

**AGRICULTURAL LAND BASE
MONITORING STUDY
(1986 - 1990)**

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EXECUTIVE SUMMARY

The Agricultural Land Base Monitoring Study documents land use changes in rural Alberta. The study collects information regarding the quality and quantity of additions and deletions to the agricultural land base. The current study monitors changes from 1986 – 1990. This is the fourth in a series of studies which have monitored land use changes since 1976.

Additions to the agricultural land base have come primarily from the sale of public lands. Competition from alternative land uses, such as residential developments (urban expansion and country residential subdivisions) and energy activities have been primarily responsible for the losses. During the past five years rural Alberta has experienced a net loss of 100,000 acres, for an average annual net loss of 20,000 acres. While these losses may adversely affect or constrain agricultural activities in rural areas, they do not represent a significant net loss in terms of the total agricultural land base. Alberta has 52 million acres of farmland. The current average annual net loss represents less than 0.2 percent of this land base.

It is important to note the characteristic differences between lands added to and deleted from the agricultural land base. One-half of all of the lands lost are defined as higher capability agricultural lands, Canada Land Inventory (CLI) class 1-3 soils (croplands). Most of these losses occur within the more densely populated regions of the province. Conversely, more than two-thirds of all the additions are lower capability CLI class 4-7 soils (forage, rangelands and mixed cropping) and are located along the fringe of the settled land base, primarily in northern Alberta.

More than 15 years of data confirms that Alberta continues to experience small losses in the quality and quantity of its agricultural lands. From a total acreage perspective, the annual net losses are relatively small when compared to the province's total agricultural land base. While Alberta's agricultural land base is not in jeopardy, the dispersed pattern of small scale residential subdivisions and their potential cumulative impact on traditional agricultural activities is an ongoing concern to the agricultural industry. Past planning initiatives have focused on the protection of better (CLI 1-3) agricultural lands. Future efforts must recognize the importance of agricultural lands for both cropping and livestock purposes and place an increased emphasis on ensuring that new developments are compatible with the area's existing agricultural activities. Agriculture's interests must be balanced against those of other alternative economic land uses. Benefits arising from non-agricultural developments include employment opportunities which may help to stabilize rural populations. Negative effects, for example, may arise from reduced groundwater supplies for agricultural pursuits or increased livestock nuisance odour conflicts between neighbours. Proper land use planning is required to maximize the benefits of these other land uses to rural communities, while minimizing any potential negative effects these developments may have on traditional agricultural practices. The Agricultural Land Base Monitoring Study will continue to be an important tool in assessing the impacts of these changing land use patterns.

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4. The Local Authorities Board and Energy Resources Conservation Board.
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Carla Wright

Mike Pearson

1. INTRODUCTION

Alberta's agricultural land base encompasses more than one third of the province's total land area. It includes privately owned lands within the settled regions of south, central and northwestern Alberta. Although notable on a national scale for its size, the uniqueness of Alberta's agricultural resource lies in its regional variations and diverse economic opportunities. Albertan's perceptions vary from those who believe the agricultural land base is constantly being eroded by residential and commercial developments: to others who see it as a vast expanse of unending farmland.

Accurate information on land use change is required for informed public debate and design of government policy. Periodic information updates provide Alberta Agriculture, Food and Rural Development with a valuable tool for long-range planning. The Agricultural Land Base Monitoring Study was designed to document additions to and deletions from the agricultural land base between 1986-1990. Results provide useful information on current land use changes as well as historical and geographical ends. The study's objectives are to:

- (a) quantify recent land use changes and
- (b) determine how these changes affect Agriculture.

The fourth in a series of studies, the Agricultural Land Base Monitoring Study accurately assesses the significance of land use changes. The study's findings will help the department identify and assess land use trends and determine appropriate land use policies. Other studies in this series include:

1. An inventory of Changes in Alberta's Agricultural Land Base Between 1976 and 1980. Birch, A., 1982. Resource Economics Branch, Alberta Agriculture.
2. An Inventory of Change in Alberta's Agricultural Land Base, 1981. Woloshyn, P., 1983. Resource Economics Branch, Alberta Agriculture.
3. Agricultural Land Base Monitoring Study (1982-1985). Wehrhahn, R., 1986. Land Use Branch, Alberta Agriculture.

The preceding studies have shown that Alberta's agricultural land base is not in jeopardy. These studies show that while trends may vary at the local level, the absolute number of acres lost on a provincial scale are very small. Concerns are being expressed regarding the dispersed pattern of non-agricultural residential subdivisions and the increased potential for long-term nuisance complaints with traditional farming practices. Agriculture is one of a variety of important economic land uses, which actively compete for Alberta's land base. Ongoing monitoring will help the department to prepare policies that ensures balance between competing land uses.

2. METHODS

The study examines changes to the agricultural land base between January 1, 1986 and December 31, 1990. An evaluation of data requirements was completed prior to initiating the study. Contacts were established with various agencies and agreements were made to collect available data during 1992. Data was collected manually with the exception of a few agencies which forwarded printouts or computer tapes.

In order to accurately assess both historical and geographical trends, a broad range of data was collected. The following sections provide a brief overview of the key pieces of information required to complete the study:

- 1) A definition of the study area;
- 2) Selection of a land capability for agriculture;
- 3) Data collection; and
- 4) Data Analysis.

2.1 Study Area

The study area includes lands within the settled region or "White Area" of the province (Figure 1). The "White Area" contains about 63 million acres or one-third of the province's total land base of 164 million acres. The following areas are specifically excluded from this study: Indian Reservations, Military Reserves, National and Provincial Parks, lands within incorporated urban boundaries and "Green Area" lands which the Department of Environmental Protection defines as forested lands not available for agricultural development, other than grazing. Approximately 52 million acres are controlled by Alberta farmers. Of this, about 46 million acres is privately owned and 6 million acres are leased under a variety of agricultural dispositions from the government. Because the total acreage of government leased land rarely changes, leased lands are not included in the additions and deletions reported in this study.

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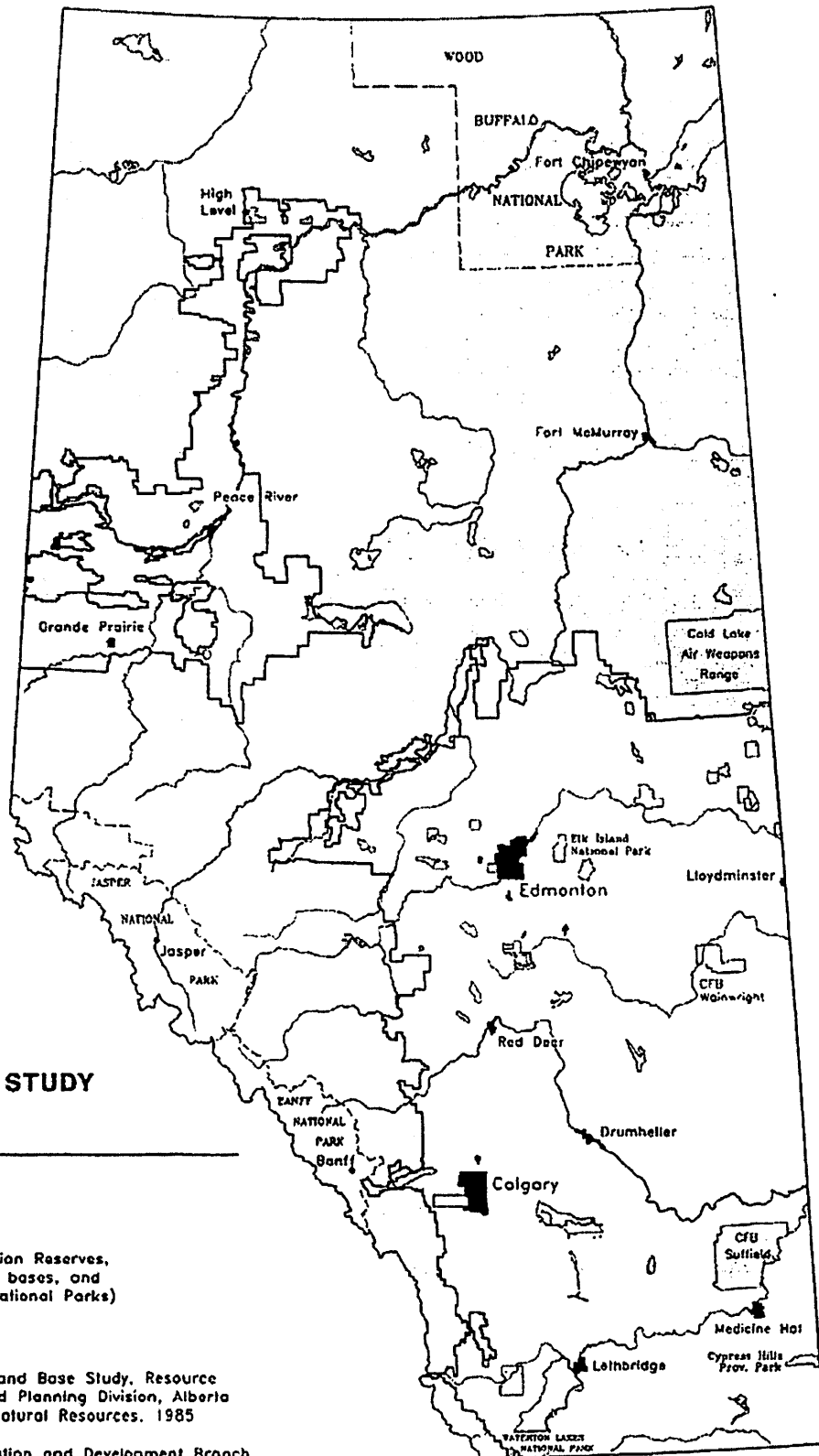
FIGURE 1
LAND BASE
MONITORING STUDY

