

BASELINE (1985) HABITAT ESTIMATES FOR THE SETTLED PORTIONS
OF THE PRAIRIE PROVINCES

Report #13: Saskatchewan Mid-Boreal Transition
Prairie Habitat Monitoring Project

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ABSTRACT

This report presents data for six transects in six physiographic units in the Saskatchewan Mid-Boreal Transition Ecoregion. Partial data are also presented for one unit which is sampled only in the Manitoba portion of the unit. Collectively these seven units account for just over two thirds of the total area of the ecoregion.

Attempts to analyse the habitat data with standard statistical methods have shown that the data are highly variable and frequently skewed to the point where these techniques cannot be legitimately used. As a result, caution must be used in interpreting apparent habitat differences and habitat values extrapolated from sample means for physiographic units. The accuracy of extrapolated habitat values in the Mid-Boreal Transition is even more variable than it is for data from more southerly ecoregions because this ecoregion is at the northern edge of settlement and several units contain large blocks of totally undeveloped land which have not been sampled.

Distribution of sampling amongst soil parent material categories is, with the exception of fluvial areas, quite close to the level of occurrence of those categories within the Saskatchewan Mid-Boreal Transition and the relationships remain reasonably close even when further subdivisions on the basis of surface form are introduced.

For the ecoregion sample as a whole:

- (a) Wetland area averages 9.2 percent of the total land area

of sampled physiographic units. This is close to the top of the range recorded so far in this study.

(b) Four of the sampled units are on predominantly morainal landforms, one is on predominantly lacustrine material and one is on eolian terrain.

(c) A large proportion of wetland area (71.3 percent) and an overwhelming proportion of wetland numbers (94.8 percent) are temporary or seasonal in nature.

(d) Almost a fifth (17.7 percent) of the wetland area and 1.6 percent of wetland numbers are classed as permanent water (natural, fresh open water). Most of this is concentrated in three of the seven sampled units.

(e) Half (49.7 percent) of the wetland area is not subjected to any human use. Grazing occurs on 21.1 percent of the wetland area.

(f) Two thirds (67.6 percent) of the total upland area is in annual crops. Native cover occurs on 24.1 percent of the uplands.

(g) Grazing occurs on 10.5 percent of the uplands.

(h) Two sampled morainal physiographic units, the Thickwood Hills and Barrier River Upland, are rated as being class one habitat for waterfowl production. The Thickwood Hills retains this level even when rated by benchmark Alberta Parkland criteria.

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I. Objective

The objective of this portion of the Prairie Habitat Monitoring Project is to establish baseline habitat values for long-term monitoring sites and to generate estimates of the current distribution and quality of each of a variety of habitat (cover) and land use classes in individual physiographic units (habitat subregions) within each of the ecoregions in the settled portions of the three Prairie Provinces.

II. Introduction

The quality and quantity of prairie migratory bird habitat has progressively declined since the time of settlement. A variety of studies have documented this decline for specific locations and time periods (Millar 1989a) but the rate of loss (and hence the severity of the problem) across the prairies as a whole is largely unknown. There is a need to monitor trends in habitat loss in the various prairie ecoregions to ensure that habitat conservation programs address the areas of primary concern and that elected officials are equipped with current, factual information as a basis for directing land management policy. The initiation of the North

American Waterfowl Management Plan will most certainly increase the demand for habitat monitoring information.

Effective measurement of habitat change is dependent upon the availability of a baseline record of current conditions against which future observations can be compared. The establishment of such a baseline record is therefore an essential first step in the development of a habitat monitoring program and the determination of habitat trends. The data presented in this report represent one segment of a more comprehensive effort to establish this baseline record, expanding on the results of earlier pilot studies (Millar 1986).

III. Methods

Most of the methods employed in this project have already been described in detail in Report #1 of this series (Millar 1987). Changes in methodology developed since that time have been summarized in Report #4 (Millar 1992a). In this report only methodology relating specifically to the Saskatchewan Mid-Boreal Transition will be discussed.

A. Delineation of Physiographic Units

Changes in unit boundaries from those delineated by Adams (1985) - All physiographic units in Saskatchewan Mid-Boreal Transition have been remapped and most now have some significantly different boundaries from those delineated by Adams.

Creation and deletion of physiographic units - In Saskatchewan Mid-Boreal Transition three new physiographic units have been created. The Mt. Nebo Outwash (7.38) is a rough fluvial area which

has been separated out of the Shell Lake Plain (7.16) primarily on the basis of surface form. The Ft. Pitt Plain (7.39) has been delineated out of the Thickwood Hills (7.13) on the basis of soil parent material (fluvial). The Upper Red Deer River Plain (7.40) has been created out of portions of the Barrier River Upland (7.20), the Red Deer River Plain (7.21) and Porcupine Upland (7.22) on the basis of soil parent material. The original Red Deer River Plain (7.21) has been renamed the Lower Red Deer River Plain and retains the same unit number.

B. Sampling Network

One of the six transects located in the Saskatchewan Mid-Boreal Transition is the product of transect splitting. This has involved a split between parkland and transition ecoregions.

Two sampled physiographic units straddle the Saskatchewan-Manitoba boundary. One of these, the Lower Red Deer River Plain (7.21), is sampled in the Saskatchewan portion of the unit. The other, the Lac La Course Plain (7.23), is sampled in the Manitoba portion of the unit. Data from this latter transect are included in parts of this report to permit extrapolation of the sample data to the area of the unit located in Saskatchewan. A third sampled unit, the Thickwood Hills (7.13), straddles the Saskatchewan-Alberta boundary and is sampled in the Saskatchewan portion of the unit.

C. Rating of Sampled Morainal Physiographic Units as Waterfowl Production Habitat

For each of seven habitat factors one point is given if the

value for the unit exceeds a designated minimum. Minimums have arbitrarily been established at approximately half the maximum observed level for each factor within the ecoregion. No attempt has been made to assign greater importance to one factor over another, except that a unit is downgraded by one level if it loses points for both semi-permanent (bulrush/cattail) and permanent (natural fresh open water) wetlands which are considered critical for brood production.

The minimum rating values for Saskatchewan Mid-Boreal Transition are as follows:

1. Total wetland area - 6.2 percent of total land area.
2. Grassy wetland cover - 30 percent of total wetland area.
3. Bulrush/cattail cover - 2.5 percent of total wetland area.
4. Natural fresh open water wetlands - 5.4 percent of total wetland area. (One aberrantly large value (Table 22) was not included in calculating the minimum.)
5. Unused wetlands - 30 percent of total wetland area.
6. Shrubby and grassy upland cover - 15 percent of total upland area.
7. Unused uplands - 11 percent of total upland area.

Rating Scale

The possible point range of zero to seven has arbitrarily been divided into four categories on the following basis:

<u>Number of Points Given the Unit</u>	<u>Rating</u>
6 - 7	1
4 - 5	2
2 - 3	3
0 - 1	4

IV. Results and Discussion

A. General Information on Saskatchewan Mid-Boreal Transition

1. Ecoregion Area and Distribution of Sampled Units

The total area occupied by the Saskatchewan Mid-Boreal Transition is calculated to be approximately 3,211,500 hectares (Table 1), based on the boundaries of physiographic units lying wholly or predominantly within the ecoregion. The area calculated in this manner will differ somewhat from the area of the ecoregion when calculated on the basis of surveyed and redefined vegetation boundaries. A comparison of these values still needs to be made.

Six physiographic units which have been sampled with habitat monitoring transects, including one which has been sampled only in the Manitoba portion of the unit, account for just over two thirds (68.9 percent) of the total area of the ecoregion. This is about the middle of the range (36.4 to 96.8 percent) of the percent of ecoregion areas to be sampled so far in this study. Unsampled units cover 26.1 percent of the ecoregion. Major river and stream valleys as well as lakes and urban areas larger than 500 hectares have been excluded from the area of physiographic units and collectively comprise 5.0 percent of the total area of the ecoregion.

2. Distribution of Landforms in the Ecoregion

The distribution of various landforms in Saskatchewan Mid-Boreal Transition is summarized in Table 2. Morainal terrain occupies almost two thirds (65.9 percent) of the total area of physiographic units in the ecoregion and 84.1 percent of that area

is in units currently being sampled in this study. Slightly less than half (44.2 percent) of the morainal area is made up of knob and kettle surface form. Undulating ground moraine accounts for just over half (53.3 percent) and dissected surface form 2.5 percent of the morainal terrain. Over two thirds (69.8 percent) of the knob and kettle terrain is in units which have been sampled while all of the units with undulating surface form have been sampled. None of the dissected morainal terrain has been sampled.

Only 12.8 percent of the land in physiographic units is on predominantly lacustrine parent material. Most (85.0 percent) of the lacustrine terrain has dissected topography and that is all in the unit which has been sampled. The remainder of the lacustrine terrain has an undulating surface form and none of that has been sampled.

Some 12.1 percent of land in physiographic units is on predominantly fluvial material. None of this area is in units which have been sampled.

The remaining 9.2 percent of the land in physiographic units is on predominantly eolian terrain and two thirds (66.9 percent) of that is in a unit which has been sampled.

The distribution of habitat sampling between various soil parent material and landform categories is also shown in Table 2. The relationship between distribution of sampling effort and distribution of all soil parent materials, except fluvial, in the ecoregion is quite close and when surface form is added most of the relationships still remain reasonably close.

3. Location and Landform Character of Individual Physiographic Units

Figure 1 shows the location of all physiographic units in Saskatchewan Mid-Boreal Transition including both those covered in this report and units which have not been sampled at all.

This report presents baseline habitat data for six sample sites located in six physiographic units in Saskatchewan Mid-Boreal Transition. In addition, partial data are also presented for one transect located in the Manitoba portion of a seventh unit which straddles the Saskatchewan-Manitoba boundary.

