	Water Rights Act	Category 2,3
	Water Resources Administration Act	Category 2
	Conservation Districts Act	Category 2,3
	Crown Lands Act	Category 1
	Wildlife Act	Category 1
Municipal Affairs	The Municipal Act	Category 3
	The Municipal Assessment Act	Category 3
	The Planning Act	Category 3
	Expropriation Act	Category 1
Highways and Transportation	The Highways Department Act	Category 2,3

[2] Category 1 - Impact on natural areas not recognizable or recognizable but of very limited significance
Category 2 - Impact on natural areas recognizable but not readily quantifiable
Category 3 - Impact on natural areas observable, significant and possibly quantifiable

Modified from Weiss (1982)

influential statutes promoting the draining and clearing of natural lands are those pertaining to the regulations governing the Canadian Wheat Board quota and municipal property tax systems (Sawatzky 1979 1981, Zittlau 1979, Ryder and Boag 1981, Brace and Pepper 1984, Morgan 1985, Wildlife Habitat Canada 1987[b]). The manner in which these regulations promote the "improvement" of agriculturally marginal lands will be discussed in more detail later in this Chapter.

1.1.4 Natural Land Conservation on Private Land: Past Failures and New Initiatives.

Programs and techniques for conserving natural areas on privately owned farmland have been reviewed and evaluated by numerous researchers (Colpitts 1974, Gottschalk 1977, Deknatel 1979, McConnell 1981, Haigis and Young 1983, Scarth 1983, Teer et al. 1983, Rakowski and Jurick 1984, Morgan 1985, Wigley and Melchoirs 1987). Initial efforts to maintain privately owned natural areas on the Canadian Prairies focused primarily on wildlife habitat oriented land acquisition programs undertaken by government agencies, and long-term easement programs undertaken by Ducks Unlimited (Bossenmair 1978).

Acquisition programs typically involve the purchase of the "entire bundle of rights" held by a landowner, and are often referred to as the acquisition of fee-simple interest in the land (Roe 1976). The provincial wildlife agencies of Alberta, Saskatchewan and Manitoba, all have acquisition programs to protect habitat, however most of these programs were more active in the past (Scarth 1983). Most of the land acquired by these agencies is placed into Wildlife Management Areas, and is typically open to the public. Acquisition of Manitoba's Wildlife Management Areas began in 1961 and was funded by a variety of sources including agreements in the Agricultural and Rural Development Act (Manitoba Department of Natural Resources 1987). Taking into consideration that an area of natural land equal to the entire area of Agro-Manitoba's existing Wildlife Management Areas (157,390 acres) is converted to cultivation, each year (Manitoba Department of Natural Resources 1985), the present acquisition program represents little more than a "feeble rearguard" attempt at slowing the juggernaut of so-called "land improvement" (Sawatzky 1979). Although on the surface, an intensified large-scale acquisition program appears to be a simple solution to this problem, this alternative would be hampered by several practical and financial constraints. The first and most obvious constraint is the excessive cost associated with the purchase of private farmland, which makes the acquisition of even modest, let alone large-scale areas virtually impossible (Sawatzky 1979, Haigis and Young 1983, Rakowski and Jurick 1984). Secondly, there are additional costs associated with

managing the land once its been purchased. These include controlling noxious weeds, improving the area for wildlife and monitoring public access (Scarth 1983). Thirdly, even if adequate funds were available, landowners are generally very unwilling to give up proprietary rights to isolated parcels of land on their property. Aggressive wetland acquisition activities by the U.S. Fish and Wildlife Service in North Dakota, have only served to polarize farmers in the state as anti-wildlife, and as a result many landowners perceive conservation programs of all types as antithetical to agricultural interests and generally view them with distrust (Smutko 1982).

Ducks Unlimited's habitat conservation program has been in operation since 1938 in the Prairie Provinces (Duffus 1984). It is based on a long-term free easement program with private landowners and deals primarily with developing and restoring wetlands. Although 91 percent of Ducks Unlimited habitat projects have been developed on privately owned land, only 15 to 20 percent of the acreage that it has developed has been secured on private land. The remaining percentage was developed on crown land (Rakowski and Jurick 1984). Since Ducks Unlimited's program has traditionally been dependent on bargaining with landowners for such things as flood control and irrigation water supplies, it has generally been restricted to larger marshes where these developments are feasible (Duffus 1984). As a result the program has failed to secure smaller, more vulnerable wetlands and their associated uplands. Land acquisition programs also fall short in this respect, since they tend to focus on developing isolated blocks of habitat, rather than on maintaining an ecologically diversified landscape. A conservation program that strives to integrate a mosaic of natural and cultivated land into actual farming operations, as opposed to a program that creates isolated reserves of habitat within a sea of cultivated land, makes more sense from both a wildlife and agriculture perspective, since it enhances the ability of the landscape to perform its environmentally protective and wildlife supportive functions.

Since habitat managers' traditional focus on land acquisition has failed to curtail the loss of privately owned natural areas, a variety of new alternatives are now being considered. Taking into consideration the financial constraints and public opposition to direct land acquisition, habitat managers have been forced to rely on alternatives that maintain private ownership, yet achieve public conservation goals (Bishop 1981). These private habitat conservation alternatives are endless and include approaches such as zoning and environmental laws (Roe 1976); short-term conservation easements, restrictive covenants and land and water banking programs (Womach 1977, Sidle 1981); loan and mortgage relief programs (Prism Environmental Consulting Services 1987, Valleau 1987); tax incentive programs (Madsen and Petersen 1981); as well as technical assistance and education programs (Ward and Pierce 1981).

Rather than provide descriptions of the wide range of options available, the remainder of this discussion will focus on the requirements of a successful private land habitat program. Before discussing these requirements it must be emphasized that there is no single simple solution to the problem of habitat loss on private land. Most habitat managers agree that the only way to achieve desired conservation goals is through the use of a strategic combination of all available options (Morgan 1985). Since it is ultimately the decisions and actions of individual landowners excercising their rights of private ownership that dictate the fate of natural areas, it is of crucial importance that private habitat programs be fostered in context with landowners' decision making process (Applegate 1981). In other words, a decentralized "grassroots" approach, which focuses on the landowners' role as decision maker, is a vital ingredient to a successful program. The key to this "grassroots" approach is a "carrot" or incentive approach, as opposed to a "stick" or punitive approach (Sorenson et al. 1984). Punitive approaches such as penalties for draining wetlands, focus on adversarial rather than consensual relationships and lead to confrontation rather than cooperation between wildlife and agricultural interests. The result of which predictably is the development of a negative attitude towards conservation in general, as well as reductions in the effectiveness of all other habitat programs which depend on landowner cooperation. On the other hand, a positive approach such as financial incentives for maintaining natural lands, will generate local support for conservation and may in time lead to the formulation of a land ethic within the farm community. Several researchers, most notably Svoboda (1980), maintain that until a land ethic permeates society, economic incentives must be relied upon to promote the benefits of conservation programs.

In concluding the requirements for a successful habitat program it is crucial that the program be acceptable to the landowner. Landowner studies have shown that in nearly all cases farmers have cited the need to maintain control of their farming decisions (Christensen and Norris 1983, Smutko 1984, Morgan 1985). In other words, although habitat programs should be integrated into existing land management operations, they should still allow farmers managerial felexibility. Finally, to be successful habitat conservation programs must integrate the short-term profitability needs of the farmer, with the long-term land enhancement needs of society (Meine 1987).

In response to the growing need to develop solutions to the problem of habitat loss on Prairie Canada's privately owned agricultural land, provincial and federal governments, along with private wildlife agencies, have recently developed several habitat oriented programs, corporations and plans (Manitoba Department of Natural Resources 1986[b]).

These conservation efforts include privately established Habitat Trust Funds[1]; provincially chartered Habitat Heritage Corporations[2]; federally chartered Wildlife Habitat Canada[3]; and the North America Waterfowl Management Plan[4], a joint project agreement between Canada and the United States. Although land acquisition programs play an important role in securing key habitat areas such as waterfowl staging marshes (Duffus 1984), new initiatives being stressed by Wildlife Habitat Canada, Ducks Unlimited and the North American Waterfowl Management Plan, appear to have a much greater potential for curtailing the widespread loss of natural habitat on privately owned agricultural land. All of these organizations realize that while it is unrealistic to purchase vast tracts of habitat, the development of decentralized farmer-oriented habitat programs, which keep land under private ownership, could cumulatively maintain a large portion of the remaining "unimproved" land in its natural uncultivated state.

Although Wildlife Habitat Canada places a great emphasis on developing such programs, one of its biggest challenges and highest priorities is to influence the background government policies and regulations currently inadvertently promoting the draining and clearing of agriculturally marginal natural lands (Wildlife Habitat Canada 1984 and 1987[a]). This study focuses generally on this challenge and in particular focuses on the role of two specific legislative policies.

1.2 Focus of the study

Although a wide range of economic, technological and educational factors

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[1] Includes programs such as the Manitoba Wildlife Federation Trust Fund, established in 1982. Most habitat has been secured through acquisition and donations. Funding provided by wildlife affiliated private clubs and government wildlife agencies (Bean 1988 pers. comm.)

[2] Includes programs such as the Manitoba Habitat Heritage Program, which was established in 1984 when the provincial government set aside $250,000 to initiate the program. Program aimed at protecting key fish and wildlife habitats through acquisition, leases, and habitat development projects (Manitoba Department of Natural Resources 1986[a] 1986[b]).

[3] National non-profit organization dedicated to the conservation, restoration and enchanement of habitat. It was established in 1984 and derives the majority of its revenue from the sale of Migratory Bird Hunting Stamps, that must be purchased by all waterfowl hunters. Over two million dollars was invested in private land habitat programs in Alberta, Saskatchewan and Manitoba in 1986-87 (Wildlife Habitat Canada 1987[a]).

[4] Plan released in 1985 and was approved in spring of 1986. Establishes population goals for various waterfowl species and the habitat requirements for reaching these goals. Plan will emphasize alternatives to land acquisition, less than 17 percent of habitat will be secured using acquisition. Approximately one billion dollars will be made available in Canada's Prairie Region (Environment Canada 1985, Lands Directorate 1986).

influence farmers land "improvement" decision making processes (see Section 1.1.3), this study is based on the premise that anachronistic government institutions, insensitive to the negative incentives they impose on farm-level decision making, play an important role in eliciting a farmer's decision to drain or clear agriculturally marginal natural land (Sawatzky 1979). More specifically, this study focuses on the land use decision making role of the regulations evolving from two particular government institutions: 1) the Canadian Wheat Board Delivery Quota Allotment System and 2) the Department of Municipal Affairs assessment and taxation of privately owned farmland.

The major short-coming of the quota system can be traced to the formula or regulations which determine a farmer's delivery quota entitlement. According to this formula, natural or "unimproved" land, must be cultivated or "improved", before it can be included in a farmer's delivery quota entitlement. Taking into consideration the chronic difficulties farmers have in marketing their crops, this stipulation inadvertently creates an incentive for farmers to "improve" agriculturally marginal natural land, not because of its crop producing potential, but simply to acquire marketing rights to larger volume of grain.

This unfortunate situation is in turn aggravated by a system of municipal land taxation that places a value on , and taxes, all farmland regardless of whether or not it is agriculturally productive. Although marginal areas such as wetlands and wooded slopes are assessed at a lower rate than high quality cropland, no breakdown reflecting this variation is provided in tax billings. Since the billings merely state the gross assessed value of each parcel of land (typically a quarter section), a farmer may logically respond as though each acre is equally taxed. As a result, farmers are tempted to recover perceived tax losses by cultivating marginal land that might otherwise be left in its natural state. It has been suggested that in many cases the perceived tax burden associated with idle (non-income producing) marginal land is recovered by its cultivation which makes it quota eligible, rather than by any actual increases in crop production (Sawatzky 1981).

Although existing Wheat Board quota and municipal property tax regulations actually penalize farmers for maintaining natural habitat, minor modifications to the frame of reference imposed by these regulations, could over time, significantly alter landowner's decisions to cultivate marginal areas and in effect create an economic incentive for them to maintain such areas in their natural state. The modifications investigated in this study are as follows:

1) a change in the Canadian Wheat Board's quota allotment formula which would extend quota entitlement to "unimproved" lands such as woodlands, wetlands and native prairie if they are maintained in their natural (uncultivated) state.
2) a change in the municipal assessment of farmland which would exempt "unimproved"

lands such as woodlands, wetlands and native prairie from property taxation if they are maintained in their natural (uncultivated) state.

The primary purpose of this study is to investigate the merit of a private land-natural area conservation program based on the aforementioned legislative modifications. Taking into consideration the great extent and local geographic variation of the agricultural zone of the Prairie Provinces, this study confines itself to Agro-Manitoba in general, and to the Rural Municipalities of Albert and Argyle in particular.

1.3 RESEARCH OBJECTIVES

Based on structured in-person interviews with farm operators from two Rural Municipalities in south-western Manitoba, the primary objectives of this study are:

1) to determine landowner acceptance and general attitude towards the proposed Wheat Board quota and property tax modifications designed to provide incentive to maintain natural areas on privately owned farmland.

2) to determine the potential environmental response of the proposed changes through an assessment of:

   i) the effect that the proposed changes would have on landowners' future land clearing and draining plans.

   ii) the ability of the proposed changes to motivate farmers to return marginal croplands to their native cover.

Secondary objectives are:

3) to outline past and future land clearing and drainage trends.

4) to determine landowner attitudes towards existing Wheat Board quota and municipal property tax regulations.

5) to determine the relative importance of existing Wheat Board quota and property tax regulations, in terms of the influence they had on landowner's past land clearing and drainage activities.

1.4 ASSUMPTIONS AND LIMITATIONS

This study, similar to Zittlau's (1979) and Morgan's (1985) landowner surveys, assumes that the respondent landowners provided accurate factual information and expressed their attitudes truthfully. In order to determine the potential environmental response of the proposed quota and tax incentives, it was assumed that landowners would actually maintain areas they previously planned to convert, or return marginal areas to their natural state, if they expressed a willingness to do so during the survey.

The major limitation of this research emanates from the fact that the study's findings are based on the responses of sample landowners from two rural municipalities which collectively occupy only a small fraction of the total area in the agricultural zone of Canada's Prairie Provinces. Taking into consideration the diverse physical, and economic conditions that characterize this vast zone, caution should be used when applying the study's findings in detail to other locations within the zone. Nevertheless, the author is confident that in general, the results of this study have far-ranging validity.

Another limitation of this study concerns its focus. The reader should be reminded that this study focuses on landowners' acceptance of, and the potential environmental response of, the proposed quota and tax modifications. As such, this study is concerned primarily with testing the "general concept" of tax and quota incentives and does not attempt to iron-out the specific details of the changes such as means of implementation, actual wording of proposed regulation changes, and possible effects of the proposed regulations on grain marketing, land prices etc.. Although these concerns are beyond the scope of this study, if the reaction towards the proposed modifications proves favorable, they will have to be addressed before the changes could actually be implemented.

Chapter 2

REVIEW OF EXISTING, ALTERNATIVE, AND PROPOSED QUOTA AND FARMLAND TAXATION REGULATIONS

The first Section (2.1) of this Chapter consists of detailed descriptions of existing Wheat Board quota and municipal land tax regulations, and is followed by a discussion of the environmental consequences emanating from these regulations (section 2.2). The final Section (2.3) reviews conservation oriented modifications to existing quota and the tax regulations that have been suggested by various researchers and government agencies, and concludes by outlining the proposed quota and property tax incentive program that is being investigated in this study.

2.1 DESCRIPTION OF EXISTING REGULATIONS

2.1.1 The Canadian Wheat Board Quota Allotment System

The Canadian Wheat Board Act outlines the constitution and powers of the Canadian Wheat Board (Weiss 1982). The major responsibility of the Board is to market in an orderly manner, Canadian grown grain in interprovincial and export trade. The most important tool used by the Wheat Board to meet its marketing responsibilities is the Delivery Quota Allotment System (Quota Review Committee 1988). The first delivery quota was instituted in the 1939-40 crop year, when large wheat surpluses created serious storage and transportation difficulties (Ellis 1971). It limited Canadian Wheat Board purchases from each farmer to 136 tonnes (5000 bushels). The following year, 1940-41, the first acreage based quota system was implemented. Since that time the quota system has been subjected to repeated changes, with quota acreage based on authorized wheat areas, 1941-46; seeded areas, 1947-52; and specified areas, 1953-69 (Wilson 1979). Since 1971, assigned acreages have been used to establish delivery quota bases.

The primary objectives of the present day quota allotment system are 1:) to bring into market channels, within the authority of the Canadian Wheat Board Act, at the right time, the kinds, qualities, and quantities of grain required to effectively meet market demand; and 2) to allocate delivery opportunities for grain in demand, to producers with a reasonable degree of equity (Quota Review Committee 1988).

The amount of grain, both Board (wheat, barley and oats) and non-Board (rye, flax and canola), that a farmer can deliver to either Board or off-Board markets, is dependent on

the number of quota acres that he is allocated (Canadian Wheat Board 1985 1988). Board grain quota policy states that: 1) Board deliveries cannot exceed general Board quotas in effect, 2) off-Board deliveries cannot exceed the off-Board quota, and 3) total deliveries cannot exceed a producer's maximum delivery entitlement. Producers may deliver non-Board grains on either the elevator or crusher/distiller quotas. However, non-Board grain quota policy states that: 1) deliveries to the elevator cannot exceed the elevator quota in effect 2) deliveries to the crusher/distiller cannot exceed the crusher/distiller quota in effect and 3) total deliveries cannot exceed a producer's maximum delivery entitlement.

The formula used to determine a farmer's quota entitlement is based on the sum of the acreage in each of the following land categories:

1) Land seeded to the six quota grains (wheat, barley, oats, flax, canola and rye);

2) Land in summerfallow;

3) Land seeded to miscellaneous crops ,this includes all crops other than the six quota grains and perennial forage;

4) Land seeded to perennial forage up to a maximum of one-third of the combined total of land in grains and oil seeds, summerfallow, and miscellaneous crops. This includes alfalfa, perennial grasses, and clovers (sweet clover, a biennial, is considered to be a miscellaneous crop).

5) Bonus acres, ie. if one third of the acreage planted to the six quota grains is greater than the acreage devoted to summerfallow and special crops, the difference is added to a farmers quota entitlement.

The Canadian Wheat Board obtains information on the acreages in each land category through the use of Permit Book Applications, which all farmers are required to complete in advance of each crop year. A farmer enters his actual seeded area or land use in the various land categories (Figure 2.1, left hand column), then calculates his total assignable acreage (middle column). This calculation takes into account seeded acreage, summerfallow, assignable perennial forage and bonus acres if applicable. In addition, land which will be newly broken during the current crop year can be reported in the permit book application. This land can be classified as cropland in the subsequent crop year, and becomes eligible for inclusion in a farmer's assignable acreage (Zittlau 1979).

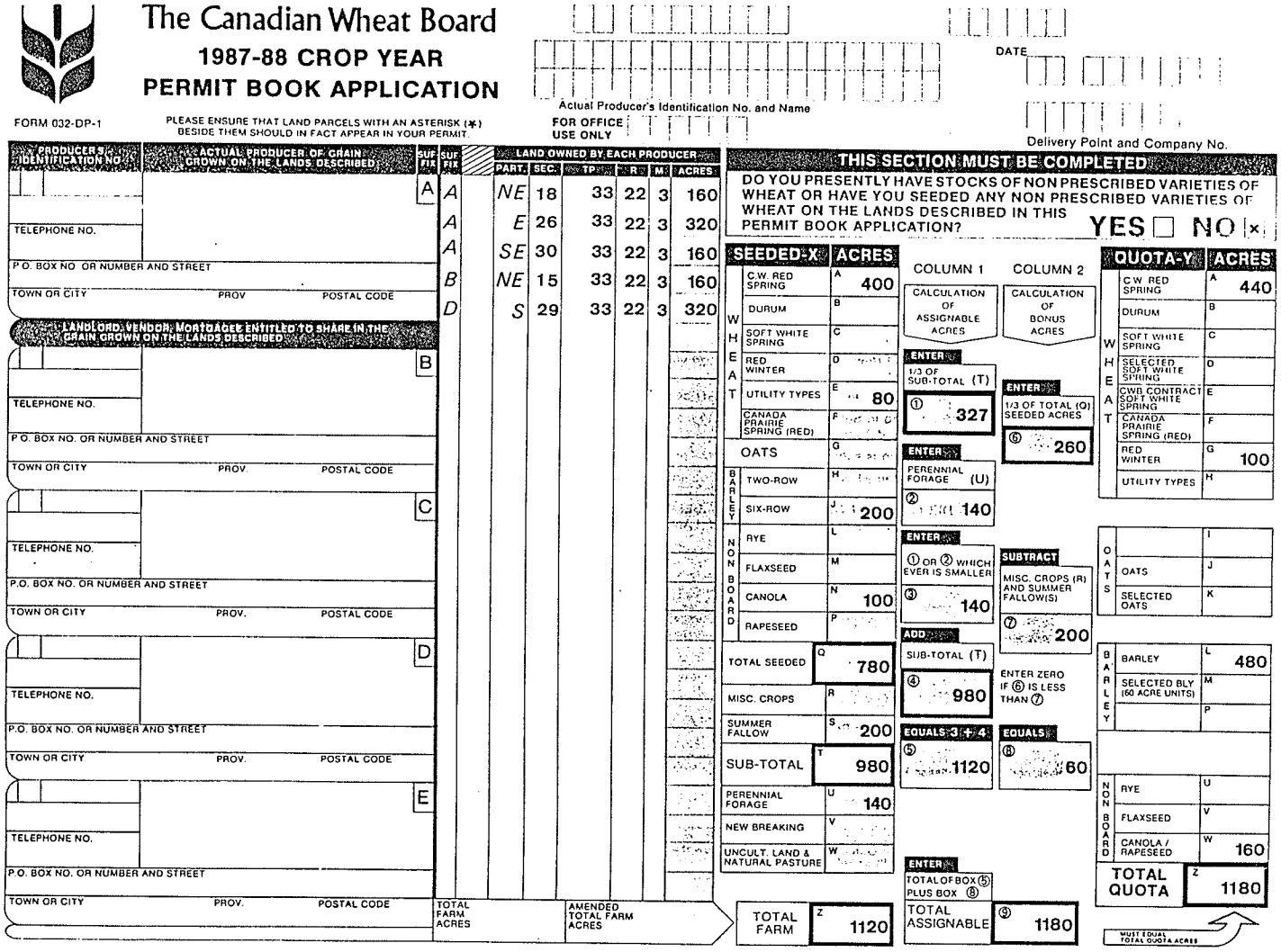

FIGURE 2.1 Completed Permit Book Application

Once a farmer's total quota acreage has been calculated, quota acres are assigned to the various types of grain to establish delivery quota entitlements (right column). The actual amount of a certain type of grain that a farmer can deliver is determined by multiplying the bushel quota currently in place for a particular grain, by the number of acres he has assigned to that grain. Bushel quotas vary considerably from year to year depending on general production and market demand. During years that grain production substantially exceeds market demand, quotas tend to be very low, while during years that demand exceeds production, quotas are usually high or open (Wilson 1979).

The manner in which quota acres are distributed among a producer's quota-dependent crops is left to the discretion of the individual. The types and amounts of grain a producer may already have in storage, as well as the amounts he is presently growing, will affect his assignment decision (Wilson 1979). Since miscellaneous crops and perennial forage are not marketed by the Wheat Board, and since summerfallow does not produce a crop, the quota eligilible land utilized for these purposes can be assigned to any of the six quota grains (Zittlau 1979). For example, in the case of wheat, most producers usually assign almost twice as many quota acres as are actually seeded. In the case of oats, seeded acreage usually exceeds assigned acreage, since most is consumed as cattle feed or sold to neighbouring farms as feed. Producers who wish to deliver grain carried over from a previous crop year, will as a rule assign a portion of the current year's quota acres in order to deliver the hold over grain.

2.1.2 Manitoba Municipal Property Tax System

Taxation provides the means by which governments collects the major portion of the revenues they require to finance their numerous operations and functions (Barlowe 1978). According to the B.N.A. Act, section 92, clause 2, property taxes are the responsibility of the provincial government. The Manitoba legislature has in turn delegated the setting and collection of property taxes to local municipalities. In most cases, land taxes (as opposed to farm building and dwelling taxes) constitute the largest proportion of municipal revenues (McCuaig and Vincent 1980).

Taxation is defined as the share each property owner pays towards services to the community at large (Manitoba Department of Municipal Affairs 1987[a]). Each year service costs are detailed in a municipal budget. This budget typically consists of three levies :

1) the general municipal levy,[1] 2) the school division levy[2], and the province-wide education support levy[3] (Manitoba Assessment Review Committee 1982). In order to raise the funds required to finance municipal budgets, each municipality establishes mill rates or tax rates, which are then applied to the assessed value of each property. A municipality's mill rate is established by dividing its total budget by the total assessment of each piece of property within its boundaries. The result is then expressed as the mill rate, with one mill equalling $1 per $1,000 of assessment.

Assessment is defined as the valuation of property for tax purposes, and provides the basis for the equitable distribution of a municipality's tax load between the individual properties within its boundaries (Manitoba Department of Municipal Affairs 1987[a]). Manitoba's Municipal Assessment Act, Section 29(1), states that:

> Lands apart from buildings shall be assessed at their value; and in determining the value, the assessor shall consider, amongst other things, the advantages and disadvantages of the location, the quality of the soil, the annual rental value, in his judgement, the lands are reasonably worth for the purposes for which they may be used, the value of any standing timber, and such other considerations as the provincial Municipal Assessor directs.

The term "value" as used in assessment legislation has been interpreted in both Federal and Provincial courts to mean market value. Therefore, under present legislation there is no difference between the terms "value", "valuation" and "assessment" (Manitoba Assessment Review Committee 1982).

Municipal Assessment Branch policy states that farmland is assessed according to its best possible use, rather than on its present use (Hamm pers. comm. 1988). Based on the lay-out of assessors' field sheets (Appendix 1), land is categorized into three general categories during the assessment process: 1) arable - refers to land which is best suited for arable culture (cropland); 2) nonarable -refers to land which is unsuitable for arable culture, and best suited for use as native pasture and hayland; and 3) wasteland - refers to land which has no agricultural economic potential (Manitoba Department of Municipal Affairs 1980). The use group symbols which are used by assessors to indicate the present or most desirable use of specific soil areas in each of the three categories are explained in Appendix

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[1] These costs are controlled by municipal council and include costs associated with snow removal; sewer and water; municipal office and administration; road, street and drain construction and maintenance.

[2] This levy is set by local school boards and is money required for education by the School Division.

[3] Set by the Department of Education and applied to all municipalities to ensure that people across the province have equivalent educational opportunities.

2. Table 2.1 summarizes the average rate at which the various classes of land are assessed within the Rural Municipalities of Albert and Argyle. The average mill rate of the two municipalities, and the estimated tax revenue per acre are also shown. Arable cropland is generally assessed two to seven times as high as non-arable pasture, and seven to twenty five times as high as "wasteland".

The value at which arable land is assessed is generally a function of its productivity and market value (Manitoba Department of Municipal Affairs 1986). Since a close relationship exists between agricultural land values and the productive capacity of the soil, land is assessed using a soil classification system. The Manitoba Soil Survey has identified, described, and mapped, several hundred soil types in Agro-Manitoba. The relative productivity of each soil type is represented by means of a soil indexing system, which expresses productivity in terms of a numerical index. Assessment indices represent optimum conditions for a given soil type. Any variation from the optimum requires an adjustment in the index to maintain equity between parcels. These downward adjustment in the assessment indices (condemnation discounts) are allowed for any conditions which adversely affect the income producing capacity of the land. Examples of condemnation discounts include poor internal drainage, stoniness, erosion, salinity and natural obstacles. Locational advantages and disadvantages such as proximity to markets are also considered.

Once the soil productivity index has been determined, a relationship is established between the index and the actual market value of the land. To determine this relationship "land only" sales data covering a period of several years is compiled and analyzed. Through this analysis, a unit value per acre is established. Actual assessment of arable cropland in Manitoba ranges from $20 per acre for the poorest land, to $75 per acre for the most productive land (Hamm pers. comm. 1988).

In keeping with the Municipal Assessment Branch's policy of assessing land according to its best possible use, uncultivated arable areas are assessed according to their potential use as cropland, minus the cost of breaking or clearing these areas (Hamm pers. comm. 1988). Since arable native grassland is inexpensive to break, its assessed value approximates that of adjacent or similar cropland. On the other hand, arable bush is relatively expensive to clear and is assessed significantly lower than similar quality lands which have already been cultivated. Average assessment of arable bushland ranges from $10 to $14 per acre. The difference in assessment between highly productive arable bushland and marginally arable bushland is rather negligible. Highly productive soils tend to produce large trees which are expensive to clear, while less productive areas tend to produce "scrub" vegetation which can be cleared at a lower cost. In otherwords, variations

TABLE 2.1 Assessment, mill rate, and tax revenue generated from different land classes in the Rural Municipalities of Albert and Argyle

	Albert			Argyle		
Land Class[1]	Average[2] Assessment $/acre	Mill[3] Rate	Average Tax Revenue $/acre	Average[2] Assessment $/acre	Mill[3] Rate	Average Tax Revenue $/acre
Arable Cropland	23	167	3.84	32	188	6.08
Arable Native Pasture	20	167	3.34	28	188	5.26
Arable Bush	10	167	1.67	9	188	1.69
Non-Arable Pasture	8	167	1.34	7	188	1.32
Hay Slough	5	167	.84	5	188	.94
Waste-Slough-Bush	3	167	.50	3	188	.57
Open Water Slough	1	167	.17	1	188	.19

1 See Appendix 2 for explanation.

2 Average assessments were provided by Assessment Officers at the Souris Assessment Office (Albert) and Morden Assessment Office (Argyle), 1988.

3 Mill rates were provided by the Department of Municipal Affairs, Winnipeg 1988.

in value due to productivity, are offset or balanced by variations in clearing costs, resulting in similar assessments.

Unlike the assessment of arable land, non-arable and "wasteland" areas do not carry soil index ratings. These areas are instead assessed at fixed pasture and "wasteland" values, which are computed on the basis of the average selling price of similar and like types of property. In most cases, the value or assessment of non-arable areas is calculated by subtracting the known selling price of the arable land on a recently sold parcel, from the total selling price of the parcel (Hamm pers. comm. 1988).

According to District Assessment Offices in Morden and Souris, tracts of non-arable "unimproved" pasture are assessed primarily according to the percentage of the pasture which consists of open grassland. Non-arable open grassland which can be used as pasture is assessed around $10 to $12 per acre, while non-arable pasture is assessed around $6 to $8 per acre. Non-arable areas of native hay are assessed similarly to non-arable open pasture, while sloughs which can be utilized for hay are assessed on average around $5 per acre. Sloughs which can be used an average of eight or more years out of ten may be assessed as high as $10 per acre.

Any area which has no economic use for agricultural purposes is according to Assessment Branch policy assessed as "wasteland". Although no income is derived from waste areas they are assigned an assessed value. Waste areas include waste sloughs, waste knolls, ravines etc.; as well as areas which cannot be utilized effectively because of natural or artificial obstacles such as railways, creeks etc.. Waste areas are generally assessed at $1 per acre. Sloughs which are being cultivated for convenience, but in the opinion of the assessor should be classified as "wasteland", are assessed the same as uncultivated waste sloughs. The same holds true for non-arable pasture that has become "wasteland" due to erosion induced by farmers' unwise attempts to convert these areas to cropland.

Farmland is assessed by assessment officers during summer when field inspections are possible (Manitoba Department of Municipal Affairs 1986). The assessment procedure involves the use of aerial photographs, field sheets and soil maps. Farmland is typically assessed in quarter section units. Based on field inspections and conversations with individual property owners, the physical features of each property are outlined in black on the aerial photograph. Identified features include areas of bush, pasture, creeks, ravines, poorly drained areas and cultivated areas. Each feature is identified by an appropriate symbol (see Appendix 2). Boundaries of the major soil types are indicated by a broken line. Assessment indices, along with condemnation discounts, are assigned to the arable areas; while fixed assessment rates are assigned to the various non-arable and waste areas. The acreage of land in each class is determined using a grid on the air photo. The total

acreage in each class, assessment per acre, and total assessment for each class are entered on the field sheet. The total assessments in each of the three major categories (arable, non-arable and wasteland) are added to form the total land assessment. Examples of this assessment procedure for typical quarter sections in each study area are presented in Figures 2.2 and 2.3. This information is later combined with the assessment of farm buildings and dwellings to form a farmer's final assessment.

The actual tax billing notice that a farmer receives (Figure 2.4) consists of a block assessed value for each quarter section and does not contain any information regarding the assessment and tax derived from arable, non-arable and waste areas. The only distinction made on the notice is the assessment and tax derived from land, as opposed to that derived from buildings.

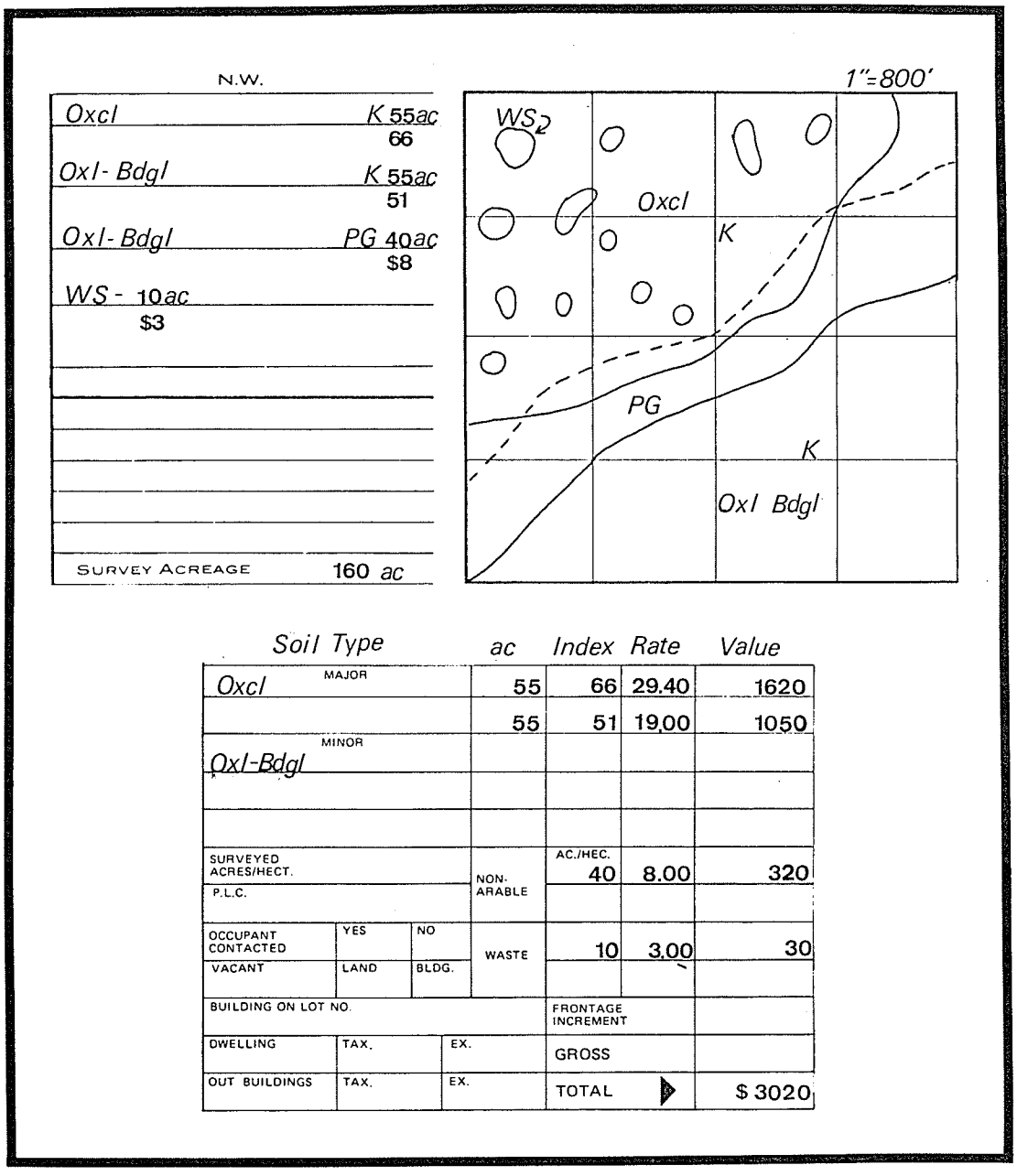
2.2 ENVIRONMENTAL CONSEQUENCES OF EXISTING REGULATIONS

An understanding of the manner in which Wheat Board quota and property tax regulations inadvertently promote the clearing and draining of agriculturally marginal natural land is necessary in order to make recommendations regarding the development of more ecologically conscious regulations.

2.2.1 The Canadian Wheat Board Quota Allotment System

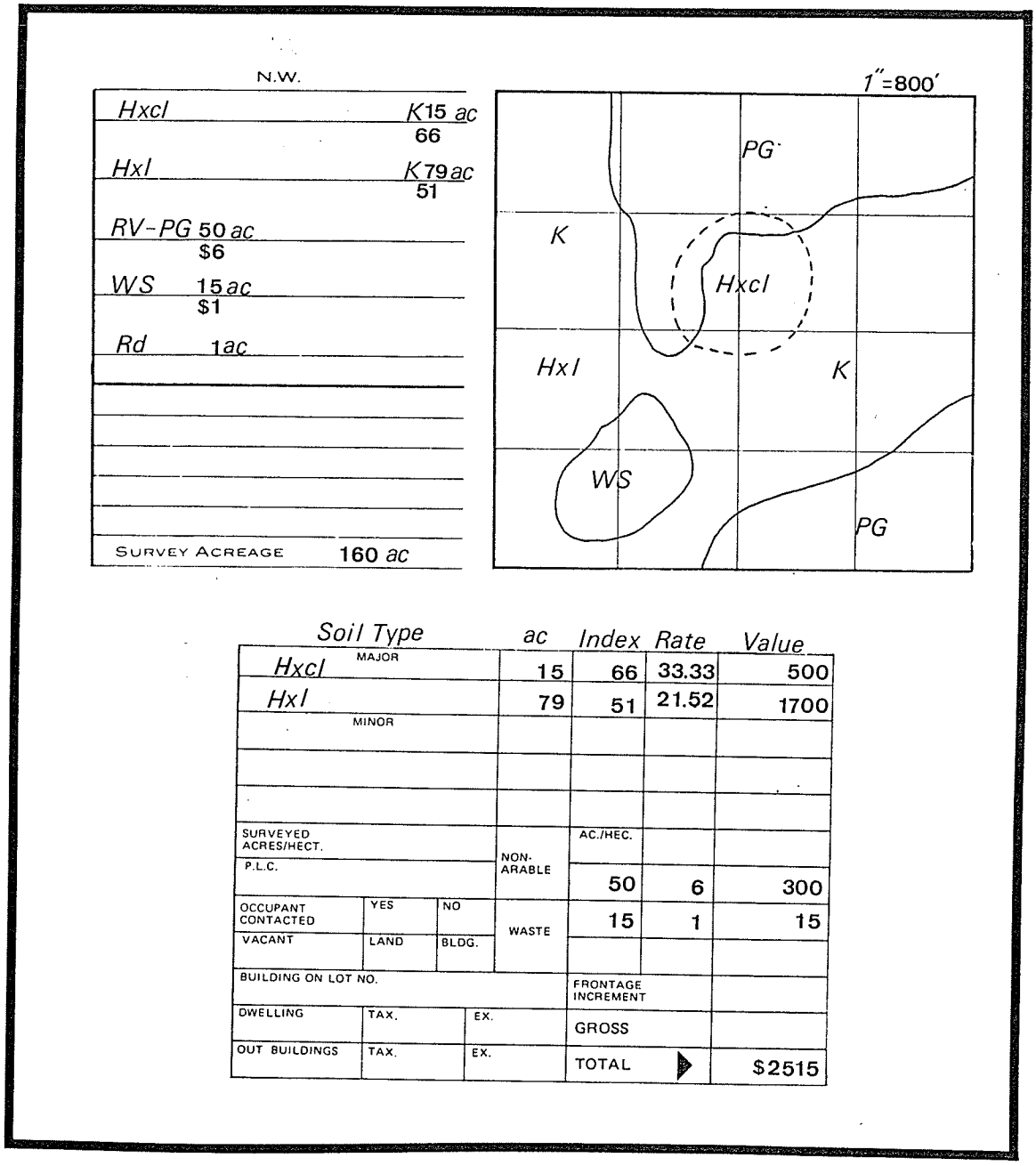
Although the quota system enables the Canadian Wheat Board to adequately carry out a system of orderly grain marketing, it has been widely criticized by wildlife managers, soil conservationists and land-use commitees for inadvertently promoting the use of ecologically undesirable land management practices (Sawatzky 1979, Zittlau 1979, Rakowski and Jurick 1980 1984, Weiss 1982, Scarth 1983, Brace and Pepper 1984, Duffus 1984, Pidgeon 1984, The Standing Senate Committee on Agriculture, Fisheries and Forestry 1984, Sugden 1984, Morgan 1985, Wildlife Habitat Canada 1987b).