LEGEND

- Study Area
(White Area)
- Excluded Area
(Green Area, Indian Reserves,
Canadian Forces bases, and
Provincial and National Parks)
- Urban Areas

Source: Agricultural Land Base Study, Resource
 Evaluation and Planning Division, Alberta
 Energy and Natural Resources, 1985

Compiled by Conservation and Development Branch



2.2 Land Capability for Agriculture

The Canada Land Inventory (CLI) classification system for agriculture groups mineral soils into seven classes and one class for organic soils. CLI ranks soil according to its potential for producing a wide range of agricultural crops. CLI classes 1, 2 and 3 have the highest capabilities, the least limitations for most crops and are defined as better agricultural land. Most of these soils are used to produce annual cereal crops. Since much of this land is located near large urban centres, it is also used for intensive (livestock, horticulture, etc.) production. CLI class 4 and 5 lands, are used primarily for mixed cropping, forage production and improved and unimproved grazing with domestic livestock. Much of Alberta's important livestock industry is located on CLI 4 and 5 soils. CLI class 6, 7 and 0 (organic) soils have very low agricultural capability. Other soil rating systems, agricultural land market values and municipal assessments, all closely reflect the CLI classification system for agricultural capability. A summary is provided below:

CLI 1 — No significant limitation in use for crops: 2 million acres = 1% of Alberta's land base

CLI 2 — Moderate limitations that restrict the range of crops or require moderate conservation practices: 10 million acres = 5% of Alberta's land base

CLI 3 — Moderately severe limitations that restrict the range of crops or require special conservation practices: 16 million acres = 10% of Alberta's land base

CLI 4 — Severe limitations that restrict the range of crops or require special conservation practices, or both: 25 million acres = 14% of surveyed land base

CLI 5 — Very severe limitations that restrict their capability to producing perennial forage crops and improvement practices are feasible: 28 million acres = 17% of land base

CLI 6 — Soils are only capable of producing perennial forage crops and improvement practices are not feasible: 9 million acres = 6% of surveyed land base

CLI 7 — No capability for agriculture: 12 million acres = 7% of Alberta's land base

Organic — Soils that have over 12 inches of a peat surface (the average being between 3-4 feet):
13 million acres = 8% of Alberta's land base

Lakes — 2 million acres = 1% of Alberta's land base

Parks/Urban — 5 million acres = 5% of Alberta's land base

Unclassified — 42 million acres = 26% of Alberta's land base

Alberta Total Land Area = 164 million acres (100%)

2.3 Data Collection

A broad range of data must be collected in order to accurately determine historical and geographical trends. Both the quantity and quality of land being added to or removed from the agricultural land base were considered important. To ensure consistency the following information was collected for each inventoried parcel:

Location (Municipality)
Legal Location (to the quarter section)
Month and Year
Acreage Affected
CLI Classification for Agriculture
Current and Intended Use

Both temporary and permanent land use changes are documented. While oil and gas activity and resource extraction are considered "temporary" losses, the loss to the agricultural land base can be for a significant amount of time. Because of their important differences it was decided to identify these activities as "temporary" deletions when the activity occurs and as "temporary" additions when they are reclaimed.

The Agricultural Land Base Monitoring Study's land conversion categories (including permanent (P) and temporary (T) changes) are noted below:

Additions (to the agricultural land base):

- a) Public Land Dispositions for agricultural sale (P)
- b) Reclamation of resource extraction sites (T)
- c) Abandoned oil and gas wells (T)

Deletions (from the agricultural land base):

- a) Residential Subdivisions with Certificate of Title (P)
- b) Industrial Commercial. (P)
- c) Public Service/Utility (P)
- d) Urban Annexations (P)
- e) Oil and Gas Activity (T)
- f) Resource extraction (T)
- g) Transportation (P)
- h) Other non-agricultural uses (P)

Table 1 provides more detailed information regarding the types of land use changes documented for this study. The data sources are listed, as well as a brief discussion of data limitations.

TABLE 1. CATEGORIES AND SOURCES OF LAND BASE ACTIVITIES

Activity	Source	Comments
<p>A. Additions to the Land Base</p> <p>1. Public Land Dispositions Leading to Sale</p> <p>a) Farm Development Sale b) Public Land Sale c) Farm Development Lease</p>	<p>Land Administration Branch, Public Lands Division, Alberta Environmental Protection</p>	<p>Dispositions included in this study are sold for agricultural purposes and are considered to be a new and permanent land use change.</p> <p>Disposition represent new lands not previously leased or sold in the past 30 years.</p> <p>CLI for agriculture was determined on a quarter section basis from CLI maps at a scale of 1:250 000.</p>
<p>2. Reclamation</p> <p>a) Prairie Coal Mines b) Sand and Gravel Pits c) In situ Oil Sands</p>	<p>Reclamation Division, Alberta Environmental Protection</p>	<p>CLI for agriculture for Prairie Coal Mines and In situ Oil Sands reclamation was determined on a quarter section basis from CLI maps at a scale of 1:250 000.</p> <p>CLI for agriculture and acreage figures were reported on a site-by-site basis for reclaimed sand and gravel pits. Total acreage figures were averaged over the 5 year period.</p>
<p>3. Abandoned Wellsites</p>	<p>Energy Resources Conservation Board (ERCB) and SIDMAP (Soil Inventory Database for Management and Planning)</p>	<p>It is assumed that abandoned wellsites will be reclaimed within a 2-3 year time frame after production is completed. ERCB estimates average wellsite size to be four acres.</p> <p>CLI classification was determined on a site-by-site basis using SIDMAP.</p>
<p>B. Deletions from the Land Base</p> <p>Registered Subdivisions</p> <p>1. Residential Subdivisions</p> <p>a) Farmstead Separation b) Single Parcel/Country Residential c) Multi-Parcel Country Residential d) Rural Bolding (< 20 acres) e) Other (boundary adjustments, hamlet expansion, conservation, etc.</p>	<p>Municipal Subdivision Approving Authorities, Regional Planning Commissions, Alberta Municipal Affairs, and Alberta Justice</p>	<p>Subdivisions have been grouped according to intended use and are reported this way in the results section.</p> <p>Only those subdivision parcels registered with a Certificate of Title from the Land Titles Office of Alberta Justice were included in the final results. Registration must have occurred between January 1, 1986 and June 30, 1992.</p> <p>Only those applications with a prior use of agriculture and an intended use other than agriculture were recorded.</p> <p>CLI for agriculture was obtained from the subdivision files on a case-by-case basis or when not available, from CLI maps</p> <p>Farmstead separations are identified as deletions from the agricultural land base since they are part of the farm infrastructure. They provide a residence, a yard site, and holding facilities for livestock, crop products and equipment.</p>

TABLE 1. CATEGORIES AND SOURCES OF LAND BASE ACTIVITIES (continued)

Activity	Source	Comments
<p>2. Industrial/Commercial</p> <p>f) Industrial/Commercial (business developments, communications towers)</p> <p>g) Private Recreational (golf course, riding stables, etc.)</p> <p>h) Mobilehome Park</p> <p>3. Public Service/Utility</p> <p>i) Public Service (church, school, cemetery, etc.)</p> <p>j) Public Utilities (sewage lagoon, waste disposal, municipal wells)</p>	<p>Same as above</p>	<p>Same as above</p>
<p>4. Annexation by Urban Centres</p>	<p>Local Authorities Board, Alberta Municipal Affairs</p>	<p>Gradual expansion of urban development onto annexed land is difficult to monitor on a provincial basis. Reported deletions are inaccurate over the short-term. However, the assumption was made that all land annexed by an urban centre was removed from agriculture on the day of annexation.</p>
<p>5. Oil and Gas Activity</p> <p>a) Oil and Gas Wells</p> <p>b) Industrial Plants and Compressor Stations</p>	<p>Energy Resources Conservation Board</p>	<p>Average wellsite size was estimated to be four acres. CLI for agriculture was obtained from SIDMAP.</p> <p>Plant sizes ranged from 2 to 30 acres. CLI classifications were determined on a case-by-case basis from CLI maps at a scale of 1:250 000.</p> <p>Includes processing plants and industrial development permits. Acreage figures were estimated for land area used from the maximum output capacity of the plant (personal communication, ERCB staff).</p>
<p>6. Resource Extraction</p> <p>a) Prairie Coal Mines</p> <p>b) In situ Oil Sands</p> <p>c) Sand and Gravel Pits</p>	<p>Reclamation Division, Alberta Environmental Protection</p>	<p>CLI for agriculture for Prairie Coal Mines and In situ Oil Sands activity was determined on a quarter section basis from 1:250,000 CLI maps.</p> <p>CLI for agriculture and acreage figures were reported on a site-by-site basis for sand and gravel pits. Total acreage figures were averaged over the 5 year period.</p>
<p>7. Transportation</p> <p>a) Local roads</p> <p>b) Secondary roads</p> <p>c) Primary highways and interchanges</p>	<p>Municipal Services Division, Alberta Transportation and Utilities</p>	<p>Acreage calculations are for new road and highway construction only. Classifications were assigned from SIDMAP based on the percentages in which they occur in each municipality. These are new road developments in the White Area of the province.</p> <p>Figures for road expansion (widening) were not available through Alberta Transportation and are not reported in this study.</p>
<p>8. Other Non-Agricultural Uses</p> <p>a) Power Stations</p> <p>b) Transmission Lines</p> <p>c) Pipelines</p>	<p>Energy Resources Conservation Board</p>	<p>Reported in previous studies, these activities represent a disturbance to the agricultural landbase rather than a deletion. There are some production losses during the year of surface disturbance and in following seasons because of the inconvenience of manoeuvring equipment around structures. Actual acreage losses are minimal since most of the right-of-way can be farmed.</p> <p>These figures are not reported in this study.</p>

2.4 Data Analysis

The Statistical Applications Software (SAS) with mainframe and PC capabilities was used to manage data, provide cross-tabulations and perform frequency distributions. This package allows for reading many forms of data, easy information storage and retrieval, data modification and programming, statistical analysis and file handling.