Individual units and the transects located in them are listed in Table 3. Collectively the seven units in the Transition Ecoregion comprise an area of approximately 2,212,900 hectares (Table 1) or about 68.9 percent of the total Saskatchewan Mid-Boreal Transition Ecoregion.

Origin of soil parent material and surface form for the seven transition units are also summarized in Table 3. Five of the units are entirely or predominantly of morainal origin. One is on predominantly lacustrine and one on eolian material. Two of the morainal units have predominantly knob and kettle surface form and three are on undulating ground moraine. The lacustrine unit is on dissected terrain and the eolian unit has a predominantly hummocky surface form.

The nine physiographic units in Saskatchewan Mid-Boreal Transition which have not been sampled to date are summarized in Table 4 as to their soil parent material, surface form and area.

Three of them are entirely or predominantly morainal in nature, one is on lacustrine material, four are fluvial in origin and one is eolian.

4. Size of Monitoring Samples in Relation to Physiographic Units

The relative sizes of monitoring samples covered in this report and the physiographic units in which they occur are presented in Table 5.

The percentage which the area of each sample is of the area of the entire unit is given both for the total area of the unit and the portion of the unit located in Saskatchewan. Samples range from a low of 0.3 percent of the Thickwood Hills and Porcupine Upland to a high of 1.7 percent of the total Barrier River Upland. Overall sample size for the seven units is 0.5 percent of the total area of the units. This is at the lower end of the range of 0.5 to 1.1 percent recorded for all the other ecoregions reported on to date (Millar 1989b, 1992 a to f, 1993a,b,c).

Three of the seven units contain sufficiently well-defined variations in surface form, including density and size distribution of wetlands, and soil parent material that they can be divided into two or more sub-units. The Tisdale Plain and Porcupine Upland are each divided into two sub-units while the Thickwood Hills is divided into seven sub-units, four of which occur in the Saskatchewan portion of that unit. Ideally, transects should be related to the sub-units in which they occur rather than to the unit as a whole. However, if this were to be done there should be

substantial additional sampling in other significant sub-units.

B. Sample Results

1. Wetlands

a. Percent of Total Land Area Occupied by Wetlands

The first step in assessing variability in baseline habitat conditions between various physiographic units has been to determine the relative amounts of wetlands and uplands in the landscape. Within the six individual transects in Saskatchewan Mid-Boreal Transition there is just over a three-fold variation (4.3 to 13.0) in the percent of total land area occupied by wetlands (Table 6).

i. Landform character and wetland area - Four of the six transects in the Saskatchewan Mid-Boreal Transition are located on morainal terrain and in these the total wetland area ranges from 8.1 to 12.3 percent. The wetland area on the two transects in knob and kettle moraine is at the low end (8.1 and 9.2 percent) of the range for morainal landforms in the ecoregion. The single lacustrine transect has the lowest (4.3) and the single eolian transect the highest (13.0) percent of total land area in wetlands in this ecoregion.

For the sampled portion of the ecoregion as a whole the percent of land area occupied by wetlands averages 9.2. This is close to the top of the range of values (1.9 to 9.9 percent) recorded for ecoregions reported on to date in this study.

ii. Variability in wetland area between samples within the same physiographic unit - None of the units sampled in the Saskatchewan Mid-Boreal Transition contains more than one transect so this particular analysis is not applicable to this ecoregion.

iii. Cultivated wetlands - The amount of land occupied by cultivated wetlands is of particular interest because this is a

part of the landscape which, depending on surface water conditions at the time of surveys, cannot always be interpreted from air photos as being wetland. Classification may shift back and forth between wetland and cropland (upland) categories in terms of cover and land use.

The percent of total land area occupied by cultivated wetlands in the transition transects covered in this report ranges from 0.7 at Pleasantdale East to 4.9 percent at Porcupine Plain (Table 6) where 60.6 percent of the total wetland area is cultivated. In three of the six transects cultivated wetlands occupy less than one percent of the total landscape.

For the ecoregion as a whole, total land area occupied by cultivated wetlands averages 1.8 percent. This ties with Saskatchewan Parkland for the second highest percent of total land area occupied by cultivated wetlands which has been recorded to date (Millar 1989b).

b) Area of Wetlands in Various Cover Classes

The percent of total wetland area in various cover classes is summarized for all transects and physiographic units in Table 7. Cultivated, grassy and shrub or tree cover are considered collectively as the cover types most indicative of temporary or seasonal water conditions and this group dominates (53.1 to 98.1 percent of total wetland area) in all transects. In only two of the six transects do those cover categories account for more than 90 percent of the total wetland area. The level of dominance by the cultivated/grassy/wooded cover group in Saskatchewan Mid-Boreal

Transition Ecoregion as a whole is the second lowest (71.3 percent) recorded so far in this project.

The percent of wetland area that is cultivated in the six transects varies from 5.9 on fluvial terrain at Leask to 60.6 on undulating morainal terrain at Porcupine Plain. It is the dominant cover class in two transects.

Grass (including sedge and forbs) is the dominant cover class in three of six transects. While both shallow marsh and wet meadow vegetation are included in this class, ground truthing surveys have confirmed that the great majority of the area involved is shallow marsh.

The percentage of total wetland area covered by willows and trees ranges from 1.7 to 21.1 in the six transects. The values given in Table 7 for willows and trees include only cover which can be mapped as polygons and not the narrow wooded margins which are characteristic of wetlands in parkland or woodland.

Bulrush and cattail (deep marsh vegetation) occupy 0.2 to 24.5 percent of total wetland area in five of the six transects. The top value is almost two and a half times the next largest percentage and is due entirely to widespread stands in one large lake.

Transitional open water, which can only be identified from ground surveys, is absent from all transects.

Natural fresh open water is highly variable in its occurrence. It is completely absent from one transect and occupies from 0.2 to

40.2 percent of the wetland area in the five transects where it is present.

In this report open running water in streams and rivers has not been grouped with natural fresh open water in ponds as in some earlier reports but is recorded as "other".

The range in area of artificial open water in the transition transects is quite narrow (0.1 to 4.5 percent). In five of six transects this cover class occupies 1.3 percent or less of the total wetland area and this is almost entirely in the form of small dugouts. The largest value of 4.5 percent at Porcupine Plain is due to the presence of large roadside dugouts excavated for highway construction.

Saline open water is absent from all transects covered in this report.

The "other" cover category is recorded in four of six transects and, where present, accounts for 0.1 to 9.5 percent of the wetland area. In three transects it accounts for one percent or less of the wetland area and in these cases disturbance situations are involved. The one value in excess of one percent (9.5 percent) is generated by the presence of a stream.

For the ecoregion sample as a whole 97.9 percent of the total wetland area falls into five cover classes: grass - 39.3 percent, cultivated - 20.1 percent, natural fresh open water - 17.7 percent, willows and trees - 11.9 percent and bulrush/cattail - 8.9 percent. These values rank as follows amongst the ecoregions reported on to date. The grass value is the third lowest, cultivated is the sixth

lowest, natural fresh open water is the second highest, willows and trees is the second highest and bulrush/cattail is the second highest.

c) Wetland Density

Wetland density figures can be used to a limited extent to draw certain inferences about the character of the wetlands under study but must be interpreted with caution. A high wetland density, for example, can be taken as a reliable indicator that most of the wetlands present are small and hence not likely to be very permanent in nature. A low density, on the other hand, may be indicative of a variety of conditions and hence is not a reliable indicator by itself of either wetland size or permanence. It may, for example, result from the presence of small numbers of either small temporary wetlands, a mixture of a variety of sizes of wetlands of variable permanence or a few very large permanent wetlands.

The mean wetland densities per quarter section for all transects covered in this report and for the ecoregion sample as a whole are listed in Table 8. Densities range from 4.3 per quarter section at Pleasantdale East to 24.9 at Ridgedale. Wetland densities on morainal landforms range from 4.3 to 20.5 with both the highest and lowest figures being associated with knob and kettle terrain. The density on the lacustrine transect is the highest recorded for the ecoregion (24.9 percent) and is the third highest recorded to date for all ecoregions. On the one fluvial transect the density is 9.6.

For the entire ecoregion sample the average density is 14.7 wetland per quarter section. This is the second highest density recorded to date and is exceeded only by the value recorded for Saskatchewan Parkland (Millar 1989b).

d) Numbers of Wetlands in Various Cover Classes

In this report each wetland has been categorized according to the one cover class which dominates the central and deepest portion of the basin.

The three cover classes characteristic of temporary or seasonal wetlands, i.e., cultivated, grasses (including sedges) and woody vegetation collectively and overwhelmingly dominate (85.6 to 98.0 percent) the numbers of wetlands in all six transects (Table 8). Within these three cover classes grasses and cultivation each dominate in three transects. From 1.3 to 19.2 percent of wetlands are wooded in the six transects.

With few exceptions representation of all other cover classes is at a very low level. Natural fresh open water is present in five of six transects and never exceeds 7.8 percent of wetland numbers. Bulrush/cattail are present in three of six transects and achieve a maximum of 1.8 percent at Leask. This cover class is listed as being absent from the Midnight Lake transect in terms of wetland numbers but is listed in Table 7 as occupying 24.5 percent of the wetland area in that transect. This is explained by the fact that this cover class occurred in extensive beds in a single lake on the transect.

Artificial open water wetlands are present in all six

transects and account for 0.4 to 6.9 percent of total wetland numbers. Saline open water wetlands are absent from all wetlands. From 0.4 to 1.9 percent of total wetlands fall into the "other" category in four of six transects.

