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

Report #3: Saskatchewan Parkland - Part II

Prairie Habitat Monitoring Project

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## ABSTRACT

The 1988/89 fiscal year is year three of a five-year program to establish baseline habitat values for various physiographic units in the Prairie Provinces. This report presents data for 24 transects and 15 physiographic units primarily in the western part of the Saskatchewan Parkland as well as a summation of conditions in the Saskatchewan Parkland as a whole.

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, considerable caution must be used in interpreting apparent habitat differences and habitat values extrapolated from sample means for physiographic units. The application of non-parametric analytical techniques to the data will be attempted in the future.

Distribution of sampling amongst landform categories parallels quite closely the level of occurrence of those categories within the Saskatchewan Parkland Ecoregion.

For the ecoregion sample as a whole:

a) Wetland area averages 9.5 percent of the total land area of sampled physiographic units.

b) Wetland area and numbers are highest on morainal landforms. Those landforms comprise almost two thirds of the total area of the ecoregion.

c) An overwhelming proportion of wetland numbers (92.5 percent) and wetland area (81.2 percent) are temporary or seasonal in nature.

d) Almost four fifths (79 percent) of the total upland area is in annual crops and only 16.4 percent is in native cover.

e) Three morainal physiographic units, the Touchwood-Beaver Hills, Ponass Lakes Plain and Redberry Lake Upland are rated as the best waterfowl production areas in the sampled portion of the ecoregion.

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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 1986a) 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 recent 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 methods and activities described 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 1986b).

## III. Methods

The methods employed in this project have been described in detail in an earlier report (Millar 1987). Therefore, information presented here will be confined to changes in methodology which have been instituted since that report and which apply directly to the material presented in this report.

### A. Delineation of Physiographic Units

Physiographic unit boundaries within Saskatchewan parkland have been mapped on 1:250,000 scale topographic maps with the aid of 1970 aerial photos and newly developed soils and surficial geology maps. Contrary to initial expectations, this mapping has produced many significant changes in the boundaries delineated by Adams (1984). These changes fall into three categories:

1. Boundary shifts between units - These have affected all of the physiographic units covered in this report.

2. Creation of new physiographic units - A total of six new units have been delineated within the Saskatchewan Parkland. Two of these, the Neutral Upland and Kerrobert Plain, are covered in this report. The Neutral Upland is a previously defined unit which has been transferred from mixedgrass prairie (Unit 2.35) to parkland (Unit 4.88) on the basis of a redefinition of the grassland-parkland boundary. The Kerrobert Plain is a

new unit (4.89) created out of portions of the Sibbald Plain (2.34) and Tramping Lake Plain (2.69) as a result of the redefinition of the grassland-parkland boundary.

3. Identification of subdivisions within physiographic units - This has been done on the basis of obvious differences in density and distribution of wetlands and, to some extent, topography. These subdivisions have not been utilized in this report but should provide a basis for more accurate sampling of habitat conditions in the future if resources become available for expanding the sampling network.

B. Sampling Network

The number of transects in the sampling network remains at 152 as previously reported (Millar 1988). Four of the 24 transects discussed in this report have been created by transect splitting and sample three additional physiographic units plus one distinctive subdivision of a fourth unit.

C. Data Assembly

1. Wetland impact and upland secondary cover and feature codes. Occasional new categories are still being created as new situations requiring special identification are encountered. These will be summarized in a later report.

2. Preparation of "clean data records". Our procedures have now been modified so that corrected descriptive data are entered directly into the in-house computer at the Prairie and Northern Wildlife Centre in Saskatoon and transferred onto diskettes for transmission to the Environmental Information System (EIS) of Canadian Wildlife Service (formerly the Canada Land Data System of Lands Directorate) in Ottawa.

D. Data Analysis

Summarization of all cover/activity combinations for both wetlands and uplands has proven to be a rather cumbersome exercise with many combinations occurring only rarely and contributing little to overall habitat conditions within a sample. In order to simplify evaluation of the occurrence of various cover and activity classes data analysis has been divided into two steps. First, cover classes are summarized without regard to land use activities and, second, land use activities are summarized without regard to cover. In this latter summary a number of minor land use activity classes have been combined.

At the present time wetland margin data are not being analysed and consideration of wetland impacts is being limited to identifying the number of wetlands per quarter section that are affected by one or more permanent impacts.

The EIS in Ottawa is now generating all polygon area values in hectares so the conversion of data from acres to hectares described in my previous report (Millar 1988) is no longer required.

In this report wetlands are categorized in terms of cover classes established in accordance with the former Canada Land Data System's Land Cover Classification. These classes are equated in the following table to the wetland types defined in Millar's (1984) wetland classification system.

| Wetland Cover Class Used in this Report (1) | Wetland Types of Millar (1984) Basin Wetlands | Wetlands Identified as Stream Segments |
|---|---|---|
| Cultivated (V1, X0) | 0.3 | |
| Shrubs and Trees (W3, W1) | 0.2, 1.2 | |
| Grasses, Sedges and Forbs (V3) | 1.1, 1.8, 2.1, 2.8 | 1.9, 2.9 |
| Bulrush & Cattail (V4) | 3.1, 3.8 | 3.9, 9.1, 9.3 |
| Transitional Open Water (Z6) | 4.1, 4.8 | 4.9 |
| Natural Fresh Open Water (Z3) | 5.1, 5.2, 5.8, 9.9 | 5.9, 9.5 |
| Artificial Open Water (Z5) | 5.3, 5.4, 5.5, 9.8 | 5.6, 5.7, 9.2 |
| Saline Open Water (Z4) | 6.1 | |
| Other (primarily V2, V5, X - non-cultivated, Z1) | 0.3 | 9.6 |

(1) Cover codes are in parentheses.

E. Terminology

In this report in the term "unit" is used as an abbreviation for "physiographic unit".

## IV. Results and Discussion

Presentation of data on baseline habitat conditions in Saskatchewan Parkland has been divided between last year's report (Millar 1988) and this one. Therefore this report will contain both information on transects and physiographic units not previously covered and an overview of conditions in the ecoregion as a whole.

### A. General Information on Saskatchewan Parkland

#### 1. Parkland Area and Distribution of Sampled Units

The total area occupied by the Saskatchewan Parkland is calculated to be approximately 13,404,300 hectares (Table 1), based on the boundaries of physiographic units lying within the ecoregion. In a later report a comparison will be drawn between the area calculated in this fashion and the area of the ecoregion based on surveyed and redefined vegetation boundaries. Some further minor modification to the area of the ecoregion will also be made once parkland outliers in the mixedgrass prairie have been surveyed.

Physiographic units which have been sampled with habitat monitoring transects in Saskatchewan account for just over three quarters (75.8 percent) of the total area of the ecoregion (Table 1) while unsampled units cover 20.3 percent of the area. 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 3.8 percent of the total area of the ecoregion.

#### 2. Distribution of Landforms in Saskatchewan Parkland

The distribution of various landforms in Saskatchewan Parkland is summarized in Table 2. Morainal terrain occupies almost two thirds (65.7 percent) of the total area of physiographic units in the ecoregion and 87.7

percent of that area is in units currently being sampled in this study. Over half of the morainal area is made up of one sub-category - knob and kettle surface form with 4 to 9 percent slopes. Almost all of this sub-category is in physiographic units which are being sampled. The most poorly sampled sub-category of morainal terrain (other than one unit of mixed surface form) is the very rough (10 percent and greater slopes) knob and kettle terrain where only 30.8 percent of the land is in units containing transects. Lack of access in these rough uplands is a prime factor in the low level of sampling. However, since these areas are most likely to contain significant amounts of undisturbed natural habitats, efforts should be made in the future to sample them more extensively.

Lacustrine and lacustrine-complex areas occupy almost a quarter (23.2 percent) of the total area of the ecoregion's physiographic units but only 58.8 percent of that area is in units currently being sampled. Since the soils on these landforms have for the most part already been intensively developed for agriculture there is a low level of existing natural habitats and little potential for future change. Increased sampling on these landforms is therefore not considered to be a high priority.

The remaining 11.2 percent of land in physiographic units is found on a variety of landforms, including various combinations of fluvial, aeolian and alluvial terrain. Over two thirds (68.5 percent) of this area is in units that are being sampled.

The distribution of habitat sampling in the various landform categories is also shown in Table 2. For most major morainal categories the correlation between distribution of sampling and distribution of the category in the ecoregion is quite close. Sampling for all morainal categories amounts to 71.7 percent of our total effort while those same

categories account for 65.7 percent of the total land area in the ecoregion. The extent of sampling in lacustrine categories is somewhat low in relation to the distribution of those categories - 18.0 and 23.2 percent, respectively. For the variety of fluvial, aeolian and alluvial categories the correlation between distribution of sampling and presence of the categories in the ecoregion is quite close - 10.4 and 11.2 percent, respectively.

3. Location and Landform Character of Individual Physiographic Units

Figure 1 delineates the location of all physiographic units in Saskatchewan Parkland, including those covered in this report, those previously reported and units which have not been sampled at all.

This report presents baseline habitat data for 24 sample sites in 15 physiographic units. Individual units and the transects located in them are listed in Table 3. Collectively these 15 units comprise an area of approximately 5,385,800 hectares (Table 5) or about 40 percent of Saskatchewan Parkland.

Origin of soil parent material, surface form and slope values for the 15 units are summarized in Table 3. Slightly more than half of the units are entirely or predominantly of morainal origin. Two each are on lacustrine and lacustrine/morainal material and one each are on fluvial/aeolian, fluvial/lacustrine and aeolian material, respectively. Seven of the eight morainal units have predominantly knob and kettle landform and one is on hummocky terrain. All of the lacustrine, lacustrine/morainal and fluvial/lacustrine units are on undulating terrain while the fluvial/aeolian and aeolian units have a mixture of undulating and hummocky surface forms.

The 22 physiographic units in Saskatchewan Parkland which have not been sampled to date are summarized in Table 4 as to their soil parent material, surface form, degree of slope and area. Ten of them are morainal in nature, five are primarily lacustrine and another three are various lacustrine-dominated combinations. Of the remaining four, one each is fluvial, aeolian/fluvial, fluvial/lacustrine and alluvial/morainal. Two of the units, the Provost and Hillmond Uplands, are sampled in the Alberta portion of the units.

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. Samples range from a low of 0.3 percent of the Whitesand River Plain to a high of 2.5 percent of the Neutral Upland. Overall sample size for the 15 units is 0.7 percent which compares closely with that (0.6 percent) of the 13 units previously reported (Millar 1988).

Most of the 15 units contain sufficiently well-defined variations in surface form, including density and size distribution of wetlands, that they can be divided into two or more sub-units. This situation is most extreme in the Eagle Hills and Redberry Lake Upland which have been divided into 11 and 12 sub-units, respectively. 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 done there should be additional sampling in other large sub-units.

As mentioned in last year's report, it is my feeling that any future expansion of the sampling base should be done by creating new transects at other sites, rather than enlarging the sample within existing transects in order to provide a broader sampling of the units.

B. Sample Results

1. Percent of Total Land Area Occupied by Wetlands and Uplands

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 24 individual transects there is a seven-fold variation (2.4 to 16.7) in the percent of total land area occupied by wetlands (Table 6). This is a somewhat broader range of variation than that encountered in the 18 transects previously studied.

(a) Landform character and wetland area - Wetland area values in the transects covered in this report are on the whole much higher in morainal terrain than in any other landform, ranging from 6.9 to 16.7 percent and averaging 10.4 percent for 13 transects. Lacustrine/morainal areas have the next highest average value at 8.3 percent. Two of the three transects in that group have values equivalent to the mid-range of the morainal category. This undoubtedly reflects the influence of underlying morainal landforms on thin lacustrine veneers. Lowest wetland area values occur on lacustrine and combinations of lacustrine, fluvial, aeolian and alluvial landforms and only one of these transects has an area value above 5 percent.

Within the knob and kettle sub-category of morainal landform the pattern observed in previously reported transects (Millar 1988) was found to prevail in the present sample. That is, areas with the lowest and strongest relief (1 to 3 and 10 to 15 percent slopes, respectively) have the highest and closely comparable wetland area values (11.7 and 11.8 percent, respectively). The intermediate relief class (4 to 9 percent slopes) has a lower average wetland area (9.0 percent). The maximum

wetland area of 16.7 percent occurred on a hummocky morainal landscape in a unit that is characterized by the presence of a low density of very large wetlands and small lakes.

For the ecoregion as a whole the percent of land area occupied by wetlands ranges from 2.4 to 18.1 and averages 9.5. Morainal terrain has the highest overall average wetland area at 11.0 percent and also the widest range (4.7 to 18.1 percent) in area. Lacustrine/morainal complexes have wetland area levels similar to morainal terrain, averaging 9.4 percent, while all other landforms have substantially lower wetland area values, averaging 4.4 percent.

(b) Variability in wetland area between samples within the same physiographic unit - Seven of the 15 physiographic units covered in this report each contain two transects and one has three. The expectation in such situations is that transects within the same relatively homogeneous unit should have reasonably comparable habitat values. This does not hold true for over half of the above cases (Table 6). Of the four multi-transect units on morainal landforms only one, the Eagle Hills (4.28), has very similar (7.0 and 7.4 percent) wetland area values in both transects. In the three-transect unit, the Moose Mountain Upland (4.55), however, two of the three transects have closely comparable values (6.9 and 7.4 percent). The three large differences on morainal landforms involve maximum values which are from 57 to 101 percent larger than minimum values. In one of these cases, the Neutral Upland, the difference is likely due to one transect (Hoosier) being located at the boundary between morainal and lacustrine landforms.

The two two-transect units on lacustrine terrain have very similar wetland area values for both transects (4.4 and 4.7 percent in one case and

2.4 and 3.7 percent in the other) but in the units on lacustrine/morainal and fluvial/aeolian terrain maximum area values exceed minimum values by 83 and 147 percent, respectively. The location of one transect adjacent to the boundary between undulating and knob and kettle terrain may account for the difference in the lacustrine/morainal unit. In the case of the fluvial/aeolian unit the difference is likely due to differing proportions of undulating and hummocky terrain in the two transects.

(c) 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 wetlands, and 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 transects covered in this report ranges from 0.1 percent at Pleasantdale West to 5.6 percent at Waldheim (Table 6) where 61 percent of the total wetland area is cultivated. Unlike the situation described for previously reported transects in the ecoregion (Millar 1988), there does appear to be some consistency in the relationship between some landforms and the percent of total land area occupied by cultivated wetlands. Values for all morainal sub-categories are consistently low, ranging between 0.1 and 2.9 percent. Similarly, values for lacustrine units range between 0.4 and 1.9 percent. Highest values (in excess of 3 percent) occur on transects in lacustrine/morainal and fluvial/aeolian units.

Differences between transects in the same physiographic unit, in percent of total land area occupied by cultivated wetlands, are generally quite small because of the size of the percentages involved. The most

extreme differences in terms of percent of land area involved occur in unit 4.89, the Kerrobert Plain (1.6 and 3.6 percent), and unit 4.31, Asquith-Dundurn-Goose Lake Sandhills and Plain (0.4 and 4.0 percent).

For the ecoregion as a whole, total land area occupied by cultivated wetlands ranges from 0.1 to 6.7 percent and averages 1.8 percent. The highest values in our samples are found in the Hawarden Hills (Loreburn - 6.7 percent), a hummocky morainal area, and the South Saskatchewan River Plain (Waldheim - 5.6 percent), an undulating lacustrine/morainal area.

2. Wetlands

(a) 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. The dominance of the two cover classes, cultivated and grasses, is not as consistent in the group of transects covered in this report as it was for those previously reported (Millar 1988) and ranges from 15.2 to 90.5 percent of total wetland area. A significant factor in this situation is the wider distribution of wooded wetlands in many units. If cultivated, grassy, and wooded cover are considered collectively as the cover types most indicative of temporary or seasonal water conditions, then this group does dominate in all transects (51.6 to 97.7 percent of total wetland area). In only three transects does the group value fall below 74 percent. In two of those cases large saline wetlands are important elements and in the third, the Whitesand River Plain (4.51), the situation is distorted by a single large bulrush/cattail marsh which accounts for almost half the total wetland area in the transect.

The percent of wetland area that is cultivated varies in the 24 transects from 0.4 percent at Pleasantdale on hummocky morainal terrain to

60.9 percent at Waldheim on an undulating lacustrine/morainal mix. In three transects cultivation is the dominant cover type. Within the 24 transects it is difficult to establish any consistent relationship between landform and the extent of wetland cultivation. Minimal cultivation values are variously associated with the occurrence of more permanent wetlands and with the occurrence of light soils which are less suitable for cropping. Six of the seven highest levels of cultivation occur on undulating terrain. This is not surprising since wetlands in areas of low relief tend to be shallower and hence more susceptible to cultivation. Those same six high levels occur on lacustrine/morainal and various non-morainal landforms. Within the morainal group there seems to be some tendency for higher cultivation levels to be associated with lower levels of wetland area in the landscape but this pattern is not clear-cut.

Grass (including sedges and forbs) is the dominant cover class in 18 of the 24 transects. While both wet meadow and shallow marsh vegetation are included in the class, ground-truthing surveys have confirmed that by far the great majority of the area involved is shallow marsh.

Willows and trees constitute a more significant element of wetland cover in this group of transects than in those covered in last year's report. The percent of total wetland area in this cover class ranges from 0.2 to 45.3 and 11 of the 24 transects have values higher than the 11 percent maximum recorded last year. Willows and trees form the dominant cover class in two transects and the second most common cover type in eight others. The values given in Table 7 for this cover class includes only cover which can be mapped as polygons and not all the narrow wooded margins which are characteristic of parkland wetlands.

Bulrush and cattail (deep marsh vegetation) generally account for only a minor part of total wetland cover and achieve double digit values in only four transects. The one situation in which this class appears to be dominant has been distorted by the presence of one very large bulrush marsh on the edge of the transect which accounts for almost half the total wetland area in that transect.

Transitional open water, which can only be identified from ground surveys, is irregular in its occurrence. It is recorded on only six transects and never constitutes more than 7.2 percent of wetland area. This class is useful as an indicator of areas which have recently experienced above-normal water levels.

Natural fresh open water is highly variable in its occurrence, as it was in previously reported transects in the ecoregion. It is not recorded at all in four transects, all of which are on lacustrine, fluvial/lacustrine and fluvial/aeolian landforms, occupies three percent or less of the wetland area in another 12 transects and achieves a maximum of 21.1 percent at Pleasantdale West.

The area of artificial open water is consistently low in 22 of the 24 transects, ranging from zero to 2.6 percent. This is to be expected since most of this cover class occurs as small dugouts. The two larger values of 9.8 and 13.4 percent on the Inchkeith and Cloan West transects are due to the presence of large reservoirs.

Saline open water is present on only three transects and in significant amounts in only two of those, Hoosier (38.5 percent) and Fusilier (20.8 percent), both of which are in the Neutral Upland. This cover class is, however, based on personal observations, more widely distributed outside of the sample sites.

Other cover classes account for more than two percent of wetland area in only three transects and in each case the cover class is open running water (streams).

The percent of wetland area in various cover classes varies widely between transects within the same physiographic unit. Of the 46 data pairs and triads (i.e., those cover classes which were recorded in both or in all three transects), 17 or 37 percent have differences of less than five percent of the total wetland area while in the remaining 29 or 63 percent the differences are greater and run up to 45 percent of the wetland area. This differs markedly from the results obtained for the previously recorded transects where 58 percent of the data pairs had small differences. Nineteen (66 percent) of the large differences were associated with the three major cover types but only five (29 percent) of the small differences were associated with this group. This is to be expected since the potential for large differences is greater where larger areas are involved. On the other hand, the great majority of small differences were associated with the more poorly represented cover classes. Large differences occurred most frequently (in five of the nine cover classes) in the Eagle Hills (4.28), Asquith-Dundurn-Goose Lake Sandhills and Plain (4.31) and the Moose Mountain Upland (4.55). With the exception of the Moose Mountain Upland, the members of transect pairs exhibit identifiable landform differences which may account for the large differences in distribution of wetland cover classes.