Zittlau (1979) notes that although the quota system was established on the principle that it would be flexible enough to enable farm operators to adapt to changes in market conditions, good farming practices and/or public policies (Bowden Committee 1970), it appears that this principle has been almost completely ignored. Similarly, Ryder and Boag (1981) stress that the Canadian Wheat Board Act is narrow in scope and fails to directly assign any responsibility to the area of land use policy. Scarth (1983) emphasizes that in the Wheat Board's pursuit of objectives unrelated to land use, it shows little consideration



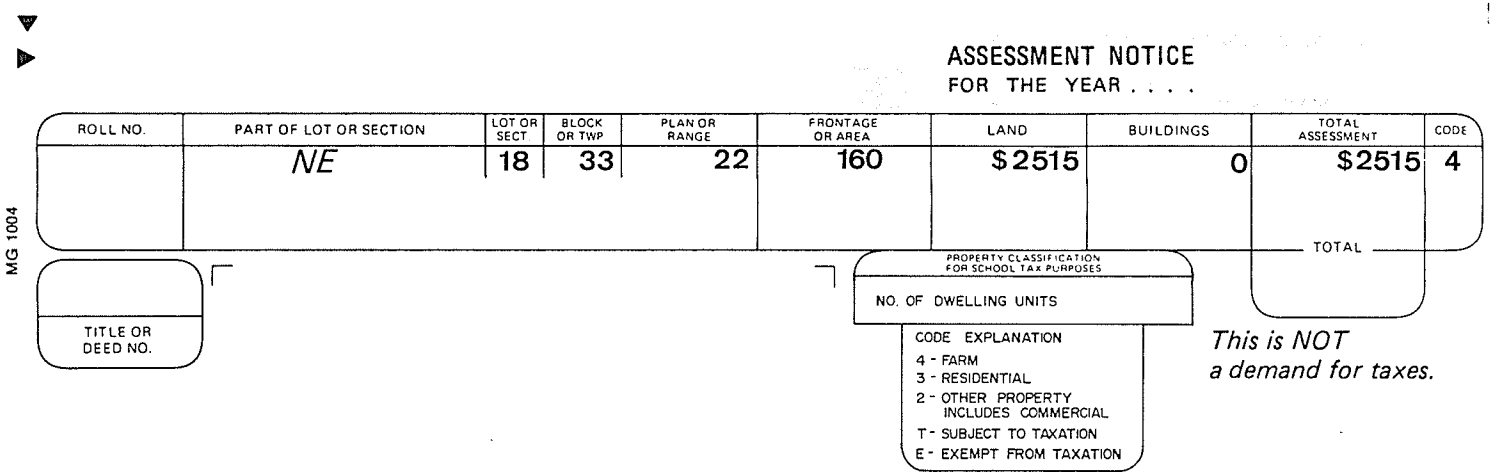
Soil Type			ac	Index	Rate	Value
Oxcl MAJOR			55	66	29.40	1620
			55	51	19.00	1050
MINOR Oxl-Bdgl						
SURVEYED ACRES/HECT.			NON-ARABLE	AC./HEC. 40	8.00	320
P.L.C.						
OCCUPANT CONTACTED	YES	NO	WASTE	10	3.00	30
VACANT	LAND	BLDG.				
BUILDING ON LOT NO.				FRONTAGE INCREMENT		
DWELLING	TAX.	EX.		GROSS		
OUT BUILDINGS	TAX.	EX.		TOTAL ▶		$ 3020

FIGURE 2.2 Property assessment example: typical quarter section in the Rural Municipality of Albert, 1988



Soil Type			ac	Index	Rate	Value
MAJOR Hxcl			15	66	33.33	500
Hxl			79	51	21.52	1700
MINOR						
SURVEYED ACRES/HECT.			NON-ARABLE	AC./HEC.		
P.L.C.				50	6	300
OCCUPANT CONTACTED	YES	NO	WASTE	15	1	15
VACANT	LAND	BLDG.				
BUILDING ON LOT NO.				FRONTAGE INCREMENT		
DWELLING	TAX.	EX.		GROSS		
OUT BUILDINGS	TAX.	EX.		TOTAL ▶		$2515

FIGURE 2.3 Property assessment example: typical quater section in the Rural Municipality of Argyle, 1988



ASSESSMENT NOTICE
FOR THE YEAR . . . .

MG 1004

ROLL NO.	PART OF LOT OR SECTION	LOT OR SECT	BLOCK OR TWP	PLAN OR RANGE	FRONTAGE OR AREA	LAND	BUILDINGS	TOTAL ASSESSMENT	CODE
	NE	18	33	22	160	$2515	0	$2515	4
								TOTAL	

TITLE OR DEED NO.

PROPERTY CLASSIFICATION FOR SCHOOL TAX PURPOSES

NO. OF DWELLING UNITS

CODE EXPLANATION
4 - FARM
3 - RESIDENTIAL
2 - OTHER PROPERTY INCLUDES COMMERCIAL
T - SUBJECT TO TAXATION
E - EXEMPT FROM TAXATION

This is NOT a demand for taxes.

Take notice that you are assessed as above specified. If you deem yourself improperly assessed you must lodge your complaint in writing, at least **TEN DAYS** before the sitting of the Court of Revision, with the Clerk of the Municipality or Local Administrator setting out the grounds and nature of the complaint and the same will be considered at a meeting of the Court of Revision to be held on the of at at Manitoba.

FORM NO. 4

PROVINCIAL MUNICIPAL ASSESSOR

FIGURE 2.4 Property tax billing notice

for the long-term environmental consequences of the undesirable practices that it is inadvertently promoting.

As was emphasized in Chapter One, the major environmental inadequacies of the quota system have been traced to inconsistencies in the formula used to determine an individual farmer's quota entitle acreage. The two major inconsistencies of the formula are as follows: 1) a stipulation that states farmers cannot include "unimproved" land in their assignable acreage and 2) a stipulation that allows farmers to include cultivated summerfallow in their assignable acreage. As a result of these inconsistencies, it has been argued that the current quota system inadvertently promotes the indiscriminate drainage and clearing of natural lands, as well as the widespread use of cultivated summerfallow.

In order to appreciate the magnitude of the "quota formula problem" as it relates to the destruction of natural lands, it is first necessary to explain the two-fold classification of Canadas' prairie farmlands as either "improved" or "unimproved". "Improved" land refers primarily to land which is cultivated on regular basis such as croplands and summerfallow[1]. Conversely, "unimproved" land refers to cultivated land and consists primarily of native range pasture, wetlands and woodlands. Since virtually all of the land capable of annual crop production on the Prairies has already been developed (Prairie Farm Rehabilitation Administration 1983), the remaining areas of "unimproved" land[2], may for the sake of argument, be considered as non-arable land.

Several researchers, most notably Sawatzky (1979), suggest that the quota-ineligible status of "unimproved" land, which constitutes the largest reserve of natural land on the Prairies, is one of the primary reasons for the hectic tempo of natural land conservation currently taking place on prairie farmlands. According to quota formula regulations, land must be cultivated or "improved" before it can be included in a farmer's quota entitled acreage. Taking into consideration the chronic difficulties farmers have in marketing their crops, this stipulation inadvertently creates an incentive for farmers to cultivate agriculturally marginal land, not because of its crop producing potential, but simply to acquire marketing rights to larger volume of grain (Sawatzky 1979). This is particularly attractive in regions where highly productive land is interspersed with parcels of non-arable land (Zittlau 1979). In this situation farmers can simply break non-arable native areas, manage them as fallow, and assign the newly developed quota-eligible acreage to adjacent productive lands.

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[1] "Improved" category also includes land classified as tame pasture. This land is cultivated , seeded and sprayed, but usually not on a regular basis.

[2] Excluding Peace River area of Alberta.

In 1980, the Advisory Committee of the Canadian Wheat Board reported that land under cultivation increased by 17.8 million acres in the Agricultural Zone of Central Canada, between 1931 and 1976. During the same period, summerfallow increased by 8.9 million acres, or nearly fifty percent of the total added acreage. Although the Advisory Committee expressed surprise at the fact that most of the added summerfallow acreage was located in moist regions where continuous cropping is possible, Sawatzky (1979) suggested that much of this newly developed fallow acreage involved former woodlands and wetlands which were brought under cultivation more in the interests of increased quota acreage than in actual increases in production. Sawatzky further suggested that gains in "improved" acreage to supplement delivery quota entitlement, have to a great extent, been achieved at the expense of the subsistence base for wildlife, and have contributed to localized and regional flooding, lowering of the water table, reductions in groundwater quality, and increased soil erosion. It is unfortunate that farmers who make a conscious effort to maintain natural areas are in effect penalized for the efforts, while those who mutilate such areas, are in years of restricted quotas, rewarded by being able to deliver a greater portion of their grain.

In addition to providing incentive to "improve" marginal land, the current quota system has received considerable criticism for promoting the widespread use of summerfallow (Pidgeon 1984, The Standing Senate Committee on Agriculture, Fisheries and Forestry 1984). This criticism stems largely from the quota formula provision that permits farmers to deliver grain on summerfallow acreage. The extensive use of summerfallow on the Canadian Prairies leaves a considerable area of land exposed to wind and water without any protective vegetative cover. Summerfallowing also facilitates the underground movement of water, which in turn results in the formation of saline seeps and increased salinization of soils (Pidgeon 1984). It seems ironic that black fallow, which contributes to soil erosion and salinization is granted quota-eligible status, while "unimproved" natural lands, no matter how important they are to the overall ecological well-being of the Prairies, are specifically excluded.

The quota system has also been criticized for discriminating against high yielding crop varieties and the more productive farmer. Zittlau (1979) expands on this criticism. Given that quota allotment and resultant delivery opportunities are largely a function of cultivated acreage (as opposed to productivity per acre), farmers who wish to adopt more intensive management practices such as continuous cropping are given little incentive to do so. This is especially true during years in which grain demands are reduced and quotas are correspondingly low. In this situation the farmer who maximizes production per acre , rather than acres of production, may well be at an economic disadvantage. This

disadvantage is primarily due to the fact that his costs per acre are higher than those of the land extensive manager, yet his sales per acre are the same. While the efficient farmer can store his surplus stocks until market conditions improve, a reduced cash flow may hinder his ability to acquire the inputs necessary to plant a new crop.

In January 1982, the Canadian Wheat Board announced a change in the quota formula that attempts to incorporate a productive factor into the system by discouraging the use of summerfallow (Weiss 1982). Under this change, if one third of the acreage planted to the six quota grains is greater than the acreage devoted to summerfallow and special crops, the difference will be added to a farmer's quota base. Although this change provides a non-intrusive incentive for farmers to abandon the practice of summerfallowing, great concern has been expressed by The Standing Senate Committee on Agriculture, Fisheries and Forestry (1984), that the bonus-acreage-system has put added pressure on farmers to break the remaining natural areas on their farms. Despite this drawback, it is encouraging to see that the Wheat Board is at least attempting to incorporate conservation oriented incentives into its policies.

2.2.2 Manitoba Municipal Property Tax System

Although property taxes are used primarily as a means of supplying needed governmental revenue, they often encourage certain land uses while at the same time discouraging others (Barlowe 1978). The effects of taxation on land use can be accidental or incidental, or may be the product of deliberate government policy. Similarly, the effects on land use can be either desirable or undesirable from the standpoint of society at large.

As is the case with the quota allotment system, the regulations governing the municipal assessment and taxation of farmland represent regulations that inadvertently contradict the ideals expressed in the land use policy of the three Prairie Provinces (Zittlau 1979). These contradictions occur largely as a result of assessment policies that place a tax value on, and tax, all farmland regardless of whether or not it is agriculturally productive. Consequently, farmers are encouraged to cultivate ecologically sensitive areas that from the standpoint of society would be more "productive" if they were left to perform their numerous natural functions.

Alternatively, assessment regulations provide no incentive for farmers to maintain marginal lands in their natural state. Although it is true that arable natural lands are assessed much lower than productive croplands, no breakdown reflecting this variation is provided in tax billings. Since tax notices merely state the gross assessed value of each parcel of land (quater-section), landowners are liable to manage their lands as though each acre is in fact

equally taxed. As a result of this potential misconception, farmers are even further motivated to cultivate marginal areas in order to make all parts of their land "pay its own way". It has been suggested that in many cases the perceived tax burden associated with non-arable natural areas is recovered by its cultivation which makes it quota-eligible, rather by any actual increases in crop production (Sawatzky 1981).

Zittlau (1979) suggests that the land clearing and drainage promotion inherent in the property tax system is in part due to the failure of the system to adjust to the structural and economic changes which the agricultural industry has undergone. Farm units are no longer all relatively similar mixed operations, as was the case when the system was first inaugurated. Instead, as a result of a combination of economic and technological factors, most farms are now highly specialized, emphasizing the production of either crops or livestock. The failure of the assessment system to adjust to these changes is most evident when examining the assessment terminology currently used to describe non-arable natural lands. For example, assessment categories such as "non-arable native pasture" and "waste-slough-hay" are terms which imply universal economic value. In the past, when virtually all farmers raised cattle, the aforementioned non-arable lands could legitimately be assessed and taxed at rates reflecting their value as cattle browse and pasture. However, to the modern farmer specializing in the production of grain, any land which isn't cultivated has no direct economic value, and in many cases is considered a lability. To continue taxing land according to its "best possible use" tempts the specialized farmer who has no alternative means of recovering his tax dollars to cultivate areas he might otherwise leave in a natural condition.

It is important to note that property tax policy which provides landowners with incentives to "improve" marginal and non-arable land is not in the best interests of the taxing authority (Zittlau 1979). Although the additional cultivated area created by these "improvements" will in the short-term generate larger tax revenues, the loss of the protective functions that these non-arable lands perform will in the long-term result in a gradual decline in the productivity of adjacent croplands, and in the end will translate into a lower assessment value and reduced tax base. Other environmental disbenefits of natural land conversion such as local and regional flooding, erosion, silting of ditches, clogging of drains, and pollution of domestic water supplies, also translate into taxation problems by increasing the maintenance cost portion of general municipal levies.

2.3 CONSERVATION ORIENTED MODIFICATIONS TO THE EXISTING REGULATIONS

Several conservation-oriented modifications to the existing quota and property tax regulations have been suggested or proposed by various researchers (Sawatzky 1979 1981, Zittlau 1979, Ryder and Boag 1981, Brace and Pepperr 1984, Morgan 1985) and government agencies (The Standing Senate Committee on Agriculture, Fisheries and Forestry 1984, Wildlife Habitat Canada 1987, Quota Review Committee 1988). The major theme of the proposed modifications is to encourage the maintenance of the natural parkland mosaic in the farming regions of Canadas' Prairie Provinces. By encouraging the maintenance of the natural mosaic, the environmentally protective functions that it performs will also be maintained.

The first part of this section discusses the various quota and tax modification alternatives, and concludes with a description of the combined quota and tax modifications that are being investigated in this study.

2.3.1 Review of Alternative Modifications to Existing Quota Allotment Regulations

Minor modifications to the formula currently used to calculate individual farmers' quota-entitled acreage could transform the quota system into a valuable soil and water conservation tool. A variety of alternative modifications to the quota acreage calculation have been suggested. These alternatives include: 1) awarding quota acres solely on the basis of seeded acreage, 2) altering the existing bonus acres calculation, 3) prohibiting the granting of quota on all newly broken lands, and 4) extending quota-eligible status to "unimproved land" within existing farms. A recent proposal by the Quota Review Committee (February 1988) will also be discussed. This proposal recommends that the Canadian Wheat Board totally abandon its acreage based quota system in favour of a supply based system.

2.3.1.1 Acreage based quota formula modifications

According to Pidgeon (1984), discontinuing the quota formula provision that permits a farmer to deliver on summerfallow acreage (awarding quota acres solely on the basis of seeded acreage) would reduce the attractiveness of incorporating summerfallow into crop rotations and would instead promote the use of continuous cropping. This modification also has potential for indirectly reducing quota-oriented motivation to break

non-arable natural land. It is unlikely that farmers would go to the trouble and expense of seeding non-arable lands solely to acquire marketing rights to a larger volume of grain. Under present quota formula regulations farmers can acquire quota for non-arable lands by simply breaking them and managing them as summerfallow.

Despite the potential benefits that would arise from a seeded acreage quota formula, Large et. al (1978) expressed concern that eliminating the quota formula provision which allows farmers to deliver grain on fallow acreage, while leaving all other quota formula variables unchanged, could prove disruptive to the grain delivery and transportation system. Zittlau (1979) estimated that if this quota formula modification motivated all farmers in the Rural Municipalities of Odanah and Strathcona to adopt continuous cropping, the result would be an increase in production of 38 percent. Zittlau further suggested that unless the increased production consisted primarily of forage and miscellaneous crops, the short-term impact on the grain storage, transportation and marketing network would be devastating. The potential economic complications that might arise from newly introduced quota formula modification could be minimized, however by using a coordinated plan designed to implement the changes gradually over a transition period of five to ten years.

The Canadian Wheat Board's bonus acreage program motivates farmers to practice continuous cropping, but has been criticized for intensifying farmers motivation to "improve" non-arable lands solely for the purpose of increasing quota entitled acreage (The Standing Committee on Agriculture,Fisheries and Forestry 1984). Pidgeon (1984) suggests an alteration to the bonus acreage program that would maintain the program's major purpose of encouraging continuous cropping, yet would eliminate the inadvertent development pressure it places on marginal land. The altered bonus acreage calculation would be very similar to the existing calculation (see page 18, stipulation 5), but would be based on one-third of a farmer's total acreage, rather than on one third of a farmer's seeded acreage. As a result of this change, acreages in woodlands, wetlands and native range pasture, as well as seeded acreage would qualify for the bonus calculation.

The introduction of a quota formula provision which prohibits the inclusion of all new breaking in a farmers quota entitled acreage represents another alternative that could potentially eliminate quota oriented motivation to break marginal land (Pidgeon 1984). Although this alternative would discourage farmers from breaking natural land solely for the purpose of acquiring additional quota, it does not provide any incentive or reward for those individuals who maintain marginal areas in their natural state. Rather than rewarding farmers who maintain natural areas, this alternative in effect penalizes farmers for breaking natural areas. As a result, it would accomplish little in the way of generating "grass-roots"

support for habitat conservation, and in the long-term would probably result in a reduction in the effectiveness of all habitat programs which are dependent on landowner cooperation for their success.

The quota formula modification that appears to have the greatest potential for motivating farmers to maintain "unimproved" land in its natural state, is the extension of the quota eligible status to all remaining "unimproved" land already in farms (Sawatzky 1979 1981). This modification recognizes the fact that unless farmers are totally motivated by aesthetic considerations, they bear the burden of wildlife habitat ownership with little or no direct compensation (Ryder and Boag 1981). By granting additional quota to "unimproved" lands, farmers receive direct economic compensation for retaining natural areas and as a result would see much of their present day motivation to "improve" marginal land eliminated.Furthermore, many farmers would be able to realize increases in quota-eligible acreage without going to the trouble and expense of "improving" natural areas which have little or no crop producing potential. Unlike punitively oriented quota modifications (no quota for new breaking), quota rewards will predictably generate "grass-roots" support for habitat conservation and in the long run will help maintain a cooperative relationship between wildlife and farming interests.

Although farmers who have little or no uncultivated land might consider the inclusion of natural land in the quota entitlement to be unjust, considered from the perspective of the entire agricultural community this change would serve to reduce the competitive edge that totally cultivated farms have over ecologically conscious operations which maintain marginal areas in their natural state (Zittlau 1979). Setting a limit on the amount of uncultivated land that farmers could include as assignable acreage (possibly 20 to 30 acres per quarter section averaged over the entire farm), would, however, ensure that no single individual obtained a disproportionate share of the benefits resulting from the proposed modification (Zittlau 1979). Acreage limits would also guard against the creation of a land market based solely on attached delivery quota entitlement (Sawatzky pers. comm. 1988).

Another acreage ceiling possibility is the extension of quota entitlement to "unimproved" lands, up to a maximum of fifty percent of a farm's total seeded acreage. This acreage ceiling alternative would ensure that virtually all of each farmer's "unimproved" acreage could potentially qualify as quota-entitled acreage. If the Canadian Wheat Board expresses concern over the suggested increases to quota-entitled acreage, it is possible that the increases could be achieved at the expense of summerfallow entitlement. Furthermore, it can be argued that if the Wheat Board continues to deny quota entitlement to "unimproved" land, sooner or later it is all likely to end up in the quota anyway.

Primarily through the recognized process of "improvement" which in effect amounts to mutilation (Sawatzky pers. comm. 1988).

2.3.1.2 Supply based quota allotment system

A recent proposal released by the 1987-88 Quota Review Committee recommends that the Canadian Wheat Board totally abandon its acreage based quota system in favor of a supply based quota system. Under the new system, farmers would be required to declare to the Canadian Wheat Board all supplies of grain available for sale to the Board following harvest. Individual delivery entitlement would be based on an equal percentage of the total market for the grade and grain each producer makes available for sale to the Canadian Wheat Board, ie. equal opportunity per bushel available for sale to the Canadian Wheat Board, rather than equal delivery opportunity per cultivated acre. The system would be enforced by penalizing those producers who fail to deliver the stated volume. For a more detailed explanation of this system see Appendix 3.

Although the Wheat Board has not yet actually considered implementing the new system, Board officials are currently in the process of meeting with various farm organizations in an attempt to determine farm operators' attitude towards the proposed system. Even if the reaction towards the proposed system is favorable, the earliest possible date that it could be instituted is August 1, 1990 (Keena pers. comm. 1988).

The Quota Review Committee cited two major reasons for moving towards the new system. First, the Canadian Wheat Board would have more accurate information on the grain stocks available for sale. Although the sales program has been relatively well served by the current quota system, the committee felt the existing system may not represent the best possible approach for the future. The Committee cited the fact that space available in primary elevators has dropped by almost thirty percent in the last fifteen years and stress that the trend is likely to continue. Consequently, the Committee feels that the existing marketing system would be enhanced by having enforceable supply agreements directly with producers. The supply agreements would enable the Wheat Board to call supplies readily and would result in useful market information. The second reason cited for the change to the new system is that the present acreage based system has always been subject

to criticism for not addressing productivity. The Committee felt that a supply based system would provide a uniform and fair approach to different levels of production[1].

The Quota Review Committee also made reference to concerns expressed by a number of environmental groups who explained that the current quota system promotes the cultivation of marginal lands and the widespread use of summerfallow. The Committee suggested that their recommended switch from an acreage base to a supply base system, should remove "the perception among environmental groups" that the quota allotment system is a major factor contributing to the aformentioned undesirable land management practices. Despite this suggestion, it can be argued that the proposed supply based system would accomplish little in the way of promoting environmentally desirable land use. Although the proposed system would eliminate existing acreage based incentives to summerfallow, it would encourage farmers to "improve" their remaining, primarily marginal, uncultivated lands. Obviously, farmers would have great incentive to squeeze as much production as possible out of all available acreages, since the amount of grain that could be marketed would be directly proportional to the volume of grain grown. Farmers in south-western Saskatchewan echoed this sentiment at recent Quota Review Meetings (Morris pers. comm. 1988). They felt the new system would force them to break and crop large areas of marginal native range pasture, in an attempt to maintain economically competitive farming operations.

Furthermore, Lang (1988) stresses that a supply based system would be open to abuse by unscrupulous farmers. If a farmer thinks quotas are going to be low, he could report twice as much grain as he really has, and in effect double his quota[2]. Similarly, the potential exists for farmers to double count a portion of their grain available for sale to the Wheat Board by pooling their grain with a neighbour's.

As a final note, if the proposed supply based system is actually instituted, the potential does exist for the development of conservation oriented "quota percentage credits", in much the same way as this study is investigating the idea of "quota acreage credits". For example, percentage credits could be awarded for maintaining designated areas of marginal land in their natural state.

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[1] This concern would appear to be indirectly covered under the block system of quota allotment , which can respond to different levels of production at least up to the level of small regions.

[2] Penalties in the form of fines have been proposed by the Quota Review Committee but they would be difficult and expensive to enforce.

2.3.2 Review of Alternative Modifications to Manitoba's Property Tax System and Review Of Existing Tax Incentive Programs

Manitoba's farmland taxation system, like the quota allotment system, represents an environmentally insensitive bureaucratic structure that could with proper modification be converted into a valuable land management tool. Barlowe (1978) stresses that although property taxes are used primarily as a means of supplying needed governmental revenue, they can also be effectively used as a means of encouraging environmentally desirable land use practices. The following discussion outlines habitat conservation oriented proposals for modifying Manitoba's existing municipal property assessment and taxation regulations, and reviews several property tax incentive programs currently in existence in the United States.

2.3.2.1 Manitoba municipal property tax system

Conservation oriented proposals for modifying Manitoba's farmland assessment and taxation regulations have focused primarily on the idea of implementing property tax exemptions or credits as a means of encouraging landowners to maintain "unimproved" land in its natural (uncultivated) state. The proposed tax incentive program that has received the most support in the literature (Brace and Pepper 1984, Manitoba Environmental Council 1985, Morgan 1985) was initially developed and described by Sawatzky (1979 1981) and Zittlau (1979). The major features of this proposal include property tax exemptions on non-arable natural lands and the implementation of detailed property tax billing notices. More specifically, the proposal recommends that all "unimproved" farmland currently assessed as "wasteland" be exempt from property taxation. The effect of this exemption would be to offer at least some encouragement or reward for those farmers who retain natural areas on their property. Farmers would not be required to sign any legal agreement, except a statutory declaration as to the true state of the acreage in question, in order to qualify for the exemption. Farmers would still have the freedom to cultivate natural areas, but would lose the exempt status on the newly "improved" areas, which in turn would be assessed at the higher cultivated rate the following year.

Sawatzky (pers. comm. 1988) stresses that the likelihood of landowners maintaining natural lands in response to the proposed tax concessions could be enhanced by providing more detailed property assessment information on tax billing notices (as opposed to block or "lump sum" billing notices). By providing landowners with detailed tax notices which clearly list the acreage, assessment and taxes due on cropland vs

exempted natural areas, those individuals who persist in cultivating natural areas would be repeatedly reminded, each time they receive their annual billing notice, of the impact on their property taxes resulting from their actions. At the same time, those individuals who decide to retain their marginal land in its natural state would be repeatedly reminded of the benefits (reduced property taxes) derived from their actions. The proposed tax incentive program could be expanded by extending exempt status to "unimproved" haylands and pasturelands subject to the proviso that they be left undisturbed until July 10th, a date after which virtually all ground-nesting birds have hatched their young (Sawatzky 1981).

Although exempting non-arable natural land would result in substantial reductions in many municipalities taxable acreage, because of the low rate at which non-arable land is assessed, the actual loss in municipal revenue would be proportionally much lower than the reduction in taxable acreage (Zittlau 1979). With this in mind, two alternative revenue raising methods have been suggested to offset the municipal tax base short fall.

The first alternative involves the transfer of the tax burden (total assessment) formerly associated with non-arable uncultivated land, to arable cropland on municipality-wide basis. Sawatzky (1979) calculated the potential effect of this assessment shift in the Rural Municipality of Harrison, Manitoba, using late 1970's data (Tables 2.2 and 2.3). The expected effect on the actual tax derived from three typical quarter sections (Table 2.4) would be a slight proportional increase in cropland tax, but a major proportional reduction in the taxes derived from non-arable uncultivated land. The major advantages of this revenue raising alternative are that it would result in very little direct cost to the public, could be implemented by a single level of government (municipal), and as such would not require the necessity of arriving at new cost and authority-apportioning agreements (Sawatzky 1979).

Despite these advantages, Zittlau (1979) notes that a case also be made for reimbursing municipalities for the lost tax revenue using provincial funds. This argument is based on the premise that privately owned wetlands, woodlands etc. perform a variety of functions (eg. floodwater retention, erosion control, wildlife production), which directly or indirectly benefit all Manitobans. As such, all provincial tax payers should pay for the benefits resulting from the conservation of natural areas (Weiss 1982). The costs of a tax incentive program include annual payments to reimburse municipalities for lost tax revenues, as well as initial implementation costs involved with the restructuring of tax billing notices. The provincial Municipal Tax sharing Act (S.M. 1976, c.70) represents one administrative avenue by which the province could reimburse municipalities (Zittlau 1979). Madsen (1981) noted that if dollar values are properly attached to the benefits provided by

TABLE 2.2 Current land-tax calculation basis, Rural Municipality of Harrison, Manitoba,1979

Soil class[1]	Area (acres)	Avg. Assessment	Mill rate	Tax Yield
K	70,000	$30.00/acre	100	$3+/acre
PA/BA/A	2,200	$20.00/acre	100	$2 /acre
W	40,500	$ 8.00/acre	100	$0.80/acre
TOTAL	112,700	$2.5 million		$246,000

[1] K - cultivated, PA/BA - potentially arable pasture: hayland/woodland, A - farmsteads, W - wasteland

Source: Sawatzky (1979)

TABLE 2.3 Recommended land-tax calculation basis, Rural Municipality of Harrisson, Manitoba

Soil class[1]	Area (acres)	Avg. Assessment	Mill rate	Tax Yield
K	70,000	$34.60/acre	100	$3.46/acre
PA/BA/A	2,200	$20.00/acre	100	$2.00/acre
W	40,500	$ 0.00/acre	100	$0.00/acre
TOTAL	112,700	$2.5 million		$ 246,000

[1] K - cultivated, PA/BA - potentially arable pasture: hayland/woodland, A - farmsteads, W - wasteland

Source: Sawatzky (1979)

TABLE 2.4 Expected effect of the recommended assessment shift on three typical quarter sections in the Rural Municipality of Harrision

Soil class[1]	Quarter Section A	Quarter Section B	Quarter Section C
K	40 acres	80 acres	120 acres
PA/BA/A	10 acres	15 acres	20 acres
W	110 acres	65 acres	20 acres
Current System[2]	Tax Yield	Tax Yield	Tax Yield
K	$120.00	$240.00	$360.00
PA/BA/A	20.00	30.00	40.00
W	$ 88.00	$ 52.00	$ 16.00
Total	$228.00	$322.00	$416.00
Recommended System[3]	Tax Yield	Tax Yield	Tax Yield
K	$138.40	$276.80	$415.20
PA/BA/A	20.00	30.00	40.00
W	$ 0.00	$ 0.00	$ 0.00
Total	$158.40	$306.80	$455.20
Change	-$ 69.60	-$ 15.20	+$ 39.20

[1] K - cultivated, PA/BA - potentially arable pasture: hayland/woodland, A - farmsteads, W - wasteland

[2] See Table 2.2

[3] See Table 2.3

Source: Sawatzky (1979)

natural areas, the rebate payments and administration costs of a tax incentive program may only be a fraction of the total benefits received.

A report by Rakowski and Jurick (1984), which examined habitat protection alternatives for the Minnedosa Pothole Region of western Manitoba, proposed two alternative property tax incentive strategies. The first alternative is based on providing tax rebates to landowners who maintain uncultivated areas in their natural state. This alternative is similar to the previously discussed proposal by Sawatzky (1979), however it involves rebates equal to fifty percent of the tax which would normally be paid on the maintained areas. The municipal cost of protecting 191,284 acres of wetland and 24,700 acres of uncultivated non-arable uplands in the Rural Municipalities of Odanah, Harrison, Minto and Saskatchewan, under this program is estimated at $40,521 annually for ten years (see Appendix 4). Rakowski and Jurick (1984) recommend that grants from the provincial and/or federal government should be used to reimburse municipalities for the cost of the program.

Their second alternative involves the use of property tax credits, whereby municipalities would exempt wetlands and native prairie from taxation. Taxes previously paid on these natural areas would then be shown as credits applied against the taxes on arable cropland. If the tax exempt property is cultivated, the landowner would lose the exempt status and would have to pay all deferred taxes. Although the deferred tax penalty would put additional pressure on farmers to maintain natural areas, farmers may see it as infringement on their property rights and would likely not be in favor of such a penalty. Costs to the municipality for this incentive program would include lost tax revenue on exempted lands, as well as the additional costs of the credits. The estimated municipal cost of protecting the wetland area outlined in the previous proposal is $1,253,866 annually for ten years (Appendix 5)[1].

2.3.2.2 Review of existing property tax incentive programs

Several states in the U.S. have implemented property tax incentive programs to protect wetlands and other natural areas on privately owned farmland. A recent survey of State wildlife management programs on private farmland revealed that seven states offer some form of property tax incentive for maintaining natural areas (Wigley and Melchoirs 1987). Incentives range from property tax exemptions and credits, to programs which

[1] Municipalities could be reimbursed by provincial coffers, habitat funds, other interest group programs, or by combined funds. (Cowan pers. comm. 1988).

involve a combination of tax incentives and technical assistance. The following discussion reviews several of these programs and also describes a property tax program designed to motivate landowners to implement soil conservation practices on their farms.

The State of Minnesota has a wetland and native prairie tax credit/exemption program which has been in operation since the 1980 tax year (Madsen and Peterson 1981, Haigis an Young 1983, Scarth 1983, Wigley and Melchoirs 1987). Scarth (1983) provides the most detailed description of the program. The wetland tax exemption aspect of the program involves no obligation or application on the part of the landowner. All wetlands in the participating counties are simply exempted from property taxation and paid by the State of Minnesota. However, in order to qualify for the wetland tax credits[1], the landowner must sign a legal application which states his agreement not to drain or cultivate qualifying wetlands during the year for which he receives the credit. The native prairie aspect of the program is similar to the wetlands aspect of the program, except that it involves application for both the tax exemption and the tax credit. Since tracts of native prairie are potentially more agriculturally productive than wetlands, the native prairie credit is exactly twice as much as the wetland credit. Landowners retain virtually all proprietary rights to the lands enrolled under tax credits, with the exception of their right to drain or cultivate them. Enrolled areas can be grazed or cut, and the landowner is not required to grant public access to any natural areas enrolled in the program. In 1981, approximately 580,000 acres of wetlands were enrolled in the tax credit portion of the program at a cost of $2 million. In turn, over $800,000 was paid out to reimburse counties for lost revenue resulting from exempting wetlands from taxation. Additionally, approximately 13,000 acres of native prairie was enrolled in the program, at a cost of $83,000 for the tax credit and $30,000 for lost tax revenue. A pilot program in Red Deer County, Alberta (similar to Minnesota program but on a much smaller scale) was generally accepted by both landowners and the general public (Kennedy 1980, Kure 1983, Westworth and Associates 1984).

Both Colorado and Indiana have private land habitat retention programs which are based on a combination of property tax and other incentives. The Indiana Classified Habitat Project is based on the State's Classified Wildlife Act of 1979 (Russel and Machan 1981, Scarth 1983). This Act provides farmers with dual incentives to maintain habitat on their land: 1) a reduction in assessed value of classified lands to $1 per acre and 2) the provision of free technical advice and assistance. Colorado's Conservation easements by Gross

[1] Applying landowners receive a tax credit equal to 3/4 of one percent of the average assessed value of an acre of cropland in the township where the wetland acreage is located, for each acre of wetland he agrees not to drain. The credit is deducted from taxes paid on adjacent cropland (Scarth 1983).

Program, involves the use of both property tax incentives and conservation easement payments (Arnold and Wood 1979). Lands under conservation easement (ie. drainage or cultivation not permitted) are revalued by the State at a lower rate. Consequently, the landowner in effect receives two forms of financial compensation: 1) from the sale of specific rights to his land, and 2) as a result of reduced property taxes.

A Wisconsin program designed to motivate landowners to implement soil conservation practices through the use of property tax credits (Griswold 1987), demonstrates the vast potential and versatility of property tax incentive programs. According to the Wisconsin program, landowners who implement soil conservation practices (ie. contour strip cropping, contour farming, conservation tillage or rotational change) receive property tax relief on their cropland, while non-participants assume a larger share of the tax burden[1]. Tax relief continues for participants at a diminishing rate as more landowners enroll. Eventually, if all landowners participate, the tax differential would disappear. By continuing the program, landowners would be motivated to continue using soil conservation practices. At present the program involves three townships (Frankfurt, Lima, and Waterville) and has been in operation for three years (1985-87). During this time the acreage of cropland adequately protected by the aformentioned soil conservation practices increased from 17,508 to 30,106 acres (Table 2.5). This represents an increase in the percentage of cropland under conservation practices from 49.8 to 85.6 percent. Based on a thorough field investigation, the increased level of cropland protection resulted in a 72.4 percent decline in soil displacement in the participating townships. Annual costs of the program, which included implementation, administration and technical assistance costs, were estimated at only $130,400. Based on the success of this program, conservation oriented tax incentive programs appear to have great potential for modifying land owners' land-use decision making process in an environmentally positive way.

Although programs such as Wisconsin's Soil Conservation Property Tax Credit Program and Minnesota's Wetland and Native Prairie Tax Credit/Exemption Program, have generally met with success (Madsen and Peterson 1981, Griswold 1987, Wigley and Melchoirs 1987), other researchers (Roe 1976, Manitoba Assessment Review Committee 1982, Haigis and Young 1983) are skeptical as to the actual effectiveness of property tax

[1] Landowners must use acceptable soil conservation practices on all owned or controlled cropland in order to qualify for tax credit. If landowners elect not to participate in any one year, they are not allowed back unto the program for the program's duration. This restriction prevents landowners from participating in years when commodity prices are low and not participating when commodity prices are high. It may however dismiss total participation.

Table 2.5 Cropland acres adequately protected from soil erosion prior to and after implementation of tax credit program in three Wisconsin Townships, 1985-87

Township	Total Cropland (acres)	Prior to program: Cropland Protected (acres)	(%)	Prior to program: Cropland Unprotected (acres)	(%)	After Program Implementation: Cropland Protected (acres)	(%)	After Program Implementation: Cropland Unprotected (acres)	(%)
Treatment Townships									
Frankfort	6,957	2,671	38.4	4,286	61.6	5,187	74.6	1,770	25.4
Lima	15,389	8,602	55.9	6,787	44.1	14,113	91.7	1,276	8.3
Waterville	12,817	6,235	48.6	6,582	51.4	10,806	84.3	2,011	15.7
Subtotals	35,163	17,508	49.8	17,655	50.2	30,106	85.6	5,057	14.4
Control Townships									
	38,704	24,696	63.8	14,008	36.2	25,004	64.6	13,700	35.4

Source: Griswold (1987)

incentives as a means of maintaining uncultivated farmland in its natural state. The major criticisms in this regard are: 1) tax incentives provide only a short-term guarantee of preservation 2) farmers who enroll natural areas in tax incentive programs are probably those individuals who have no intention of cultivating these areas in the future anyway and 3) actual monetary compensation (reduction in property taxes) is too low to disuade farmers who plan on "improving" natural areas from actually carrying out their plans.

Despite these criticisms, private land habitat retention programs based on property tax incentives have a variety of advantages over other private land habitat retention programs. The advantages of tax incentive programs include the following: 1) are cost effective in relation to other alternatives such as land acquisition, 2) do not require the establishment of extensive bureaucracy (existing government institutions and legislation can be utilized, 3) advertise the environmental values and benefits of maintaining natural areas, 4) focus on consensual rather than adversarial relationships and as such lead to cooperation between farming and wildlife interests, 5) encourage the development of conservation oriented farmers, 6) generate publicity for the cause of conservation and the formulation of a land ethic of good stewardship, 7) allow farmers to maintain managerial flexibility and 8) can be used in a complementary fashion with other conservation oriented programs (Sawatzky 1979, Zittlau 1979, Madsen and Petersen 1981, Svoboda 1981, Rakowski and Jurick 1984, Sorenson et al. 1984, Griswold 1987).