For the ecoregion as a whole 94.8 percent of all wetlands are dominated by cultivation (54.6 percent), grass (33.3 percent) and shrubs and trees (6.9 percent). Of the remaining wetlands 2.7 percent are dominated by artificial open water, 1.6 percent by natural fresh open water, 0.3 percent by bulrush/cattail and 0.6 percent by all other categories together.

e) Area of Wetlands in Various Land Use Activity Classes

Utilization of wetlands in the six transition transects falls into five major land use categories - no use, abandoned cultivation, annual crops, haying and grazing. Collectively these activity classes occur on 95.0 to 100 percent of the total wetland area in these transects (Table 9).

The percent of total wetland area that is not being subjected to any obvious or regular human activity ranges from 28.7 percent at Porcupine Plain to 60.5 percent at Pleasantdale East. The minimal no use value at Porcupine Plain is associated with a high (60.8 percent) level of cultivation.

The abandoned cultivation land use activity class is a transitory category that is assigned to wetlands which are in a state of flux between being used for annual crops and reverting to an unused condition. This category most frequently occurs when higher water levels flood out previously cultivated basins and

persist long enough to permit the establishment of disturbed wetland vegetation. Since development of the abandoned cultivation class is related to local precipitation conditions, its presence can be expected to be erratic within and between transects. The percent of the total wetland area in this category ranges from 0.2 to 7.7 for the six transects covered in this report.

The amount of wetland area being used from crop production ranges from 5.9 percent at Leask to 60.8 percent at Porcupine Plain.

Haying of wetlands occurs on 0.6 to 11.6 percent of the total wetland area in the six transects.

Grazing of wetlands occurs in five of six of the transects and on 4.1 to 30.4 percent of the wetland area in those transects. In four of the five transects grazing occurs on more than 20 percent of the wetland area.

In the Saskatchewan Mid-Boreal Transition there are extreme differences between grazing and haying values even though one might expect there to be a high degree of association between these two land use activities.

"Other" land use activities on wetlands are recorded in five of the transects and on 0.1 to 5.0 percent of the wetland area in those transects.

For the ecoregion sample as a whole, virtually all of the total wetland area (98.3 percent) falls into the five named land use categories, i.e., no use, abandoned cultivation, annual crops, haying and grazing. Half (49.7 percent) of the wetland area is

unused, grazing occurs on 21.1 percent of the wetland area, annual crops on 20.1 percent, haying on 5.3 percent and abandoned cultivation on 2.1 percent. In relation to the ecoregions previously reported on in this study the above values rank as follows: no use - fourth highest, grazing - fourth lowest (superseding Manitoba Mid-Boreal Transition), annual crops - sixth lowest, haying fourth highest and abandoned cultivation - sixth highest.

f) Wetland Size Distribution

Variations in the size distribution of wetlands amongst transects and physiographic units will not be discussed in this report because the total areas of wetlands lying only partially within quarter section sample units cannot be easily generated and analysed within the program set up for the quarter section units. Any attempt to determine wetland size distribution within quarter sections would therefore lack a true representation of larger wetlands. Future manual digitizing of wetlands extending across two or more quarter sections would make it possible to calculate accurate size distribution figures.

g) Wetlands Affected by One or More Permanent Impacts

Enough material has been generated on the nature and distribution of permanent, human-induced impacts on wetlands in the monitoring samples to provide the basis for a full-scale study on that subject alone. For the present, however, discussion of the effects of impacts on wetlands will be limited to an evaluation of the extent to which individual wetlands have been affected by one

or more such impacts. It should be emphasized here that in this study cultivation is not considered a permanent impact.

The percent of wetlands affected by one or more permanent impacts in the Saskatchewan Mid-Boreal Transition ranges from a low of 16.9 at Leask to a high of 24.9 at Pleasantdale East (Table 10). The two highest rates of impaction occur on morainal knob and kettle terrain.

For the entire ecoregion sample the average impaction level is 20.9 percent. This is the lowest rate of impaction recorded to date in this study.

h) Distribution of Streams

The presence of stream segments in the data samples has been summarized (Table 11) to provide an indication of the relative importance of this type of water body in different physiographic units of the Saskatchewan Mid-Boreal Transition.

No streams were recorded in two of the six transects and in the remaining four the percent of quarter sections containing streams ranges from 8.3 at Nut Mountain to 33.3 at Ridgedale.

In the total ecoregion sample 12.5 percent of all quarter sections contain stream segments. This ties with Saskatchewan Shortgrass Prairie (Millar 1992f) as the sixth highest level recorded to date in this study.

3. Uplands

a) Distribution of Upland Cover Classes

Upland cover data have been analysed on the basis of seven named classes, four native and three planted, plus a catch-all

category for all other cover. In the six Saskatchewan Mid-Boreal Transition transects 97.4 to 99.4 percent of the upland cover falls into the seven named classes (Table 12).

Annual crops and summerfallow are the single most common upland cover class in all six transects and occupy 53.1 to 83.4 percent of the total upland area.

Native grass occupies from 4.9 percent of total upland area at Ridgedale and Porcupine Plain to 18.1 percent at Midnight Lake.

Shrubs are a minor element in the landscape in all transects. Low shrubs (buckbrush) occupy from a trace to 0.6 percent of the upland area and tall shrubs from 0.6 to 5.1 percent. Native trees cover 4.5 to 20.9 percent of the uplands with the highest value occurring at Porcupine Plain where variable portions of nine quarter sections lie within a forest reserve.

Total native cover occupies from 11.3 to 35.7 percent of total upland area in the six transects. In all transects it occupies more than 10 percent of the upland area and in four it exceeds 20 percent.

Planted grasses and forbs are found on 3.9 to 10.3 percent of the uplands. Planted trees and shrubs are a very minor but consistent part of the landscape, occurring in five of six transects and accounting for 0.1 to 0.2 percent of the upland area in those transects.

For the ecoregion sample as a whole two thirds (67.6 percent) of the total upland cover is annual crops and summerfallow. Total native cover accounts for 24.1 percent of the upland area. Half of

that amount is native trees and two fifths (9.8 percent) is native grass. Planted grasses and forbs cover 6.7 percent of the uplands and planted trees and shrubs 0.1 percent. "Other" cover, primarily man-made surfaces and bare soil other than cropland, occupies 1.5 percent of the uplands. Interestingly, all of these figures are virtually identical (less than one percent difference) to those recorded for Manitoba Mid-Boreal Transition (Millar 1993c).

Ridgedale is the most intensively cultivated transect in the Saskatchewan Mid-Boreal Transition - 83.4 percent of upland area and 51.7 percent of wetland area.

b) Distribution of Upland Land Use Activity Classes

Upland land use data have been separated into seven named classes plus an eighth catch-call category for all other minor land uses (Table 13).

Annual crop production is the predominant land use activity in all of the transects covered in this report. The same values and comments given in the preceding section on upland cover for the cultivated cover class also apply here.

Idle (unused plus abandoned) land accounts for 8.7 to 21.9 percent of the upland area. Land which has been abandoned from other uses never amounts to more than 0.5 percent of the total upland area in any transect.

Forage production occurs on 0.6 to 11.3 percent of the upland area in the six transects. Grazing occurs on 1.7 to 23.2 percent of the uplands in five of six transects.

Land use activities which are associated with native

vegetation and/or planted grasses and forbs collectively account for 13.6 to 42.2 percent of the total upland area in any transect.

A minor but consistent part of the uplands is devoted to farmsteads (0.3 to 1.0 percent) and to roads and railways (2.0 to 4.8 percent) in all transects. "Other" land uses collectively occupy a trace to 3.5 percent of the uplands. Residential use and sewage disposal are significant contributors to the highest "other" value.

For the ecoregion sample as a whole, upland land use activities in descending order of occurrence are as follows: annual crop production (67.6 percent), idle (no use plus abandoned - 12.2 percent), grazing (10.5 percent), forage production (4.6 percent), roads and railways (3.0 percent), "other" uses (1.4 percent) and farmsteads (0.7 percent). As with upland cover data, the Saskatchewan Mid-Boreal Transition upland land use values are very close in all categories to those recorded for Manitoba Mid-Boreal Transition.

C. Extrapolation of Sampling Results

1. Data Variability

One of the objectives of this baseline habitat study has been to generate estimates of current habitat values for individual physiographic units by extrapolating the sample results obtained in this study to the entire unit. Application of standard statistical procedures to the sample data has, however, shown there to be such a high degree of variability in the data that the mean values generated cannot be considered to provide a consistently accurate

estimate of conditions beyond the samples themselves for all habitat factors in all transects. Examples of the variability in the data are illustrated for some major wetland cover, upland cover and upland land use classes in Tables 14 to 16, respectively.

Some indications of the degree of variability in the data can be obtained by comparing the different sets of data. For the three wetland cover classes, cultivated, grass and willows, the number of transition transects in which the standard error equals or exceeds the mean in relation to the number of transects in which the cover type was present is relatively low as follows: two of six, three of six and zero of six, respectively (Table 14).

In the three upland cover classes, i.e., cropland, native grass and native trees, the frequency of the standard error exceeding the mean is consistently higher: five of six, four of six and six of six transects, respectively (Table 15). This is a higher level of variability than has been previously encountered with this set of data.

The greatest extremes in data variability are to be found in upland land use categories (Table 16). The maximum level of variability (the standard error equals or exceeds the mean in six of six and five of five transects, respectively) occurs with both unused land and grazing. This differs from the pattern observed in most other ecoregions in that the variability for unused land is usually at an intermediate level. For roads and railways the standard error is consistently and strongly less than the mean in all transects. This situation is to be expected since roads and

railways are distributed with great uniformity across the country.

A very common situation which contributes significantly to the variability in habitat data is the presence within a sample of one or more quarter sections operated by a landowner whose land use practises, e.g., grazing or forage production, are markedly different than those of his neighbors. When this happens the data are strongly skewed and cannot be analysed by standard methods.

