The Final Report and Recommendations of the Agricultural Land Review Committee

Subject: Recommendations for the 2009 agricultural land assessment model

Background:

The SAMA Board established the Agricultural Land Review Committee (ALRC) in May 2004 to review all aspects of arable and non-arable agricultural land property valuation models.

The Agricultural Land Review Committee has met numerous times, analyzed the issues, and has prepared a number of recommendations that the Committee is asking the SAMA Board to approve for implementation in 2009.

The committee developed the following vision for the 2009 agricultural land model that is being used to guide the development of the 2009 model:

> "To build public trust in the arable and non-arable agricultural land assessments by providing a mass appraisal valuation system that:
>
> - is consistent with SAMA's Mission;
> - is based on the potential productivity of the land;
> - is defensible and stable; and
> - uses objective and verifiable data."

This paper provides recommendations for key questions that were addressed as part of the review of the agricultural land assessment system. The Agricultural Land Review Committee (ALRC) originally developed the questions from issues identified during their first few meetings.

The data analysis, tables and graphics in this paper do not represent the final values to be used in 2009. However, they are an accurate prediction of the expected impact of the refinements recommended by the committee. 2002 base year information and cost of production data available at the time of the report was used to prepare this paper. Changes in property value between the current June 30, 2002 base date and the June 30, 2006 base date are not included in this paper. The 2009 agricultural land model will reflect data as of the June 30, 2006 base date.

Executive Summary of Agricultural Land Review Committee Recommendations

Question 1: What role should soil productivity indexes have in the mass appraisal valuation model?

Are the current productivity index formulas adequate for cultivated and pasture land? What enhancements, if any, should be made?

Cultivated Land

Should a productivity index system continue to be used?

ALRC Recommendation:

A productivity index system should continue to be used as it permits the relative ranking of individual soil types from best to worst based on the soils long-term potential productivity or yield.

What yield data is available to update the productivity index?

ALRC Recommendation:

Saskatchewan Crop Insurance data should continue to be the source of yield data used to develop the agricultural land productivity index.

Is there a need to collect additional yield data, how would it be collected, and at what cost?

ALRC Recommendation:

The committee does not recommend setting up a data collection process for yield data at this time.

How are different crops/crop rotations considered in the valuation process? As part of the productivity index or later in the calculations of an assessment?

ALRC Recommendation:

Variations in Crops/Crop rotations should be considered later in the calculation procedure.

Are the weightings of climate, texture, profile, organic matter, and a-depth factors still appropriate?

ALRC Recommendation:

Long-term crop yield data and climate data has been used to determine if the current weightings are appropriate. The following changes to the climate, texture and profile factors are recommended.

Climate

- Change the lowest climate rating for the Black, Dark Gray and Gray Wooded soil zones from 27 to 26.
- Reduce the climate by up to 2 points for selected municipalities that are located near the transition area to the northern forests.

Texture

- Reduce the ratings for textures heavier than Loam in the Dark Gray and Gray Wooded soil zones.

Profile

- Reduce the rating for DG12 profile from 20 to 18.

Pasture, Hay and Waste

Does carrying capacity adequately measure the potential productivity of pasture? Are there other measures that might be used?

ALRC Recommendation:

Carrying capacity is to continue to be used as the measure of potential productivity for pasture.

Should the carrying capacity data, originally developed through the 1990 SRC study, be updated? Is there additional/new carrying capacity yield data available? Can additional or new data be collected (new collection programs put in place)?

ALRC Recommendation:

The results of the update of the 1990 SRC study be used to update the range site descriptions and carrying capacity ratings for the range sites in the 2006 manual subject to the recommendations being available no later than September 30, 2006 and the recommendations of the report being able to be implemented in time for the 2009 revaluation.

Should the hay land model continue to be linked to the pasture model?

ALRC Recommendation:

The hay land model should continue to be linked to the pasture model.

Question 2: Should soils with the same productivity have the same assessment?

What is "cost of production"?
ALRC Recommendation:
The "costs of production" considered for the Saskatchewan agricultural land model are to be those costs associated with land and the costs considered are to be limited to those contributed to by the landlord.

Could data from government farm programs, census, or income tax be used as a data source?
ALRC Recommendation:
That data from farm programs, income tax, or census should not be used in the agriculture land model.

What data will need to be collected, how can it be collected, and what will be the cost?
ALRC Recommendation:
The income approach not be used for the agriculture land model.

Are there currently sufficient adjustments for "cost of production" for cultivated land?
ALRC Recommendation:
Adjustments are needed to reflect varying "costs of production" for cultivated land.

What "cost of production factors" should be included and how would these variables be identified, measured and calibrated? Does cost of production vary by location and soil type? Are their data sources adequate to support an adjustment?

Note: The tables and rates for the cost of production adjustments reflect the data available when the analysis was being completed and the final cost of production adjustments will reflect the June 30, 2006 base date.

ALRC Recommendations:

- Trucking Cost Adjustment
  - Add an adjustment to recognize areas where grain must be hauled significantly more than the average
- Freight Cost Adjustment
  - Add an adjustment to recognize variations in freight rates
- Modify Current Economic Factors
  - Change from a point deduction to a percentage deduction
- Modify adjustment for Rego A-depth
  - Increase the Rego A-depth adjustment to 1.05

Note: The tables and rates for the cost of production adjustments reflect the data available when the analysis was being completed and the final cost of production adjustments will reflect the June 30, 2006 base date.

Are there currently sufficient adjustments for "cost of production" for pasture?
ALRC Recommendation
A direct relationship between carrying capacity and assessment be developed with the exception of higher carrying capacity pasture. A rating system is recommended that permits a similar calculation procedure to be used for pasture as is used for cultivated land.

Should there be similar adjustments for both pasture and cultivated land?

ALRC Recommendation:

Pasture and cultivated land are two different land uses and therefore are not required to have identical adjustments.

Question 3: What method should be used to convert productivity ratings into a dollar value in the mass appraisal valuation model?

Is there a need to convert the productivity index to a dollar value?
ALRC Recommendation:
The productivity index should continue to be converted to a dollar value.

Sales Comparison Productivity Model:

Note: The provincial average sale price used in this document reflects the June 30, 2002 base date and the final average sale price used will reflect the June 30, 2006 base date.

Should the provincial average sale price continue to be used to convert the productivity index into a dollar value?
ALRC Recommendation:
The provincial average sale price continue to be used to convert the productivity index into a dollar value.

Should the sales used be limited to sales intended for agricultural use and how could this be determined?
ALRC Recommendation:
The current sale verification process be used to remove the non-agricultural sales. The sales will be adjusted to represent agricultural value only and exclude non-agricultural influences.

Income Approach Productivity Model:

Should capitalization rate be used to convert the productivity index into a dollar value?
ALRC Recommendation:
A capitalization rate not be used to convert the productivity index into a dollar value.

Should tax policy be included in the assessment system?
ALRC Recommendation
Tax policy should not be included in the assessment system. In Saskatchewan, tax policy decisions are made by the province and by local governments.

Description of Recommendaitons:

Question 1: <u>What role should soil productivity indexes have in the mass appraisal valuation model?</u>

As described in Appendix 1, "A description of the productivity index portion of the agricultural land valuation model", SAMA's productivity indexes are an integral part of the agricultural land valuation model.

The following questions help to determine the role of a soil productivity index in the valuation model.

Are the current productivity index formulas adequate for cultivated and pasture land?
Recent crop yield and climate data has been collected for cultivated agricultural land. Analysis has determined that adjustments to the productivity index formulas are required (see Appendix 3).

SAMA is participating in an update to the 1990 SRC pasture study, which was used to develop the current carrying capacity ratings (see Appendix 4). Recent climate data and carrying capacity data is being used in the study. The results of the study may not be available until as late as March 2007.

<u>ALRC Recommendation:</u>
The results of the update of the 1990 SRC study be used to update the range site descriptions and carrying capacity ratings for the range sites in the 2006 manual subject to:

- The recommendations being available no later than September 30, 2006, and;
- The recommendations of the report being able to be implemented in time for the 2009 revaluation.

What enhancements, if any, should be made?

Cultivated Land

For cultivated land a number of questions arise including:

Do other jurisdictions use a productivity index system?
Yes, all jurisdictions do use a productivity index system (See Appendix 2). The systems used do vary in complexity. The index systems are similar to Saskatchewan's and use the yield from a single dominant crop to create the index. The dominant crop used is either wheat or corn depending on the location.

How do other jurisdictions update their productivity index system?
Appendix 2 describes how other jurisdictions update their productivity index system. Unlike Saskatchewan, which uses actual yield data, other jurisdictions either do not have an organization like Saskatchewan Crop Insurance collecting yield data or do not use the data that may be collected by the organization, and therefore must update based on yield estimates.

Should a productivity index system continue to be used?

ALRC Recommendation:
A productivity index system should continue to be used as it permits the relative ranking of individual soil types from best to worst based on the soils long-term potential productivity or yield.

What yield data is available to update the productivity index?
Saskatchewan Crop Insurance is the only source of property specific yield data. The committee could not find a comprehensive source of data other than that collected by Saskatchewan Crop Insurance.

ALRC Recommendation:
Saskatchewan Crop Insurance data should continue to be the source of yield data used to develop the agricultural land productivity index.

Is there a need to collect additional yield data, how would it be collected, and at what cost?

ALRC Recommendation:
The committee does not recommend setting up a data collection process for yield data at this time.

How are different crops/crop rotations considered in the valuation process? As part of the productivity index or later in the calculations of an assessment?
In other jurisdictions, adjustments for different crop rotations are considered later in the calculations (see Appendix 2). For jurisdictions using sales or cash rent, the adjustment is included in the sale prices and cash rent paid. For example, higher prices and rents are paid for soil types that permit more profitable rotations. For jurisdictions using crop share rent, crop rotation is listed in the formula. The formula includes consideration of the acres of each of the typical crops grown in an area.

ALRC Recommendation:
Variations in Crops/Crop rotations will be considered later in the calculation procedure.

Are the weightings of climate, texture, profile, organic matter, and a-depth factors still appropriate?
The appropriateness of the current ratings has been determined with the aid of long-term crop yield data provided by Saskatchewan Crop Insurance and climate data from Environment Canada. Climate data has been compiled and was used in the review of the climate portion of the productivity index. Appendix 3 describes the recommendations in more detail. Appendix 9 describes the impact of the recommendations for cultivated land.

ALRC Recommendation:
Long-term crop yield data and climate data has been used to determine if the current weightings are appropriate. The following changes to the climate, texture and profile factors are recommended.

Climate

- Change the lowest climate rating for the Black, Dark Gray and Gray Wooded soil zones from 27 to 26.

  The relationship will now be similar to that between the Brown and Dark Brown soil zone (see table below). It will permit lower climate ratings to be applied in areas of Dark Gray/Gray Wooded soils on the forest fringe.

Climate Ratings		
Soil Zone	**Current Rating Range**	**Recommended Rating Range**
Brown	5-15	5-15
Dark Brown	16-25	16-25
Black	27-32	26-32
Dark Gray	27-32	26-32
Gray Wooded	27-32	26-32

- Reduce the climate by up to 2 points for selected municipalities that are located near the transition area to the northern forests. (see Appendix 3 for a list of the municipalities and the recommended climate ratings).

  These municipalities should have lower climate ratings for the Dark Gray and Gray Wooded soils, as they tend to be in the areas with the lower growing degree-days and higher risk of frost. They are also a transition area between the cultivated and forest areas where it is not possible to grow cereal crops. Therefore, similar or lower climate ratings than used for the Dark Brown to Black transition area could be expected. The following table and figure provide examples of the municipalities with changed climate ratings.

Rural Municipality	Climate Rating Dark Gray/Gray Wooded	
	Current	Recommendation
331	29	27
394	28	26
520	28	26
588	28	26
622	27	26

Texture

- Reduce the ratings for textures heavier than Loam in the Dark Gray and Gray Wooded soil zones.

  The yield data indicates an adjustment is needed for heavier textured soils in the Dark Gray and Gray Wooded soil zones. The following table shows the proposed texture ratings for the Dark Gray and Gray Wooded soil zones. Ratings are lowered for textures heavier than loam. The Dark Gray ratings have been reduced roughly 3 % and the Gray Wooded reduced roughly 7 %.

Texture	Black	Dark Gray		Gray Wooded	
		Current	Recommended	Current	Recommended
Heavy Clay (HC)	35	31	30	28	26
SiC	35	33	32	30	28
Clay (C)	35	35	34	30	28
SiCl	35	35	34	32	30
Clay Loam (CL)	30	30	29	30	28
SCL	21	21	21	21	21
Silty Loam (SIL)	28	28	27	28	26
Loam (L)	24	24	24	24	24
VFSL	17	17	17	17	17
LL	19	19	19	19	19
FL	16	16	16	16	16
GL	15	15	15	15	15
Sandy Loam (SL)	14	14	14	14	14

Profile

- Reduce the rating for DG12 profile from 20 to 18.

  The average Oxbow (Black) productivity rating is 73 while Whitewood (Dark Gray) is higher at 74. This is contrary to the expectation for Dark Gray soils.

  The rating for the DG12 profile is currently the same as the OR12 profile, while the DG10 and DG8 are each 2 points less than the equivalent orthic profile. A similar relationship is recommended for the DG12 and OR12 profiles as is used for the OR10 and OR8 profiles. The following table shows the current rates for the Orthic and Dark Gray profiles and the recommended change for the DG12 profile.

Type	**Abbreviation**	**Current Rate**	**Recommended Rate**
Orthic	OR12	20	20
	OR10	18	18
	OR8	14	14
Dark Gray	DG12	20	18
	DG10	16	16
	DG8	12	12

Pasture, Hay and Waste

For pasture, the current productivity index is based upon carrying capacity. The carrying capacity assigned varies based on soil characteristics including: climate, texture, profile, a-depth, and physical factors.

How is a productivity index for pasture developed in other jurisdictions?
Carrying capacity is used in other jurisdictions (see Appendix 2). The systems used do vary in complexity.

Does carrying capacity adequately measure the potential productivity of pasture? Are there other measures that might be used?
Carrying capacity measures the long-term potential productivity for pasture. Carrying capacity is the only unit used to measure potential productivity of pasture by assessment jurisdictions in Canada and the USA.

Stocking rate is a short-term measure of the productivity of a pasture. Pasture managers' use stocking rate to adjust for short-term variations in climate and changes in pasture management procedures.

ALRC Recommendation:
Carrying capacity is to continue to be used as the measure of potential productivity for pasture.

Should the carrying capacity data, originally developed through the 1990 SRC study, be updated? Is there additional/new carrying capacity yield data available? Can additional or new data be collected (new collection programs put in place)?

SAMA is participating in the update of the 1990 SRC pasture study, which will add any new data that has been collected since the last study and intends to collect additional data in selected areas (see Appendix 4).

ALRC Recommendation:
The results of the update of the 1990 SRC study be used to update the range site descriptions and carrying capacity ratings for the range sites in the 2006 manual subject to the recommendations being available no later than September 30, 2006 and the recommendations of the report being able to be implemented in time for the 2009 revaluation.

Should the hay land model continue to be linked to the pasture model?
The rates for the hay land model are developed by first converting the hay land productivity to an equivalent carrying capacity and then using the dollar value for that carrying capacity in the hay land model.

There is no other source of data to update the hay land model. There are very few acres, approximately 200,000, where the hay land model is used. It is used primarily for crown hay leases. Given the small area affected, it is possible to use the pasture model directly to develop the hay land rates.

ALRC Recommendation:
The hay land model should continue to be linked to the pasture model.

Question 2: Should soils with the same productivity have the same assessment?

The current cultivated land productivity model calculates a productivity index and then permits adjustments for the following economic factors: stones, topography, natural hazards, man-made hazards and tree cover. The current pasture productivity model permits adjustments, which are considered cost of production related, for the following: topography, improved (non-native species) pasture, tree cover and high water table.

Some stakeholders have indicated there are different costs of production for cultivated soils with similar productivity (yield potential as reflected in the productivity index).

What is "cost of production"?
For assessment purposes, "Costs of production" are the crop production and directly related transportation costs that can reduce the potential income predicted by the productivity index. The objective of an assessment system is to value the land not the business of farming the land. Therefore, the "costs of production" are those costs associated with land.

For the income approach (see Appendix 2), the "costs of production" associated with the land are separated from the business of farming the land through the use of the landlord's income and expenses. For example, if a lessee experiences higher costs for a particular soil type, they will negotiate a lower rent payment to the landlord or if purchasing the land pay a lower price than a soil with comparable productivity but lower costs of production. For crop share rents, the lessee will negotiate:

- a lower percentage crop share for the landlord,
- additional input costs to be shared by the landlord, or
- if some input costs are shared, a higher percentage share to be paid by the landlord.