2.4 PROPOSED QUOTA-PROPERTY TAX INCENTIVE PROGRAM

The lack of tradition and incentives for the retention of natural areas on privately owned land represents a serious neglect on the part of Canadas' local, provincial and federal governments. There exists no pride in owning, or incentive to maintain, land in its natural state (Ryder and Boag 1981).

What would, more than any other technique yet discussed, motivate farm operators to maintain their remaining "unimproved" land in its natural- uncultivated state, would be the combined extension of full quota entitlement and property tax relief to retained natural areas (Sawatzky 1981). Additionally, marginal or non-productive croplands which are returned to their natural state would also qualify for property tax exemptions and quota eligibility. These complementary incentives formed the basis for the hypothetical incentive program presented to landowners in the present study[1]. Considered independently, one

[1] i) Respondent landowners were informed that quota-eligible status would be extended to "unimproved" lands up to a maximum of 50% of a farms seeded acreage.

might might argue that the proposed modifications provide insufficient economic incentive for farmers to maintain "unimproved" land its natural state, however, the combined benefits of these dual incentives would greatly increase the motivation to maintain natural areas. In other words, farmers' would simultaneously enjoy the benefits of paying no property taxes on maintained acreages, as well as the right to include these acreages in their delivery quota entitlement. Consequently, they would have very limited motivation to cultivate natural areas except those of recognized high productive potential, or those which greatly interfere with farm equipment operation.

These relatively cost -effective modifications are advantageous in that they can be instituted using already existing information banks and bureaucratic structures, and would in no way deprive farm operators of any of the proprietary and farm-level decision making rights which they now possess. The modifications would not grant the public additional access rights to the maintained areas, and landowners would not be required to sign legal agreements of any kind to qualify for the quota and tax benefits. Qualification for quota entitlement would occur automatically with a farmer's identification of his natural acreages on his Permit Book Application. Tax exempt areas would be identified through the use of detailed annual tax billing notices which outline taxable cropland vs. tax exempt natural acreages. If a farmer decides to drain or clear natural areas, he would simply lose the tax exempt status on these areas and would have to pay taxes at the higher "cultivated rate" from the next year on. Farmers would be reminded of the higher property taxes they pay (loss of exempt status) on newly "improved" areas in their annual tax billing notices.

The specific details of the hypothetical tax-quota incentive program (qualification regulations etc.) were purposely kept to a minimum. This study is concerned primarily with testing the general concept of tax-quota incentives, rather than ironing out the actual implementation details of a specific program. By introducing a detailed set of program qualifiers and rules to interviewees, the landowner survey would end up measuring farmer attitude towards the means of implementation, rather than their attitude towards the actual concept of receiving conservation oriented tax and quota rewards.

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ii) Since virtually all remaining "unimproved" land in the study areas is assessed as either non-arable or wasteland (Hamm pers. comm. 1988), as opposed to potentially arable uncultivated, all remaining "unimproved" land was considered of tax exempt status if maintained in its uncultivated state.

iii) Respondent farmers were informed that they could use qualifying areas for range pasture or native hay if they so desired.

iv) Respondent farmers were presented with two alternative means of reimbursing municipal governments for lost property tax revenue: a) tax burden on exempted lands shifted to cropland b) provincial reimbursement (see section 2.3.21 pg 38)

The proposed quota and property tax modifications would effectively complement soil and water conservation strategies outlined by the North Amercian Waterfowl Management Plan (Environment Canada 1985), as well as the Prairie Farm Rehabilitation Administration's (1987) "Marginal Land Reserve Concept".

Chapter 3

SURVEY METHODS AND STUDY AREAS

3.1 INTRODUCTION

> "Several years ago, when a relative of mine asked me what my research involved, I explained that I was using mathematical techniques to estimate how farmers would respond to changes in government programs, prices and so on. Unimpressed, my relative replied, "if you want to know what farmers would do, why don't you ask them?" The question has nagged me ever since" (Schaller 1969).

Would farmers accept a natural land retention program based on Wheat Board quota and municipal property tax incentives? If so, what effect would the program have on farmers' land clearing and wetland drainage decision making process? To provide insight into these and related questions, personal interviews were conducted amongst sample populations of farmers from two rural municipalities in south-western Manitoba. A detailed description of the landowner survey and study areas is presented in the following sections.

3.2 LANDOWNER SURVEY

Survey research must adhere to a number of scientific principles if it is to provide an accurate assessment of respondent characteristics and attitudes. In short, these include survey type, questionnaire design, sample design, field operation and data analysis (Mason et al. 1983)

3.2.1 Survey type

Personal (face-to-face) interviews, which center on having data collected from the respondent by an interviewer, were selected over telephone and mailout questionnaires. Questionnaire length and question type were the major factors dictating the use of personal interviews. A mailout survey study by Dillman (1978) concluded that mailout questionnaires of 11 pages, or 125 (question) items, represent plateaus beyond which significant response rate reductions can be expected. Mason et al. (1983) advises that personal interviews are the best type of survey when the nature of the information dictates the use of visuals (maps), and open-ended complex questions which require clarification by the interviewer. Potential disadvantages of personal interviews include interview distortion and subversion, speed of implementation and cost (Mason et al. 1983).

3.2.2 Questionnaire Design

Interviews were based on a detailed questionnaire (Appendix 6), which consisted of a combination of closed and open-ended questions. Like Morgan's (1985) landowner survey, the questionnaire was used as the foundation for a structured interview rather than a "rigid question and answer series". This technique provides the landowner with a greater opportunity to further discuss questions, and allows the researcher to collect more information on landowner attitudes than would be realized by an inflexible questionnaire.

The questionnaire was developed according to the survey research standards outlined by the Institute for Social and Economic Research[1], and was reviewed by research specialists at Ducks Unlimited (Canada), the Manitoba Department of Natural Resources and the University of Manitoba's Geography Department.

Questions relating to farmers' attitude towards the hypothetical quota-property tax incentive program comprises the most important component of the questionnaire[1]. Farmers were asked to outlined the wetland, woodland and grassland acreages which they planned to drain or clear over the next five years. They were then presented with the hypothetical quota-property tax incentives, and were asked to estimate the effect that the program would have on their planned land "improvements". The questionnaire also contains questions relating to farmers' willingness to return marginal croplands to their natural state in return for quota and tax benefits; as well as questions about past land "improvements", the perceived benefits and costs associated with retaining natural areas, farmers' attitude towards existing Wheat Board quota and municipal property tax regulations, and finally a series of questions outlining the background information pertaining to the landowner and his holdings.

3.2.3 Sample Design

Random samples of 50 landowners from each of the Rural Municipalities of Albert and Argyle were drawn from separate lists of farm owners that were derived from the most recent (1984) municipal assessment rolls for each municipality. All farmers (owning a minimum of 160 acres) in each municipality were numbered consecutively according to

[1] Program information that was provided to the respondents is outlined in section 2.4 (pg 47).

their appearance in the assessment rolls. A random numbers table was then used to select the respondent farmers from each study area. The random samples represent 32 and 20 percent of the total population of farm owners in Albert and Argyle respectively.

Since the farm owners were selected randomly, it follows that the land use, agricultural capability and wildlife capability of the respondent's farms is a random representation of the farmland from each study area.

3.2.4 Field Operation

The questionnaire was pre-tested on five farmers in early January of 1986. Actual interviews commenced on January 29,1986 and were completed on March 21, 1986. The winter time period was selected because it is generally the least busy season for most farmers and consequently farmers were less liable to refuse being interviewed or feel rushed during the interviewing process.

Farmers were telephoned one to three days in advance to set up appointments that were most suitable for them. During the telephone conversation they were informed that the information derived from the survey was to be used by the University of Manitoba to complete a land-use oriented thesis. Each of the respondents were interviewed in their home and were assured that all information provided would be kept confidential in terms of its source. In the case of family owned farms where the actual owner was retired, the person responsible for the actual management and farm operation decisions was interviewed. Only one farm operator refused to be interviewed. His reasoning was that he was not knowledgeable enough to contribute anything to a university student's research. A replacement was selected randomly using the procedure outlined in the sample design.

3.2.5 Data Analysis

The data obtained from the questionnaires was transcribed manually on to sixteen, 100 by 65 digit coding matrices. The data was then entered into computer files by staff at the Institute for Social and Economic Research, using the Amdahl computer terminal at the University of Manitoba. Statistical analysis of the data was completed using the Statistical Analysis System (S.A.S) package (Ray 1982, Helwig et al. 1983). Frequencies, means, standard deviations and standard errors were computed for each question, as were a variety of cross tabulations and simple associations and correlations between variables. Sophisticated statistical techniques were kept to a minimum because of the subjective aspects involved in trying to quantify "attitudes", as well as the difficulties involved in

trying to code qualititative answers into short-simple responses. Tables, graphs and figures were completed using a Macintosh computer.

The information derived from the landowner survey was augmented with information obtained from an extensive literature review of related studies, government reports, academic journals and correspondence with government officials and private conservation agencies.

3.3 STUDY AREAS

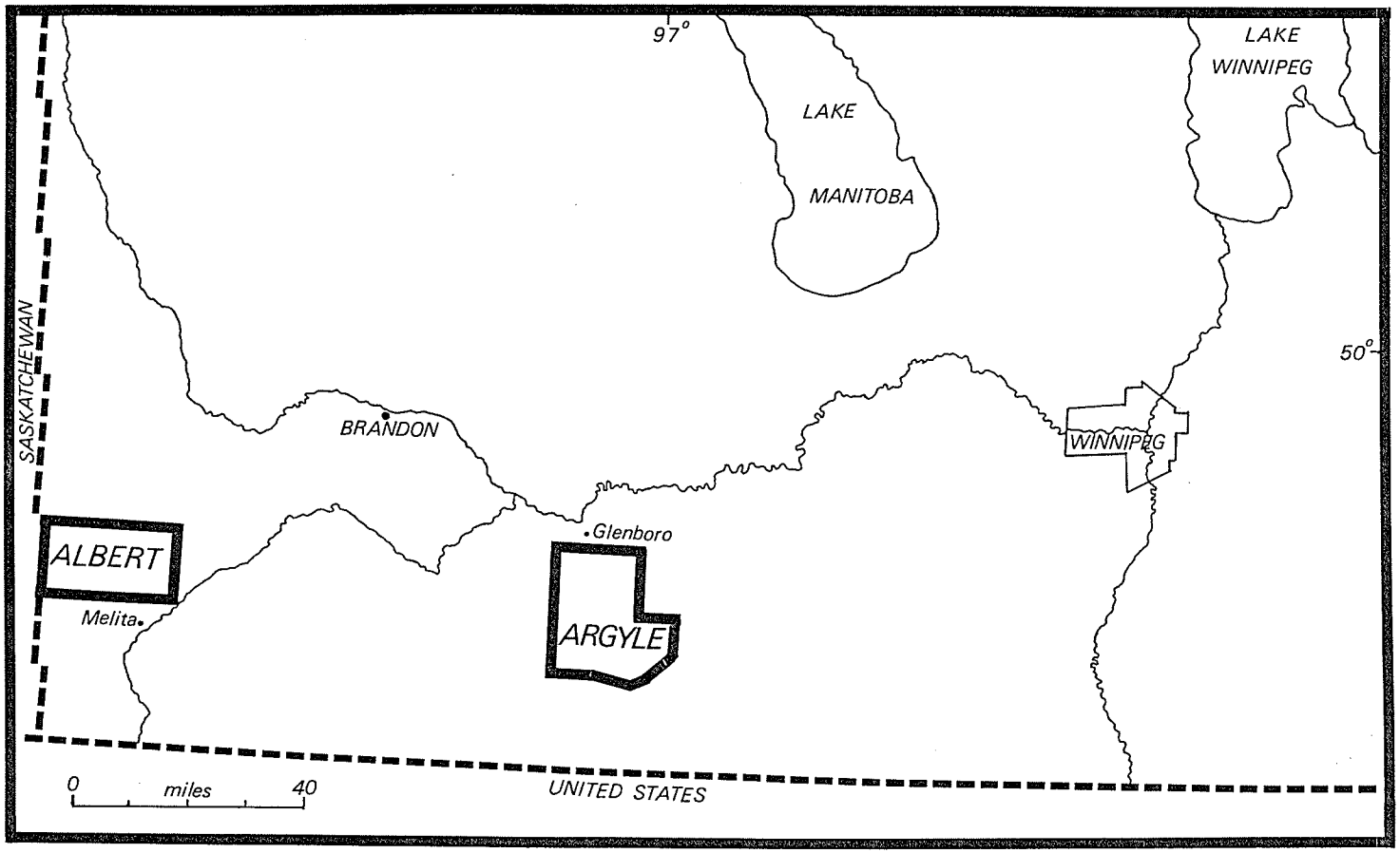
The location, rationale for selection, terrain, land use, agricultural capability, natural vegetation, wildlife habitat capability, and climate of the study areas is described in the following sections.

3.3.1 Location

The areas selected for the study were the Rural Municipalities of Argyle and Albert. The R.M. of Argyle is 297 square miles in area and is located in the south-central portion of Manitoba, while the R.M. of Albert is 288 square miles in size and is located in the extreme south-western portion of the province (Map 3.1). Both study areas are situated within the boundaries of the Aspen Parkland region as defined by Bird (1961). This region is best described as a zone of transition between the prairie on the south and the coniferous forest on the north, and characteristically consists of an irregular intermingling of aspen groves and grassland communities. It is situated on soils of the black soil zone, encroaching somewhat on the degrading black earth and dark-brown zones adjacent to it. The region is of national significance to Canada's agricultural industry and is best known for its production of wheat, mixed grains and cattle (McCuiag and Manning 1982). The Aspen Parkland is situated within the northern portion of the Prairie Pothole region of Canada, an area containing approximately ten million wetlands of glacial origin, ranging in size from fractions of an acre to area over one thousand acres (Lynch-Stewart 1983). The smaller wetlands are most numerous and are locally called "sloughs" or "potholes". Those exceeding two hundred acres are often referred to as prairie lakes.

3.3.2 Rational for Selection

The R.M.'s. of Argyle and Albert were selected as the study areas for a variety of reasons. Firstly, they are representative of the general wildlife-habitat-agricultural-land-use-



MAP 3.1 Location of study areas in southwestern Manitoba

configuration found throughout much of Aspen Parkland region of southern Manitoba. Secondly, they have a history of wildlife-agriculture related land-use conflicts. Thirdly, they contain lands with a variety of Canada Land Inventory (C.L.I.) capability classes for agriculture (classes 2-7), waterfowl (classes 1-7) and ungulates (classes 1-7)[1]. Finally, although the study areas are representative of the general Aspen Parkland landscape, they have noticeable differences in terrain that are expressed in terms of subtle differences in soil and vegetation types, agricultural capability, as well as wildlife habitat type and quality. These differences between and within study areas facilitate general comparisons between regions, as well as more specific comparisons between individual land capability classes, farm types and associated farmer attitudes. A brief description of the terrain of Argyle and Albert will highlight the differences between the study areas.

3.3.3 Terrain

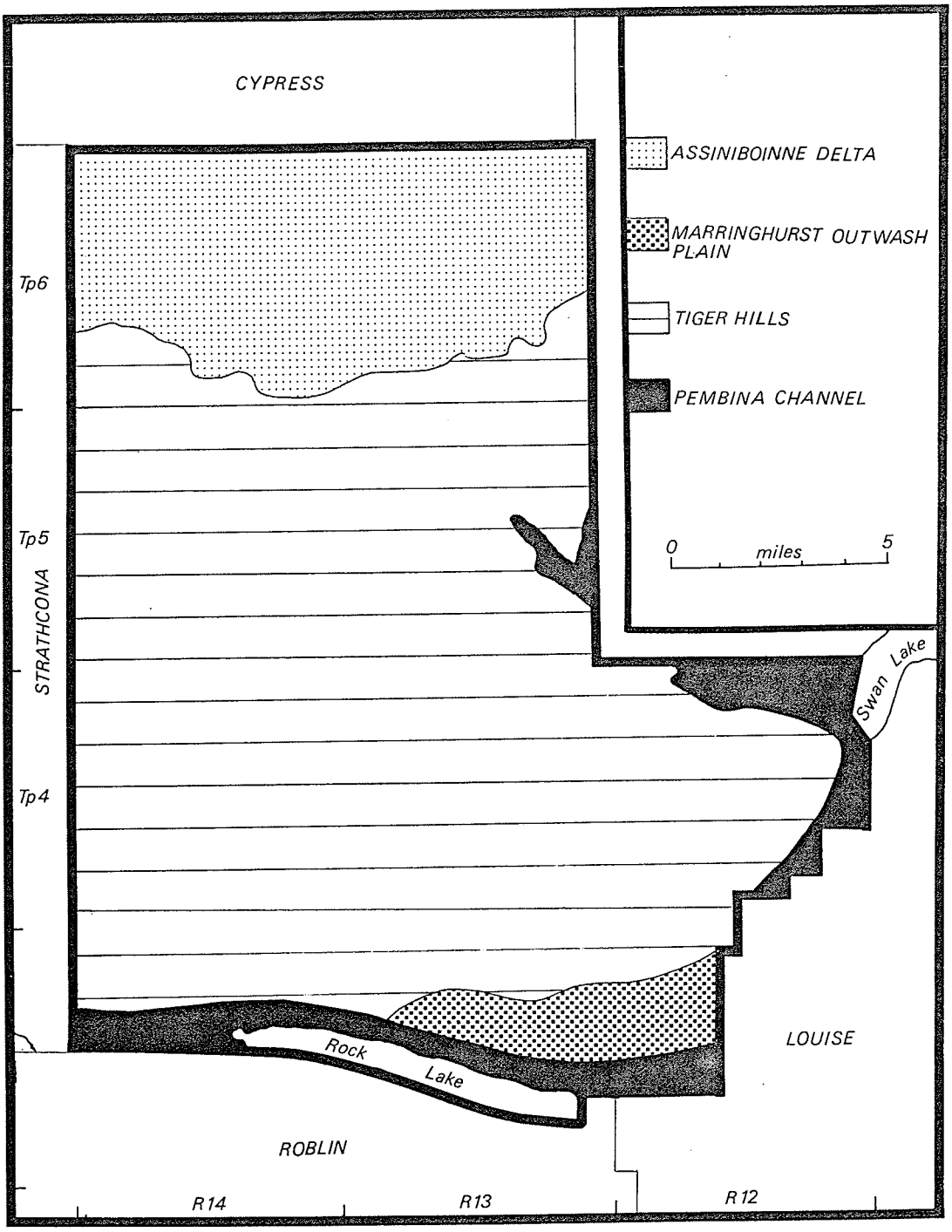
Ellis and Shafer (1981) and Elson (1969) provide excellent descriptions of Argyle's terrain. Argyle is dominated by the Tiger Hills, a region consisting primarily of well developed end moraine exhibiting higher local relief than the Assiniboinne Delta area to the south (Map 3.2). The topography of the Tiger Hills is predominantly of the knob and kettle type, slopes are steep and sloughs tend to be large, often resembling prairie lakes.

Conversely, the R.M. of Albert is dominated by an area of undulating ground moraine known as the Minnedosa-Reston Till Plain (Map 3.3) (Ellis and Shafer 1974). Although the till plain exhibits minor local relief, it contains numerous small undrained depressions which give rise to a pothole density of 40 to 70 per square mile. The till plain is dissected by several outwash channels that trend in a south easterly direction toward a broad area of lacustine sediments known as the Glacial Lake Souris Plain.

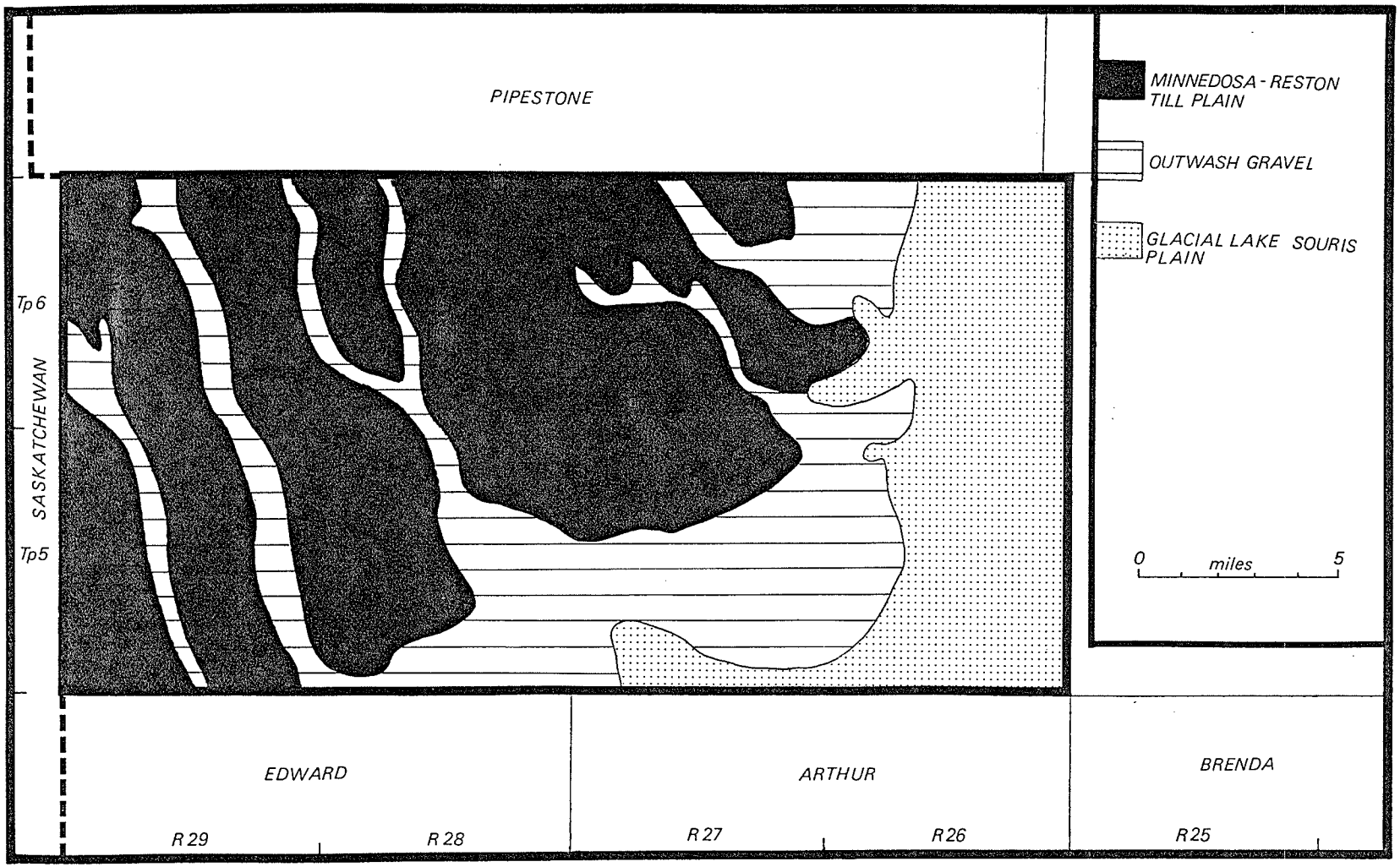
3.3.4 Land Use and Agricultural Capability

The land use pattern of Argyle is characterized by grain and mixed farming on the Assiniboinne Delta and ground moraine areas, and cattle and mixed farming exclusively on the Marringhurst Outwash Plain (Ellis and Shaffer 1981). The Canada Land Inventory (1966[a]) indicates that approximately 45 percent of Argyle's area has an agricultural capability of class 3, with the major limitation being adverse topography (Map 3.4). Hills

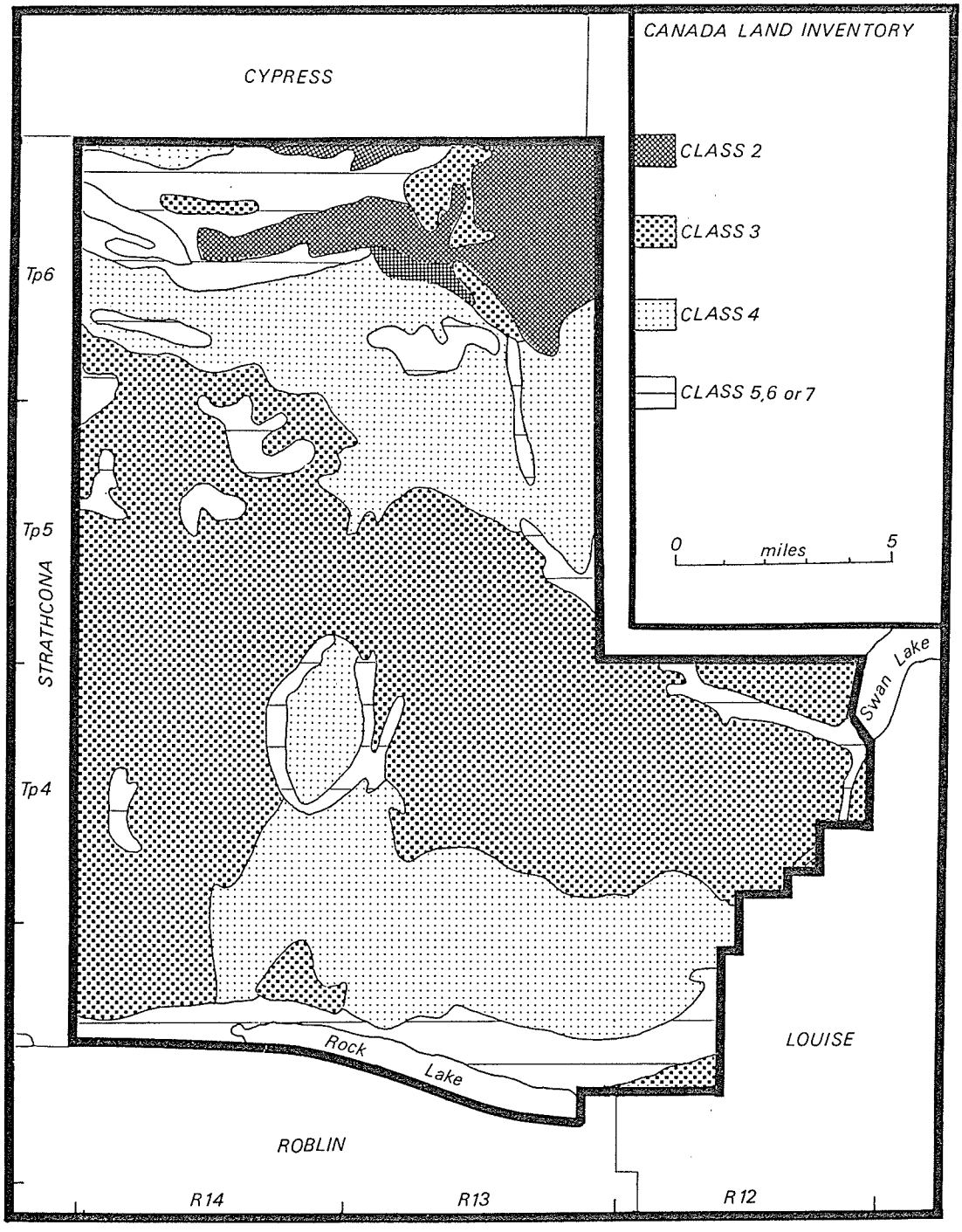
[1] For descriptive legends of C.L.I. capability classes for agricultural soils, waterfowl and ungulates see Appendices 7,8 and 9.



MAP 3.2 Terrain features: Rural Municipality of Argyle



MAP 3.3 Terrain features: Rural Municipality of Albert



MAP 3.4 Agricultural capability: Rural Municipality of Argyle

are invariably stony and drouthy, and are susceptible to water erosion due to excessive runoff from steeper slopes. Thirty percent of Argyle is considered class 4, with adverse topography and adverse soil characteristics being the major limitations. The remainder of Argyle contains small areas of class 2,5,6 and 7 agricultural capability.

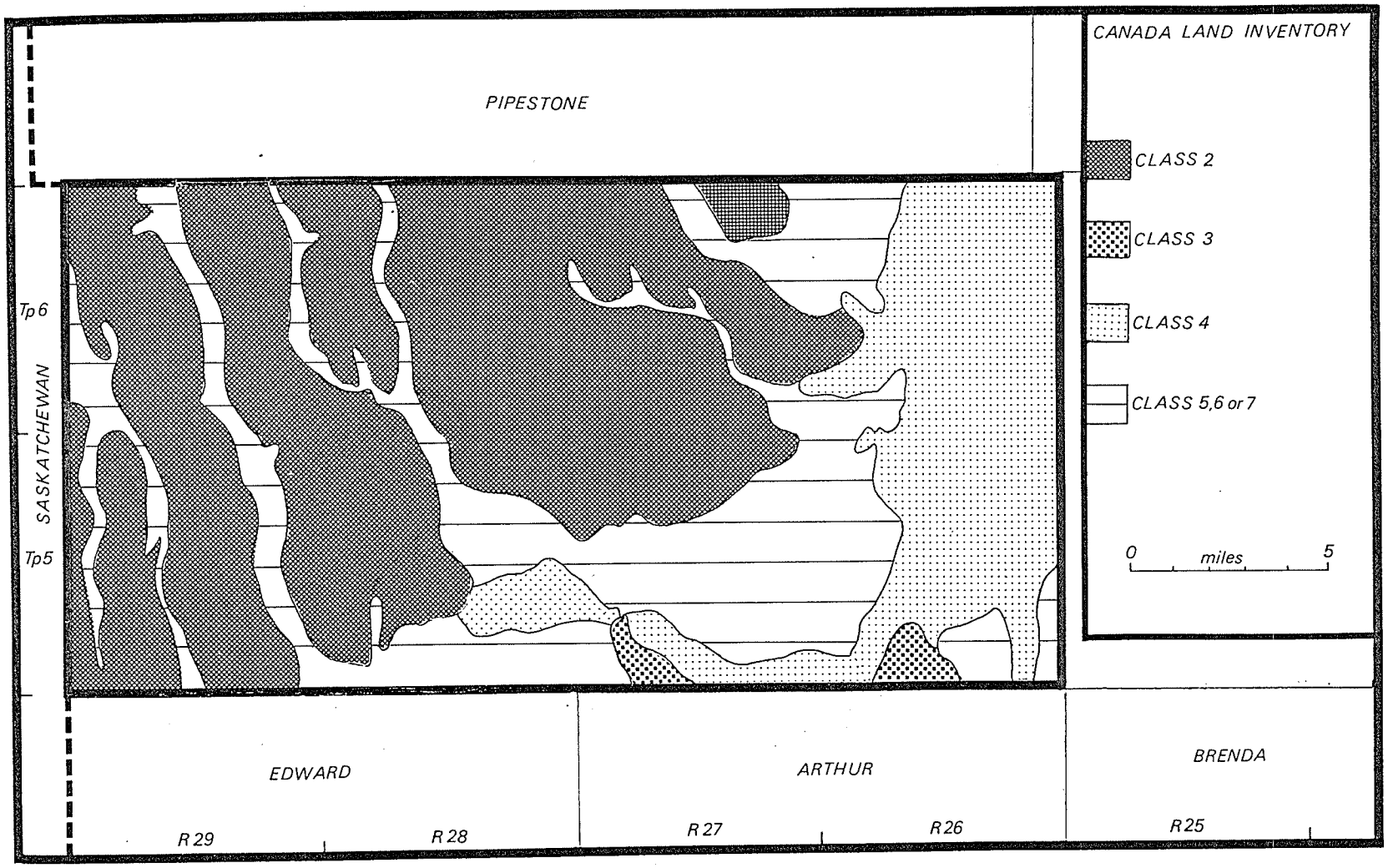
The R.M. of Albert tends to have a larger concentration of monoculture grain production enterprises and better quality agricultural land than Argyle. The land use pattern of Albert is characterized by wheat farming and to a lesser extent mixed farming on the Minnedosa-Reston Till Plain; cattle, feed grain and forage production on the Glacial Lake Souris Plain; and cattle production exclusively on outwash gravel areas (Ellis and Shafer 1974). The Canada Land Inventory (1966[b]) indicates that approximately 30 percent of Albert has an agricultural capability of class 2 with the major limitation being periodic drouth, 12 percent is class 4 with soil quality limitations, and 39 percent is considered class 5 with local drainage limitations (Map 3.5).

3.3.5 Natural Vegetation and Wildlife Habitat Capability

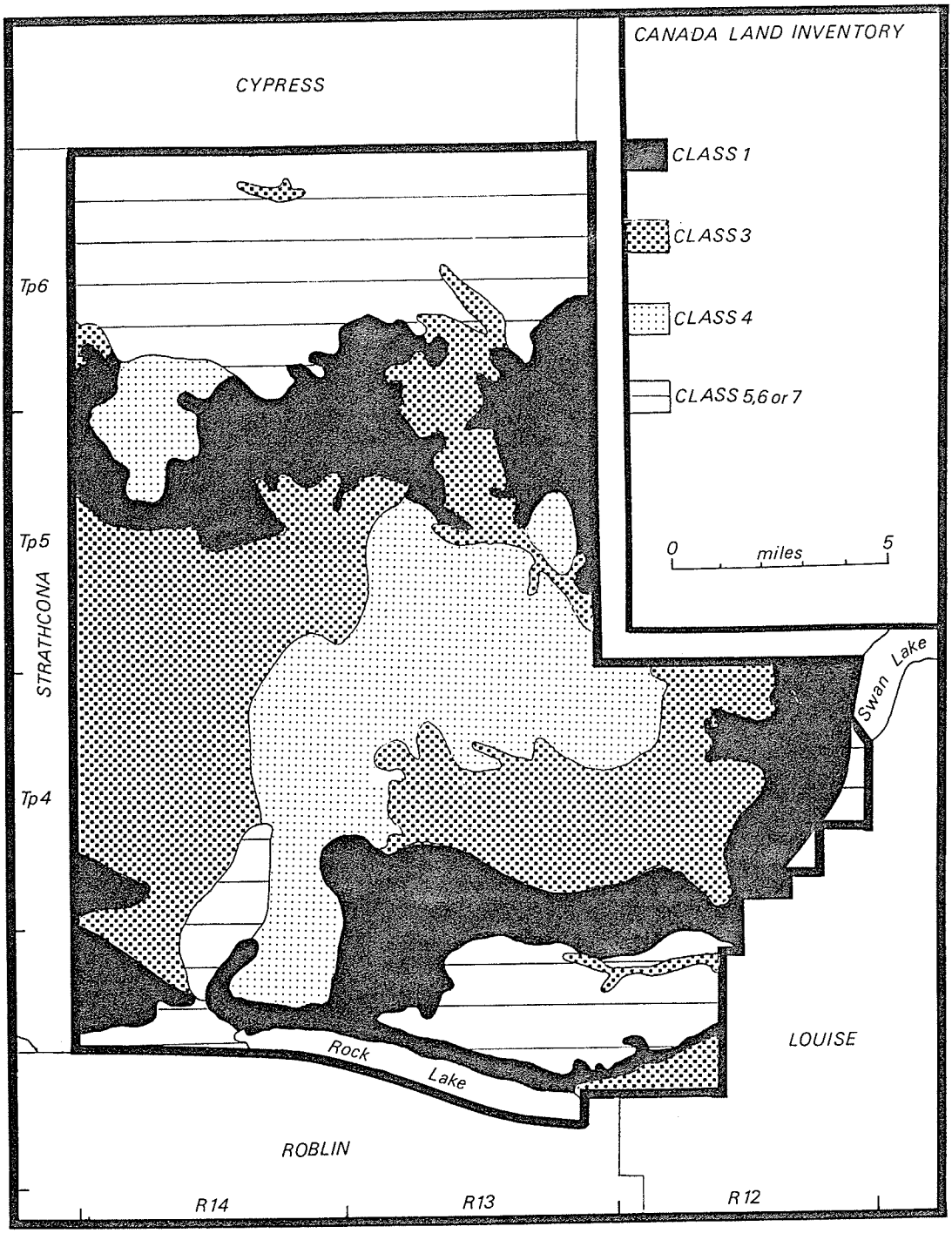
The natural vegetation pattern of Argyle varies from broad-leafed forest and Aspen Parkland on end moraine areas, to sparsely wooded mixed grassland on the Assiniboinne Delta areas (Ellis and Shafer 1981). The Canada Land Inventory (1974) indicates that Argyle contains large tracts of excellent white-tailed deer summer and winter range (Map 3.6). Approximately 29 percent of Argyle (primarily end moraine areas) has an ungulate capability of class 1, while 28 percent (primarily ground moraine areas) has an ungulate capability of class 3. The remaining area is considered class 4,5 and 6, with flatness of land being the major limitation for ungulate production.

The waterfowl production capability of Argyle is variable and somewhat poorer than its ungulate capability (Canada Land Inventory 1971). The best waterfowl producing areas occur on end and ground moraine and are designated class 3 (Map 3.7). This capability class occupies approximately 50 percent of Argyle, with the major limitation being excessive depth of sloughs and lack of well interspersed temporary or shallow basins. The remaining area is primarily class 5 and 6, with flatness, which limits the number and permanency of wetlands, being the major limitation.