When data for the entire Mid-Boreal Transition Ecoregion sample are analysed collectively the standard error is below the mean for only three of the nine categories in Tables 14 to 16. Cultivated wetlands, cropland, native grass, native trees, unused land and grazing all show a high degree of variability in their distribution. This is the greatest degree of variability yet encountered in this study and undoubtedly reflects the irregularity of agricultural development at the northern fringes of settlement.

The shortcomings of using limited habitat data from this project to generate estimated habitat values for entire physiographic units have been acknowledged in previous reports but they have become even more obvious as our studies have moved into the fringes of settlement where the many cover types and land uses are distributed irregularly and where large blocks of undeveloped land exist. However, these habitat estimates are often the only data available for many localities and, if interpreted with care, can still provide useful information.

2. Wetlands

Estimations of the area of wetland cover classes, the number

of wetlands in each cover class and the area of each wetland land use activity class present in each physiographic unit in 1985 are presented in Tables 17 to 19, respectively.

Within the group of physiographic units sampled in the Saskatchewan Mid-Boreal Transition the top unit in terms of total quantity of wetland habitat is the Thickwood Hills (7.13). It is the second largest sampled unit accounting for just over one fifth (21.1 percent) of the total area of sampled units in the ecoregion and ranks (a) first in total wetland area, (b) first in total area and first in total numbers of semi-permanent and permanent wetlands available as secure brood rearing habitat, (c) first in total area and second in total numbers of grassy (seasonal) wetlands available for additional breeding pair habitat, as well as (d) first in total undisturbed wetland area available as good escape cover.

Extrapolated wetland data for the entire sampled portion of the Saskatchewan Mid-Boreal Transition have been summarized in two ways. First, extrapolated wetland values for individual physiographic units have been added together to provide total values (physiographic unit analysis or summation) for the sampled portion of the ecoregion. Second, the entire ecoregion sample has been analysed as a single unit and the resultant wetland values have been extrapolated to generate totals for the sampled portion of the ecoregion (ecoregion analysis). The physiographic unit analysis is considered to provide the most accurate estimate of wetland conditions in the ecoregion because it takes into account variations in the contribution of individual units to the ecoregion

total in relation to both their size and wetland qualities. The relative closeness of values generated through the ecoregion analysis to those from the physiographic unit analysis is examined to determine the extent to which these two approaches produce acceptably comparable habitat estimates for the sampled portion of the ecoregion.

The total wetland area estimate generated in the ecoregion analysis is higher than that produced in the physiographic unit analysis by just 2.1 percent. Five of the seven cover classes present have lower values, four by 10.0 percent or less and one by 21.4 percent. One cover class, natural fresh open water, is higher by 74.2 percent. This large difference is interpreted as being due to the very irregular distribution of this class - it is absent or very nearly so from four transects and most of the area is concentrated in two transects. One very minor cover class has equal values.

The pattern for wetland numbers is somewhat different. The ecoregion analysis of total wetland numbers is lower than the physiographic unit analysis by 4.2 percent. Three of seven cover class values are lower by 2.7, 6.6 and 8.3 percent and four are higher by 2.3, 11.1, 36.2 and 36.4 percent. The three largest positive values involve very minor cover classes.

The ecoregion analysis of wetland area devoted to various land use activities produces higher values in two of the six categories by 5.4 and 13.5 percent and lower values in four categories by 1.0

to 15.2 percent. The two highest negative values involve small land areas.

3. Uplands

Estimated areas of upland cover and land use activity classes are presented in Tables 20 and 21. Amongst the seven physiographic units listed in these tables the Thickwood Hills (7.13) ranks second in total upland area and first in estimated amounts of upland nesting cover in the form of native vegetation plus planted grassy cover and first in the amount of upland in land uses which are conducive to the perpetuation of nesting cover, i.e., idle land, forage production and grazing.

Extrapolated upland data for the entire sampled portion of the Saskatchewan Mid-Boreal Transition have been summarized in the same way as previously described for wetland data. The two analyses generate virtually identical values (-0.2 percent for the ecoregion analysis) for total upland area. Four individual cover class estimates generated in the ecoregion analysis are lower by 0.6 to 8.4 percent and four are higher by 0.4, 4.3, 12.5 and 44.0 percent than those produced in the physiographic unit analysis. The extreme positive difference involves a relatively small land area.

For upland land use data three ecoregion estimates are higher and five are lower than the physiographic unit summation. The range in size of the differences (+0.4 to +4.2 and -1.1 to -12.7 percent) is much lower than that observed for upland cover classes. The one negative double digit difference involves a very minor land area.

The above results, together with the corresponding data for wetlands, suggest that comparable estimates of the quantities of most major cover and land use classes present in the sampled portion of the Saskatchewan Mid-Boreal Transition can be obtained by extrapolating the data from physiographic units either individually or collectively. Results for minor habitat categories are more variable.

The accuracy of extrapolated habitat values will vary more widely from unit to unit in the Saskatchewan Mid-Boreal Transition than it does in more southerly ecoregions because this ecoregion extends across the northern limit of agricultural settlement and several units contain large blocks of totally undeveloped land which have not been included in our sampling network. These undeveloped lands include the Porcupine Provincial Forest in the Porcupine Upland and Lower Red Deer River Plain, the Nisbet Provincial Forest in the Nisbet Sand Plain, a forest reserve covering part of the Thickwood Hills and undesignated wilderness areas in the above and other sampled units. In future analyses designated areas such as parks and forest reserves can be deducted from unit area calculations with little difficulty but the delineation and removal of scattered areas of undesignated wilderness is a more difficult task.

4. Rating of Sampled Morainal Physiographic Units as Waterfowl Production Habitat

On the basis of the habitat rating analysis described in the Methods section two sampled morainal units, the Thickwood Hills

(7.13) and Barrier River Upland (7.20) receive top rating as waterfowl production areas relative to other sampled morainal units in the Saskatchewan Mid-Boreal Transition (Table 22). Two of the remaining units, the Lower Red Deer River Plain (7.21) and Porcupine Upland (7.22) are bottom-rated as fours, both being downgraded by one level for losing points for both semi-permanent and permanent wetlands. The Lac La Course Plain (7.23) which was bottom-rated in Manitoba (Millar 1993c), is given a three rating when Saskatchewan Mid-Boreal Transition criteria are applied.

When Saskatchewan Mid-Boreal Transition units are rated using Manitoba Mid-Boreal Transition minimum rating values the Thickwood Hills drops to a two and the Lac La Course Plain to a four. When Alberta Parkland benchmark minimum rating values are applied the Thickwood Hills regains its number one rating and the Barrier River Upland drops to a two. The Porcupine Upland rises to a three and is downgraded to that level for losing points for both semi-permanent and permanent wetlands. The Lower Red Deer River Plain and Lac La Course Plain remain as fours, the former being downgraded by one level.

D. Cover/Land Use Changes Since May 1985

Cover/land use change is an ongoing process and formal efforts to measure this were originally scheduled to be conducted at five-year intervals as part of this project. It is possible, however, to obtain a very crude idea of the extent to which change is occurring in the interim by determining the number of quarter sections which have experienced some change in the interval between

the taking of baseline aerial photography and the completion of the ground truthing surveys. The date of baseline aerial photography for all transects covered in this report was May 1985. The interval between that date and the completion of the ground truthing surveys for the six transition transects varies from 29 to 65 months (Table 23). Recorded changes are as small as the cultivation of a single wetland and as extreme as the clearing and breaking of most of an entire quarter section. Frequently the changes have been associated with road construction. Temporary interruptions of cultivation in wetlands or uplands are not counted as changes.

Cover/land use changes have occurred on all of the six transects located in Saskatchewan Mid-Boreal Transition and the percent of quarter sections affected in individual transects ranges from 33.3 at Midnight Lake to 75.0 at Nut Mountain.

The average percent of quarter sections affected by cover/land use changes and the mean length of time in months between the taking of aerial photos and completion of ground truthing surveys for the ecoregions reported on to date are as follows:

Ecoregion	Average Percent of Quarter Sections Affected by Change	Mean Length of Time Between Photography and Ground Truthing (in months)
Saskatchewan Parkland	27.0	23.7
Alberta Parkland	47.1	40.1
Alberta Mixedgrass Prairie	34.6	55.3
Alberta Fescue Prairie	30.0	54.2
Alberta Shortgrass Prairie	8.3	63.0
Saskatchewan Mixedgrass Prairie	30.6	62.2

Saskatchewan Shortgrass Prairie	24.0	61.8
Manitoba Parkland	39.5	37.5
Manitoba Mixedgrass Prairie	34.8	40.1
Manitoba Tallgrass Prairie	20.8	49.0
Manitoba Mid-Boreal Transition	55.8	57.2
Saskatchewan Mid-Boreal Transition	52.8	53.0

Because of the wide variation in the length of time between date of baseline photography and ground truthing surveys amongst the Saskatchewan Transition transects it is perhaps better to look at the two time intervals separately. For the two transects checked 29 months after the photography was taken the rate of change averages 35.4 percent while in the four transects checked after 65 months the rate of change averages 61.5 percent. This is the highest average rate of change recorded to date and involves the longest time interval. It is well above the averages recorded for prairie ecoregions after intervals of 54 to 63 months and is consistent with the pattern observed to date of a higher rate of change in the more northern parts of the settled portions of the Prairie Provinces.