For the ecoregion sample as a whole 94.5 percent of the total wetland area falls into five cover classes: grass - 52.9 percent, cultivated - 19.2 percent, willows and trees - 9.1 percent, natural open water - 8.2 percent, and bulrush/cattail - 5.1 percent. Temporary or seasonal

wetlands, as indicated by grass, cultivated and willow/tree cover, account for 81.2 percent of the total wetland area.

(b) 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 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 3.1 per quarter section in Wroxton East to 34.5 at Grayson. Wetland densities on transects in morainal landforms are, on the whole, substantially higher than those in all other landforms. Three of the four cases in which morainal densities do not exceed maximum values in other landforms occur in transects located on the very edge of morainal areas, a situation in which there is characteristically a lower wetland density. The fourth case (Pleasantdale West) involves a unique landform situation characterized by the presence of a low density of very large wetlands and small lakes.

Wetland density data from previously reported transects (Millar 1988), are consistent with those presented here. The three lowest morainal values all occur on transects located at the edge of morainal areas. The

unusually high density (23.2) recorded for a lacustrine area at Kinistino can be explained by the fact that the lacustrine soils there overlie knob and kettle morainal material and hence assume the character of that landform.

For the entire ecoregion sample the average density is 16.1 wetlands per quarter section. The fact that this average is within the range of morainal values is to be expected since almost 72 percent of our sampling and 66 percent of the land area in the ecoregion is in morainal landforms.

While high wetland densities are associated with morainal landforms and in particular the knob and kettle categories, it appears that within those categories maximum wetland densities may be associated equally with areas of both low (one to three percent slopes) and intermediate (four to nine percent slopes) relief. The highest recorded wetland density (37.1) in the ecoregion is found at Redvers in the Gainsborough Creek Plain (Millar 1988), an area of low relief ground moraine, while the next two highest values (34.5 and 31.5) occur on upland areas of intermediate relief.

(c) Numbers of wetlands in various cover classes - In relating the occurrence of cover classes to numbers of wetlands I had the option of using either the actual number of wetland basins (i.e., recording one cover class per wetland) or the total number of wetlands recorded as having measurable quantities of each cover class (i.e., listing a particular wetland N times, once for each cover class, in multi-polygon wetlands). In this and the preceding report I have followed the first option and have categorized each wetland according to the one cover class which dominates the central and deepest portion of the basin.

The three principal cover classes in terms of number of wetlands are, as they were for wetland area, cultivation, shrubs and trees and grasses.

Collectively they dominate 73.6 to 97.6 percent of the wetlands in the 24 transects (Table 8) and in only one case (Pleasantdale West) does the level drop below 85.6 percent. Obviously an overwhelming proportion of the wetland numbers in all areas are temporary or seasonal in nature. Within these classes cultivation dominates in seven transects, shrubs and trees in one, grasses in 15 and cultivation and grasses are equal in one.

Representation of all other cover classes is at a very low level. Bulrush/cattail and natural fresh open water both achieve their maximums (4.2 and 7.4 percent, respectively) at Pleasantdale West. None of their other values attain much more than half that level. Transitional open water never dominates more than 1.5 percent of the wetlands and saline open water 4.1 percent.

Artificial open water has an interesting pattern of distribution. It never dominates more than 5.7 percent of the wetlands in 21 of the 24 transects but in the remaining three transects (Wroxton East, Cloan West and Pleasantdale West) it accounts for 14.4 to 14.9 percent of the wetlands. In all three of those areas the wetland density is at or close to the minimum recorded for the ecoregion so in those areas dugouts are apparently forming a significant segment of the wetland numbers.

The variability in percent of total wetland numbers in various cover classes between different transects within the same physiographic unit is almost as great (up to 34 percent of total wetland numbers) as that discussed earlier for wetland area. However, the proportions of small and large differences are almost reversed with 28 or 60 percent of the 47 data pairs and triads having small differences. This agrees well with the results obtained for previously reported transects (Millar 1988). Almost all (95 percent) of the large differences in percent of wetland numbers are

associated with the three major cover types but only 21 percent of the small differences are similarly associated. When the small and large differences in percent of wetland numbers are matched against the corresponding values for wetland area those values coincide (i.e., small/small, large/large) in 29 cases and do not coincide in 15 cases. This is a lower level of coincidence than that observed with the previously reported transects. In addition, there is no matching area data for three pairs of number data and no matching number data for two pairs of area data. This is due to the fact that some very small cover values are identifiable for either wetland area or numbers but are recorded as a zero for the other.

For the ecoregion as a whole 92.5 percent of the wetlands are dominated by grass (52.5 percent), cultivation (32.4 percent) and shrubs and trees (7.6 percent). Of the remaining wetlands, 2.2 percent are each dominated by natural fresh open water and artificial open water and 1.5 percent by bulrush/cattail.

In my previous report I discussed at some length the use of wetland area and numbers values to draw inferences about the relationship between cover classes and wetland size. While this operation does confirm in general terms some of the broader, and generally accepted, aspects of the relationship, I have come to the conclusion that certain limitations in the available data reduce the accuracy of any such calculations to the point where it is not worth pursuing this line of analysis any further.

(d) Area of wetlands in various land use activity classes - Utilization of wetlands in the 24 transects falls into five major land use categories - no use, abandoned cultivation, annual crops, haying and grazing.

Collectively these five activity classes occur on 83.7 to 100 percent of the total wetland area (Table 9).

The percent of total wetland area that is not being subjected to any obvious or regular human activity ranges from 31 percent at Kerrobert to 80.2 percent at Grayson. There is no apparent relationship between the level of unutilized wetland area and landform.

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. Typically this category 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 areas. Percent of the total wetland area in this category ranges from zero to 8.2 for the 24 transects covered in this report. No extreme values such as those previously reported for Redvers (Millar 1988) have been encountered in this group.

Data on wetlands used for crop production are the same as those presented earlier for the cultivated cover class. The amount of wetland area being used for crop production ranges from 0.4 percent at Pleasantdale West to 61.0 percent at Waldheim.

Haying of wetlands occurs in 21 of the 24 transects and on 0.3 to 21.4 percent of the total wetland area. However, in only two of the transects is it widespread enough to involve more than 10 percent of the total wetland area. There is no apparent association between haying and landform.

Grazing of wetlands occurs in 21 of the 24 transects and on 0.7 to 50.9 percent of the wetland area. The level of grazing is considerably higher and more widespread in this group of transects than in those previously reported. In half the transects grazing occurs on more than 10 percent of the wetland area and in seven of those it occurs on more than 20 percent of the area. The six highest levels of grazing all occur in physiographic units in the western part of the ecoregion. As with the previous group of transects, high haying and grazing values do not occur in the same transect even though one would expect them to be associated with one another.

Other land uses are recorded in substantial amounts (7.6 to 16.3 percent of wetland area) in only four transects. In two of these, Inchkeith and Cloan West, large waterbodies are used for water storage and in the other two, Mayfair and Wapella, entire quarter sections have been set aside as wildlife habitat.

The frequency of substantial differences in land use activities on wetlands in different transects within the same physiographic unit is comparable to that observed for cover and wetland area data. Large differences (over 5 and up to 37 percent of total wetland area) occur in 57 percent of the 44 data pairs. The greatest frequency of large differences within individual physiographic units is found in the Kerrobert Plain (5 of 6 data pairs) followed by the Moose Mountain Upland (4 of 6 data pairs).

For the ecoregion sample as a whole, 95 percent of the total wetland area falls into four land use categories. Over half (59.5 percent) of the area is not being subjected to any use and almost a fifth (19.3 percent) is being cultivated. Haying and grazing occur on 5.1 and 11.1 percent, respectively, of the total area.

(e) Wetland size distribution - Variations in the size distribution of wetlands among 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 should make it possible to calculate accurate size distribution figures.

(f) 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 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 ranges from a low of 14.3 at Waldheim to a high of 48.8 at Pleasantdale West (Table 10). It is interesting to note that the lowest level of permanent impaction occurs on the same transect as the highest proportion (74.6 percent - Table 8) of cultivated wetlands. Apparently at Waldheim wetlands are being extensively cultivated without being permanently impacted by drainage, filling, etc. The very high level of impaction at Pleasantdale West is probably due to the large size of most wetlands which results in them frequently being impacted by road grades. In 17 of the 24 transects the level of impaction

ranges between 20 and 30 percent. There is no apparent association between rate of impaction and landform character.

Differences in the rate of impaction between transects in the same physiographic unit are generally quite low, ranging from 0.5 to 7.5 percent of total wetlands in seven of the eight multi-transect units. In the eighth, the Cutknife Plain (4.26) the difference is 17.3 percent.

For the entire ecoregion sample the average impaction rate is 26.9 percent and the extremes are 8.9 percent at Hendon (Millar 1988) and 48.8 percent at Pleasantdale West.

(g) 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 Parkland.

No streams are recorded in nine of the 24 transects and in the remaining 15 the percent of quarter sections containing streams ranges from 4.2 at Waldheim and Denzil to 37.5 at Cloan East. Streams occur in more (8 of 11) of the transects in non-morainal landforms than they do in morainal terrain (7 of 13 transects) but the frequency with which stream segments are recorded differs only slightly (8.9 and 9.5 percent of quarter sections, respectively) for the two groups.

In five of the eight physiographic units containing two or more transects the presence or absence of streams is consistent for transects within the same unit. In the remaining three units streams were present in one transect but not the other. Cloan West and Cloan East are located in distinctly different landform sub-units of the Cutknife Plain and this probably explains the large difference between them in the distribution of stream segments.

In the total ecoregion sample 8.9 percent of all quarter sections contain stream segments. One third (16 of 42) of the transects contain no streams and 14 of those are located on morainal landforms. For transects containing streams the percent of quarter sections containing stream segments ranges from 4.2 at Craik (Millar 1988), Waldheim and Denzil to 37.5 at Cloan East.

3. Uplands

(a) Distribution of upland cover classes - Upland cover data have been analysed on the basis of seven classes, four native and three planted, plus a catch-all category for all other classes. Between 95.8 and 99.6 percent of the upland cover falls into these seven classes (Table 12).

Annual crops and summerfallow are the single most common upland cover class in 23 of 24 transects and occupy over half (61.9 to 93.0 percent) of the upland area in 19 transects. In the remaining five transects this class accounts for 28.2 to 43.7 percent of the upland area. Cloan West and Waldheim share the record for having the highest level of cropland (93.0 and 92.5 percent, respectively) but Waldheim with 60.9 percent of its wetlands also in crop is the most intensively cultivated of the transects covered in this report.

Native grass is the second most common upland cover class, occurring on 3.3 to 66.7 percent of the area. In one third of the transects it occupies more than 10 percent of the uplands and at Fusilier it is the dominant cover class.

Shrubs are a minor element of the landscape. Low shrubs (buckbrush) occupy from a trace to 8.6 percent of the area but the maximum value of 8.6 percent at Laura is three times larger than the next highest value. Tall shrubs range from a trace to 5.6 percent in their distribution but again

the two highest values (5.6 and 4.4 percent at Ibstone and Pleasantdale West, respectively) are well beyond the third highest value (2.0 percent at Paynton West).

Native trees cover 0.2 to 36.5 percent of the uplands with highest values occurring at Pleasantdale West, Wroxton East and Paynton West. They exceed grass in percent of upland cover in those three transects and three others as well.

Total native cover occupies from 4.5 to 69.6 percent of total upland area in the 24 transects. It exceeds all planted cover in two transects and almost equals it in three others. In 19 transects it occupies more than 10 percent of upland area and in nine it exceeds 20 percent. The presence of all classes of native cover is higher in this group of transects than those previously reported.

Planted grasses and forbs are found on 0.2 to 18.5 percent of the uplands. Three transects have values in excess of 10 percent (17.7 to 18.5 percent) of the upland area. One of these is in each of fluvial/lacustrine, fluvial/aeolian and aeolian/fluvial units. These same physiographic units, the Whitesand River Plain (4.51), the Asquith-Dundurn-Goose Lake Sandhills and Plains (4.31) and the Paynton Sandhills (4.22) all have high levels (30.4 to 40.3 percent) of native vegetation. The presence of high levels of native vegetation and planted grasses in these areas is undoubtedly a reflection of the low agricultural value of the sandy soils in these units.

Planted trees and shrubs are a minor part of the landscape, accounting for less than one percent of the upland area in any transect.

Variability in upland cover values between transects within the same physiographic unit is greater for transects covered in this report than for

those previously reported (Millar 1988). This is likely due to the better representation of several cover classes, primarily native cover, which provides more opportunities for the occurrence of large differences. Fifteen of the 64 data pairs for individual cover classes have large differences (in excess of five percent of total upland area). Six of those occur with annual crops and three each with native grasses and trees. In addition, there are six large differences in total native cover. The greatest number of large differences in one unit occurs in the Asquith-Dundurn-Goose Lake Sandhills and Plain (4.31) where five of the seven individual cover classes plus total native cover have large differences. This is undoubtedly related to the mixed fluvial/aeolian nature of the unit.

For the ecoregion sample as a whole, almost four fifths (79 percent) of the total upland cover is annual crops and summerfallow. Total native cover accounts for 16.4 percent of the upland area and of that amount 9.6 percent is native grass and 5.4 percent is native trees. Planted grasses and forbs cover 3.4 percent of the uplands. Loreburn (Millar 1988) remains the most intensely cultivated (96.8 percent of uplands and 76 percent of wetland area) transect in the Saskatchewan Parkland.

(b) Distribution of upland land use activity classes - Upland land use data have been separated into seven classes plus an eighth catch-all category for all other minor land uses (Table 13).

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

Idle (unused plus abandoned) land accounts for 1.2 to 32.5 percent of upland area. Five transects have values in excess of 10 percent of upland area. Land which has been abandoned from other uses never amounts to more than one percent of the total upland area in any transect.

Forage production occurs on 0.3 to 16.3 percent of the upland area in 21 of the 24 transects and is absent from or occurs as a trace on the remaining three transects. Grazing is absent from two different transects and occurs on 1.2 to 62.8 percent of the uplands in the other 22 transects. It is the dominant land use activity in one transect (Fusilier). Land use activities which are associated with native vegetation and/or planted grasses and forbs collectively occupy more than half the total upland area in five different physiographic units.

A minor but consistent part of the uplands is devoted to farmsteads (0.4 to 1.5 percent) and roads and railways (1.1 to 5.0 percent). Other land uses collectively occupy zero to 1.9 percent of the uplands in 21 of 24 transects. In the remaining three transects values are somewhat higher (3.1 to 4.1 percent). Two of these cases involve lands which have been set aside as wildlife habitat and the third involves the village of Paynton.

Variability in land use activity values between transects within the same physiographic units is greater for transects covered in this report than for those previously reported (Millar 1988) and for the same reason described in the preceding section on upland cover. Fourteen data pairs have large differences. Six of those are associated with production of annual crops, four with grazing and three with unused land. The Asquith-Dundurn-Goose Lake Sandhills and Plain (4.31) has the greatest number of large differences (4 of 8).

For the ecoregion sample as a whole, land use activities occur in descending order of importance as follows: annual crop production (79 percent), grazing (8.2 percent), idle (no use and abandoned - 7.1 percent), forage production (2.4 percent) roads and railways (2.0 percent), farmsteads (0.9 percent), and other uses (0.5 percent).

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 and 16, respectively.

Some indication 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 transects in which the standard error equals or exceeds the mean is very low (three, three and one, respectively) (Table 14). In the three upland cover classes, cropland, native grass and native trees, these numbers rise to 11, 14 and 10 transects, respectively (Table 15), suggesting a greater amount of variability in the extent of upland cover. A good example of the extreme variability which can be encountered in closely related situations is cropland at Cloan West and Cloan East, two sub-units of the same

physiographic unit. At Cloan West the mean is 60.0 and the standard error is 6.1 while at Cloan East the values are 49.3 and 108.7, respectively (Table 15).

The greatest extremes in data variability are to be found in upland land use categories (Table 16). In two thirds of the transects the standard error equals or exceeds the mean for unused land. For grazing this situation occurs in all 22 transects in which this land use is present. This confirms general observations that the occurrence of unused land and grazing is very irregular in most areas. At the other extreme, the standard error for roads and railways is consistently less than the mean. This is to be expected since this land use occurs 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 practices, e.g., grazing, are markedly different than those of his neighbors. When this happens the data are strongly skewed and cannot be analysed by standard methods. Possible use of nonparametric statistical methods to analyse such data will be explored in the future.

Examination of standard error and coefficient of variation values obtained when data from two transects within the same physiographic unit are combined indicates that doubling the sample size does little to decrease the variability of the data so expanded sampling on a scale that would be economically feasible is not likely to improve the situation very much.

When data for the entire ecoregion are analysed collectively the degree of variability is reduced and grazing remains as the only category out of nine in Tables 14 to 16 in which the standard error exceeds the mean.

Although the shortcomings of using limited sampling habitat data from this project to generate estimated habitat values for entire physiographic units have been identified, those extrapolated estimates are still useful. Certain broad conclusions can still be drawn from the more obvious data extremes and the figures can be used to compare the results obtained from this study with those of other studies such as agricultural surveys and Ducks Unlimited's Habitat Inventory. The combination of accurate groundtruth data from the Prairie Habitat Monitoring Project with a total habitat inventory from Thematic Mapper imagery in the Ducks Unlimited program still appears to offer the best possibility for obtaining the most accurate assessment of current habitat conditions.

2. Wetlands

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

Within the group of physiographic units covered in this report the two top units in terms of quantity of wetland habitat are the Moose Mountain Upland (4.55) and Redberry Lake Upland (4.24). They rank high in all the wetland qualities which contribute to good waterfowl habitat. These include: (a) large areas and numbers of natural fresh open water wetlands for secure brood rearing habitat, (b) large areas and numbers of grassy (seasonal) wetlands for additional breeding pair habitat, and (c) a good proportion of undisturbed wetlands to ensure adequate escape cover.

Two additional units, the Yorkton Plain (4.52) and Pheasant Hills Upland (4.54) possess most of the desirable wetland qualities but lack good quantities of permanent brood ponds. A fifth unit, the Tiger Hills Upland (4.40) has a high quantity of permanent open water wetlands but is relatively low in grassy wetlands. All of the above units are on morainal landforms.

Extrapolated wetland data for the entire sampled portion of Saskatchewan Parkland 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). 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 ecoregion totals in relation to their size and wetland qualities. At the same time, the relative closeness of values generated through the ecoregion analysis to those from the physiographic unit analysis should provide an indication of how representative our sampling network is of the actual landform relationships in the ecoregion.

The total wetland area estimate generated in the ecoregion analysis is lower than that produced in the physiographic unit analysis by less than three percent. Seven of the nine cover class values are also lower, five by less than five percent and two by under 12 percent. Two cover classes are higher by two and 11 percent. A similar pattern exists with wetland numbers. The ecoregion analysis estimate of total wetland numbers is lower

by four percent. Eight of nine cover class values are lower, seven by less than 10 percent and one by 18 percent. One cover class is higher by less than two percent. Five of six land use classes are lower by up to 13 percent and one class is higher by 23 percent, the largest deviation in any of the analyses.