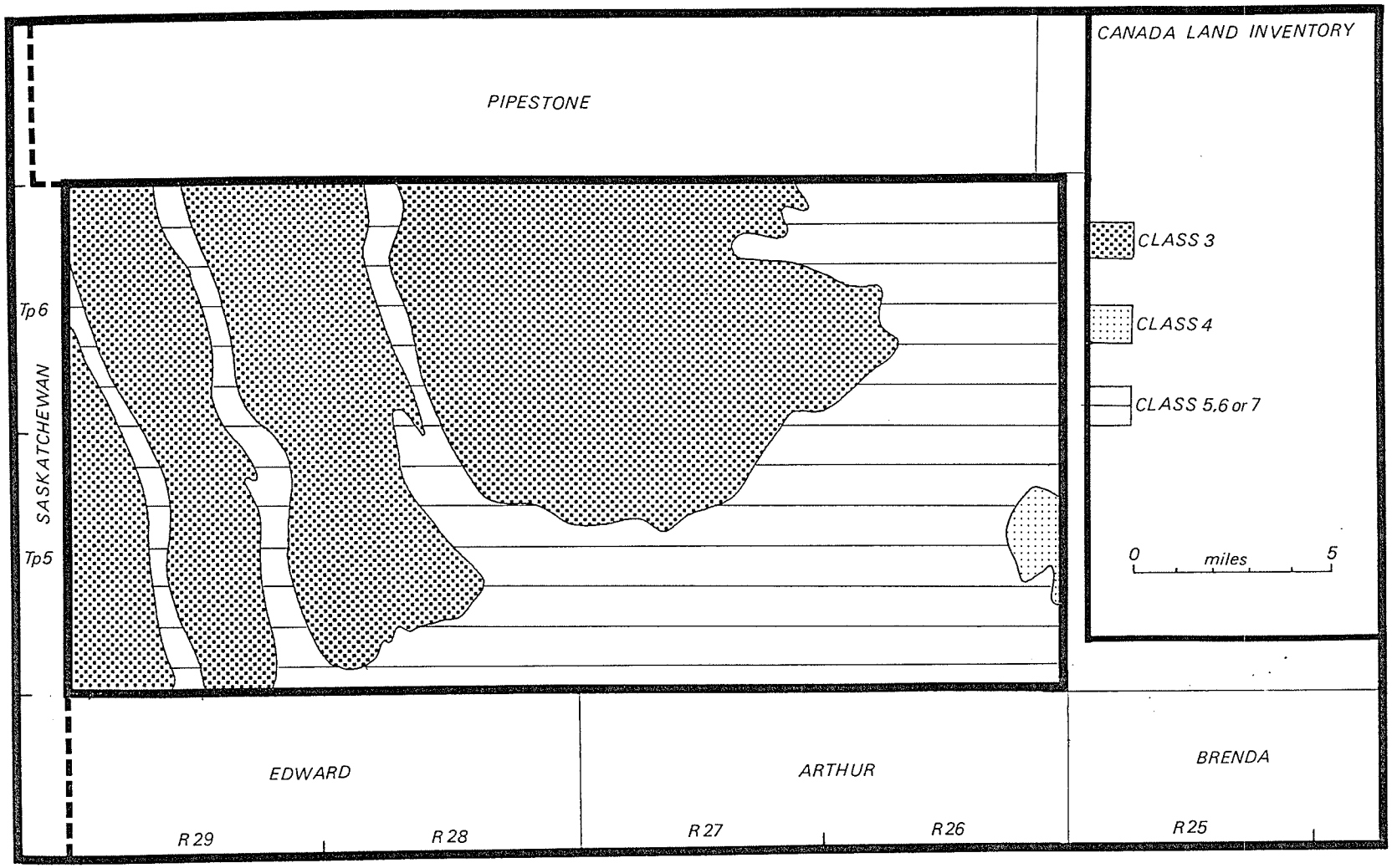
The vegetation of Albert varies from typical Aspen Parkland vegetation on the Minnedosa-Reston Till Plain, to mixed grasses with occasional willows on the Souris Plain and outwash areas (Ellis and Shafer 1974). The Canada Land Inventory (1970[b]) indicates that unlike Argyle, Albert has no large tracts of excellent white-tailed deer habitat (Map 3.8). However, 56 percent of Albert's area, primarily the Minnedosa-Reston Till Plain, is



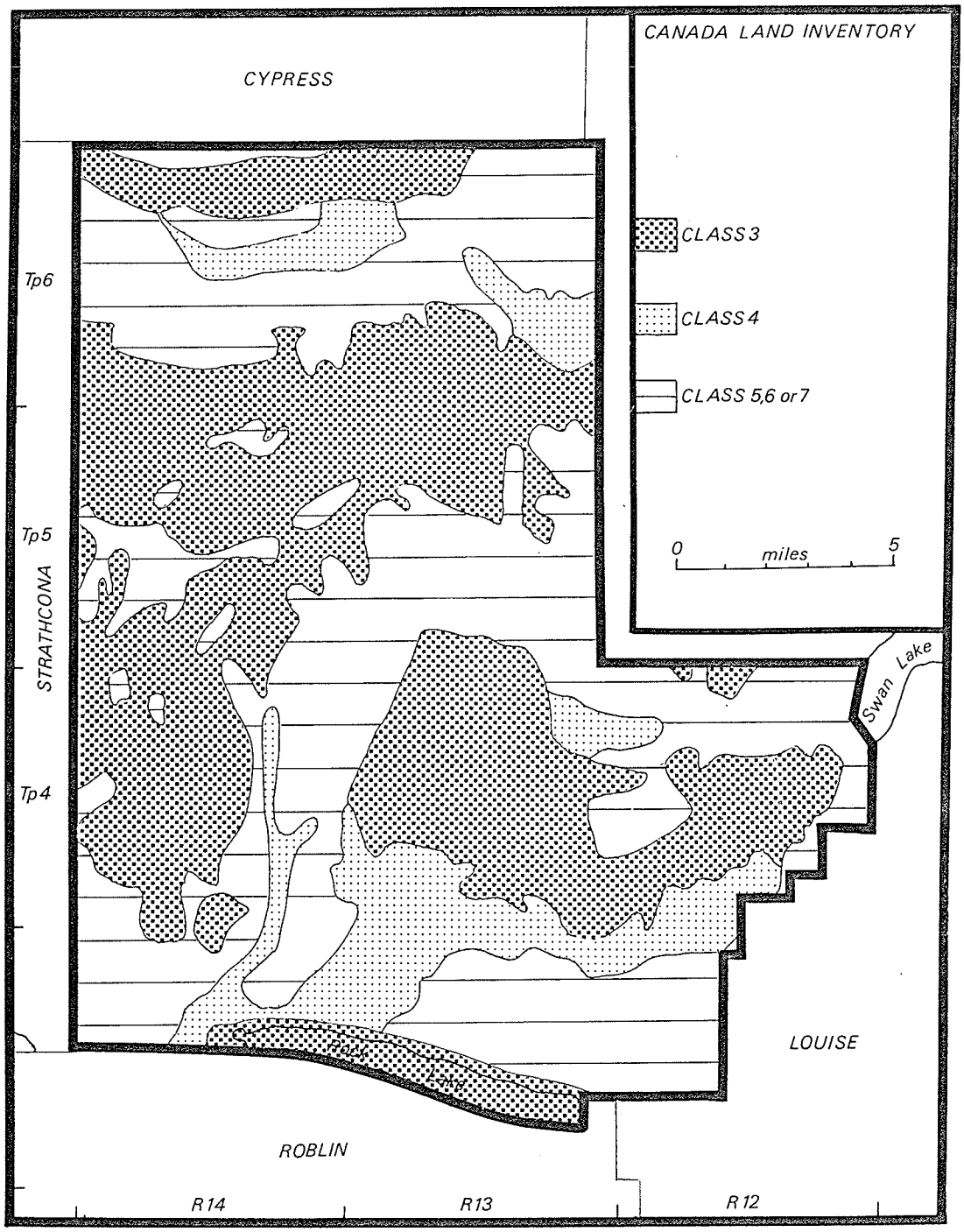
MAP 3.5 Argricultural capability: Rural Municipality of Albert



MAP 3.6 Ungulate capability: Rural Municipality of Argyle



MAP 3.7 Ungulate capability: Rural Municipality of Albert



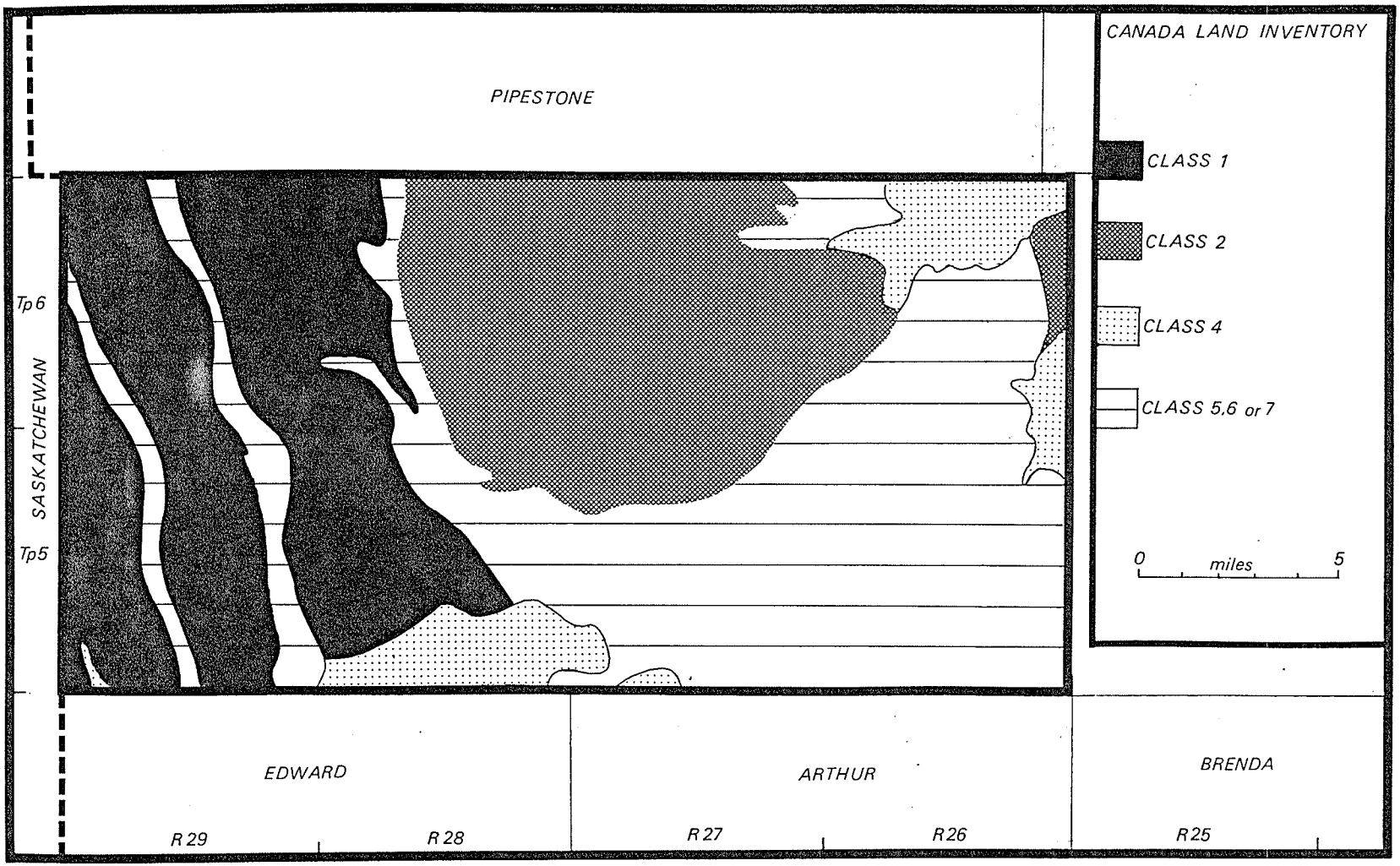
MAP 3.8 Waterfowl capability: Rural Municipality of Argyle

designated as class 3 ungulate habitat. The major limitation of the till plain is the inoptimal interspersion of landforms necessary for optimum ungulate habitat. The remaining area consists of equal amounts of class 5 and 6 ungulate habitat, with the major limitation being extreme flatness.

The Canada Land Inventory (1970[a]) also indicates that unlike Argyle, Albert contains large areas of excellent waterfowl habitat. The high density of sloughs on the Minnedosa-Reston Till Plain creates some of the best waterfowl habitat in Manitoba (Map 3.9). Approximately 26 percent of Albert consists of class 1 waterfowl habitat, while 25 percent is class 2 with lack of permanent wetlands and periodic drouth being the major limitations. The remaining area, which consists primarily of outwash channels and lacustrine plain, is designated as class 5 and 6, with flatness and limited water retention capability being the major limitations.

3.3.6 Climate

The climate of both study areas is very similar and is typically continental, with large seasonal temperature ranges and moderate precipitation (Dunlop and Shaykewich 1982). However, the R.M. of Albert tends to have slightly lower mean annual precipitation than the R.M. of Argyle. Average number of degree days above 5.5°C between May 1 and September 30 for Albert and Argyle is 1550 and 1500 respectively. Mean annual precipitation is 400 to 500 mm (16 to 18 inches) for Albert and 450 to 500 mm (18 to 20 inches) for Argyle. Although both municipalities experience periodic drouth, it occurs much more frequently in Albert. Average annual soil water deficit (August 1) for Albert and Argyle is 125 mm (5 inches) and 50 mm (2 inches) respectively.



MAP 3.9 Waterfowl capability: Rural Municipality of Albert

Chapter 4

RESULTS AND DISCUSSION

This chapter presents and discusses the data that was obtained in the landowner survey. The first section provides a composite of the typical sample landowner and his farm operation, and is followed by a natural land inventory (section 4.2) which outlines the area and land use of natural upland and wetland habitat on the sample farms. The third section (4.3) quantitatively summarizes past natural land conversions and determines the role of existing Wheat Board quota and municipal property tax regulations in promoting these conversions. The final section outlines the natural areas that the sample landowners plan to convert to cropland over the next five years, and assesses the natural land conservation potential of the proposed quota and property tax incentives.

4.1 LANDOWNER PROFILE

4.1.1 Landowner Income

All of the sample landowners reported that they were practicing farmers. Ninety-seven percent indicated that farming was their main source of net income; the remaining 3 percent classified themselves as part-time farmers[1]. Actual monetary values were not requested by the interviewer since test sample respondents felt uneasy about disclosing such information. Most landowners' net farm income accounted for nearly eighty percent of their total net income (Table 4.1). Thirty-four and 32 percent respectively, reported having a secondary source of income.

4.1.2 Landowner Age and Education

The average age of the sample landowners in Albert and Argyle was 43.8 and 45.4 years respectively. Over half of the surveyed landowners in both study areas were forty years of age or older (Table 4.2).

[1] Net farm income of part-time farmers accounted for an average of 25 percent of total net income.

TABLE 4.1 Distribution of percent of total net income derived from farm net income amongst surveyed landowners

	Albert (n=50)			Argyle (n=50)		
%	Freq.	%	Cum. %	Freq.	%	Cum. %
1 - 20	0	0	0	1	2.0	2.0
21 - 40	1	2.0	2.0	2	4.0	6.0
41 - 60	4	8.0	10.0	1	2.0	8.0
61 - 80	5	10.0	20.0	7	14.0	22.0
81 - 100	40	80.0	100.0	39	78.0	100.0

TABLE 4.2 Age distribution of surveyed landowners

	Albert (n=50)			Argyle (n=50)		
Age	Freq.	%	Cum. %	Freq.	%	Cum. %
20 - 29	5	10.0	10.0	4	8.0	8.0
30 - 39	19	38.0	48.0	17	34.0	42.0
40 - 49	13	26.0	74.0	9	18.0	60.0
50 - 59	6	12.0	86.0	10	20.0	80.0
> 59	7	14.0	100.0	10	20.0	100.0

Thirty-eight and 42 percent of the respondents from Albert and Argyle respectively, had less than a grade 10 education (Table 4.3). Twelve and 16 percent respectively, had at least some post-secondary education.

4.1.3 Farm Ownership

The typical farm operator in both study areas owned a large percentage of the land that he farmed. The sample farmers in Albert and Argyle respectively, owned 78.2 and 83.4 percent of the land they farmed. The remaining percentage was either rented from other landowners or leased from the government.

Respondent landowners in Albert and Argyle have owned and/or operated their farms for an average of 18.2 and 19.9 years respectively. Seventy-four and 80 percent respectively, have owned and/or operated their farms for 10 or more years. Sixty eight and 64 percent respectively, indicated that the previous owner was another family member. Eighty-six percent of the respondent landowners in Argyle planned to transfer farm ownership to another family member when they retire. Alternatively, only 60 percent of the respondents in Albert planned on doing the same. Persevering drouth conditions, in combination with recent low grain prices and farm forclosures, are to a large extent responsible for the less favourable attitude towards future family ownership in the Rural Municipality of Albert.

4.1.4 Public Access

Forty-eight (96%) of the sample farm operators in Argyle reported that they allow hunters on their property. Of the respondents granting access to hunters, six (12%) allow locals and/or relatives only. One reported that access was granted only through payment for access privileges. Ninety percent of the respondents granting access to hunters permitted the use of both long (rifles) and limited-range firearms (shotguns), while 10 percent permitted the use of limited-range firearms only.

Forty-six (92%) of the sample farm operators in Albert reported that they allow hunters on their property. Sixteen percent of these farmers allow locals and/or relatives only. Fee payment for hunting privileges was not reported by any of the respondents in this municipality. Eighty-seven percent of the respondents granting access to hunters permitted the use of both long and limited-range firearms, while 13 percent permitted the use of limited-range firearms only.

TABLE 4.3 Educational experience of surveyed landowners

	Albert (n=50)			Argyle (n=50)		
Years of Education	Freq.	%	Cum. %	Freq.	%	Cum. %
4 - 6	3	6.0	6.0	3	6.0	6.0
7 - 9	16	32.0	38.0	18	36.0	42.0
10 - 12	25	50.0	88.0	21	42.0	84.0
> 12	6	12.0	100.0	8	16.0	100.0

4.1.5 Farm Size

The mean farm size in Albert and Argyle was 997.7 and 885.4 acres respectively. This 12 percent difference in mean farm size is in part due to the high concentration of large monocultural grain operations in the western portion of Albert. Thirty (60%) of the sample farms in Argyle were under 800 acres in size, in comparison to only 19 (38%) in Albert (Figure 4.1).

4.1.6 Farm Type

A majority of the landowners from both study areas classified their agricultural operation as either a grain farm[1] (45 percent) or a mixed farm[2] (40 percent) (Table 4.4). The remaining 15 percent classified their operation as a livestock farm[3]. Although grain farms are more common in Argyle, 15 (79%) of the sample grain farmers in Albert derived 100 percent of their gross income from grain sales, while only 8 (31%) reported the the same in Argyle.

Mean reported farm size varied considerably with farm type in both municipalities. On average Albert grain farmers operated the largest farms (1164.6 ac), while Argyle cattle farmers operated the smallest farms (576.0 ac).

4.1.7 Land Use

The total land area occupied by the sample farms in Albert and Argyle was 49,887 and 44,212 acres respectively[4]. The land-use pattern of the sample farms is summarized in Table 4.5.

Cultivated land accounted for approximately 76 and 69 percent of the sample farmland area in Albert and Argyle respectively. Land seeded to grain accounted for over three-quarters of this cultivated land. Summerfallow accounted for approximately 14 and 7 percent of the cultivated acreage on Albert and Argyle sample farms respectively. The

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[1] Grain sales account for at least 70 percent of gross farm income.

[2] Neither grain or cattle sales account for at least 70 percent of gross farm income.

[3] Livestock sales account for at least 70 percent of gross farm income.

[4] Similar to Zittlau's (1979) landowner survey, the reader is cautioned that acreages presented in this Chapter are based on estimates provided by the sample farm operators. Farm operators can provide accurate cultivated acreage estimates from measuring equipment attached to grain seeding equipment, however uncultivated acreage estimates are less accurate and may be influenced by farmers' perception of these areas.

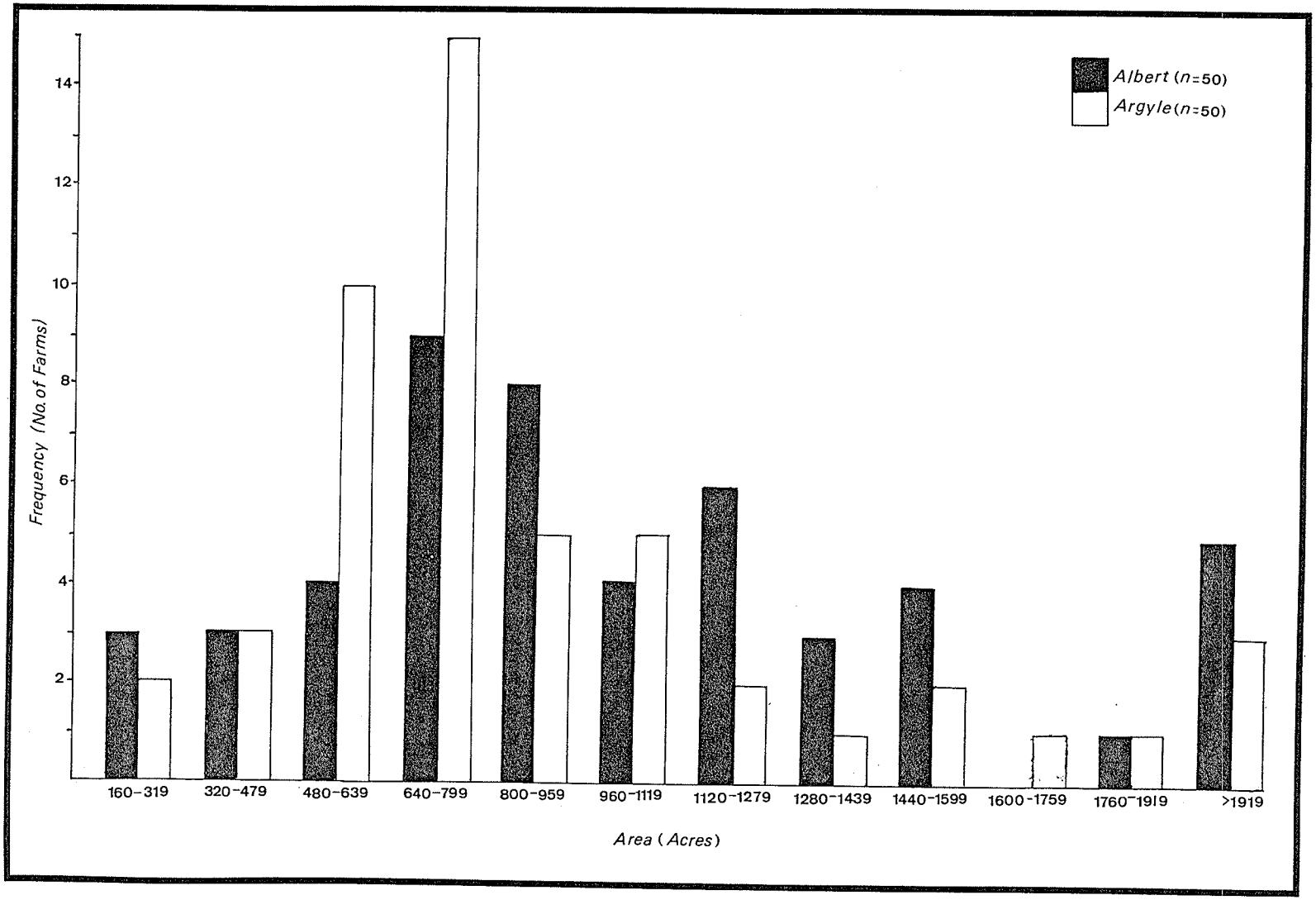

FIGURE 4.1 Frequency distribution of farm size for Albert and Argyle sample farms

TABLE 4.4 Farm type classification of sample farms

	Albert (n=50)		Argyle (n=50)		Total (n=100)	
Farm Type	Freq.	%	Freq.	%	Freq.	%
Grain	19	38.0	26	52.0	45	45.0
Mixed	21	42.0	19	38.0	40	40.0
Livestock	10	20.0	5	10.0	15	15.0
		100.0		100.0		100.0

TABLE 4.5 Land use of Albert and Argyle sample farms

	Albert (n=50)			Argyle (n=50)		
Land-Use Category	Area (acres)	% of Total Area	% of Total Cult/Uncult Area	Area (acres)	% of Total Area	% of Total Cult/Uncult Area
Cultivated Land	37,951	76.1	-	30,395	68.7	-
Grain	26,926	54.0	70.9	25,673	58.0	84.4
Forage	1,406	2.8	3.7	1,874	4.2	6.2
SummerFallow	5,336	10.7	14.1	2,042	4.6	6.7
Tame Pasture	1,075	2.2	2.9	321	0.7	1.0
Tame Hayland	3,208	6.4	8.4	485	1.2	1.7
Uncultivated Land	11,692	23.4	-	13,578	30.8	-
Native Pasture	6,336	12.7	54.3	8,285	18.7	60.7
Native Hayland	894	1.8	7.7	1,241	2.9	9.4
Idle/Wasteland	4,462	8.9	38.0	4,052	9.2	29.9
Farm Yard	244	0.5	-	239	0.5	-
Total area	49,887			44,212		

higher incidence of summerfallowing in Albert can be attributed to the drier local climate in this municipality. "Improved" or tame pasture and hayland accounted for approximately 11 percent of the cultivated acreage in Albert, as opposed to only 3 percent in Argyle. Albert's lack of high quality native pasture and hayland is the primary reason for this difference.

Uncultivated land accounted for approximately 23 and 31 percent of the sample farmland area in Albert and Argyle respectively. "Unimproved" or natural pasture accounted for over half of this uncultivated farmland. Idle land or "wasteland" accounted for approximately 38 and 30 percent of the uncultivated acreage on Albert and Argyle sample farms respectively. Farmyards occupied less than one percent of the total farmland area.

More significant land use patterns become evident when analyzing land use in relation to farm type. For example, in the Rural Municipality of Albert, "unimproved" acreage accounted for only 17.2 percent of the total area of farms classified as grain farms, while amongst mixed and cattle farms, it accounted for 26.1 and 36.7 percent respectively. The same situation was reported in Argyle. Zittlau (1979) and Morgan (1985) reported similar trends in the Minnedosa Pothole Region of south-western Manitoba. The trend away from cattle and mixed farming operations, towards large monocultural grain operations, and the associated loss of "unimproved" natural areas, has been cited as one of the major causes of declining wildlife habitat on the Canadian Prairies (Kiel et al. 1972, Boyd 1985).

Sample grain farms (as opposed to mixed and cattle operations) from both municipalities were characterized by a lack of forage-based crop rotations, instead favoring the use of resource consumptive practices such as wide-row monoculture and black summerfallow.

4.2 NATURAL LAND INVENTORY OF SAMPLE FARMS

A general inventory of the natural acreages on the sample farms is necessary in order to fully understand past and future land "improvement" trends. This in turn helps explain the role that existing and proposed property tax and Wheat Board quota regulations have had, and will have, on the land "improvement" decision-making process of the individual farm operator.

Although a variety of complex definitions of "natural area" occur in the literature, the following working definition was selected for the inventory: any surface area that is currently in an uncultivated or "unimproved state". This includes large uncultivated blocks of habitat such as "unimproved" range pasture, as well as small isolated patches of habitat

such as bluffs or sloughs which are isolated on cultivated fields. A rather simplistic natural land classification system was utilized for this inventory, since actual natural acreages were based on estimates provided by respondent farm operators[1]. The natural land habitat categories which were utilized are as follows:

1) wetlands - includes permanent, semi-permanent and temporary wetlands (for explanation see Smutko 1982), but does not include ponded water on cultivated fields or cultivated wetland basins. Wetland boundary is considered as the landward edge of the sedge meadow or shallow-marsh zone.

2) Uplands - i) woodlands - includes areas of permanent bush such as woodlots and bluffs, as well as areas of scrub bush and willows.

ii) grasslands - primarily open or grass portions of "unimproved" pasture.

The results of the inventory are presented on the basis of this two-fold habitat classification and are discussed in relation to land use and farm type. Comparisons between study areas are also be made.

4.2.1 Wetlands

Ninety eight and 92 percent of the sample landowners in Albert and Argyle respectively, reported the presence of wetlands on their farms. The average number of wetlands per farm varied considerably between study areas. Albert farm operators reported an average of 38.5 wetlands per farm (27.8 wetlands/section), while those in Argyle reported an average of only 5.2 wetlands per farm (3.5 wetlands/section). Thirty-five (62%) of the sample landowners in Albert had more than 10 wetlands on their property, as opposed to only 4 (9%) in Argyle (Figure 4.2). Although Argyle respondents reported a low density of wetlands, they had a higher mean wetland acreage (69.9), than Albert respondents (57.9 acres). The average reported size of the wetlands in Albert and Argyle was 14.6 and 1.5 acres respectively.

The variation in wetland density and size, between study areas, is primarily due to differences in terrain. Albert is dominated by ground moraine, which because of its undulating nature typically has a high density of small, shallow, depressional basins (Figure 4.3). As a result, Albert has large expanses of excellent waterfowl habitat (C.L.I.

[1] Topographic maps, Wheat Board Permit Book Applications, and in some cases aerial photographs, were used during the farm operator interviews to aid in the estimation of natural land acreages.

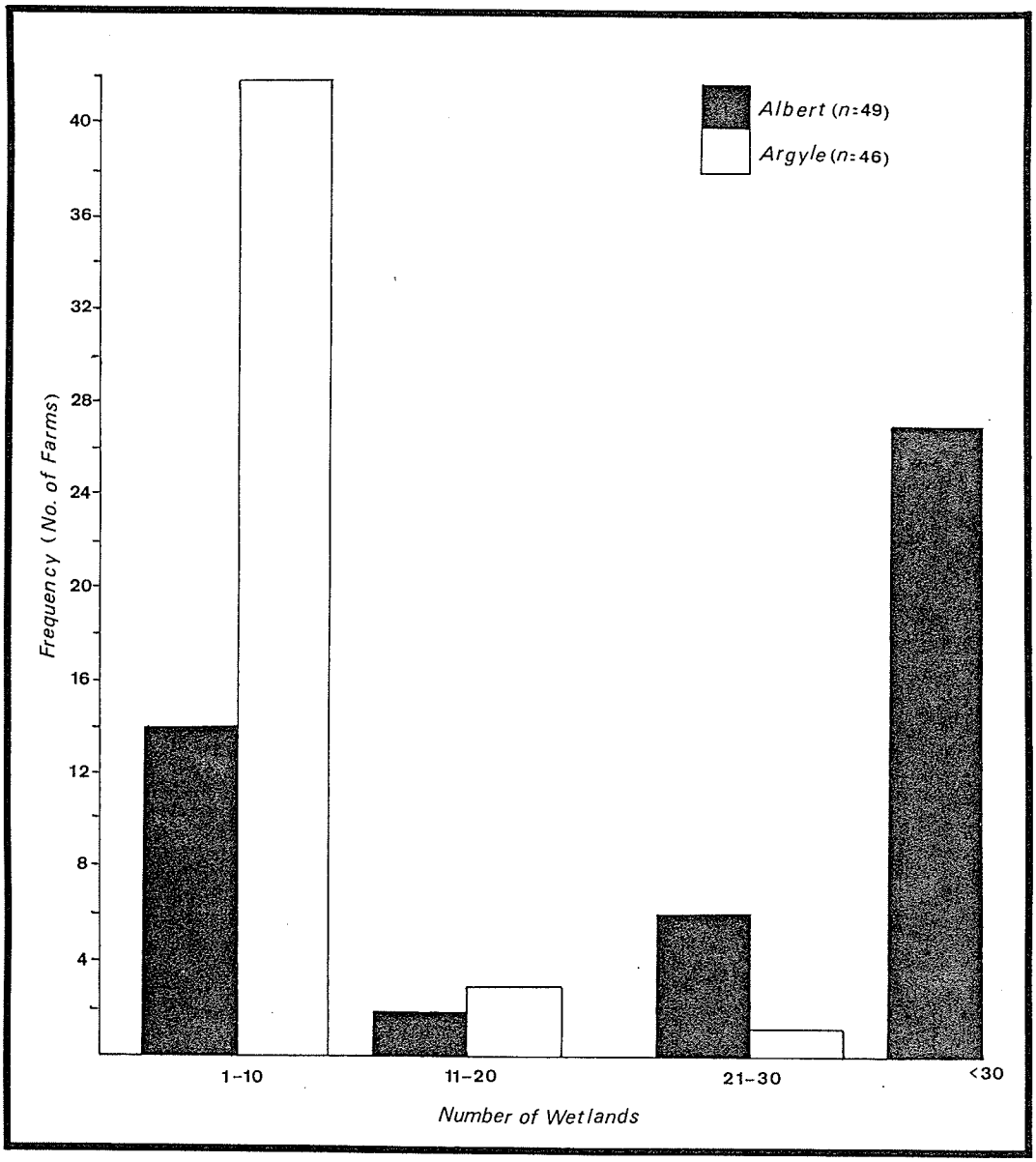

FIGURE 4.2 Frequency distribution of number of wetlands located on Albert and Argyle sample farms

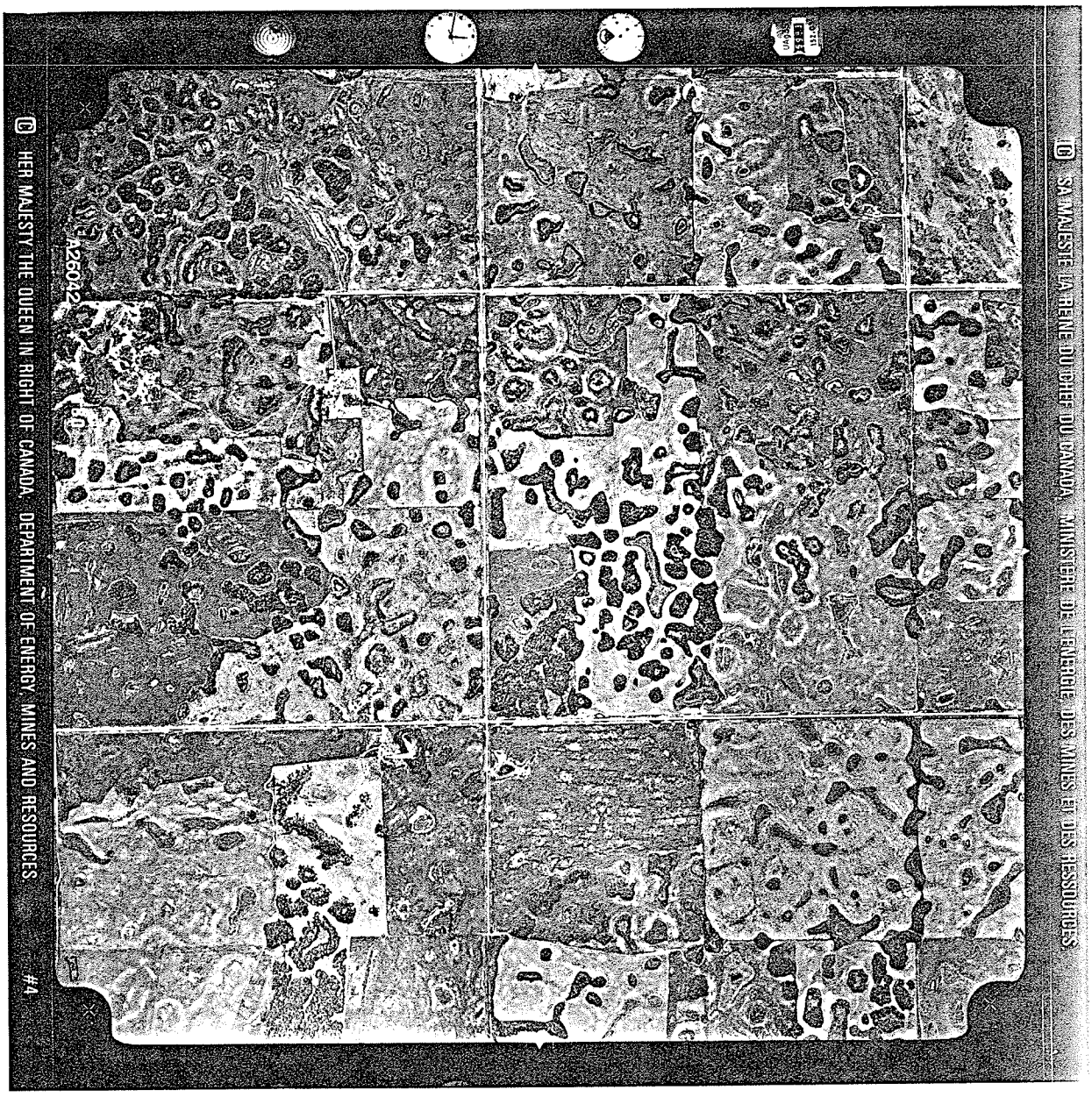

FIGURE 4.3 Aerial photograph of typical wetland habitat (ground moraine)in the Rural Municipality of Albert

class 1 and 2). On the other hand, Argyle is dominated by hummocky moraine, which because of its higher local relief produces a low density of large, deep permanent wetlands (Figure 4.4), and generally results in lower quality waterfowl habitat (C.L.I. classes 3-5). Taking into consideration that ground moraine areas (high quality waterfowl habitat areas) also tend to produce some of the most productive cropland on the Prairies, the potential for conflict between agricultural and wetland conservation interests becomes very evident (Millar 1982).

The land use of the upland adjacent to a wetland often determines the wildlife habitat quality of a basin, as well as the likelihood of future agricultural encroachment. Waterfowl nesting studies have shown that nesting densities, hatching success, and the protection from predators, all decrease dramatically with increasing land use intensity on the wetland edge[1] (Duebbert and Kantrud 1974, Duebbert and Lokeman 1976, Kirsch et al. 1978). The primary reason for this relationship is that the density and height of residual vegetation on the wetland edge usually decreases with increasing land use intensity. Consequently, wetlands with low intensity uses on adjacent upland, such as idle land, native pasture and native hayland, are usually better suited for the production of waterfowl than those with high intensity uses such as grain production. However, it should be noted that the waterfowl producing capability of wetlands located on native pasture and hayland can be virtually eliminated by the use of intensive agricultural practices such as mowing or overgrazing (Kirsch 1969, Duebbert et al. 1986).

The condition of the wetland edge in Albert can generally be described as very heavily utilized. Wetlands with grain fields on adjacent upland occurred on 84.2 percent of the sample farm wetlands (Table 4.6). Alternatively, the "waste"/idle, native hay and native pasture categories, which are best suited for the production of waterfowl, occurred on only 12.9 percent of the sample basins. Since small temporary basins located on grain fields are the primary targets of most drainage activities, it would appear that in the absence of a wetland conservation program, virtually all of the wetlands in Albert will be eliminated in the forseeable future.

The condition of the wetland edge in the Rural Municipality of Argyle can generally be described as moderately utilized (Table 4.6). Wetlands with grain fields on adjacent upland accounted for 56.9 percent of the sample basins, while "waste"/idle, native hay and pasture categories occurred on 42.3 percent of the sample basins. Since a smaller percentage of the wetlands in Argyle occur on grain fields, and since many of the remaining wetlands are large permanent basins which are difficult and expensive to drain, it would

[1] Wetland edge is defined as the upland area within 30 yards of the wetland basin.

FIGURE 4.4 Aerial photograph of typical wetland habitat (ground moraine) in the Rural Municipality of Argyle

TABLE 4.6 Number and percent of sample farm wetlands located on six major land use types.

	Albert (n=49)		Argyle (n=46)	
Land-Use Category	Number of wetlands	%	Number of wetlands	%
Cropland	1591	84.2	136	56.9
Improved Pasture	32	1.7	2	0.8
Improved Hayland	23	1.2	0	0.0
Unimproved Pasture	223	11.8	79	33.1
Unimproved Hayland	6	0.3	0	0.0
Waste/Idle	15	0.8	22	9.2
	1890	100.0	239	100.0

appear that future agricultural encroachment on Argyle's wetlands will be less severe than in Albert.

4.2.2 Natural Uplands

4.2.2.1 Woodlands

Ninety-six and 94 percent of the respondents in Argyle and Albert respectively, reported the presence of woodlands on their farm. Argyle sample landowners reported approximately forty percent more woodland acreage (5166 ac, mean = 103.3 ac) than those in Albert (3626 ac, mean = 72.5 ac). The bulk of the woodland acreage in both study areas consists of trembling Aspen (Populus tremuloides), balsam poplar (P. balsamfera) and burr oak (Quercus macrocarpa), as well as a variety of willow and other small bush species (Ellis and Shafer 1974, 1981).

Sixty-eight (70%) of the sample farms from both study areas had 100 acres or less of woodland (Figure 4.5). The larger woodland area reported by Argyle respondents was primarily due to the presence of five farms containing very large acreages (over 250 ac) of woodland. Argyle farms were characterized by large blocks of woodland, while Albert farms were characterized by small bluffs associated with wetlands.

The land use of the sample farm woodlands varied considerably between study areas (Table 4.7). Seventy-five percent of the woodland in Argyle was reportedly located on "unimproved" pasture and waste/idle land, while only 38 percent of Albert's woodland acreage was located on these land types. On the other hand, 61 percent of the woodland on Albert sample farms was located on grain fields, while only 23.8 percent of Argyle's woodland was located on grain fields.