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Figure 1. Distribution of Habitat Sampling in Saskatchewan Mid-Boreal Transition



Table 1. Distribution of Habitat Sampling Relative to the Entire Saskatchewan Mid-Boreal Transition

	Area		
	No. of Units	In Hectares ¹	As Percentage of Entire Ecoregion
Sampled Physiographic Units	7 ²	2,212,900	68.9
Unsampled Physiographic Units	9	839,000	26.1
Areas Not Included in Physiographic Units			
- River and Stream Valleys	-	119,400	3.7
- Lakes ³	-	39,700	1.3
- Urban Areas ³	-	500	T ⁴
Total Saskatchewan Transition Ecoregion	16	3,211,500	100

1. To the nearest 100 hectares.

2. Including one unit, totalling 180,300 hectares or 5.6 percent of the Saskatchewan Mid-Boreal Transition, which is sampled only in the Manitoba portion of that unit.

3. Larger than 500 hectares.

4. T = trace = less than 0.05 percent.

Table 2. Distribution of Landforms in Saskatchewan Mid-Boreal Transition

Origin of Parent Material ¹	Surface Form ¹	Area in Hectares ²			Percent of Sampling Effort in Landform Category
		Sampled Units ³	Unsampled Units ³	Total ⁴	
Morainal	Knob and Kettle	621,000 (69.8)	268,900 (30.2)	889,900 (29.1)	28.6
	Undulating	1,071,700 ⁵ (100)	-	1,071,700 (35.1)	42.8
	Dissected	-	50,600 (100)	50,600 (1.7)	0.0
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Total Morainal		1,692,700 (84.1)	319,500 (15.9)	2,012,200 (65.9)	71.4

Lacustrine	Undulating	-	58,600 (100)	58,600 (1.9)	0.0
	Dissected	332,200 (100)	-	332,200 (10.9)	14.3
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Total Lacustrine		332,200 (85.0)	58,600 (15.0)	390,800 (12.8)	14.3

Fluvial	Undulating	-	263,200 (100)	263,200 (8.6)	0.0
	Hummocky	-	59,800 (100)	59,800 (2.0)	0.0
	Rolling	-	45,000 (100)	45,000 (1.5)	0.0
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Total Fluvial		-	368,000 (100)	368,000 (12.1)	0.0

Table 2. Distribution of Landforms in Saskatchewan Mid-Boreal Transition - Continued

Origin of Parent Material ¹	Surface Form ¹	Area in Hectares ²		Percent of Sampling Effort in Landform Category	
		Sampled Units	Unsampled Units ³	Total ⁴	
Eolian	Hummocky	188,000 (66.9)	92,900 (33.1)	280,900 (9.2)	14.3
Total Eolian		188,000 (66.9)	92,900 (33.1)	280,900 (9.2)	14.3

1. Listed by primary category only.
2. To the nearest 100 hectares.
3. Figure in parentheses is the percent the indicated area is of the total area of that landform category.
4. Figure in parentheses is the percent each landform category is of the total area in physiographic units in the ecoregion.
5. Including one unit sampled in the Manitoba portion of that unit.

Table 3. Physiographic Units Covered in This Report

Unit Number	Name	Landform Character ¹			Transect ²
		Origin of Parent Material	Surface Form		
7.13	Thickwood Hills	Morainal (Fluvial)	Undulating * Ridged * Knob and Kettle	Midnight Lake	
7.17	Nisbet Sand Plain	Eolian * Fluvial	Hummocky * Undulating	Leask	
7.19	Tisdale Plain	Lacustrine	Dissected * Undulating	Ridgedale	
7.20	Barrier River Upland	Morainal	Knob and Kettle	Pleasantdale West	
7.21	Lower Red Deer River Plain	Morainal * Lacustrine	Undulating	Porcupine Plain	
7.22	Porcupine Upland	Morainal * Lacustrine (Organic)	Knob and Kettle	Nut Mountain	
7.23	Lac La Course Plain	Morainal * Fluvial * Lacustrine	Undulating (Hummocky)	Durban ³	

1. Based primarily on data from "A Regional Map Base for a Migratory Bird Habitat Inventory Prairie Provinces" G.D. Adams, revised Oct. 25, 1985.

Secondary categories following * are a significant component while those in parentheses are of minor importance.

2. The sample size in all transects is 24 quarter sections.

3. The unit is sampled in the Manitoba portion of the unit.

Table 4. Physiographic Units in Saskatchewan Mid-Boreal Transition Which Have Not Been Sampled

Unit Number	Name	Landform Character ^{1,2}			Area in 3 Hectares
		Origin of Parent Material	Surface Form		
7.14	Witchekan Plain	Lacustrine * Morainal * Fluvial	Undulating * Veneer		58,600
7.15	Thickwood Hills Upland	Morainal	Knob & Kettle * Ridged * Rolling		254,200
7.16	Shell River Plain	Fluvial * Morainal	Undulating * Rolling		125,800
7.18	Nipawin Plain	Eolian * Lacustrine * Fluvial	Hummocky * Undulating		92,900
7.24	Swan River Plain	Morainal * Lacustrine	Dissected * Undulating		50,600 ⁴
7.25	Big Boggy Creek Upland	Morainal	Knob & Kettle		14,700 ⁴
7.38	Mt. Nebo Outwash	Fluvial	Hummocky		59,800
7.39	Ft. Pitt Plain	Fluvial	Rolling * Undulating		45,000
7.40	Upper Red Deer River Plain	Fluvial * Lacustrine * Morainal	Undulating		137,400
				Total Area	839,000

1. Based primarily on data from "A Regional Base Map for a Migratory Bird Habitat Inventory Prairie Provinces" G.D. Adams, revised Oct. 25, 1985.
2. Secondary categories following * are a significant component while those in parentheses are of minor importance.
3. To the nearest 100 hectares.
4. Saskatchewan portion of the unit only. The unit straddles the Saskatchewan-Manitoba boundary.

Table 5. Size of Monitoring Samples in Relation to Physiographic Units

Unit Number	Name ¹	No. of Quarter Sections ² In Sample	Area in Hectares		Sample ⁵	Percentage that Sample is of Unit Area ⁶
			Unit ^{3,4}	Unit ^{3,4}		
7.13	Thickwood Hills *	24	488,700	(576,300)	1,592	0.3 (0.3)
7.17	Nisbet Sand Plain	24	188,000		1,589	0.8
7.19	Tisdale Plain	24	332,200		1,576	0.5
7.20	Barrier River Upland	24	94,800		1,583	1.7
7.21	Lower Red Deer River Plain **	24	402,700	(406,500)	1,587	0.4
7.22	Porcupine Upland	24	526,200		1,575	0.3
7.23	Lac La Course Plain **	- (24)	180,300	(288,200)	- (1,559)	- (0.5)
Total for Ecoregion		144+(24)	2,212,900	(2,412,200)	9,502+(1,559)	0.4 (0.5)

1. The unit marked with one asterisk straddles the Saskatchewan-Alberta boundary and those marked with two asterisks straddle the Saskatchewan-Manitoba boundary.

2. Figure in parentheses is the number of quarter sections sampled in the Manitoba portion of the unit.

3. To the nearest 100 hectares.

4. Each figure in parentheses is the total size of the unit, including the portion of the unit in Alberta or Manitoba.

5. Each figure in parentheses is the size of the sample, in hectares, located in the Manitoba portion of the unit.

6. Based on the size of the unit and sample in the Saskatchewan portion of the unit only. Figures in parentheses are based on the total unit and sample size, including portions located in Alberta or Manitoba.

Table 6. Land Area Occupied by Wetlands and Uplands

Physio- graphic Unit	Transect ¹	Sample Size (in ha)	Percent of Total Sample ²			Uplands
			Total	Wetlands		
				Uncultivated	Cultivated	
	<u>(Morainial - K&K)</u>					
7.20	Pleasantdale East	1,583	9.2	8.5	0.7	90.8
7.22	Nut Mountain	1,575	8.1	6.6	1.5	91.9
	<u>(Morainial - U)</u>					
7.13	Midnight Lake	1,592	12.3	11.4	0.9	87.7
7.21	Porcupine Plain	1,587	8.1	3.2	4.9	91.9
	<u>(Lacustrine - D)</u>					
7.19	Ridgedale	1,576	4.3	2.1	2.2	95.7
	<u>(Eolian - H)</u>					
7.17	Leask	1,589	13.0	12.2	0.8	87.0
Ecoregion Sample		9,502	9.2	7.4	1.8	90.8

1. Transects are grouped by landform (soil parent material and surface form). Letters identifying surface forms in this and subsequent tables are as follows: K&K - Knob and Kettle, U - Undulating, H - Hummocky, D - Dissected.

Table 7. Distribution of Wetland Area in Various Cover Classes

Physio-graphic Unit	Transect	Total Wetland Area in Sample (in ha)	Percent of Total Wetland Area in Cover Class																	
			Cultivated	Willows and Trees	Grasses and Sedges	Bulrush/Cattail	Transitional	Natural	Artificial	Saline	Other									
<u>(Morainal - K&K)</u>																				
7.20	Pleasantdale East	146	7.7	14.0	31.4	4.9	0.0	0.0	40.2	0.8	0.0	1.0								
7.22	Nut Mountain	127	18.4	21.1	58.6	0.0	0.0	0.0	0.0	1.3	0.0	0.6								
<u>(Morainal - U)</u>																				
7.13	Midnight Lake	196	7.6	13.5	43.0	24.5	0.0	0.0	10.8	0.6	0.0	0.0								
7.21	Porcupine Plain	129	60.6	8.3	26.2	0.2	0.0	0.0	0.2	4.5	0.0	0.0								
<u>(Lacustrine - D)</u>																				
7.19	Ridgedale	68	51.7	1.7	33.5	1.1	0.0	0.0	1.4	1.1	0.0	9.5								
<u>(Eolian - H)</u>																				
7.17	Leask	207	5.9	8.8	39.3	10.3	0.0	0.0	35.5	0.1	0.0	0.1								
Ecoregion Sample		873	20.1	11.9	39.3	8.9	0.0	0.0	17.7	1.2	0.0	0.9								