SAS was also used to re-work data collected from previous studies to allow for the analysis of trends from 1976-1990. Changes to the methodology and results previously reported include: the modification of land conversion categories to reflect those reported in the current study; soil classes previously listed as "undetermined" were identified on a case-by-case basis using CLI maps and Soil Inventory Database for Management and Planning (SIDMAP)¹; leased public lands were deleted; transportation data is now presented at the municipal level; the 1982 Edmonton City annexation which accounted for the loss of 86,000 acres of agricultural land is included; and sand and gravel pit developments have been recorded for the 1982-85 period.

¹SIDMAP was used extensively to determine CLI classifications at the quarter section level and to provide total acreage figures within the "White Area" and for individual Municipalities.

3. RESULTS

The results of the study are presented under the following three sections:

- 3.1 Summary by Year
- 3.2 Summary by CLI Classification
- 3.3 Summary by Region

This presentation of the results allows the reader to develop a better understanding of land use changes on a regional, as well as provincial scale. Net gains and losses may be more significant in a regional context since rural populations, land use demands and soil quality vary considerably at this level. A more detailed examination of changes on CLI 1-3 lands have been included because land use policy/guidelines have traditionally promoted preservation of these lands for agricultural use. The results are presented in both tabular and graphic forms.

3.1 Summary by Year

Additions and deletions from January 1986 to December 1990 resulted in a total net loss of 100,330 acres or an average annual loss of 20,066 acres. The province recorded a net loss in each of the surveyed years. The average annual loss represents less than 4/100 of 1 percent and the cumulative 5 year loss represents less than 2/10 of 1 percent of the province's total agricultural land base of 52 million acres. Deletions (190,823 acres) out—numbered additions (90,493 acres) at a rate of 2:1 for the 5 year period.

Most deletions result from, in descending order: oil and gas activities, urban annexation and residential subdivisions. Combined, these three uses represent 83 percent of the total deletions during the 5 year period. Deletions have been relatively constant over the study period, with the exception of the 1989 City of Calgary annexation of 37,400 acres from surrounding rural municipalities. While a majority (60%) of the losses may be considered permanent, about 40 percent of the losses are considered to be only temporary. Temporary losses include resource extraction (7%) and oil and gas activity (33%). It is estimated that temporary losses return to the agricultural land base at about one—third the rate at which they are removed. For example, 5 acres from every 15 acres of previously disturbed land are reclaimed and returned to the agricultural land base each year. Table 2 and Figure 2 provide a more detailed summary of total additions and deletions (permanent and temporary).

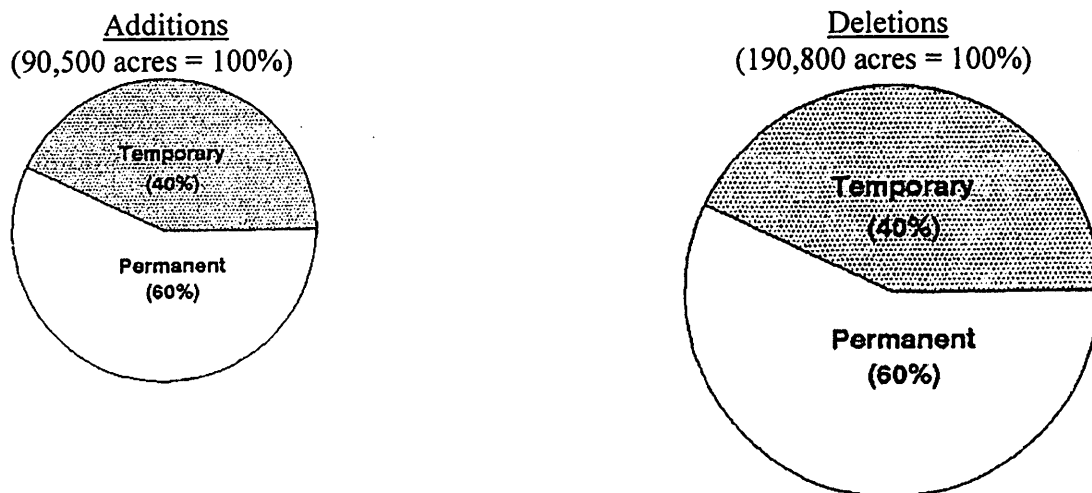
Additions to the agricultural land base are primarily (70%) from public land dispositions leading to sale. The remaining 30 percent are lands returned after temporary disturbances associated with oil and gas wells or resource extractions. While additions from temporary disturbances remain relatively stable at around 5,000 acres per year, there has been a steady and significant decline in new public land dispositions. From 1986 to 1990, public land dispositions have dropped from over 20,000 acres to less than 2,000 acres per year. The decrease in new public land dispositions is

recognized to be the primary cause of the increasing net loss in Alberta's agricultural land base. Less new public lands are available to offset the ongoing annual losses.

TABLE 2. Agricultural Land Use Changes By Year
(‘000 Acres)

	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>Total</u>	<u>(%)</u>
Additions							
Public Land Disposition (P)	20.7	14.4	19.9	7.2	1.5	63.7	(70)
Abandoned Well/sites (T)	3.8	4.9	6.3	4.5	4.0	23.5	(26)
Reclamation (T)	0.6	0.8	0.7	0.6	0.6	3.3	(4)
Total Additions	25.1	20.1	26.9	12.3	6.1	90.5	(100)
Deletions							
Oil and Gas Activity (T)	9.6	14.1	17.0	13.5	14.3	68.5	(36)
Urban Annexation (P)	3.6	1.1	8.8	37.8	0.7	52.0	(27)
Residential Subdivision (P)	5.8	5.8	6.7	8.5	10.4	37.2	(20)
Resource Extraction (T)	2.7	3.0	2.8	2.3	3.0	13.8	(7)
Transportation (P)	3.5	2.3	3.2	1.9	2.3	13.2	(7)
Industrial/Commercial (P)	0.6	0.9	0.8	0.6	1.0	3.9	(2)
Public Service/Utility (P)	0.5	0.3	0.5	0.3	0.6	2.2	(1)
Total Deletions	26.3	27.5	39.8	64.9	32.3	190.8	(100)
NET CHANGE	-1.2	-7.4	-12.9	-52.6	-26.2	-100.3	

Figure 2. Additions and Deletions: Permanent vs. Temporary



3.2 Summary by CLI Classification

On a provincial scale, Canada Land Inventory classification for agriculture is the only system available to measure the comparative productive quality of agricultural land. While there are many criticisms of the CLI system, it is the systems' emphasis on capability for cereal crop production and its inappropriate use as a detailed site—specific planning tool that raises most concerns; not the objectivity of CLI.

CLI classes are grouped to provide a better interpretation of the land's capability for agricultural production. Land quality changes are then assessed by a comparative analysis of net gains and losses within each group. In the past, CLI classes 1-7 and 0 (organic) have been categorized into the following groups for planning purposes:

- a) CLI 1, 2 and 3 = important cereal, oil seed and speciality croplands (referred to as better agricultural land)
- b) CLI 4 and 5 = important forage and livestock producing lands (referred to as marginal lands)
- c) CLI 6, 7 and 0 = perennial and native grasses for grazing (referred to as non—arable lands).

The largest category' of additions was for CLI 4 and 5 lands. These marginal lands are added at twice the rate of the higher capability CLI 1-3 soils. Approximately two—thirds of all additions (55,300 acres) were the result of public land dispositions on CLI 4 and 5 lands. It is recognized that the majority of future additions to the agricultural land base will be within the lower capability (CLI 4 and lower) classes. Most of the province's hi^gher capability lands are now under cultivation.

Deletions occur at approximately the same rate for both CLI 1-3 and CLI 4-5 lands. Low capability or non—arable, CLI 6, 7 and 0 lands represent only 6 percent of the total deletions. Urban annexation (City of Calgary, 1989) was the single largest contributor to the loss of CLI 1-3 agricultural land during the study period. Oil and gas activity was the major contributor to the loss of CLI 4 and 5 lands. Although removals on CLI 4 and 5 lands are notable, most of these deletions are offset by the relatively large (although decreasing) additions of new lands within this grouping. As a result, net loss of marginal land represents only 25 percent of the total deletions. On average, most permanent losses occur on CLI 1-3 while temporary losses occur more often on CLI 4 and 5 lands.