4.2.2.2 Native grassland

Eighty-eight and 72 percent of the sample landowners in Argyle and Albert respectively, reported the presence of native grassland on their farms. The average native grassland acreage on Argyle and Albert sample farms was 93 and 101 acres respectively. Ninety-nine and 91 percent of the sample farm grassland acreage in Albert and Argyle respectively, was either grazed or mowed on a regular basis (ie. located on native pasture or hayland). Consequently, most of the grassland in the study areas is not true prairie grassland. Excessive grazing and mowing can drastically reduce the wildlife carrying

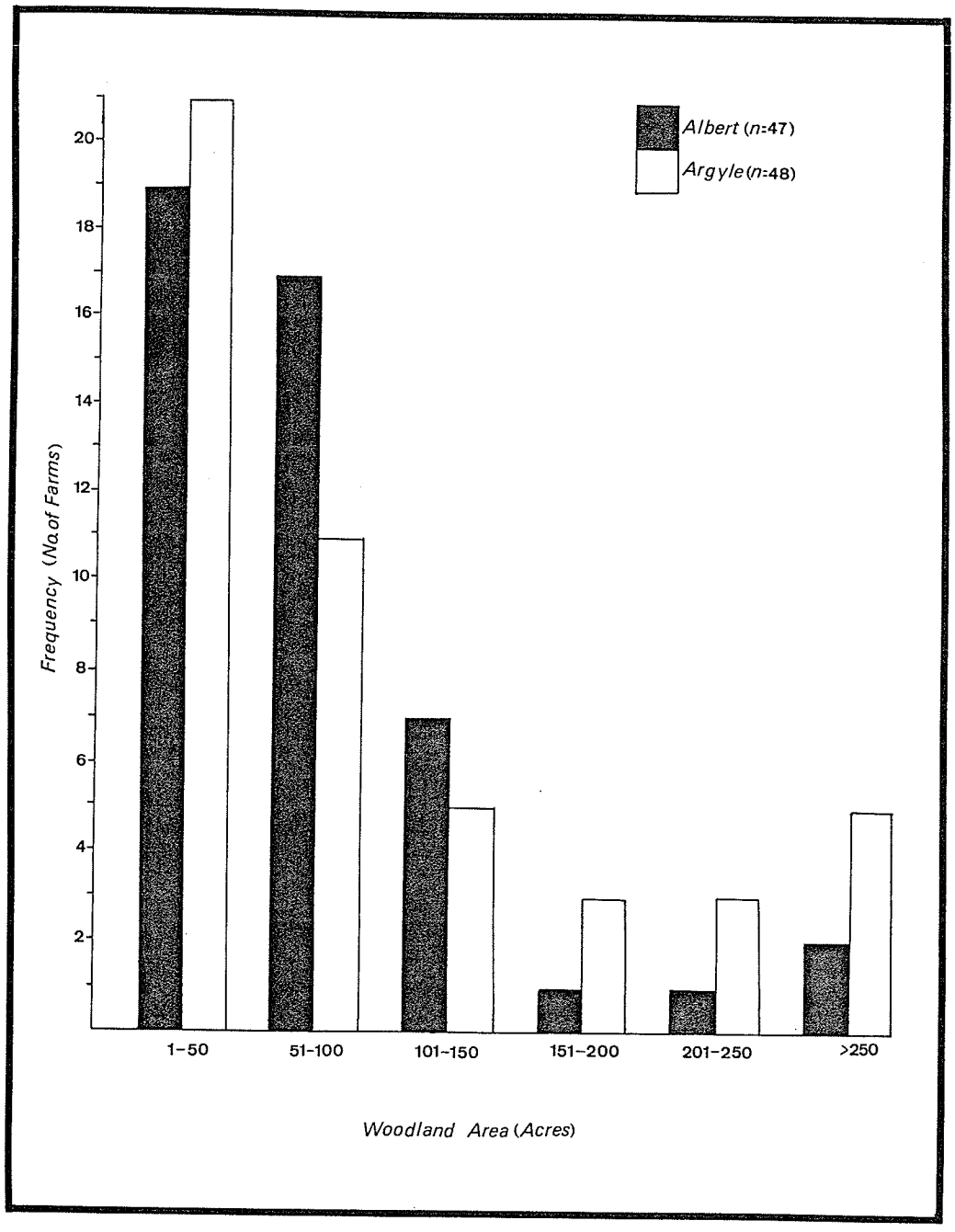

FIGURE 4.5 Frequency distribution of woodland area located on Albert and Argyle sample farms

TABLE 4.7 Percent of sample farm woodland acreage located on six major land use types

	Albert (n=47)		Argyle (n=48)	
Land-Use Category	Woodland Acreage	%	Woodland Acreage	%
Cropland	2213	61.1	1229	23.8
Improved Pasture	14	.4	5	0.0
Improved Hayland	20	.6	0	0.0
Unimproved Pasture	1165	32.1	3195	61.8
Unimproved Hayland	9	.2	44	.9
Waste/Idle	205	5.6	693	13.5
	3626	100.0	5166	100.0

capacity of grassland areas (Kirsch et al. 1978), however, with proper range management practices these areas can support good wildlife populations (Kantrud and Stewart 1984).

4.3 PAST NATURAL LAND CONVERSIONS AND THE ROLE OF EXISTING QUOTA AND PROPERTY TAX REGULATIONS

This section presents and discusses data relating to the past wetland and natural upland conversions that took place on the sample farms during a ten year period (1976-86) prior to the commencement of the landowner survey. The first part of this section quantitatively summarizes the acreages of the natural land that were converted to cropland and discusses them in relation to various landowner characteristics. The second part discusses farm operators' perceptions of the success or failure of their drainage and land clearing projects. The third part discusses landowners' perception of the primary factors which influenced their decision to convert natural areas. The fourth section analyzes landowner's perceptions of a variety of potential benefits and costs of maintaining natural areas on their property. The final part analyzes and discusses landowner attitude towards, and the land conversion consequences of existing Wheat Board policy and municipal property tax regulations.

4.3.1 Quantitative Summary of Past Natural Land Conversions

4.3.1.1 Past wetland conversions

Since the quantitative land use data that was obtained in the survey was based on estimates provided by landowners, the data collection process was kept to a minimum, ie. only wetlands that were totally drained and/or cultivated were enumerated. Cultivation of wetlands occurs primarily under drouth conditions since the costs of agriculturally developing dry wetland basins may approach a level similar to preparation costs of adjacent uplands which are normally cultivated (Duffus 1984). Cultivation of wetlands is often considered a transitory impact and occurs most frequently on small temporary wetlands, while drainage is often considered a permanent impact and occurs most frequently on larger semi-permanent wetlands.

According to land use studies by Kiel et al. (1962), Adams and Gentle (1978) and Millar (1982), over three times as many prairie wetlands are affected by transitory impacts as opposed to permanent impacts. Consequently, transitory impacts such as wetland cultivation, haying and grazing, are often considered a greater threat to waterfowl nesting

habitat than actual wetland drainage. The actual impact of wetland cultivation varies with the length and severity of the disruption. Following reflooding, cultivated basins are likely to be shallower and less permanent than before cultivation. In many cases vegetation is unable to re-establish itself due to substantial increases in surface soil salinity which often occur following the removal of the original wetland vegetation (Duffus 1984).

Returning to the results of the landowner survey, 36 (72%) and 24 (52%) of the sample landowners in Albert and Argyle respectively, who had wetlands on their property at the beginning of the ten year period, indicated that they had either drained or totally cultivated some wetlands on their farm. Total cultivation of temporary basins was the most common technique used to convert wetlands in Albert and accounted for 75 percent of the converted wetlands. Cultivation and drainage of wetlands occured at nearly an equal rate in Argyle. Sample wetland converters in Albert reportedly destroyed 574 wetlands (mean = 15.9) totalling 805 acres (mean = 22.4 ac), while those in Argyle eliminated 198 wetlands (mean = 8.3) totalling 580 acres (mean = 24.2 ac). This represents a 20.9 and 13.2 percent reduction in sample farm wetland area in Albert and Argyle respectively, over the ten year period.

Landowners that had converted 1 to 5 wetlands were most common in both municipalities (Figure 4.6). However, 12 (33%) of the sample wetland converters in Albert destroyed more than 15 wetlands, while only 2 (8%) of those in Argyle reported the same. Ninteen (53%) and 10 (42%) of the sample wetland converters in Albert and Argyle respectively destroyed 10 or less acres, while 7 (19%) and 3 (13%) eliminated more than 40 acres.

Wetlands located on cropland were the major target of wetland converters in both study areas (Table 4.8).

Several factors contribute to the higher incidence of wetland conversion in Albert. First, the sample farms in Albert had nearly eight times as many wetlands on their property as compared to those in Argyle. Second, the wetlands in Albert tend to be smaller and more temporary than those in Argyle and consequently are less difficult and less expensive to drain. Finally, nearly twice and as many of the respondents in Albert are monocultural grain farmers, who because of their specialized interests often perceive wetlands as a liability, which must be eliminated or converted to another use.

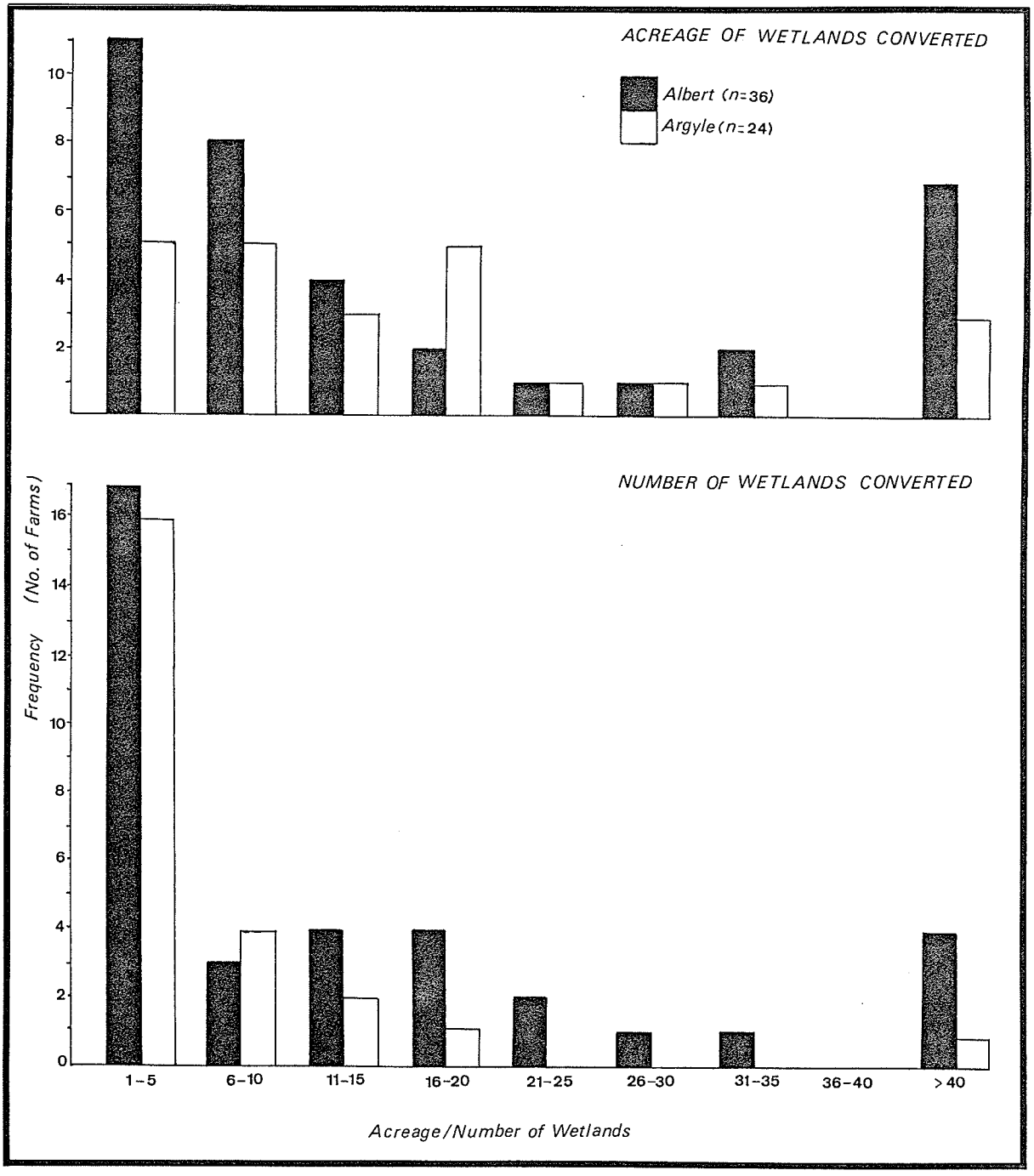

FIGURE 4.6 Frequency distributions of the number and acreage of wetlands converted by Albert and Argyle sample landowners during the past 10 years (1976-86)

TABLE 4.8 Location of converted wetlands on sample farms (1976-86)

	Albert (n=36)		Argyle (n=24)	
Land-Use Category	Number converted	%	Number converted	%
Cropland	477	83.1	195	98.5
Unimproved Pasture	74	12.9	3	1.5
Unimproved Hayland	1	0.2	0	0.0
Waste/Idle Land	18	3.0	0	0.0
Improved Pasture	2	0.4	0	0.0
Improved Hayland	2	0.4	0	0.0
	574	100.0	198	100.0

Statistical Associations

In order to deterimne possible statistical associations between past wetland conversion and selected landowner variables the survey respondents were grouped[1] into the following categories:

		Area converted(acres)	Frequency
Category 1	Non-wetland converters	0	38
Category 2	Moderate wetland converters	1 to 10 acres	29
Category 3	Heavy wetland converters	greater than 10 acres	33
			100

Statistical associations between variables were measured using the gamma coefficient[2] and chi-square test of statistical significance[3]. These statistics have been used effectively in wildlife oriented landowner surveys by Leitch and Danielson (1979) and Smutko (1982), and through comparison of the chi-square significance level and gamma value, provide a good understanding of variable association. Gamma coefficients are considered meaningful only if the relationship is deemed statistically significant. A chi-square signifance level of .10 was arbitrarily selected for this purpose.

Six of the seven landowner variables tested were found to have a statistically significiant relationship with the area of wetland converted (Table 4.9)[4]. The statistical values for farm size imply that operators of large farms (1200 ac or more) tended to convert more wetland acreage than operators of small farms (less than 1200 ac). The values for farm type imply that operators of grain farms and to a lesser extent mixed farms, tended to convert more wetland acreage than operators of livestock farms. The lower rate of wetland

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[1] Respondents from both study areas were grouped together in order to insure an adequate sample size for statistical analysis.

[2] The coefficient gamma is distribution free and measures the degree of association between two variables at the ordinal or higher level. The coefficient has a range of -1 to +1, where a maximum or minimum gamma value indicates that paired observations of two variables are all consistent (ie. all move together or all move in opposite directions). Values in between -1 and +1 indicate less than complete consistency (For more information see James 1971, Nie 1979).

[3] The chi-square test is a test of statistical significance and measures the discrepancy between observed frequencies and the corresponding expected frequencies. The probability level reported is the probability of obtaining by chance an observed chi-square value as great as what was observed. (For more information see James 1971, Nie 1979).

[4] Cross-tabulation tables for the significant associations are displayed in Appendix 10 A.

TABLE 4.9 Statistical relationships between area of wetland converted and selected landowner variables

Variable	Gamma Value	Chi-square Statistic Significance Level
Farm Size	.47	.01
Farm Type	-.38	.08
Wetland Area (1976)	.37	.01
Landowner Age	-.50	.00
Landowner Education	.21	.10
Non-Nunter/Hunter?	-.29	.06
No association - Secondary Source of Income? (Chi-square significance level = .60)		

conversion on mixed and livestock farms reflects the higher value that wetlands have to operations that involve livestock (Morgan 1985). Considering the recent trend towards large monocultural grain operations (Boyd 1985), the aformentioned associations suggest that the tempo of wetland conversion will steadily increase in the future.

The values for wetland area that existed in 1976, suggest that farmers who owned a large area of wetlands in 1976 (30 ac or more) tended to convert more wetland acreage than those who owned a small area of wetlands (less than 30 ac). The values for landowner age imply that younger farmers (less than 40 years) tended to convert more wetland acreage than older farmers (40 years or older). This association is probably due to the fact that younger farmers tend to be oriented towards profit related expansion, while old farmers are usually oriented towards retirement.

The direction of the association between the level of landowner education[1] and the area of wetland converted contradicts what is expected, as does the association between hunting status and the area of wetland converted. These associations imply that both better educated farmers (more than grade 12), and farmers who hunt, tended to convert more wetland acreage than less educated (less than grade 9), and non-hunting farmers respectively. Other landowner surveys found that highly educated farmers, and farmers who hunt, were more aware of the environmental values of wetlands and are therefore less likely to convert wetlands to cropland (Christensen and Norris 1983).

No statistically significant association was found between whether farmers have a secondary source of income and the area of wetlands converted.

4.3.1.2 Past natural upland conversions

Thirty (63%) and 30 (61%) of the repondents in Albert and Argyle respectively, who had woodlands on their property, indicated that they had cleared some woodland on their property during the last ten years (1976-86). Seventeen (43%) and 8 (15%) of the respondents who had grassland on their property, had broken some grassland during the last ten years. Sample upland converters in Albert cleared a total of 859 acres (mean = 28.6 ac) and 1049 acres of grassland (mean = 61.7), while those in Argyle cleared 941 acres of woodland (mean = 31.4 ac) and 453 acres of grassland (mean = 56.6 ac). This amount of clearing respresents a 19.1 and 15.4 percent reduction in woodland area in Albert and

[1] Chi-square test may not be vaild for this particular association since 22% of the cells have expected frequencies less than 5.

Argyle respectively, over the ten year period. Similarly, 17.3 and 8.9 percent of the native grassland on the sample farms was converted to cultivation over the ten year period.

Twenty-one (70%) and 17 (57%) of the woodland clearers in Argyle and Albert respectively, cleared 20 acres or less (Figure 4.7). Four individuals in Argyle cleared more than 70 acres of woodland, while only one individual in Albert reported the same. Seven (88%) and 9 (53%) of grassland breakers in Arglye and Albert respectively, converted 30 or less acres of grassland (Figure 4.7). Five individuals in Albert converted more then 60 acres of grassland, while no individuals in Argyle converted this much grassland.

Woodland located on cropland was the major target of clearing activities in both municipalities. It accounted for 81 and 66 percent of the woodland acreage cleared on Argyle and Albert sample farms respectively (Table 4.10). Woodland located on "unimproved" pasture and idle/"wasteland" accounted for the remainder of the cleared woodland.

Native grassland located on "unimproved" pasture was the major target of grassland breakers in both study areas and accounted for 85 and 79 percent of grassland converted in Albert and Argyle respectively (Table 4.11). Grassland located on "unimproved" hayland, cropland and idle/"wasteland", accounted for the remainder of the converted grassland.

Although approximately twice as much natural upland acreage was converted over the ten year period than wetland acreage, approximately 40 percent of the converted woodland and grassland was located adjacent to wetlands. Loss of wooded and grassland areas adjacent to wetlands has a siginificant impact on wetlands, since these areas contribute significant amounts of spring runoff to wetland water regimes (Kiel et al. 1972).

Statistical Associations

Possible statistical associations between the area of natural upland converted and selected landowner variables were investigated. Procedures used, and landowner variables tested, were identical to those used in section 4.3.1.1. To facilitate statistical analysis sample landowners were grouped into the following categories :

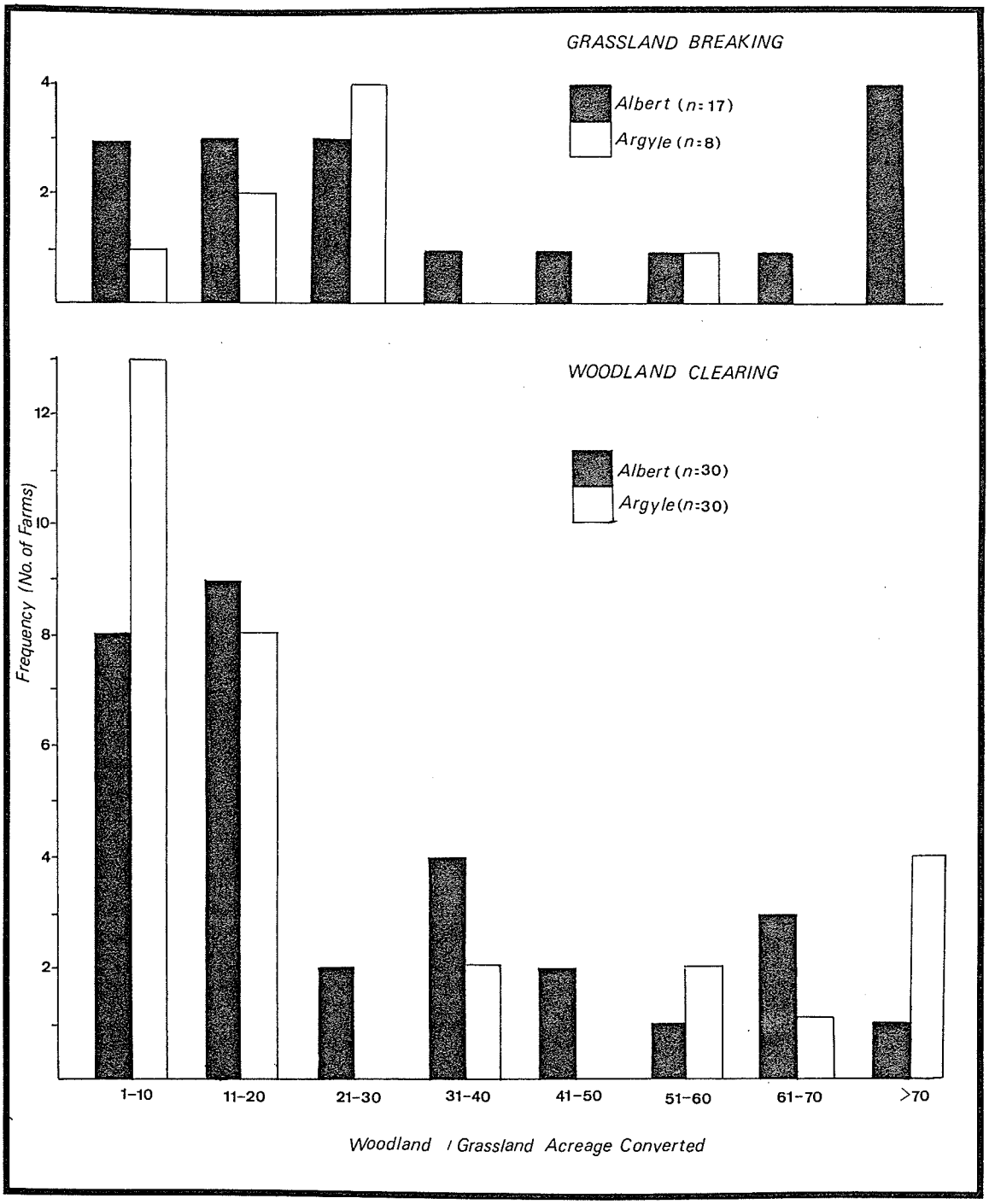

FIGURE 4.7 Frequency distributions of woodland and grassland acreage converted on Albert and Argyle sample farms during the past 10 years (1976-86)

TABLE 4.10 Location of cleared woodlands on sample farms (1976-86)

	Albert (n=30)		Argyle (n=30)	
Land-Use Category	Acreage Converted	%	Acreage Converted	%
Cropland	568	66.1	761	80.8
Unimproved Pasture	240	27.9	105	11.2
Waste/Idle	51	6.0	75	8.0
	859	100.0	941	100.0

TABLE 4.11 Location of converted grassland on sample farms (1976-86)

	Albert (n=17)		Argyle (n=8)	
Land-Use Category	Acreage Converted	%	Acreage Converted	%
Cropland	85	8.1	3	0.7
Unimproved Pasture	893	85.1	360	79.4
Unimproved Hayland	47	4.5	90	19.9
Waste/Idle	24	2.3	0	0.0
	1049	100.0	453	100.0

		Acreage of woodland and grassland converted	Frequency
Category 1	Non-upland converters	0	33
Category 2	Moderate upland converters	1 to 15 acres	29
Category 3	Heavy upland converters	greater than 15 acres	38

Of the seven landowner variables tested, only two have a statistically significant association with the area of natural upland converted (Table 4.12)[1]. The implications of the statistical values for farm size and farm type are similar to those outlined for past wetland conversion, ie. larger farms and farms oriented towards grain production tended to convert more upland area than smaller farms and farms oriented towards livestock production. Variables that were statistically associated with past wetland conversion but had no association with past upland conversions, include landowner education, landowner age, hunting status and natural upland area (1976).

4.3.2 Success of Natural Land Conversion Projects-Landowner Perceptions

4.3.2.1 Success of wetland conversion projects

Crop production was the major use of the converted wetlands in both municipalities. Approximately 86 percent of the wetland converters in both study areas indicated that most of their converted wetlands were used primarily for crop production following drainage or cultivation. The remaining respondents indicated that most of their converted wetlands were used as either tame hayland (7%) or permanent summerfallow (7%).

Most farmers felt that their converted wetland acreage proved very successful for its intended agricultural purpose (Table 4.13). Only two individuals (4%) rated usefulness as poor and only eight individuals (14%) rated usefulness as fair. Excessive moisture or salinity was in most cases cited as the reason for the poor performance of these wetlands. If the survey had taken place during a normal or wet cycle, instead of during a drougth, farmers' perception of the usefulness of their converted wetlands would have in all likelihood been substantially more negative. The fact that 83 percent of the sample wetland

[1] Cross-tabulation tables for the significant associations are displayed in Appendix 10 B).

TABLE 4.12 Statistical relationships between area of natural upland converted and selected landowner variables

Variable	Gamma Value	Chi-square Statistic Significance Level
Farm Ssize	.57	.00
Farm Type	-.40	.01

No association - Landowner Education (.97)[1], Landowner Age (.11), Hunting Status (.27) Natural Upland Area 1975 (.15), Secondary Source Income ? (.30).

[1] Chi-square statistic significance level.

TABLE 4.13 Sample landowners' perception of the success of their past wetland conversion projects

Usefulness of wetland for selected purpose			Soil quality of wetland as compared to adjacent cropland			Most successful crop		
Response	Freq.	%	Response	Freq.	%	Response	Freq.	%
Excellent	27	48.2	Substantially better	8	13.3	Wheat	21	37.5
Good	19	33.9	Better	17	28.3	Anything	10	17.9
Fair	8	14.3	Same	25	41.7	Oats	9	16.1
Poor	2	3.6	Worse	6	10.0	Barley	8	14.3
	56[1]	100.0	Substantially Worse	4	6.7	Nothing	4	7.1
				60	100.0	Forage	3	5.3
						Flax	1	1.8
							56[1]	100.0

[1] Four individuals used converted wetland as summerfallow.

converters felt that the soil of their converted wetlands was the same as, or better than that on adjacent cropland, was also likely inflated by persistent drouth conditions. Thirty eight percent of the respondents indicated that wheat was the most successful crop grown on their converted wetlands, followed by oats (16 percent) and barley (14 percent).

4.3.2.2 Success of natural upland conversion projects

Crop production was the major use of converted upland (wood-grassland) in both study areas. Approximately 90 percent of the upland converters in both study areas indicated that their converted upland acreage was used primarily for crop production. The remaining individuals indicated that tame hay production (5%), permanent summerfallow (3%), and native pasture (3%), were the major uses of their converted uplands. Table 4.14 summarizes landowner's perception of the usefulness, soil quality and crop success of their converted upland acreages. Most farmers felt their converted upland acreage proved successful for its intended agricultural purpose. Only 22 percent rated usefulness as fair or poor. Excessive stoniness and poor water holding capacity of soil, were the major drawbacks reported by the dissatisfied farmers. Seventy-eight percent of the sample upland converters felt that the soil of their recently converted uplands was as good as, or better, than the soil on adjacent cropland. Thirty-three percent indicated that wheat was the most successful crop grown on their converted upland, followed by barley (28 percent) and flax (10 percent).

4.3.3 Landowner's Major Reasons for Converting Natural Areas in the Past

In order to get a non-biased indication of landowners' major reasons for undertaking land conversion projects, respondents who had converted wetlands and/or natural uplands in the past were asked to list, in order of importance, the top three factors which contributed to their decision to convert these areas. Responses were weighted as follows: primary factor(3), secondary factor(2) and tertiary factor(1), and were summed in order to quantitatively determine the most important factors.

4.3.3.1 Major reasons for past wetland conversions

TABLE 4.14 Sample landowners' perception of the success of their past natural upland conversion projects

Usefulness of wetland for selected purpose			Soil quality of wetland as compared to adjacent cropland			Most successful crop		
Response	Freq.	%	Response	Freq.	%	Response	Freq.	%
Excellent	27	46.6	Substantially better	7	11.7	Wheat	19	32.8
Good	18	31.0	Better	20	33.3	Barley	16	27.6
Fair	10	17.2	Same	20	33.3	Anything	10	17.3
Poor	3	5.2	Worse	9	15.0	Flax	6	10.3
	58[1]	100.0	Substantially Worse	4	6.7	Nothing	3	5.2
				60	100.0	Oats	2	3.4
						Rye	2	3.4
							58[1]	100.0

[1] Two individuals used converted upland as summerfallow.

Table 4.15 summarizes the primary, secondary and tertiary reasons indicated by Albert and Argyle sample farmers for undertaking wetland conversion projects in the past. Nine different reasons for undertaking wetland conversion projects were reported. According to the weighting procedure outlined earlier, the most important reasons were to 1) to increase crop production or income derived from wetlands (average score = 1.68) and 2) to improve cultivation pattern (1.63). Landowner surveys by Zittlau (1979) and Morgan (1985) reported similar results.

A study by Desjardins (1983), that examined the impact of obstacles on field operations, concluded that obstacles such as sloughs or bluffs can result in a loss of productive area, but more importantly the size and location of the obstacles can have an impact on the efficiency of farm operations and cause an increase in the costs of production. Location was found to be more important than size of the obstacle. Production costs of farming around sloughs which are not in contact with the boundary of a field were approximately seven times as great as the costs associated with obstacles in contact with the edge of the field.

Returning to the results of the landowner survey, the fact that wetlands are taxed yet no or very little income is derived from them, was the third most important reason indicated by farmers for undertaking past drainage projects (average score = .48). No respondents mentioned increased quota acreage as a major factor responsible for their decision to convert wetlands. However, when respondents were asked to provide more information regarding their response " to increase crop production/income", most stated that "what good is extra production without extra quota acres", ie. increased crop production/income and increased quota acreage, seem to go hand in hand. Another possibility is that farmers may feel uneasy about admitting to quota related drainage in an interview situation, in the same way that business owners may feel uneasy about revealing tax loopholes etc. that they use to their advantage. The fact that 72 percent of the sample landowners said that increased quota acreage was a major reason for neighbouring farmers bush and wetland conversions attests to the above possibility. However, despite these rationalizations, based on Table 4.15, one has to conclude that "to increase crop production/income" and "improve cultivation pattern" were the major factors eliciting farmers' decision to convert wetlands in the past. The fact that landowners at least mentioned property tax and quota acreage in an open-ended type of question, does however, suggest that these regulations did at least have some bearing on landowners' wetland conversion decision-making process.

Other reasons fowarded by landowners for undertaking past wetland conversion projects include: to control weeds (average score = .35), to increase hay production (.26),

TABLE 4.15 Sample landowners' primary,secondary and tertiary reasons for undertaking wetland conversion projects in the past

	Albert (n=36)				Argyle (n=24)					
Reasons Advanced by Landowners	1°	2°	3°	Score	1°	2°	3°	Score	Total Score (n=60)	Average Score T.S/60
1) Increased crop prod./income	13(39)	10(20)	1(1)	60	8(24)	7(14)	3(3)	41	101	1.68
2) Improve cultural pattern	13(39)	6(12)	1(1)	52	11(33)	6(12)	1(1)	46	98	1.63
3) Property taxes/ no income	2(6)	7(14)	0(0)	20	2(6)	1(2)	1(1)	9	29	.48
4) Control weeds	1(3)	4(8)	3(3)	14	1(3)	2(4)	0(0)	7	21	.35
5) Increase hay production	3(9)	1(2)	0(0)	11	0(0)	2(4)	1(1)	5	16	.26
6) Reduce salinity	2(6)	0(0)	0(0)	6	2(6)	1(2)	1(1)	9	15	.25
7) Cattle to grain conversion	1(3)	1(2)	0(0)	5	0(0)	1(2)	0(0)	2	7	.12
8) Land prices high	1(3)	0(0)	0(0)	3	0(0)	0(0)	2(2)	2	5	.08
9) Increase value property	0(0)	0(0)	1(1)	1	0(0)	0(0)	0(0)	0	1	.02
No reason =	0	7	30		0	4	15			

to reduce salinity (.25), switch in emphasis from cattle to grain (.12), cheaper than buying cropland (.08) and to increase value of property (.01).

Major reasons advanced by non-converters for not undertaking drainage in the past include 1): marginal land not economically worthwhile (average score = 1.68), 2) provide hay for livestock (.88), 3) provide pasture (.53), 4) provide water for livestock (.53), 5) provide habitat for wildlife (.30), 6) maintain water table (.25), 7) retiring soon (.10), 8) lack proper equipment (.08), 9) enjoying hunting (.08), 10) cheaper to buy cropland (.08) and 11) reduce soil erosion (.03)[1].

4.3.3.2 Major reasons for past upland conversions

Sample woodland clearers reported eleven different reasons for clearing woodlands in the past (Table 4.16). As was the case with wetland conversions,the most important reasons advanced by landowners for clearing woodlands were 1) to increase crop production/income (average score = 1.80) and 2) to improve cultural pattern (1.48). The fact that "woodlands are taxed yet no or very little income is derived from them" was the third most important reason (.40). Other reasons for woodland clearing include: switch in emphasis from cattle to grain (.30), to reduce water induced soil erosion/flooding[2] (.21), weed control (.18), to increase pasture area (.10), cheaper than buying land (.10), to reduce salinity (.08), to increase hay production (.05) and to increase value of property (.02).

The major reasons advanced by non-clearers for not undertaking any woodland clearing in the past include: use woodlands for pasture (1.58), marginal land, not economically worthwile (.31), provide habitat for wildlife (.31), reduce wind erosion (.28), retiring soon (.19), lack proper equipment (.08) and help maintain water table (.06).

Sample grassland breakers reported six different reasons for undertaking grassland breaking in the past (Table 4.17). Unlike wetland and woodland conversions, the major reason indicated by landowners for breaking native grassland was a switch in emphasis from cattle to grain (mean score =1.70). Most of these farmers complained that there "was no longer any money in cattle farming". A landowner survey by Huszar and Young (1984), which examined farmers' reasons for the conversion of nearly 600,000 acres of fragile grassland to dryland wheat production in eastern Colorado, concluded with similar

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[1] These scores calculated in same way as those in Table 4.15.

[2] These respondents claimed that large snow drifts accumulate in bluffs and cause erosion and flooding in the spring.

TABLE 4.16 Sample landowners' primary,secondary and tertiary reasons for clearing woodlands in the past

Reasons Advanced by Landowners	Albert (n=30) 1°	2°	3°	Score	Argyle (n=30) 1°	2°	3°	Score	Total Score (n=60)	Average Score T.S/60
1) Increased crop prod./income	14(42)	7(14)	1(1)	57	9(27)	10(20)	4(4)	51	108	1.80
2) Improve cultural pattern	8(24)	5(10)	3(3)	37	15(45)	3(6)	1(1)	52	89	1.48
3) Property taxes/ no income	1(3)	4(8)	0(0)	11	2(6)	3(6)	1(1)	13	24	.40
4) Cattle to grain conversion	3(9)	0(0)	1(1)	10	2(6)	1(2)	0(0)	8	18	.30
5) Reduce flooding	0(0)	1(2)	0(0)	2	1(3)	4(8)	0(0)	11	13	.21
6) Control weeds	1(3)	3(6)	0(0)	9	0(0)	1(2)	0(0)	2	11	.18
7) Increase pasture	1(3)	0(0)	0(0)	3	1(3)	0(0)	0(0)	3	6	.10
8) Land expensive to buy	1(3)	0(0)	1(1)	4	0(0)	1(2)	0(0)	2	6	.10
9) Increase hay production	1(3)	0(0)	0(0)	3	0(0)	0(0)	0(0)	0	3	.05
10) Reduce salinity	0(0)	1(2)	1(1)	3	0(0)	1(2)	0(0)	2	5	.08
11) Land prices high	1(3)	0(0)	0(0)	3	0(0)	0(0)	2(2)	2	5	.08
12) Increase value property	0(0)	0(0)	1(1)	1	0(0)	0(0)	0(0)	0	1	.02
No reason =	0	9	22		0	6	24			

TABLE 4.17 Sample landowners' primary,secondary and tertiary reasons for breaking native grassland in the past

	Albert (n=16)				Argyle (n=8)					
Reasons Advanced by Landowners	1°	2°	3°	Score	1°	2°	3°	Score	Total Score (n=24)	Average Score T.S/24
1) Cattle to grain conversion	9(27)	2(4)	0(0)	31	4(8)	1(2)	0(0)	10	41	1.71
2) Increased crop prod./income	5(15)	4(8)	0(0)	23	3(9)	2(4)	0(0)	13	36	1.50
3) Increase hay production	2(6)	1(2)	0(0)	8	1(3)	0(0)	0(0)	3	11	.46
4) Taxed/no income	0(0)	2(4)	0(0)	4	0(0)	0(0)	0(0)	2	6	.25
5) Control weeds	0(0)	1(2)	0(0)	2	0(0)	0(0)	0(0)	2	4	.17
6) Land expensive to buy	0(0)	0(0)	0(0)	1	0(0)	0(0)	0(0)	1	2	.08
No reason =	0	6	15		0	5	8			

findings. Huszar and Young stress that the greater the difference between wheat and cattle prices, the greater the tendency to plow grassland.

Other reasons advanced by landowners for breaking grassland in the past include: to increase crop production/income (.88), to increase hay production (.46), property taxes to high, considering income derived from native pasture (.17), to control weeds (.08) and cheaper than buying cropland (.04). Although no landowners indicated that additional quota acreage was a reason for past grassland breaking, by simply tilling these areas (as opposed to expensive woodland clearing or wetland drainage), farmers could substaintially increase their quota eligible acres. As was mentioned earlier, farmers may feel uneasy about admitting to quota related conversions.

The major reasons advanced by landowners for not breaking any grassland in the past include: use grassland for pasture (average score = 1.87), marginal/not economically feasible to break (.89), use for hay production (.22) and to reduce wind erosion (.05).

The fact that non-converters cited cattle related uses (pasture, hayland etc) as the major reasons responsible for their decision to maintain natural areas in an uncultivated state has important implications for wildlife habitat management. The most important implication is that it may be more cost-effective for wildlife managers to concentrate on educating livestock farmers regarding wildlife compatible farming techniques (eg. rest rotational grazing[1]), which enhance the quality of existing unimproved pasture, than it would be to attempt to conserve natural areas that have no use to the farmer, as is the case with wetlands located on monoculture grain farms (Morgan 1985).

4.3.4 Landowner Perception of the Benefits and Costs of Retaining Natural Areas on Their Property

According to land use specialists, farmers' decision to retain or convert natural areas is controlled by a vareity of push-pull factors for and against the two alternatives. In order to explore this theory, sample landowners owning natural areas were asked to agree or disagree to two sets of eleven statements relating to both the advantages (benefits) and disadvantages (costs) of maintaining the existing natural areas on their property (Appendix 6, questions 3.1 and 3.2). A benefit-cost index was developed for both wetlands and natural uplands by subtracting the number of benefits indicated from the number of costs indicated. A score of +11 indicates a landowner who is extremely pro-conservation, while

[1] Studies have shown that rotational grazing significantly increases pasture quality and beef production (Chessmore 1979), as well as the quality of waterfowl nesting cover and hatching success rates (Ducks Unlimited Canada 1982).

a score of -11 indicates a landowner who is extremely pro-drainer/clearer. Chi-square analysis and the gamma coefficient were used to determine whether an association exists between benefit-cost index scores and past land conversion decisions. The relative importance of the various benefits and costs is also discussed.

4.3.4.1 Benefits and costs of retaining wetlands

Table 4.18 summarizes sample landowners' perception of the benefits and costs of retaining wetlands on their property in the Rural Municipalities of Albert and Argyle. The most common benefit indicated by the respondents (80%) was the role wetlands play in replenishing groundwater supplies and maintaining the water table. The fact that wetlands provide habitat for wildlife was indicated as a benefit by 73 percent of the sample landowners. Other common benefits indicated by the respondents include: hay production (66 percent), water for cattle (61%) and improve appearance of countryside (54%).

The average number of wetlands benefits indicated by the sample landowners was 4.84. The average number of benefits indicated by grain, mixed and livestock farms was 4.51, 5.27 and 5.31, respectively. The greater number of benefits indicated by mixed and cattle farms reflects the wider range of uses which diversified farming operations derive from wetlands.

The most common cost or disadvantage of retaining wetlands indicated by landowners (74%), was the fact that wetlands are taxed yet little or no income is derived from them. Unsatisfactory cultural pattern was indicated as a cost by 72 percent of the respondents. The fact that wetland acreages are currently quota-ineligable was indicated as a cost by 71 percent of the respondents. Alternatively, only 47 percent felt that the "wetlands occupy potential cropland" was a cost. Taking these last two percentages into consideration with the fact that " to increase crop production" was a major reason indicated by farmers for undertaking past wetland drainage, suggests that increases in "production", were in some cases probably realized by increases in marketing rights, rather than by actual increases in the volume of crop produced.