Appendix 6 provides an analysis of the typical landlord costs based on the 2005 rental survey.

ALRC Recommendation:
The "costs of production" considered for the Saskatchewan agricultural land model are to be those costs associated with land and the costs considered are to be limited to those contributed to by the landlord.

How do other jurisdictions adjust for "cost of production"?
Other jurisdictions adjust for cost of production using sales data, cash rent data, or crop share rent formulas (see Appendix 2).

The 2002 cultivated land model uses a single province wide sales based adjustment (Sales Comparison Productivity Model). It may be possible to adjust for variations in the cost of production using rents. A productivity model using the income data such as rents (Income Productivity Model) can also be used to develop cost of production adjustments.

Could data from government farm programs, census, or income tax be used as a data source?
There is no readily available source of data from farm programs, income tax, or census that can be used. This type of data is considered highly confidential.

Farm program data is highly confidential and is not available other than at the provincial level. The data collection form indicates the government departments that can use the data and is legally binding on government.

Income tax data can only be made available at a summarized level provided there is an adequate sample to maintain confidentiality.

A key requirement for any analysis is to be able to link the SAMA productivity database and other sources of data. It is not possible to link farm program or income tax data to the SAMA productivity database. The data is collected by farm unit and does not specify the parcels of land involved. As well, the data does not adequately separate the data between crop production, cattle production, and other types of operations in the farm unit.

ALRC Recommendation:
That data from farm programs, income tax, or census should not be used in the agriculture land model.

Are commodity prices considered in an income productivity model?
Commodity prices are considered directly in crop share rental agreements and are considered indirectly when a lessee determines the cash rent to be paid.

For example, the typical crop share formula is as follows (see examples from several jurisdictions in Appendix 2):
Crop Share:

Rent = [(Yield x Price x 1/3 Crop Share) - EXP]

Where	Yield	=	average yield of crops grown, considering crop rotation
	Price	=	average price for crops grown
	EXP	=	allowed landlord expenses

What rental data sources are there?
Cash rent data is not readily available and would need to be collected. Significantly more data than that collected, as part of the agricultural land rental survey, would be required to be able to use the information to calculate an assessment using the income productivity model.

Actual crop share data from individual landlords is not readily available and is very difficult to collect. The rental survey provides an understanding of the typical crop share rental practices. The other components can be estimated using various public sources, however, the data is not available at a soil type level.

How much agricultural land is rented and is there a sufficient number for the income approach?
The past rental surveys completed by Saskatchewan Agriculture and Food reported that approximately 30 to 40 percent of farmers rent land with approximately 6 quarters rented on average. The 2001 census reported that 54 percent of farmers rented land with 25 million of the 65 million acres rented.

The rental data collected for the 2005 rental survey is not sufficient to use the income approach using cash rents. Appendix 6 shows, for the sample of soil associations with significant rental data, there were five times as many sales used for the 2002 base year.

What data will need to be collected, how can it be collected, and what will be the cost?
Approximately $300,000 to $600,000 per year would be required to collect and analyze the required data. Unlike commercial property, there would not be costs associated with defending how the income data was used as agricultural land assessment is regulated.

<u>ALRC Recommendation:</u>
The income approach not be used in the agriculture land model.

Are there currently sufficient adjustments for "cost of production" for cultivated land?

Analysis of rental and sales data indicates that there are not sufficient adjustments for cost of production. Both analysis of rental data and sales data indicate that there are different costs of production for different soil types that have similar productivity indexes.

SAMA and Saskatchewan Agriculture and Food (SAF) completed a survey in 2005 of cash and crop share rents in the province. This survey demonstrates that soils with similar productivity would have different rents (see Appendix 6). For example, the crop share rental portion of the survey indicated soils with similar productivity in different soil zones would receive different rents. The following percentages are typically paid for crop share arrangements in the three major soil zones in the province:

- Brown – 33 %
- Dark Brown – 31 %
- Black – 29 %

The cash rent portion of the survey demonstrated similar results for specific soil types. For example, a similar soil in the Dark Brown and Black soil zone had similar cash rents, but the productivity index was significantly different at 55 and 64 points. Another example, in the Black and Dark Brown soil zone, indicated a significantly higher rent for the soil in the Dark Brown soil zone even though the productivity indexes were almost identical. The analysis of sales for these soil types demonstrates similar results (see Appendix 6).

ALRC Recommendation:
Adjustments are needed to reflect varying "costs of production" for cultivated land.

What "cost of production factors" should be included and how would these variables be identified, measured and calibrated? Does cost of production vary by location and soil type? Are their data sources adequate to support an adjustment?

One of the key areas of concern expressed by property owners, with the current agricultural model, is a lack of recognition of variations in cost of production.

ALRC Recommendations:

- Trucking Cost Adjustment
  - Add an adjustment to recognize areas where grain must be hauled significantly more than the average
- Freight Cost Adjustment
  - Add an adjustment to recognize variations in freight rates
- Modify Current Economic Factors
  - Change from a point deduction to a percentage deduction
- Modify adjustment for Rego A-depth
  - Increase the Rego A-depth adjustment to 1.05

Appendix 8 describes the recommendations in more detail and Appendix 9 describes the impact of the recommendations for cultivated land.

Trucking Costs

- Add an adjustment, expressed as a percentage, to reduce the final rating for areas experiencing higher than normal trucking costs

In some areas of the province grain must be hauled a considerable distance to deliver to the nearest elevator. Three key areas have been identified:

- Southwest corner south of the Cypress Bench
- Meadow Lake
- Hudson Bay

Trucking incentives between $4 and $7 are offered by grain companies and significantly reduce the cost of grain delivery for the majority of the province. Based on typical trucking costs the mileage cost to transport grain is reduced to $0 for distances between 65 and 110 kilometres. The range of distances is due to a the number of car spots at an elevator and the resulting trucking incentive offered.

A crop share income model has been developed to estimate the impact of the increased trucking costs on the income for the area being studied. The model takes into account the types of crops and prices received net of freight costs. An estimate of the impact, expressed as a percentage, on the net income can be calculated by comparing the added trucking costs to the net income. A cost of production adjustment, expressed as a percentage, can be applied to the Final Rating for areas experiencing higher than normal trucking costs.

Freight Costs

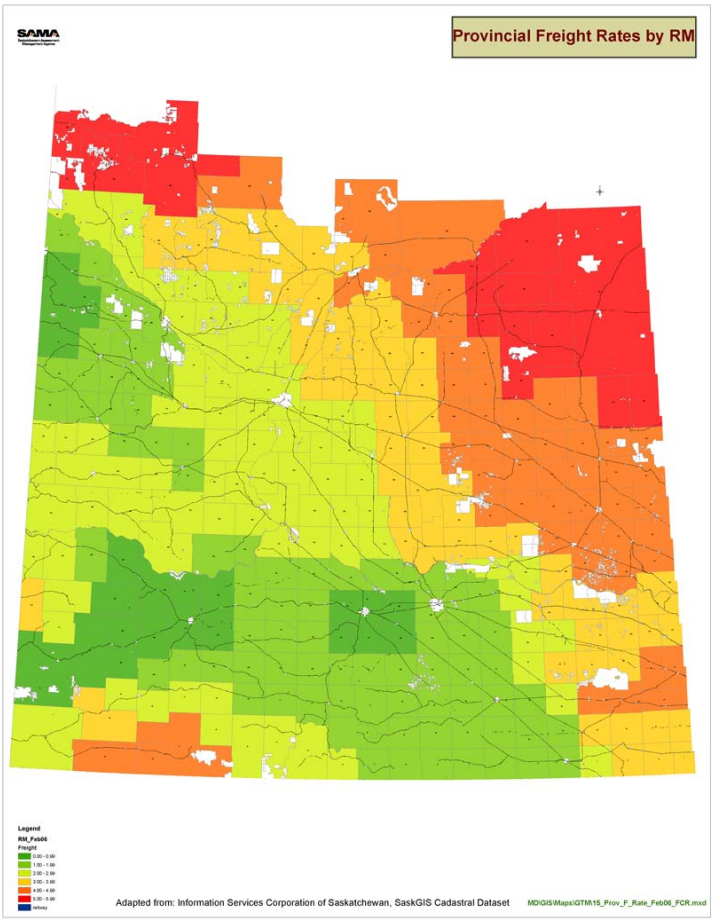
- A freight rate adjustment of up to 5 percent be assigned based on variations in the freight consideration rate.

A model has been developed to estimate the impact of varying freight costs. The model shows that freight costs tend to be highest on the east side of the province. Most crops are shipped west and therefore the costs are higher on the east side of the province. The freight rates range between $32/tonne and $42/tonne. The Freight Consideration Rate (FCR) for each station, which is published by the Canadian Wheat Board, is to be used in determining the adjustment.

The impact of the difference in freight costs has been estimated by comparing it to the typical income expected in an area from the typical crops grown in that area. The model suggests a maximum adjustment for freight would be between 3 and 4 percent for freight rates between $32/tonne and $40/tonne.

The following table shows the recommended freight adjustment table using 4% for the $40-42/tonne freight rate. The following figure shows the freight rate adjustment for each municipality in the province. The comparison of freight rates to crop price suggests a relatively small difference in freight adjustment for different crop prices and as a result a simple model based strictly on the freight rate in an area can be used. The discount is to be assigned by rural municipality based on the typical freight consideration rate in that municipality.

Freight ($/tonne)	Discount (%)	Legend
32-34	0	Dark Green
34-36	1	Med. Green
36-38	2	Light Green
38-40	3	Light Orange
40-42	4	Dark Orange
42+	5	Red



Current Economic Factors

Are the adjustments for the current economic factors reflective of the increased "costs of production" associated with them?

- Current economic factors be increased by changing from point deductions to percentage deductions.

Some stakeholders have recommended an increase in the deduction given for the current economic factors.

Analysis (see Appendix 6) of the relationship between productivity and both sales and rental data suggest that:

- Black (includes Dark Gray/Gray Wooded) till soils are over-assessed compared to Dark Brown and Brown till soils.
- Till soils in general are over-assessed compared to sand and lacustrine soils.
    - Till soils are characterized by the presence of stones, higher topography and more sloughs than sand and lacustrine soils.

Till soils by definition have significant economic adjustments for stones and topography when compared to other soil types. Black soils in general have higher deductions for natural hazards (sloughs).

The current deductions are expressed as points. When the 1965 manual was first introduced in the mid-70's, percentage deductions were initially used for all factors.

As the productivity index increases, the use of percentages would deduct more points for a similar level of economic factors. This would:

- Reduce the difference in final rating for Black tills in comparison to Brown and Dark Brown tills;
- Increase the difference in final ratings between till and lacustrine soils, and;
- Better reflect the relationship suggested by both sales and rental data.

A higher deduction for higher productivity soils would suggest a higher cost of production due to differences caused by such things as the number of times equipment must be used on the land. The greater the number of times will result in greater costs associated with farming around natural and man-made hazards, stones, and topography.

A deduction of 2 percent would result in a similar deduction for the average soil in the province (55 points final rating) as would be given using the current point deductions.

The following table shows the difference in deductions.

Description	**Range of Discount**	
	Current Points	**Recommended 2 %**
Stones	2-30	4-60
Topography	2-13	4-26
Natural Hazards	1-8	2-16
Man-made Hazards	1-8	2-16
Tree Cover	15-45	30-90

The cultivated agricultural land calculation would be modified as follows:

Productivity Rating (PR)	60
x Stones	0.96
x Topography	0.98
x Natural Hazards	0.96
x Man-made Hazards	
x Tree Cover	
Final Rating (FR)	54
x Provincial Factor ($/FR)	5.8
Fair Value ($/acre)	313

Modify A-depth Factor

- The Rego a-depth factor of 1.05 be reinstated.

Heavy lacustrine soils in the Brown and Dark Brown soil zones are typically assigned a Rego a-depth. The Sutherland and Regina soils are both heavy dark brown lacustrine soils. The Sutherland is a less desirable soil, as it is more variable and slightly lower in texture than the Regina soil. It also has a distinct a-depth and therefore is typically given a 5+ a-depth rating (1.05 factor) which is higher than the factor (1.00) assigned to Regina. This has resulted, for the current system, in the same assessment of $446 for the typical Regina and Sutherland soils even though the productivity rating, prior to application of the a-depth factor, is higher for the Regina soil. Applying an a-depth factor of 1.05 results in a spread in the assessments between the Regina and Sutherland soils of $27 per acre ($460 vs $487).

Sale prices, cash rents and crop share rents suggest a higher value is required for these soils than is suggested by the productivity ratings.

Changing the Rego a-depth factor from 1.00 to 1.05 improves the comparability between the Regina and Sutherland soils and recognizes the economic advantage for the heavy lacustrine soils.

Soil Zone	**A-depth Description**	**Factor**
Brown/ Dark Brown	Rego	1.05
	5+ inches	1.05
(Average)	3-5 inches	1.00

Are there currently sufficient adjustments for "cost of production" for pasture?

Appendix 5 describes the results of the 2005 pasture rental survey. Appendix 7 provides an analysis of the relationship demonstrated by rents and compares them to both the current assessments for pasture and for cultivated land.

The analysis shows a fairly uniform rental rate between 25 and 90 animal unit months (AUM). Rates do decrease to some degree as the carrying capacity increases. As with the sales database, the rental sample is relatively small. Therefore, caution should be taken in the conclusions made from the analysis.

The results of the rental survey suggest a closer relationship between the assessment and productivity than the current assessments. Application of this relationship would result in higher carrying capacity pasture (greater than 44 AUM) increasing significantly (up to approximately 48 %) and lower carrying capacities decreasing 10 to 16 percent. The total provincial pasture land assessment would not increase.

A comparison between pasture and cultivated land shows that Black soil zone pasture values will be higher than cultivated land and an adjustment is recommended to improve the comparability. This relationship does not occur in the native and improved Brown and the native Dark Brown pasture. A lower value for the higher carrying capacity pasture is needed in order to maintain a reasonable relationship in the assessment between pasture and cultivated land.

There are a number of reasons why the value relationship changes at higher carrying capacities. One explanation is higher costs of production for the following reasons:

- Different management practices are used which means land is used more intensively resulting in greater costs associated with providing items such as fencing and water
- Control of bush
- Maintaining improved pasture (improved pasture will be rated at the higher carrying capacities)
- Shorter grazing period in the Black soil zone which results in higher costs to winter cattle.

An adjustment is recommended to reduce the value of pasture with higher carrying capacities (see Appendix 7). The adjustment described in Appendix 7 results in improved relationships between cultivated and pasture land for the Black soil zone pasture, and a similar relationship to that in the Brown and Dark Brown soil zones. With the recommendation, the increase for higher carrying capacities (greater than 44 AUM) is reduced, but is still significant. Application of the recommended rates would result in higher carrying capacity pasture (greater than 44 AUM) increasing up to approximately 31 % and lower carrying capacities decreasing up to approximately 15 percent.

Pasture Rating

A rating system is recommended that permits a similar calculation procedure to be used for pasture as is used for cultivated land (see Appendix 7). A rating has been assigned to each carrying capacity. The rating can be multiplied by a single base year factor to determine the assessment.

The following table includes a recommended rating for each carrying capacity and a value calculated by multiplying the rating by a provincial factor of 5.0. The provincial factor reflects the 2002 base year province-wide selling price and will be updated to the 2006 base year.

The calculation for a 56 AUM pasture would be as follows:

31 point rating x $5.00/point base year factor = $155/acre

Carrying Capacity	Rating	Value ($/acre)	Carrying Capacity	Rating	Value ($/acre)
4	5	25	64	34	170
8	7	35	68	35	175
12	9	45	72	36	180
16	11	55	76	37	185
20	13	65	80	38	190
24	15	75	84	39	195
28	17	85	88	40	200
32	19	95	92	41	205
36	21	105	96	42	210
40	23	115	100	43	215
44	25	125	104	44	220
48	27	135	108	44	220
52	29	145	112	45	225
56	31	155	116	45	225
60	33	165			

ALRC Recommendation

A direct relationship between carrying capacity and assessment be developed with the exception of higher carrying capacity pasture. A rating system is recommended that permits a similar calculation procedure to be used for pasture as is used for cultivated land.

Should there be similar adjustments for both pasture and cultivated land?

The productivity portion, for both pasture and cultivated land, is linked to soil characteristics. The methodology used to apply the soil characteristics is not the same. Range sites are used in the pasture model and soil associations are used in the cultivated land model.