An examination of net changes shows that a loss occurred in each of the CLI groupings. The overall net loss, for the 5 year study period, is approximately 100,000 acres. The most significant net loss occurred on CLI 1-3 lands, which represented about 70 percent of the total net loss (70,000 acres or about 14,000 acres per year). Alberta has approximately 30 million acres of CLI class 1-3 soils. Accordingly, the annual net loss of 14,000 acres represents less than 1/10 of 1 percent of the province's total supply of better agricultural land. Land conversion categories (additions and deletions) are shown by CLI class groupings in Table 3.

TABLE 3. Agricultural Land Use Changes By CLI¹ Classification (1986-1990)
('000 Acres)

	CLI 1, 2, & 3	CLI 4 & 5	CLI 6, 7 & 0	
	<u>(Better)</u>	<u>(Marginal)</u>	<u>(Non-arable)</u>	<u>Total</u>
Additions				
Public Land Disposition (P)	17.8	41.3	4.6	63.7
Abandoned Well/sites (T)	9.4	12.0	2.0	23.5
Reclamation (T)	1.1	2.0	0.3	3.3
Total Additions	28.3	55.3	6.9	90.5
(%)	(31.3)	(61.1)	(7.6)	(100.0)
Deletions				
Oil and Gas Activity (T)	28.1	34.7	5.7	68.5
Urban Annexation (P)	34.2	17.4	0.4	51.9
Residential Subdivision (P)	21.4	13.6	2.2	37.2
Resource Extraction (T)	5.0	7.4	1.4	13.8
Transportation (P)	6.3	4.9	2.0	13.2
Industrial/Commercial (P)	1.8	1.9	0.2	3.9
Public Service/Utility (P)	0.9	0.9	0.4	2.2
Total Deletions	97.7	80.8	12.3	190.8
(%)	(51.2)	(42.3)	(6.5)	(100.0)
NET CHANGE	-69.4	-25.5	-5.4	-100.3

¹NOTE: CLI was designed to indicate regional capabilities, not site specific classifications. Therefore, it must be cautioned that CLI ratings obtained from files or 1:250,000 map sheets may not exactly represent the CLI at the site of activity.

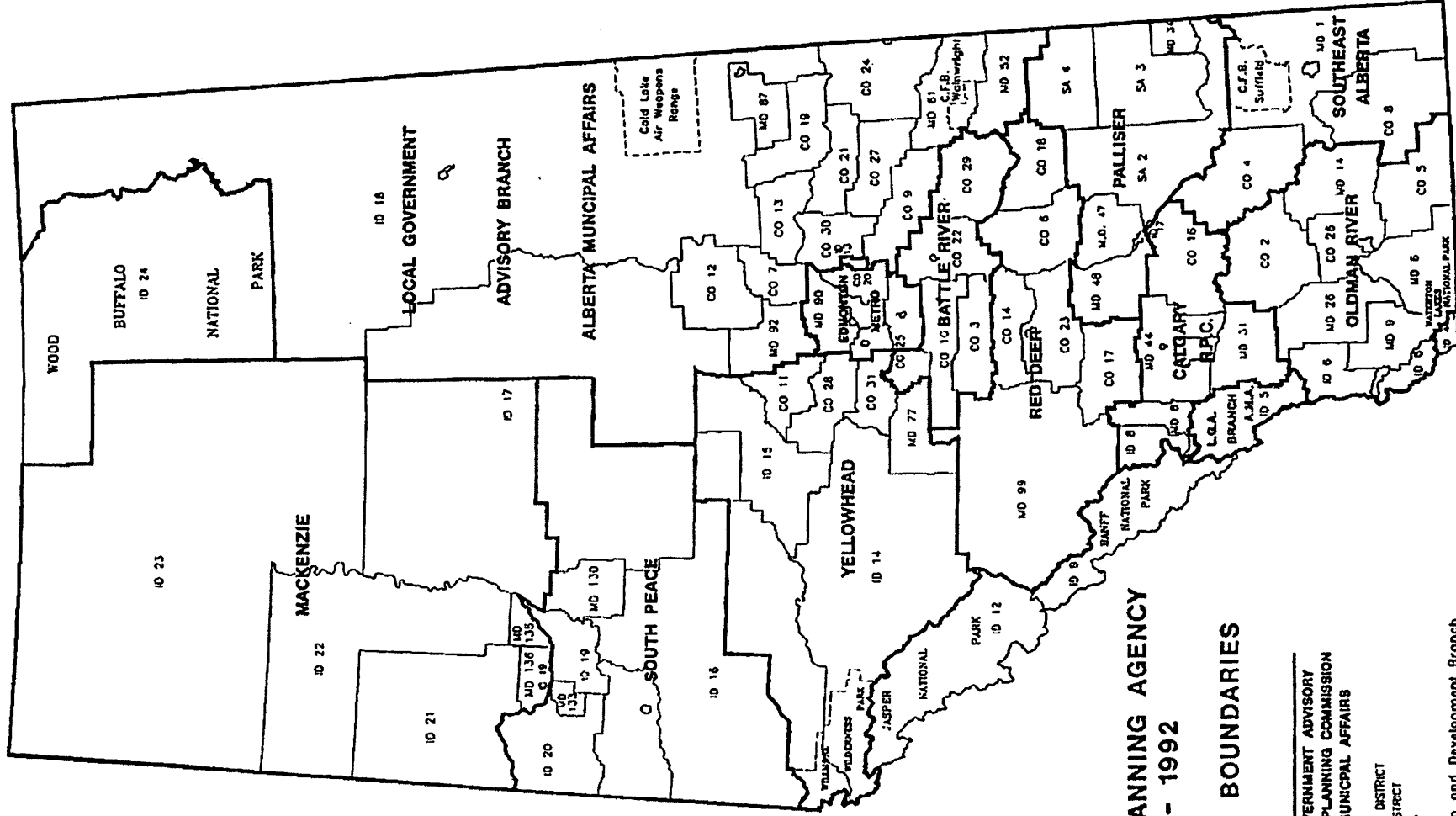
3.3 Summary by Region

In order to isolate development trends, additions and deletions are organized according to the geographical distribution of Alberta's 11 regional planning areas. These areas are represented by 10 Regional Planning Commissions (RPC's) and the Department of Municipal Affairs, which is responsible for land use planning in northeast Alberta (Figure 3). Table 4 provides a detailed summary of additions and deletions on rural lands within each of the province's planning areas.

Deletions occur throughout the settled area of the province. The more densely populated Edmonton—Calgary corridor shows the most intensive activity relating to annexations and country—residential subdivisions. While most deletions remain relatively constant for the 5 year study period, a few exceptions exist and have been noted:

- a) Calgary's 1989 urban annexation represented the single greatest deletion to the agricultural land base.
- b) Country residential subdivision activity in the Calgary RPC represents one—third of the provincial total, and
- c) Overall the Calgary RPC has the highest rate of development activity, occurring at a rate of 4:1 over the province's other urban planning centre, the Edmonton Metropolitan RPC. (Edmonton had more activity in previous years. This shows the cyclical nature of urban annexations.)

Additions occur primarily in the Peace River district. Combined, the Mackenzie and South Peace Regional Planning Commission areas accounted for about 70 percent of all additions. Most of these additions are permanent new lands from public land dispositions, which are found primarily along the fringes of the settled areas in northern Alberta. Fewer additions occurred within the central and southern RPC's. Additions within these more settled areas are largely the result of reclamation activities for temporary resource extraction purposes or oil and gas developments. Excluding the Calgary RPC, other relatively large net losses occurred in the Red Deer and Palliser RPC's, and northeast Alberta. These losses are primarily temporary disturbances due to oil and gas activity rather than the permanent types of losses normally associated with urban and residential uses.



Alberta
 AGRICULTURE, FOOD AND
 RURAL DEVELOPMENT

FIGURE 3
REGIONAL PLANNING AGENCY
BOUNDARIES - 1992
WITH
MUNICIPALITY BOUNDARIES

LEGEND

L.G.A.	-	LOCAL GOVERNMENT ADVISORY
R.P.C.	-	REGIONAL PLANNING COMMISSION
A.J.A.A.	-	ALBERTA MUNICIPAL AFFAIRS
CO	-	COUNTY
ID	-	IMPROVEMENT DISTRICT
MD	-	MUNICIPAL DISTRICT
SA	-	SPECIAL AREA

Compiled by: Conservation and Development Branch

TABLE 4. Agricultural Land Use Changes By Region (1986-1990)