A very noteworthy result, considering the high profile waterfowl crop depradation, is the fact that 70 percent of the sample landowners felt that "wetlands breed and attract insects" was a cost, as compared to only 33 percent who felt that "wetlands increase waterfowl crop depradation" was a cost. The major concern expressed by farmers regarding insects was that an abundance of wetlands on croplands increases the population

TABLE 4.18 Sample landowners' perception of the benefits and costs of retaining wetlands on their property

	Albert (n=49)		Argyle (n=46)		Total (n=95)	
	Agree Freq.	Agree %	Agree Freq.	Agree %	Agree Freq.	Agree %
Benefit Statement						
1) Replenish ground-water supplies	41	83.7	35	76.1	76	80.0
2) Provide habitat for wildlife	35	71.4	34	73.9	69	72.6
3) Provide hay production	30	61.2	33	71.7	63	66.3
4) Provide water for cattle	26	53.1	32	69.6	58	61.1
5) Improve appearance of countryside	28	57.1	23	50.0	51	53.7
6) Provide hunting areas	25	50.1	25	54.3	50	
7) Reduce flooding/runoff pollution	19	38.8	18	39.1	37	52.6
8) Provide trapping areas	12	24.5	23	50.0	35	36.8
9) Provide water for irrigation	4	8.2	5	10.9	9	9.5
10) Fish production	2	4.1	6	13.0	8	8.4
11) Main domestic supplies	1	2.0	3	6.5	4	4.2
Average # bens./landowner	4.55	-	5.15	-	4.84	-
Cost statement						
1) Taxed/no income	34	69.4	36	78.3	70	73.7
2) Poor cultural pattern	35	71.4	33	71.7	68	71.6
3) Cannot include as quota	35	71.4	32	69.6	67	70.5
4) Attract/breed insects	30	61.2	36	78.3	66	69.5
5) Cause weed problems	26	53.1	30	65.2	56	58.3
6) Cause salinity	20	40.8	26	56.5	46	47.9
7) Occupy potential cropland	17	34.7	28	60.9	45	46.9
8) Attract hunters	14	28.6	17	37.0	31	32.3
9) Income wildlife crop damage	8	18.4	23	50.0	31	32.3
10) Cause flooding/erosion	12	24.5	14	30.4	26	27.1
11) Interfere with suitable burning	2	4.1	4	8.7	6	6.3
Average # costs/landowner	4.76	-	6.06	-	5.39	-
Average ben.-cost score	-0.21	-	-0.91	-	-0.55	-

level of crop damaging insects such as grasshoppers, aphids, midges and cutworms. However, according to entomologists with the University of Manitoba's Agriculture Department, this concern is a misconception, since the presence of wetlands and other natural areas has little bearing on the population level of crop damaging insects.

Other perceived costs of wetlands that do not actually exist (wetlands create weed problems, wetlands cause salinity) were reported by 58 and 47 percent of the sample landowners respectively. Studies have shown that wetlands actually reduce salinity and weed problems on cropland, since wetland edge vegetation acts as barrier to the spread of undesirable weeds and the spread of salinity on cropland (Osborne 1979). In many cases, human disturbances such as drainage or wetland cultivation actually increase weed problems due to the invasion of new vegetative communities on the disturbed areas (Marble and Gross 1984).

The average number of wetland costs indicated by the sample landowners was 5.39. A greater number of costs were indicated by grain farmers (6.42) as opposed to mixed (5.40) and cattle farmers (3.77). The average benefit-cost index score for all sample landowners was -0.55.

In order to determine whether a statistical association exists between the wetland benefit-cost index and wetland area drained in the past, respondents were grouped into the following attitudinal groups:

	Benefit-cost score	Frequency
Attitude group 1 (pro-wetland conversion)	less than -2.00	38
Attitude group 2 (neutral)	-2.00 to 2.00	37
Attitude group 3 (pro-preservation)	greater than 2.00	20
		95

Wetland area converted was also grouped into three categories (see section 4.3.1.1, pg 89). Statistical associations were measured using the gamma coefficient and chi-square test of statistical significance. According to these procedures, a significant association (chi-square statistic significance level =.03, gamma = -.31) exists between the benefit cost-index and the area of wetland converted in the past. This association implies that farmers with low (negative) cost benefit indices, tended to convert a larger area of wetland than those with

(positive) benefit-cost indices. Simply put, it appears that if the perceived costs of retaining wetlands outweigh the perceived benefits derived from retaining them, then farmers tend to drain. Alternatively, if the perceived benefits derived from retaining them, outweigh the costs of retaining them, then farmers tend to preserve. Based on the current rate of wetland conversion occuring on the Canadian Prairies, most farmers perceived costs of retaining wetlands must outweigh the perceived benefits derived from retaining them. Reasons for this are numerous: 1) many of the benefits derived from wetlands (eg. flood water retention, wildlife production) accrue to society as a whole, and cannot easily be garnished by individual landowners, 2) many of the costs farmers associate with wetlands (salinity, weed problems) actually don't exist and 3) short-term economics has biased farmers' attitude regarding the benefits and costs of wetlands.

4.3.4.2 Benefits and costs of maintaining natural uplands

Table 4.19 summarizes sample landowners' perceptions of the benefits and costs of retaining uplands (woodland and grassland) on their property. The most common upland benefit indicated by the respondents (95%) was the role they play in reducing wind induced soil erosion. Other common upland benefits indicated by landowners include: reduce wind damage to young plants (88%), capture snow (86%), improve appearance countryside (81%), provide habitat for wildlife (80%), reduce ditch maintaince (77%) and provide protection for livestock (70%). Landowners' perceptions of natural upland benefits are relatively similar between study areas. However, a substantially higher percentage of Argyle respondents felt that "provide areas for trapping and hunting" was a benefit, while a higher percentage of Albert respondents felt that "capture snow" and "reduce ditch maintenance" were benefits. The average number of upland benefits indicated by the sample landowners was 7.58.

The most common cost or disadvantage of retaining natural uplands that was indicated by landowners (71%) was the fact that natural upland acreages are quota-ineligible. As was the case with wetlands, a substantially lower percentage (45%) felt that "occupy potential cropland" was a cost of maintaining natural uplands. The fact that "property taxes are paid on natural uplands yet little or no income is derived from them" was indicated as a cost by approximately 70 percent of the respondents. Poor cultural pattern was indicated as a cost by 63 percent of the respondents. All of the remaining upland statements were indicated as costs by less than 50 percent of the respondents. The average number of upland costs indicated by the sample landowners was 5.14.

TABLE 4.19 Sample landowners' perception of the benefits and costs of retaining natural uplands (woodland and grassland) on their property

	Albert (n=50)		Argyle (n=49)		Total (n=99)	
	Agree Freq.	Agree %	Agree Freq.	Agree %	Agree Freq.	Agree %
Benefit Statement						
1) Reduce soil erosion	48	98.0	45	91.8	93	94.9
2) Reduce wind damage to young plants	43	87.6	43	87.8	86	87.8
3) Capture snow	45	91.8	39	79.8	84	85.7
4) Improve appearance of countryside	36	73.5	43	87.8	79	80.6
5) Provide habitat for wildlife	35	71.4	43	87.8	78	79.8
6) Reduce ditch clearing costs	44	89.8	31	61.3	75	76.5
7) Provide protection for livestock	31	63.3	38	77.6	69	70.4
8) Provide firewood	25	51.0	31	63.3	56	57.1
9) Provide areas for hunting	24	49.0	31	63.3	55	56.1
10) Provide areas for trapping	15	30.6	26	53.1	41	41.8
11) Provide logs for fence posts	9	18.4	13	26.5	22	22.4
Average # bens./landowner	7.31	-	7.84	-	7.58	-
Cost statement						
1) Cannot include as quota	37	75.5	33	67.3	70	71.4
2) Taxed/no income	32	65.3	37	75.5	69	70.4
3) Poor cultural pattern	33	67.3	29	59.2	62	63.2
4) Occupy potential cropland	22	44.9	31	63.3	53	54.1
5) Snowdrifts delay spring work	15	30.6	29	59.2	44	44.9
6) Attract/breed insects	17	34.7	21	42.9	38	38.8
7) Cause weed problems	16	32.7	20	40.8	36	36.7
8) Attract hunters	14	28.6	18	36.7	32	32.7
9) Cause flooding/erosion	13	26.5	14	28.6	27	27.6
10) Increase wildlife damage crop	3	6.1	6	12.2	9	9.2
11) Interfere with stubble burning	3	6.1	4	8.2	7	7.1
Average # costs/landowner	4.48	-	5.43	-	5.14	-
Average ben.-cost score	2.47	-	2.41	-	2.44	-

The average natural upland benefit-cost index score was 2.44. This score is 2.99 points higher than the average wetland benefit-cost index score. Consequently, it appears that the sample landowners view the maintenance of wetlands on their property much more negatively from a benefit-cost standpoint than they do natural uplands. Habitat programs should be developed in context with this finding, ie. a higher level of compensation is required to promote the conservation of wetlands than wooded areas.

In order to determine whether an association exists between the upland benefit-cost index and past upland area cleared, respondents were grouped as follows:

	Benefit-cost score	Frequency
Attitude group 1 (pro-wetland conversion)	less than 0	29
Attitude group 2 (neutral)	0 to 4.00	39
Attitude group 3 (pro-preservation)	greater than 4.00	30
		98

Upland area converted was also grouped into three categories (see section 4.3.1.2, pg 96). As was the case with wetland drainage, a siginificant association exists between the upland benefit-cost index and the area of upland converted in the past (chi-square statistic significance level = .01, gamma = -.48). This association implies that farmers with low (negative) benefit-cost indices , tended to clear more upland than those with high (positive) upland indices. This association, along with the previously determined association for wetlands, supports the theory that farmers' decision to retain or convert natural acreages is based on his perception of the total benefits and costs he realizes from these acreages.

4.3.5 Landowner Attitude Towards, and Land Use Impact of Existing Quota and Property Tax Regulations

4.3.5.1 Wheat Board Quota Regulations

General landowner attitude

Ninety-six percent of the sample landowners demonstrated during the interviews that they understood the differences and limitations in quota entitlement in respect to the several land categories referred to in the annual quota application. Seventy-eight percent indicated that they were at least satisfied with the current quota allotment system, 11 percent were either unsatisfied or very unsatisfied and 11 percent were indifferent. Table 4.20 summarizes comments advanced by landowners who were dissatisfied with the existing quota allotment system. All comments were negative remarks concerning agricultural economics topics such as pricing, transportation and bushels-per-acre quota levels.

Impact on natural conversion.

In order to assess the land conversion impact of Wheat Board quota regulations, sample landowners who had converted natural areas during the past ten years were asked if quota regulations (ie. the quota-ineligible status of uncultivated land) had a bearing on their decision to convert natural acreages. Additionally, respondents who stated that quota regulations had influenced their decision to convert to natural areas were asked to rate the importance of quota regulations as a factor in their overall decision.

Of the 78 sample landowners who had converted natural areas during the past ten years, 40 (51 %) indicated that Wheat Board regulations pertaining to the quota-ineligible status of uncultivated areas had a bearing on their land conversion decision (Table 4.21). Of these 40 individuals, 9 (12%) rated quota regulations as a very important factor, while 12 (30%) and 19 (47%) rated quota regulations as moderately and slightly important respectively. These results in combination with previous results (ie. quota was not directly mentioned as a factor in open-ended style question regarding farmers' primary reasons for undertaking past land conversions), suggest that the quota-ineligible status of uncultivated land was definitely a motivating factor, however in most cases it was probably not the primary factor eliciting the final decision to convert natural areas.

TABLE 4.20 Qualitative summary of comments advanced by sample landowners who were dissatisfied with the existing quota allotment system

Comment	Frequency
Quotas to low, usually can't sell all my grain	5
Transportation system to slow	3
Pricing of grains to low	3
Payment to slow	1
Crop prices vary to much	1
	13

TABLE 4.21 Importance of additional quota acres as a factor in sample landowners' decision to convert natural areas in the past

	Albert (n=44)			Argyle (n=34)			Total (n=78)		
Response Scale	Freq.	Cum. Freq.	Cum. %	Freq.	Cum. Freq	Cum. %	Freq	Cum. Freq.	Cum. %
Very important	6	6	13.6	3	3	8.8	9	9	11.5
Moderately important	5	11	25.0	7	10	29.4	12	21	26.9
Slightly important	8	19	43.1	11	21	61.8	19	40	51.3
Not important	25	44	100.0	13	34	100.0	38	78	100.0
	44			34			78		

Statistical Associations

Table 4.22 summarizes the statistical relationships[1] between landowner's perception of the importance of additional quota acres as a factor encouraging past natural land conversions, and nine selected landowners variables. Of the 9 landowner variables tested, 4 were found to have statistically significant associations[2].

The statistical values for farm type imply that grain farmer's decision to convert natural areas was more influenced by quota regulations than mixed and livestock farmers. The fact that straight-grain farmers often have a hard time marketing all of their grain through the Wheat Board, while mixed and to greater extent livestock operations, feed a large porportion of their grain to livestock, appears to be the major reason for this statistical relationship.

The values for the total natural acreage converted during the last ten years (1976-86), imply that farmers who converted a large amount of land (more than 20 ac), were more influenced by quota regulations than farmers who converted a small amount of land (20 ac or less). In other words, quota regulations appear to have motivated those farmers that are responsible for the greatest portion of natural land conversion. The values for the natural land benefit-cost index[3] suggest that the land conversion decision of farmers who had a negative attitude towards natural areas (score = less than -3.00) was more influenced by quota regulations than that of farmers with a positive attitude (score = more than 3.00).

The statistical values for landowner education level imply that the land conversion decision of highly educated farmers (more than grade 12) was more influenced by quota regulations than less educated farmers (less than grade 8). This association is unexplained.

The fact that a significant association does not exist between landowners' overall level of satisfaction with the quota allotment system and the importance of quota on past decisions to convert natural areas, suggests that the respondents were answering the latter question truthfully and were not just answering it on the basis of their attitude towards the quota system in general.

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[1] See section 4.3.1.1, pg 89 for explanation of the statistical procedures.
[2] Cross-tabulation tables for the significant associations are displayed in Appendix 10C.
[3] This index is a combination of the scores for the wetland and upland indexes which were introduced in section 4.3.4.

TABLE 4.22 Statistical relationship between sample landowners' perception of the importance of additional quota acreage on their decision to convert natural land, and selected landowners variables

Variable	Gamma Value	Chi-square statistic Significance Level
Farm Type	-.61	.05
Acreage Natural Land Converted During Last 10 Years	.53	.02
Natural Land Benefit Cost Index	.43	.04
Landowner Education	-.01	.02

No Association - Farmsize (.78)[1], Landowner Age (.74), Secondary Source Income? (.69) Summerfallow Acreage (.37) and Satisfied with Quota Allotment System (.46)

[1] Chi-square statistic significance level.

4.3.5.2 Property tax regualtions

General landowner awareness and attitude

Although 96 percent of the sample landowners felt that they were familiar with the property assessment rates of their various acreages, 54 percent cited per acre assessments for their woodland and wetland acreages that were higher than they actually are (Table 4.23). These assessments ranged from approximately half, to the full assessed value of cropland. Only five percent of the respondents cited per acre woodland and wetland rates that were close to the actual assessed value. Dixon (1970) and Leitch and Danielson (1979) reported similar findings in Manitoba and Minnesota study areas respectively.

Impact on natural land conversion

In order to assess the impact of property tax assessment on natural land conversion, farmers who had converted natural areas during the past ten years (1976-86), were asked if natural land property tax rates had a bearing on their decision to convert these areas. Additionally, respondents who felt that taxes paid on natural areas did influence their decision were asked to rate the importance of these taxes.

Of the 78 landowners who had converted natural areas during the past ten years, 43 (55%) said that property taxes paid out on natural areas had an influence on their land conversion decision (Table 4.24). Of these 43 individuals, 13 (30%) rated this taxes as very important, while 16 (37%) and 14(33%) rated it as moderately and slightly important respectively. These results, in combination with the similar results of the question regarding farmers' primary reasons for undertaking past land conversions (see section 4.33), suggest that landowners' perception of the taxes paid on natural areas was definitely a motivating factor. The combination of taxes paid and quota-ineligibility, surely act to strengthen the resolve of landowners to convert natural areas to cropland.

Statistical Associations

Table 4.25 summarizes the statistical relationships between sample landowners' perception of the importance of taxes paid on natural areas as a factor encouringing past

TABLE 4.23 Value that sample landowners felt that their woodland and wetland acreages were assessed at

	Albert		Argyle		Total	
Value Response	Freq.	%	Freq.	%	Freq.	%
Not taxed	1	2.0	0	0.0	1	1.0
Couldn't cite value,but said taxed minimally	22	44.0	18	36.0	40	40.0
Gave correct or nearly correct value	2	4.0	3	6.0	5	5.0
Gave moderately higher value	13	26.0	20	40.0	33	33.0
Gave substantially higher value	12	24.0	9	18.0	21	21.0
	50	100.0	50	100.0	100	100.0

TABLE 4.24 Importance of taxes paid on natural areas as a factor in sample landowners' decision to convert natural areas in the past

	Albert			Argyle			Total		
Response Scale	Freq.	Cum. Freq.	Cum. %	Freq.	Cum. Freq	Cum. %	Freq	Cum. Freq.	Cum. %
Very important	7	7	15.9	6	6	17.6	13	13	16.7
Moderately important	8	15	34.1	8	14	41.2	16	29	37.2
Slightly important	7	22	50.0	7	21	61.8	14	43	55.1
Not important	22	44	100.0	13	34	100.0	35	78	100.0
	44			34			78		

TABLE 4.25 Statistical relationship between sample landowners' perception of the importance of property taxes on their past decision to convert natural areas and selected landowners variables

Variable	Gamma Value	Chi-square Statistic Significance Level
Acreage Natural Land Converted During Last 10 Years	.66	.00
Natural Land Benefit Cost Index	-.54	.01
Landowner Education	.21	.00

No Association - Farmsize (.43)[1], Landowner Age (.78), Farm Type (.14), Secondary Source Income? (.59),Summerfallow Acreage (,64) and Satisfied with Property Tax System (.54)

[1] Chi-square statistic significance level.

natural land conversion, and nine selected landowners variables[1]. Of the 9 landowner variables tested 3 were deemed to have statistically significant associations[2].

The statistical values for total natural acreage converted during the last ten years (1976-86) imply that farmers who converted a large amount of land (more than 20 ac), were more influenced by tax payments on natural lands than those who converted a small amount of land (less than 20 ac).

The values for the natural land benefit-cost index suggest that the land conversion decision of farmers with a negative attitude (benefit-cost score less than -3.00) regarding natural areas, was more influenced by tax payments on natural areas than those with a positive attitude (score greater than 3.00).

The values for the education level of the landowners imply that the decision of the less educated farmers (less than grade 8) to convert natural areas, was more influenced by tax payments than that of highly educated farmers (more than grade 12).

As was previously mentioned, over half of the sample landowners thought that their natural acreages (woodlands, wetlands) were taxed higher than they actually are. Seventy-one percent of the landowners who felt that wetlands were taxed substantially higher than they actually are had converted wetlands during the last ten years (1976-86) (Table 4.26). On the other hand, only 52 percent of the landowners who were aware of the actual modest tax paid on wetlands did the same. A similar trend is also apparent for woodlands. Consequently, it appears that a great deal of the current property tax motivation to convert natural areas could be eliminated by providing landowners with detailed tax billing notices that clearly state the assessed value, and taxes paid, on acreages in the three major land categories, ie. cropland, "improved" and "unimproved" pasture, and "wasteland".

4.4 FUTURE NATURAL LAND CONVERSION AND THE POTENTIAL ROLE OF WHEAT BOARD QUOTA AND PROPERTY TAX INCENTIVES.

This section includes: 1) a quantitative summary of the natural land acreages that the sample landowners planned to convert over the next five years (1986-91), 2) an analysis of landowners' acceptance of the proposed Wheat Board and property tax modifications, and 3) an assessment of the natural land and marginal cropland conservation potential of the proposed modifications.

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[1] See section 4.3.1.1, pg 89 for explanation of statistical procedures.
[2] Cross-tabulation tables for the significant association are displayed in Appendix 10D.

TABLE 4.26 Cross-tabulation between landowners' perception of the taxes paid on natural areas and whether or not they had converted any natural land during the last ten years (1976-86)

Landowner Perception of Taxes paid on Natural areas	Convert any wetlands last ten years? Yes	No	Yes(%)	Convert any woodland last ten years? Yes	No	Yes(%)
1) Gave value close to actual or said tax paid is minimal[1]	24	22	(52.1)	28	18	(60.8)
2) Gave moderately higher value	21	12	(63.6)	23	10	(69.6)
3) Gave substantially higher value	15	6	(71.4)	16	5	(76.2)

[1] One of these individuals thought no tax was paid on natural areas.

4.4.1 Quantitative Summary of Future Natural Land Conversions

4.4.1.1 Future wetland conversions

Fifteen (31%) and 10 (23%) of the sample landowners owning wetlands in Albert and Argyle respectively, indicated that they planned to convert some wetland acreage over the next five years (1986-1991). Wetland converters in Albert planned to drain and/or cultivate 277 wetlands (mean = 18.5) totalling 366 acres (mean = 24.4 ac), while those in Argyle planned to convert 25 wetlands (mean = 2.5) totalling 237 acres (mean = 23.7ac). Potentially, this represents a 12.0 and 16.2 percent reduction in Albert's and Argyle's wetland acreage respectively, over the next five years. These rates of wetland habitat loss are similar to those that occurred in Albert and Argyle during the ten year period (1976-86) prior to the commencement of the landowner survey. (Figure 4.8).

Ten (67%) of the sample wetland converters in Albert planned to convert more than 10 wetlands during the next five years, while none in Argyle planned to convert this many wetlands (Figure 4.9, bottom). Seventeen (64%) of the sample wetland converters in both study areas planned to convert 20 acres or less of wetland (Figure 4.9, top). The average size of the wetlands that Argyle landowners planned to convert (9.8 ac) is much larger than the average size of the wetlands that Albert landowners planned to convert (1.2ac). Most of the wetlands targeted for conversion in Argyle are large semi-permanent wetlands. Sixty-four percent of the targeted wetlands in this municipality will reportedly be converted by drainage. Alternatively, 78 percent of the targeted wetlands in Albert will reportedly be converted by cultivation, since most of the wetlands in this municipality are small and temporary in nature. As was the case with past wetland conversions, wetlands located on cropland are the major targets of future wetland conversion activitites in both municipalities (Table 4.27). Grain farms accounted for 60 percent of the sample farms that planned to convert wetlands during the next five years, while mixed and livestock farms accounted for 36 and 4 percent respectively.

Table 4.28 compares the relative amount of future wetland conversion to both farm type and farm size. Thirty-three percent of the respondents operating grain farms planned to convert wetlands during the next five years, while 23 and 7 percent of the respondents operating mixed and livestock farms reported the same. Sixty-four percent of the respondents owning farms 1600 acres or larger planned to convert some wetlands over the next five years, while only 18 percent owning farms 640 acres or less planned the same.

Eighty-four percent of the sample landowners who planned to convert wetlands in the future stated that they would use their converted wetlands for grain production, while

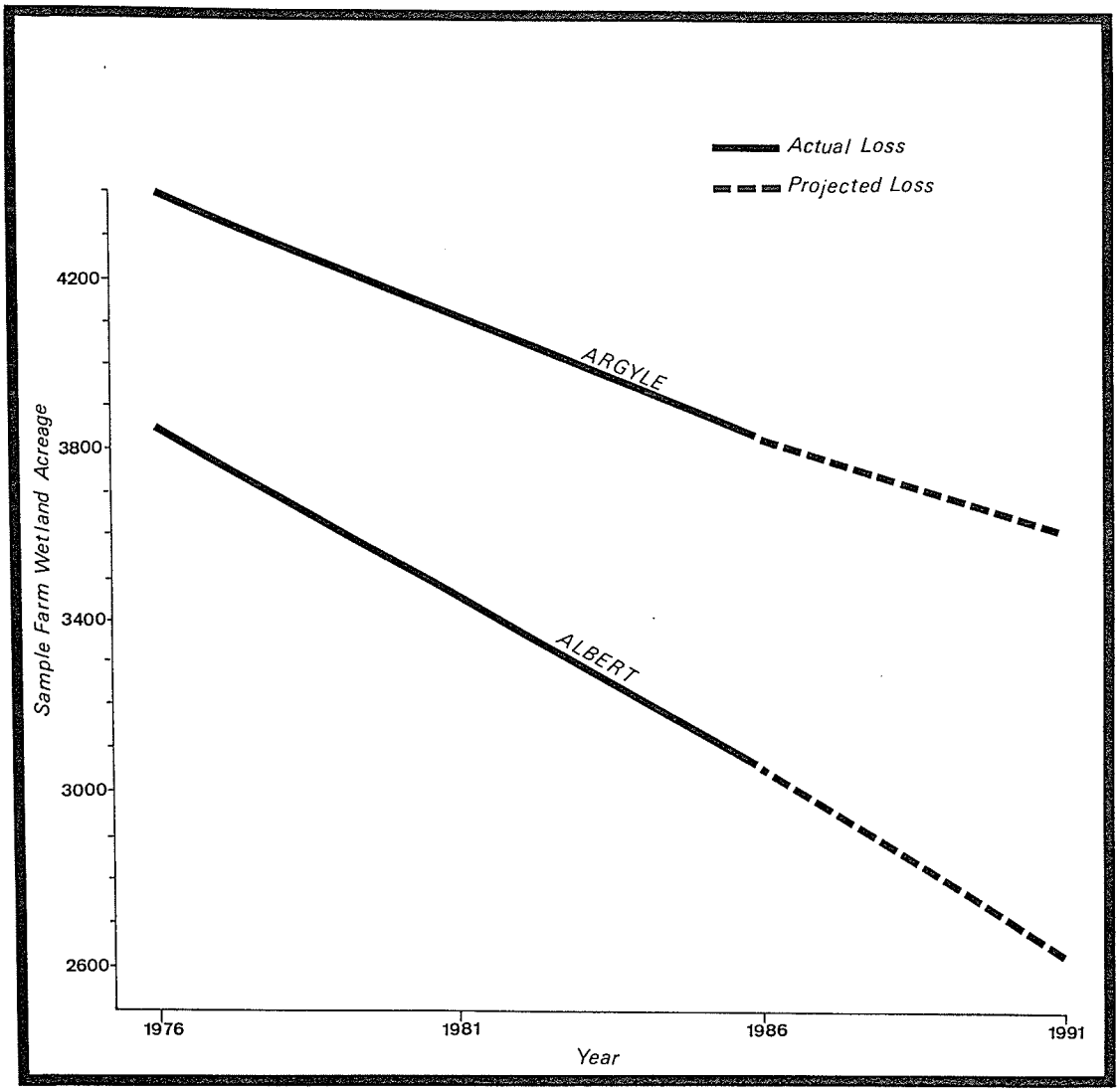

FIGURE 4.8 Past and projected decline in wetland acreage on Albert and Argyle sample farms

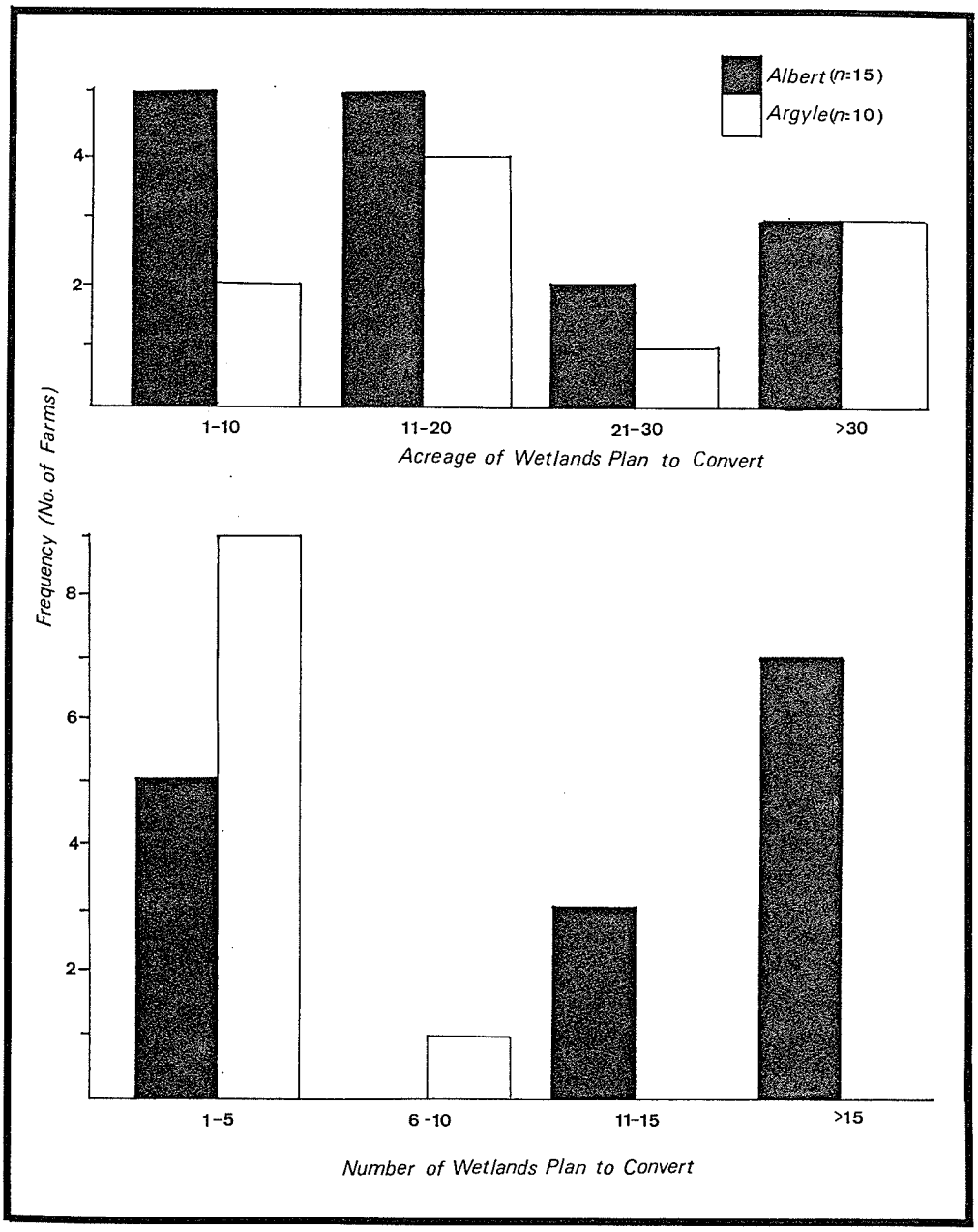

FIGURE 4.9 Frequency distributions of the number and acreage of wetlands that sample landowners in Albert and Argyle planned to convert during the next five years (1986-91)

TABLE 4.27 Location of wetlands that surveyed landowners planned to convert over the next five years (1986-91)

	Albert (n=15)		Argyle (n=10)	
Landuse Category	# Wetlands Plan Convert	Percent	# Wetlands Plan Convert	Percent
Cropland	228	82.3	23	95.7
Unimproved Pasture	39	14.1	2	4.3
Waste/ Idle Land	10	3.6	0	0.0
	277	100.0	25	100.0

TABLE 4.28 Comparison of the relative amount of future wetland conversion on surveyed farms with farm type and farm size

	Albert (n=50) Convert any wetlands next 5 yrs?.			Argyle (n=50) Convert any wetlands next 5 yrs?.			Total
	Yes	No	%Yes	Yes	No	%Yes	%Yes
Farm Type							
Livestock	1	9	10.0	0	5	0.0	6.7
Mixed	6	15	28.6	3	16	15.8	22.5
Grain	8 / 15	11 / 35	42.0	7 / 10	19 / 40	26.9	33.3
Farm Size (acres)							
< 640	1	9	10.0	1	14	6.7	8.0
640 - 1119	5	16	23.8	4	21	16.0	19.6
1120 - 1599	5	8	38.5	2	3	40.0	38.9
> 1599	4 / 15	2 / 35	66.7	3 / 10	2 / 40	60.0	63.6

the remaining 15 percent planned to use the converted wetlands for hay production. The reasons advanced by landowners for deciding to convert wetlands in the future are virtually the same as reasons given for the past wetland conversions.

4.4.1.2 Future natural upland conversions

Nineteen (40%) and 15 (32%) of the sample landowners owning wetlands in Argyle and Albert respectively, indicated that they planned to clear some woodland acreage on their property during the next five years. Three (7%) and 6 (16%) of the sample landowners owning grassland in Argyle and Albert respectively, indicated that they planned to break some grassland during the next five years. Sample woodland clearers in Argyle planned to convert 672 acres woodland (mean = 35.4 ac) and 65 acres of grassland (mean = 21.7 ac), while those in Albert planned to convert 496 acres of woodland (mean = 33.0 ac) and 940 acres of grassland (mean = 156.7 ac). Potentially, this represents a 13.0 and 1.4 percent reduction in Argyle's woodland and grassland acreage respectively, and 13.7 and 18.7 percent reduction in Albert's woodland and grassland acreage respectively. In three of four cases, these projected rates of future woodland and grassland habitat loss vary slightly from past rates (Figure 4.10). It appears that Albert's grassland breaking, and to a lesser extent its woodland clearing, will accelerate dramatically over the next five years. The fact that thirty percent of the sample livestock farms in Albert are in the process of converting their farm into a straight-grain operation is one of the major reasons for the projected acceleration in the loss of grassland acreage. In Argyle, it appears that the rate of woodland acreage loss will accelerate slightly over the next five years, while its rate of grassland breaking will decrease substantially. This decrease is unexplained.

Eighteen (53%) of the sample woodland clearers in both areas planned to clear 20 acres or more of woodland over the next five years. All of the sample grassland breakers in Argyle planned to break 20 acres or more of grassland, while 5 (83%) of the sample grassland breakers in Albert planned to do the same (Figure 4.11).

Woodland isolated, or on the edge of cropland, is the primary target of future woodland clearing activities in both study areas (Table 4.29). Alternatively, grassland defined as "unimproved" pasture is the primary target of future grassland breakers in both study areas.

Grain farms account for 59 percent of the sample farms that planned to clear woodlands during the next five years, while mixed and livestock farms account for 29 and 12 percent respectively. Similarly, grain farms accounted for 67 percent of the respondents

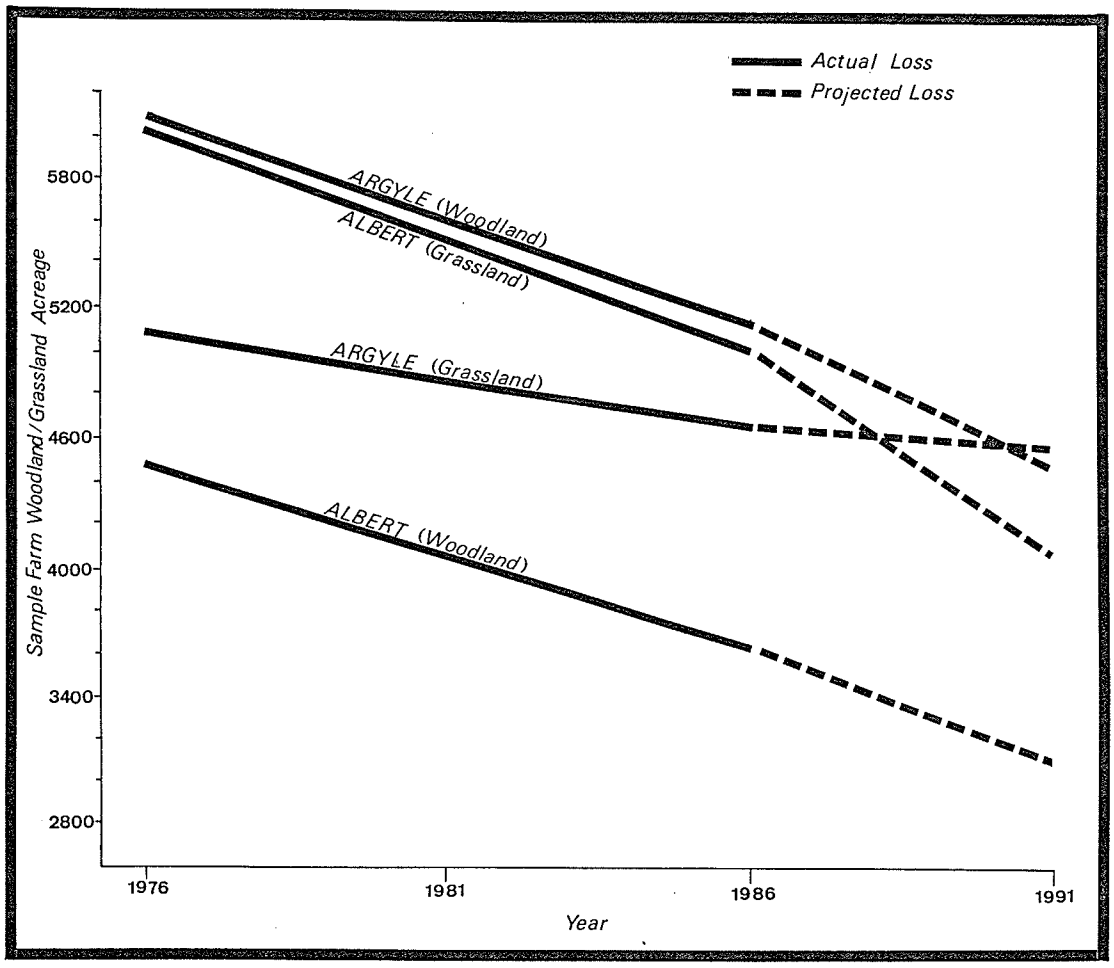

FIGURE 4.10 Past and projected decline in woodland and grassland acreage on Albert and Argyle sample farms

FIGURE 4.11 Frequency distributions of the woodland and grassland acreage that Albert and Argyle sample landowners planned to convert during the next five years (1986-91)

TABLE 4.29 Location of woodland and grassland acreage that surveyed landowners planned to convert over next five years (1986-91)

	Albert				Argyle			
	(n=15) Woodland		(n=6) Grassland		(n=19) Woodland		(n=3) Grassland	
Landuse Category	ac.	%	ac.	%	ac.	%	ac.	%
Cropland	285	57.5	15	1.6	352	52.4	45	69.2
Unimproved Pasture	94	19.0	880	93.6	140	20.8	20	30.8
Unimproved Hayland	7	1.4	40	4.3	0	0.0	0	0.0
Waste/Idle Land	110	22.1	5	.5	180	26.8	0	0.0
	496	100.0	940	100.0	672	100.0	65	100.0

farms that planned to break grassland during the next five years, while mixed and livestock farms account for 22 percent and 11 percent respectively.

Table 4.30 compares the relative amount of future natural upland (grassland and woodland combined) conversion with both farm type and farm size. Approximately 51 percent of the sample grain farms planned to convert some natural upland during the next five years, while 40 percent and 27 percent of the mixed and livestock farms planned on doing the same. Approximately 82 percent of the sample farms 1600 acres or larger planned to convert some natural upland over the next five years, while only 20 percent of the farms 640 acres or smaller planned the same.

Eighty-five percent of the future upland converters planned to use their converted upland acreage for grain production, while the remaining 15 percent planned to utilize it for hay production. The reasons advanced by landowners for deciding to convert natural uplands in the future are virtually the same as the reasons forwarded for past upland conversions.

4.4.2 Landowner Acceptance of Proposed Wheat Board Quota and Property Tax Modifications

During the latter portion of the landowner interviews, respondents were presented with the following suggested Wheat Board quota and property tax modifications:

(1) a change in the Canadian Wheat Board 's quota allotment formula that would extend quota entitlement to "unimproved" acreages such as wetlands, woodlands and native prairie if they are maintained in their natural (uncultivated) state.

and (2) a change in the municipal assessment of farmland that would exempt "unimproved" acreages such as wetlands, woodlands and native prairie from municipal property taxation if they are maintained in their natural (uncultivated) state.