The current pasture productivity model permits adjustments for the following: topography, improved (non-native species) pasture, tree cover and high water table. In addition, there are specific range sites, with different carrying capacities, for till (stony/hilly) soils, and sandy and heavy lacustrine (flat and stone free) soils.

The current cultivated land productivity model permits adjustments for the following: stones, topography, natural hazards, man-made hazards and tree cover.

Both models have similar factors that receive adjustments, such as stones, topography and tree cover. The models also have unique characteristics that require adjustments specific to the use as pasture or cultivation. Natural and man-made hazard deductions are unique to cultivated land as they are intended to account for the increased costs to cultivate around hazards such as sloughs. Sloughs could be considered as a positive for pasture as they are a potential water source. An adjustment for high water table, which is rarely used, is unique to pasture land as it is intended to account for the increased productivity due to a high water table.

ALRC Recommendation:
Pasture and cultivated land are two different land uses and therefore are not required to have identical adjustments.

Question 3: What method should be used to convert productivity ratings into a dollar value in the mass appraisal valuation model?

Is there a need to convert the productivity index to a dollar value?

In order to apply one mill rate (ie. school) to agricultural, residential and commercial property assessments, a common valuation base is required. The value of a property as of a base date is the common valuation base used for property assessments. In order to achieve the value for agricultural land, a productivity index is converted to a dollar value. Two general "approaches to value" may be used; a "sales comparison approach" or an "income approach".

ALRC Recommendation:
The productivity index will continue to be converted to a dollar value.

How do other jurisdictions convert productivity ratings into a dollar value?

In Saskatchewan, sales have been used to make the conversion from a productivity index to a dollar value for the 1965, 1994, 1998 and 2002 base years. The 2002 agricultural land model uses the provincial average sale price to convert the productivity index into a dollar value (Sales Comparison Productivity Model). Other jurisdictions use income methods to make this conversion (see Appendix 2). Prior to the 1965 system being introduced, an income method was used to convert the productivity index to a dollar value per acre.

Sales Comparison Productivity Model:

- **Should the provincial average sale price continue to be used to convert the productivity index into a dollar value?**

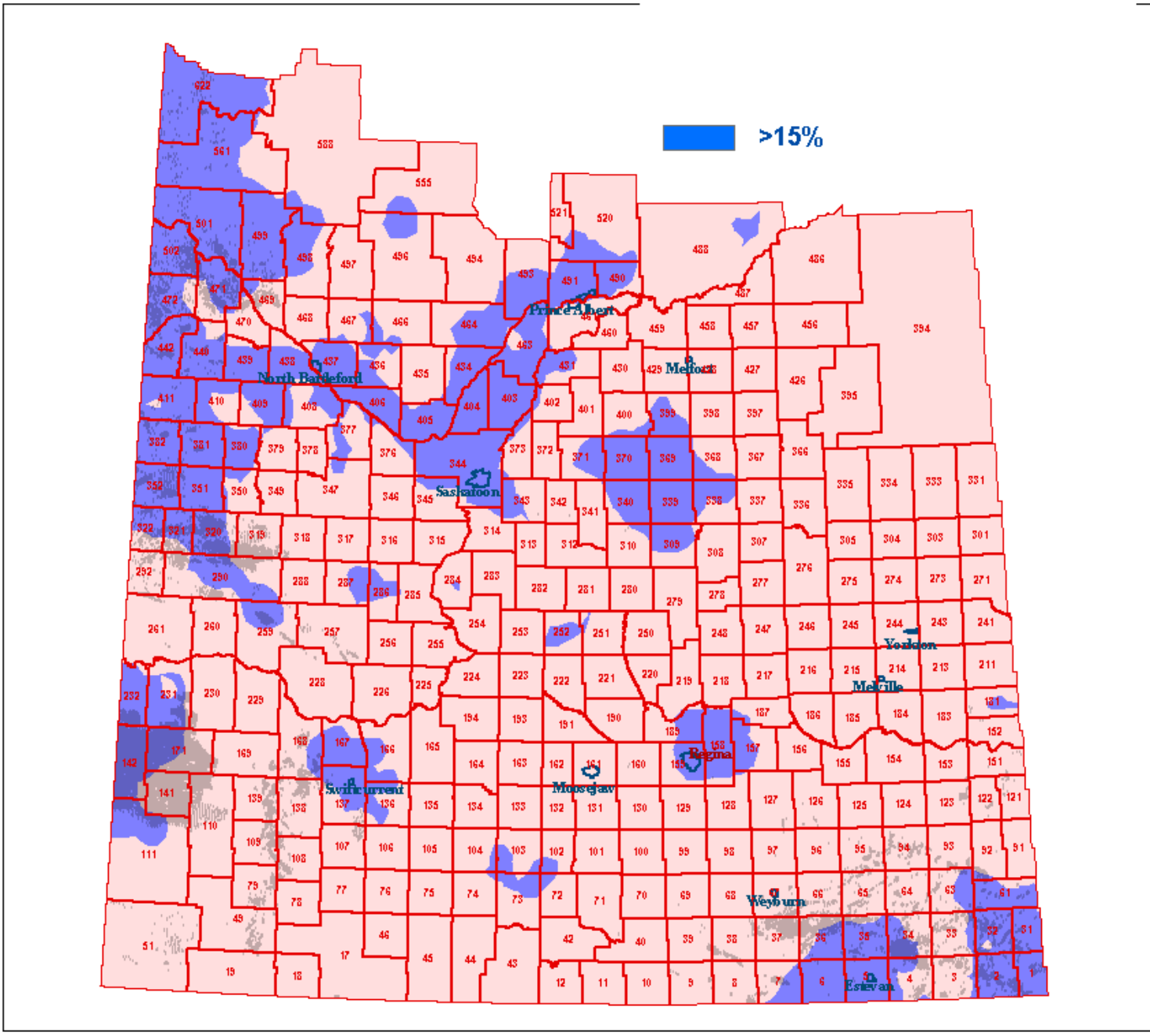
ALRC Recommendation:
The provincial average sale price continue to be used to convert the productivity index into a dollar value.

- **Should the sales used be limited to sales intended for agricultural use and how could this be determined?**

ALRC Recommendation:
The current sale verification process be used to remove the non-agricultural sales. The sales will be adjusted to represent agricultural value only and exclude non-agricultural influences.

There are options that could be used to screen potential non-agricultural sales that are not removed during the sale verification process. For example, one jurisdiction (Appendix 2) uses rental data to screen sales that are significantly higher than the rental data would support. Rental data would be required to implement this technique.

Higher than average sale price areas can be identified and used to screen out sales. For example, relatively higher priced areas around cities can be identified and sales within the city influence area can be removed from the analysis. The following figure was created using SAMA's GIS and shows areas with higher than average selling prices.



The sales from these areas were removed from the analysis and the provincial factor recalculated. This was completed for properties with dominantly one soil type and for all the arm's length sales available from 1991 to 2002. The following table shows that the provincial factor did not change significantly when the sales were removed.

Sales Sample		Number of Sales	Prov. Factor (PF)	Difference
One soil type	All	11,478	5.88	
	Part	9,444	5.67	-3.7%
All Sales	All	38,120	6.23	
	Part	30,669	5.99	-4%

Income Approach Productivity Model:

Should a capitalization rate be used to convert the productivity index into a dollar value?

Prior to being considered as an option, a cash rent or a rent calculated using a crop share formula is required that can be capitalized into a dollar value. The cost and difficulty to collect either type of information would not make this a viable option (see discussion earlier in this document under "cost of production").

The rental survey analysis (Appendix 6) demonstrated that cash, crop share and sales data show similar relationships to productivity. Therefore no significant advantage could be achieved by using an income approach instead of the current method.

ALRC Recommendation:
A capitalization rate not be used to convert the productivity index into a dollar value.

For this model, a capitalization rate is used to convert a yearly rent into a dollar value. How will the capitalization rate be calculated?

There are two approaches, direct capitalization and investment value method, used to develop a capitalization rate. Both approaches are intended to be used to find the market value of a property.

Direct capitalization is the normal procedure used to convert a rent into a dollar value. To calculate a capitalization rate the typical rent for a property is divided by the typical sale price. A provincial capitalization rate similar to the provincial factor could be calculated by dividing the province-wide average rent by the province-wide average sale price. The following is an example of this calculation:

Capitalization Rate = $23 per acre / $330 per acre
= 7 %

Where sales information is not available, an investment value method can be used. This technique is more difficult to develop and defend. The rate is a combination of the discount rate and the effective tax rate. The discount rate is developed by:

- Determining the required rate of return for borrowed funds and equity; or
- Determining and adding together the safe rate, risk rate, liquidity rate, and investment management rate.

The direct capitalization method is more objective and less complex than the investment value method as the investment value method must realistically reflect the expectations and behaviours of probable purchasers.

Can a non-sales based method, similar to that used in other jurisdiction, be used? Is it used to provide tax relief, which is a tax policy issue?

Versions of the investment value method are used by assessment jurisdictions that are using the income approach to value agricultural land (see Appendix 2).

The method is used to preserve farmland and to provide tax relief and therefore is used as a method to implement tax policy.

It is considered to be a form of preferential assessment. In Saskatchewan, tax classes and percentages of value are the techniques used to achieve preferential assessment for agricultural land. In other jurisdictions, like Alberta, they do not have tax classes and percentages of value. Instead, a preferential capitalization rate is used to provide tax relief.

There is a wide variation in techniques and rates used. The most common technique is to use the 5-year average Federal farm lending rate plus an allowance for taxes (effective tax rate for each County). Some specify a rate without an indication of its source. Some build up a rate by adding up the risk rate, liquidity rate, safe rate and effective tax rates.

Should tax policy be included in the assessment system?

ALRC Recommendation
Tax policy should not be included in the assessment system. In Saskatchewan, tax policy decisions are made by the province and by local governments.

What other methods are there to apply tax policies that lower agricultural land taxes or preserve agricultural land?

In Saskatchewan, tax classes and percentages of value are the techniques used to achieve preferential assessment for agricultural land.

In Manitoba, tax relief is provided to farms near cities (see Appendix 2). Manitoba maintains a second value for properties whose sale prices are strongly influenced by urban development such as the land surrounding the city of Winnipeg. In this situation, a highest and best use assessment, and an agricultural use assessment are reported. If the owner of the land is qualified to receive farm status, the agricultural use assessment is used. The owner can apply for agricultural use value for tax purposes. If the land use changes to non-agricultural use, a claw back of taxes (five years) is payable based upon the "market value" (highest and best use assessment).

In some jurisdictions, tax relief is provided by using a technique referred to as a "circuit breaker". Circuit breaker tax policy directly links personal/farm income to property tax payments. Programs of this nature vary considerably with the common elements being they are usually a formula or sliding scale that provides tax relief in cases of high property taxes in relation to low annual income. Another important feature regarding circuit breakers is they are not funded by the property tax system.

Another tax policy tool similar to the circuit breaker is the tax credit. The tax credit varies from a circuit breaker in that a direct link between annual income and tax burden is required to be eligible for a tax credit.

Question 4: What other issues will need to be considered?

- Communication with stakeholders

The ALRC discussion paper was first forwarded to the SAMA Board's March 2006 meeting. The SAMA Board referred it through the consultation process and in particular the advisory committees in early April 2006. The ALRC reviewed the feedback received and forwarded, in June 2006, the ALRC position paper for approval by the SAMA Board. The Board will be forwarding the final report to the Advisory Committees for their review in the fall 2006.

- Staff training

An overview of the changes was provided to staff on June 1, 2006. Additional training will be provided in the fall following approval of the ALRC recommendations by the SAMA Baord.

- Staffing requirements

The recommendations will not require additional staff to implement.

- Computer resources

Changes to the computer calculation procedure are in process of being implemented.

- Legislative changes

No legislative changes are required.

Appendix 1

Subject: A description of the productivity portion of the agricultural land valuation model

Arable Agricultural Land Productivity Model

Potential productivity is the primary basis of comparison for the valuation of agricultural land. The productive capacity of arable agricultural land is determined using a soil classification system that has been correlated with long term wheat yields. The productivity system has been calibrated to long term wheat yields using over 250,000 crop yield reports from the Saskatchewan Crop Insurance Corporation. The actual yields are not of primary importance. It is the comparison of yields between different soil areas that is important for a productivity system.

The ratings are calculated by application of the following formula:

FR = ((C + OM + T + (P x PAF) x A-dep x Phys) - Econ

where:

FR	=	final rating
C	=	climate rating
OM	=	organic matter rate
T	=	texture rate
P	=	profile rate
PAF	=	profile adjustment factor
A-dep	=	A-depth factor
Phys	=	physical factors
Econ	=	economic factors

Arable agricultural land includes land that is tilled with agricultural equipment to allow seeding, harvesting, and other agronomic practices used in field crop or forage crop production, and land that is not tilled with agricultural equipment but with reasonable breaking costs is well suited for field crop or forage crop production.

Each soil area is identified, mapped, and classified based on the Canadian System of Soil Classification. An indexing system is used to rate the potential productivity of each soil area in a numerical form on the basis of the following key factors:

- long term effects of climate
- organic matter content
- soil texture or the ability of the soil to retain moisture
- soil profile or the effect of soil structure on growth

The master rating is the base rate of the productive capacity method for arable land comprised of climate, organic matter, texture, and profile, which have a direct effect on soil productivity. The master rating units are expressed as index points per acre with a maximum rating of 100 points.

Consideration is also given to physical factors that affect the productivity of the soil, such as:

- thickness of the surface layer of the soil (A-depth)
- sand or gravel pockets
- solonetzic burnouts
- poor internal drainage
- susceptibility to flooding
- peat
- salinity

The productivity rating (PR) is the master rating adjusted for the thickness of the surface layer of soil (A-depth) and physical factors. A-depth factors make adjustments for deeper than average and shallower than average topsoil depth. Physical factors are detrimental land features as specified in the assessment manual that reduce the productivity of the soil. The productivity rating units are index points per acre.

Economic factors are an important consideration in determining the fair value of agricultural land. Economic factors are features that cause the operational costs of farming to increase. Factors for which economic adjustments are made include:

- topography
- stones
- natural hazards
- man-made hazards
- tree cover

The final rating (FR) is the productivity rating adjusted for economic factors that affect the average cost of production for specified features. The final rating units are index points per acre.

Pasture Land Productivity Model

CC = Range x Veg x Tree x Water

Where:	CC	=	carrying capacity per quarter section
	Range	=	range site carrying capacity
	Veg	=	vegetation type adjustment
	Tree	=	tree cover adjustment
	Water	=	high water table adjustment

Pasture land is non-arable agricultural land where the productive potential is best suited to the grazing of cattle and other livestock.

Hay Land Productivity Model

Hay land is land growing native and introduced forage species located in low lying areas such as river flats and slough bottoms where excessive moisture conditions do not allow normal field or forage crop practices. Harvesting of the forage may be possible.

HR = HP x Yield

where:	HR	=	Hay rating
	HP	=	Harvesting period
	Yield	=	Hay yield in tons

Hay land productivity is linked to pasture productivity as represented in the following table:

Pasture Carrying Capacity (AUM/quarter)	**Linked Hay Rating (Yield/Harvest Period)**
40	Poor-Biennial
56	Low-Biennial
68	Medium-Biennial
76	Poor-Annual
88	High-Biennial
112	Low-Annual
144	Medium-Annual
176	High-Annual

Appendix 2

Agricultural Land Assessment Methodologies used in North American Jurisdictions

Background

This report reviews the valuation models of nine assessment jurisdictions, and compares them to Saskatchewan's model. The jurisdictions selected provide detailed examples of the agricultural land valuation methodologies used in North America.

Discussion

Overview of Valuation Models

Manitoba, Nebraska, and South Dakota use sales comparison valuation models that reflect the value of the land in its present use as agricultural land. Sale prices, calibrated to soil productivity, are used in their valuation models. Legislation and manual guidelines limit the agricultural land assessment to the value in its present use as agricultural land rather than at its highest and best use, which may be for residential or commercial development. Neighbourhoods can be created to address different market conditions. Ratio studies are performed in these jurisdictions to test the accuracy of the valuation model against sales of agricultural land intended to continue to be used as agricultural land.

Manitoba maintains a second value for properties whose sale prices are strongly influenced by urban development such as the land surrounding the city of Winnipeg. In this situation, a highest and best use assessment, and an agricultural use assessment are reported. If the owner of the land is qualified to receive farm status, the agricultural use assessment is used.

Alberta, Colorado, Montana, North Dakota and Wisconsin use modified income valuation models where the formulas and factors to be considered are established in legislated "preferential use-value" provisions. These legislated valuation models result in preferential treatment of agricultural land as compared to other property classes (including agricultural buildings and equipment) that are typically valued using sales of comparable property. These models are generally described as "preferential use-value" or "use-value" assessment valuation models.