1. Transects are grouped by landform (soil parent material and surface form).

Table 8. Wetland Density/Distribution of Wetland Numbers in Various Cover Classes

Physio- graphic Unit	Total Number of Wetlands in Sample Section	Mean Density Per Quarter Section	Percent of Total Wetland Numbers in Cover Class																	
			Culti- vated			Willows and Trees		Grasses and Sedges		Bulrush and Cattail		Trans- itional		Natural		Artif- icial		Saline		Other
<u>(Morainal - K&K)</u>																				
7.20 Pleasantdale East	104	4.3	23.1	19.2	43.3	0.9	0.0	0.0	0.0	4.9	6.7	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.6
7.22 Nut Mountain	492	20.5	44.1	7.3	46.6	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.6
<u>(Morainal - U)</u>																				
7.13 Midnight Lake	289	12.0	34.9	16.3	43.9	0.0	0.0	0.0	0.0	3.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.21 Porcupine Plain	406	16.9	60.8	5.7	25.9	0.5	0.0	0.0	0.0	0.2	6.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<u>(Lacustrine - D)</u>																				
7.19 Ridgedale	597	24.9	76.3	1.3	19.6	0.0	0.0	0.0	0.0	0.3	1.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
<u>(Eolian - H)</u>																				
7.17 Leask	230	9.6	49.1	4.8	35.7	1.8	0.0	0.0	0.0	7.8	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Ecoregion Sample	2,118	14.7	54.6	6.9	33.3	0.3	0.0	0.0	0.0	1.6	2.7	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6

1. Transects are grouped by landform (soil, parent material and surface form).

Table 9. Distribution of Wetland Area in Various Land Use Activity Classes

Physio-graphic Unit	Transect ¹	Total Wetland Area in Sample (in ha)	Percent of Total Wetland Area in Land Use Activity Class						
			No Use	Abandoned Cultivation	Annual Crop	Mowing	Grazing	Other	
	(<u>Morainal - K&K</u>)								
7.20	Pleasantdale East	146	60.5	0.2	7.7	1.2	30.4	0.0	
7.22	Nut Mountain	127	49.8	5.7	18.5	0.7	22.1	3.2	
	(<u>Morainal - U</u>)								
7.13	Midnight Lake	196	56.5	0.5	7.6	11.6	23.7	0.1	
7.21	Porcupine Plain	129	28.7	1.7	60.8	0.6	4.1	4.1	
	(<u>Lacustrine - D</u>)								
7.19	Ridgedale	68	34.1	7.7	51.8	1.4	0.0	5.0	
	(<u>Eolian - H</u>)								
7.17	Leask	207	54.7	1.0	5.9	9.0	28.9	0.5	
Ecoregion Sample		873	49.7	2.1	20.1	5.3	21.1	1.7	

1. Transects are grouped by landform (soil parent material and surface form).

Table 10. Wetlands Affected by One or More Permanent Impacts

Physio- graphic Unit	Transect ¹	Mean Number of Wetlands/Quarter ²		Percent of Wetlands Impacted
		Total	Affected by One or More Impacts	
	<u>(Morainal - K&K)</u>			
7.20	Pleasantdale East	4.3	1.1	24.9
7.22	Nut Mountain	20.5	5.1	24.8
	<u>(Morainal - U)</u>			
7.13	Midnight Lake	12.0	2.7	22.2
7.21	Porcupine Plain	16.9	3.5	20.7
	<u>(Lacustrine - D)</u>			
7.19	Ridgedale	24.9	4.5	18.3
	<u>(Eolian - H)</u>			
7.17	Leask	9.6	1.6	16.9
Ecoregion Sample		14.7	3.1	20.9

1. Transects are grouped by landform (soil parent material and surface form).

Table 11. Occurrence of Streams in Data Samples

Physio- graphic Unit	Transect ¹	Number of Quarters In Sample ²	Number of Quarters Containing Streams ²	Percent of Quarters Containing Streams ²
	(Morainal - K&K)			
7.20	Pleasantdale East	24	3	12.5
7.22	Nut Mountain	24	2	8.3
	(Morainal - U)			
7.13	Midnight Lake	24	0	0.0
7.21	Porcupine Plain	24	5	20.8
	(Lacustrine - D)			
7.19	Ridgedale	24	8	33.3
	(Eolian - H)			
7.17	Leask	24	0	0.0
Ecoregion Sample		144	18	12.5

1. Transects are grouped by landform (soil parent material and surface form).

Table 12. Distribution of Upland Cover Classes

Physio-graphic Unit	Transect ¹	Total Upland Area (in ha)	Percent of Total Upland in Cover																	
			Native				Planted													
			Grass	Low Shrub	Tall Shrub	Trees	Total	Annual ² Crops	Perennial Grass & Forbs	Trees & Shrubs	Other									
	(Morainal - K&K)																			
7.20	Pleasantdale East	1437	7.1	T ³	5.1	6.8	19.0	72.8	6.9	0.1	1.2									
7.22	Nut Mountain	1448	7.5	0.1	0.7	12.1	20.4	72.5	5.3	0.1	1.7									
	(Morainal - U)																			
7.13	Midnight Lake	1396	18.1	0.6	1.0	16.0	35.7	53.1	9.6	0.0	1.6									
7.21	Porcupine Plain	1458	4.9	0.5	0.6	20.9	26.9	66.5	3.9	0.1	2.6									
	(Lacustrine - D)																			
7.19	Ridgedale	1508	4.9	0.1	1.8	4.5	11.3	83.4	4.6	0.1	0.6									
	(Eolian - H)																			
7.17	Leask	1382	17.4	0.4	1.1	14.2	33.1	55.8	10.3	0.2	0.6									
Ecoregion Sample		8629	9.8	0.3	1.7	12.3	24.1	67.6	6.7	0.1	1.5									

1. Transects are grouped by landform (soil parent material and surface form).

2. Includes summerfallow.

3. T = trace = less than 0.05 percent.

Table 13. Distribution of Upland Land Use Activity Classes

Physio-graphic Unit	Transect ¹	Total Upland Area (in ha)	Percent of Total Upland Area in Land Use Activity									
			Unused	Abandoned	Annual Crops ²	Forage	Grazing	Farmsteads	Roads & Railways	Other		
	(Morainal - K&K)											
7.20	Pleasantdale East	1437	9.2	0.3	72.8	1.2	12.2	0.8	2.0	1.5		
7.22	Nut Mountain	1448	10.3	0.2	72.5	0.8	11.1	0.6	2.7	1.8		
	(Morainal - U)											
7.13	Midnight Lake	1396	9.1	0.5	53.1	9.4	23.2	0.7	2.9	1.1		
7.21	Porcupine Plain	1458	21.5	0.4	66.5	0.6	1.7	1.0	4.8	3.5		
	(Lacustrine - D)											
7.19	Ridgedale	1508	8.4	0.3	83.3	4.9	0.0	0.3	2.8	T ³		
	(Eolian - H)											
7.17	Leask	1382	12.9	0.3	55.8	11.3	15.9	0.9	2.6	0.3		
Ecoregion Sample		8629	11.9	0.3	67.6	4.6	10.5	0.7	3.0	1.4		

1. Transects are grouped by landform (soil parent material and surface form).

2. Includes summerfallow.

3. T = trace = less than 0.05 percent.

Table 14. Examples of Variability in Wetland Cover Data

Physio- graphic Unit	Transect ¹	Area in Hectares Per Quarter Section												
		Cultivated			Grass			Willows						
		Mean	S.E. ²	C.V. ³	Mean	S.E.	C.V.	Mean	S.E.	C.V.				
	(<u>Morainal - K&K</u>)													
7.20	Pleasantdale East	0.5	0.5	4.8	1.9	3.5	9.1	0.9	0.5	3.0				
7.22	Nut Mountain	1.0	0.2	1.1	3.1	1.6	2.5	0.8	0.4	2.2				
	(<u>Morainal - U</u>)													
7.13	Midnight Lake	0.6	0.2	1.5	3.5	3.5	4.9	1.1	0.6	2.6				
7.21	Porcupine Plain	3.3	31.0	46.5	1.4	0.7	2.4	0.5	0.2	2.0				
	(<u>Lacustrine - D</u>)													
7.19	Ridgedale	1.5	0.5	1.6	0.9	0.1	0.7	0.1	0.0	0.4				
	(<u>Eolian - H</u>)													
7.17	Leask	0.5	0.1	0.9	3.4	4.2	6.1	0.8	0.4	2.7				
Ecoregion Sample		1.2	2.2	21.8	2.4	1.0	5.0	0.7	0.2	2.6				

1. Transects are grouped by landform (soil parent material and surface form).

2. S.E. = Standard Error.

3. C.V. = Coefficient of Variation.

Table 15. Examples of Variability in Upland Cover Data

Physio- graphic Unit	Transect ¹	Area in Hectares Per Quarter Section													
		Cropland			Native Grass			Native Trees							
		Mean	S.E. ²	C.V. ³	Mean	S.E.	C.V.	Mean	S.E.	C.V.					
	(<u>Morainal - K&K</u>)														
7.20	Pleasantdale East	43.6	116.6	13.1	4.3	6.2	7.2	4.0	7.1	8.6					
7.22	Nut Mountain	43.7	87.6	9.8	4.5	7.0	7.6	7.3	34.8	23.4					
	(<u>Morainal - U</u>)														
7.13	Midnight Lake	30.9	126.8	20.1	10.6	33.0	15.3	9.3	32.4	17.1					
7.21	Porcupine Plain	40.4	85.4	10.4	3.0	1.2	2.0	12.7	55.9	21.5					
	(<u>Lacustrine - D</u>)														
7.19	Ridgedale	52.4	37.2	3.5	3.1	1.4	2.2	2.8	5.9	10.3					
	(<u>Eolian - H</u>)														
7.17	Leask	32.1	102.6	15.7	10.0	34.3	16.8	8.2	30.3	18.2					
Ecoregion Sample		40.5	41.0	12.2	5.9	6.3	12.8	7.4	11.8	19.2					