	Mackenzie	South Peace	Yellowhead	Edmonton Metro	Battle River	Red Deer	Palliser	Calgary	Oldman River	S.E. Alberta	N.E. Alberta Municipal Affairs	Province
Addition												
Public Lands (P)	37,888	21,476	401	0	58	0	160	0	1,993	160	1,536	63,672
Abandoned Wells (T)	568	2,588	2,232	476	2,055	2,556	3,820	264	3,404	1,560	3,940	23,463
Reclamation (T)	7	18	840	171	410	915	208	114	242	77	356	3,358
Total	38,463	24,082	3,473	647	2,523	3,471	4,188	378	5,639	1,797	5,832	90,493
(%)	42.5	26.6	3.8	0.7	2.8	3.8	4.7	0.4	6.2	2.0	6.5	100
Deletion												
Oil and Gas Activity(T)	898	6,044	5,657	2,518	5,594	9,014	10,846	1,420	4,520	6,425	15,586	68,522
Urban Annexation (P)	236	163	0	1,308	540	616	881	40,671	450	4,247	2,801	51,913
Residential Sub. (P)	2,443	2,601	3,549	2,033	2,467	5,428	851	10,668	3,499	641	2,990	37,170
Resource Extraction (T)	197	860	1,863	661	1,557	2,234	734	947	1,172	438	3,180	13,843
Transportation (P)	1,605	1,211	1,641	729	570	2,219	801	1,221	1,178	867	1,181	13,223
Industrial/Commer. (P)	205	114	677	192	349	1,219	172	110	480	233	181	3,932
Public Service/Util. (P)	195	178	278	241	345	326	152	202	159	61	83	2,220
Total	5,779	11,171	13,665	7,682	11,422	21,056	14,437	55,239	11,458	12,912	26,002	190,823
(%)	3.0	5.9	7.2	4.0	6.0	11.0	7.6	28.9	6.0	6.8	13.6	100
Net Change	+32,685	+12,911	-10,192	-7,035	-8,899	-17,505	-10,249	-54,861	-5,820	-11,115	-20,169	-100,330

4. TREND ANALYSIS

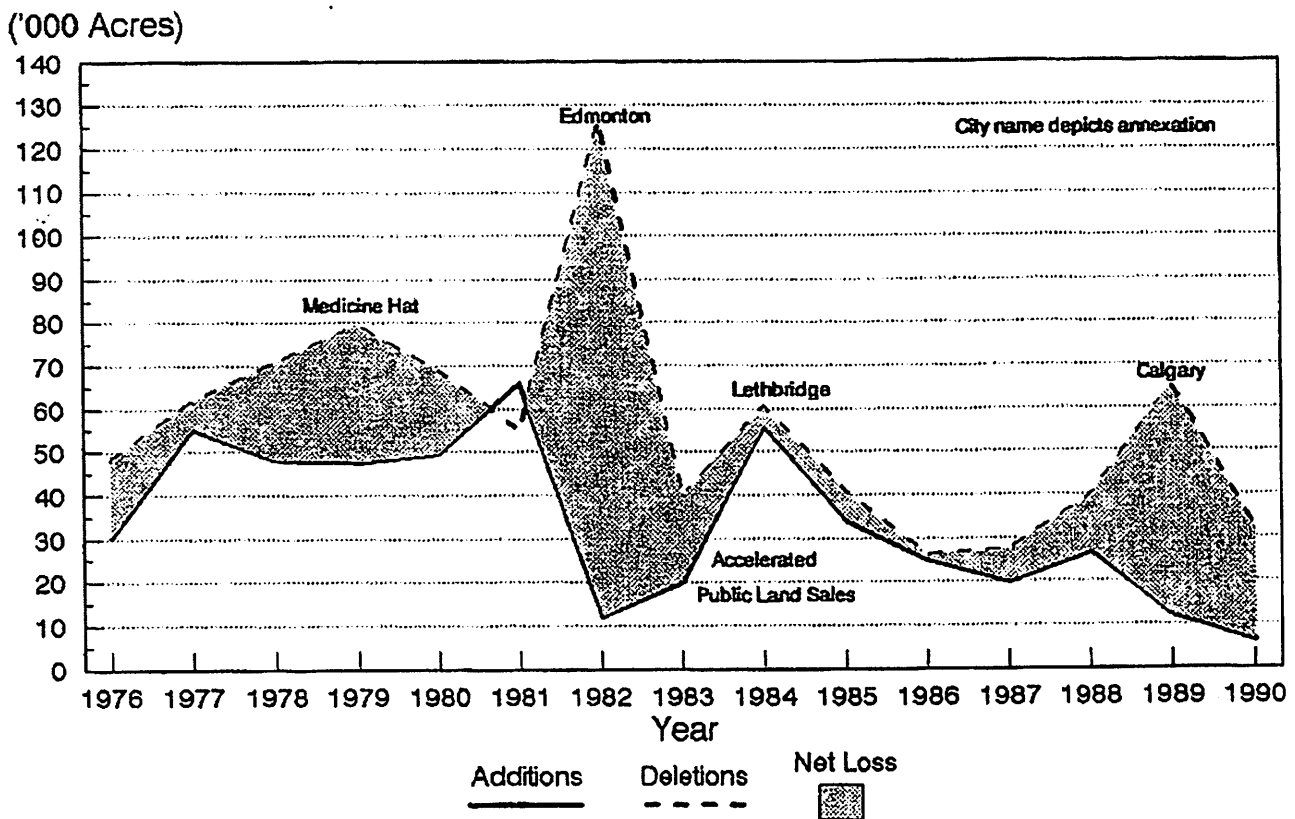
Fifteen years (1976-1990) of data focuses on changes by year, quality and regional variations.

4.1 Additions, Deletions and Net Loss

Figure 4 shows total additions and deletions over the 15 year study period. The net loss is illustrated as the shaded area between the two lines. From 1976 to 1990 the province experienced a net loss of 334,100 acres, averaging about 22,300 acres per year or 4/100 of one percent of the agricultural land base (Appendix 7.1).

Total additions closely reflect the acreage of new public land dispositions issued during a given year. The prominent peaks recorded for the deletions are attributable to large urban annexations. Two of the most significant annexations include the 86,000 acres allocated to the City of Edmonton's 1982 annexation and the 37,400 acres allocated to the City of Calgary's 1989 annexation. As fewer new agricultural lands (public lands) are made available for development, the annual net loss is expected to increase (unless there is an accompanying decrease in overall losses to non—agricultural developments).

Figure 4. Total Additions and Deletions 1976 - 1990

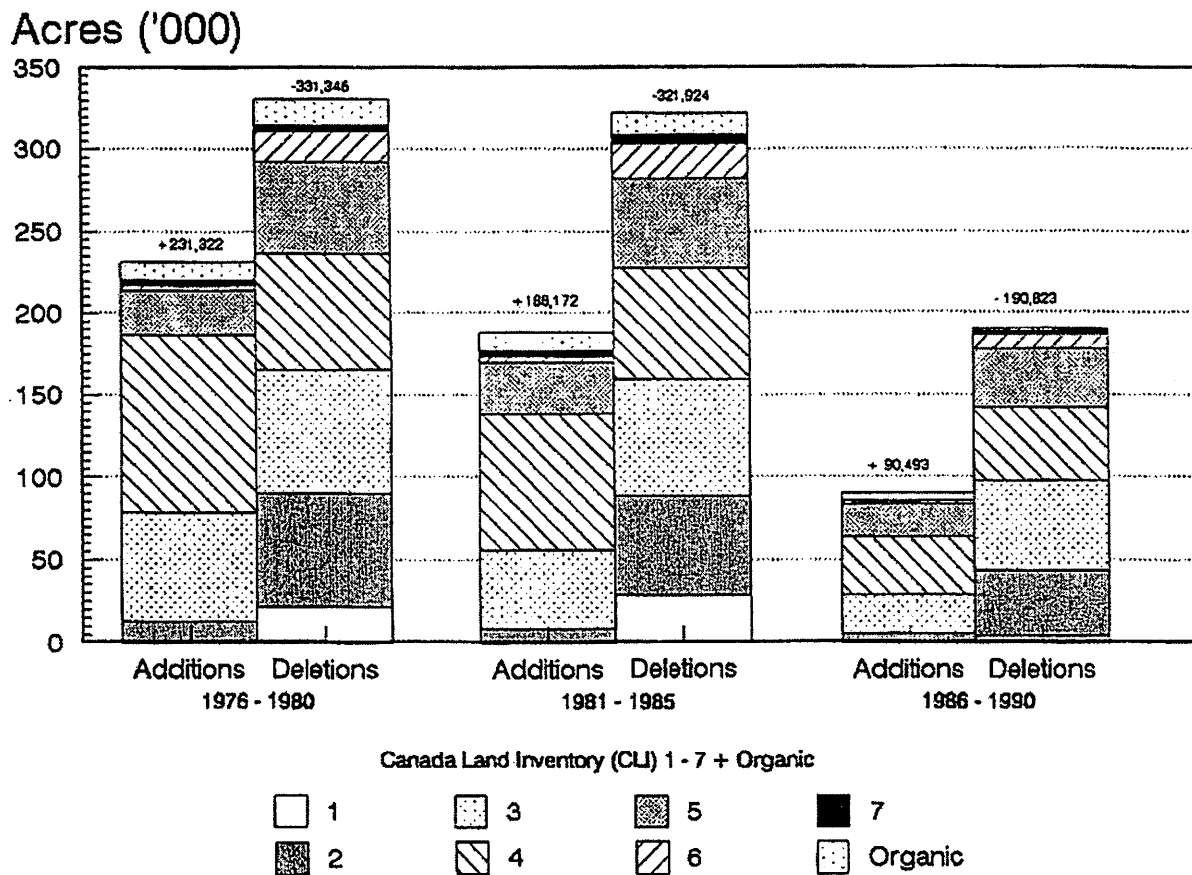


While Figure 4 gives useful trend information it fails to show the changes on a scale proportional to the overall land base. The vertical (y) axis of this graph currently depicts losses from 0 to 140,000 acres. In order to properly scale this graph in relation to the total provincial agricultural land base (52 million acres), the vertical axis must be extended about 370 times the length shown here.