These jurisdictions use legislated capitalization rates rather than capitalization rates developed from sales of agricultural land. This typically results in assessed values below the actual value of agricultural land. Sale prices may or may not be collected for ratio study purposes. The degree of preferential treatment is generally not known. The rental formula, frequency of update, use of averaging, and some factors such as the capitalization rate are specified in legislation. Typically legislation requires an update of the data annually using three to ten year averages.
A legislated income model and capitalization rate is used to convert a productivity rating to an assessed value expressed in dollars. Typically cash rent or a landlord crop share formula is used to calculate the rent. Information on crop rents, crop yields, cropping rotations, crop prices, and typical landlord expenses are required. The data required has been collected for many years, and the cost to

collect the data is funded primarily by the United States Federal Government. There are no similar sources of this type of data in Saskatchewan.

Due to the importance of the capitalization rate in determining agricultural land assessment levels, there is considerable political pressure in setting these rates. For example, Alberta has not been able to update their model since it was first introduced in 1984. Using interest rates and other factors established in their 1984 model, the current average farmland assessment is $350 per acre. If the formula were to be updated to reflect average conditions for the 1995 to 1998 crop years, the average agricultural land assessment would be 2.2 times higher at $770 per acre.

The North Dakota system was developed in 1991 and, due to political concerns, the income and expense factors have not been updated to reflect current conditions. The capitalization rate is updated based on the Federal government farm loan interest rate averaged over ten years. Lower interest rates over the last few years have resulted in increased farm land assessments, even though farm land prices have decreased.

The following statement summarizes the "preferential use-value" agricultural valuation models in the United States:

> *"Although property taxes on agricultural land can be reduced in many ways, including classified tax systems, exemptions, and circuit-breakers, use-value assessment has become the most widely used method in the United States since the 1960s."*
> Source: Measuring Use-Value Assessment Tax Expenditures, Anderson, John E. and Griffing, Marlon F. Assessment Journal, January/February 2000, Volume 7 Number 1, page 35.

The province of Saskatchewan uses a "classified tax system" to reduce property taxes on agricultural land. Starting in 2005, cultivated agricultural land is taxed at 55 percent of fair value, and pasture land is taxed at 40 percent of fair value.

Of the jurisdictions reviewed that have "preferential use-value" legislation, some have indicated that they have few true sales of agricultural land because sales are influenced by non-agricultural factors such as urban development. Some jurisdictions also discussed the strong public support to protect farm land and open spaces from being developed, including public support to provide farmers with preferential tax treatment. To address these issues, a "preferential use-value" standard, which ignores sales of agricultural land, was legislated specifically for agricultural land. "Preferential use-value" models apply only to land that qualifies as agricultural land. Agricultural improvements, applicable personal property, and rural houses are assessed using sales of comparable property.

By managing the statutory capitalization rate, jurisdictions do have the ability to either set agricultural land assessed values at the same level as would be calculated if sales of agricultural land were used, or at some other level. If capitalization rates were calibrated to target the same level as sales of agricultural land, the result would be values similar to those in jurisdictions such as Saskatchewan and Manitoba.

Use of Soil Productivity in Valuation Models

The most notable similarity among all the jurisdictions reviewed is the consideration of soil productivity within the valuation model. Soil information provided by the State or Provincial Soil Survey is used in all cases. This is a general practice for all jurisdictions in Canada and the United States. However the type, detail, and application of this data in relating soil productivity to value varies considerably.

The Canadian jurisdictions reviewed consider soils information and crop yields through a comprehensive productivity model. Saskatchewan and Manitoba calibrate productivity ratings to sale prices using sales comparison valuation models, whereas Alberta uses a modified income valuation model. These jurisdictions provide productivity models for arable land, pasture land, hay land and waste land. Alberta and Manitoba also have productivity models for irrigated land.

The American jurisdictions reviewed use simple productivity rating models, such as USDA soil conservation service quality rating tables, to group similarly rated soils into a limited number of discrete categories (usually 1 to 8). In North Dakota, a separate productivity index for each soil category is developed for each county. The result is a different assessment for similar soil on either side of the county boundary.

Analysis:

1. "Modified Income Productivity Model" versus the "Sales Comparison Productivity Model".

The two main agricultural models are the "Modified Income Productivity Model" and the "Sales Comparison Productivity Model". Both methods use soil productivity as the first step in the formula. They differ in the type of data used to convert the productivity into a dollar value.

Both models value agricultural land at it's present use as agricultural land. A "rollback" tax is collected in many jurisdictions (ie. Manitoba) if the use is changed to a non-agricultural use.

2. Soil Productivity

- Soil productivity relates to the portion of the model that rates the potential yield of different soil types.
- In both Canadian and US jurisdictions soil productivity is based on soil survey soil classification systems.
- USDA, Natural Resource Conservation Service (NRCS) soil survey data is used in US jurisdictions.
- Western provinces use soil survey information provided by the Federal government soil survey.
- US states, Alberta and Manitoba use the soil survey data provided with little modification while Saskatchewan uses soil survey as a base to remap the province in detail.
- Alberta and Manitoba rarely physically inspect agricultural land while in Saskatchewan a reinspection cycle is now required by legislation.
- Typically the productivity model in US jurisdictions is simpler than in Saskatchewan.
- Canadian Soil Survey reports provide soil information only.
- USDA soil survey reports include crop yield estimates for each soil map unit.
    - For some states, such as North Dakota, a soil index similar to that used in Saskatchewan, is included in the report.
    - The highest yielding soil in a county is assigned an index of 100 and each soil is indexed based on it's relative yield.
    - Spring wheat is used (same as in Saskatchewan).
    - The result is differing indexes for the same soil in different counties.
    - Saskatchewan's soil index is based on the best soil in the province receiving an index of 100 with one average yield for each association in the province being used.
- North Dakota and other states with a more detailed productivity system use indexing systems developed by the USDA soil survey, which are similar to the system used in Saskatchewan.
- Both Saskatchewan and Alberta use a productivity index system with a maximum of 100 index points for the best soil.
- In Saskatchewan, a similar productivity model formula has been used for the 1965, 1994, 1998 and 2002 base year cultivated (arable) land assessment systems.

3. Modified Income Productivity Model (Preferential use-value)

Typical Formulas

a. Crop Share:
AV = [(Yield x PR x 1/3 Crop Share) - EXP] / CAP

Where	AV	=	agricultural value
	Yield	=	average yield of crops grown, considering crop rotation
	PR	=	average price for crops grown
	EXP	=	allowed landlord expenses, not including property taxes
	CAP	=	statutory capitalization rate (including effective tax rate)

b. Cash Rent:
Agricultural Value = Cash Rent / statutory capitalization rate (including effective tax rate)

Capitalization Rate

- Unlike commercial property, capitalization rates are not calculated using sales and therefore will only by chance reflect actual value of agricultural land.
- The majority use a built up rate based on agricultural lending and/or bond rates plus effective tax rate.
  - Recent decreases in lending rates have resulted in agricultural land assessment increases at a time when actual farm land prices have remained constant or dropped.
  - If Alberta had followed their original formula, the capitalization rate would have decreased from 8.9% in 1995 to 5.2% in 1998. This would result in the average assessment increase of 83%.
  - In Saskatchewan, assessments increased 33% on average, over the same time period, using a sales comparison productivity model.
- Capitalization rates are legislated.
- Capitalization rates selected are intended to provide tax relief to agricultural land, which results in tax policy being included in the calculation of the "fair value" assessment.
- A built up capitalization rate would meet accepted appraisal practice in jurisdictions with few or no "agricultural use" sales.
  - This would not be required in Saskatchewan as there are adequate sales to calculate a capitalization rate.

Landlord Crop Share or Cash Rent

- Typically a landlord crop share or a combination of crop share and cash rent is used.
- The formula for crop share is typically legislated.
  - In order to provide tax relief, most often the formula does not reflect actual rents paid and as a result tax policy is again included in the calculation of the "fair value".

Productivity Classifications for Agricultural Land

- Soil survey information provided by the federal government is used in all jurisdictions in Canada and USA.
- As few as 3 cultivated classes and 1 pasture class for each county in a state (ie Wisconsin) with each class and county having a unique rental model. This results in significant differences in value across county boundaries.
- US jurisdictions typically have less detailed classification systems than western Canadian provinces.
- Alberta starts with a single provincial rental model that uses a productivity rating system (similar to Saskatchewan's) to vary the value by soil class.
    - It is very difficult to determine the average crop share rental for a province as a whole without being arbitrary. Alberta has attempted to address the issue of varying rents and cropping practices across the province by breaking the productivity model into regions with adjustments for variations in rent included in the formula for each region.
    - The model has not been updated since the early 80's, farming practices and crops grown have changed significantly, and as a result significant shifts are expected when the model is updated.

Value differences across Boundaries

- Significant value differences across county boundaries occur for soils of similar productivity.
    - Typically a rental model with a minimum of 3 to 5 soil types is used in each county with different values being calculated in each county for soils of similar productivity.
- While Alberta uses one rental model for the province to calculate the base rate ($/acre) variations still exist as adjustments are made for the various regions in the province.

Use of Assessment to Sale Price Ratios

- In the majority of jurisdictions assessments are not compared to actual sales of agricultural land.
- In some instances, it is compared to ensure the assessment is not higher than the actual selling prices.
- Alberta indicated assessments range from 10 % to 100 % of current value, which is creating school tax equity problems.

Reasons for Using This Method

- Method to apply tax policy;
- Lower agricultural land taxes;
- Preserve agricultural land; and
- Pressure for urban development results in few or no "agricultural use" sales.

4. Sales Comparison Productivity Model

Typical Formula

Value ($/acre) = (Productivity Index Points, yield, or Soil type) x
(Price paid per productivity index point or per soil type)

Agricultural Use Sales

- Only sales of land intended to continue to be used for agricultural purposes are used.
- In South Dakota, income data is used to remove sales that may reflect a non-agricultural use.
- In Saskatchewan, the sales comparison productivity model has been in place for the 1965, 1994, 1998 and 2002 base year agricultural land assessment systems.
- Manitoba provides two values for agricultural land where there is strong demand for agricultural land for another use (ie. residential or commercial) and has a legislated "claw back" provision.
    - The "agricultural use" value is used until such time as the property is sold for another use, at which time five years of taxes at the higher "market value" are payable.

Classes of Agricultural Land

- US jurisdictions are typically less detailed than western Canadian provinces.
- South Dakota and Nebraska group similar soils using the eight land capability classes established by USDA soil survey and the yield data by County provided in the soil survey reports.
- Manitoba calculates an index by soil series (approximately 500) using Manitoba Soil Survey information.
- Saskatchewan builds up an index based on the various characteristics of the soil using Saskatchewan Soil Survey guidelines.

Shifts across Municipal Boundaries

- Manitoba grades in significant differences between municipal boundaries.
- Nebraska and South Dakota establish market neighbourhoods within counties.
    - Similar soil in different neighbourhoods can have different assessments.
    - South Dakota requires at least 10 % difference before a new neighbourhood can be created.
    - Nebraska uses a land valuation board to assist with grading in the differences in value across county boundaries.

Use of Assessment to Sale Price Ratios (ASR)

- Target levels are established in jurisdictions using sales.
- Nebraska has a statutory target ASR of 80% of agricultural market value.
- South Dakota has a target level of 0.85 to 1.0 with a COD of less than 25% permitted.

Reasons for Using This Method

- Legislation requires a market value to be calculated using sales of "agricultural use" land.
- Sales of agricultural land are available.
- Tax policy tools such as percentages of value by tax class are used to provide tax relief.

Conclusions:

1. The two agricultural models used are the "Modified Income Productivity Model" and the "Sales Comparison Productivity Model".

2. Both models use productivity as a base with rental or sales data used to convert the productivity into a dollar value.

3. Soil yield and productivity information is more readily available in US jurisdictions than in Saskatchewan.

4. The "Modified Income Productivity Model" typically includes tax policy in the formula to provide tax relief for agricultural land. Tax policy has not been included in the valuation of other property types in Saskatchewan.

5. The "Modified Income Productivity Model" is used to lower agricultural land taxes (tax policy tool), preserve agricultural land in heavily urbanized areas, and due to pressure for urban development resulting in few or no "agricultural use" sales.

6. The "Sales Comparison Productivity Model" is used when legislation requires a market value to be calculated using sales of "agricultural use" land, sales of agricultural land are available, and tax policy tools such as percentages of value by tax class are used to provide tax relief.

7. The "Sales Comparison Productivity Model" has been used in Saskatchewan for the 1965, 1994, 1998 and 2002 base year agricultural land assessment systems.

8. Shifts across municipal boundaries for similar soils can occur for both methods.

Comparison of Arable Land Model Features Between Saskatchewan and Other Jurisdictions

Feature	Saskatchewan	Alberta	Manitoba	Colorado	Montana	Nebraska	N. Dakota	S. Dakota	Wisconsin
Use considered[2]	Present use	Present use	Present Use	Present use	Present use	Present Use	Present use	Present Use	Present use
Soil productivity considered	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Importance of productivity in valuation model	Moderate	Moderate-High	Low-moderate	High	High	Moderate	Low	Moderate	High
Valuation Approach	Sales	Modified Income[1]	Sales	Modified Income[1]	Modified Income[1]	Sales	Modified Income[1]	Sales	Modified Income[1]
Verified agric. sales used	Yes	No	Yes	No	No	Yes	No	Yes	No
Level of sales calibration	Province	n/a	NBHD	n/a	n/a	NBHD	n/a	NBHD	n/a
Value differentials graded between municipalities	No	No	Yes	No	No	Yes	No	No response	No
ASR level target for base date	1.00	None set	1.00	None set	None set	0.80	None set	0.85-1.00	None set
Present ASR level	1.00 (province)	0.2 - 0.8	0.75 - 0.85	No data	No data	0.74-0.80	0.67	No response	0.25 - 1.00
Income/expense data state or local assessor applied	n/a	Province	n/a	Local	State	n/a	State	n/a	State/Local
Capitalization rate	n/a	Legislated	n/a	Legislated	Statutory	n/a	Legislated	n/a	Legislated

1. Modified income approach is not a recognized valuation approach as the capitalization rate is not calculated using sale prices.
2. Present use considers the value in the land's current use as agricultural use not a higher use such as residential development.

Overview of Arable Land Valuation Models for Selected Jurisdictions

Province of Saskatchewan

- The "agricultural use" valuation model uses a sales comparison approach with consideration for present use as agricultural land. A productivity index is converted to a dollar value using sales of comparable agricultural land.
- Basis for Saskatchewan productivity model:
  - A similar productivity model formula has been used for the 1965, 1994, 1998 and 2002 base year cultivated (arable) land assessment systems.
  - Soil Index = ((Climate + Texture + Profile) * A-depth * Physical Factors) less Economic Factors
  - The productivity model is based on a study published by H.C. Moss, University of Saskatchewan, titled "A Revised Approach to Rating Saskatchewan Soils", 1972. This study was based on crop yields for 1100 shipping points collected from 1932 to 1961. The 1965 base year model used the soil productivity ratings from this study.
  - The model was updated for the 1994 base year using crop yield data collected by Sask. Crop Insurance for 250,000 quarters from 1973 to 1992.
  - The productivity model develops an index system which compares relative wheat yields throughout the province. The average yield for the best yielding soil in the province, Melfort, increased from 23.7 bushels/acre to 31.2 bushels/acre. The best soil in the province is assigned a productivity rating of 100.
  - A rating system was developed, which adjusts for variations in such things as climate, soil texture and erosion, based on the specific characteristics of the soil. A soil association will have different productivity indexes based on how it rates for each of the factors used to calculate the productivity index.
  - Soil characteristics, based on soil survey guidelines and used to calculate the indexes, have been collected by appraisers inspecting all properties in the province.
- Sales of agricultural use land are used to adjust the productivity index to a dollar value for the 1965, 1994, 1998 and 2002 base year cultivated (arable) land assessment systems.
- 1965 Base Year model:
  - Province-wide average of $1 per final rating point calculated using sales of agricultural land.
    - Value ($/acre) = Soil Index x $1/acre
  - The average index of 55 points resulted in the average value calculated as follows:
  - 55 index points x $1/point = $55/acre
- 1994 and 1998 Base Year models

  Value ($/acre) = Soil Index x PMI (for the Soil Association) x LMI (for neighbourhood or Soil Association)
  - A provincial average value, expressed in $/index point and called the provincial market index (PMI), is calculated for each soil association. Adjustments, through the application of a local market index LMI), are permitted to reflect the difference in agricultural values due to location
- 2002 Base Year Model
  - Value ($/acre) = Soil Index x PF (Provincial Factor)

Province of Manitoba

- The "agricultural use" valuation model is a sales comparison approach with consideration for present use as agricultural land. The model can be generally expressed as follows:

  AV = (SI x PP x P) x D x M

  Where: AV = assessed value ($/acre)
  SI = soil index value for a soil series
  PP = price per point adjustment for the municipality
  P = percentile adjustment when two soils are mapped in combination
  D = discounts, as a percentage, for undesirable soil related features
  M = modifier for grading value differentials between municipalities

- The productivity component considers soil quality, with ad hoc adjustments for physical features such as climate, soil structure, erosion, texture, flooding, salinity, stones, topography and other soil related characteristics.
- Soil series is used to identify and rate soils. Soil series can be described as individual kinds of soils that are included in a soil association. Manitoba has over 500 different soil series described.
- Soil productivity is calibrated to sale price by soil series; each soil series has a soil index specified in the manual.
- Each municipality has a "price per point" rating estimated by local sales which can be fine tuned to account for soil series differences.
- Sale prices are closely verified to ensure they reflect agricultural use.
- If significant value differentials occur between municipalities, the assessor can grade in these differences by the use of "modifiers". Grading patterns consider the extent of the differential, natural land forms, and other appropriate factors to ensure a reasonable transition between municipalities. In most cases there are no sales to perform the grading, therefore the process is more of a judgement call by the assessor.
- Irrigated land is assessed using sales of irrigated lands (excluding the value of equipment).
- Pasture land is assessed considering vegetation (grass vs. bush pasture), with limited consideration for carrying capacity.
- Farm buildings are assessed and taxed.
- There are claw-back provisions to provide tax relief. In locations with strong demand for non-agriculture use (i.e. close to Winnipeg) two values are reported: "agricultural use value" and "market value". The owner can apply for agricultural use value for tax purposes. If the land use changes to non-agricultural use, a claw back of taxes (five years) is payable based upon the "market value".
- Intensive use agricultural land is valued using sale prices of comparable land.
- The valuation model is currently not under review and is generally accepted by stakeholders.
- The current base year is 2001 and was implemented in 2006.