3. Uplands

Estimated areas of upland cover and land use activity classes are presented in Tables 20 and 21. Amongst the 24 transects covered in this report, Moose Mountain Upland (4.55) and Redberry Lake Upland (4.24) rank first and fourth, respectively, in total upland area and third and second, respectively, for estimated amounts of upland nesting cover in the form of total native vegetation plus planted grassy cover. They also rank fifth and third, respectively, in terms of the amount of upland in land uses which are conducive to the perpetuation of nesting cover, i.e., idle land, forage production and grazing. The mixed aeolian/fluvial/lacustrine units, the Paynton Sandhills (4.22), the Asquith-Dundurn-Goose Lake Sandhills and Plain (4.31) and the Whitesand River Plain (4.51), also rate high for amounts of upland cover and helpful land uses but are poor in terms of wetland habitat.

Extrapolated upland data for the entire sampled portion of the Saskatchewan Parkland have been summarized in the same two ways previously described for wetland data. The two analyses generate virtually identical values for total upland area. Individual cover class estimates generated in the ecoregion analysis are almost equally higher and lower than those produced in the physiographic unit analysis. Differences range from +24 to -16 percent with six of the nine values differing by less than 10 percent. A similar situation exists with upland land use data. Differences range

from +20 to -17 percent and six of the eight values deviate by less than 10 percent. These results together with the comparable data for wetlands support my earlier conclusion that our sampling network is a reasonable representation of the actual distribution of landforms in the Saskatchewan Parkland.

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

In the North American Waterfowl Management Plan, areas in each province identified as having the greatest capability for waterfowl production have been designated as key or priority program areas. Habitat management activities under NAWMP will be focussed in these areas. The Prairie Habitat Monitoring Program not only samples these areas but non-priority areas as well and it is important that we have some mechanism for comparing or rating the relative potential for waterfowl production of physiographic units right across the prairies.

From the location of NAWMP priority areas (NAWMP Saskatchewan Technical Committee 1988) and the baseline data generated for Saskatchewan Parkland in this and my previous report (Millar 1988) it is apparent that physiographic units located on morainal landforms are most likely to possess the combinations of habitat values needed to ensure successful waterfowl production. Therefore, efforts to rate units as to their capability for waterfowl production will be confined at this point to units located on those landforms.

My initial effort to identify the best units for waterfowl production simply involved identifying the estimated total amounts of various habits in each unit. Unfortunately this approach has not proven to be adequate because it has been shown that large quantities of habitat may be a

reflection of the size of the physiographic unit rather than the quality of the habitat (e.g. the Moose Mountain Upland, 4.55). Using this method small but highly productive units are not given a high rating.

In this section I want to make a further effort at rating morainal physiographic units by using seven habitat factors, each of which plays a particular role in some aspect of waterfowl production. I want to emphasize that this is a subjective, "quick and dirty" approach which may not stand up in its present form under critical scrutiny. For the moment, however, the resultant rating of individual units does seem to correlate fairly well with my general knowledge of those areas.

The structure of the rating system is as follows:

Habitat factors and their role in waterfowl production

1. Percent of total land area occupied by wetlands - This provides a measure of the relative availability of waterholding depressions in a unit. The premise here is simple - no depressions, no water; no water, no ducks!

2. Percent of total wetland area occupied by grassy cover - This is a measure of the amount of good quality temporary or seasonal wetlands available for breeding pair dispersal.

3. Percent of wetland area occupied by bulrush/cattail cover - This is a measure of the availability of semipermanent brood waters, i.e., those likely to be present in years of normal water levels.

4. Percent of total wetland area occupied by natural fresh open water - This is a measure of the availability of permanent brood waters which will be present under all but the severest drought conditions.

5. Percent of total wetland area that is unused - This is taken as a measure of the availability of undisturbed escape cover.

6. Percent of total upland area occupied by shrubs and native and seeded grasses - This is a measure of the availability of upland nesting cover.

7. Percent of total upland area that is unused - This is taken as a crude indication of the availability of dense nesting cover.

Assignment of points to individual habitat factors

For each of the seven habitat factors one point is given if the value for the unit exceeds a designated minimum. No attempt has been made to assign greater importance to one factor over another. Minimums have been arbitrarily established at approximately half the maximum observed level (with a couple of exceptions) for each factor. They are as follows:

1. Total wetland area - 10 percent of total land area
2. Grassy wetland cover - 40 percent of total wetland area
3. Bulrush/cattail cover - 7.5 percent of total wetland cover
4. Open water wetlands - 10 percent of total wetland area
5. Unused wetlands - 40 percent of total wetland area
6. Shrubby and grassy upland cover - 10 percent of total upland area (One unusually large value (Table 22) was not included in calculating the minimum.)
7. Unused uplands - 5 percent of total upland area (Two exceptionally large values for this factor (Table 22) were not included in the calculation of the minimum as they involve the presence of large tracts of woodland, a cover class not included in the calculation of upland nesting cover.

Rating scale

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

| Number of Points Given the Unit | Rating |
|---|---|
| 6 - 7 | 1 |
| 4 - 5 | 2 |
| 2 - 3 | 3 |
| 0 - 1 | 4 |

On the basis of the above analysis three sampled morainal units, the Touchwood-Beaver Hills (4.44), Ponass Lakes Plain (4.41) and Redberry Lake Upland (4.24) receive top rating as waterfowl production areas. All three are also amongst the top five units in terms of estimated amounts of waterfowl habitat and amongst the top six in unit size. Eight units are given a number two rating but five of those, including the Gainsborough Creek Plain (4.58), Pheasant Hills Upland (4.54), Yorkton Plain (4.52), Pipestone Plain (4.56) and Eagle Hills (4.28), have low values for both semipermanent and permanent brood waters. This double deficiency in brood habitat causes me to question whether these areas deserve to be rated as high as a two and whether the system requires some modification in this area.

Seven of the morainal units are rated number three because they have low values in at least four of the habitat factors. Moose Mountain Upland (4.55) is of particular interest because it was top-rated in terms of the total amount of habitat it is estimated to contain. This, however, is due to the size of the unit (at 816,000 hectares it is the largest physiographic unit in the Saskatchewan Parkland) rather than the quality of its habitat. It is given a three rating because of low values for total wetland area, both semipermanent and permanent brood waters and undisturbed nesting cover.

One unit, the Hawarden Hills (4.32) is bottom-rated (4). It did not score points for any of the seven habitat factors and, as previously mentioned, is the most intensely cultivated of the sampled units in the ecoregion.

Several of the unsampled morainal units in the Saskatchewan Parkland are unquestionably high quality waterfowl production habitat and should be given high priority in any expansion of the Prairie Habitat Monitoring Project.

D. Cover/Land Use Changes Since May 1985

Cover/land use change is an ongoing process and formal efforts to measure this are 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 completion of groundtruthing 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 groundtruthing surveys for these transects has varied from 24 to 36 months (Table 23). Recorded changes were 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 were associated with road construction. Temporary interruptions of cultivation in wetlands or uplands were not counted as changes.

Cover/land use changes have occurred on all of the 24 transects and the percent of quarter sections affected ranges from 13 at Bredenbury in the Yorkton Plain (4.52) to a high of 67 at Kerrobert in the Kerrobert Plain (4.89). These values are considerably higher than the range of 8 to 29

percent previously recorded for 14 other transects in the ecoregion but this is simply indicative of the progression of change with the passage of time. There is no obvious association between landform and the rate at which quarter sections are being affected. Differences in percent of affected quarters recorded for transects within the same physiographic units are highly variable and range from zero in the Cutknife Plain (4.26) to three-fold in the Kerrobert Plain (4.89).

## V. Current Project Status

As of April 15, 1989, the status of work on the Prairie Habitat Monitoring Project is as follows:

1. Saskatchewan Parkland

   -Completed, reports submitted.

2. Alberta Parkland

   -Photo interpretation and groundtruthing is complete for all transects.

   -Data processing is complete for four of 17 transects and is in various stages of progress on the remainder.

   -Data analysis and reporting on this ecoregion is scheduled for completion in 1989/90.

3. Manitoba Parkland

   -Photo interpretation is complete for all transects and groundtruthing is done for 13 of 16 transects.

   -Data processing is complete for 7 of 16 transects.

   -Data analysis and reporting on this ecoregion is scheduled for completion in 1989/90.

4. Saskatchewan Transition

   -Photo interpretation is completed for all transects.

-Data analysis is complete for 2 of 6 transects.

-Reporting of results will be deferred until the entire ecoregion has been completed.

5. Alberta Transition

-Photo interpretation is complete for all transects.

-Groundtruthing and data processing is finished for one of eight transects.

6. Manitoba Transition

-Photo interpretation is complete and one of seven transects is groundtruthed.

7. Manitoba Mixedgrass Prairie

-Photo interpretation and groundtruthing is finished.

8. Alberta Mixedgrass Prairie

-Photo interpretation is completed for eight of 17 transects.

-Groundtruthing and data processing is complete for one transect.

9. Alberta Fescue Prairie

-Photo interpretation is complete for two of five transects.

-Data processing is complete for one of five transects.

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Figure 1. Distribution of Habitat Sampling in Saskatchewan Parkland

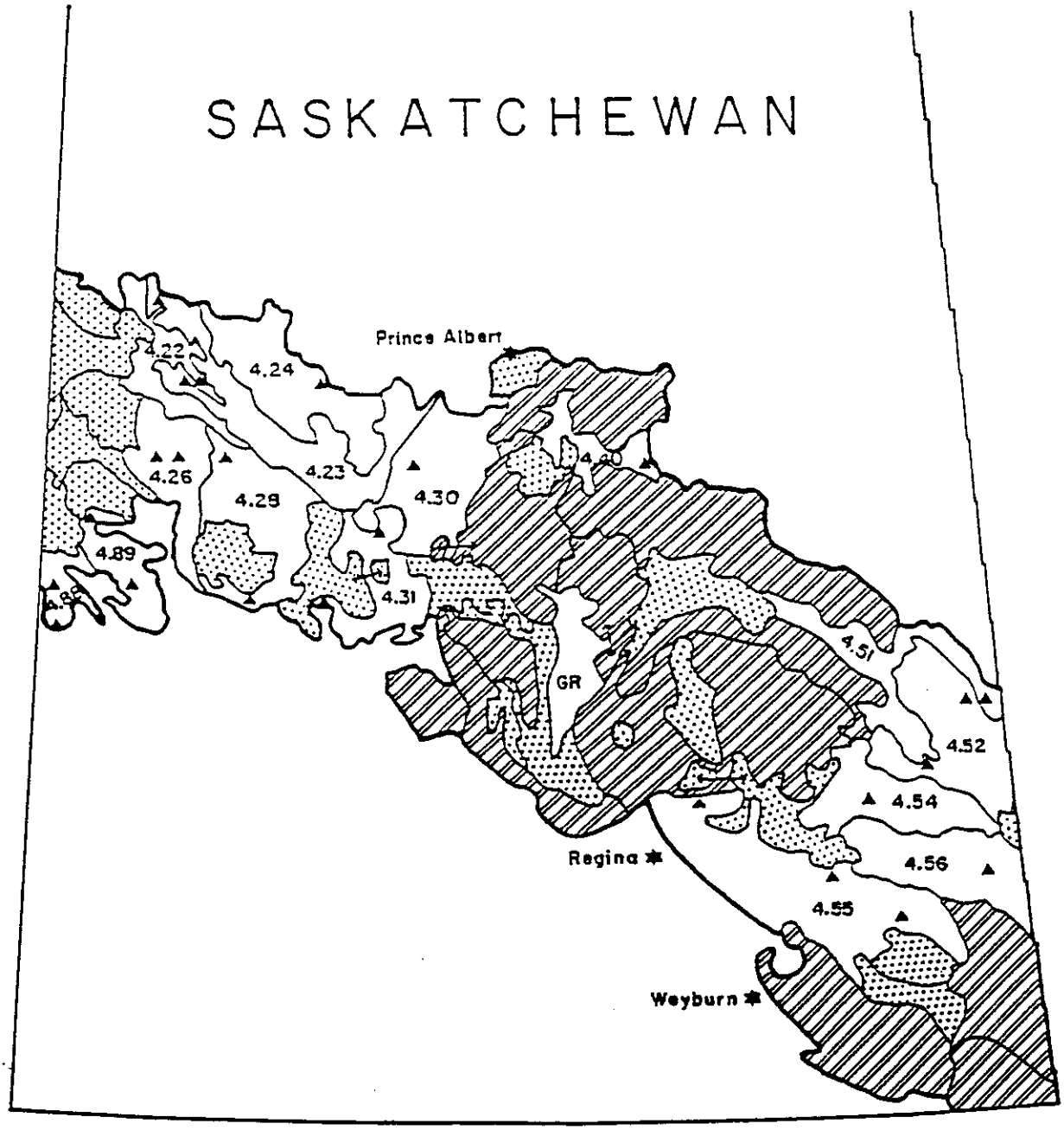

Table 1. Distribution of Habitat Sampling Relative to the Entire Saskatchewan Parkland.

| | No. of Units | Area | |
|---|---|---|---|
| | | In Hectares[1,2] | As Percentage of Entire Ecoregion[2] |
| Sampled Physiographic Units | 28 | 10,162,100 (10,326,500) | 75.8 (77.0) |
| Unsampled Physiographic Units | 22[3] | 2,723,900 ( 2,559,500) | 20.3 (19.1) |
| Areas Not Included in Physiographic Units - River and Stream Valleys | - | 335,800 | 2.5 |
| - Lakes[4] | - | 163,600 | 1.2 |
| - Urban Areas[4] | - | 18,900 | 0.1 |
| Total Saskatchewan Parkland Ecoregion | | 13,404,300 | |

1. To the nearest 100 hectares.

2. Figures in parentheses are those obtained when values in 3 are taken into consideration.

3. Two units totalling 164,400 hectares or 1.2 percent of Saskatchewan Parkland are sampled in the Alberta portion of those units.

4. Larger than 500 hectares

Table 2. Distribution of Landforms in Saskatchewan Parkland.

| Origin of Parent Material | Surface Form | % Slope | Area in Hectares[1] Sampled Units[2] | Unsampled Units[2] | Total[3] | % of Sampling Effort in Landform Category |
|---|---|---|---|---|---|---|
| Morainal | Knob & Kettle | 1-3 | 1,669,200 | - | 1,669,200 (13.0) | 15.4 |
| | | 4-9 | 4,249,200 (96.0) | 178,900 | 4,428,100 ( 4.0) | 37.4 (34.4) |
| | | 10+ | 274,600 (30.8) | 615,800 (69.2) | 890,400 ( 6.9) | 6.7 |
| | Undulating | 1-3 | 621,600 | - | 621,600 ( 4.8) | 5.0 |
| | Hummocky | 4-9 | 302,400 | - | 302,400 ( 2.3) | 4.7 |
| | Mixed | 4-9 | - | 245,300 | 245,300 ( 1.9) | - |
| | Dissected | 4-9 | 303,300 | - | 303,300 ( 2.4) | 2.5 |
| Total Morainal | | | 7,420,300 (87.7) | 1,040,000 (12.3) | 8,460,300 (65.7) | 71.7 |
| Lacustrine | Knob and Kettle | 4-9 | - | 67,300 | 67,300 ( 0.5) | - |
| | Undulating | 1-3 | 1,160,200 (67.0) | 571,900 (33.0) | 1,732,100 (13.4) | 8.2 |
| Lacustrine/ Morainal | Undulating | 1-3 | 595,500 (87.5) | 85,000 (12.5) | 680,500 ( 5.3) | 9.8 |
| Lacustrine/ Fluvial | Undulating/ Knob & Kettle | 1-9 | - | 508,000 | 508,000 ( 3.9) | - |
| Total Lacustrine | | | 1,755,700 (58.8) | 1,232,200 (41.2) | 2,987,900 (23.2) | 18.0 |
| Fluvial | Dissected | 1-9 | - | 21,700 | 21,700 ( 0.2) | - |
| Fluvial/ Morainal | Undulating | 1-3 | 197,500 | - | 197,500 ( 1.5) | 2.5 |
| Fluvial/ Aeolian | Undulating/ Hummocky | 1-9 | 251,300 | - | 251,300 ( 2.0) | 4.7 |
| Aeolian/ Fluvial | Hummocky | 4-9 | 196,800 (63.9) | 111,300 (36.1) | 308,100 ( 2.4) | 1.6 |
| Alluvial/ Morainal | Undulating | 1-3 | - | 199,500 | 199,500 ( 1.5) | - |
| Total Fluvial, Aeolian, Alluvial | | | 986,100 (68.5) | 451,700 (31.5) | 1,438,800 (11.2) | 10.4 |
| Total for Ecoregion | | | 10,162,100 (75.8) | 2,723,900 (20.3) | 12,886,000 | 100.1 |

1. To nearest 100 hectares.

2. Figure in parentheses is the percent the indicated area is of the total area of that landform category.

3. Figure in parentheses is the percent each landform category is of the total ecoregion.

Table 3. Physiographic Units Covered in This Report.

| No. | Name | Landform Character[1] | | | Transects[2] |
|---|---|---|---|---|---|
| | | Origin of Parent Material | Surface Form | Percent Slope | |
| 4.22 | Paynton Sandhills | Aeolian (Fluvial) | Hummocky (Undulating) | 4-9 (1-3) | Paynton West (18) |
| 4.23 | North Saskatchewan River Plain | Lacustrine (Fluvial, Morainal) | Undulating, (Hummocky, Knob and Kettle) | 1-3 (4-9) | Paynton East (19) Cleeves |
| 4.24 | Redberry Lake Upland | Morainal (Fluvial) | Knob and Kettle (Ridged) | 4-9 (10-15) | Hayfair |
| 4.26 | Cutknife Plain | Lacustrine (Morainal) | Undulating (Ridged) | 1-3 (4-9) | Cloan West Cloan East (16) |
| 4.28 | Eagle Hills | Morainal (Lacustrine, Fluvial) | Knob and Kettle (Hummocky) | 4-9 (1-3)(10-15) | Ibstone Valley Center |
| 4.30 | South Saskatchewan River Plain | Lacustrine/Morainal (Fluvial) | Undulating | 1-3 | Waldheim |
| 4.31[3] | Asquith-Dundurn-Goose Lake Sandhills and Plain | Fluvial/Aeolian | Undulating/Hummocky | 1-3/4-9 (10-15) | Environ Laura |
| 4.40 | Tiger Hills Upland | Morainal | Hummocky | 4-9 | Pleasantdale West (22) |
| 4.51 | Whitesand River Plain | Fluvial/Lacustrine (Alluvial) | Undulating | 1-3 | Wroxton East (16) |
| 4.52 | Yorkton Plain | Morainal | Knob and Kettle | 1-3 | Wroxton West Bredenbury |
| 4.54 | Pheasant Hills Upland | Morainal | Knob and Kettle | 4-9 | Grayson |
| 4.55 | Moose Mountain Upland | Morainal | Knob and Kettle | 4-9 | Grenfell, Inchkeith, Edenwold |
| 4.56 | Pipestone Plain | Morainal | Knob and Kettle/ Hummocky (Undulating) | 4-9 | Wapella |
| 4.88 | Neutral Upland | Morainal | Knob and Kettle | 16-30 (4-9) | Moosier (18) Fusilier |
| 4.89 | Kerrobert Plain | Lacustrine/ Morainal (Fluvial) | Undulating | 1-3 | Denzil Kerrobert |

1. Categories separated by / are roughly equal in occurrence while those in parentheses are of secondary or minor importance.

2. The sample size in most transect is 24 quarter sections. Where the sample size varies from 24 it is shown in parentheses.