1. Transects are grouped by landform (soil parent material and surface form).

2. S.E. = Standard Error.

3. C.V. = Coefficient of Variation.

Table 16. Examples of Variability in Upland Land Use Data

Physio-graphic Unit	Transect ¹	Area in Hectares Per Quarter Section											
		Unused			Grazing			Roads & Railways					
		Mean	S.E. ²	C.V. ³	Mean	S.E.	C.V.	Mean	S.E.	C.V.			
	(<u>Morainal - K&K</u>)												
7.20	Pleasantdale East	5.5	23.8	21.3	7.3	65.5	43.9	1.2	0.1	0.3			
7.22	Nut Mountain	6.2	28.3	22.2	6.7	31.7	23.2	1.6	0.4	1.3			
	(<u>Morainal - U</u>)												
7.13	Midnight Lake	5.3	11.0	10.2	13.5	93.7	34.0	1.7	0.4	1.3			
7.21	Porcupine Plain	13.1	57.7	21.6	1.0	1.5	7.1	2.9	0.3	0.5			
	(<u>Lacustrine - D</u>)												
7.19	Ridgedale	5.3	12.9	12.0	0.0	0.0	0.0	1.7	0.4	1.1			
	(<u>Eolian - H</u>)												
7.17	Leask	7.5	39.0	25.6	9.1	63.7	34.1	1.5	0.1	0.3			
Ecoregion Sample		7.1	12.0	20.1	6.3	18.6	35.6	1.8	0.1	0.9			

1. Transects are grouped by landform (soil parent material and surface form).

2. S.E. = Standard Error.

3. C.V. = Coefficient of Variation.

Table 17. Estimated Area of Wetland Cover Classes in Physiographic Units

Physiographic Unit Number	Name	Estimated Area in Thousands of Hectares											
		Total Wetland Area	Cult- ivated	Willows and Trees	Grasses and Sedges	Bulrush/ Cattail	Trans- itional		Natural		Artif- icial		Other
							Open Water	Water	Open Water	Water	Open Water	Water	
(Morainal - K&K)													
7.20	Barrier River Upland	8.8	0.7	1.2	2.8	0.4	0.0	0.0	3.5	0.1	0.0	0.1	
7.22	Porcupine Upland	42.6	7.8	9.0	24.9	0.0	0.0	0.0	0.0	0.6	0.0	0.3	
(Morainal - U)													
7.13	Thickwood Hills	60.1	4.6	8.1	25.8	14.7	0.0	0.0	6.5	0.4	0.0	0.0	
7.21	Lower Red Deer River Plain	32.7	19.8	2.7	8.5	0.1	0.0	0.0	0.1	1.5	0.0	0.0	
7.23	Lac La Course Plain	4.4	2.1	0.5	1.5	0.1	0.0	0.0	0.1	0.1	0.0	T ²	
Total Morainal ³		148.6	35.0	21.5	63.5	15.3	0.0	0.0	10.2	2.7	0.0	0.4	
Total Morainall ⁴		144.2	32.9	21.0	62.0	15.2	0.0	0.0	10.1	2.6	0.0	0.4	
(Lacustrine - D)													
7.19	Tisdale Plain	14.3	7.4	0.2	4.8	0.2	0.0	0.0	0.2	0.2	0.0	1.3	
Total Lacustrine		14.3	7.4	0.2	4.8	0.2	0.0	0.0	0.2	0.2	0.0	1.3	

1. Grouped by landform (soil parent material and surface form).
2. T = trace = less than 50 hectares.
3. Summation of values from individual units including 7.23 in which the data sample is located in the Manitoba portion of the unit.
4. Summation of values from individual units excluding 7.23.

Table 17. Estimated Area of Wetland Cover Classes in Physiographic Units - Continued

Physiographic Unit ¹ Number	Name	Estimated Area in Thousands of Hectares											
		Total Wetland Area	Cult- ivated	Willows and Trees	Grasses and Sedges	Bulrush/ and Cattail	Trans- itional		Natural		Artif- icial		Other
							Open Water	Open Water	Open Water	Open Water			
7.17	Nisbet Sand Plain	24.5	1.5	2.2	9.6	2.5	0.0	0.0	8.7	T	0.0	T	
Total Eolian		24.5	1.5	2.2	9.6	2.5	0.0	0.0	8.7	T	0.0	T	
Total for Entire Sampled Portion of Ecoregion		A ⁵ 187.4	43.9	23.9	77.9	18.0	0.0	0.0	19.1	2.9	0.0	T	
		A ⁶ 183.0	41.8	23.4	76.4	17.9	0.0	0.0	19.0	2.8	0.0	1.7	
		B ⁷ 186.8	37.6	22.2	73.4	16.6	0.0	0.0	33.1	2.2	0.0	1.7	

5. Based on summation of values from individual physiographic units including 7.23.

6. Based on summation of values from individual physiographic units excluding 7.23.

7. Based on the analysis of the ecoregion sample as a single unit excluding 7.23.

Table 18. Estimated Numbers of Wetland Cover Classes in Physiographic Units

Physiographic Unit ¹ Number Name	Estimated Number of Wetlands (in Thousands)									
	Total Number of Wetlands	Cult- ivated	Willows and Trees	Grasses and Sedges	Bulrush/ Cattail	Trans- itional Open Water	Natural Open Water	Artif- icial Open Water	Saline Open Water	Other
<u>(Morainal - K&K)</u>										
7.20 Barrier River Upland	6.2	1.4	1.2	2.7	0.1	0.0	0.3	0.4	0.0	0.1
7.22 Porcupine Upland	164.4	72.5	12.0	76.6	0.0	0.0	0.0	2.3	0.0	1.0
<u>(Morainal - U)</u>										
7.13 Thickwood Hills	88.7	31.0	14.5	38.9	0.0	0.0	2.8	1.5	0.0	0.0
7.21 Lower Red Deer River Plain	103.1	62.7	5.9	26.7	0.5	0.0	0.2	7.1	0.0	0.0
7.23 Lac La Course Plain	20.9	12.9	0.7	5.1	0.2	0.0	0.5	1.4	0.0	0.1
Total Morainals ²	383.3	180.5	34.3	150.0	0.8	0.0	3.8	12.7	0.0	1.2
Total Morainals ³	362.4	167.6	33.6	144.9	0.6	0.0	3.3	11.3	0.0	1.1
<u>(Lacustrine - D)</u>										
7.19 Tisdale Plain	125.8	96.0	1.6	24.7	0.0	0.0	0.4	1.6	0.0	1.5
Total Lacustrine	125.8	96.0	1.6	24.7	0.0	0.0	0.4	1.6	0.0	1.5

1. Grouped by landform (soil parent material and surface form).

2. Summation of values from individual units including 7.23 in which the data sample is located in the Manitoba portion of the unit.

3. Summation of values from individual units excluding 7.23.

Table 18. Estimated Numbers of Wetland Cover Classes in Physiographic Units - Continued

Physiographic Unit ¹ Number	Physiographic Unit Name	Estimated Number of Wetlands (in Thousands)									
		Total Number of Wetlands	Cult- ivated	Willows and Trees	Grasses and Sedges	Bulrush/ Cattail	Trans- itional Open Water	Natural Open Water	Artif- icial Open Water	Saline Open Water	Other
7.17	Nisbet Sand Plain	27.2	13.4	1.3	9.7	0.5	0.0	2.1	0.1	0.0	0.1
	Total Eolian	27.2	13.4	1.3	9.7	0.5	0.0	2.1	0.1	0.0	0.1
	Total for Entire Sampled Portion of Ecoregion	536.3 515.4 493.7	289.9 277.0 269.5	37.2 36.5 34.1	184.4 179.3 164.4	1.3 1.1 1.5	0.0 0.0 0.0	6.3 5.8 7.9	14.4 13.0 13.3	0.0 0.0 0.0	2.8 2.7 3.0

4. Based on summation of values from individual physiographic units including 7.23.

5. Based on summation of values from individual physiographic units excluding 7.23.

6. Based on the analysis of the ecoregion sample as a single unit excluding 7.23.

Table 19. Estimated Area of Wetland Use Activity Classes in Physiographic Units

Physiographic Unit Number	Physiographic Unit Name	Estimated Area in Thousands of Hectares						
		Total Wetland Area	No Use	Abandoned Cultivation	Annual Crops	Haying	Grazing	Other
<u>(Morainal - K&K)</u>								
7.20	Barrier River Upland	8.8	5.3	T ²	0.7	0.1	2.7	0.0
7.22	Porcupine Upland	42.6	21.2	2.4	7.9	0.3	9.4	1.4
<u>(Morainal - U)</u>								
7.13	Thickwood Hills	60.1	33.9	0.3	4.6	7.0	14.2	0.1
7.21	Lower Red Deer River Plain	32.7	9.4	0.6	19.9	0.2	1.3	1.3
7.23	Lac La Course Plain	4.4	1.9	0.2	2.1	T	T	0.2
Total Morainal ³		148.6	71.7	3.5	35.2	7.6	27.6	3.0
Total Morainall ⁴		144.2	69.8	3.3	33.1	7.6	27.6	2.8
<u>(Lacustrine - D)</u>								
7.19	Tisdale Plain	14.3	4.9	1.1	7.4	0.2	0.0	0.7
Total Lacustrine		14.3	4.9	1.1	7.4	0.2	0.0	0.7

1. Grouped by landform (soil parent material and surface form).
2. T = trace = less than 50 hectares.
3. Summation of values from individual units including 7.23 in which the data sample is located in the Manitoba portion of the unit.
4. Summation of values from individual units excluding 7.23.