Province of Alberta

- The "preferential use value" model is a modified income approach which is summarized in the following formula:

  FAV = [(MR - SDR - SSR - TR - MISC) -ITCR - TR - SR - MCP] x BYM

  Where: FAV = fair actual value ($/ac)
  MR = master rating for a soil type
  SDR = surface depth adjustment
  SSR = subsoil rate adjustment
  TR = soil texture rate adjustment
  MISC = miscellaneous soil related adjustments
  ITCR = increased cost of production rating adjustment
  TR = topography rate adjustment
  SR = stone rate adjustment
  MCP = miscellaneous costs of production rate adjustments
  BYM = base year modifier - $350/ac for dryland arable or $3.50/point

  Note: Adjustments to the master rate only apply when the soil type demonstrates a non-typical feature. All rates are specified in the manual, and can vary by the agroclimatic regions specified in the manual.

- A provincial regulation requires farmland to be valued at agricultural use value.
- The productivity component attempts to reflect the ability of different soil types to generate a net income. The most profitable soils are assigned an index rating of 100 with relative comparisons being made to less productive soils. The index considers soil productivity, climate, and typical costs of operation such as stones and topography. All ratings are scheduled in the manual.
- Soil survey information is used for soil identification and classification.
- The soil rating index is then multiplied by a regulated agricultural use value base rate. This base rate is developed from a single landlord crop share income model.
  - Three years of income/expense data is used.
  - The following rotation is used: 10% canola, 10% wheat, 70% barley, and 10% summer-fallow.
  - The capitalization rate is based on a three year average of Canada Savings Bond rate and FCC loan rates.
  - The "Agricultural Use Value Base Rate" of $350/ac has remained unchanged since 1984; if the "Base Year Modifier" had been updated the base rate would be approximately $772/acre.
  - The base rate is applied province-wide with no consideration for local influences.
- Irrigated land is assessed using an irrigation productivity model (base rate of $464/acre).
- Pasture land model considers carrying capacity. The hay land model considers hay yields.
- It is estimated that fair actual arable land assessments are 5 to 80 percent of market value.
- An MLA committee has been studying the issues for several years.
  - A discussion paper was distributed and the feedback compiled in May 1999
  - No decisions have been made.

State of Colorado

- The "preferential use value" model is a modified income approach which is referred to as the "capitalization of net landlord income method". The model is based upon the capitalization of landlord rents less allowed expenses calculated for each soil area within a county. The formula to capitalize the landlord net income can be expressed as follows:

  AV = [((Yield x PR x 1/3 Crop Share or Cash Rent) - EXP] / CAP

  Where AV = actual value
  Yield = average yield of crops grown, considering crop rotation
  PR = average price for crops grown
  EXP = allowed landlord expenses, not including property taxes
  CAP = statutory capitalization rate (13%)

- The agricultural land valuation model is not calibrated to market value. The intention of the state is to provide tax relief to agricultural landholders.
  - The basic valuation model has been in place since the 1960s.
  - Legislation is powerful, vague and lenient towards the agricultural land property owner.
  - No market ratio studies are performed to test the accuracy of the model to sale prices, as a result there is no way to compare agricultural land assessed values to sale prices or to other property classes.
  - There are some abuses of the system by developers and speculators.
- As the model does not estimate market value, many components of the model are specified in the manual and legislation (highly regulated).
- Soil productivity is measured using National Resource Conservation Service (NRCS) soil identification and classification materials and yield estimates. Yield estimates may be adjusted if supported by local data.
- There are four main productivity classes of arable land with two to five subclasses for irrigated cropland and four subclasses for dry cropland. Yields are allocated by soil productivity class. Crop rotation is considered in yield estimates.
- A separate capitalized landlord net income calculation is completed for each soil area in a county. A 10 year average crop yield, price and expense data calculation is made by the assessor following the procedure specified in the manual, and is typically sourced from national and state agencies. The capitalization rate (at the time of survey at 13%) is specified in legislation and based on ten year average bank loan rate.
- Irrigated land is assessed using similar procedures as dry land arable.
- Pasture land model considers grazing capacity, hay land model considers hay yields.
- As yield, crop price and expense information are estimated by the assessor, significant value differentials can occur between counties and municipalities. In some cases these differentials can be as great as 30%. If each assessor can defend their data to state auditors, the differential is allowed.
- Agricultural buildings are assessed at market value and taxable. Farm equipment is assessed at market value, but exempt from taxation.
- Valuations are performed annually, which includes updating the income/expense 10 year average data.

State of Montana

- The valuation model can be considered a modified income approach. Valuation models are based upon regulated "agricultural land valuation schedules". The model is based upon the capitalization of allowed income from cash crops that can be expressed as follows:

  AV = Income / CAP
  Where AV = assessed value
  Income = net income
  CAP = statutory capitalization rate

- The agricultural valuation models are not on a market standard. Sale prices are not used in the valuation model. Ratio studies are not performed to observe/test assessment level.
- Other property classes in the state are on a market standard.
- The base date for the 2001 taxation year was January 1, 1996. The new values are being phased-in over a four-year period.
- There are "agricultural land valuation schedules" for the following agricultural land classes:
  - Non-irrigated summer fallow - value range of $30 to $309 per acre;
  - Non-irrigated continuously cropped - $76 to $679 per acre;
  - Irrigated - value range of $95 to $882 per acre;
  - Continuously cropped hay land - value range of $53 to $638 per acre; and
  - Grazing - value range of $10 to $647 per acre (waste land at lowest rating).
- Income, expense and production information obtained from USDA, state and university sources. Soil productivity and yield information is from the USDA Soil Conservation Service, with actual farm averages used when USDA information not available.
- Each schedule reports an assessed value ($/acre) for a soil quality (grade). The assessor determines the appropriate rating schedule and soil quality to estimate value. No consideration given for location influencing values.
- Valuation shears between counties can occur due to application and interpretation of schedules.
- Non-irrigated arable land crop production is based upon wheat with a conversion for barley.
- Irrigated arable land crop production is based upon alfalfa.
- Grazing land crop production is based upon grass production measured in terms of grazing capacity (no adjustment for stocking rate or range condition).
- Non-irrigated hay land is based on hay yield.
- The arable land income is estimated using the crop share approach.
- Grazing land valuation model based upon carrying capacity and a series of indexes established by an appraiser in the early 1960s. Range condition and stocking rate are not considered.
- A capitalization rate of approximately nine percent is used and is based upon an average of farm bank rates (6 percent) plus the effective tax rate (3 percent). The rate is applied within the valuation schedules.
- Farm buildings valued using the cost approach. Farm personal property is valued based upon "loan value" (a cost model).
- tax policy includes percentages of value to agricultural class to maintain historic taxation levels as well as assessment phase-in

State of Nebraska

- The "agricultural use" model uses a sales comparison approach with consideration for present use as agricultural land. Only sales of property for Agricultural use are considered. Sales prices are analyzed for soils with similar productivity/yield.
- Nebraska moved from a "preferential use-value" income model to a sales comparison model in 1992. The income model was declared unconstitutional.
- State legislation directs the assessor to use market valuation and comparable sales. This model contains no observed preferential treatment to agricultural land.
- Soil productivity is measured by using USDA land capability classes, soils data, and yield data.
- Sale prices are analyzed by similar soil capability groupings. Only agricultural use arm's length sales are used. A state department administers the sales database that is used by county assessors, with sales up to five years old are used.
  - The statutory assessment to sale price(ASR) level is 80% of the agricultural market value.
  - The current ASR levels range between 74-80% of value.
- Valuation neighbourhoods within counties are used. Similar land in different neighbourhoods will have different values.
- Valuations are updated annually.
- Valuation models are specified for irrigated land, dry land, and grass land.
- Value differentials between counties do occur on a regular basis. The Regional Agricultural and Horticultural Land Valuation Boards may address the issue of value differentials if occurrences are within their jurisdiction.
  - The Boards represent multiple counties and consist of stakeholders and related experts.
  - To address value differentials, the Board considers available sales and reports from experts. The assessor is then given direction on how differentials between counties are feathered in
  - The Board will use "de-influenced" agricultural sales in areas of urban sprawl surrounding cities.
- Agricultural buildings and equipment are assessed and taxed.

State of North Dakota

- The "preferential use value" model uses a modified income approach based upon capitalization of landlord rents less allowed expenses. One landlord rent formula is applied to each county.
- The following landlord rent formula is used for cultivated dryland:

  V = [(Yield x PR x 0.3) - EXP] / CAP

  Where V = value
  Yield = county average yield of crops grown, considering crop rotation
  PR = county average price for crops grown
  EXP = allowed landlord expenses by county, not including property taxes
  CAP = statutory capitalization rate
  0.3 = Landlord crop share

- This model was developed in the early 1980's with values updated annually.
- The state provides each county with an average value for cultivated, pasture, and hay land.
- The county director and township assessors have the authority to revise this average value.
- There are no guides provided by the state to perform this function. The method of adjustment varies, but generally they rely on USDA/Soil Survey soil yield and index information to differentiate values by soil quality.
- The state determines the average value for each county using the formula described earlier.
  - Average county yield and commodity prices are based on a six year average with the highest and lowest years dropped.
  - The capitalization rate is based upon a 12 year average bank loan rate with the highest and lowest years dropped.
  - Due to the use of county averages as well as the removal of "high and low year" data, value differentials for similar soils occur between counties.
- The following procedures are used by the county considered to have the most sophisticated model:
  - They use the USDA "productivity index"(PI) for spring wheat. It is based upon spring wheat long term (30 years) yields with good management. Yields are from North Dakota agricultural statistics, NDSU, farm programs, etc. The USDA prepares a unique PI for each soil type for each county and results in a different index for the same soil in different counties (Barnes county: the best soil has a yield of 48 bu/ac, and PI of 100. Ransom county: best soil yield of 40 bu/ac and PI of 100.
  - Ratings then assigned to other soils as compared to the maximum. Each map unit has a productivity index estimated.
  - Productivity indexes are not provided by every state soil survey department.
  - The County adjusts for various detrimental soil factors such as flooding, stones, and tree cover. The best soil has a PI of 99; the worst soil a PI of 30.
  - A spreadsheet is used to determine values ($/acre) for each PI from 30 ($169/acre) to 99 ($409/acre) with the average PI of 73 valued at $409, the number provided by the state. The spreadsheet is designed to ensure the state calculated average for the county ($409.45) is still achieved when land values are varied for soil quality. Each PI is worth $5.64 which is similar to applying an "LMI" for the county.
- Agricultural buildings, related residences, and equipment are not assessed/taxed.

State of South Dakota

- The "agricultural use" valuation model uses a sale comparison approach with consideration for present use as agricultural land.
- Statutes specify that market value is the assessment standard for assessable property. There are additional statutes controlling the use of agricultural sales.
  - Small parcel sales (less than 70 acres) cannot be used.
  - In areas with strong urban influence, sales that are more than 150 percent of a specified income value are not to be used.
  - Income value is determined by a legislated modified income model, an eight percent capitalization rate is used.
- Market neighbourhoods within a county may be established when neighbourhood value differences are greater than ten percent.
- Soil productivity is to be considered in the valuation of agricultural land.
  - Soils to be classified and grouped into the eight classes defined by USDA soil conservation service.
  - Average crop and pasture (grazing capacity) yield information is to be collected and applied in determining soil productivity.
  - Crop yield information is based on a ten year average.
- Target assessment levels are 0.85 to 1.00, and maximum COD is 25 percent.
- Agricultural buildings and personal property are assessed and taxed at market value.
- Valuations are performed annually.

State of Wisconsin

- Currently revising their agricultural valuation model from "agricultural use value" to "preferential use-value".
- Prior to 1996 agricultural land valuation models used soil productivity information and agricultural land sale prices to value agricultural land. Soils information was sourced from USDA, with three soil quality classes being determined. Sales analysis for each soil quality class was performed by municipal assessors.

The new valuation model can be described as follows:

- Statutes clearly specify that agricultural land is assessed differently than other classes of property.
- To develop and implement the new valuation model, a Farmland Advisory Council was created.
- A modified income approach, similar to the Colorado and North Dakota models, is used.
- The valuation model is not calibrated to sale prices of agricultural land.
- Soil productivity is considered with three quality classes of land used in allocating yield data.
- The productivity portion of the model has not been changed.
- The four USDA soil survey quality classes are regrouped into three quality classes.

  V = [(Yield x PR x Crop Share) - EXP] / CAP

  Where V = value
  Yield = average yield of crops grown, considering crop rotation
  PR = average price for crops grown
  EXP = allowed landlord expenses, not including property taxes
  CAP = statutory capitalization rate
- The landlord crop share model is calculated using five year averages for rental, yields, crop prices, landlord expenses, and capitalization rates (based on farm bank loan rates). Data is sourced from state and federal agencies. Corn is the crop used to estimate yield.
  - The model is still being revised.
  - The state is attempting to collect rental data, but find the data difficult to find, particularly in the north part of the state.
  - They are finding it difficult to obtain current corn prices; USDA data has a two-year delay.
- The state (rather than the municipal assessor) reports values for each quality class of land (three classes) by county.
- Revaluations are performed annually.
- Valuation model will result in differentials between counties.
- Farmyard sites and buildings are assessed at market value.
- An example of assessment shift for class 1 arable land due to the change in the valuation model is provided in the following table:

Location	**Old Agricultural Use Value ($/ac)**		**New Preferential Use Value ($/ac)**	
	Assessed Value	**Taxes ($)**	**Assessed Value**	**Taxes ($)**
Northern Wisconsin	350	4	350-400	4
Southern Wisconsin	1,800-2,100	44	650-680	9

Appendix 3
Cultivated Productivity Rating

Subject: Review of Cultivated Land Productivity Rating

Background:

Yield data from the Saskatchewan Crop Insurance Corporation (SCIC) has been used to develop the current productivity ratings and is being used to determine if changes to the rating system are required.

Analysis has been completed on the recently acquired 1990 to 2004 SCIC yield data. Yield data in this time period was collected by farm rather than by quarter section and therefore will be less useful in identifying yields by quarter sections with dominantly one soil type.

The majority of analysis completed to date, and used for recommendations in this appendix, has used SCIC yield data from 1971 to 1991. There are 750,000 yield samples from quarters with dominantly one soil type in this database. The more recent data (up to 2004) was analyzed and it supports the older data. There are approximately 740,000 quarters of yield data available.

Climate data has been collected and analyzed to assist in determining if changes to the climate ratings in the cultivated agricultural land model are needed.

The focus of the analysis has been on the Black, Dark Gray and Gray Wooded soil zones. Recommendations for adjustments to the climate, texture and profile ratings are included in this appendix.