3. This unit number was originally assigned to the Dundurn Sandhills.

Table 4. Physiographic Units in Saskatchewan Parkland which have Not been Sampled.

| No. | Name | Landform Character[1,2] Origin of Parent Material | Surface Form | Percent Slope | Area In Hectares[3] |
|---|---|---|---|---|---|
| 4.11 | Dilberry Plain | Aeolian/Fluvial | Hummocky | 4-9 | 111,300 |
| 4.12 | Provost Upland[4] | Lacustrine/Morainal, (Fluvial) | Undulating | 1-3 | 85,000 |
| 4.13 | Edgerton Plain | Morainal | Knob and Kettle | 10-15 | 12,500 |
| 4.14 | Vermilion Upland | Morainal | Knob and Kettle | 4-9 | 100 |
| 4.15 | Hazeldine Plain | Morainal | Knob and Kettle (Undulating) | 4-9 (1-3) | 178,800 |
| 4.21 | Millmond Upland[4] | Morainal (Fluvial) | Knob and Kettle | 10-15 (4-9) | 79,500 |
| 4.25 | Freemont Upland | Morainal (Lacustrine) | Knob and Kettle/ Hummocky (Undulating) | 4-15 (1-3) | 151,000 |
| 4.27 | Cutknife Hills | Morainal | Knob and Kettle/ Hummocky | 4-30 | 105,900 |
| 4.29 | Whiteshore Lake Plain | Lacustrine/Fluvial | Knob and Kettle/ Undulating | 1-3/4-9 | 139,100 |
| 4.35 | Colonsay Plain | Lacustrine/Fluvial | Undulating (Knob and Kettle) | 1-3 (4-9) | 368,900 |
| 4.37 | Hoodoo Lakes Plain | Lacustrine (Morainal) | Undulating (Hummocky) | 1-3 (4-9) | 79,300 |
| 4.38 | Red Deer Hills | Lacustrine | Knob and Kettle | 4-9 | 67,300 |
| 4.43 | Quill Lakes Basin | Alluvial/Morainal | Undulating/Dissected | 1-3 | 199,500 |
| 4.45 | Touchwood Upland | Morainal | Knob and Kettle | 10-15 (4-9) | 127,100 |
| 4.47 | Last Mountain Upland | Morainal | Knob and Kettle | 10-15 | 16,400 |
| 4.48[5] | Allan Slope | Morainal (Lacustrine) | Undulating/Hummocky/ Knob & Kettle/Dissected | 4-9 (1-3) | 245,300 |
| 4.49 | Balcarres Plain | Lacustrine (Fluvial, Morainal) | Undulating | 1-3 (4-9) | 224,800 |
| 4.53 | St. Lazare Plain | Fluvial | Dissected | 1-3/4-9 | 21,700 |
| 4.57 | Moose Mountain | Morainal | Knob and Kettle | 10-15 (16-30) | 123,400 |
| 4.86 | Moose Mountain Creek Plain | Fluvial/Lacustrine/ Morainal | Undulating | 1-3 | 119,200 |
| 4.87 | Arm River Plain | Lacustrine (Fluvial) | Undulating | 1-3 | 58,000 |
| 4.91 | Lower Eagle Creek Plain | Lacustrine (Fluvial) | Undulating | 1-3 | 209,800 |
| | | | | Total | 2,723,900 |

1. Based on data from map "Generalized Soil Landscapes of Saskatchewan", Shields and Acton, 1985.
2. Categories separated by / are roughly equal in occurrence while those in parentheses are of minor or secondary importance.
3. To the nearest 100 hectares.
4. Unit is sampled in the Alberta portion of the unit.
5. This unit number was originally assigned to the Buffalo Pound Upland.

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

| No. | Physiographic Unit Name[1] | Area in Hectares | | Percentage that Sample is of Unit Area |
|---|---|---|---|---|
| | | Unit[2] | Sample | |
| 4.22 | Paynton Sandhills (18) | 196,800 | 1,008 | 0.5 |
| 4.23 | N. Saskatchewan River Plain (43) | 532,200 | 2,652 | 0.5 |
| 4.24 | Redberry Lake Upland (24) | 443,900 | 1,675 | 0.4 |
| 4.26 | Cutknife Plain (40) | 299,500 | 2,647 | 0.9 |
| 4.28 | Eagle Hills (48) | 421,700 | 3,174 | 0.8 |
| 4.30 | S. Saskatchewan River Plain (24) | 403,900 | 1,575 | 0.4 |
| 4.31 | Asquith-Dundurn-Goose Lake Sandhills and Plain (48) | 251,300 | 3,070 | 1.2 |
| 4.40 | Tiger Hills Upland (22) | 155,300 | 1,456 | 0.9 |
| 4.51 | Whitesand River Plain (16) | 340,500 | 1,072 | 0.3 |
| 4.52 | Yorkton Plain (48) | 481,500 | 3,191 | 0.7 |
| 4.54 | Pheasant Hills Upland (24) | 332,600 | 1,601 | 0.5 |
| 4.55 | Moose Mountain Upland (72) | 816,100 | 4,753 | 0.6 |
| 4.56 | Pipestone Plain (24) | 407,600 | 1,615 | 0.4 |
| 4.88 | Neutral Upland (42) | 111,300 | 2,778 | 2.5 |
| 4.89 | Kerrobert Plain (48) | 191,600 | 3,175 | 1.7 |
| | Total 1988 | 5,385,800[3] | 35,442 | 0.7 |
| | Total 1987 | 4,776,300 | 29,548 | 0.6 |
| | Total for ecoregion | 10,162,100 | 64,900 | 0.6 |

1. Figures in parentheses are the numbers of quarter sections in the sample.
2. To nearest 100 hectares.
3. Approximately 40 percent of total Saskatchewan Parkland.

Table 6. Land Area Occupied by Wetlands and Uplands.

| Unit | Transect[1] | Sample Size (in ha)[2] | Percent of Total Sample[2] | | | |
|---|---|---|---|---|---|---|
| | | | Wetlands | | | |
| | | | Total | Uncultivated | Cultivated | Uplands |
| | (Morainal - K&K, 1-3) | | | | | |
| 4.52 | Bredenbury | 1,609 | 7.8 | 5.9 | 1.9 | 92.2 |
| | Wroxton West | 1,582 | 15.7 | 13.5 | 2.3 | 84.3 |
| | | ( 3,191) | (11.7) | ( 9.7) | (2.1) | (88.3) |
| | (Morainal - K&K, 4-9) | | | | | |
| 4.24 | Mayfair | 1,675 | 10.9 | 9.8 | 1.1 | 89.1 |
| 4.28 | Ibstone | 1,582 | 7.4 | 5.4 | 2.0 | 92.6 |
| | Valley Center | 1,592 | 7.0 | 4.1 | 2.9 | 93.1 |
| | | ( 3,174) | ( 7.2) | ( 4.7) | (2.4) | (92.8) |
| 4.54 | Grayson | 1,601 | 12.4 | 11.3 | 1.2 | 87.6 |
| 4.55 | Grenfell | 1,579 | 11.4 | 10.8 | 0.5 | 88.7 |
| | Inchkeith | 1,580 | 7.4 | 6.4 | 1.0 | 92.6 |
| | Edenwold | 1,594 | 6.9 | 5.4 | 1.5 | 93.1 |
| | | ( 4,753) | ( 8.5) | ( 7.5) | (1.0) | (91.5) |
| 4.56 | Wapella | 1,615 | 8.6 | 8.2 | 0.5 | 91.4 |
| | (Morainal - K&K, 10+) | | | | | |
| 4.88 | Hoosier | 1,199 | 8.9 | 8.3 | 0.6 | 91.1 |
| | Fusilier | 1,579 | 13.9 | 13.8 | 0.2 | 86.1 |
| | | ( 2,778) | (11.8) | (11.4) | (0.4) | (88.2) |
| | (Morainal - H, 4-9) | | | | | |
| 4.40 | Pleasantdale West | 1,456 | 16.7 | 16.6 | 0.1 | 83.3 |
| | (Lacustrine/Morainal - U, 1-3) | | | | | |
| 4.30 | Waldheim | 1,575 | 9.2 | 3.6 | 5.6 | 90.8 |
| 4.89 | Denzil | 1,590 | 5.6 | 4.1 | 1.6 | 94.4 |
| | Kerrobert | 1,585 | 10.1 | 6.6 | 3.6 | 89.9 |
| | | ( 3,175) | ( 7.9) | ( 5.3) | (2.6) | (92.1) |
| | (Lacustrine - U, 1-3) | | | | | |
| 4.23 | Paynton East | 1,066 | 4.7 | 2.8 | 1.9 | 95.4 |
| | Cleeves | 1,587 | 4.4 | 4.1 | 0.4 | 95.6 |
| | | ( 2,652) | ( 4.5) | ( 3.6) | (1.0) | (95.5) |
| 4.26 | Cloan West | 1,585 | 2.4 | 1.5 | 0.9 | 97.6 |
| | Cloan East | 1,062 | 3.7 | 3.0 | 0.7 | 96.3 |
| | | ( 2,647) | ( 2.9) | ( 2.1) | (0.8) | (97.1) |
| | (Fluvial/Lacustrine - U, 1-3) | | | | | |
| 4.51 | Wroxton East | 1,072 | 3.7 | 3.5 | 0.2 | 96.3 |
| | (Fluvial/Aeolian - U/H, 1-3) | | | | | |
| 4.31 | Environ | 1,569 | 7.8 | 3.9 | 4.0 | 92.2 |
| | Laura | 1,501 | 3.2 | 2.7 | 0.4 | 96.8 |
| | | ( 3,070) | ( 5.5) | ( 3.3) | (2.2) | (94.5) |
| | (Aeolian/Fluvial - H, 4-9) | | | | | |
| 4.22 | Paynton West | 1,008 | 2.7 | 2.2 | 0.5 | 97.3 |
| Entire Ecoregion Sample | | 64,990 | 9.5 | 7.7 | 1.8 | 90.5 |

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

2. Figures in parentheses are composite values for those transects occurring in one physiographic unit.

Table 7. Distribution of Wetland Area in Various Cover Classes.

| Physio-graphic Unit | Transect[1] | Total Wetland[1] Area in Sample (in ha) | Percent of Total Wetland Area in Cover Class[2] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Cultivated | Willows and Trees | Grasses | Bulrush Cattail | Transitional Open Water | Natural Open Water | Artificial Open Water | Saline Open Water | Other |
| | (Morainal - K&K, 1-3) | | | | | | | | | | |
| 4.32 | Bredenbury | 126 | 24.1 | 25.2 | 46.7 | 1.0 | 0 | 2.1 | 1.0 | 0 | 0 |
| | Wroxton-West | 249 | 14.3 | 10.4 | 62.7 | 10.2 | 0 | 0.4 | 0.6 | 0 | 1.4 |
| | | (375) | (17.6) | (15.4) | (57.3) | ( 7.1) | ( 0) | ( 1.0) | ( 0.8) | ( 0) | (0.9) |
| | (Morainal - K&K, 4-9) | | | | | | | | | | |
| 4.24 | Mayfair | 183 | 10.1 | 21.5 | 51.8 | 1.1 | 2.2 | 11.6 | 1.7 | 0 | 0 |
| 4.28 | Ibstone | 117 | 26.8 | 13.7 | 42.4 | 0 | 7.2 | 9.4 | 0.4 | 0 | 0 |
| | Valley Center | 111 | 41.7 | 7.2 | 48.8 | 0.9 | 0 | 0.2 | 0.7 | 0 | 0.7 |
| | | (228) | (33.9) | (10.5) | (45.5) | ( 0.4) | (3.6) | ( 5.1) | ( 0.6) | ( 0) | (0.3) |
| 4.54 | Grayson | 199 | 9.4 | 13.4 | 70.7 | 2.7 | 0.1 | 2.1 | 1.7 | 0 | 0 |
| 4.55 | Grenfell | 179 | 4.7 | 7.2 | 79.2 | 1.3 | 0 | 6.6 | 0.9 | 0 | 0 |
| | Inchkeith | 117 | 13.5 | 8.4 | 63.9 | 3.5 | 0.4 | 0.2 | 9.8 | 0 | 0.2 |
| | Edenwold | 110 | 22.4 | 4.6 | 54.6 | 5.7 | 0 | 5.0 | 2.2 | 5.7 | 0 |
| | | (406) | (12.1) | (6.8) | (68.1) | ( 3.2) | (0.1) | ( 4.3) | ( 3.9) | ( 1.6) | (0.1) |
| 4.56 | Wapella | 139 | 5.7 | 12.9 | 75.3 | 2.6 | 0 | 1.9 | 1.7 | 0 | 0 |
| | (Morainal - K&K, 10+) | | | | | | | | | | |
| 4.88 | Hoosier | 107 | 6.9 | 0.2 | 45.9 | 7.3 | 0 | 0.3 | 0.8 | 38.5 | 0.2 |
| | Fusilier | 220 | 1.3 | 2.3 | 32.8 | 18.8 | 2.4 | 0.2 | 0.3 | 20.6 | 0.3 |
| | | (327) | ( 3.1) | ( 1.7) | (51.3) | (15.0) | (1.7) | ( 0.3) | ( 0.4) | (26.5) | (0.2) |
| | (Morainal - M, 4-9) | | | | | | | | | | |
| 4.40 | Pleasantdale - West | 243 | 0.4 | 43.5 | 30.3 | 1.0 | 0 | 21.1 | 2.6 | 0 | 1.1 |
| | (Lacustrine/Morainal - U, 1-3) | | | | | | | | | | |
| 4.30 | Waldheim | 145 | 60.9 | 16.5 | 15.2 | 4.0 | 0 | 3.0 | 0.5 | 0 | 0 |
| 4.89 | Denzil | 89 | 27.6 | 6.4 | 57.4 | 3.0 | 4.0 | 1.1 | 0.3 | 0 | 0.3 |
| | Kerrobert | 160 | 35.4 | 8.3 | 47.2 | 0.2 | 0 | 8.9 | 0.2 | 0 | 0 |
| | | (249) | (32.5) | ( 7.7) | (50.7) | ( 1.2) | (1.5) | ( 6.1) | ( 0.2) | ( 0) | (0.1) |
| | (Lacustrine - U, 1-3) | | | | | | | | | | |
| 4.23 | Paynton - East | 50 | 40.4 | 9.6 | 41.2 | 1.2 | 0 | 6.5 | 1.2 | 0 | 0 |
| | Cleeves | 70 | 8.2 | 30.5 | 45.6 | 8.2 | 0 | 2.4 | 0.3 | 0 | 4.8 |
| | | (120) | (21.5) | (21.9) | (43.4) | ( 5.4) | ( 0) | ( 4.3) | ( 0.7) | ( 0) | (2.9) |
| 4.26 | Cloan - West | 38 | 36.3 | 18.5 | 30.6 | 0 | 0 | 0 | 13.4 | 0 | 1.3 |
| | Cloan - East | 39 | 18.0 | 45.3 | 34.3 | T | 0 | 0.4 | 0.4 | 0 | 1.6 |
| | | ( 77) | (27.0) | (32.2) | (32.2) | ( 0.1) | 0 | ( 0.3) | ( 6.8) | 0 | (1.6) |
| | (Fluvial/Lacustrine - U, 1-3) | | | | | | | | | | |
| 4.51 | Wroxton - East | 40 | 6.4 | 36.4 | 8.8 | 46.8 | 0 | 0 | 1.6 | 0 | 0 |
| | (Fluvial/Aeolian - U/M, 1-3) | | | | | | | | | | |
| 4.31 | Environ | 122 | 50.6 | 9.4 | 27.8 | 11.8 | 0 | 0 | 0.4 | 0 | 0 |
| | Laura | 47 | 13.7 | 4.1 | 73.1 | 4.1 | 0 | 0 | 0 | 0 | 5.1 |
| | | (169) | (40.2) | ( 7.9) | (40.4) | ( 9.6) | ( 0) | ( 0) | ( 0.3) | ( 0) | (1.6) |
| | (Aeolian/Fluvial - M, 4-9) | | | | | | | | | | |
| 4.22 | Paynton - West | 27 | 16.9 | 5.4 | 52.0 | 4.7 | 0 | 6.1 | 0.7 | 0 | 14.2 |
| Entire ecoregion sample | | 6,176 | 19.2 | 9.1 | 52.9 | 5.1 | 1.2 | 8.2 | 1.2 | 2.4 | 0.8 |