4.2 Land Quality

Figure 5 shows additions and deletions within CLI classes for each of the previous 5 year study periods. As reported in previous studies, the trend continues to indicate a very slight decline in the overall quality of the agricultural land base. Most additions occurred on CLI 3, 4 and 5 soils, while most of the deletions are reported on CLI 2, 3, 4 and 5 soils. Figure 5 also illustrates that the overall additions and deletions are declining over time. Appendix 7.2 shows total acreage change for each CLI class.

Figure 5. Total Additions and Deletions by CLI Class



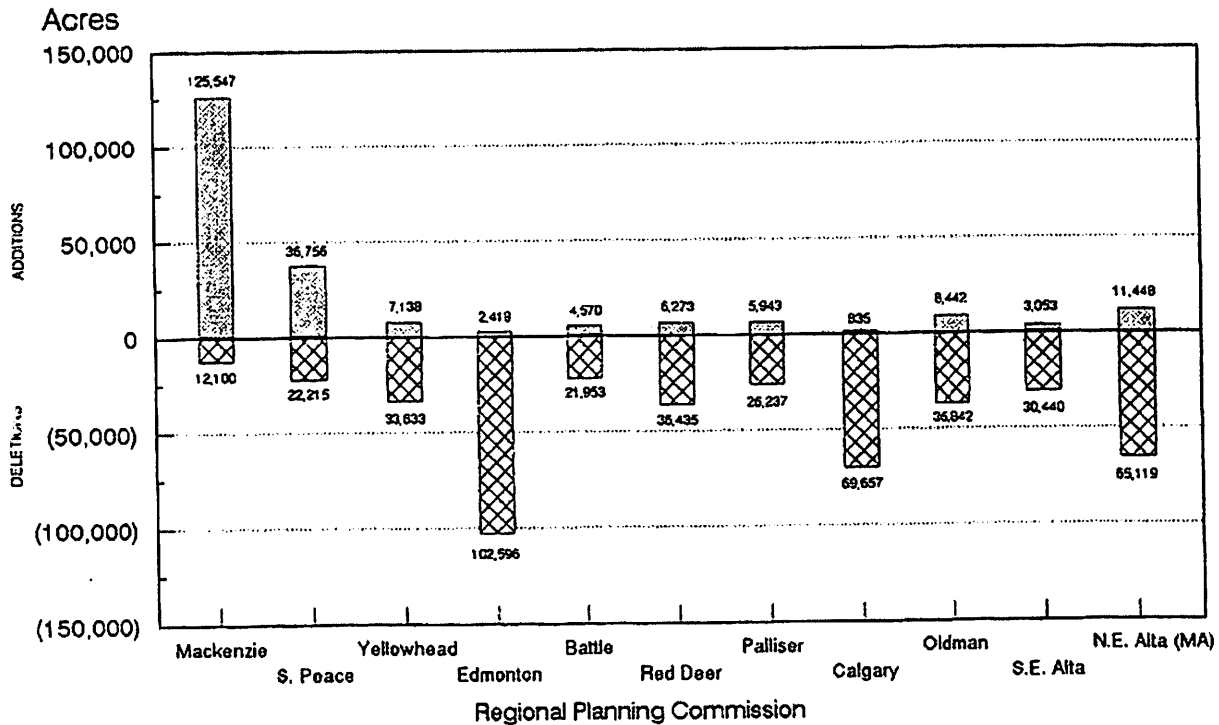
4.3 Regional Variation

Figure 6 shows trends by Regional Planning Commission area from 1982-1990. Data by Regional Planning Commission area is not available for the years 1976-1981. Acreage values for land use changes by region are shown in Appendix 7.3.

While considerable regional variations exist, trend analysis confirms that most new agricultural land is added along the fringe of the settled areas in northern Alberta, while most of the lands are lost in the south—central areas. Only two areas, the Mackenzie and South Peace Regional Planning Commissions, experienced a net increase to their agricultural land bases over the past decade.

Urban annexations and oil and gas activity are major deletions to the agricultural land base. Figures for annexations within the Edmonton Metropolitan and Calgary Regional Planning Commission areas support the public's perception that most agricultural land is lost near large urban centres within in the Edmonton—Calgary corridor. Over half of the losses recorded in the North East Region are the result of increased oil and gas activity since 1982.

Figure 6. Agricultural Land Use Changes by Region 1982-1990



4.4 Other Observations

The past seven years of study (1984-1990) has shown a dramatic decline in public land sales in the province. This trend is likely to continue until little or no public land is made available for private sale for agricultural purposes. Quarter sections (160 acres) of public land along the settled fringe will continue to be sold if there are no special conservation concerns and the land is not required for wildlife habitat, recreation or forestry purposes. However, future large—scale public land developments in northern Alberta are unlikely in the foreseeable future due to other resource (primarily forestry) commitments.

Based on an assessment of recent urban annexations, the Local Authorities Board will usually approve annexations that provide land for up to thirty years of uninterrupted urban growth. As the cities of Calgary, Edmonton, Lethbridge, Leduc, Airdrie, Camrose, Medicine Hat and Lloydminster have undergone major annexations in the past few years, there should be fewer agricultural lands lost to urban developments during the next 10 to 15 years. If past urban growth projections prove to be overly optimistic, the previously annexed lands may provide for even longer term needs. Several other cities (such as Red Deer, Spruce Grove, Wetaskiwin and Grande Prairie) have annexed land since 1990 or may require additional lands in the near future, however, fewer acres are anticipated due to lower urban growth rates and these cities' smaller sizes.

5. ISSUES RAISED DURING THE MONITORING STUDY

Unfortunately, periodical monitoring of the agricultural land base does not accurately reflect the extent to which non—agricultural subdivisions can affect the agricultural industry. While Alberta's rural land base would be largely unaffected by the losses to non—agricultural land uses, the agricultural industry may not. The agricultural industry can be directly affected when subdivisions incompatible with traditional agricultural pursuits are permitted to occur within rural areas. In these instances it is not the absolute net change in acreage, which concerns the agricultural industry, but rather the dispersed pattern of non—agricultural subdivisions.

5.1 Dispersed Subdivisions and Incompatible Land Uses

Figures 7 and 8 illustrate the potential impacts of non—agricultural country residential subdivisions within the rural landscape. While the losses to the agricultural land base in each of these examples represent less than one percent of the area illustrated, they visually portray different impacts on the agricultural industry. In Figure 7, conflicts between potentially incompatible land uses may reduce the ability of the agricultural industry to diversify or expand, or, in a worst case scenario, result in the premature closure of some operations. Figure 8, on the other hand, shows an example of clustered single and multiple residential subdivisions in the rural area. Clustered subdivisions would be more economical to service and would decrease the potential for conflicts between non—agricultural residents and the existing and future agricultural activities within the surrounding land base. This issue is important to the province's livestock industry.

Given the diversity of today's agricultural products, it is important to recognize that most rural lands are valuable to various elements of the agricultural industry. Future planning activities must recognize the importance of agricultural lands for both cropping and livestock purposes and understand the types of developments, which accompany these activities. Greater priority should be given to ensuring that proposed non—agricultural developments are directed towards areas where they are compatible with the existing agricultural land uses. While the infill⁸ of existing country residential subdivisions or city annexations may use some high quality agricultural lands, the future agricultural use of these lands will most likely be limited because of the adjacent urban development. Using these lands for non—agricultural uses may be more desirable than leap—frog developments that affect entirely new agricultural areas.

5.2 Importance of Lower Capability CLI Land

In the past, the Department of Agriculture, Food and Rural Development has supported the protection of "higher capability CLI agricultural land" as a major goal in land use planning. The Planning Act, through its subdivision regulations, also attempts to protect higher quality agricultural land. Where developments could logically be located into either of two locations, the development is directed towards the lower quality site. This goal continues to have some merit as higher capability CLI lands are valuable to the cereal cropping