Analysis:

1. Climate Ratings

Analysis of Climate Data

Data, from the following sources, has been collected and used for the analysis:

- Environment Canada – Western Canada Climate Normals 1970-2000
  Mean, Maximum and Minimum temperature and precipitation for 180 Saskatchewan Weather Stations and limited number from bordering Provinces.
- PFRA gross evaporation from limited Saskatchewan Weather Station.
- Saskatchewan Environment topographic and digital elevation model

The cultivated agricultural region is divided into five soil zones (see Figure 1). Climate ratings have been assigned in the productivity index system with the lowest rating in the southwest corner and the highest rating in the north and northeast part of the cultivated portion of the province.

The limited number of climate stations restricts the analysis to broad indications of climate trends.

Figure 2 shows the change in the ratio between precipitation and evapotranspiration (P/ET) across the province. It follows close to the soil zone lines. The lowest ratio is found in the driest part of the province. The highest ratios are found in the Dark Gray/Gray Wooded soil zones. An area with a high ratio would have less of a benefit from yield increases typically experienced for heavier textured soil.

Figure 3 shows the change in growing degree days (GDD) across the province. Plants need heat to grow and develop which means a temperature above freezing. The heat reported above a base temperature (mean daily), of 5 degrees Celsius for grains and cereals, is reported as GDD. It is calculated as the sum of the mean daily temperature less 5. Cereals and oilseeds require a minimum of 1200 GDD above 5 degrees Celsius to reach maturity. Cereals and oilseeds in areas with GDD close to the minimum of 1200 GDD will have a higher risk of not reaching maturity (approximately 1 in 10). The growing degree days ranges from a low of 1346 in the northeast to a high of 1963 in part of the brown and dark brown soil zones in the south and southwest parts of the province.

Figures 4 and 5 show the percent of days below 0 degrees Celsius in May and September. The number of days ranges from a high of 26 to 32% to a low of 15 to 17%. This shows the areas with the greatest risk of frost and the shorter frost-free period. The following table summarizes the frost free period required for a sample of crops.

Crop	**Days to Maturity**
Barley	60-90
Canola-Early Polish	73-83
Oats	85-88
Wheat	90-100
Canola-Late Argentina	92-102

Figure 6 shows the average yield by rural municipality. The municipalities on the edge of the cultivated portion of Saskatchewan have relatively low yields compared to the Black soil zone and areas of the Dark Gray/Gray Wooded soil zone in the transition to the Black soil zone.

Analysis of Climate Ratings

The following table describes the range of climate ratings currently assigned. For rural municipalities that have soils from the Black, Dark Gray and/or Gray Wooded soil zones, the same climate rating is used for the entire municipality. Typically in these municipalities, the three soil zones can be found on different parts of the slope in the same quarter section and therefore could not be considered a different climate.

Current Climate Ratings	
Soil Zone	**Rating Range**
Brown	5-15
Dark Brown	16-25
Black	27-32
Dark Gray	27-32
Gray Wooded	27-32

The current ranges provide for a smooth transition between soil zones. For example, in areas with a Dark Brown to Black transition a climate rating of 26 is used. This is an average of the maximum climate rating for Dark Brown (25) and the minimum for the Black soil zone (27).

There are municipalities that are dominantly Dark Gray and/or Gray Wooded soil zones, or have significant areas that are. These municipalities should have lower climate ratings for the Dark Gray and Gray Wooded soils, as they tend to be in the areas with the lower growing degree-days and higher risk of frost (see Figures 3, 4 and 5). They are also located in a transition area between the cultivated and forest areas where it is not possible to grow cereal crops. Therefore, similar or lower climate ratings than used for the Dark Brown to Black transition area could be expected.

The lowest rating of 27 is used in only one rural municipality in the transition area to forest.

A reduction in the climate of 2 points for these municipalities, and lowering of the range for the Dark Gray and Gray Wooded soil zone to 26-32 are proposed. For example, this would reduce the climate rating in RM 394 from 28 to 26. This is one point lower than the current lowest rating in the range for these soil zones, but still above the 25 points maximum for the Dark Brown soil zone.

Proposed Climate Ratings	
Soil Zone	**Rating Range**
Brown	5-15
Dark Brown	16-25
Black	26-32
Dark Gray	26-32
Gray Wooded	26-32

Municipalities in transition to the Black soil zone from the Dark Gray/Gray Wooded soil zones may require a higher climate rating to match the Black soil zone where these soils are found in combination on the same quarter section. For these areas the climate is identical and therefore the ratings should not be different. For example, RM 458 is dominantly Dark Gray/Gray Wooded with a climate rating proposed to drop from 31 to 29. However, the southwest corner is in transition to the Black soil zone and for this area a 31 climate is proposed.

The following table and figure provide examples of the municipalities with changed climate ratings. A complete listing can be found in Table 1.

Rural Municipality	**Climate Rating Dark Gray/Gray Wooded**	
	Current	**Recommended**
331	29	27
394	28	26
520	28	26
588	28	26
622	27	26

Revised climate ratings

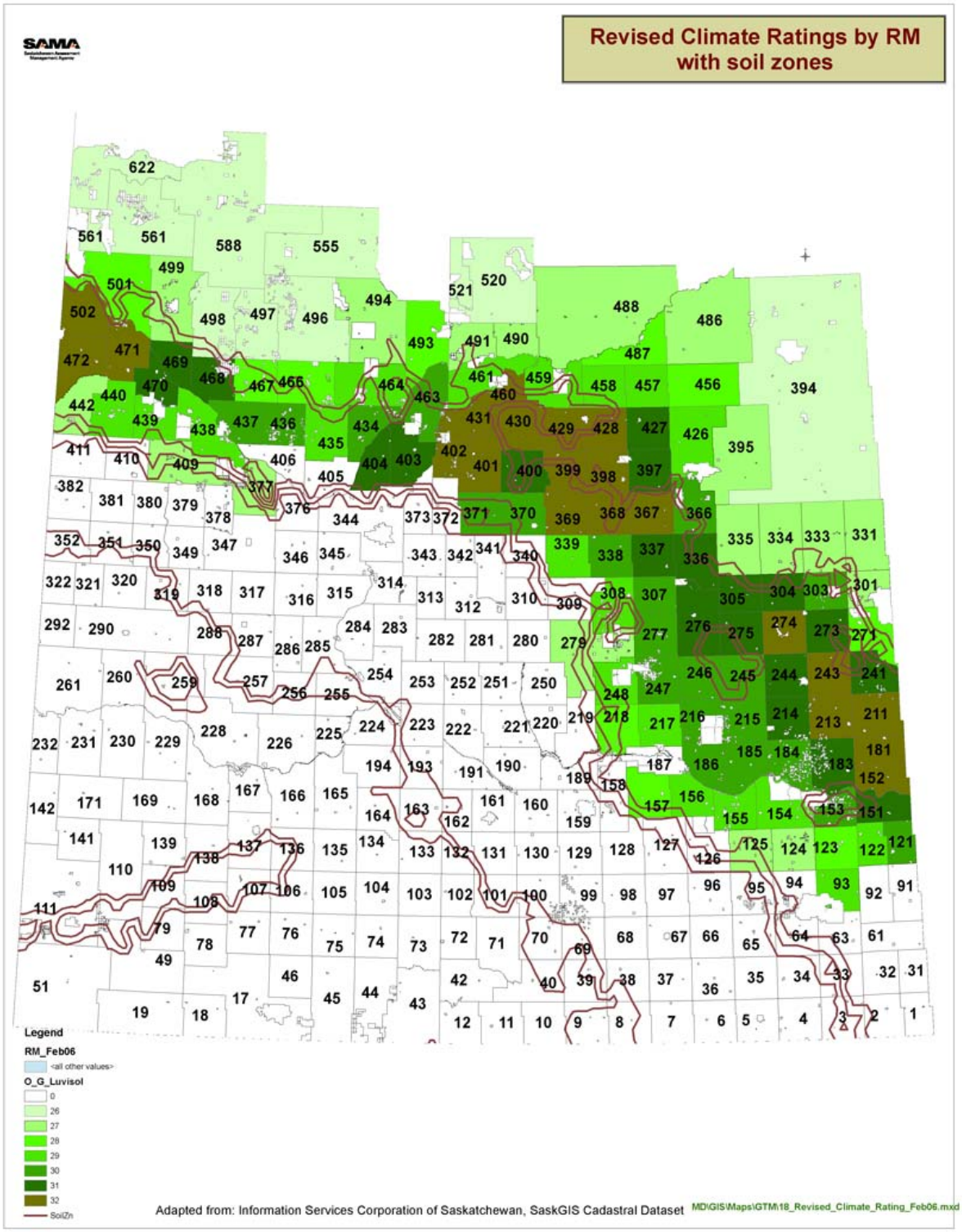


Table 1: Revised Climate Ratings in the Black/Dark Gray/Gray Wooded Soil Zones

Municipality	Original Dark Gray/ Gray Wooded	Revised Dark Gray/ Gray Wooded	Municipality	Original Dark Gray/ Gray Wooded	Revised Dark Gray/ Gray Wooded
301	29	27	457	30	29
303	30	30	458	31	29
304	31	31	459	31	29
305	31	31	460	32	32
307	30	30	461	31	29
308	29	29	463	30	30
331	29	27	464	29	29
333	29	27	466	28	28
334	29	27	467	29	28
335	29	27	468	31	31
336	31	31	469	31	31
337	31	31	470	31	31
338	30	30	486	29	27
394	28	26	487	29	28
395	29	27	488	29	27
397	31	31	490	29	27
398	32	32	491	29	27
399	32	32	493	29	28
400	31	31	494	29	27
401	32	32	496	28	26
402	32	32	497	28	26
426	30	29	498	28	26
427	31	31	499	29	27
428	32	32	501	30	28
429	32	32	502	32	32
430	32	32	520	28	26
431	32	32	521	28	26
434	30	30	555	28	26
440	29	29	561	28	26
442	27	27	588	28	26
456	30	28	622	27	26