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

2. Figures in parentheses are composite values for those transects occurring within one physiographic unit.

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

| Physio-graphic Unit | Transect[1] | Total Number of Wetlands In Sample | Mean Density Per Quarter Section | Percent of Total Wetland Numbers in Cover Class[1] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Cult-ivated | Willows & Trees | Grasses | Bulrush Cattail | Transitional Open Water | Natural Open Water | Artificial Open Water | Saline Open Water | Other |
| | (Morainal - K&K, 1-3) | | | | | | | | | | | |
| 4.52 | Bredenbury | 478 | 19.9 | 40.6 | 20.1 | 36.6 | 0.4 | 0 | 0.4 | 1.9 | 0 | 0 |
| | Wroxton West | 691 | 28.8 | 33.2 | 10.3 | 53.3 | 1.3 | 0 | 0.4 | 1.2 | 0 | 0.4 |
| | | (1,169) | (24.4) | (36.2) | (14.3) | (46.5) | (1.0) | 0 | (0.4) | (1.4) | 0 | (0.3) |
| | (Morainal - K&K, 4-9) | | | | | | | | | | | |
| 4.24 | Mayfair | 563 | 23.5 | 22.7 | 13.3 | 55.8 | 0.9 | 1.4 | 3.9 | 2.0 | 0 | 0 |
| 4.28 | Ibstone | 399 | 16.6 | 40.8 | 13.5 | 40.1 | 0 | 1.5 | 2.3 | 1.5 | 0 | 0.2 |
| | Valley Center | 245 | 10.2 | 44.5 | 5.3 | 43.7 | 1.2 | 0 | 0.4 | 1.7 | 0 | 3.2 |
| | | ( 644) | (13.4) | (42.3) | (10.4) | (41.4) | (0.5) | (0.9) | (1.6) | (1.6) | 0 | (1.4) |
| 4.34 | Grayson | 828 | 34.5 | 18.2 | 10.5 | 64.9 | 1.2 | 0.2 | 2.2 | 2.7 | 0 | 0.1 |
| 4.35 | Crenfell | 479 | 20.0 | 17.3 | 10.0 | 67.6 | 0.9 | 0 | 2.5 | 1.7 | 0 | 0 |
| | Inchkeith | 404 | 16.8 | 13.8 | 8.7 | 68.6 | 2.2 | 0.2 | 0.5 | 5.2 | 0 | 0.7 |
| | Edenwold | 300 | 12.5 | 39.7 | 5.0 | 46.0 | 0.6 | 0 | 2.6 | 5.7 | 0.3 | 0 |
| | | (1,183) | (16.4) | (21.8) | ( 8.3) | (62.5) | (1.3) | (0.1) | (1.9) | (3.9) | (0.1) | (0.2) |
| 4.36 | Wapella | 439 | 18.3 | 16.6 | 13.0 | 67.0 | 0 | 0 | 0.4 | 3.0 | 0 | 0 |
| | (Morainal - K&K, 10+) | | | | | | | | | | | |
| 4.38 | Hoosier | 146 | 8.1 | 28.7 | 0 | 60.9 | 1.4 | 0 | 0.7 | 2.7 | 3.5 | 2.1 |
| | Fusilier | 445 | 18.5 | 4.8 | 1.4 | 85.1 | 1.4 | 0.4 | 0.2 | 1.1 | 4.1 | 1.6 |
| | | ( 591) | (14.1) | (10.7) | ( 1.0) | (79.2) | (1.4) | (0.4) | (0.4) | (1.5) | (3.9) | (1.6) |
| | (Morainal - H, 4-9) | | | | | | | | | | | |
| 4.40 | Pleasantdale West | 93 | 4.3 | 8.4 | 22.0 | 43.2 | 4.2 | 0 | 7.4 | 14.9 | 0 | 0 |
| | (Lacustrine/Morainal - U, 1-3) | | | | | | | | | | | |
| 4.30 | Waldheim | 302 | 12.6 | 74.6 | 6.3 | 15.9 | 1.0 | 0 | 0.6 | 1.7 | 0 | 0 |
| 4.39 | Denzil | 204 | 8.5 | 41.7 | 2.9 | 51.6 | 1.4 | 0.5 | 0.5 | 1.4 | 0 | 0 |
| | Kerrobert | 228 | 9.5 | 46.6 | 6.1 | 44.4 | 0.4 | 0 | 1.3 | 1.3 | 0 | 0 |
| | | ( 432) | (9.0) | (44.3) | ( 4.7) | (47.7) | (0.9) | (0.2) | (0.9) | (1.3) | ( 0) | ( 0) |
| | (Lacustrine - U, 1-3) | | | | | | | | | | | |
| 4.23 | Paynton East | 191 | 10.1 | 62.8 | 3.7 | 26.1 | 1.1 | 0 | 1.6 | 4.2 | 0 | 0.5 |
| | Cleeves | 181 | 7.5 | 39.8 | 14.9 | 39.8 | 1.1 | 0 | 2.3 | 1.1 | 0 | 1.1 |
| | | ( 372) | ( 8.7) | (51.7) | ( 9.1) | (32.8) | (1.0) | 0 | (1.9) | (2.7) | 0 | (0.8) |
| 4.26 | Cloan West | 96 | 4.0 | 29.3 | 11.5 | 44.8 | 0 | 0 | 0 | 14.5 | 0 | 0 |
| | Cloan East | 104 | 6.5 | 12.5 | 26.0 | 58.7 | 0.9 | 0 | 0.9 | 0.9 | 0 | 0 |
| | | ( 200) | ( 5.0) | (20.4) | (19.0) | (51.9) | (0.6) | ( 0) | (0.6) | (7.6) | ( 0) | ( 0) |
| | (Fluvial/Lacustrine - U, 1-3) | | | | | | | | | | | |
| 4.31 | Wroxton East | 49 | 3.1 | 26.5 | 42.8 | 16.3 | 0 | 0 | 0 | 14.4 | 0 | 0 |
| | (Fluvial/Aeolian - U/H, 1-3) | | | | | | | | | | | |
| 4.31 | Environ | 257 | 10.7 | 57.2 | 6.3 | 33.1 | 1.1 | 0 | 0 | 2.3 | 0 | 0 |
| | Laura | 88 | 3.7 | 25.1 | 1.1 | 67.2 | 2.2 | 0 | 0 | 1.1 | 0 | 3.3 |
| | | ( 345) | ( 7.2) | (49.0) | ( 4.9) | (41.8) | (1.4) | 0 | 0 | (2.1) | 0 | (0.8) |
| | (Aeolian/Fluvial - H, 4-9) | | | | | | | | | | | |
| 4.22 | Paynton West | 94 | 5.2 | 43.6 | 3.3 | 44.6 | 1.2 | 0 | 2.1 | 2.1 | 0 | 3.3 |
| Entire Ecoregion Sample | | 15,825 | 16.1 | 32.4 | 7.6 | 52.5 | 1.5 | 0.6 | 2.2 | 2.2 | 0.2 | 0.9 |

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

2. Figures in parenthesis are composite values for those transects occurring within one physiographic unit.

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

| Physio-graphic Unit | Transect[1] | Total Wetland Area (in ha)[2] | Percent of Total Wetland Area in Land Use Activity Class[2] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | No Use | Abandoned Cultivation | Annual Crop | Haying | Grazing | Other |
| | (Morainal - K&K, 1-3) | | | | | | | |
| 4.52 | Bredenbury | 126 | 63.2 | 1.9 | 24.0 | 6.5 | 4.4 | 0 |
| | Wroxton - West | 249 | 56.6 | 5.9 | 14.3 | 7.1 | 16.1 | T[3] |
| | | (375) | (58.8) | (4.6) | (17.5) | (6.9) | (12.2) | T |
| | (Morainal - K&K, 4-9) | | | | | | | |
| 4.24 | Mayfair | 183 | 72.3 | 8.2 | 10.1 | 0.5 | 0.7 | 8.2 |
| 4.28 | Ibstone | 117 | 58.2 | 4.1 | 26.8 | 1.6 | 7.4 | 1.8 |
| | Valley Center | 111 | 43.0 | 1.1 | 41.7 | 8.0 | 6.3 | 0 |
| | | (228) | (50.9) | (2.7) | (34.0) | (4.9) | ( 6.8) | ( 0.8) |
| 4.54 | Grayson | 199 | 80.2 | 2.5 | 9.4 | 0.6 | 6.3 | 1.0 |
| 4.55 | Grenfell | 179 | 72.8 | 2.0 | 4.7 | 0.3 | 20.1 | 0.1 |
| | Inchkeith | 117 | 54.4 | 5.5 | 13.5 | 0.6 | 15.8 | 10.2 |
| | Edenwold | 110 | 57.0 | 5.3 | 22.4 | 1.5 | 13.8 | T |
| | | (406) | (63.1) | (3.9) | (12.1) | (0.7) | (17.2) | ( 3.0) |
| 4.56 | Wapella | 139 | 59.3 | 2.2 | 5.7 | 0 | 16.5 | 16.3 |
| | (Morainal - K&K, 10+) | | | | | | | |
| 4.88 | Hoosier | 107 | 68.4 | 0.8 | 6.9 | 0.5 | 22.8 | 0.5 |
| | Fusilier | 220 | 45.0 | 0.7 | 1.3 | 2.0 | 50.9 | 0.2 |
| | | (327) | (52.8) | (0.6) | ( 3.1) | (1.4) | (41.8) | ( 0.3) |
| | (Morainal - H, 4-9) | | | | | | | |
| 4.40 | Pleasantdale - West | 243 | 79.0 | 1.4 | 0.4 | 3.1 | 14.7 | 1.5 |
| | (Lacustrine/Morainal - U, 1-3) | | | | | | | |
| 4.30 | Waldheim | 145 | 37.5 | 1.5 | 61.0 | 0 | 0 | 0 |
| 4.89 | Denzil | 89 | 45.7 | 7.0 | 27.5 | 11.5 | 7.8 | 0.5 |
| | Kerrobert | 160 | 31.0 | 0.8 | 35.4 | 0.5 | 32.2 | 0.2 |
| | | (249) | (36.3) | (3.1) | (32.5) | ( 4.4) | (23.5) | (0.3) |
| | (Lacustrine - U, 1-3) | | | | | | | |
| 4.23 | Paynton - East | 50 | 53.8 | 3.8 | 40.1 | 0.4 | 0 | 1.9 |
| | Cleeves | 70 | 76.5 | 3.1 | 8.2 | 5.5 | 6.8 | T |
| | | (120) | (67.3) | (3.2) | (21.6) | (3.2) | ( 4.0) | (0.7) |
| 4.26 | Cloan - West | 38 | 51.3 | 0 | 36.1 | 1.3 | 3.8 | 7.6 |
| | Cloan - East | 39 | 54.9 | 1.6 | 18.0 | 1.2 | 24.2 | T |
| | | ( 77) | (53.3) | (1.0) | (26.9) | (1.0) | (14.0) | (3.7) |
| | (Fluvial/Lacustrine - U, 1-3) | | | | | | | |
| 4.51 | Wroxton - East | 40 | 71.4 | 0.8 | 6.5 | 21.4 | 0 | T |
| | (Fluvial/Aeolian - U/H, 1-3) | | | | | | | |
| 4.31 | Environ | 122 | 43.7 | 0.2 | 50.6 | 1.8 | 3.5 | 0.2 |
| | Laura | 47 | 46.7 | 3.0 | 13.6 | 1.5 | 34.2 | 1.0 |
| | | (169) | (44.7) | (0.9) | (40.2) | (1.7) | (12.2) | (0.3) |
| | (Aolian/Fluvial - H, 4-9) | | | | | | | |
| 4.22 | Paynton - West | 27 | 34.9 | 4.0 | 16.8 | 0 | 40.9 | 3.4 |
| Entered Ecoregion Sample | | 6,176 | 59.5 | 3.9 | 19.3 | 5.1 | 11.1 | 1.1 |

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

2. Figures in parentheses are composite values for transects occurring within one physiographic unit.

3. T (trace) - less than 0.05 percent.

Table 10. Wetlands Affected by One or More Permanent Impacts.

| Physiographic Unit | Transect[1] | Mean Number of Wetlands/Quarter[2] Total | Affected by One or More Impacts | Percent of Wetlands Impacted |
|---|---|---|---|---|
| | (Morainal - K&K, 1-3) | | | |
| 4.52 | Bredenbury | 19.9 | 4.1 | 20.6 |
| | Wroxton - West | 28.8 | 8.0 | 27.8 |
| | | (24.4) | ( 6.1) | (25.0) |
| | (Morainal - K&K, 4-9) | | | |
| 4.24 | Mayfair | 23.5 | 7.0 | 29.8 |
| 4.28 | Ibstone | 16.6 | 4.0 | 24.1 |
| | Valley Center | 10.2 | 2.7 | 26.5 |
| | | (13.4) | ( 3.4) | (25.4) |
| 4.54 | Grayson | 34.5 | 12.0 | 34.8 |
| 4.55 | Grenfell | 20.0 | 5.5 | 27.5 |
| | Inchkeith | 16.9 | 5.6 | 33.1 |
| | Edenwold | 12.5 | 3.6 | 28.8 |
| | | (16.4) | ( 4.9) | (30.0) |
| 4.56 | Wapella | 18.3 | 5.8 | 31.7 |
| | (Morainal - K&K, 10+) | | | |
| 4.88 | Moosier | 8.1 | 2.5 | 30.9 |
| | Fusilier | 18.5 | 4.8 | 26.0 |
| | | (14.1) | ( 3.8) | (27.0) |
| | (Morainal - H, 4-9) | | | |
| 4.40 | Pleasantdale - West | 4.3 | 2.1 | 48.8 |
| | (Lacustrine/Morainal - U, 1-3) | | | |
| 4.30 | Waldheim | 12.6 | 1.8 | 14.3 |
| 4.89 | Denzil | 8.5 | 2.1 | 24.7 |
| | Kerrobert | 9.5 | 2.3 | 24.2 |
| | | ( 9.0) | ( 2.2) | (24.4) |
| | (Lacustrine - U, 1-3) | | | |
| 4.23 | Paynton - East | 10.1 | 2.7 | 26.7 |
| | Cleaves | 7.5 | 1.8 | 24.0 |
| | | ( 8.7) | ( 2.2) | (25.3) |
| 4.26 | Cloan - West | 4.0 | 1.8 | 45.3 |
| | Cloan - East | 6.5 | 1.8 | 27.7 |
| | | ( 5.0) | ( 1.8) | (35.3) |
| | (Fluvial/Lacustrine - U, 1-3) | | | |
| 4.51 | Wroxton - East | 3.1 | 0.7 | 22.6 |
| | (Fluvial/Aeolian - U/H, 1-3) | | | |
| 4.31 | Environ | 10.7 | 2.9 | 27.1 |
| | Laura | 3.7 | 0.8 | 21.7 |
| | | ( 7.2) | ( 1.8) | (25.0) |
| | (Aeolian/Fluvial - H, 4-9) | | | |
| 4.22 | Paynton - West | 5.2 | 1.3 | 25.0 |
| Average for Entire Ecoregion Sample | | 16.0 | 4.3 | 26.9 |

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

2. Figures in parentheses are composite values for those transects occurring within one physiographic unit.

Table 11. Occurrence of Streams in Data Samples.

| Physiographic Unit | Transect[1] | No. of Quarters In Sample[2] | No. of Quarters Containing Streams[2] | Percent of Quarters Containing Streams |
|---|---|---|---|---|
| | (Morainal - K&K, 1-3) | | | |
| 4.52 | Bredenbury | 24 | 0 | 0 |
| | Wroxton - West | 24 | 2 | 8.3 |
| | | (48) | ( 2) | ( 4.2) |
| | (Morainal - K&K, 4-9) | | | |
| 4.24 | Mayfair | 24 | 6 | (25.0) |
| 4.28 | Ibstone | 24 | 0 | 0 |
| | Valley Center | 24 | 0 | 0 |
| | | (48) | ( 0) | ( 0) |
| 4.54 | Grayson | 24 | 0 | 0 |
| 4.55 | Grenfell | 24 | 4 | 16.7 |
| | Inchkeith | 24 | 3 | 12.5 |
| | Edenwold | 24 | 4 | 16.7 |
| | | (72) | (11) | (15.3) |
| 4.56 | Wapella | 24 | 6 | 25.0 |
| | (Morainal - K&K, 10+) | | | |
| 4.38 | Hoosier | 18 | 0 | 0 |
| | Fusilier | 24 | 0 | 0 |
| | | (42) | ( 0) | ( 0) |
| | (Morainal - M, 4-9) | | | |
| 4.40 | Pleasantdale - West | 22 | 4 | 18.2 |
| | (Lacustrine/Morainal - U, 1-3) | | | |
| 4.30 | Waldheim | 24 | 1 | 4.2 |
| 4.89 | Denzil | 24 | 1 | 4.2 |
| | Kerrobert | 24 | 0 | 0 |
| | | (48) | ( 1) | ( 2.1) |
| | (Lacustrine - U, 1-3) | | | |
| 4.23 | Paynton - East | 19 | 1 | 5.3 |
| | Cleeves | 24 | 2 | 8.3 |
| | | (43) | ( 3) | ( 7.0) |
| 4.26 | Cloan - West | 24 | 3 | 12.5 |
| | Cloan - East | 16 | 6 | 37.5 |
| | | (40) | ( 9) | (22.5) |
| | (Fluvial/Lacustrine - U, 1-3) | | | |
| 4.51 | Wroxton - East | 16 | 0 | 0 |
| | (Fluvial/Aeolian - U/M, 1-3) | | | |
| 4.31 | Environ | 24 | 0 | 0 |
| | Laura | 24 | 3 | 12.5 |
| | | (48) | ( 3) | ( 6.3) |
| | (Aeolian/Fluvial - M, 4-9) | | | |
| 4.22 | Paynton - West | 18 | 4 | 22.2 |
| Entire Ecoregion Sample | | 985 | 88 | 8.9 |

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

2. Figures in parentheses are composite values for those transects occurring within one physiographic unit.

Table 12. Distribution of Upland Cover Classes.

| Physiographic Unit | Transect[1] | Upland Area (in ha) | Percent of Total Upland Area in Cover[2] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Native | | | | | Planted | | | |
| | | | Grass | Low Shrub | Tall Shrub | Trees | Total | Annual Crops[3] | Perennial Grass & Forbs | Trees & Shrubs | Other |
| | (Morainal - K&K, 1-3) | | | | | | | | | | |
| 4.52 | Bredenbury | 1,484 | 6.7 | 0.3 | 0.7 | 6.6 | 14.3 | 84.4 | 0.6 | 0.2 | 0.5 |
| | Wroxton - West | 1,333 | 10.4 | 0.3 | 0.4 | 9.5 | 20.7 | 78.0 | 0.3 | 0.1 | 1.0 |
| | | (2,817) | ( 8.5) | (0.3) | (0.6) | ( 8.0) | (17.3) | (81.3) | ( 0.5) | (0.2) | (0.7) |
| | (Morainal - K&K, 4-9) | | | | | | | | | | |
| 4.24 | Mayfair | 1,493 | 8.3 | 1.9 | 3.1 | 19.0 | 32.4 | 65.6 | 0.9 | 0.1 | 1.1 |
| 4.28 | Ibstone | 1,465 | 10.5 | 1.9 | 5.6 | 7.4 | 25.3 | 73.8 | 0.2 | T[4] | 0.7 |
| | Valley Center | 1,481 | 7.3 | 1.3 | 0.1 | 0.8 | 9.4 | 88.1 | 1.3 | 0.4 | 0.9 |
| | | (2,946) | ( 8.9) | (1.6) | (2.8) | ( 4.1) | (17.3) | (81.0) | ( 0.8) | (0.2) | (0.8) |
| 4.54 | Grayson | 1,402 | 9.0 | 0.3 | 0.2 | 1.2 | 10.7 | 86.1 | 1.2 | 0.2 | 1.8 |
| 4.55 | Grenfell | 1,400 | 7.3 | 1.2 | 0.9 | 4.2 | 13.5 | 84.4 | 1.5 | 0.2 | 0.4 |
| | Inchkeith | 1,463 | 11.3 | 0.4 | 0.5 | 2.9 | 15.1 | 80.1 | 2.7 | 0.3 | 1.8 |
| | Edenwold | 1,484 | 7.9 | 0.2 | 0.4 | 1.8 | 10.4 | 87.1 | 2.0 | 0.1 | 0.5 |
| | | (4,347) | ( 8.9) | (0.6) | (0.6) | ( 3.0) | (13.0) | (83.9) | ( 2.1) | (0.2) | (0.9) |
| 4.56 | Wapella | 1,475 | 6.7 | 1.1 | 0.9 | 10.9 | 19.6 | 76.5 | 3.1 | 0.1 | 0.7 |
| | (Morninal - K&K, 10+) | | | | | | | | | | |
| 4.88 | Moosier | 1,092 | 33.0 | 1.0 | T | 0.2 | 34.2 | 61.9 | 2.7 | 0.2 | 1.2 |
| | Fusilier | 1,359 | 66.7 | 2.1 | 0.1 | 0.7 | 69.6 | 28.2 | 0.6 | 0.3 | 1.4 |
| | | (2,451) | (51.7) | (1.6) | (0.1) | ( 0.5) | (53.8) | (43.2) | ( 1.5) | (0.2) | (1.3) |
| | (Morainal - H, 4-9) | | | | | | | | | | |
| 4.40 | Pleasantdale - West | 1,213 | 9.9 | 0.1 | 4.4 | 36.5 | 50.9 | 40.3 | 7.7 | 0.1 | 1.0 |
| | (Lacustrine/Morainal - U, 1-3) | | | | | | | | | | |
| 4.30 | Waldheim | 1,430 | 3.3 | 0.2 | 0.1 | 2.8 | 6.4 | 92.5 | 0.3 | 0.4 | 0.4 |
| 4.89 | Denzil | 1,501 | 4.3 | 0.1 | 0 | 0.2 | 4.5 | 91.8 | 2.5 | 0.4 | 0.8 |
| | Kerrobert | 1,425 | 7.8 | 0.2 | 0.1 | 0.3 | 8.3 | 88.6 | 1.5 | 0.4 | 1.2 |
| | | (2,926) | ( 6.0) | (0.1) | (0.1) | ( 0.2) | ( 6.4) | (90.2) | ( 2.0) | (0.4) | (1.0) |
| | (Lacustrine - U, 1-3) | | | | | | | | | | |
| 4.23 | Paynton - East | 1,016 | 4.5 | T | 0.5 | 2.3 | 7.3 | 85.7 | 2.2 | 0.6 | 4.2 |
| | Cleeves | 1,516 | 4.5 | 0.6 | 0.7 | 8.2 | 14.0 | 84.0 | 1.3 | T | 0.8 |
| | | (2,532) | ( 4.5) | (0.3) | (0.6) | ( 5.8) | (11.3) | (84.7) | 1.7 | (0.2) | (2.1) |
| 4.26 | Cloan - West | 1,547 | 4.0 | T | 0.1 | 0.5 | 4.6 | 93.0 | 1.6 | 0.4 | 0.4 |
| | Cloan - East | 1,023 | 15.9 | 0.1 | 0.3 | 2.3 | 18.6 | 77.1 | 3.6 | 0.1 | 0.7 |
| | | (2,570) | ( 8.8) | (0.1) | (0.2) | ( 1.2) | (10.2) | (86.7) | ( 2.4) | (0.3) | (0.5) |
| | (Fluvial/Lacustrine - U, 1-3) | | | | | | | | | | |
| 4.51 | Wroxton - East | 1,032 | 6.3 | 1.4 | 1.5 | 31.1 | 40.3 | 40.7 | 18.2 | 0.2 | 0.6 |
| | (Fluvial/Aeolian - U/H, 1-3) | | | | | | | | | | |
| 4.31 | Environ | 1,446 | 10.5 | 2.8 | 0.7 | 9.5 | 23.5 | 69.4 | 6.1 | 0.2 | 0.8 |
| | Laura | 1,454 | 28.2 | 8.6 | 0.2 | 0.4 | 37.3 | 43.7 | 17.7 | 0.3 | 1.0 |
| | | (2,900) | (19.4) | (5.7) | (0.5) | ( 4.9) | (30.4) | (56.5) | (11.9) | (0.2) | (0.9) |
| | (Aeolian/Fluvial - H, 4-9) | | | | | | | | | | |
| 4.22 | Paynton - West | 981 | 6.6 | 1.0 | 2.0 | 28.4 | 38.1 | 40.4 | 18.5 | 0.1 | 2.9 |
| Entire Ecoregion Sample | | 58,727 | 9.6 | 0.7 | 0.8 | 5.4 | 16.4 | 79.0 | 3.4 | 0.2 | 1.0 |

1. Grouped by landform (parent soil material, surface form and percent slope).
2. Figures in parentheses are composite values for those transects occurring within one physiographic unit.
3. Includes summerfallow.
4. T = trace - less than 0.05 percent.