Following this presentation, the surveyed landowners were asked if they would like to make any general comments regarding their attitude towards the proposed changes (Table 4.31). One hundred and forty-one (88%) of the 160 comments received were positive in nature, while 15 (9%) were negative, and 4 (3%) were neutral. Most of the positive comments (59%), related to the potential economic benefits of the proposed changes (eg. reduced property taxes and increased quota-eligible acreage), while 40 percent were environmental in nature, (eg. reduce land degradation problems, provide more habitat for

TABLE 4.30 Comparison of the relative amount of future upland (woodland-grassland) conversion on surveyed farms with farm type and farm size

	Albert (n=50) Convert any wetlands next 5 yrs?.			Argyle (n=50) Convert any wetlands next 5 yrs?.			Total
	Yes	No	%Yes	Yes	No	%Yes	%Yes
Farm Type							
Livestock	2	8	20.0	2	3	40.0	26.7
Mixed	7	14	33.3	5	14	26.3	40.0
Grain	10/19	9/31	52.7	13/20	13/30	50.0	51.1
Farm Size (acres)							
< 640	2	8	20.0	3	12	20.0	20.0
640 - 1119	5	16	25.0	10	15	40.0	31.9
1120 - 1599	7	6	50.0	3	2	60.0	55.6
> 1599	5/19	1/31	83.3	4/20	1/30	80.0	81.8

TABLE 4.31 General comments advanced by sample landowners regarding their attitude towards the proposed quota and property tax modifications

Positive Comments	Freq.	Negative Comments	Freq.
1) Would reduce my property taxes	48	1) Unfair farmers with no uncultivated land would have lower quotas	7
2) Would get extra quota acres without breaking land	35	2) Unfair, farmers with no uncultivated land would see their property taxes go up	3
3) Would reduce draining and clearing of marginal land	29	3) Would reduce rights of landowner	1
4) Would reduce land degradation problems such as erosion and would help maintain water table	15	4) Already to much government involvement	1
5) Would help maintain wildlife habitat	9	5) Most people include wetlands or cropland as quota acres already	1
6) Would reduce incentive to break land for quota	3	6) Quota does not affect clearing as much as professionals think	1
7) Would allow more management options	1	7) Not practical	1
8) Would make land more attractive to rent	1		15
	141		

Neutral Comments	Freq.
1) Have no problem selling all my grain through Wheat Board	1
2) Use most of my grain as feed, quota not important	1
3) Good idea but only if Province reimbursed municipalities for lost tax revenue	1
4) Make income from my sloughs, don't mind paying taxes	1
	4

wildlife). Sixty-seven percent of the negative comments related to the lack of potential economic advantages for farmers having no, or very little, uncultivated land.

Landowners acceptance of the proposed quota and property tax modifications was determined based on the following options: A - full quota entitlement, plus property taxes previously paid on exempt natural areas would be shifted to cultivated land on a municipality-wide basis; B - full quota entitlement, plus provincial government would reimburse municipalities for tax revenue lost on exempted natural areas(direct payment to farmers); and option C- same property tax option as option B, but with a restriction on the amount of "unimproved" range pasture that would qualify for quota-entitlement (ie. up to 50% of a farmer's seeded acreage). Sample landowners were asked for their response to option A before being presented with option B, as well as their response to option B before presented with option C.

Farmers' acceptance of the proposed quota and tax modifications can be described as very favorable (Table 4.32). Seventy-eight and 64 percent of the sample landowners in Argyle and Albert respectively, indicated that they would be in favor of the modifications under option A (tax-shift). The percentage in favor would increase to 90 and 92 percent respectively, if the province of Manitoba reimbursed municipalities for taxes previously paid on exempted natural areas (option B). If pasture restriction C was also introduced, the percentage in favor in Argyle would increase slightly to 94 percent, while it would have no bearing on Albert respondents' attitude towards the proposed modifications.

Although option A is attractive in terms of its low governmental cost[1], landowners were more in favor of option B. In order to gain more information regarding landowner attitude towards option A, farmers' acceptance of this option was analyzed in relation to several landowner characteristics.

4.4.2.1 Statistical Associations

Five of the 11 landowner variables tested have a statistically significant association with landowner acceptance of the proposed quota and tax modifications under option A (Table 4.33)[2]. The statistical values for percent of farm area that is uncultivated, strongly imply that operators of farms with a substantial portion (25 % or more) of uncultivated land tended to be more in favor of option A, than operators of farms with a low percentage (less

[1] Costs of option A are primarily just the costs of administrating the tax and quota modifications, ie. changes to tax billing notices and annual quota application forms.

[2] For explanation of statistical procedures see section 4.3.1.1, pg 89, cross tabulation tables for the significant associations are displayed in Appendix 10E.

TABLE 4.32 Percent of sample landowners in favor of the proposed quota and property tax modifications (options A-C)

Option	In favor of proposed quota and property tax modifications? Albert (n=50) Yes Freq.	Albert (n=50) Yes Percent	Argyle (n=50) Yes Freq.	Argyle (n=50) Yes Percent
A - Full quota-entitlement plus natural land property tax shifted to cultivated land	32	64.0	39	78.0
B - Full quota-entitlement plus farmers reimbursed directly for taxes previously paid on natural land.	46	92.0	45	90.0
C - Pasture restriction on quota-entitlement plus tax option in (B) above	46	92.0	47	94.0

TABLE 4.33 Summary of the statistical relationships between sample landowners' acceptance of the proposed quota and tax modifications (option A) and selected landowners variables

Variable	Gamma Value	Chi-square Statistic Significance Level
Percent of Farm Area Uncultivated	.84	.00
Farm Type	-.48	.02
Natural Land Benefit Cost Index	.62	.00
Allow Hunters on Property?	.17	.10
Soil Quality of Converted Natural Land	-.64	.05

No Association - Landowner Age (.40)[1], Acreage Converted Last 10 yrs (.11), Secondary Source Income? (.23),Landowner Education Level (,65),Do You Hunt?(.43), Acreage Natural Land Plan to Convert in Future (.31).

[1] Chi-square statistic significance level.

than 25%) of uncultivated land. Forty-seven (92%) of the 51 sample landowners whose uncultivated acreage accounted for more than 25 percent of their total farm were in favor of option A, while only 24 (49%) of the 49 landowners whose uncultivated acreage accounted for less than 25 percent were in favor of this option. Although the former would see his property taxes drop under option A, while the latter would see his rise, it should be stressed that under option A, the proportional increase in property taxes which landowners with little or no uncultivated land would experience , is much smaller than the proportional decrease in property taxes that landowners with large areas of uncultivated land would experience (Sawatzky 1979).

The values for farm type imply that sample livestock farmers tended to be more in favor of option A, than grain farmers, and to a lesser extent mixed farmers. This is probably because grain farmers typically have a smaller percentage of uncultivated land than mixed and livestock farms. This explanation also explains the association between natural land benefit-cost index and landowner acceptance of option A. This association implies that sample farmers with high (greater than 3.00) benefit-cost indices are more in favor of option A, than sample farmers with low (less than -3.00) benefit-cost indices.

Although not related specifically to option A, whether or not landowners allow hunters on their property was significant at the .10 level[1] (gamma = .17) when tested against sample landowners' acceptance of the proposed modifications. Although weak, this association suggests that sample landowners who do not allow hunters on their property tended to be less in favor of the proposed quota and tax modifications, than those who allow hunters on their property. Most of the landowners not granting access to hunters felt that the proposed modifications would grant the public additional access rights to their property, even though they were assured otherwise by the interviewer. They felt that the modifications would create an opinion amongst tresspassers that the public has a right to access private hunting areas that they contribute tax dollars to protect.

The values for landowners' perception of the soil quality of converted natural areas imply that farmers who had experienced bad yields on recently converted natural areas tended to be more in favor of the proposed quota and tax modifications, than those who had experienced good yields.

[1] Chi-square test may not be valid for this particular association since 50% of the cells have expected frequencies less than 5.

4.4.3 Natural Land Conservation Potential of the Proposed Wheat Board Quota and Property Tax Incentives

This section assesses the wetland, woodland and native grassland conservation potential of the proposed Wheat Board quota and property tax modifications (incentives). The conservation potential of the proposed combined incentives was determined by asking future natural land converters to estimate the effect (if any) that the proposed incentives would have on the amount of wetland, woodland and/or grassland acreage that they originally intended to convert over the next five years. Although most of the respondents were able to provide actual acreage estimates, it was decided that the land conserving potential of the proposed incentives would be rated on the following scale:

Response Categories	Explanation given to sample landowners
1) no effect on acreage originally planned to convert	- zero reduction
2) slightly reduce acreage originally planned to convert	- less than 1/3 reduction
3) moderately reduce acreage originally planned to convert	- 1/3 - 2/3 reduction
4) drastically reduce acreage originally planned to convert	- greater than 2/3 reduction

The marginal cropland conservation potential of the proposed incentives (ie. ability of the proposed incentives to persuade farmers to return marginal cropland to native cover) is also discussed in this section. Cropland areas that are the returned to native cover would qualify as quota-eligible and tax exempt acreages in the same way that existing natural areas would. Landowners' willingness to retain natural areas and return marginal cropland under the proposed incentives were statistically tested against various landowner variables in order to determine whether landowners' response to the incentives was related to specific landowner characteristics.

4.4.3.1 Potential impact of proposed incentives on future wetland conversion

Fifteen (31%) and 10 (23%) of the sample landowners owning wetlands in Albert and Argyle respectively, indicated that they intended to convert a total of 366 and 237 acres of wetland respectively over the next five years. Their perceptions of the effect that

combined quota and tax incentives would have on their intentions to convert wetlands are summarized in Table 4.34. Sixty percent would at least slightly reduce the planned amount of wetland conversion, while 40 percent indicated that they would still convert all of the wetland acreage that they originally intended to convert. Half of the future wetland converters in Argyle indicated that they would drastically reduce the amount of wetland they originally planned to convert, while none in Albert indicated the same. This variation may be related to the fact that wetland density (number of wetlands per section) is much higher in Albert than in Argyle), as is the resultant operating cost associated with maneuvering around them. Consequently, the potential quota and property tax benefits derived from retaining wetlands appear to more adequately compensate farmers residing in Argyle.

An estimate of the reduction in future wetland conversion that would take place on the sample farms if the proposed incentives were actually instituted was calculated by multiplying the mid-points[1] of response categories 1-3, by the wetland acreage designated for conversion in each response category. Based on this estimate procedure, approximately 219 acres (36 percent) of the 603 acres of wetland originally designated for conversion over the next five years would be maintained (Table 4.35). Extrapolating this acreage over both municipalities, the proposed incentives would apparently result in the maintenance of approximately 850 acres of wetland, that would otherwise he converted to cropland[2].

4.4.3.2 Potential impact of proposed incentives on future woodland clearing

Ninteen (43%) and 15 (32%) of the sample landowners owning woodlands in Argyle and Albert respectively, indicated that they planned to clear a total of 672 and 496 acres of woodland respectively, over the next five years. Their perceptions of the effect that the proposed quota and tax incentives would have on their intentions to clear woodlands is summarized in Table 4.36. Approximately 67 and 53 percent of the future woodland clearers in Albert and Argyle respectively, would at least slightly reduce the planned amount of woodland clearing, while the remainder indicated that they would still clear all of the woodland they originally intended to clear.

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[1] Midpoints for response categories 1, 2 and 3 are .17, .50 and .87 % respectively.
[2] Argyle sample size = 50, actual number of farm owners in Argyle = 250.
Albert sample size = 50, actual number of farm owners in Albert = 152.

TABLE 4.34 Sample landowners' perception of the effect that the proposed quota and property tax incentives would have on their intentions to convert wetlands over the next five years (1986-91)

Effect on wetland acreage originally intended to convert	Albert (n=15)			Argyle(n=10)			Total(n=25)		
	Freq.	%	Cum. %	Freq.	%	Cum. %	Freq.	%	Cum. %
1) Drastically reduce	0	0.0	0.0	5	50.0	50.0	5	20.0	20.0
2) Moderate reduce	6	40.0	40.0	1	10.0	60.0	7	28.0	48.0
3) Slightly reduce	3	20.0	60.0	0	0.0	60.0	3	12.0	60.0
4) No effect	6	40.0	100.0	4	40.0	100.0	10	40.0	100.0

TABLE 4.35 Rough estimate of the reduction in wetland conversion that would take place on sample farms during the next five years (1986-91) under the proposed quota and tax incentives

	Wetland area originally planned to convert during next five yrs. (acres)	Wetland area that would be maintained under proposed incentives (acres)	Percent reduction in wetland area that will be converted during the next 5 yrs.
Albert	366	122	33.3
Argyle	237	97	40.9
Total	603	219	36.3

TABLE 4.36 Sample landowners' perception of the effect that the proposed quota and property tax incentives would have on their intentions to clear woodland over the next five years (1986-91)

	Albert (n=15)			Argyle(n=19)			Total(n=24)		
Effectt on woodland acreage originally iplanned to convert	Freq.	%.	Cum. %	Freq.	%	Cum. %	Freq.	%	Cum. %
1) Drastically reduce	1	6.7	6.7	2	10.5	10.5	3	8.8	8.8
2) Moderate reduce	7	46.7	53.4	4	21.0	31.5	11	32.4	41.2
3) Slightly reduce	2	13.3	66.7	4	21.0	52.5	6	17.6	58.8
4) No effect	5	33.3	100.0	9	47.5	100.0	14	41.2	100.0

Based on the estimate procedure explained in the previous section, approximately 392 acres (34%) of the woodland originally designated for conversion over the next five years would be maintained if the proposed quota and tax incentives were actually instituted (Table 4.37). Extrapolating this acreage over both municipalities, the proposed incentives would result in the protection of approximately 1,570 acres of woodland, that would otherwise be cleared.

4.4.3.3 Potential impact of proposed incentives on future native grassland breaking

Six (16%) and 3 (7%) of the sample landowners owning grassland in Albert and Argyle respectively, indicated that they planned to break total of 940 and 65 acres of grassland respectively, over the next five years. Their perceptions of the effect that the proposed incentives would have on their intentions to break grassland are summarized in Table 4.38. Eight of the nine grassland breakers in both study areas who originally intended to break some grassland would at least slightly reduce the area they planned to break. This equates to the maintenance of 515 acres (51%) of the grassland originally designated for conversion to cropland (Table 4.39). Extrapolating this acreage over both municipalities, the proposed incentives would result in the protection of approximately 1,630 acres of grassland that would otherwise be converted to cropland.

4.4.3.4 Statistical associations

This section summarizes the statistical relationships[1] between future converters response to the proposed incentives and selected landowner variables. In order to maintain an adequate sample size for statistical analysis, future wetland, woodland and grassland converters were collapsed into one group. Futhermore, landowner response categories were reduced from four to two, in order to maintain adequate expected frequencies in chi-square tables (Table 4.40).

Of the ten landowners variables tested only two were found to be statistically significant (Table 4.41)[2]. The statistical values for farm size strongly imply that operators of large farms (1200 acres or more) would be more inclined to curtail natural land

[1] For explanation of statistical procedures see section 4.3.1.1, pg 89.
[2] Cross tabulation tables for the significant association are presented in Appendix 10F.

TABLE 4.37 Rough estimate of the reduction in woodland clearing that would take place on sample farms during the next five years (1986-91) under the proposed quota and tax incentives.

	Woodland area originally planned to convert during next five yrs. (acres)	Woodland area that would be maintained under proposed incentives (acres)	Percent reduction in woodland area that will be converted during the next 5 yrs.
Albert	496	194	36.3
Argyle	672	198	29.5
Total	1168	392	33.6

TABLE 4.38 Sample landowners' perception of the effect that the proposed quota and property tax incentives would have on their intentions to break grassland over the next five years (1986-91)

	Albert (n=6)			Argyle(n=3)			Total		
Effectt on grassland acreage originally planned to break	Freq.	%.	Cum. %	Freq.	%	Cum. %	Freq.	%	Cum. %
1) Drastically reduce	1	16.7	16.7	1	33.3	33.3	2	22.2	22.2
2) Moderate reduce	4	66.6	83.3	1	33.3	66.6	5	55.6	77.8
3) Slightly reduce	1	16.7	100.0	0			1	11.1	88.9
4) No effect	0	0.0	100.0	1	33.3	100.0	1	11.1	100.0

TABLE 4.39 Rough estimate of reduction in grassland breaking that would take place on sample farms during the next five years (1986-91) under the proposed quota and tax incentives

	Grassland area originally planned to break during next five yrs. (acres)	Grassland area that would be maintained under proposed incentives (acres)	Percent reduction in grassland area that will be converted during the next 5 yrs.
Albert	940	482	51.3
Argyle	65	33	50.7
Total	1005	515	51.2

TABLE 4.40 Collapsed table of sample landowners' perception of the effect of the proposed incentives on the acreage of natural land that they originally planned to convert over the next five years (1986-91)

Reduce area natural land originally planned to convert.	Freq.	Percent
No	17	43.6
Yes	22	56.4
	39	100.0

TABLE 4.41 Summary of the statistical relationships between the effects of the proposed incentives on sample landowners' natural land conversion intentions and selected landowner variables

Variable	Gamma Value	Chi-square Statistic Significance Level
Farm Size	.82	.01
Acreage Natural Land Originally Planned to Convert During Next 5 Yrs.	.75	.02

No Association - Farm Type (.80)[1], Landowner Age (..29), Natural Land Benefit-Cost Index (.29),Secondary Source Income? (.20),Landowner Education Level (,69),Hunter/Non Hunter (.86), Allow Hunters on Property?(.84), Passing Farm on to Another Family Member? (.40).

[1] Chi-square statistic significance level.

conversion activities under the proposed quota and property tax incentives than operators of small farms (less than 1200 acres). Twenty (67%) of the sample landowners operating large farms indicated that they would reduce that area of natural land that they originally intended to convert to cropland, while only 2 (22%) of those operating small farms indicated that they would do the same. This finding is very encouraging since it suggests that the proposed incentives would have the greatest impact on those farmers (large acreage farmers) that are responsible for the greatest portion of natural land conversion. Futhermore, this finding contradicts the negative opinion that agricultural and property tax officials have regarding the "conservation utility" of quota and tax incentives. Most of these officials feel that quota and tax incentives would at best provide a minimal conservation incentive for small acreage farmers.As a result of this misconception, they in turn believe that conversation-oriented alterations to the quota and property tax systems are not justified.

Similarly, the statistical values for the acreage of natural land that the sample landowners originally planned to convert, imply that the proposed quota and tax incentive package would have a greater influence on the land conversion activities of large acreage (more than 20 ac) converters, than it would on small acreage (20 ac or less) converters.

No statistically significant association exists between landowners response to the proposed incentives and landowner variables such as farm type, landowner age, landowner education and natural land benefit-cost index. This suggests that the proposed quota and tax incentives would not target a specific subset of the farm population, and would instead have a general "broad-brush" influence on conservation throughout the entire farm community.

4.4.3.5 Marginal cropland conservation potential of the proposed incentives

Most areas of the Prairies have lands that are at a severe to extreme risk of soil degradation when cultivated annually (Prarie Farm Rehabilitation Administration 1987). The risks include degradation of fertility, organic matter, productivity and production hazards such as wind erosion and dryland salinity. Other marginal cropland areas are characterized by physical limitations such as stoniness, topography, hard-pan, drainage and acidity. The vast majority of marginal cropland should never have been cultivated in the first place, however some of it has developed problems from excessive summerfallowing. The Prairie Farm Rehabilitation Administration (1987) advises that in most cases, the most effective soil conservation measure for marginal croplands would be to return them to permanent vegetative cover. However, without special assistance or payments, conversion

of these lands is not feasible for most farmers. Consequently, the Administration is currently investigating the potential of a Conservation Reserve for Marginal Cropland that would be based on direct cash payments to participating landowners. The estimated cost is an overwhelming $250-300 million to protect a target of 6-8 million acres of marginal cropland, over a 5 year period. Considering the high cost of this program, Wheat Board quota and property tax incentives represent a financially attractive alternative to direct cash payments. Another option is that quota and property tax incentives could be used in combination with direct cash payments. This option would no doubt reduce the level of cash payment required to persuade farmers to return marginal cropland to permanent vegetative cover.

The marginal cropland conservation potential of the proposed quota and property tax incentives was determined by measuring the ability of the incentives to persuade landowners to return marginal cropland to permanent native cover (ie. allow it to re-vegetate). Marginal cropland areas that are allowed to re-vegetate would qualify as quota-eligible and tax exempt acreage, in the same way that existing natural areas would.

Eighteen (36%) and 11 (22%) of the surveyed landowners in Argyle and Albert respectively, indicated they would return some marginal cropland acreage to permanent native cover in exchange for quota-eligible and tax exempt status on the converted acreages. Argyle sample landowners indicated that they would return 812 acres, while Albert sample landowners indicated thet they would return 291 acres. Extrapolating these acreages over each municipality, the proposed incentives would result in the return of approximately 4060 acres and 909 acres of marginal cropland to native cover in Argyle and Albert respectively. Nearly half of the sample landowners who would return some marginal cropland to native cover indicated that they would return more than 20 acres (Table 4.42).

The major agricultural drawbacks of the marginal cropland that farmers would return are as follows: highly saline (48%), excessively stony or sandy (21%), wet most years (21%), too steep to farm properly (7%), and heavily eroded (4%).

Statistical association

The intentions of landowners to return marginal cropland to native cover under the proposed quota and tax modifications was statistically tested[1] against eight landowner variables in order to categorize their characteristics of acceptance (Table 4.43). The only statistically significant relationship was the association with farm size. This association

[1] For explanation of statistical procedures see section 4.3.1.1,pg 89.

TABLE 4.42 Total marginal cropland acreage that the surveyed landowners would return to native cover under the proposed quota and tax incentives

Marginal cropland acreage would return (acres)	Albert (n=11)			Argyle(n=18)			Total		
	Freq.	%.	Cum. %	Freq.	%	Cum. %	Freq.	%	Cum. %
1-10	5	45.4	45.4	7	38.9	38.9	12	41.4	41.4
11-20	1	9.1	54.5	2	11.1	50.0	3	10.3	51.7
21-30	2	18.2	72.7	1	5.6	55.6	3	10.3	62.0
31-40	2	18.2	91.9	1	5.6	61.2	3	10.3	72.3
41-50	0	0.0	91.9	3	16.7	77.9	3	10.3	82.6
>50	1	9.1	100.0	4	22.1	100.0	5	17.4	100.0
>50	11	100.0		18	100.0		29	100.0	

TABLE 4.43 Statistical relationships between the intentions of sample landowners to return marginal cropland to native cover under the proposed incentives, and selected landowner variables

Variable	Gamma Value	Chi-square Statistic Significance Level
Farm Size	.82	.01

No Association - Landowner Age(.51)[1], Farm Type (..32), Landowner Education (.27), Soil Quality of Natural Areas Converted During Past (.45), Hunter/Non Hunter (..22), Allow Hunters on Property?(.81), Natural Land Benefit-Cost Index (.55).

[1] Chi-square statistic significance level.

implies that operators of large farms (1200 ac or more), are more likely to return marginal cropland to native cover than operators of small farms (less than 1200 ac).

Chapter 5

CONCLUSIONS, RECOMMENDATIONS AND SUMMARY

5.1. Conclusions

Current Wheat Board quota and property tax regulations are designed almost exclusively to accomplish narrowly focused marketing and revenue raising objectives. In the process of accomplishing these objectives they have inadvertently promoted the use of environmentally destructive land use practices, most notably the conversion of marginal and sensitive natural areas to cultivation. Over half of the surveyed landowners who had converted natural areas in the past indicated that they were at least partially motivated to do so by quota and property tax regulations.

Although these regulations are currently "disincentives" for the conservation of natural areas, this study demonstrates how minor modifications could transform them into effective conservation tools. More specifically, it demonstrates that a combination of modest, yet mutually reinforcing quota and tax incentives, would motivate most farmers to retain more of their marginal land in its natural (uncultivated) state. Over 60 percent of the surveyed landowners indicated that the combined incentives would motivate them to reduce the acreage of natural land that they original intended to clear or drain in the future. Furthermore, nearly one-third indicated that the proposed incentives would motivate them to return some marginal cropland to native cover.

Although the results of the landowner survey indicate that quota and property tax incentives are definitely a step in the right direction, by no means do they by themselves, represent a universal solution to the problem of habitat loss on private farmland. Considering the variety of circumstances and problems relating to the conservation of natural areas on an individual farm basis, it is obvious that there is not, nor will there ever be, a simple single solution to the problem. What comes through loud and clear is that an incentive land management program, that applies a strategic combination of available conservation initiatives, would be the most appropriate course of action. To insure that this broadly based program is successful, it is critical that the initiatives designed to promote soil and water conservation be integrated with agricultural policies and regulations that directly and indirectly influence the way farmers manage their land. Political leaders at all levels of government must be made aware of this need to integrate, and in turn must use available legislative processes to insure that these changes are instituted.

Implementation of the Wheat Board quota and property tax modifications proposed in this study represent an excellent opportunity to "get the ball rolling". Implementation of the changes would not adversely affect the primary objectives of the quota allotment and property tax systems, and would leave farmers sufficient domain to make their own managerial decisions. Since the proposed incentives involve modifications to already existing legislation, implementation would not require extensive legislative and administratives processes.

Quota and property tax incentives are directly in line with the conservation objectives and goals outlined in the Senate of Canada's "Soil at Risk" report and would effectively complement private land habitat programs operated by organizations such as Wildlife Habitat Canada and Ducks Unlimited (Canada). Furthermore, quota and property tax incentives would also effectively complement the recently developed "Marginal Land Reserve Concept" proposed by the Prairie Farm Rehabilitation Administration.

In the event that the Wheat Board abandons its acreage-based quota system in favor of the recently proposed supply-based marketing system[1], the author is confident that the acreage-based conservation incentives proposed in this thesis could easily and effectively be incorporated into the new system. Under the new system, the originally proposed acreage incentives would instead be in the form of "quota percentage credits". Farmers that retain natural areas on their property, or return marginal cropland to native cover, would be rewarded by granting them the right to market a larger volume of their "grains in store" through the Board. The actual percent (volume) increment would be directly proportional to the acreage of natural land that is retained, and the total acreage of marginal cropland that is retired.

Ultimately it is the decisions and actions of individual landowners that dictates the fate of natural areas and the level of soil and water conservation on private farmland. Successful conservation programs of the future must, there can be little doubt, be developed in context with landowners decision making process. Inflexible programs, or programs which are viewed by farmers as infringements to their rights of private ownership, are doomed from the beginning. Aggressive habitat-oriented acquisition programs only serve to polarize farmers as "anti-wildlife", and lead to the perception that conservation programs of all types are antithetical to agricultural interests (Smutko 1982).

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[1] The 1987-88 Quota Review Committee has accepted the supply-based marketing proposal, but is reserving its judgement on the system until producers' attitude towards the system are fully investigated. If the Wheat Board actually decides to implement the system, the earliest possible date that this would occur is August,1990 (Keena pers. comm. 1989).

What is needed more than anything is a "grassroots" approach to conservation. Such an approach strives to accomplish public conservation objectives on private land in a cooperative manner through the use of positive motivators such as incentives, provision of technical assistance, and environmental education. The quota and property tax incentives proposed in this study would definitely generate "grassroots" support for conservation, and in the long-run would contribute substantially to the formulation of a conservationist "land ethic" within the farm community.

5.2 RECOMMENDATIONS

Recommended Modifications to the Quota Allotment System

Existing quota allotment regulations encourage the draining and clearing of environmentally sensitive natural areas. In light of the favorable response of surveyed farmers towards the concept of receiving conservation oriented quota incentives, it is recommended that:

1) The Canadian Wheat Board modify quota allotment regulations so that full quota-entitlement is extended to "unimproved" lands such as wetlands, woodlands and native prairie that are maintained in their natural uncultivated state.

In addition it is recommended that :

2) Full quota-entitlement be extended to marginal cropland acreages that are returned to native cover.

To insure that no single farmer receives a disproportionate share of the benefits resulting from the proposed modifications, it is recommended that:

3) Quota entitlement be extended to natural acreages up to a maximum of fifty percent of a farmer's total seeded acreage.

This acreage ceiling would also guard against the creation of a land market based solely on attached delivery quota-entitlement.

To minimize the administrative costs of the quota incentive program it is recommended that:

4) Qualification for quota-entitlement on natural areas and returned cropland occur automatically with a farmers' identification of these areas on his Permit Book Application.

In the event that a supply-based marketing system is adopted by the Wheat Board it is recommended that:

5) Conservation oriented "quota credits" be incorporated into the new system.

Recommended Modifications to the Municipal Property Tax System

Modifications to the assessment and taxation of natural areas represent a relatively simple and convenient means of encouraging farmers to preserve natural areas on their property. Therefore it is recommended that:

6) Municipal governments exempt from property taxation all "unimproved" lands such as wetlands, woodlands and native prairie that are maintained in their natural state.

It is further recommended that:

7) Provincial government funds be used to compensate municipalities for the annual loss in tax revenue resulting from the exemption of natural areas.

8) North American Waterfowl Management Plan funds be used to mitigate the costs of implementing and administrating quota and property tax incentive programs.

To minimize the administrative costs of the property tax incentive program it is recommended that:

9) Farmers not be required to sign legal agreements in order to qualify for property tax exemptions. If exempted natural areas are cultivated, the landowner would simply lose the exempt status on these areas and would be assessed at the higher cultivated rate the following tax year.

The likelihood of landowners maintaining natural areas in response to the proposed tax concessions would be enhanced by providing detailed property assessment information on tax billing notices. Thus it is recommended that:

10) Municipal tax billing notices clearly list the acreage, assessment, and taxes due on cropland, pasture and exempted natural areas.

As a result of these recommendations, farmers who persist in cultivating natural areas would be repeatedly reminded, each time they receive their billing notice, of the increase in property taxes resulting from their actions. Additionally, those farmers who retain natural

areas in an uncultivated state would be repeatedly reminded of the financial benefit resulting from their decision.

General Recommendations

Experts in the area of incentive theory stress that if incentives are developed and thrust upon a community without its full awareness and understanding they will accomplish nothing (Sorenson 1984). For incentive programs to succeed they must generate public support and confidence and cannot be viewed as "bribes that serve only to undermine puralistic ideals". In other words, incentives should be introduced and developed at the community level. Therefore it is recommended that:

11) Public forums be held throughout rural areas of the Prairies. The main objectives of these forums would be to educate and involve the farm community in the development and implementation of quota and property tax incentives. To insure maximum effectiveness, these forums should be held in cooperation with local farm and social organizations.

Further in the area of incentive theory, results of incentive research indicate that packages of incentives are of greater utility than, individual, isolated incentives. By itself, a modest decrease in taxes associated with exempting natural areas from property taxation does not provide farmers with substantial motivation to retain natural areas on their property. However, when combined with quota-entitlement, the motivation to retain natural areas becomes much greater. In view of the complementary nature of the proposed incentives, it is of crucial importance that:

12) Wheat Board quota and property tax incentives be legislated and implemented simultaneously.

Lobbying activities by private conservation agencies and interest groups are undoubtedly the key to influencing political leaders to legislate Wheat Board quota and property tax incentives (Wood and Chesters 1988). Considering the high profile and favorable reputation of Ducks Unlimited in the area of conservation, it is therefore recommended that:

13) Ducks Unlimited (Canada) publish a glossy executive style summary of this thesis that effectively highlights:
    i) the "disincentives" to soil and water conservation resulting from existing Wheat Board quota and property tax regulations;
    ii) the nature of the proposed modifications (incentives) and the ease with which they could be legislated;

iii) the relatively low cost of implementing and administrating the proposed incentives;
iv) the very favorable attitude of farmers towards the proposed changes; and
v) the long-term soil and water conservation benefits that would result from the proposed incentives.

This document could be used as a platform to push for the changes at meetings and public hearings and could be distributed to political leaders at all levels of government.

5.3 SUMMARY

The Canadian Prairie Region is facing the most serious environmental crisis in its history. Land degradation problems such as soil erosion and salinization now affect over six million acres of the region's agricultural land, and are costing farmers approximately $550 million annually in reduced yields and higher input costs. Destructive farming practices such as summerfallowing and excessive tillage are to a major degree responsible for the degradation of prairie farmland. However, the indiscriminate breaking and draining of agriculturally marginal natural areas, and the resultant loss of the environmentally protective functions they perform has magnified the severity of many land degradation problems. What was once a stable land base characterized by a diverse mosaic of natural grasslands, woodlands, wetlands, pasture and croplands; has in the span of only several decades become increasingly characterized by wide expanses of monoculture croplands. Declining wildlife populations associated with the destruction of the parkland mosaic are symptomatic of a much wider environmental decay to the entire prairie land base itself. Unless action is taken immediately to protect the parkland mosaic, the Prairie Region will lose a major portion of its agricultural and wildlife producing capabilities.

The current transition from parkland mosaic to monoculture croplands has almost exclusively been the result of private land clearing and drainage "improvements" undertaken by individual farm operators. In Agro-Manitoba alone, farmers convert nearly 160,000 acres of wetlands, woodlands and native pasture annually. Although short-term economic pressures and technological change are major factors motivating farmers to convert these areas, it has been widely suggested that the whole process is catalysed by legislative policies and regulations that inadvertently provide incentives for farmers to incorporate these areas into their farming operations. These "disincentive programs" range from direct subsidies for drainage and bush clearing; to marketing systems which discriminate against small farmers and high-yield producers, while favoring large acreage cultivation regardless of productivity. In the absence of these subsidies and marketing

systems, the input costs associated with farming marginal lands would no doubt exceed any benefits derived from cultivating them.

Since 1979, several policy review oriented studies have identified a total of 12 federal, and 16 provincial statutes, that potentially provide landowners with incentives to drain or clear marginal lands. Two of the most influential statutes in this regard are the regulations governing the Canadian Wheat Board quota and municipal property tax systems. This study focused on the land use role of these governmental systems.

According to quota system regulations, natural or "unimproved" land must be cultivated or "improved" in order to qualify for delivery quota entitlement. As a result, farmers are motivated to convert marginal natural land, not because of its crop producing potential, but simply to acquire marketing rights to a larger volume of grain. This unfortunate situation is in turn aggravated by a property tax system that taxes all farmland regardless of whether or not its agriculturally productive. Although wetlands and woodlands are assessed at a lower rate than productive croplands, no breakdown reflecting this variation is provided in tax billing notices. Since tax notices merely state the gross assessed value of each quarter-section, farmers are tempted to recover perceived tax losses by developing land that might otherwise be left in its natural state. In many cases the perceived tax burden associated with idle natural areas is probably recovered by its cultivation, which makes it quota-eligible, rather than by any actual increases in crop production.

Despite the disincentives to conservation resulting from existing quota and tax regulations, modifications have been suggested that could significantly alter landowners' decision to convert natural areas, and in effect create economic incentives to maintain them. The modifications investigated in this study centered around provisions that would 1) extend quota entitlement to natural areas if they are maintained in an uncultivated state, and 2) exempt natural areas from property taxation if they are maintained in an uncultivated state.

A questionnaire designed primarily to assess Manitoba farm operators' attitudes toward the concept of receiving combined quota and property tax incentives for retaining natural areas on their property was personally administered on fifty randomly selected landowners in each of the Rural Municipalities of Albert and Argyle. The landowner survey also investigated past and future land conversion trends, and assessed the role of existing quota and property tax regulations in promoting past land conversions.

Most of the sample farms in both study areas were classified as either grain (45 %) or mixed farms (40 %), while 15 percent were classified as livestock operations. Average farm size was moderately larger in Albert (997 acres) than Argyle (885 acres), as was the

percent of farmland acreage that was cultivated (76 and 69 % respectively). Sixty percent of the respondents were between 30 and 49 years of age. Nearly half had less than a grade ten education.

Ninety-five percent of the sample landowners reported owning wetlands. Albert landowners owned a high density (28 wetlands per section) of small wetlands (58 acres per section), while Argyle landowners owned a low density (5 wetlands per section) of large wetlands (70 acres per section). The condition of the wetland edge in Albert can be described as heavily utilized since nearly 90 percent of the sample farm wetlands were located on cropland. On the other hand, only 58 percent of the sample wetlands in Argyle were located on cropland.

Ninety-five percent of the surveyed farmers reported owning wooded areas, while 80 percent reported owning some native grassland acreage. Argyle landowners owned an average of 103 acres of woodland and 93 acres of grassland, while those in Albert owned an average of 73 and 101 acres of woodland and grassland respectively. Most of the wooded acreage in Albert consisted of small bluffs associated with wetlands on cultivated fields, while larger expanses of bush located on "unimproved" pasture were the norm in Argyle. Virtually all the native grassland in both study areas was grazed on a regular basis.

Seventy-two and 52 percent of the respondents owning wetlands in Albert and Argyle respectively, had either drained or totally cultivated some wetlands on their property during the last ten years (1976-86). Sample landowners in Albert destroyed 574 wetlands totalling 805 acres, while those in Argyle destroyed 198 wetlands totalling 580 acres. This represents a 20.9 and 13.2 percent reduction in sample farm wetland area in Albert and Argyle respectively, over the ten year period. Wetlands located on cropland were the major targets of conversion activities in both study areas. Chi-square tests revealed that young farmers, grain oriented operations, large farms and farmers owning large acreages of wetlands; tended to convert more wetland acreage than older farmers, mixed and livestock operations, small farms and farmers owning small acreages of wetlands respectively.

Just over 60 percent of the respondents owning woodlands had cleared some woodland during the last ten years. Forty-three and 18 percent of the respondents owning native grassland in Albert and Argyle respectively, had broke some grassland acreage. Sample landowners in Albert cleared a total of 859 acres of woodland and 1049 acres of grassland, while those in Argyle cleared 941 acres of woodland and 453 acres of grassland. This represents a 19.1 and 17.3 percent reduction in Albert's woodland and grassland acreage respectively, and a 17.3 and .9 percent reduction in Argyle's woodland and grassland acreage. Over two-thirds of the woodland cleared in both study areas was located on cropland, while over 90 percent of the grassland that was broken was either

native pasture or hayland. Chi-square tests revealed that large farms and grain oriented operations tended to convert more upland acreage than small and mixed/livestock operations respectively.

The primary reasons cited by landowners for clearing and draining natural areas were 1) to increase crop production or income derived from these areas, and 2) to improve cultural pattern.

Quota and tax regulations provided motivation for over half the sample landowners who had converted natural areas in the past. Of the 78 landowners who had converted natural areas in the past, 40 (51 %) indicated that the quota-eligible status of uncultivated lands had an influence on their decision to convert. Of these 40 individuals 9 (23 %) rated quota as very important in their decision, while 12 (30 %) and 19 (47 %) rated it as moderately and slightly important respectively. Chi-square tests revealed that farmers who converted the most natural land and farmers operating grain farms, were more influenced by quota regulations than those who converted the least amount of land and those operating mixed/livestock farms respectively.

Forty-three (55 %) of the 78 landowners who had converted natural areas in the past indicated that taxes paid out on natural areas had an influence on their decision to convert. Of these 43 individuals, 13 (30 %) rated property tax payments as very important in their decision, while 16 (37%) and 14 (33 %) rated it as moderately and slightly important respectively. Chi-square tests revealed that farmers who had converted the most land, were more influenced by tax payments than those who converted the least amount of land.

A great deal of the "land improvement" motivation caused by the property tax system appears to be the result of landowners' misconceptions regarding the per acre assessment rate of natural areas. Ninety-six percent of the sample landowners felt they were familiar with with the assessment rates of their various acreages, yet 55 percent cited per acre assessments for their natural acreages that were higher than they actually are. These assessments ranged from approximately half, to the full assessed value of cropland. Seventy percent of the landowners who cited higher than actual assessment rates had converted natural areas in the past, while just over half of the landowners who were aware of the actual assessment rates had done the same. The combination of taxes paid out and quota-eligibility surely act to strengthen the resolve of landowners to convert natural areas to cropland.