Figure 1: Soil Zones

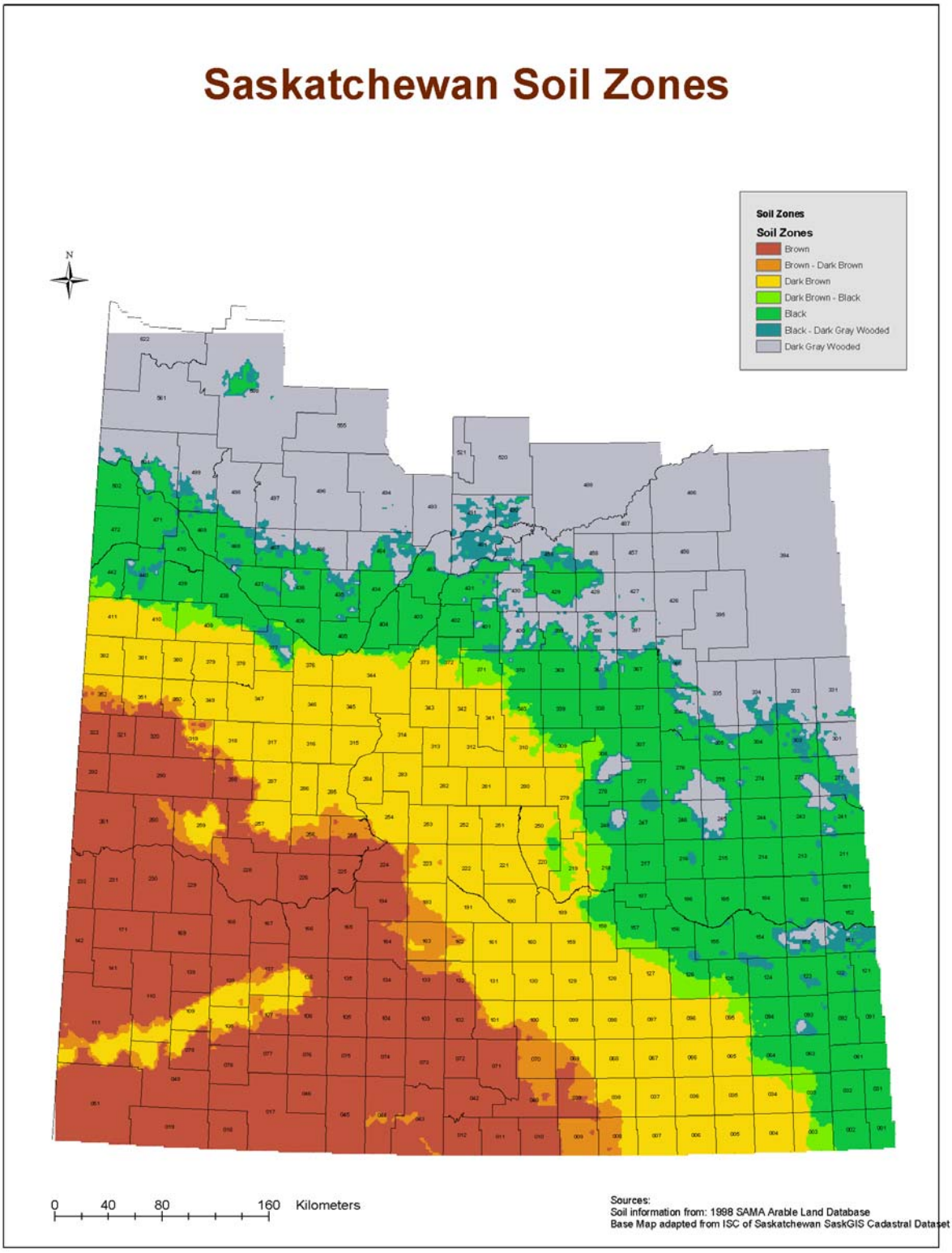


Figure 2: Precipitation to Evapotranspiration (P/ET) Ratio

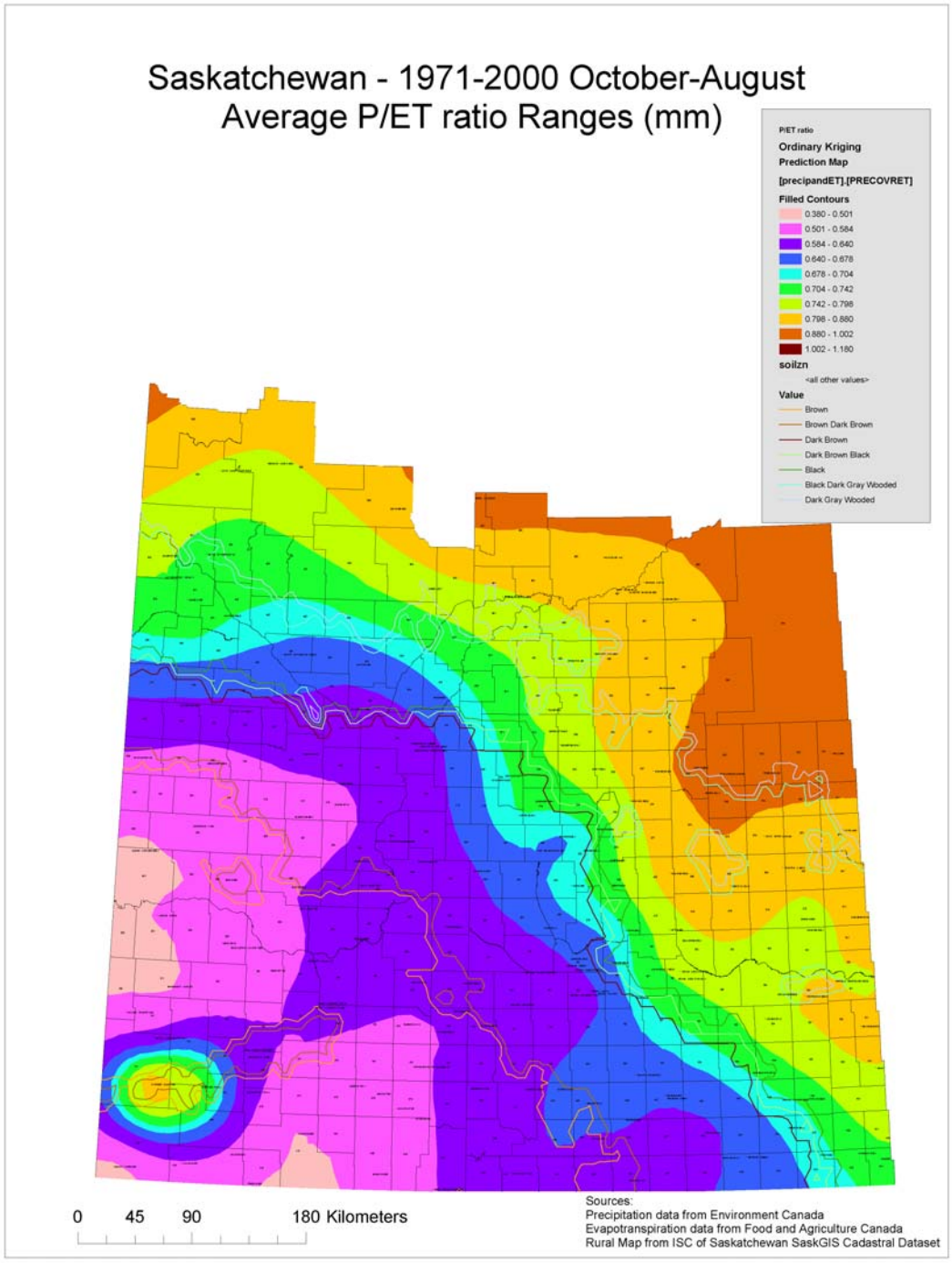


Figure 3: Growing Degree Days

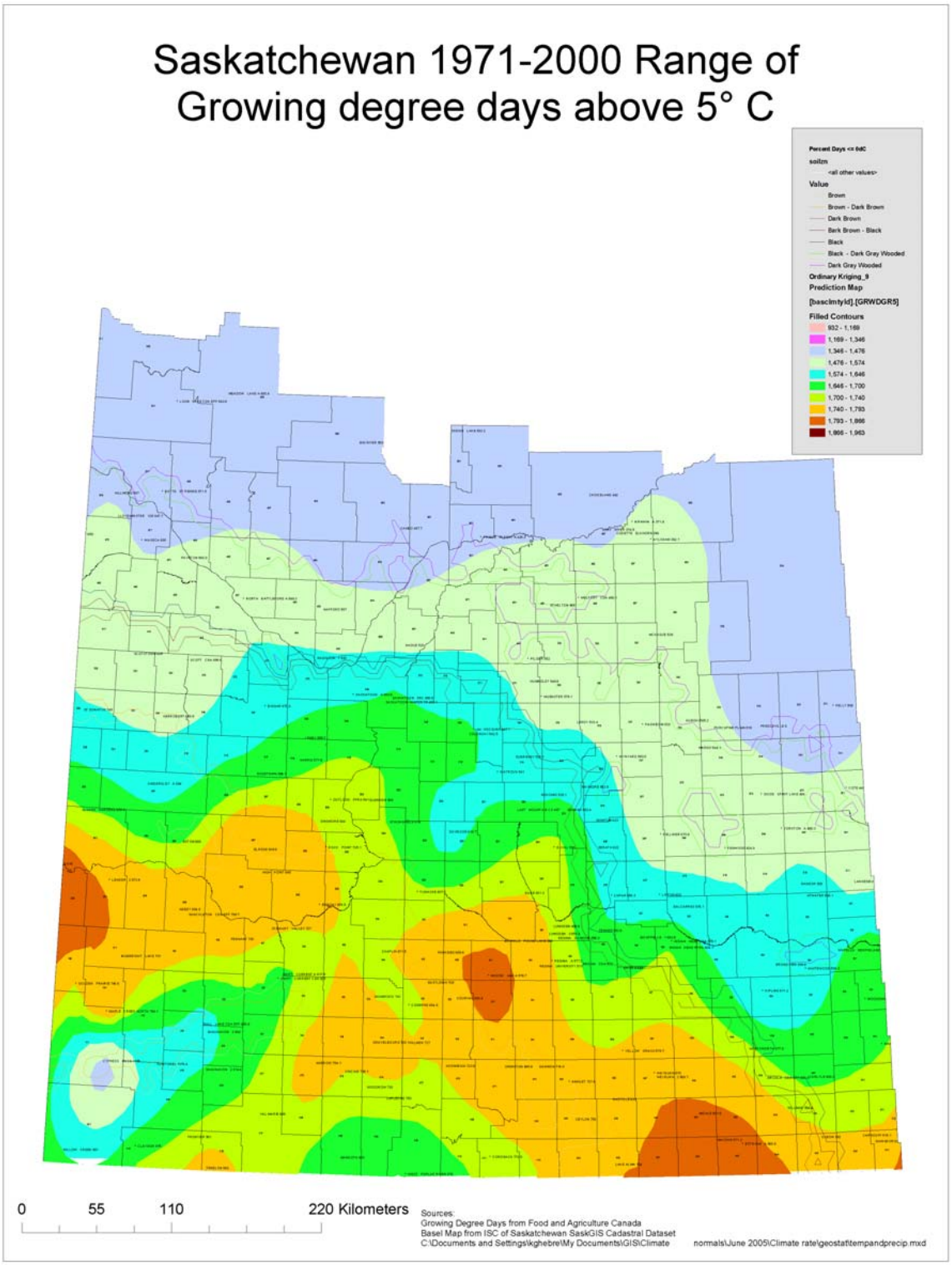


Figure 4: May Frost Free Days

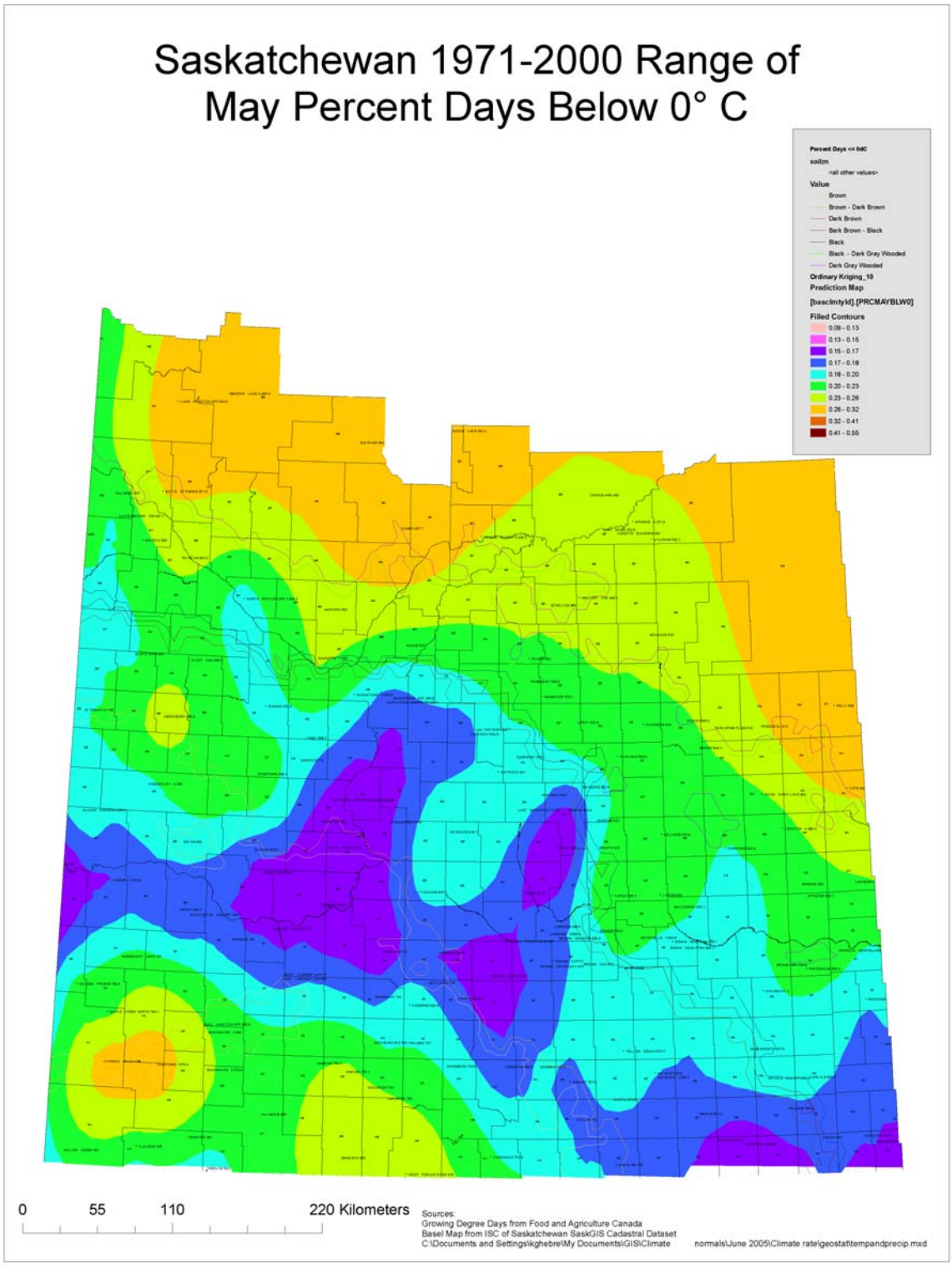


Figure 5: September Frost Free Days

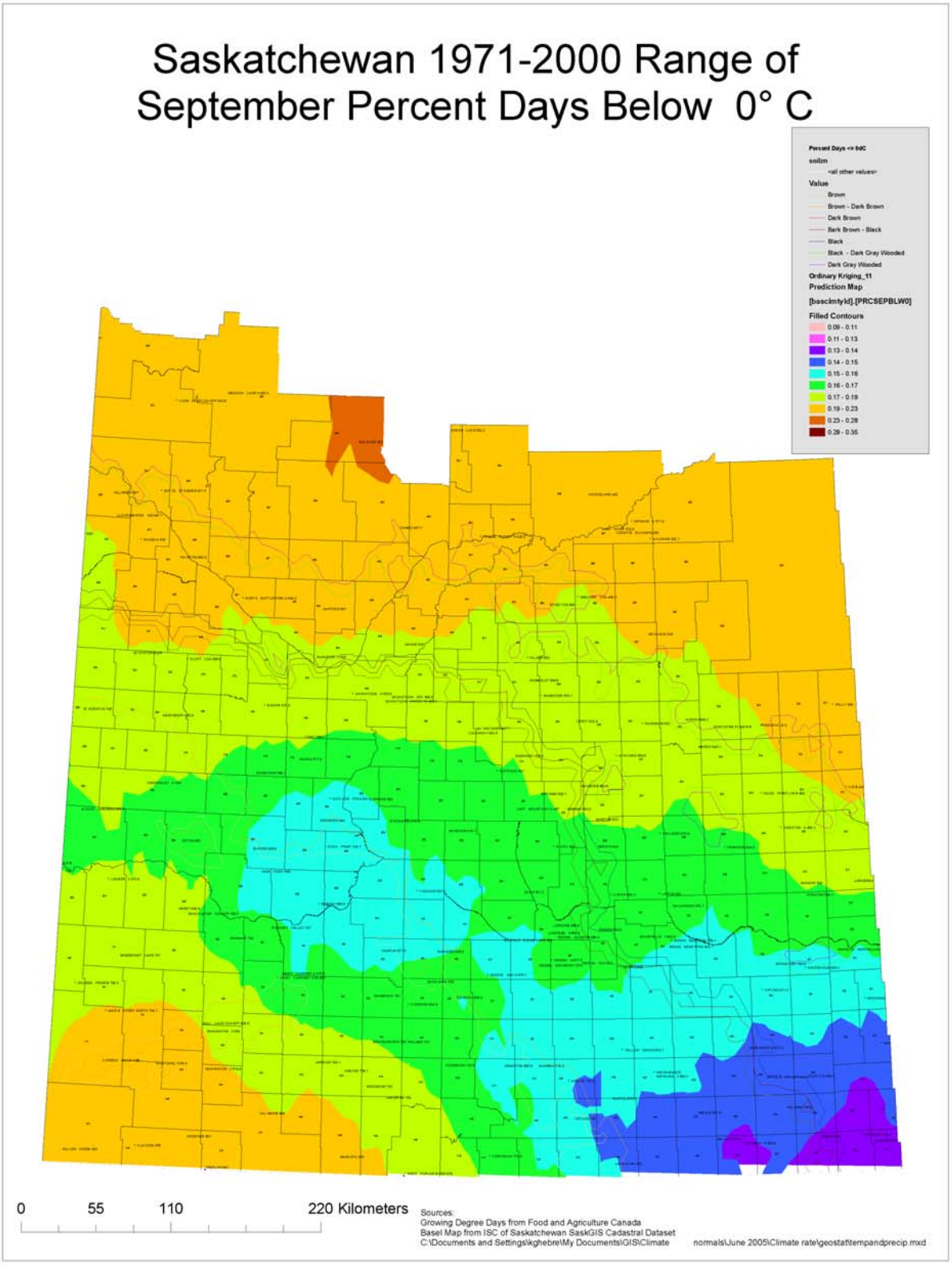
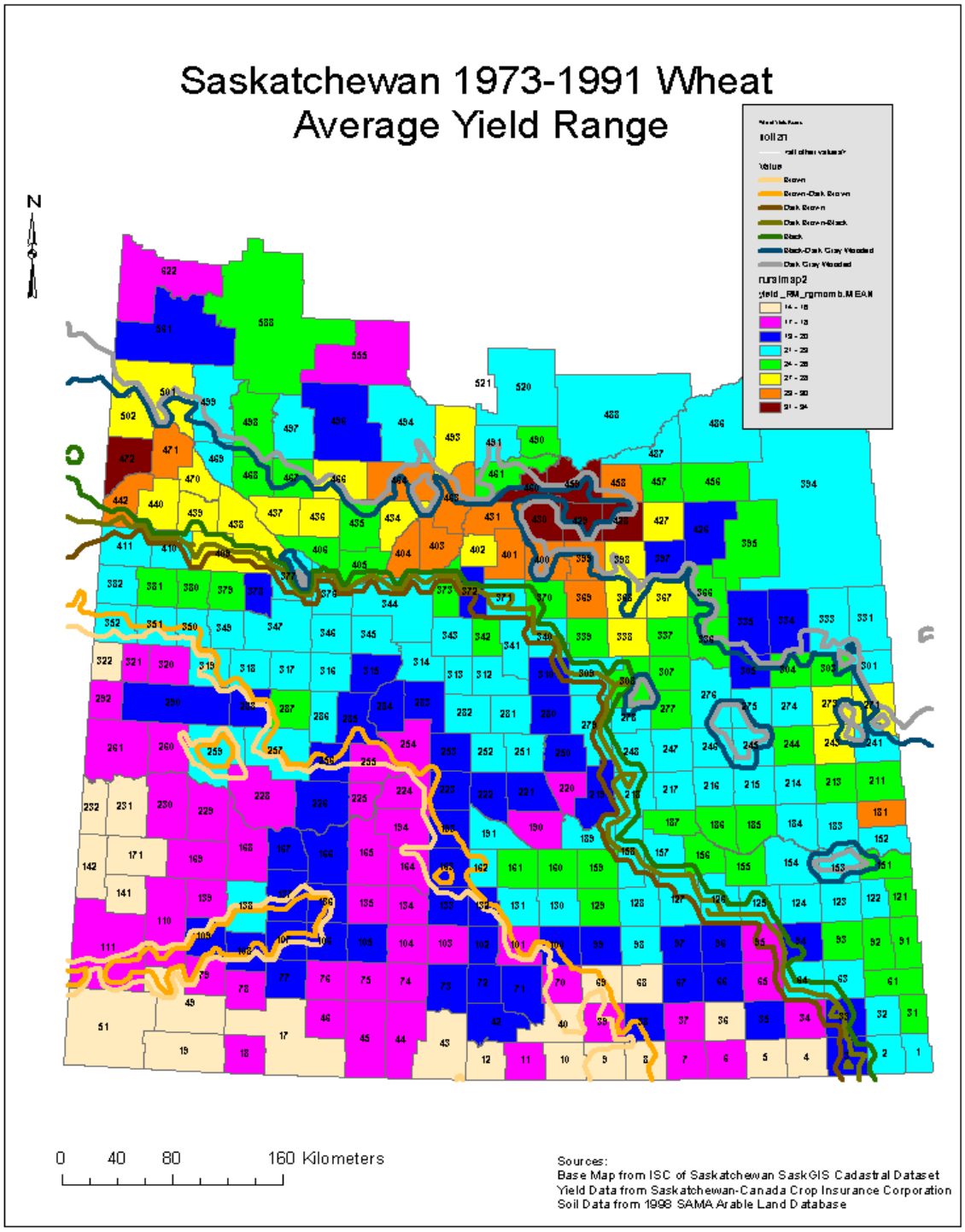


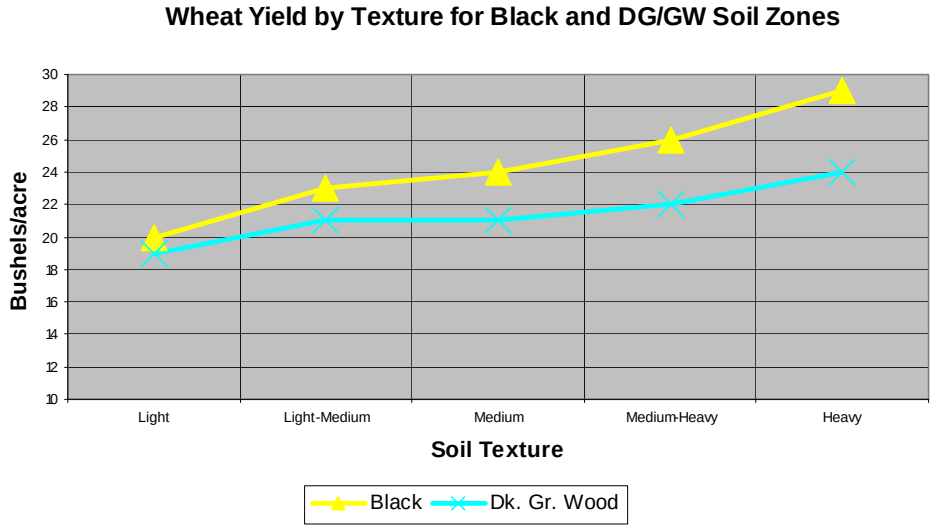
Figure 6: Average yield by municipality



2. Texture

Analysis of yield data (see following table and figure) suggests a significant improvement in yield as textures increase for the Black soil zone. However, yield data suggests texture has significantly less impact on yield in the Dark Gray and Gray Wooded soil zones. Climate data (Figure 2 under climate) shows that the Dark Gray/Gray Wooded soils occur in the areas with the highest precipitation to evapotranspiration ratios, which indicates they have the highest amount of moisture available for plant growth irrespective of the soil texture. The following table and figure show the typical yields for each texture within the Black and Dark Gray/Gray Wooded soil zones.