Table 13. Distribution of Upland Land Use Activity Classes.

| Physiographic Unit | Transect[1] | Total Upland Area (in ha)[2] | Percent of Total Upland Area in Land Use Activity | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Unused | Abandoned | Annual Crops[3] | Forage | Grazing | Farmsteads | Roads and Railways | Other |
| | (Morainal - K&K, 1-3) | | | | | | | | | |
| 4.52 | Bredenbury | 1,484 | 8.5 | 0.3 | 84.3 | 0.4 | 1.8 | 1.0 | 3.7 | 0 |
| | Wroxton - West | 1,333 | 9.3 | 0.1 | 78.0 | 1.3 | 8.1 | 0.7 | 2.1 | 0.4 |
| | | (2,817) | ( 8.9) | (0.2) | (81.3) | (0.9) | (4.8) | (0.9) | (2.9) | (0.2) |
| | (Morainal - K&K, 4-9) | | | | | | | | | |
| 4.24 | Mayfair | 1,493 | 21.4 | 0.8 | 65.6 | 0.8 | 4.0 | 0.4 | 2.9 | 4.1 |
| 4.28 | Ibstone | 1,465 | 17.4 | 1.0 | 73.8 | 0 | 2.8 | 0.4 | 3.0 | 1.8 |
| | Valley Center | 1,481 | 2.8 | 0.1 | 88.1 | 1.0 | 4.5 | 1.3 | 2.3 | 0 |
| | | (2,946) | (10.0) | (0.6) | (81.0) | (0.5) | (3.7) | (0.9) | (2.6) | (0.9) |
| 4.54 | Grayson | 1,402 | 3.9 | 0.2 | 86.1 | 0.3 | 2.4 | 1.1 | 5.0 | 1.0 |
| 4.55 | Grenfell | 1,400 | 5.4 | 0.6 | 84.4 | 1.4 | 5.7 | 0.7 | 1.8 | 0.1 |
| | Inchkeith | 1,463 | 4.9 | 0.5 | 80.1 | 1.9 | 7.5 | 1.4 | 3.2 | 0.6 |
| | Edenwold | 1,484 | 2.5 | 0.3 | 87.1 | 1.3 | 6.7 | 0.7 | 1.3 | 0.2 |
| | | (4,347) | ( 4.2) | (0.5) | (83.9) | (1.5) | (6.6) | (0.9) | (2.1) | (0.3) |
| 4.56 | Wapella | 1,475 | 7.3 | 0.1 | 76.5 | 1.7 | 9.6 | 0.6 | 1.1 | 3.1 |
| | (Morainal - K&K, 10+) | | | | | | | | | |
| 4.88 | Hoosier | 1,092 | 4.4 | 1.0 | 61.9 | 0 | 28.8 | 0.7 | 3.0 | 0.2 |
| | Fusilier | 1,359 | 3.0 | 0.4 | 28.2 | 0.5 | 62.8 | 0.7 | 4.2 | 0.3 |
| | | (2,451) | ( 3.6) | (0.7) | (43.2) | (0.3) | (47.7) | (0.7) | (3.7) | (0.3) |
| | (Morainal - H, 4-9) | | | | | | | | | |
| 4.40 | Pleasantdale - West | 1,213 | 32.0 | 0.5 | 40.3 | 6.5 | 15.9 | 0.9 | 2.8 | 1.1 |
| | (Lacustrine/Morainal - U, 1-3) | | | | | | | | | |
| 4.30 | Waldheim | 1,430 | 4.3 | 0.2 | 92.5 | T[4] | 0 | 0.6 | 2.4 | 0 |
| 4.89 | Denzil | 1,501 | 1.2 | 0.3 | 91.8 | 0.5 | 2.6 | 1.2 | 2.5 | T |
| | Kerrobert | 1,425 | 1.0 | 0.2 | 88.6 | 0.1 | 6.3 | 1.0 | 2.3 | 0.5 |
| | | (2,926) | ( 1.1) | (0.3) | (90.2) | (0.3) | ( 4.4) | (1.1) | (2.4) | (0.3) |
| | (Lacustrine - U, 1-3) | | | | | | | | | |
| 4.23 | Paynton - East | 1,016 | 4.0 | 0.3 | 85.7 | 1.0 | 0 | 1.5 | 4.0 | 3.5 |
| | Cleeves | 1,516 | 6.6 | 0.2 | 84.0 | 0.5 | 4.4 | 0.8 | 2.9 | 0.7 |
| | | (2,532) | ( 5.6) | (0.2) | (84.6) | (0.7) | ( 2.7) | (1.1) | (3.3) | (1.8) |
| 4.26 | Cloan - West | 1,547 | 1.6 | 0.5 | 93.0 | 1.5 | 1.2 | 0.5 | 1.6 | T |
| | Cloan - East | 1,023 | 7.1 | 0.7 | 77.1 | 3.3 | 9.8 | 0.4 | 1.7 | 0 |
| | | (2,570) | ( 3.8) | (0.6) | (86.7) | (2.2) | ( 4.6) | (0.5) | (1.6) | T |
| | (Fluvial/Lacustrine - U, 1-3) | | | | | | | | | |
| 4.51 | Wroxton - East | 1,032 | 11.3 | 0.2 | 40.7 | 16.3 | 27.9 | 1.0 | 2.4 | 0.3 |
| | (Fluvial/Aeolian - U/H, 1-3) | | | | | | | | | |
| 4.31 | Environ | 1,446 | 8.4 | 0.3 | 69.4 | 6.1 | 12.3 | 1.1 | 2.1 | 0.4 |
| | Laura | 1,454 | 3.1 | 0.1 | 43.7 | 15.0 | 34.6 | 1.0 | 1.9 | 0.6 |
| | | (2,900) | ( 5.7) | (0.2) | (56.5) | (10.6) | (23.5) | (1.0) | (2.0) | (0.5) |
| | (Aeolian/Fluvial - H, 4-9) | | | | | | | | | |
| 4.22 | Paynton - West | 981 | 21.9 | 0.3 | 40.4 | 3.0 | 30.4 | 0.6 | 1.6 | 1.9 |
| Entire Ecoregion Sample | | 58,727 | 6.6 | 0.5 | 79.0 | 2.4 | 8.2 | 0.9 | 2.0 | 0.5 |

1. Grouped by landform (parent soil material, surface form and percent slope).
2. Figures in parentheses are composite values for those transects occurring within one physiographic unit.
3. Includes summerfallow.
4. T = trace - less than 0.05 percent.

Table 14. Examples of Variability in Wetland Cover Data.

| Physio-graphic Unit | Transects[1] | Area in Hectares Per Quarter Section | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Cultivated[2] | | | Grass[2] | | | Willows[2] | | |
| | | Mean | S.E.[3] | C.V.[4] | Mean | S.E. | C.V. | Mean | S.E. | C.V. |
| | (Morainal - K&K, 1-3) | | | | | | | | | |
| 4.52 | Bredenbury | 1.3 | 0.3 | 1.3 | 2.4 | 0.7 | 1.4 | 1.3 | 0.5 | 1.7 |
| | Wroxton - West | 1.5 | 0.5 | 1.7 | 6.5 | 1.1 | 0.8 | 1.1 | 0.3 | 1.1 |
| | | (1.4) | (0.3) | (1.5) | (4.5) | (1.2) | (1.9) | (1.2) | ( 0.3) | ( 1.4) |
| | (Morainal - K&K, 4-9) | | | | | | | | | |
| 4.24 | Hayfair | 0.8 | 0.4 | 2.5 | 3.9 | 3.3 | 4.1 | 1.6 | 0.9 | 2.6 |
| 4.28 | Ibstone | 1.3 | 0.8 | 3.1 | 2.1 | 0.6 | 1.5 | 0.7 | 0.1 | 1.0 |
| | Valley Center | 1.9 | 0.9 | 2.3 | 2.3 | 0.5 | 1.1 | 0.3 | T[5] | 0.4 |
| | | (1.6) | (0.6) | (2.6) | (2.2) | (0.4) | (1.3) | (0.5) | ( 0.1) | ( 0.8) |
| 4.54 | Grayson | 0.8 | 0.2 | 1.0 | 5.9 | 0.5 | 0.4 | 1.1 | 0.3 | 1.5 |
| 4.55 | Grenfell | 0.4 | T | 0.5 | 5.9 | 6.0 | 4.9 | 0.5 | 0.1 | 1.0 |
| | Inchkeith | 0.7 | 0.5 | 3.8 | 3.1 | 0.6 | 0.9 | 0.4 | 0.1 | 1.0 |
| | Edenwold | 1.0 | 0.4 | 2.0 | 2.5 | 0.6 | 1.2 | 0.2 | T | 0.5 |
| | | (0.7) | (0.2) | (2.3) | (3.8) | (1.6) | (3.5) | (0.4) | T | ( 1.0) |
| 4.56 | Wapella | 0.3 | T | 0.6 | 4.4 | 4.0 | 4.4 | 0.8 | 0.2 | 1.0 |
| | (Morainal - K&K, 10+) | | | | | | | | | |
| 4.88 | Hoosier | 0.4 | 0.2 | 2.0 | 2.7 | 1.2 | 1.9 | T | 0 | 0.1 |
| | Fusilier | 0.1 | T | 0.6 | 4.9 | 1.4 | 1.4 | 0.2 | T | 0.7 |
| | | (0.2) | (0.1) | (1.7) | (4.0) | (1.1) | (1.8) | (0.1) | T | ( 0.8) |
| | (Morainal - H, 4-9) | | | | | | | | | |
| 4.40 | Pleasantdale - West | T | 0 | 0.2 | 3.4 | 3.3 | 4.7 | 4.8 | 21.1 | 20.6 |
| | (Lacustrine/Morainal - U, 1-3) | | | | | | | | | |
| 4.30 | Waldheim | 3.7 | 2.1 | 2.8 | 0.9 | 0.3 | 1.5 | 1.0 | 0.7 | 3.4 |
| 4.89 | Denzil | 1.0 | 0.5 | 2.3 | 2.1 | 0.9 | 2.0 | 0.2 | 0.1 | 1.1 |
| | Kerrobert | 2.4 | 2.5 | 5.2 | 3.2 | 3.3 | 5.2 | 0.6 | 0.2 | 2.0 |
| | | (1.7) | (1.1) | (4.5) | (2.6) | (1.5) | (3.9) | (0.4) | ( 0.1) | ( 1.7) |
| | (Lacustrine - U, 1-3) | | | | | | | | | |
| 4.23 | Paynton - East | 1.1 | 0.2 | 1.0 | 1.1 | 0.4 | 1.5 | 0.3 | T | 0.7 |
| | Cleeves | 0.2 | T | 0.3 | 1.3 | 0.3 | 1.2 | 0.9 | 0.3 | 1.6 |
| | | (0.6) | (0.1) | (1.1) | (1.2) | (0.2) | (1.3) | (0.6) | ( 0.2) | ( 1.6) |
| 4.26 | Cloan - West | 0.6 | 0.6 | 4.8 | 0.5 | 0.1 | 1.2 | 0.3 | T | 0.7 |
| | Cloan - East | 0.4 | 0.2 | 1.3 | 0.8 | 0.1 | 0.7 | 1.1 | 0.7 | 2.8 |
| | | (0.5) | (0.3) | (3.6) | (0.6) | (0.1) | (1.0) | (0.6) | ( 0.2) | ( 2.3) |
| | (Fluvial/Lacustrine - U, 1-3) | | | | | | | | | |
| 4.51 | Wroxton - East | 0.2 | T | 0.4 | 0.2 | 0.1 | 1.9 | 0.9 | 0.8 | 3.7 |
| | (Fluvial/Aeolian - U/H, 1-3) | | | | | | | | | |
| 4.31 | Environ | 2.6 | 2.6 | 4.9 | 1.4 | 0.6 | 2.1 | 0.5 | 0.3 | 2.8 |
| | Laura | 0.3 | 0.1 | 2.1 | 1.4 | 1.0 | 3.4 | 0.1 | T | 1.1 |
| | | (1.4) | (1.1) | (5.5) | (1.4) | (0.6) | (2.7) | (0.3) | ( 0.1) | ( 2.6) |
| | (Aeolian/Fluvial - H, 4-9) | | | | | | | | | |
| 4.22 | Paynton - West | 0.3 | T | 0.6 | 0.8 | 0.3 | 1.8 | 0.1 | 0 | 0.2 |
| Entire Ecoregion Sample | | 1.2 | 0.2 | 5.9 | 3.3 | 0.3 | 3.1 | 0.6 | 0.1 | 6.0 |

1. Grouped by landform (parent soil material, surface form and percent slope).
2. Figures in parentheses are composite values for those transects occurring within one physiographic unit.
3. S.E. - Standard Error.
4. C.V. - Coefficient of Variation.
5. T = trace - less than 0.05

Table 15. Examples of Variability in Upland Cover Data.

| Physio-graphic Unit | Transects[1] | Area in Hectares for Quarter Section | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Cropland[2] | | | Native Grass[2] | | | Native Trees[2] | | |
| | | Mean | S.E.[3] | C.V.[4] | Mean | S.E. | C.V. | Mean | S.E. | C.V. |
| | (Morainal - K&K, 1-3) | | | | | | | | | |
| 4.32 | Bredenbury | 52.2 | 15.8 | 1.5 | 4.1 | 2.1 | 2.5 | 4.1 | 5.2 | 6.3 |
| | Wroxton - West | 43.3 | 23.3 | 2.6 | 5.8 | 4.5 | 3.8 | 5.3 | 7.7 | 7.1 |
| | | (47.7) | ( 16.4) | ( 2.4) | ( 5.0) | ( 2.4) | ( 3.3) | ( 4.7) | ( 4.5) | ( 6.7) |
| | (Morainal - K&K, 4-9) | | | | | | | | | |
| 4.24 | Mayfair | 40.8 | 77.7 | 9.3 | 5.2 | 5.3 | 5.0 | 11.8 | 29.7 | 12.3 |
| 4.28 | Ibstone | 45.0 | 60.7 | 6.6 | 6.4 | 8.2 | 6.3 | 4.5 | 6.5 | 7.1 |
| | Valley Center | 54.4 | 21.1 | 1.9 | 4.5 | 8.9 | 9.7 | 0.5 | 0.1 | 0.8 |
| | | (49.7) | ( 31.5) | ( 4.4) | ( 5.4) | ( 6.1) | ( 7.7) | ( 2.5) | ( 2.8) | ( 7.9) |
| 4.54 | Grayson | 50.3 | 10.2 | 1.0 | 5.3 | 3.0 | 2.8 | 0.7 | 0.4 | 2.7 |
| 4.55 | Grenfell | 49.2 | 31.9 | 3.2 | 4.3 | 5.7 | 6.5 | 2.4 | 2.2 | 4.4 |
| | Inchkeith | 48.8 | 20.5 | 2.1 | 6.9 | 8.2 | 5.8 | 1.8 | 1.5 | 4.1 |
| | Edenwold | 53.8 | 44.4 | 4.0 | 4.9 | 19.4 | 19.5 | 1.1 | 0.6 | 2.7 |
| | | (50.6) | ( 18.7) | ( 3.1) | ( 5.3) | ( 6.4) | (10.1) | ( 1.8) | ( 0.8) | ( 4.0) |
| 4.56 | Wapella | 47.0 | 62.3 | 6.5 | 4.1 | 3.0 | 3.6 | 6.7 | 24.7 | 18.0 |
| | (Morainal - K&K, 10+) | | | | | | | | | |
| 4.88 | Hoosier | 37.5 | 142.9 | 16.2 | 20.0 | 95.3 | 20.2 | 0.1 | T[5] | 0.2 |
| | Fusilier | 16.9 | 85.4 | 26.2 | 37.8 | 86.9 | 11.3 | 0.4 | 0.1 | 0.8 |
| | | (25.2) | ( 93.0) | (23.9) | (30.2) | (74.9) | (16.1) | ( 0.3) | T | ( 0.7) |
| | (Morainal - H, 4-9) | | | | | | | | | |
| 4.40 | Pleasantdale - West | 22.2 | 92.3 | 19.5 | 5.5 | 3.5 | 3.0 | 20.2 | 65.0 | 15.1 |
| | (Lacustrine/Morainal - U, 1-3) | | | | | | | | | |
| 4.30 | Waldheim | 55.1 | 7.5 | 0.7 | 2.0 | 0.4 | 1.1 | 1.6 | 0.6 | 1.8 |
| 4.89 | Denzil | 57.4 | 6.2 | 0.5 | 2.7 | 3.8 | 7.0 | 0.1 | T | 0.5 |
| | Kerrobert | 52.6 | 37.6 | 3.5 | 4.7 | 27.9 | 29.4 | 0.2 | T | 0.6 |
| | | (55.0) | ( 16.0) | ( 2.0) | ( 3.7) | (11.1) | (21.1) | ( 0.1) | T | ( 0.6) |
| | (Lacustrine - U, 1-3) | | | | | | | | | |
| 4.23 | Paynton - East | 45.8 | 19.6 | 1.9 | 2.4 | 2.3 | 4.1 | 1.2 | 0.7 | 2.4 |
| | Cleeves | 53.1 | 32.6 | 3.0 | 2.8 | 2.5 | 4.3 | 5.2 | 10.1 | 9.5 |
| | | (49.9) | ( 20.9) | ( 2.8) | ( 2.7) | ( 1.7) | ( 4.2) | ( 3.4) | ( 4.9) | ( 9.4) |
| 4.26 | Cloan - West | 60.0 | 6.1 | 0.5 | 2.6 | 1.3 | 2.5 | 0.3 | 0.1 | 0.9 |
| | Cloan - East | 49.3 | 108.7 | 8.8 | 10.2 | 64.7 | 25.5 | 1.5 | 1.1 | 3.0 |
| | | (55.7) | ( 33.6) | ( 3.8) | ( 5.6) | (18.6) | (20.9) | ( 0.8) | ( 0.3) | ( 2.8) |
| | (Fluvial/Lacustrine - U, 1-3) | | | | | | | | | |
| 4.31 | Wroxton - East | 26.3 | 110.2 | 16.8 | 4.1 | 5.7 | 5.6 | 20.0 | 63.4 | 12.7 |
| | (Fluvial/Aeolian - U/H, 1-3) | | | | | | | | | |
| 4.31 | Environ | 41.8 | 66.2 | 7.8 | 6.3 | 8.2 | 6.4 | 5.7 | 16.5 | 14.1 |
| | Laura | 26.5 | 138.1 | 25.6 | 17.1 | 77.8 | 22.3 | 0.2 | 0.1 | 1.8 |
| | | (34.2) | ( 79.4) | (16.1) | (11.7) | (34.0) | (20.1) | ( 3.0) | ( 6.9) | (16.0) |
| | (Aeolian/Fluvial - H, 4-9) | | | | | | | | | |
| 4.22 | Paynton - West | 22.0 | 130.3 | 25.1 | 3.6 | 2.9 | 3.4 | 15.5 | 69.7 | 19.1 |
| Entire Ecoregion Sample | | 47.0 | 9.4 | 6.3 | 5.7 | 3.3 | 18.0 | 3.2 | 1.7 | 17.0 |

1. Grouped by landform (parent soil material, surface form and percent slope).
2. Figures in parenthesis are composite values for those transects occurring within one physiographic unit.
3. S.E. - Standard Error.
4. C.V. - Coefficient of Variation.
5. T = trace - less than 0.05.