Figure 7. Example of Dispersed Subdivisions in a Rural Area

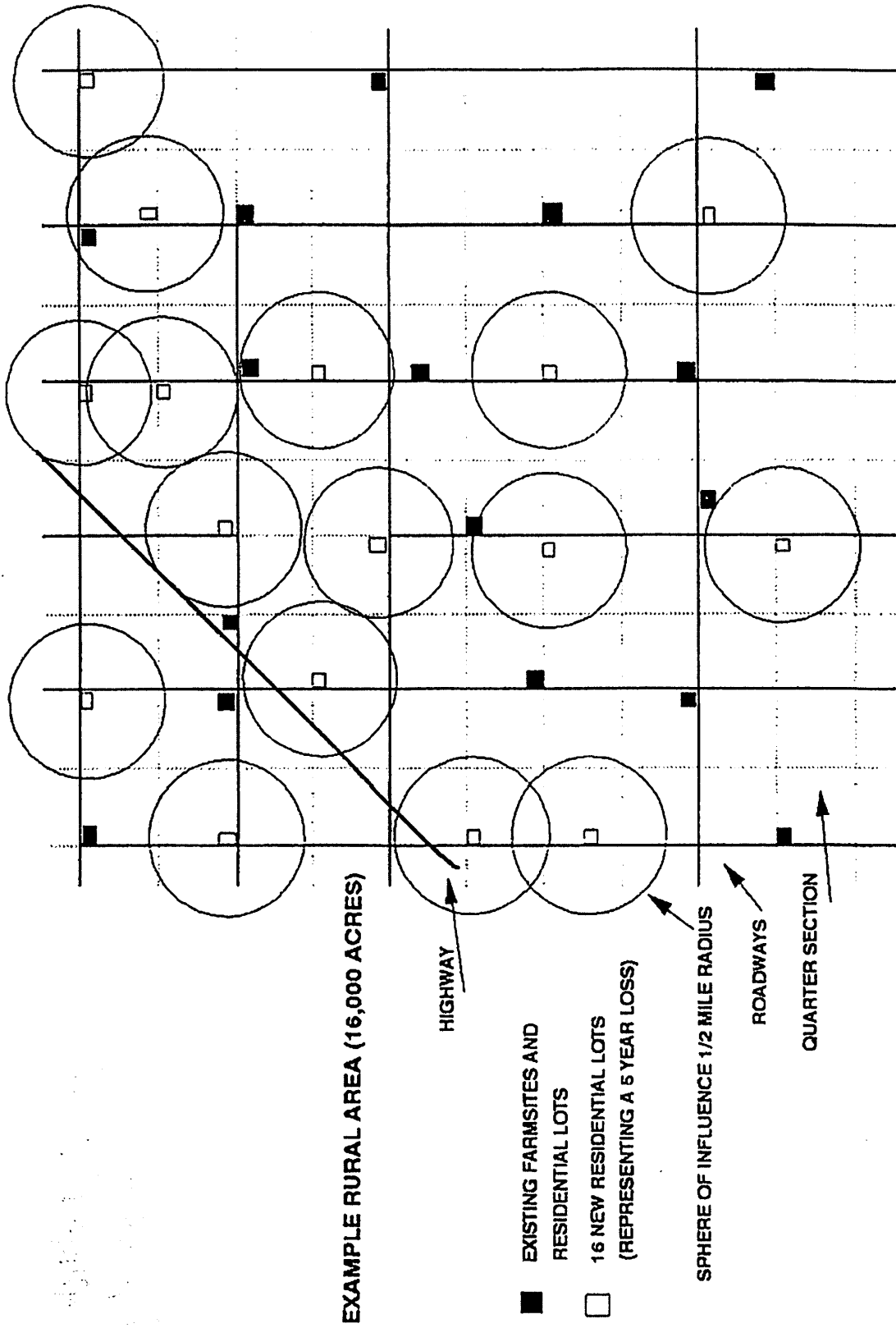
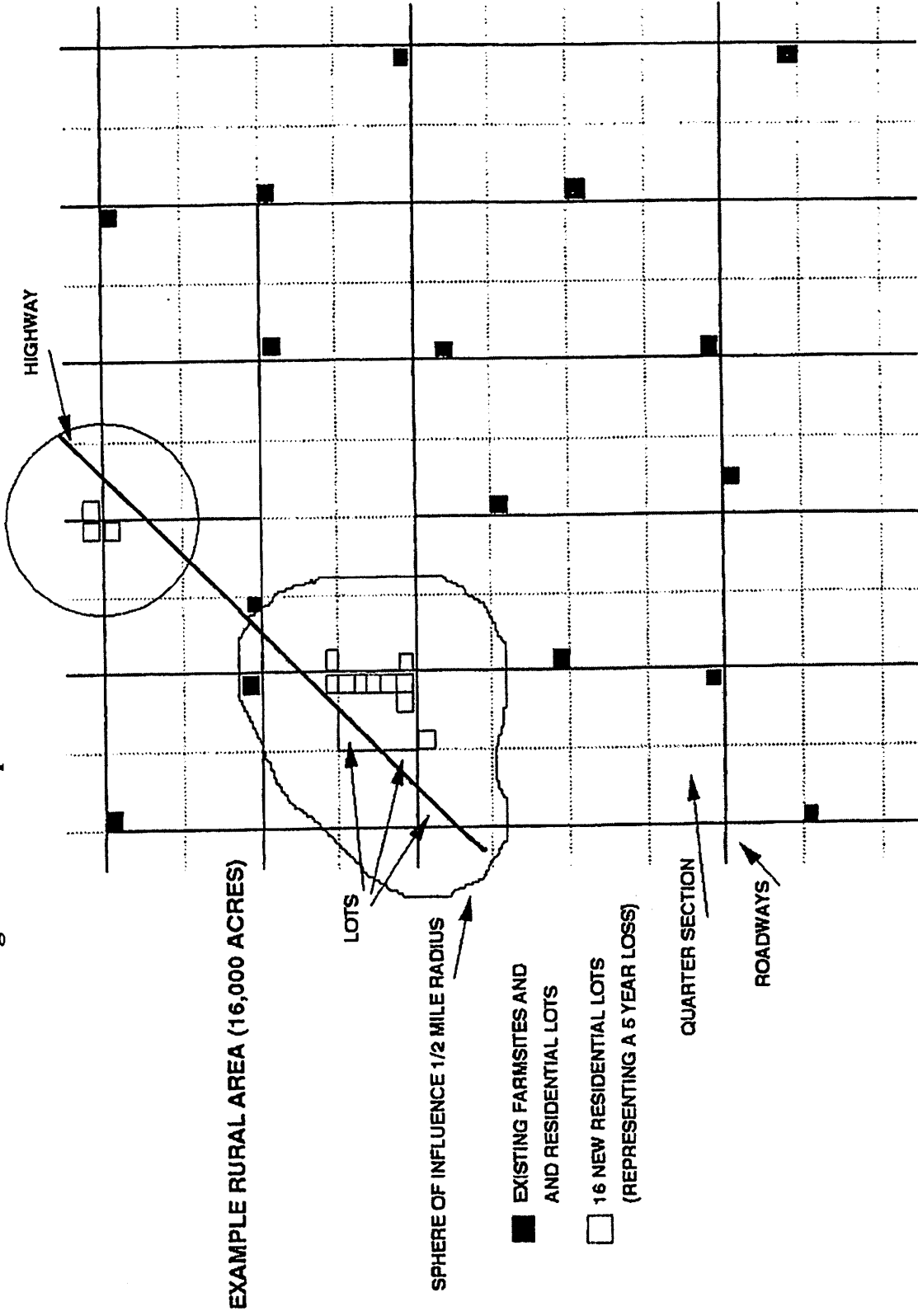


Figure 8. Example of Cluster Subdivisions in a Rural Area



sector. The crop sector currently (1990) accounts for 44 percent or \$1.9 billion of Alberta's farm cash receipts.

Land quality directly affects the productivity and the competitiveness of the industry. However, land quality affects many sectors within the industry in very different ways. For example, livestock operations are often situated on lands described as having a lower capability for cereal crop production but which in fact have a high capability for livestock and forage production. Past decisions to direct country residential subdivisions towards lower capability CLI agricultural land, without due consideration of the existing agricultural activities, may have inadvertently created land use conflicts by bringing new residential developments into close proximity with livestock operations. Valuable water sources and shelter areas may have been lost and large, continuous tracts of rangeland are broken up with subdivisions. The livestock sector currently (1990) accounts for 56 percent or \$2.4 billion of our farm cash receipts.

5.3 Agriculture, Food and Rural Development's Planning Guidelines

Alberta's Planning Act is intended to achieve orderly development without infringing on the rights of individuals, except to the extent that is necessary for the greater public good. This often requires that land use planning decisions balance a variety of economic, social and environmental interests. It must be recognized that all of these competing land uses benefit the province. The challenge is to maximize the benefits from these new development opportunities while minimizing the impacts (costs) to existing agricultural uses. This approach will strengthen, not weaken rural communities.

Because of the comparatively small acreage lost annually, it has not been necessary to introduce stronger regulatory mechanisms, such as land banks or reserves, to freeze agricultural land from urban, commercial or industrial developments. Alberta Agriculture, Food and Rural Development supports the existing land use planning system as the most appropriate mechanism for protecting agricultural land. However, as described earlier, there are historical problems associated with dispersed and incompatible land uses and with the planning system's dependence on CLI to determine agricultural capability. This problem is further enhanced by CLI being used as the primary determinant for subdivision land use decisions.

The capability of agricultural land depends on more than its CLI rating. As previously mentioned the agricultural industry depends on a variety of CLI classes. CLI is one tool, which is primarily designed to measure the land's capability for cereal crop production. Other tools, such as an examination of current land uses, forage and other crop production⁸ capability, the minimum distance separation formula, market proximity and the availability of shelter and water sources should also be considered when assessing agricultural capability. Municipal assessments and existing mapping projects will provide some of the information necessary to better assess the agricultural capability and the current land uses.

The system can be made more responsive to industry by broadening the criteria that defines "high quality agricultural lands" and by placing an increased emphasis on ensuring that new developments are compatible with the existing agricultural land uses. Alberta Agriculture, Food and Rural Development encourages planning agencies to adopt the following planning guidelines:

1. to define, identify and protect higher quality agricultural areas from non—agricultural development;
2. to prevent the premature conversion of agricultural lands to non—agricultural uses; and
3. to direct non—agricultural development towards lower quality agricultural areas or towards areas where future agricultural land uses are limited;
4. to minimize land use conflicts between agricultural land uses and their farm and non—farm neighbours.

Improved land information systems should enhance the type and variety of information available for decision makers. Both "detailed" resource (topography, soil, water, etc.) and "big picture" land use information (industries, neighbourhoods, roads, utilities, area structure plans, etc.) information will help minimize the impact of new developments on the agricultural industry. The introduction and use of the computerized Land Information Alberta (LIA) system will be an important new planning tool for all regional and municipal planning activities.