Table 19. Estimated Area of Wetland Use Activity Classes in Physiographic Units - Continued

Physiographic Unit ¹ Number	Name	Estimated Area in Thousands of Hectares						
		Total Wetland Area	No Use	Abandoned Cultivation	Annual Crops	Haying	Grazing	Other
7.17	Nisbet Sand Plain	24.5	13.4	0.2	1.5	2.2	7.1	0.1
Total Eolian		24.5	13.4	0.2	1.5	2.2	7.1	0.1
Total for Entire Sampled Portion of Ecoregion		187.4 183.0 186.8	90.0 88.1 92.9	4.8 4.6 3.9	44.1 42.0 37.5	10.0 10.0 9.9	34.7 34.7 39.4	3.8 3.6 3.2

5. Summation of values from individual physiographic units including 7.23.

6. Summation of values from individual physiographic units excluding 7.23.

7. Based on the analysis of the ecoregion sample as a single unit excluding 7.23.

Table 20. Estimated Area of Upland Cover Classes in Physiographic Units

Physiographic Unit Number	Total Upland Area	Estimated Area in Thousands of Hectares					Planted				
		Grass	Low Shrub	Tall Shrub	Trees	Total	Annual Crops	Perennial Grasses and Forbs	Trees and Shrubs	Other	
(Morainal - K&K)											
7.20	Barrier River Upland	86.0	6.1	T ²	4.4	5.8	16.3	62.7	5.9	0.1	1.0
7.22	Porcupine Upland	483.6	36.3	0.5	3.4	58.5	98.7	350.6	25.6	0.5	8.2
(Morainal - U)											
7.13	Thickwood Hills	428.6	77.5	2.6	4.3	68.6	153.0	227.6	41.1	0.0	6.9
7.21	Lower Red Deer River Plain	370.0	18.1	1.9	2.2	77.3	99.5	246.1	14.4	0.4	9.6
7.23	Lac La Course Plain	175.9	9.5	T	0.3	2.5	12.3	149.5	7.4	1.2	5.5
Total Morainal ³		1,544.1	147.5	5.0	14.6	212.7	379.8	1,036.5	94.4	2.2	31.2
Total Morainall ⁴		1,368.2	138.0	5.0	14.3	210.2	367.5	887.0	87.0	1.0	25.7
(Lacustrine - D)											
7.19	Tisdale Plain	317.9	15.6	0.3	5.7	14.3	35.9	265.1	14.7	0.3	1.9
Total Lacustrine		317.9	15.6	0.3	5.7	14.3	35.9	265.1	14.7	0.3	1.9

1. Grouped by landform (soil parent material and surface form).

2. T = trace = less than 50 hectares

3. Summation of values from individual units including 7.23 in which the data sample is located in the Manitoba portion of the unit.

4. Summation of values from individual units excluding 7.23.

Table 20. Estimated Area of Upland Cover Classes in Physiographic Units - Continued

Physiographic Unit Number	Physiographic Unit Name	Estimated Area in Thousands of Hectares									
		Native					Planted				
		Total Upland Area	Grass	Low Shrub	Tall Shrub	Trees	Total	Annual Crops	Perennial Grasses and Forbs	Trees and Shrubs	Other
7.17	Nisbet Sand Plain	163.5	28.4	0.7	1.8	23.2	54.1	91.2	16.9	0.3	1.0
Total Eolian		163.5	28.4	0.7	1.8	23.2	54.1	91.2	16.9	0.3	1.0
Total for Entire Sampled Portion of Ecoregion		2,025.5	191.5	6.0	22.1	250.2	469.8	1,392.8	126.0	2.8	34.1
A ⁵		1,849.6	182.0	6.0	21.8	247.7	457.5	1,243.3	118.6	1.6	28.6
B ⁷		1,845.8	180.9	5.5	31.4	227.0	444.8	1,247.8	123.7	1.8	27.7

5. Based on summation of values from individual physiographic units including 7.23.

6. Based on summation of values from individual physiographic units excluding 7.23.

7. Based on the analysis of the ecoregion sample as a single unit excluding 7.23.

Table 21. Estimated Area of Upland Land Use Activity Classes in Physiographic Units

Physiographic Unit Number	Physiographic Unit Name	Total Upland Area	Estimated Area in Thousands of Hectares							
			Unused	Abandoned	Annual Crops	Forage	Grazing	Farm- steads	Roads and Railways	Other
<u>(Morainal - K&K)</u>										
7.20	Barrier River Upland	86.0	7.9	0.3	62.6	1.0	10.5	0.7	1.7	1.3
7.22	Porcupine Upland	483.6	49.8	1.0	350.6	3.9	53.7	2.9	13.0	8.7
<u>(Morainal - U)</u>										
7.13	Thickwood Hills	428.6	39.0	2.1	227.6	40.3	99.5	3.0	12.4	4.7
7.21	Lower Red Deer River Plain	370.0	79.5	1.5	246.0	2.2	6.3	3.7	17.8	13.0
7.23	Lac La Course Plain	175.9	4.7	2.5	149.5	5.3	0.9	3.0	6.5	3.5
Total Morainals ²										
		1,544.1	180.9	7.4	1,036.3	52.7	170.9	13.3	51.4	31.2
Total Morainals ³										
		1,368.2	176.2	4.9	886.8	47.4	170.0	10.3	44.9	27.7
<u>(Lacustrine - D)</u>										
7.19	Tisdale Plain	317.9	26.7	0.9	264.8	15.6	0.0	0.9	8.9	0.1
Total Lacustrine										
		317.9	26.7	0.9	264.8	15.6	0.0	0.9	8.9	0.1

1. Grouped by landform (soil parent material and surface form).
2. Summation of values from individual units including 7.23 in which the data sample is located in the Manitoba portion of the unit.
3. Summation of values from individual units excluding 7.23.

Table 21. Estimated Area of Upland Land Use Activity Classes in Physiographic Units - Continued

Physiographic Unit ¹ Number	Total Upland Area	Estimated Area in Thousands of Hectares								
		Unused	Abandoned	Annual Crops	Forage	Grazing	Farm- steads	Roads and Railways	Other	
(Eolian - H)										
7.17 Nisbet Sand Plain	163.5	21.1	0.5	91.2	18.5	26.0	1.5	4.2	0.5	
Total Eolian	163.5	21.1	0.5	91.2	18.5	26.0	1.5	4.2	0.5	
Total for Entire Sampled Portion of Ecoregion	A ⁴ A ⁵ B ⁶	2,025.5 1,849.6 1,845.8	228.7 224.0 219.7	8.8 6.3 5.5	1,392.3 1,242.8 1,247.8	86.8 81.5 84.9	196.9 196.0 193.8	15.7 12.7 12.9	64.5 58.0 55.4	31.8 28.3 25.8

4. Based on summation of values from individual physiographic units including 7.23.

5. Based on summation of values from individual physiographic units excluding 7.23.

6. Based on the analysis of the ecoregion sample as a single unit excluding 7.23

Table 22. Rating of Sampled MORAINAL Physiographic Units in Saskatchewan Mid-Boreal Transition as Waterfowl Production Habitat

Physiographic Unit ¹ Number	Name	Percent of Wetland Area			Percent of Upland Area		Area of Unit in 1000's of Hectares	Rating as Waterfowl Production Habitat ²		
		Percent of Total Unit Area in Wetlands	In Cover Class		Native and Seeded That is Grass and Shrub Cover Unused					
			Bulrush/ Cattail	Natural Fresh Open Water	Unused					
7.13	Thickwood Hills	12.3	43.0	24.5	10.8	56.5	29.3	9.1	488.7 ⁴	1 / 2 / 1
7.20	Barrier River Upland	9.2	31.4	4.9	40.2	60.5	19.1	9.2	94.8	1 / 1 / 2
7.21	Lower Red Deer River Plain	8.1	26.2	0.2	0.2	28.7	9.9	21.5	402.7 ⁴	4* / 4 / 4*
7.22	Porcupine Upland	8.1	58.6	0.0	0.0	49.8	13.6	10.3	526.2	4* / 4* / 3*
7.23	Lac La Course Plain ³	2.4	33.8	3.2	1.3	43.3	11.2	2.7	180.3 ⁴	3 / 4* / 4

1. Physiographic units are arranged in order of diminishing proportion of wetland area in the landscape.
2. Three waterfowl production ratings have been calculated for each unit using the minimum rating values for, sequentially, Saskatchewan Mid-Boreal Transition/ Manitoba Mid-Boreal Transition/ Alberta Parkland. Asterisks indicate ratings which have been downgraded one level because of loss of points for both bulrush/cattail and natural fresh open water.
3. Sampled only in the Manitoba portion of the unit.
4. Saskatchewan portion of the unit only.

Table 23. Frequency of Land Use/ Cover Changes Between May 1985
and Time of Ground Truth Survey

Physio- graphic Unit	Transect ¹	Numbers of Quarters ² Affected by		Percent of Quarters Affected	Time Interval from May 1985 to Ground Truth Survey (in months)
		In Sample	Land Use/ Cover Changes		
	(<u>Morainial - K&K</u>)				
7.20	Pleasantdale East	24	9	37.5	29
7.22	Nut Mountain	24	18	75.0	65
	(<u>Morainial - U</u>)				
7.13	Midnight Lake	24	8	33.3	29
7.21	Porcupine Plain	24	11	45.8	65
	(<u>Lacustrine - D</u>)				
7.19	Ridgedale	24	16	66.7	65
	(<u>Eolian - H</u>)				
7.17	Leask	24	14	58.3	65
Ecoregion Sample		144	76	52.8	

1. Transects are grouped by landform (soil parent material and surface form).