Table 16. Examples of Variability in Upland Land Use Data.

| Physiographic Unit | Transects[1] | Area in Hectares Per Quarter | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Unused[2] | | | Grazing[2] | | | Road & Railways[2] | | |
| | | Mean | S.E.[3] | C.V.[4] | Mean | S.E. | C.V. | Mean | S.E. | C.V. |
| | (Morainal - K&K, 1-3) | | | | | | | | | |
| 4.32 | Bredenbury | 5.2 | 12.7 | 11.9 | 1.1 | 1.9 | 8.5 | 2.3 | 0.1 | 0.2 |
| | Wroxton - West | 5.2 | 8.3 | 7.8 | 4.5 | 15.5 | 16.8 | 1.1 | 0.1 | 0.6 |
| | | ( 5.2) | ( 7.3) | ( 9.7) | ( 2.8) | ( 6.4) | (15.9) | (1.7) | (0.1) | (0.5) |
| | (Morainal - K&K, 4-9) | | | | | | | | | |
| 4.24 | Mayfair | 15.5 | 63.5 | 20.1 | 2.5 | 18.0 | 35.9 | 1.8 | 0.3 | 0.8 |
| 4.28 | Ibstone | 10.6 | 56.5 | 26.1 | 1.7 | 5.5 | 15.8 | 1.8 | 0.1 | 0.4 |
| | Valley Cancer | 1.7 | 1.9 | 5.3 | 2.8 | 20.5 | 36.2 | 1.4 | 0.2 | 0.6 |
| | | ( 6.1) | (23.1) | (26.0) | ( 2.2) | ( 9.1) | (28.0) | (1.6) | (0.1) | (0.5) |
| 4.54 | Grayson | 2.3 | 1.3 | 2.8 | 1.4 | 4.3 | 15.1 | 2.9 | 0.7 | 1.3 |
| 4.55 | Grenfell | 3.1 | 2.5 | 3.9 | 3.3 | 12.6 | 18.6 | 1.0 | 0.1 | 0.7 |
| | Inchkeith | 3.0 | 3.3 | 5.5 | 4.6 | 9.8 | 10.6 | 1.9 | 0.5 | 1.3 |
| | Edenwold | 1.6 | 0.6 | 1.9 | 4.1 | 23.8 | 28.2 | 0.8 | 0.1 | 0.5 |
| | | ( 2.6) | ( 1.3) | ( 4.2) | ( 4.0) | ( 8.7) | (18.4) | (1.2) | (0.2) | (1.1) |
| 4.56 | Wapella | 4.5 | 5.9 | 6.4 | 5.9 | 39.1 | 32.4 | 0.7 | 0.1 | 0.7 |
| | (Morainal - K&K, 10+) | | | | | | | | | |
| 4.88 | Hoosier | 2.7 | 7.5 | 12.0 | 17.5 | 126.8 | 30.3 | 1.8 | 0.2 | 0.5 |
| | Fusilier | 1.7 | 3.7 | 10.8 | 35.6 | 118.3 | 16.3 | 2.4 | 0.7 | 1.4 |
| | | ( 2.1) | ( 3.7) | (11.3) | (27.8) | ( 97.3) | (22.7) | (2.2) | (0.4) | (1.1) |
| | (Morainal - H, 4-9) | | | | | | | | | |
| 4.40 | Pleasantdale - West | 17.7 | 60.9 | 16.2 | 8.8 | 53.8 | 28.8 | 1.5 | 0.1 | 0.3 |
| | (Lacustrine/Morainal - U, 1-3) | | | | | | | | | |
| 4.30 | Waldheim | 2.5 | 1.4 | 2.7 | 0 | 0 | 0 | 1.5 | 0.2 | 0.8 |
| 4.89 | Denzil | 0.7 | 0.5 | 3.3 | 1.7 | 3.4 | 10.0 | 1.5 | 0.1 | 0.4 |
| | Kerrobert | 0.6 | 0.1 | 0.8 | 3.8 | 30.0 | 39.1 | 1.4 | 0.2 | 0.8 |
| | | ( 0.7) | ( 0.2) | ( 2.1) | ( 2.7) | ( 11.7) | (30.0) | (1.4) | (0.1) | (0.6) |
| | (Lacustrine - U, 1-3) | | | | | | | | | |
| 4.23 | Paynton - East | 2.2 | 1.0 | 2.1 | 0 | 0 | 0 | 2.1 | 1.7 | 3.5 |
| | Cleeves | 4.2 | 9.2 | 10.8 | 2.8 | 9.5 | 16.6 | 1.8 | 0.5 | 1.4 |
| | | ( 3.3) | ( 4.2) | ( 8.4) | ( 1.6) | ( 4.2) | (17.6) | (2.0) | (0.7) | (2.4) |
| 4.26 | Cloan - West | 1.1 | 0.3 | 1.2 | 0.8 | 0.8 | 5.0 | 1.0 | 0.2 | 1.1 |
| | Cloan - East | 4.5 | 10.9 | 9.6 | 6.3 | 71.8 | 46.0 | 1.1 | 0.6 | 2.1 |
| | | ( 2.5) | ( 3.2) | ( 8.4) | ( 3.0) | ( 19.0) | (40.4) | (1.0) | (0.2) | (1.4) |
| | (Fluvial/Lacustrine - U, 1-3) | | | | | | | | | |
| 4.51 | Wroxton - East | 7.3 | 27.1 | 14.9 | 18.0 | 135.2 | 30.1 | 1.5 | 0.4 | 1.0 |
| | (Fluvial/Aeolian - U/H, 1-3) | | | | | | | | | |
| 4.31 | Environ | 5.1 | 7.8 | 7.5 | 7.5 | 47.2 | 31.1 | 1.3 | 0.1 | 0.5 |
| | Laura | 1.9 | 2.5 | 6.5 | 21.0 | 145.5 | 34.0 | 1.1 | 0.7 | 3.1 |
| | | ( 3.5) | ( 3.9) | ( 7.9) | (14.2) | ( 73.4) | (35.8) | (1.2) | (0.3) | (1.7) |
| | (Aeolian/Fluvial - H, 4-9) | | | | | | | | | |
| 4.22 | Paynton - West | 12.0 | 79.7 | 28.3 | 16.6 | 129.5 | 33.2 | 0.9 | 0.5 | 2.4 |
| Entire Ecoregion Sample | | 3.9 | 1.8 | 15.0 | 4.9 | 5.4 | 34.0 | 1.2 | 0.1 | 1.5 |

1. Grouped by landform (parent soil material, surface form and percent slope).
2. Figures in parentheses are composite values for those transects occurring within one physiographic unit.
3. S.E. - Standard Error.
4. C.V. - Coefficient of Variation.

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

| No. | Physiographic Unit Name | Estimated Area in Thousands of Hectares: Total Wetland Area | Cultivated | Willows and Trees | Grasses | Bulrush Cattail | Transitional Open Water | Natural Open Water | Artificial Open Water | Saline Open Water | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Morainal - K&K, 1-3) | | | | | | | | | | |
| 4.52 | Torkton Plain | 56.6 | 9.9 | 8.7 | 32.4 | 4.0 | 0 | 0.6 | 0.4 | 0 | 0.5 |
| | (Morainal - K&K, 4-9) | | | | | | | | | | |
| 4.24 | Redberry Lake Upland | 48.5 | 4.9 | 10.4 | 25.1 | 0.5 | 1.1 | 5.6 | 0.8 | 0 | 0 |
| 4.28 | Eagle Hills | 30.3 | 10.3 | 3.2 | 13.8 | 0.1 | 1.1 | 1.5 | 0.2 | 0 | 0.1 |
| 4.54 | Pheasant Hills Upland | 41.3 | 3.9 | 5.5 | 29.2 | 1.1 | 0.1 | 0.8 | 0.7 | 0 | 0 |
| 4.55 | Moose Mountain Upland | 69.7 | 8.4 | 4.7 | 47.4 | 2.2 | 0.1 | 3.0 | 2.7 | 1.1 | T[2] |
| 4.56 | Pipestone Plain | 35.1 | 2.0 | 4.5 | 26.5 | 0.9 | 0 | 0.7 | 0.6 | 0 | 0 |
| | (Morainal - K&K, 10+) | | | | | | | | | | |
| 4.88 | Neutral Upland | 13.1 | 0.4 | 0.2 | 6.7 | 2.0 | 0.2 | T | 0.1 | 3.5 | T |
| | (Morainal - H, 4-9) | | | | | | | | | | |
| 4.40 | Tiger Hills Upland | 25.9 | 0.1 | 11.3 | 7.8 | 0.3 | 0 | 5.5 | 0.7 | 0 | 0.3 |
| | Total Morainal | 320.5 | 39.9 | 48.5 | 188.9 | 11.1 | 2.6 | 17.7 | 6.2 | 4.6 | 0.9 |
| | (Lacustrine/Morainal - U, 1-3) | | | | | | | | | | |
| 4.30 | South Saskatchewan River Plain | 37.2 | 22.7 | 6.1 | 5.6 | 1.5 | 0 | 1.1 | 0.2 | 0 | 0 |
| 4.89 | Kerrobert Plain | 15.0 | 4.9 | 1.2 | 7.7 | 0.2 | 0.2 | 0.9 | T | 0 | T |
| | Total Lacustrine/Morainal | 52.2 | 27.6 | 7.3 | 13.3 | 1.7 | 0.2 | 2.0 | 0.2 | 0 | T |
| | (Lacustrine - U, 1-3) | | | | | | | | | | |
| 4.23 | North Saskatchewan River Plain | 24.1 | 5.2 | 5.2 | 10.4 | 1.3 | 0 | 1.0 | 0.2 | 0 | 0.7 |
| 4.26 | Cutknife Plain | 8.7 | 2.4 | 2.8 | 2.8 | T | 0 | T | 0.6 | 0 | 0.1 |
| | Total Lacustrine | 32.8 | 7.6 | 8.0 | 13.2 | 1.3 | 0 | 1.0 | 0.8 | 0 | 0.8 |
| | (Fluvial/Lacustrine - U, 1-3) | | | | | | | | | | |
| 4.51 | Whitesand River Plain | 12.7 | 0.8 | 4.6 | 1.1 | 5.9 | 0 | 0 | 0.2 | 0 | 0 |
| | (Fluvial/Aeolian - U/H, 1-3) | | | | | | | | | | |
| 4.31 | Asquith-Dundurn-Goose Lake Sandhills and Plain | 13.8 | 5.6 | 1.1 | 5.6 | 1.3 | 0 | 0 | T | 0 | 0.2 |
| | (Aeolian/Fluvial - H, 4-9) | | | | | | | | | | |
| 4.22 | Paynton Sandhills | 5.3 | 0.9 | 0.2 | 2.7 | 0.2 | 0 | 0.3 | T | 0 | 0.7 |
| | Total Fluvial Mixtures | 31.8 | 7.3 | 5.9 | 9.4 | 7.4 | 0 | 0.3 | 0.2 | 0 | 0.9 |
| Total for Entire Sampled Portion of Ecoregion | A[3] | 995 | 189.7 | 91.5 | 522.3 | 48.5 | 12.2 | 89.3 | 11.5 | 20.9 | 9.0 |
| | B[4] | 967 | 185.4 | 88.4 | 511.1 | 49.4 | 11.6 | 78.8 | 11.2 | 23.2 | 8.0 |

1. Grouped by landform (parent soil material, surface form and percent slope).
2. T = trace - less than 50 hectares.
3. Based on summation of values from individual physiographic units.
4. Based on the analysis of the ecoregion sample as a single unit.

Table 18. Estimated Numbers of Wetlands by Cover Class in Physiographic Unit.

| No. | Physiographic Unit Name | Estimated Numbers of Wetlands (in thousands) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total Number of Wetlands | Cultivated | Willows and Trees | Grasses | Bulrush Cattail | Transitional Open Water | Natural Open Water | Artificial Open Water | Saline Open Water | Other |
| | (Horainal - K&K, 1-3) | | | | | | | | | | |
| 4.52 | Torkton Plain | 176.4 | 63.9 | 25.2 | 82.0 | 1.7 | 0 | 0.7 | 2.5 | 0 | 0.4 |
| | (Horainal - K&K, 4-9) | | | | | | | | | | |
| 4.24 | Redberry Lake Upland | 149.2 | 33.9 | 19.8 | 83.2 | 1.3 | 0 | 5.9 | 2.9 | 2.1 | 0 |
| 4.28 | Eagle Hills | 85.6 | 36.2 | 8.9 | 35.5 | 0.4 | 0.8 | 1.3 | 1.3 | 0 | 1.2 |
| 4.54 | Pheasant Hills Upland | 172.0 | 31.4 | 18.1 | 111.6 | 2.1 | 0.4 | 3.7 | 4.6 | 0 | 0.2 |
| 4.55 | Moose Mountain Upland | 203.1 | 44.3 | 16.8 | 126.9 | 2.6 | 0.1 | 3.8 | 7.9 | 0.1 | 0.5 |
| 4.56 | Pipestone Plain | 110.8 | 18.4 | 14.4 | 74.3 | 0 | 0 | 0.5 | 3.3 | 0 | 0 |
| | (Horainal - K&K, 10+) | | | | | | | | | | |
| 4.88 | Neutral Upland | 23.7 | 2.5 | 0.2 | 18.8 | 0.3 | 0.1 | 0.1 | 0.4 | 0.9 | 0.4 |
| | (Horainal - H, 4-9) | | | | | | | | | | |
| 4.40 | Tiger Hills Upland | 10.1 | 0.8 | 2.2 | 4.4 | 0.4 | 0 | 0.8 | 1.5 | 0 | 0 |
| | Total Horainal | 930.9 | 231.4 | 105.6 | 536.7 | 8.8 | 1.4 | 16.8 | 24.4 | 3.1 | 2.7 |
| | (Lacustrine/Horainal - U, 1-3) | | | | | | | | | | |
| 4.30 | South Saskatchewan River Plain | 77.5 | 57.8 | 4.9 | 12.3 | 0.7 | 0 | 0.5 | 1.3 | 0 | 0 |
| 4.89 | Kerrobert Plain | 26.1 | 11.6 | 1.2 | 12.5 | 0.2 | 0 | 0.2 | 0.4 | 0.1 | 0 |
| | Total Lacustrine/Horainal | 103.6 | 69.4 | 6.1 | 24.8 | 0.9 | 0 | 0.7 | 1.7 | 0.1 | 0 |
| | (Lacustrine - U, 1-3) | | | | | | | | | | |
| 4.23 | North Saskatchewan River Plain | 74.7 | 38.6 | 6.8 | 24.5 | 0.8 | 0 | 1.4 | 2.0 | 0 | 0.6 |
| 4.26 | Cutknife Plain | 22.6 | 4.6 | 4.3 | 11.7 | 0.1 | 0 | 0.1 | 1.7 | 0 | 0 |
| | Total Lacustrine | 97.3 | 43.2 | 11.1 | 36.2 | 0.9 | 0 | 1.5 | 3.7 | 0 | 0.6 |
| | (Fluvial/Lacustrine - U, 1-3) | | | | | | | | | | |
| 4.51 | Whitesand River Plain | 15.6 | 4.1 | 6.7 | 2.6 | 0 | 0 | 0 | 2.2 | 0 | 0 |
| | (Fluvial/Aeolian - U/H, 1-3) | | | | | | | | | | |
| 4.31 | Asquith-Dundurn-Goose Lake Sandhills and Plain | 28.2 | 13.8 | 1.4 | 11.8 | 0.4 | 0 | 0 | 0.6 | 0 | 0.2 |
| | (Aeolian/Fluvial - H, 4-9) | | | | | | | | | | |
| 4.22 | Paynton Sandhills | 18.3 | 8.0 | 0.6 | 8.2 | 0.2 | 0 | 0.4 | 0.4 | 0 | 0.6 |
| | Total Fluvial Mixtures | 62.1 | 25.9 | 8.7 | 22.6 | 0.6 | 0 | 0.4 | 3.2 | 0 | 0.8 |
| Total for Entire Sampled Portions of Ecoregion | A[2] | 2,579 | 835.5 | 202.7 | 1,337.8 | 38.6 | 13.4 | 65.4 | 55.6 | 4.9 | 25.2 |
| | B[3] | 2,474 | 801.8 | 186.8 | 1,299.8 | 37.1 | 13.6 | 53.9 | 53.9 | 4.7 | 22.8 |

1. Grouped by landform (parent soil material, surface form and percent slope).
2. Based on summation of values from individual physiographic units.
3. Based on the analysis of the ecoregion sample as a single unit.