6. SUMMARY AND CONCLUSIONS

6.1 1986-1990 Study

The Agricultural Land Base Monitoring Study examined additions and deletions to the agricultural land base from 1986-1990. During this period Alberta experienced a total net loss of approximately 100,000 acres of agricultural land, or about 20,000 acres per year. The annual net loss represents less than 4/100 of one percent of Alberta's 52 million acres of farmland.

Most deletions occur when higher capability CLI class 1-3 soils are used for residential or energy-related developments within the settled central and southern regions of the province. Permanent losses are normally associated with urban annexations and country residential subdivisions. Energy-related developments are considered temporary disturbances which are later reclaimed and returned to agricultural production. Additions to the agricultural land base occur primarily in northern Alberta or along the fringes of the settled areas. Additions are normally characterized as lower capability CLI class 4-6 soils, the majority of which are recently allocated public lands.

Historical settlement patterns continue to bring agricultural land and land uses into conflict with various commercial, industrial, recreational and residential developments. Most urban centres were originally sited on or around some of the province's best agricultural lands. As these urban communities grow, agricultural lands are converted to other important economic land uses. The use of agricultural lands within the urban fringe is largely influenced by the rate of urban growth. Recently annexed land tends to remain as farmland until required for urban development. Agricultural production within the cities often diversifies the local economy as farmers access speciality markets. However, many "rural" areas which are immediately adjacent to the larger urban centres have now become more "urban" in nature.

There is a perception that the loss of agricultural land may affect Alberta's ability to produce food for our domestic and export markets. Accordingly, people feel that immediate and strong action is required to freeze and protect agricultural land from development. It is generally recognized that Alberta will continue to lose small amounts of agricultural land, in all CLI classes, and from this point forward there is likely to be less new agricultural lands brought into production to offset these losses. However, considering the comparatively small amount of land, which is annually withdrawn from production (4/100 of one percent), the agricultural land base is not in jeopardy. Accordingly stronger regulatory mechanisms, such as land reserves and land banks, have not been required in Alberta.

6.2 Future Agricultural Land Base Monitoring Studies

The Agricultural Land Base Monitoring Study is the fourth in a series of reports, which have examined additions and deletions to the agricultural land base from 1976 to present. An analysis

of trends during this fifteen year period confirms that little land is actually being withdrawn from agricultural production on an annual basis. It is important to note that on a provincial scale, the vast majority of Alberta's agricultural land base experienced little or no change. Continued monitoring of land base changes should reduce concerns that Alberta's agricultural land base is in immediate or long—term jeopardy, provide a long—term data source, help to better focus local, regional and provincial planning efforts and to increase Alberta Agriculture, Food and Rural Development's communication with rural planning agencies.

Every change to the land base brings costs and benefits to individuals and society. A proper balance is essential. The loss of agricultural lands brings increased economic activity in other industries, employment and the tax base. However, it can also bring conflicts with adjacent land uses, increased servicing costs, groundwater depletions and changes to the rural character of the area. These types of issues may negatively impact the agricultural industry more than the actual acres lost. The goal should be to maximize the benefits of any proposed new development while minimizing the cost (impact) to the existing agricultural land uses. Future monitoring studies should consider assessing the impact of non—agricultural developments on the agricultural industry and evaluating areas experiencing tremendous urban growth to ensure orderly and efficient development.

Appendix 7.1

TOTAL AGRICULTURAL LAND USE CHANGES BY YEAR (1976 – 1990)

	('000 acres)														
	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Additions															
Public Land Disposition (P)	29.7	54.8	44.4	42.7	44.2	61.0	7.3	15.9	50.3	28.5	20.7	14.4	19.9	7.2	1.5
Abandoned Well/sites (T)	0.4	0.2	3.3	4.5	5.1	4.6	3.9	3.2	4.7	4.8	3.8	4.9	6.3	4.5	4.0
Reclamation (T)	0.2	0.3	0.5	0.6	0.4	0.6	0.9	0.8	1.1	0.6	0.6	0.8	0.7	0.6	0.6
Total Additions	30.3	55.3	48.2	47.8	49.7	66.2	12.1	19.9	56.1	33.9	25.1	20.1	26.9	12.3	6.1
Deletions															
Urban Annexation (P)	7.0	8.4	17.8	34.7	23.0	8.6	92.1	12.7	29.7	5.6	3.6	1.1	8.8	37.8	0.7
Oil & Gas Activity (T)	21.3	21.1	19.4	18.4	22.9	19.1	18.4	12.6	17.6	25.0	9.6	14.1	17.0	13.5	14.3
Residential Subdivision (P)	9.2	19.9	21.2	16.9	11.3	15.6	7.0	5.6	4.3	3.5	5.8	5.8	6.7	8.5	10.4
Transportation (P)	5.4	5.1	5.2	3.5	5.9	5.0	4.5	4.6	5.3	3.0	3.5	2.3	3.2	1.9	2.3
Resource Extraction (T)	2.7	2.6	2.9	2.9	3.1	2.9	2.6	2.4	2.6	2.6	2.7	3.0	2.8	2.3	3.0
Industrial/Commercial (P)	2.1	4.1	3.4	2.8	2.3	2.9	1.2	1.1	0.8	0.6	0.6	0.9	0.8	0.6	1.0
Public Service/Utility (P)	0.9	1.2	1.3	0.6	0.8	0.9	0.5	0.4	0.3	0.3	0.5	0.3	0.5	0.3	0.6
Total Deletions	48.6	62.4	71.2	79.8	69.3	55.0	126.3	39.4	60.6	40.6	26.2	27.4	39.8	64.9	32.2
NET CHANGE	-18.3	-7.1	-23.0	-32.0	-19.6	+11.2	-114.2	-19.5	-4.5	-6.7	-1.1	-7.3	-12.9	-52.6	-26.1

Appendix 7.2

AGRICULTURAL LAND USE CHANGES BY CLI Class (1976 – 1990)

CLI	1	2	3	4	5	6	7	0	Total
Additions									
Public Land Disposition (P)	567	12,773	120,065	208,046	64,992	4,116	6,596	25,916	443,071
Abandoned Well/sites (T)	2,080	9,702	13,866	15,228	11,861	3,327	891	714	57,669
Reclamation (T)	63	1,812	2,946	2,130	1,711	512	53	6	9,233
Total Additions	2,710	24,287	136,877	225,404	78,564	7,955	7,540	26,636	509,973
Deletions									
Urban Annexation (P)	34,712	80,731	75,693	44,860	28,415	13,935	4,261	8,902	291,509
Oil & Gas Activity (T)	7,710	39,917	53,626	66,546	60,757	16,330	3,469	16,454	264,809
Residential Subdivision (P)	6,978	26,868	38,471	38,635	28,979	8,589	1,334	1,785	151,641
Transportation (P)	2,837	9,744	14,748	15,290	9,678	3,735	1,396	3,312	60,740
Resource Extraction (T)	1,056	5,592	9,737	8,828	10,703	4,394	540	473	41,323
Industrial/Commercial (P)	1,003	4,055	6,195	6,581	5,268	1,473	295	300	25,170
Public Service/Utility (P)	277	1,268	2,254	2,445	1,701	777	79	100	8,900
Total Deletions	54,573	168,175	200,724	183,185	145,501	49,223	11,374	31,326	844,091
NET CHANGE	-51,863	-143,888	-63,847	142,219	-66,937	-41,278	-3,834	-4,692	-334,118

Appendix 7.3

AGRICULTURAL LAND USE CHANGES BY Region (1982 - 1990)

	Mackenzie	South Peace	Yellowhead	Edmonton Metro	Battle River	Red Deer	Palliser	Calgary	Oldman River	S.E. Alberta	N.E. Alberta Municipal Affairs	Province
Additions												
Public Land Disposition (P)	124,354	32,313	1,562	1,115	58	0	160	157	2,309	160	3,490	165,678
Abandoned Well-sites (T)	1,180	4,412	3,824	996	3,235	4,688	5,304	474	5,698	2,756	7,432	39,999
Reclamation (T)	13	31	1,752	307	1,277	1,585	479	204	435	137	526	6,476
Total Additions	125,547	36,756	7,138	2,418	4,570	6,273	5,943	835	8,442	3,053	11,448	212,423
Deletions												
Urban Annexation (P)	1,602	165	7,772	89,646	1,243	1,037	3,459	51,289	18,257	10,799	6,777	192,046
Oil & Gas Activity (T)	2,574	12,163	10,759	6,070	10,999	18,394	17,149	2,906	8,674	14,959	37,451	142,098
Residential Subdivision (P)	4,515	4,840	6,536	2,907	4,098	7,461	1,439	11,639	4,312	1,083	8,967	57,797
Transportation (P)	2,510	3,534	3,529	1,859	1,314	3,158	2,349	1,667	2,586	2,124	6,015	30,645
Resource Extraction (T)	357	982	3,696	1,187	2,986	4,022	1,393	1,702	2,110	790	4,790	24,015
Industrial/Commercial (P)	246	294	1,007	601	786	1,923	275	152	654	529	644	7,111
Public Service/Utility (P)	296	237	334	326	527	440	173	302	249	156	475	3,515
Total Deletions	12,100	22,215	33,633	102,596	21,953	36,435	26,237	69,657	36,842	30,440	65,119	457,227
NET CHANGE	+113,447	+14,541	-26,495	-100,178	-17,383	-30,162	-20,294	-68,822	-28,400	-27,387	-53,671	-244,800