Landowner acceptance of the proposed Wheat Board quota and property tax incentives was very favorable. However, acceptance varied considerably depending on the manner in which municipalities would be reimbursed for the tax revenue lost on exempted

natural areas. Seventy-one percent of the sample landowners indicated that they would be in favor of the combined incentives if the taxes previously paid on exempted natural areas were shifted to cultivated land on a municipal-wide basis. The percent in favor would increase to 91 percent if the province reimbursed municipalities for lost tax revenue. Chi-square tests revealed that operators of farms that were more than 25 percent uncultivated, were significantly more in favor of the "tax-shift" alternative, than operators of farms that were 25 or less percent uncultivated. This association is undoubtedly related to the increase in property taxes that would affect the latter.

Prior to introducing the proposed quota and property tax incentives farmers were asked to outlined the acreages of wetland, woodland and native grassland that they planned to convert over the next five years. The conservation potential of the combined incentives was then determined by asking these landowners to estimate the effect that the combined incentives would have on the area of natural land that they initially planned to convert.

Fifteen (31 %) and 10 (23 %) of the sample landowners owning wetlands in Albert and Argyle respectively indicated that they planned to convert some wetlands during the next five years. Albert landowners planned to convert 277 wetlands totalling 366 acres, while those in Argyle planned to convert 25 wetlands totalling 237 acres. Potentially, this represents a 12.0 and 16.2 percent reduction in Albert's and Argyle's wetland area respectively. Fifteen (60 %) of the 25 landowners who planned to convert some wetlands indicated that the combined incentives would at least slightly reduce the amount of wetland acreage they initially planned to convert. Of these 15 individuals, 5 (33 %) said they would drastically reduce the wetland acreage they initially planned to convert, while 7 (47 %) and 3 (20 %) said they would moderately and slightly reduce the area they planned to convert respectively. A rough estimate indicated that 219 (36 %) of the 603 acres wetland initially designated for conversion would be retained in an uncultivated state if the combined incentives were actually instituted.

Nineteen (41 %) and 15 (32 %) of the sample landowners owning woodlands in Argyle and Albert respectively planned to clear some woodland during the next five years. Argyle landowners planned to clear 672 acres, while those in Albert planned to clear 496 acres. Potentially, this represents a 13 percent reduction in both Argyle's and Albert's woodlands acreages. Twenty (59 %) of the 34 landowners who planned to clear some woodland indicated that the combined incentives would at least slightly reduce the amount of woodland they initially planned to clear. Of these 20 individuals, 3 (15 %) said they would drastically reduce the area of woodland they initially planned to clear, while 11 (55 %) and 6 (30 %) said they would moderately and slightly reduce the area they plan to clear respectively. A rough estimate indicated that 392 acres (34 %) of the 1,168 acres woodland

initially designated for clearing would be maintained under the proposed quota and tax incentives.

Six (16 %) and 3 (7 %) of the sample landowners owning native grassland in Albert and Argyle respectively, planned to break some grassland during the next 5 years. Albert landowners planned to break 496 acres, while those in Argyle planned to break 65 acres. Potentially this represents a 19 percent reduction in Albert's grassland acreage, and a 1 percent reduction in Argyle's. Eight (89 %) of the 9 landowners who planned to break some grassland indicated that the combined incentives would reduce the amount of grassland they originally intended to break. Approximately 515 acres (51.2 %) of the 1,005 acres of grassland originally designated for conversion would be maintained under the proposed tax and quota incentives.

Chi-square tests indicated that landowners operating large farms and those who planned to convert the most natural lands, were more likely to reduce the amount of land they would convert under the proposed incentives than those operating small farms and those who planned to convert small acreages. These results are very encouraging since it appears that the proposed incentives would have the greatest impact on those farmers that are responsible for the greatest portion of land "improvement". No significant associations were found between landowners' response to the proposed incentives and landowner variables such as farm type, landowner age, and landowner education. This suggests that the proposed quota and tax incentives would not target a specific subset of the farm population, but would instead have have a general influence on conservation throughout the entire farm community.

Most areas of the Prairies, including this reports study areas, have lands that are at severe risk of soil degradation when cultivated annually. In most cases the most effective conservation measure for these marginal croplands is to return them to permanent cover. Combined quota and tax incentives appear to have great potential for motivating farmers to return marginal cropland to native cover. Cropland areas that are returned to native cover would qualify as quota-eligible and tax exempt acreages in the same way that existing natural acreages would. Eighteen (36 %) and 11 (22 %) of the sample landowners in Argyle and Albert respectively indicated that they would return some marginal cropland to native cover under the proposed incentives. Argyle respondents would return 812 acres, while those in Albert would return 291 acres. Extrapolating these acreages over both municipalities, the proposed incentives would result in the re-vegetation of nearly 5000 acres of marginal cropland.

Thirteen recommendations to promote the conservation of marginal cropland and natural areas resulted from this study. Most of the recommendations focus on conservation oriented modifications to Wheat Board quota and property tax regulations.

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APPENDIX 1

PROPERTY ASSESSMENT FIELD SHEET (LAND ASSESSMENT PORTION)

SOIL SYMBOL & TEXTURE			AC./HEC.	INDEX	RATE	VALUE
MAJOR						
MINOR						
SURVEYED ACRES/HECT.			NON-ARABLE	AC./HEC.		
P.L.C.						
OCCUPANT CONTACTED	YES	NO	WASTE			
VACANT	LAND	BLDG.				
BUILDING ON LOT NO.				FRONTAGE INCREMENT		
DWELLING	TAX.	EX.		GROSS		
OUT BUILDINGS	TAX.	EX.		TOTAL ▶		
EX. REASON AND SEC. OF M.A.A.				DAY MO. YEAR		ASSESSOR NO.
BUILDING PERMIT NO. AND DATE				REMARKS		
CONST. COST.						
CORPORATION LETTER						

APPENDIX 2

PROPERTY ASSESSMENT USE GROUP SYMBOLS

Use group symbols are designed to indicate the present or most desirable use of specific soil areas. These symbols may be conveniently divided into two classes.

(1) Those used to describe the utilization of soil areas to which an association name may be applied.

(2) Those used to describe soil areas to which an association name cannot be applied. Such "miscellaneous" soils do not carry an index rating but are assessed at waste land or pasture land values.

CLASS I

(a) Arable Land Symbols:

K——————Arable land presently under cultivation.

K/G——————Arable land seeded to tame grasses. Suitable for continued cultivation.

KG——————Land which has been cultivated and is suitable for continued culture but is presently abandoned.

PA——————Land under native hay is suitable for arable culture

BA——————Land under native bush or scrub but is suitable for arable culture.

(b) Non-Arable Land Symbols:

K/PG——————Land which is under cultivation but which, in the valuator's opinion, is best suited for pasture purposes.

K/G/PG——————Cultivated land which has been seeded to tame grass and and which, in the valuator's opinion, is best suited for pasture.

KG/PG——————Land which has been cultivated but has been abandoned and which, in the valuator's opinion, is unsuitable for arable culture.

PG——————Non-arable land, suitable for pasture use only and presently under native grass.

B——————Non-arable land under bush or scrub.

CLASS II

(a) Waste Land Symbols: (where the following are used, the areas should be mapped out and a nominal value employed).

W———Waste - small, isolated areas which cannot be utilized effectively because of natural or artificial hazards, such as railways, creeks, etc.

WS———Waste sloughs or potholes which are not cultivated and have no economic utilization.

WSK———Waste sloughs or potholes which are being cultivated for the convenience but which the valuator considers should be classified as waste land.

WSB———A waste slough which is surrounded by scrub or bush Where such conditions exist in isolated areas throughout cultivated fields and cannot be utilized for hay, they must be classified as waste.

WN———Waste knolls, uncultivated. The symbols is used to describe a condition of isolated stony and gravelly knolls which are not arable and have no pasture utilization.

WNK———A waste knoll which, for convenience, is being cultivated. The symbol is used to describe a condition of eroded, stony or gravelly knolls with steep side slopes and which the evaluator considers unsuitable for cultivation.

CK———Creek. The symbol described an area affected by a creek, including the bed and the eroded banks, which is non-arable and has no economic utilization as pasture.

Rv———Ravine. The symbol is used to describe a dry ravine bed and is a similar manner as the symbol for a creek.

DDw———Deep Draw. The symbol is used to descride a condition of gully erosion which has progressed to the extent that the free passage of machinery is impeded. The actual area of the draw is considered to have waste value only.

Pt———Peat. The symbol is used to describe isolated peat areas which have no economic utilization.

Mk———Muskeg. The symbol is used to describe an area of muskeg which has no pasture utilization.

(b) Miscellaneous Soil Symbols: (The following symbols are employed to describe various soil areas to which an association name cannot be applied, but which have some degree of utilization for the production of forage. In such cases, the symbols are used in association with the proper use group symbols).

Av———Alluvium. Recent flood plain or stream bed deposits which show no profile development and which have pasture utilization only. The symbol may also be employed in reference to recent pond and slough deposits of considerable areas, which have dired up and may be utilized for forage.

Ds———Dune sand. Areas of coarse textured material which has been duned by wind action.

Dp———Dissected Plateau. The symbol is used to describe isolated plateau areas along with the steep, eroded banks, where the economic utilization is grazing.

Er———Eroded. The symbol is used to describe highly eroded areas, generally associated with the gradual slopes into river valleys.

Ri———River. The symbol embraces the eroded banks and stream bed but not arable alluvium deposits.

WS-H———A slough which may be utilized for hay.

APPENDIX 3

SUMMARY OF THE 1987-88 QUOTA REVIEW COMMITTEE SUPPLY BASED QUOTA SYSTEM PROPOSAL

1. Documentation

(a) Application for Permit. Producers will submit an application for permit as under the present system. The application will include all information provided under the current system except quota acres.

(b) Inventory Declaractions. The producer will declare to the Canadian Wheat Board all supplies of wheat, oats and barley held on farm following harvest. An estimate of the grades of wheat will be listed on the declaraction. The inventory will be made following harvest but prior to October 31.

(c) Supply Agreements. Supply Agreements will be commitments to deliver a stated volume of wheat, barley or oats to the Canadian Wheat Board as these grains are required by the Board. For wheat, each type of grain will be listed separately. The supply Agreement would not be grade specific however the producer would provide an estimate of the grade breakdown of the stated supplies. All delivery opportuntiy will be defined as a portion of the supply Agreements.

The major Supply Agreement must be signed prior to October 31st if producers wish to deliver grain to the Canadian Wheat Board in the period from August 1st to February 28th. The Supply Agreement may be adjusted upwards, once during the period from August 1 to October 31. The supply Agreement should include all grain that the producer is willing to commit to the Canadian Wheat Board.

In order to provide flexibility for producers who are unable to determine the total grain they have available for sale to the Canadian Wheat Board, two subsequent Supply Agreements are available. These Supply Agreements must be signed before February 28th and May 31st.

2. Delivery Calls.

(a) Minimum Call. Each producer will be allowed to deliver a minimum of 25 tonnes of grain. The grain delivered under a minimum call must be grain required by the Canadian Wheat Board. The purpose of the minimum call is to allow a number of producers who have very small volumes to deliver their entire crop so the deliveries will not have to be spread over extremely small amounts throughout the crop year. The call will allow the Canadian Wheat Board to call some grain to farmers signing Supply Agreements. The first deliveries in a year will be charged against the minimum delivery call. The 25 tonne figure was developed to reflect current conditions and may have to be adjusted through time.

(b) Remaining Calls. Calls will be issued as a percentage of grain held under Supply Agreement. All Supply Agreements signed during the period from August 31st are eligible for delivery at the time the agreement is signed. Supply Agreements signed after October 31st will be eligible for the calls which are not terminated before the final day of the period. Calls will be made on a grade or location specific basis as required but there will be a general attempt to keep calls as close to equal as possible.

3. Special Situations

(a) Selected Grains. Producers wishing to submit a sample for selection have two options. The producer may opt to place the grain under Supply Agreement. If the producer does this, the grain registered on the Supply Agreement must be delivered to the Canadian Wheat Board if the sample is not accepted. In return for making the initial commitment to the Canadian Wheat Board, the producer is eligible for all past calls at the time the grain is rejected. If a carload of grain under a Supply Agrteement is rejected at unload, the producer is eligible for past calls with the remainder of the grain accepted against future calls.

The producer may opt not to place the grain submitted for selection under the Supply Agreement. If the producer does this, the producer retains the option of selling the grain to the off-board market if grain is not accepted. The only way the producer would then deliver to the Canadian Wheat Board would be to sign a Supply Agreement in a later period and receive those calls which are still open for that supply agreement. The producer has traded the access to past delivery calls for the option of selling the rejected grain to the off-board market.

(b) Feed Grain User. The committee recommends that the Canadian Wheat Board make grain held under Canadian Wheat Board Supply Agreements available for sale to the local feeding industry. The feeders could contact the Canadian Wheat Board prior to needing delivery of the grain. The Canadian Wheat Board could then notify local feed producers that their contract was purchased. The producer could have the grain weighed at the local elevator and have a cash ticket issued. The elevator company could receive a fee for weighing the grain and issuing the ticket. The producer could receive the initial price for the grain and could be eligible for any final payments. The feeder could be required to pay a market related price and be responsible for transportation beyond the primary elevator. The current policy of allowing off-board switching of feed grain stocks could remain in effect.

(c) The present policies of over-delivery of seed and gristing will not be changed.

4. Enforcement

The majority of submissions indicated a desire for increased enforcement and the committee concurs that enforcement of regulations is an essential conerstone of any delivery system. In addition, a large number of submissions suggested spot-checking a random sample of producers. The Committee concurs with the submissions and recommends that the Canadian Wheat Board spot-check a random sample of producers in order to ensure that Applications for Permit, Inventory Declarations, and Supply Agreements are accurate.

The Committee recommends that any producer who does not deliver up to an acceptable tolerance (suggests 10 %) of the volume stated on the Supply Agreement, be responsible for paying a penalty to the Canadian Wheat Board.These penalties could be defined as a set dollar value per tonne. The purpose of the fine is to ensure that producers do not overstate Supply Agreement in order to gain disproportionate access to the system. The Committee recognizes the responsibility of producers to meet terminations on delivery calls. The Canadian Wheat Board will notify producers who miss delivery calls. If no satisfactory response is received and if missing the calls means that the producer is unable to meet the terms of the Supply Agreement, the producer would be liable for a fine. During implementation, the Committee recommends that all first offences could be waived in favor of a warning. All subsequent offences would be charged.

5. Quotas on off-Board and non-Board grains

The submissions argued that quota should be removed on non-board grains. The quotas are perceived as an undue restriction on the movement of these products. The Canadian Wheat Board is perceived as only being responsible for whaet, barley and oats. The delivery restrictions are perceived to affect the margins in the markets for these crops. However, non-board grains have had preferentail treatment at West Coast ports and in total movement. From 1977/78 to 1986/87 non-board grains spent, on average, 10 days longer in westerns ports than did Board grains. In addition, canola average stocks to production ratio was maintained at a lower level than any of the Board grains indicating a disproportionate access to rail cars. In addition, the canola exports have been allowed to move almost exclusively through premium West Coast ports. With the move to a new system, it may be possible for the Canadian Wheat Board to remove quotas on off-board and non-board grain. However, if this is to take place, Board grains must be ensured their fair share of elevator space, total movement, West Coast movement, and storage space at port. Until this access can be provided through some other agencies, the committee recommends that the delivery restrictions are maintained on off-board and non-board grains. When the Canadian Wheat Board begins to draw Board grains on the basis of Supply Agreements, any quotas which are necessary on non-boards may be provided on a seeded acreage base and carryover statement.

6. Information

A large number of submissions asked for increased information. The committee recommends that the Canadian Wheat Board examine buying time on major radio stations to announce delivery calls and termination dates. Special programs could also be explanied.

APPENDIX 4

MUNICIPAL COST OF TAX REBATE PROGRAM PROGRAM PROPOSED BY RAKOWSKI AND JURICK (1984) FOR THE MINNEDOSA POTHOLE REGION

Cost to protect 191,284 acres of wetland and 24,700 acres of non-cultivated non-arable land in the municipalities of Odanah, Harrision, Minto and Saskatchewan:

Cost: $40,520 annually for 10 years

.50[a] (191,284 ac x $2.70/ac[b] x 137 mills[c]	= $35,378 (wetlands)
.50[a] (24,700 ac x $3.04/ac[b] x 137 mills[c]	= $ 5,143 (uplands)
Total	= $40,521

[a] 50 percent rebate factor

[b] Average assessment for wetlands (hay slough, waste-slough-bush, open water)

[c] Average combined municipal and education mill rate for Odanah and Strathcona Municipalities.

[d] Average assessment for non-cultivated non-arable land.

[e] Added to this would be a one-time expenditure of an estimated $100,00 for discreet billing on tax notices.

APPENDIX 5

MUNICIPAL COST OF TAX CREDIT PROGRAM PROPOSED BY RAKOWSKI AND JURICK (1984) FOR THE MINNEDOSA POTHOLE REGION

Cost to protect 191,284 acres of wetlands in the municipalities of Odanah, Harrision, Minto and Saskatchewan:

Cost: $943,00 annually for 10 years	
191,284 ac x 514/ac[a] x 0,0075[b]	= $ 737,400 (Tax credit)
191,248ac x $2.70/ac[c]	= $ 516,466 (Lost revenue to Municipality)
Total	= $1,253,866

[a] Highest appraised value of cropland in above municipalities.

[b] Tax credit factor (3/4 of 1.0% of highest appraised value of cropland).

[c] Average assessment for wetlands (hay slough, waste-slough-bush, and open water).

APPENDIX 6

LANDOWNER QUESTIONNAIRE

1.0 PAST AND PRESENT UNCULTIVATED ACREAGES

WETLANDS

1.1 Do you presently have any uncultivated wetlands or sloughs on your property?.

yes ____ then go to 1.2 no ____ then go to 1.10

1.2 How many individual wetlands do you have on your property?

_____

1.2.1 What is their estimated total acreage?

_____

1.2.2 Outline the location of the wetlands on your property.

_____

1.3 Have you in the past 10 years, drained, filled or otherwise "improved" any wetlands on your property?

yes ____ then go to 1.3.2 no ____ then go to 1.3.1

1.3.1 If no, then why not? (list top three reasons in order of importance)

_____

_____

_____

_____ go to 1.11

1.3.2 If yes, then how many individual wetlands were "improved"?

_____

1.3.2.1 What was their estimated total acreage?

_____

1.3.2.2 Outline the location of the "improved" wetlands.

_____

1.4 What were your reasons for wetland "improvement"? (list top three reasons in order of importance.)

_____

_____

_____

_____

1.5 Following the "improvement" of the wetland acreage, what was this land initially used for?

_____

_____

1.6 How useful has the land proved to be for this purpose?

(a) excellent ____ c) fair ____
(b) good ____ d) poor ____

1.6.1 Comment on your above answer.

_____

_____

_____

1.7 How does the soil of the recently drained wetland compare to that in adjacent fields?

(a) substantially better ____ (d) worse ____
(b) better ____ (e) substantially worse ____
(c) same ____

1.8 Which crops have proven most successful on the above soils?

_____

_____

_____

1.9 Did you receive any financial benefit (including tax deduction) or other assistance in draining your wetlands?

yes ____ then go to 1.9.1 no ____ then go to 1.11

1.9.1 If yes, from whom?

_____

1.9.2 How important was this assistance in your final decision to drain?

(a) wouldn't have drained without it ____
(b) had moderate affect on my decision to drain ____
(c) had slight affect on my decision to drain ____
(d) had absolutely no affect on my decision to drain ____

Note go to 1.11

1.10 Questions for farmers without wetlands.

1.10.1 Did you previously have any wetlands on your property?

yes ____ then go to 1.10.2 no ____ then go to 1.11

1.10.2 What year(s) were they drained, and how many acres?

year	acres drained
____	____
____	____
____	____

go to 1.3.2

NATURAL UPLANDS
(woodland, scrubland, native grassland)

1.11 Do you have any natural upland on your property?

yes ____ then go to 1.12 no ____ then go to 1.20

1.12 How many acres of natural upland do you have on your property?

woodland/scrubland _____

native grassland _____

1.12.1 Outline the location of the natural uplands on your property.

woodland/scrubland _____

native grassland _____

1.13 Have you in the past 10 years cleared or otherwise "improved" any natural upland on your property?

yes ____ then go to 1.13.2 no ____ then go to 1.13.1

1.13.1 If no, then why not? (list top three reasons in order of importance.)

_____

_____

_____

_____

1.13.2 If yes, how many acres of natural upland were "improved"?

woodland/scrubland _____

native grassland _____

1.13.3 Outline the location of the "improved" upland.

woodland/scrubland _____

native grassland _____

1.14 What were your reasons for "improving" the natural upland? (list top three reasons in order of importance.)

_____

_____

_____

1.15 Following "improvement" of the natural upland acreage, what was this land initially used for?

_____

_____

1.16 How useful has the land proved to be for this purpose?

(a) excellent ____ (c) fair ____
(b) good ____ (d) poor ____

1.16.1 Comment on your above answer.

_____

_____

_____

1.17 How does the soil of the recently "improved" natural upland compare to adjacent fields?

(a) substantially better ____ (d) worse ____
(b) better ____ (e) substantially worse ____
(c) same ____

1.18 Which crops have proven most successful on the above soils?

_____

_____

1.19 Did you receive any financial benefit (including tax deduction) or other assistance is "improving" your natural upland?

yes ____ then go to 1.19.1 no ____ then go to 2.0

1.19.1 If yes, from whom?

_____

1.19.2 How important was this assistance in your final decision to "improve" your natural upland?

(a) wouldn't have cleared without it _____
(b) had moderate affect on my decision to clear _____
(c) had slight affect on my decision to clear _____
(d) had absolutely no affect on my decision to clear _____

Note go to 2.0

1.20 Questions for farmers without natural uplands.

1.20.1 Did you previously have any natural upland on your property?

yes ____ then go to 1.20.2 no _____ then go to 2.0

1.20.2 What year(s) was it cleared and how many acres?

year	acres cleared
_____	_____
_____	_____

go to 1.13.

2.0 FUTURE UNCULTIVATED ACREAGE

2.1 Do you have any wetland "improvement" planned for the next 5 years?

yes ____ then go to 2.1.1 no _____ then go to 2.1.2

2.1.1 If yes, how many wetlands and how much wetland acreage do you plan to "improve"?

_____

2.1.1 Outline the location of the wetlands you plan to "improve".

_____

2.1.2 What are your reasons for considering/not considering wetland drainage in the future? (list top three reasons in order of importance.)

_____

2.1.3 What would you do with the land following "improvement"?

_____

2.2 Do you have any natural upland clearing planned for the next 5 years?

yes ____ then go to 2.2.1 no ____ then go to 2.2.2

2.2.1 If yes, how many acres of natural upland do you plan to "improve".

woodland/scrubland _____
native grassland _____

2.2.2 Outline the location of the natural upland you plan to "improve".

woodland/scrubland _____
native grassland _____

2.2.3 What are your reasons for considering/not considering upland "improvement"in the future? (list top three reasons in order of importance.)

_____

2.2.4 What would you do with the land following "improvement"?

_____

2.3 Do you anticipate clearing or draining any of your existing wasteland acreage for the purpose of selling it?

yes ____ no ____

2.3.1 Explain.

_____

_____

_____

2.4 Do you think you could increase the production/yield on your existing cultivated acreage?

yes ____ no _____

2.4.1 If yes, by what percentage and why? (if no why?)

_____

_____

3.0 LANDOWNER PERCEPTIONS OF BENEFITS/COSTS OF NATURAL AREAS

3.1 What do you think are the benefits of having natural areas (wetlands, uplands: bushland, scrubland, grassland) on your property?

WETLANDS		NATURAL UPLANDS	
(a)	none	(a)	none
(b)	provide water for irrigation	(b)	reduce soil erosion
(c)	provide water for livestock	(c)	reduce siltation of drainage ditches by drifting soil
(d)	provide domestic water	(d)	reduce wind damage to young plants
(e)	hay production	(e)	provide firewood
(f)	fish production	(f)	provide protection for livestock
(g)	provide areas for hunting	(g)	provide logs for fence posts
(h)	provide areas for trapping	(h)	capture snow
(i)	replenish groundwater supplies/maintain water table	(i)	provide habitat for wildlife
(j)	reduce flooding and runoff pollution	(j)	provide areas for hunting
(k)	provide habitat for wildlife	(k)	provide areas for trapping
(l)	improve appearance of countryside	(l)	improve appearance of countryside
(m)	other (specify)	(m)	other (specify)

3.2 What do you think are the disadvantages of having natural areas (wetlands, uplands: bushland, scrubland, grassland) on your property?

WETLANDS		NATURAL UPLANDS	
(a)	none	(a)	none

(b)	cannot include this land as quota entitled acreage_____	(b)	cannot include this land as quota entitled acreage _____
(c)	occupy potential cropland_____	(c)	occupy potential cropland_____
(d)	cause flooding/erosion_____	(d)	cause flooding/erosion_____
(e)	attract hunters_____	(e)	attract hunters_____
(f)	increase weed problems in fields_____	(f)	increased weed problems in fields_____
(g)	attract undesirable wildlife which may damage crops_____	(g)	attract undesirable wildlife which may destroy livestock_____
(h)	cause salinity problems_____	(h)	hard to manoeuvre equipment around bushland_____
(i)	hard to manoeuvre equipment around_____	(i)	lands occupied by bushland are taxed, yet no income is derived from them_____
(j)	lands occupied by wetlands are taxed, yet no income is derived from them_____	(j)	attract/breed insects_____
(k)	attract/breed insects_____	(k)	interfere with stubble burning_____
(l)	interfere with stubble burning_____	(l)	cause deep snow drifts which delay spring work_____
(m)	other (specify)_____	(m)	other (specify)_____

3.3 Indicate the extent to which you agree or disagree that the benefits of wetlands outweigh the costs.

(a)	strongly agree	_____	(d)	disagree	_____
(b)	agree	_____	(e)	strongly disagree	_____
(c)	don't know/indifferent	_____			

3.4 Indicate the extent to which you agree or disagree that the benefits of natural uplands outweigh the costs.

(a)	strongly agree	_____	(d)	disagree	_____
(b)	agree	_____	(e)	strongly disagree	_____
(c)	don't know/indifferent	_____			

4.0 LANDOWNER AWARENESS AND ATTITUDE TOWARD EXISTING POLICY

4.1 Are you aware of any programs or agencies which are involved in or provide assistance in the "improving" of uncultivated areas?

yes ____ then go to 4.1.1 no ____ then go to 4.2

4.1.1 If yes, which of the following are you aware of?

(a) P.F.R.A._____
(b) Farm Credit Act_____
(c) Water Rights Branch Dept. Env._____
(d) Rural Municipality_____
(e) local area authority_____
(f) Ducks Unlimited (Canada)_____
(g) Wildlife Branch Man. Dept. Nat. Res._____
(h) private co-op with neighbours_____
(i) other (specify)_____

4.1.2 Have you ever been involved with any of these agencies regarding

(a) drainage_____
(b) flood control_____
(c) bush clearing_____
(d) grassland cultivation_____

Note, if yes go to 4.1.2.1, if no go to 4.2.

4.1.2.1 Were you satisfied with the outcome of the project?

yes ____ no _____

4.1.2.2 How important was the previously mentioned assistance in your decision to "improve" your land?

(a) wouldn't have cleared/drained without it_____
(b) had moderate effect on my decision to clear/drain_____
(c) had slight effect on my decision to clear/drain_____
(d) had absolutely no effect on my decision to clear/drain_____

4.2 Do you believe you understand the rules of the Canadian Wheat Board System of Quota Allotment?

yes ____ no _____

4.2.1 Are you aware of the differences and limitations in quota entitlement of the several land categories referred to in the annual quota application?

yes ____ no _____

4.2.2 Did Wheat Board quota regulations influence your past decision to "improve"uncultivated land on your farm? (past "improvers" only)

yes ____ then go to 4.2.2.1 no _____ then go to 4.2.5

4.2.2.1 Explain _____

_____

_____

4.2.2.2 Rate the importance of additional quota acres as a factor in your overall decision to "improve" uncultivated areas on your farm.

(a) very important_____
(b) moderately important_____
(c) slightly important_____
(d) not important_____

4.2.2.3 Have you heard of any neighbouring farmers "improving" marginal land to increase their quota eligable acreage.

yes ____ no _____

4.2.4 Are you satisfied with the Quota Allotment System?

(a) very satisfied_____
(b) satisfied_____
(c) don't know/indifferent_____
(d) unsatisfied_____
(e) very unsatisfied_____

4.2.4.1 Explain your above answer.

_____

_____

_____

4.3 Are you familiar with the details of municipal land assessment in respect to the several land categories applied?

yes ____ then go to 4.3.1 no _____ then go to 4.4

4.3.1 What is the average per acre assessment of the wetland and woodland acreages on your property? (farmers not owning wetlands or woodlands give average value that these areas are assessed at in the municipality.)

wetlands_____
woodlands_____

4.3.2 Did taxes paid out on natural areas (eg. woodlands, wetlands) influence your past decision to "improve" these areas (past "improvers" only)

yes ____ then go to 4.3.2.1 no _____ then go to 4.4

4.3.2.1 Explain _____

_____

_____

4.3.2.2 Rate the importance of taxes paid out on natural areas as a factor in your overall decision to "improve" these areas.

(a) very important_____
(b) moderately important_____
(c) slightly important_____
(d) not important_____

4.4 Are you familiar with the Canadian Wheat Board's bonusing system?

yes ____ then go to 4.4.1 no _____ then go to 5.0

4.4.1 Have you adjusted your fallow acreage in response to the bonusing system?

yes ____ no _____

4.4.2 Since the bonusing system began, have you increased or do you plan to increase the breaking and/or draining of your uncultivated acreage?

yes ____ no _____

5.0 LANDOWNER ATTITUDES TOWARD POTENTIAL POLICY CHANGES

Consider the following policy changes:

i) The Wheat Board allows farmers to include "unimproved" acreages such as wetlands, woodlands and native grassland in their quota entitlement if these areas are maintained their natural (uncultivated) state.

ii) "Unimproved" acreages such as wetlands, woodlands and native grassland will be exempt from municipal property taxation if these areas are maintained in their natural "uncultivated" state.

5.1 Would you support these quota and tax changes?

yes ____ no _____

5.1.1 Comments

_____

_____

_____

5.2 Would the policy changes affect your future decision to "improve" uncultivated areas on your property?

yes ____ no _____ (go to 5.3)

5.2.1 If yes, how do you think the policy changes would affect the amount of wetland, woodland and grassland "improving" that your plan to undertake in the future (next 5 years)?

	acreage	rating
wetland	____	____
woodland	____	____
grassland	____	____
overall	____	____

a) drastically reduce
b) moderately reduce
c) slightly reduce
d) no effect
e) slightly increase
f) moderately increase
g) drastically increase

5.2.2 Explain _____

_____

_____

_____

5.3 Would you allow any of your marginal cropland acreage to go back to its natural state if its quota entitlement would be retained and its property taxation discontinued?

yes ____ no _____

5.3.1 Explain _____

_____

_____

5.3.2 How many acres of marginal cropland would you return?

_____

5.3.3 Briefly explain the quality of the land you would return (e.g. soil quality).

_____

_____

_____

5.4 Would you rather have only one of the aforementioned policy changes incorporated?

yes ____ then go to 5.6.1 no _____ then go to 5.5

5.4.1 If yes, which policy and why?

_____

_____

_____

5.5 If all government programs providing financial assistance for the clearing and/or draining of wasteland were discontinued and switched to other farm assistance programs, would you think of this as a good idea?

yes ____ then go to 5.5.1 no ____ then go to 5.6

5.5.1 If yes, why and which programs would you like to see the money shifted to?

_____

_____

_____

5.5.2 If no, why?

_____

_____

5.6 Would any other policy changes or programs make the conservation or wetlands, woodlands and grassland on your property more attractive?

yes ____ no _____

5.6.1 Explain your above answer.

_____

_____

_____

6.0 BACKGROUND DATA

6.1 Is farming your main source of income?

yes ____ no _____

6.1.1 If yes, approximately what percentage of your gross farm revenue is derived from the following?

grain	____	livestock	____
forages	____	other(specify)	____

6.2 On the average, how many acres of the following do you have on your farm?

A. cultivated acreage
(a) grain_____
(b) forages_____
(c) summerfallow_____
(d) other(specify)_____
total_____

B. uncultivated acreage
(a) improved pasture_____
(b) unimproved pasture_____
(c) improved hayland_____
(d) unimproved hayland_____
(e) wasteland_____
total_____

6.3 How large is your farm? (specify)

owned acreage ____ leased acreage ____ rented acreage ____
total acreage ____

6.4 How long have you been the proprietor of this farm?

____ years

6.5 Was the previous owner another family member?

yes ____ no ____

6.6 Do you anticipate that this farm will be passed on to another family member when you retire?

yes ____ no ____

6.7 What level of education have you attained?

(a) less than high school ____
(b) high school ____
(c) technical school ____
(d) some university ____
(e) university graduate ____

6.8 What is your age?

(a) 20-29 ____
(b) 30-39 ____
(c) 40-49 ____
d) 50-59 ____
e) over 59 ____

6.9 Do you hunt?

yes ____ no ____

6.10 Do you allow hunters on your property

(a) without restriction_____
(b) with minimal restriction (locals and/or friends only)_____
(c) with substantial restriction (fee and/or damage deposit)_____
(d) never_____

6.10.1 If a, b, or c, then do you allow

(a) both long and limited range firearms_____
(b) limited range firearms only_____

6.11 Are you a member of the Municipal Council?

yes ____ no _____

7.0 FURTHER COMMENTS

APPENDIX 7

CANADA LAND INVENTORY AGRICULTURAL CAPABILITY CLASSES

Class 1 - Soils in this class have no significant limitations in use for crops.

Class 2 - Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices.

Class 3 - Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices.

Class 4 - Soils in this class have severe limitations that restrict the range of crops or require special conservation practices, or both.

Class 5 - Soils in this class have very severe limitations that restrict their capability to producing perrenial forage crops, and improvement practices are feasible.

Class 6 - Soils in this class are capable only of producing perrenial forage crops, and improvement practices are not feasible.

Class 7 - Soils in this class have no capablilty for arable culture or permanent pasture.

Limitations: C - adverse climate, E - erosion damage, I - inundation, P - stoniness, R - shallowness to solid bedrock, S - adverse soil characteristics, T - adverse topography, W - excess water and X - limitations caused by combination of two or more adverse characteristics.

For more detailed description see Canada Land Inventory (1966[b]).

APPENDIX 8

CANADA LAND INVENTORY WATERFOWL CAPABILITY CLASSES

Class 1 - Lands in this class have no significant limitations to the production of waterfowl.

Class 2 - Lands in this class have very slight limitations to the production of waterfowl.

Class 3 - Lands in this class have slight limitations to the production of waterfowl.

Class 4 - Lands in this class have moderate limitations to the production of waterfowl.

Class 5 - Lands in this class have moderately severe limitations to the production of waterfowl.

Class 6 - Lands in this class have severe limitations to the production of waterfowl.

Class 7 - Lands in this class have such severe limitations that almost no waterfowl are produced.

Limitations: A - aridity, B - free-flowing water, C - climate, F - fertility, G - landform, I - inundation, J - reduced marsh edge, M - soil moisture, N - adverse soil and water characteristic, R - soil depth, T - adverse topography, and Z - water depth.

Subclass: S - serve as important staging areas.
M - serve as important or wintering areas

For more detailed description see Canada Land Inventory (1971).

APPENDIX 9

CANADA LAND INVENTORY UNGULATE CAPABILITY CLASSES

Class 1 - Lands in this class have no significant limitations to the production of ungulates.

Class 2 - Lands in this class have very slight limitations to the production of ungulates

Class 3 - Lands in this class have slight limitations to the production of ungulates.

Class 4 - Lands in this class have moderate limitations to the production of ungulates

Class 5 - Lands in this class have moderately severe limitations to the production of ungulates.

Class 6 - Lands in this class have severe limitations to the production of ungulates.

Class 7 - Lands in this class have such severe limitations that almost no ungulates are produced.

Limitations: A - aridity, B - free-flowing water, C - climate, Q - snow depth, U - exposure or aspect, F - fertility, G - landform, I - inundation, J - reduced marsh edge, M - soil moisture, N - adverse soil and water characteristic, R - soil depth and T - adverse topography.

Subclass: W - serve as wintering areas for surrounding animals.

For more detailed description see Canada Land Inventory (1970).

APPENDIX 10

CROSS-TABULATION TABLES FOR STATISTICALLY SIGNIFICANT ASSOCIATIONS

A) Cross-Tabulations for Table 4.9

1.

Farm Size (ac)	AREA (ac) WETLAND CONVERTED (1976-86)		
	0	1-10	>10
< 1200	33	22	16
≥ 1200	7	7	15

2.

Farm Type	AREA (ac) WETLAND CONVERTED (1976-86)		
	0	1-10	>10
Grain	18	11	18
Mixed	12	14	12
Livestock	10	4	1

3.

WETLAND AREA (ac) 1976	AREA (ac) WETLAND CONVERTED (1976-86)		
	0	1-10	>10
1-15	7	12	3
16-30	10	5	5
>30	10	12	23

4.

Farm Age (Yrs)	AREA (ac) WETLAND CONVERTED (1976-86)		
	0	1-10	>10
< 40	17	25	23
>40	23	4	8

5.

Landowner Education (Yrs)	AREA (ac) WETLAND CONVERTED (1976-86)		
	0	1-10	>10
<9	18	6	8
9-12	18	16	20
>12	4	7	3

6.

Hunting Status	AREA (ac) WETLAND CONVERTED (1976-86)		
	0	1-10	>10
Non-Hunter	26	11	14
Hunter	14	18	17

B) Cross-Tabulations for Table 4.12

1.

Farm Size (ac)	AREA (ac) UPLAND CONVERTED (1976-86)		
	0	1-15	>15
< 1200	29	22	20
≥ 1200	4	7	18

2.

Farm Type	AREA (ac) UPLAND CONVERTED (1976-86)		
	0	1-15	>15
Grain	11	14	22
Mixed	11	14	13
Livestock	11	1	3

C) Cross-Tabulations for Table 4.22

1.

Farm Type	Quota Factor?	
	No	YES
Grain	15	23
Mixed	16	16
Livestock	7	1

2.

Area (ac) of Natural Land Converted (1976-86)	Quota Factor?	
	No	YES
1-20	21	11
>20	17	29

3.

Natural Land Benefit-cost Index	Quota Factor?	
	No	YES
<-3.0	9	17
-3.00 -+3.00	9	13
>+3.00	20	10

4.

Landowner Education (Yrs)	Quota Factor?	
	No	YES
< 8	14	9
9-12	15	28
> 12	9	3

D) Cross-Tabulations for Table 4.27

1.

Area (ac) of Natural Land Converted (1976-86)	Property tax Factor?	
	No	YES
1-20	21	11
>20	13	33

2.

Natural Land Benefit-cost Index	Property tax Factor?	
	No	YES
<-3.0	6	20
-3.00 -+3.00	9	13
>+3.00	19	11

3.

Landowner Education	Property tax Factor?	
	No	YES
< 8	11	12
9-12	13	30
> 12	10	2

E) Cross-Tabulations for Table 4.23

1.

Percent farm area uncultivated	In favor of proposed modifications? No	YES
0-25%	25	24
> 25%	4	47

2.

Farm Type	In favor of proposed modifications? No	YES
Grain	19	26
Mixed	8	32
Livestock	2	13

3.

Natural land Benefit-Cost Index	In favor of proposed modifications? No	YES
<-3.00	18	14
-3.00-+3.00	5	22
>+3.00	6	35

4.

Soil quality of converted lands	In favor of proposed modifications? No	YES
Worse than sourrounding cropland	2	13
Same/better than surrounding cropland	21	30

5.

Allow hunters on property	In favor of proposed modifications? No	YES
No	4	2
Yes	25	69

F) Cross-Tabulations for Table 4.41

1.

Farm Size (acres)	Reduce area natural land originally planned to convert during next 5 yrs? No	YES
< 1200	7	2
≥ 1200	10	20

2.

Area natural land originally planned to convert during next 5 yrs (acres)	Reduce area natural land originally planned to convert during next 5 yrs?	
	No	YES
1-20	7	2
> 20	10	20