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

| No. | Physiographic Unit[1] Name | Estimated Area in Thousand of Hectares: Total Wetland Area | No Use | Abandoned Cultivation | Annual Crop | Haying | Grazing | Other |
|---|---|---|---|---|---|---|---|---|
| | (Morainal - K&K, 1-3) | | | | | | | |
| 4.52 | Yorkton Plain | 56.6 | 33.3 | 2.6 | 9.9 | 3.9 | 6.9 | T[2] |
| | (Morainal - K&K, 4-9) | | | | | | | |
| 4.24 | Redberry Lake Upland | 48.5 | 35.1 | 4.0 | 4.9 | 0.3 | 0.3 | 4.0 |
| 4.28 | Eagle Hills | 30.3 | 15.4 | 0.8 | 10.3 | 1.5 | 2.1 | 0.2 |
| 4.54 | Pheasant Hills Upland | 41.3 | 33.1 | 1.1 | 3.9 | 0.3 | 2.6 | 0.4 |
| 4.55 | Moose Mountain Upland | 69.7 | 44.0 | 2.7 | 8.4 | 0.5 | 12.0 | 2.1 |
| 4.56 | Pipestone Plain | 35.1 | 20.8 | 0.8 | 2.0 | 0 | 5.8 | 5.7 |
| | (Morainal - K&K, 10+) | | | | | | | |
| 4.88 | Neutral Upland | 13.1 | 6.9 | 0.1 | 0.4 | 0.2 | 5.5 | T |
| | (Morainal - M, 4-9) | | | | | | | |
| 4.40 | Tiger Hills Upland | 25.9 | 20.5 | 0.4 | 0.1 | 0.8 | 3.8 | 0.4 |
| | Total Morainal | 320.5 | 213.1 | 12.5 | 39.9 | 7.5 | 39.0 | 8.8 |
| | (Lacustrine/Morainal - U, 1-3) | | | | | | | |
| 4.30 | South Saskatchewan River Plain | 37.2 | 14.0 | 0.6 | 22.7 | 0 | 0 | C |
| 4.89 | Kerrobert Plain | 15.0 | 5.5 | 0.5 | 4.9 | 0.7 | 3.5 | T |
| | Total Lacustrine/Morainal | 52.2 | 19.5 | 1.1 | 27.6 | 0.7 | 3.5 | T |
| | (Lacustrine - U, 1-3) | | | | | | | |
| 4.23 | North Saskatchewan River Plain | 24.1 | 16.2 | 0.8 | 5.2 | 0.8 | 1.0 | 0.2 |
| 4.26 | Cutknife Plain | 8.7 | 4.6 | 0.1 | 2.3 | 0.1 | 1.2 | 0.3 |
| | Total Lacustrine | 32.8 | 20.8 | 0.9 | 7.5 | 0.9 | 2.2 | 0.5 |
| | (Fluvial/Lacustrine - U, 1-3) | | | | | | | |
| 4.51 | Whitesand River Plain | 12.7 | 9.1 | 0.1 | 0.8 | 2.7 | 0 | T |
| | (Fluvial/Aeolian - U/M, 1-3) | | | | | | | |
| 4.31 | Asquith-Dundurn-Goose Lake Sandhills and Plain | 13.8 | 6.2 | 0.1 | 5.6 | 0.2 | 1.7 | T |
| | (Aeolian/Fluvial - M, 4-9) | | | | | | | |
| 4.22 | Paynton Sandhills | 5.3 | 1.9 | 0.2 | 0.9 | 0 | 2.2 | 0.2 |
| | Total Fluvial Mixtures | 31.8 | 17.2 | 0.4 | 7.3 | 2.9 | 3.9 | 0.2 |
| Total for Entire Sampled Portion of Ecoregion | A[3] | 995 | 612.8 | 39.5 | 189.4 | 54.5 | 86.9 | 12.6 |
| | B[4] | 967 | 575.1 | 37.3 | 186.5 | 49.7 | 107.2 | 10.9 |

1. Grouped by landform (parent soil material, surface form and percent slope).
2. T = trace - less than 50 hectares.
3. Based on summation of values from individual physiographic units.
4. Based on the analysis of the ecoregion sample as a single unit.

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

| No. | Physiographic Unit[1] Name | Total Upland Area | Estimated Area in Thousands of Hectares: Native | | | | | Planted | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Grass | Low Shrub | Tall Shrub | Trees | Total | Annual Crops | Perennial Grasses and Forbs | Trees and Shrubs | Other |
| | (Morainal - K&K, 1-3) | | | | | | | | | | |
| 4.52 | Torkton Plain | 425.0 | 36.0 | 1.2 | 2.5 | 33.9 | 73.6 | 345.6 | 2.0 | 0.7 | 3.1 |
| | (Morainal - K&K, 4-9) | | | | | | | | | | |
| 4.24 | Redberry Lake Upland | 395.7 | 32.9 | 7.5 | 12.3 | 75.3 | 128.0 | 259.7 | 3.7 | 0.2 | 4.2 |
| 4.28 | Eagle Hills | 391.4 | 34.7 | 6.1 | 11.0 | 15.9 | 67.7 | 317.0 | 2.9 | 0.8 | 3.0 |
| 4.54 | Pheasant Hills Upland | 291.3 | 26.2 | 0.8 | 0.6 | 3.5 | 31.1 | 250.9 | 3.6 | 0.6 | 5.1 |
| 4.55 | Moose Mountain Upland | 746.4 | 66.1 | 4.3 | 4.6 | 22.0 | 97.0 | 626.1 | 15.3 | 1.5 | 6.6 |
| 4.56 | Pipestone Plain | 372.4 | 24.9 | 4.0 | 3.4 | 40.7 | 73.0 | 285.0 | 11.5 | 0.5 | 2.5 |
| | (Morainal - K&K, 10+) | | | | | | | | | | |
| 4.88 | Neutral Upland | 98.2 | 50.7 | 1.6 | T[2] | 0.5 | 52.8 | 42.4 | 1.5 | 0.2 | 1.2 |
| | (Morainal - H, 4-9) | | | | | | | | | | |
| 4.40 | Tiger Hills Upland | 129.4 | 12.8 | 0.1 | 5.7 | 47.3 | 65.9 | 52.2 | 10.0 | 0.1 | 1.2 |
| | Total Morainal | 2,849.8 | 284.3 | 25.6 | 40.1 | 239.1 | 589.1 | 2,178.9 | 50.5 | 4.6 | 26.9 |
| | (Lacustrine/Morainal - U, 1-3) | | | | | | | | | | |
| 4.30 | South Saskatchewan River Plain | 366.7 | 12.1 | 0.8 | 0.5 | 10.1 | 23.5 | 339.2 | 1.1 | 1.3 | 1.6 |
| 4.89 | Kerrobert Plain | 176.5 | 10.6 | 0.2 | 0.1 | 0.4 | 11.3 | 159.3 | 3.6 | 0.7 | 1.7 |
| | Total Lacustrine/Morainal | 543.2 | 22.7 | 1.0 | 0.6 | 10.5 | 34.8 | 498.5 | 4.7 | 2.0 | 3.3 |
| | (Lacustrine - U, 1-3) | | | | | | | | | | |
| 4.23 | North Saskatchewan River Plain | 508.1 | 22.9 | 1.7 | 3.2 | 29.6 | 57.4 | 430.4 | 8.4 | 1.2 | 10.8 |
| 4.26 | Cutknife Plain | 290.8 | 25.4 | 0.2 | 0.5 | 3.5 | 29.6 | 252.0 | 7.0 | 0.8 | 1.5 |
| | Total Lacustrine | 798.9 | 48.3 | 1.9 | 3.7 | 33.1 | 87.0 | 682.4 | 15.4 | 2.0 | 12.3 |
| | (Fluvial/Lacustrine - U, 1-3) | | | | | | | | | | |
| 4.51 | Whitesand River Plain | 327.7 | 20.7 | 4.5 | 5.0 | 101.8 | 132.0 | 133.4 | 59.6 | 0.7 | 2.1 |
| | (Fluvial/Aeolian - U/H, 1-3) | | | | | | | | | | |
| 4.31 | Asquith-Dundurn-Goose Lake Sandhills and Plain | 237.4 | 46.0 | 13.4 | 1.1 | 11.7 | 72.2 | 134.2 | 28.3 | 0.6 | 2.2 |
| | (Aeolian/Fluvial - H, 4-9) | | | | | | | | | | |
| 4.22 | Paynton Sandhills | 191.5 | 12.6 | 1.9 | 3.9 | 54.4 | 72.7 | 77.4 | 35.5 | 0.2 | 5.6 |
| | Total Fluvial Mixtures | 756.6 | 79.3 | 19.8 | 10.0 | 167.9 | 276.9 | 345.0 | 123.4 | 1.5 | 9.9 |
| Total for Entire Sampled Portion of Ecoregion | A[3] | 9,167 | 712.2 | 53.9 | 78.3 | 589.3 | 1,433.6 | 7,310.9 | 309.4 | 20.5 | 92.2 |
| | B[4] | 9,197 | 881.1 | 65.3 | 70.8 | 494.8 | 1,512.0 | 7,263.8 | 309.0 | 22.1 | 90.1 |

1. Grouped by landform (parent soil material, surface form and percent slope).
2. T = trace - less than 50 hectares.
3. Based on summation of values from individual physiographic units.
4. Based on the analysis of the ecoregion sample as a single unit.

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

| No. | Physiographic Unit[1] Name | Estimated Area in Thousands of Hectares: Total Upland Area | Unused | Abandoned | Annual Crops | Forage | Grazing | Farmsteads | Roads and Railways | Other |
|---|---|---|---|---|---|---|---|---|---|---|
| | (Morainal - K&K, 1-3) | | | | | | | | | |
| 4.32 | Torkton Plain | 425.0 | 37.7 | 0.9 | 345.6 | 3.6 | 20.3 | 3.6 | 12.5 | 0.8 |
| | (Morainal - K&K, 4-9) | | | | | | | | | |
| 4.24 | Redberry Lake Upland | 395.7 | 84.7 | 3.2 | 259.7 | 3.0 | 15.6 | 1.7 | 11.3 | 16.2 |
| 4.28 | Eagle Hills | 391.4 | 39.1 | 2.2 | 316.9 | 1.8 | 14.3 | 3.4 | 10.3 | 3.4 |
| 4.34 | Pheasant Hills Upland | 291.3 | 11.5 | 0.6 | 250.8 | 0.8 | 6.9 | 3.2 | 14.5 | 3.0 |
| 4.35 | Moose Mountain Upland | 746.4 | 31.6 | 3.4 | 626.0 | 11.5 | 49.5 | 6.9 | 15.3 | 2.0 |
| 4.36 | Pipestone Plain | 372.4 | 27.1 | 0.4 | 284.9 | 6.5 | 35.8 | 2.3 | 3.9 | 11.5 |
| | (Morainal - K&K, 10+) | | | | | | | | | |
| 4.88 | Neutral Upland | 98.2 | 3.5 | 0.7 | 42.4 | 0.3 | 46.8 | 0.7 | 3.6 | 0.2 |
| | (Morainal - H, 4-9) | | | | | | | | | |
| 4.40 | Tiger Hills Upland | 129.4 | 41.4 | 0.7 | 52.1 | 8.4 | 20.6 | 1.1 | 3.6 | 1.4 |
| | Total Morainal | 2,849.8 | 290.4 | 12.1 | 2,178.4 | 35.9 | 209.8 | 22.9 | 75.0 | 24.8 |
| | (Lacustrine/Morainal - U, 1-3) | | | | | | | | | |
| 4.30 | South Saskatchewan River Plain | 366.7 | 15.6 | 0.8 | 339.3 | 0.1 | 0 | 2.0 | 8.9 | 0 |
| 4.39 | Kerrobert Plain | 176.5 | 1.9 | 0.5 | 159.2 | 0.5 | 7.8 | 1.9 | 4.2 | 0.4 |
| | Total Lacustrine/Morainal | 543.2 | 17.5 | 1.3 | 498.5 | 0.6 | 7.8 | 3.9 | 13.1 | 0.4 |
| | (Lacustrine - U, 1-3) | | | | | | | | | |
| 4.23 | North Saskatchewan River Plain | 508.1 | 28.4 | 1.1 | 430.1 | 3.6 | 13.5 | 5.3 | 16.9 | 9.2 |
| 4.26 | Cutknife Plain | 290.8 | 11.1 | 1.8 | 252.0 | 6.3 | 13.4 | 1.4 | 4.7 | 0.1 |
| | Total Lacustrine | 798.9 | 39.5 | 2.9 | 682.4 | 9.9 | 26.9 | 6.7 | 21.6 | 9.3 |
| | (Fluvial/Lacustrine - U, 1-3) | | | | | | | | | |
| 4.51 | Whitesand River Plain | 327.7 | 37.0 | 0.6 | 133.4 | 53.4 | 91.4 | 3.1 | 7.8 | 1.0 |
| | (Fluvial/Aeolian - U/H, 1-3) | | | | | | | | | |
| 4.31 | Asquith-Dundurn-Goose Lake Sandhills and Plain | 237.4 | 13.6 | 0.4 | 134.2 | 25.1 | 55.8 | 2.4 | 4.7 | 1.2 |
| | (Aeolian/Fluvial - H, 4-9) | | | | | | | | | |
| 4.22 | Paynton Sandhills | 191.5 | 42.0 | 0.5 | 77.4 | 5.6 | 58.2 | 1.1 | 3.0 | 3.7 |
| | Total Fluvial | 756.6 | 92.6 | 1.5 | 345.0 | 84.1 | 205.4 | 6.6 | 15.5 | 5.9 |
| Total for Entire Sampled | A[2] | 9,167 | 652.5 | 46.0 | 7,310.0 | 222.2 | 631.8 | 77.2 | 175.8 | 50.8 |
| Portion of Ecoregion | B[3] | 9,197 | 603.3 | 46.0 | 7,265.6 | 216.1 | 757.8 | 80.0 | 185.8 | 42.3 |

1. Grouped by landform (parent soil material, surface form and percent slope).
2. Based on summation of values from individual physiographic units.
3. Based on the analysis of the ecoregion sample as a single unit.

Table 22. Rating of Sampled Morainal Physiographic Units in Saskatchewan Parkland as Waterfowl Production Habitat.

| No. | Physiographic Unit[1] Name | Percent of Total Unit Area in Wetlands | Percent of Wetland Area In Cover Class | | | | Percent of Upland Area | | Area of Unit in 1000's of Hectares | Rating as Waterfowl Production Habitat |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Grass | Bulrush/ Cattail | Natural, Fresh, Open Water | That is Unused | In Native and Seeded Grass and Shrub Cover | That is Unused | | |
| 4.44 | Touchwood-Beaver Hills | 16.9 | 58.4 | 6.3 | 19.9 | 71.9 | 12.2 | 10.0 | 595.9 | 1 |
| 4.36 | Minichinas Hills | 16.9 | 46.5 | 2.8 | 16.5 | 83.3 | 5.9 | 3.8 | 449.2 | 2 |
| 4.40 | Tiger Hills Upland | 16.7 | 30.3 | 1.0 | 21.1 | 79.0 | 22.1 | 32.0 | 155.3 | 2 |
| 4.58 | Gainsborough Creek Plain | 13.5 | 70.1 | 6.8 | 5.6 | 65.4 | 22.6 | 8.1 | 430.1 | 2 |
| 4.34 | Allan Hills | 13.2 | 72.2 | 7.3 | 1.1 | 68.0 | 8.5 | 4.4 | 163.3 | 3 |
| 4.41 | Ponass Lakes Plain | 12.8 | 50.3 | 7.8 | 14.2 | 56.5 | 9.9 | 7.1 | 757.6 | 1 |
| 4.54 | Pheasant Hills Upland | 12.4 | 70.7 | 2.7 | 2.1 | 80.2 | 10.7 | 3.9 | 332.6 | 2 |
| 4.88 | Neutral Upland | 11.8 | 51.3 | 15.0 | 0.3 | 52.8 | 54.9 | 3.6 | 111.3 | 2 |
| 4.52 | Yorkton Plain | 11.7 | 57.3 | 7.1 | 1.0 | 58.8 | 9.9 | 8.9 | 481.5 | 2 |
| 4.42 | Lanigan Creek Plain | 11.7 | 22.3 | 1.9 | 20.2 | 40.0 | 6.5 | 3.3 | 254.2 | 3 |
| 4.24 | Redberry Lake Upland | 10.9 | 51.8 | 1.1 | 11.6 | 72.3 | 14.2 | 21.4 | 443.4 | 1 |
| 4.59 | Upper Souris River Plain | 8.8 | 66.6 | 1.3 | 2.6 | 47.7 | 9.1 | 2.7 | 621.6 | 3 |
| 4.32 | Hawarden Hills | 8.8 | 22.2 | 0 | 1.1 | 14.2 | 2.7 | 0.2 | 147.1 | 4 |
| 4.56 | Pipestone Plain | 8.6 | 75.3 | 2.6 | 1.9 | 59.3 | 11.8 | 7.3 | 407.6 | 2 |
| 4.55 | Moose Mountain Upland | 8.5 | 68.1 | 3.2 | 4.3 | 63.1 | 12.3 | 4.2 | 816.1 | 3 |
| 4.46 | Last Mountain Plain | 8.4 | 51.0 | 4.6 | 6.3 | 53.5 | 5.5 | 3.2 | 381.4 | 3 |
| 4.28 | Eagle Hills | 7.2 | 45.5 | 0.4 | 5.1 | 50.9 | 14.1 | 10.0 | 421.7 | 2 |
| 4.33 | Kenaston-Buffalo Pound Upland | 6.9 | 46.0 | 2.4 | 10.6 | 59.2 | 8.3 | 1.9 | 146.6 | 3 |
| 4.50 | Touchwood Slope | 4.7 | 45.2 | 3.3 | 13.2 | 74.0 | 8.7 | 4.8 | 303.3 | 3 |

1. Physiographic units are arranged in order of diminishing proportion of wetland area in the landscape.

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

| Physiographic Unit | Transect[1] | No. of Quarters[2] In Sample | Affected by Land Use/Cover Changes | Percent of Quarters Affected[2] | Time Interval from May 1985 to Ground Truth Survey (in months) |
|---|---|---|---|---|---|
| | (Morainal - K&K, 1-3) | | | | |
| 4.52 | Bredenbury | 24 | 3 | 13 | 25 |
| | Wroxton - West | 24 | 8 | 33 | 25 |
| | | (48) | (11) | (23) | |
| | (Morainal - K&K, 4-9) | | | | |
| 4.24 | Mayfair | 24 | 10 | 42 | 25 |
| 4.28 | Ibstone | 24 | 10 | 42 | 26 |
| | Valley Center | 24 | 12 | 50 | 28 |
| | | (48) | (22) | (46) | |
| 4.54 | Grayson | 24 | 15 | 63 | 26 |
| 4.55 | Grenfell | 24 | 6 | 25 | 26 |
| | Inchkeith | 24 | 7 | 29 | 26 |
| | Edenwold | 24 | 13 | 54 | 25 |
| | | (72) | (26) | (36) | |
| 4.56 | Wapella | 24 | 7 | 29 | 26 |
| | (Morainal - K&K, 10+) | | | | |
| 4.88 | Hoosier | 18 | 6 | 33 | 36 |
| | Fusilier | 24 | 6 | 25 | 36 |
| | | (42) | (12) | (29) | |
| | (Morainal - M, 4-9) | | | | |
| 4.40 | Pleasantdale - West | 22 | 5 | 23 | 24 |
| | (Lacustrine/Morainal - U, 1-3) | | | | |
| 4.30 | Waldheim | 24 | 5 | 21 | 31 |
| 4.89 | Denzil | 24 | 5 | 21 | 27 |
| | Kerrobert | 24 | 16 | 67 | 25 |
| | | (48) | (21) | (44) | |
| | (Lacustrine - U, 1-3) | | | | |
| 4.23 | Paynton - East | 19 | 9 | 47 | 27 |
| | Cleeves | 24 | 5 | 21 | 25 |
| | | (43) | (14) | (33) | |
| 4.26 | Cloan - West | 24 | 9 | 38 | 27 |
| | Cloan - East | 16 | 6 | 38 | 27 |
| | | (40) | (15) | (38) | |
| | (Fluvial/Lacustrine - U, 1-3) | | | | |
| 4.51 | Wroxton - East | 16 | 4 | 25 | 25 |
| | (Fluvial/Aeolian - U/M, 1-3) | | | | |
| 4.31 | Environ | 24 | 12 | 50 | 31 |
| | Laura | 24 | 8 | 33 | 31 |
| | | (48) | (20) | (42) | |
| | (Aeolian/Fluvial - M, 4-9) | | | | |
| 4.22 | Paynton - West | 18 | 4 | 22 | 27 |

1. Grouped by landform (parent soil material, surface form and percent slope).
2. Figures in parenthesis are composite values for values for those transects occurring within one physiographic unit.