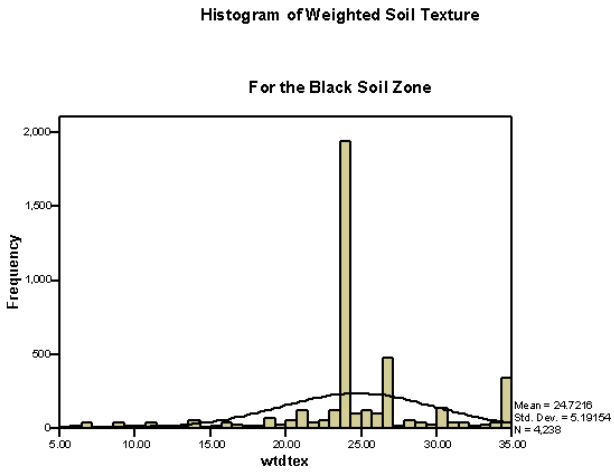
Soil Zone	Texture	Yield (Bu/acre)
Black	Light	20
	Light-Medium	23
	Medium	24
	Medium-Heavy	26
	Heavy	29
	Range	9
Dark Gray/ Gray Wooded	Light	19
	Light-Medium	21
	Medium	21
	Medium-Heavy	22
	Heavy	24
	Range	5

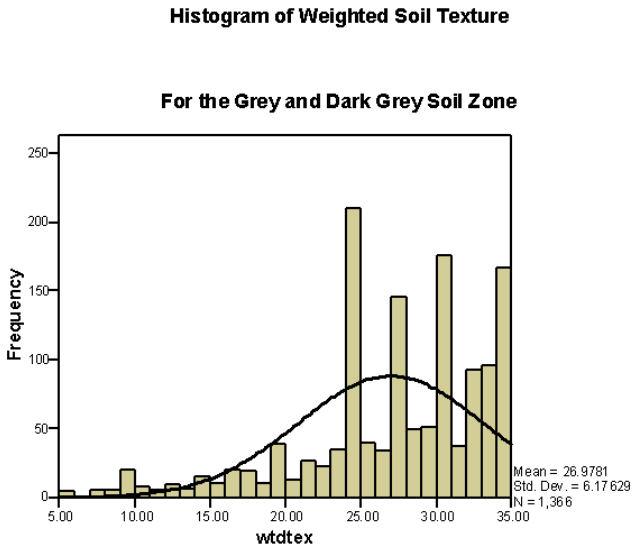


The following table shows that the current texture ratings are reduced to some degree for the heavier textures in the Dark Gray (DG) and Gray Wooded (GW) soil zones. The limited difference between yield and texture in the Dark Gray/Gray Wooded soil zones suggests that there should be a greater reduction for the heavier textured soils.

Texture	BW/DB	BK	DG	GW
Heavy Clay (HC)	35	35	31	28
SiC	33	35	33	30
Clay (C)	32	35	35	30
SiCl	30	35	35	32
Clay Loam (CL)	26	30	30	30
SCL	18	21	21	21
Silty Loam (SIL)	24	28	28	28
Loam (L)	21	24	24	24
VFSL	15	17	17	17
LL	17	19	19	19
FL	14	16	16	16
GL	13	15	15	15
Sandy Loam (SL)	12	14	14	14

The following figures show the frequency of occurrence for the various textures in the Black soil zone and the Dark Gray/Gray Wooded soil zones. By far, the dominant texture rating in the Black soil zone is approximately 24 points, which is a Loam texture. A similar relationship exists in the Brown and Dark Brown soil zones. However, in the Dark Gray/Gray Wooded soil zones, the texture ratings are more equally distributed between the Loam and Clay textures (24-35 points). These are the heavier textures that the yield data suggests do not contribute to increased yields.





The yield data suggests a more significant adjustment is needed for heavier textured soils in the Dark Gray and Gray Wooded soil zones. The following table shows the proposed texture ratings for the Dark Gray and Gray Wooded soil zones. Ratings are lowered for textures heavier than loam. The Dark Gray ratings have been reduced roughly 3 % and the Gray Wooded reduced roughly 7 %.

		Dark Gray		Gray Wooded	
Texture	**Black**	Current	**Proposed**	**Current**	**Proposed**
Heavy Clay (HC)	35	31	30	28	26
SiC	35	33	32	30	28
Clay (C)	35	35	34	30	28
SiCl	35	35	34	32	30
Clay Loam (CL)	30	30	29	30	28
SCL	21	21	21	21	21
Silty Loam (SIL)	28	28	27	28	26
Loam (L)	24	24	24	24	24
VFSL	17	17	17	17	17
LL	19	19	19	19	19
FL	16	16	16	16	16
GL	15	15	15	15	15
Sandy Loam (SL)	14	14	14	14	14

3. Profile

The average Oxbow (Black) productivity rating is 73 while Whitewood (Dark Gray) is higher at 74. This is contrary to the expectation for Dark Gray soils. The profile rating for the Dark Gray soil is one area that can be adjusted.

The rating for the DG12 profile is currently the same as the OR12 profile, while the DG10 and DG8 are each 2 points less than the equivalent orthic profile. A similar relationship is recommended for the DG12 and OR12 profiles as is used for the OR10 and OR8 profiles. The following table shows the current rates for the Orthic and Dark Gray profiles and the recommended change for the DG12 profile. Due to being developed under tree cover the Dark Gray soil tends to be deeper than the black even though it is an inferior profile. With the proposed change, this is now recognized for all three Dark Gray profiles. As typically a combination of two profiles are used for these soils (ie DG10 to DG12), the productivity rating will be reduced by 1 point.

Type	**Abbreviation**	**Current Rate**	**Proposed Rate**
Orthic	OR12	20	20
	OR10	18	18
	OR8	14	14
Dark Gray	DG12	20	18
	DG10	16	16
	DG8	12	12

Appendix 4
Pasture Productivity Rating

Subject: Review of Pasture Land Productivity Rating

Background:

One of the activities of the Agricultural Land Review Committee (ALRC) is to review the productivity model for pasture. Key topics include pasture range sites and carrying capacity ratings.

The basis for the range site descriptions and carrying capacity estimates for the 1994, 1998 and 2002 Base Year Saskatchewan Assessment Manuals (SAM) is the Saskatchewan Research Council (SRC) report An Assessment Procedure For Saskatchewan Rangeland, 1990. The SRC is currently updating the report.

Basic research on ranges sites and carrying capacities will be managed by a Greencover Canada funded sub-committee of The Saskatchewan Prairie Conservation Action Plan (PCAP). A SAMA representative sits on this sub-committee. The SRC has been selected to perform the work, with Jeff Thorpe being the project leader. The project name is "Range Health and Site Descriptions of Saskatchewan".

The goal of the project is to update the "brown" SRC publication A Practical Guide to Planning for Management and Improvement of Saskatchewan Rangeland. This publication is based upon a previous SRC report An Assessment Procedure For Saskatchewan Rangeland, 1990; which is the basis for the range site descriptions and carrying capacity estimates for the 1994, 1998 and 2002 Base Year Saskatchewan Assessment Manuals (SAM).

The results of this report will be used to revise the SAMA's current pasture productivity model.

Summary:

SAMA has been able to collaborate with the Prairie Conservation Action Plan (PCAP) and the Saskatchewan Research Council (SRC) to perform basic research regarding pasture range site descriptions and carrying capacity estimates for these descriptions. This project is the ideal vehicle for obtaining summarized information that can be used to review and update SAMA's pasture land range site descriptions and carrying capacity ratings.

SAMA's contribution to this research includes staff participation as technical advisors to the PCAP sub-committee. As well SAMA will be providing a data table containing pasture information on a property basis. This data will be incorporated into a GIS to display pasture range sites on a provincial map format.

A final report is not expected until March 2007. The ALRC has recommended that the results of the update of the 1990 SRC study be used to update the range site descriptions and carrying capacity

ratings for the range sites in the 2006 manual subject to the recommendations being available no later than September 30, 2006 and the recommendations of the report being able to be implemented in time for the 2009 revaluation.

Discussion:

The Prairie Conservation Action Plan (PCAP) has engaged the SRC to update the A Practical Guide to Planning for Management and Improvement of Saskatchewan Rangeland. This guide is based upon An Assessment Procedure For Saskatchewan Rangeland, 1990. A sub-committee from PCAP will oversee the project.

PCAP consists of 25 stakeholder groups with the above sub-committee having technical advisors from the U of S, Sask Ag and Food (SAFRR), Sask Environment (SE), Sask Watershed Authority (SWA), PFRA, Ducks Unlimited, and the Nature Conservancy of Canada.

The project deliverables of specific interest to SAMA are two publications:

1. Range Site Descriptions (approximately 250 pages); and
2. Range Health Assessment Guide (approximately 110 pages).

Project activities include:

1. Compiling existing information on vegetation, stocking rates, and management of native, forested and tame pasture sites; and
2. Meetings to discuss project progress as well as issues relating to the project including feedback regarding the field application of An Assessment Procedure For Saskatchewan Rangeland, 1990.

Project timelines indicate that draft publications will be completed by April, 2006 with final versions being completed by September-December of 2006.

The benefits of SAMA's participation include:

1. SAMA can contribute to the committee by providing feedback regarding the field application of the report An Assessment Procedure For Saskatchewan Rangeland, 1990. SAMA could also act as a data source for soils and carrying capacity information.
2. SAMA can provide input as to how range site and carrying capacity information is used in the property assessment model, with feedback being received from experts in the fields of plant ecology and range management. As well the opportunity may exist to request consideration/clarification regarding property assessment applications within the publication(s).
3. SAMA will have immediate access to draft research and publications, allowing more timely subsequent research on pasture productivity models for the 2006 Base Year Manual.
4. A greater likelihood for uniform standards of application regarding range sites and carrying capacities by various government agencies, universities and private stakeholders. This enhances the fairness and acceptance of SAMA's pasture productivity model.

5. SAMA will be viewed by stakeholders as a contributor of expertise to the development of the final publications.

SAMA's financial contribution to this project include:

1. Providing an assessment staff person to act as technical advisor to the committee. The "cash in kind" value of the staff person would be approximately $2,500.
2. A database of agricultural information that could be used in a GIS to identify range sites by location. The "cash-in-kind" value of the database would be approximately $25,000.

SRC has made a request to access SAMA's agricultural land database to identify areas of pasture. At the November 2, 2005 Agricultural Land Review Committee meeting, a motion was passed that the SAMA Board accept this request for information. The Board has subsequently considered and accepted SRC's request for information. SAMA is currently in the process of developing a data query for this request as well as drafting an agreement with SRC to use this data.

Appendix 5
Rental Survey Results

Subject: Overview of 2005 rental survey

Background:

The 2005 Lease Rate Survey was designed and funded in partnership with Saskatchewan Assessment Management Agency (SAMA) and Saskatchewan Agriculture and Food (SAF). A third party company was hired to provide assistance to develop and to conduct the survey.

The survey was conducted between March 24 and April 7, 2005. 11,291 farmers and ranchers were contacted with 2,026 individuals, or 18 per cent of those contacted, participating in the survey. Of those contacted and having rental information, a cooperation rate of 79 per cent occurred.

The 2,026 tenants reported a total of 4,413 agreements for both cultivated and pasture land, for an average of 2.2 agreements per tenant.

The rental information was linked to the SAMA assessment information for properties where the legal location was provided. The results are summarized in the following table.

		Legal Description Provided
Cultivated	**Cash**	64% (1903 quarters)
	Crop Share	52% (598 agreements)
Pasture		53% (469 quarters)

Cultivated Agreements:

Of the tenants surveyed 1,656 reported having an agreement for cultivated land, with a total of 3,419 agreements (2.1 agreements per tenant). 1147 of these tenants had cash agreements and 818 tenants had crop share agreements.

The cash agreements were for an average of 3.1 quarters of land for each agreement, while crop share agreements had 4.3 quarters per agreement.

The most common crop share arrangement was 1/3 to the landlord (55 per cent of responses), followed by one quarter to the landlord (24 per cent of responses). Twenty eight per cent of tenants with crop share arrangements indicated that some manner of sharing crop inputs occurs.

The following table shows the number of 2005 cultivated cash rents, summarized by soil zone, where the legal description was provided and they were linked to SAMA's database. There is a lower number than expected from the Brown soil zone.

Soil Zone	No. of Parcels Linked to SAMA
Brown	78
Dark Brown	444
Black	739
Dark Gray	125
Gray	32
Total	1418

Rental surveys were conducted in 1999, 2000, 2002 and 2005. Rates decreased 1 percent from 1999 to 2000, increased 3 percent from 2000 to 2002, and decreased 1 percent from 2002 to 2005.

The following tables lists the rental rate by crop district and Crop Insurance soil type for the 2005 and 2002 rental surveys. Rental rates are similar with only a 1 percent difference in province-wide rental rate.

		Rental rate ($/ K acre)		
Crop District	**Count (2005)**	**2005**	**2002**	
1a	103	18.81	17.84	5%
1b	132	20.17	18.99	6%
2a	65	19.51	21.53	-9%
2b	82	27.2	28.07	-3%
3an	12	21.58	22.97	-6%
3as	43	20.19	21.43	-6%
3bn	24	25.21	23.96	5%
3bs	14	24.29	22.45	8%
4a	7	20.43	18.59	10%
4b	Insufficient	data		
5a	164	21.38	20.15	6%
5b	103	24.59	23.59	4%
6a	112	20.42	21.3	-4%
6b	67	24.06	24.63	-2%
7a	13	25.08	25.77	-3%
7b	61	23.44	24.8	-5%
8a	46	31.17	30.28	3%
8b	102	31.16	32	-3%
9a	135	23.87	23.3	2%
9b	135	24.3	24.74	-2%
Province	**1435**	**23.36**	**23.64**	-1%

Soil Class		2002 Rental Rate ($/k acre)		
	Count	**2005**	**2002**	
A	4	41.00	42.10	-3%
B	29	38.83	37.39	4%
C	30	32.53	33.19	-2%
D	36	29.83	30.82	-3%
E	39	29.36	28.73	2%
F	92	27.75	25.75	8%
G	236	23.60	22.71	4%
H	185	21.90	21.76	1%
J	223	21.03	20.59	2%
K	95	18.93	20.05	-6%
L	46	20.20	19.08	6%
M	7	15.43	18.24	-15%
O	5	18.20	17.39	5%
P	2	12.50	15.57	-20%
Sask.	**1435**	**23.36**	**23.64**	-1%

Pasture Agreements:

There were 655 tenants that reported having an agreement for pastureland, with a total of 874 agreements (1.33 agreements per tenant). 617 of these tenants had cash agreements and 37 tenants had calf share agreements. Cash agreements were for an average of 2.69 quarters of land.

The average grazing period was five months for 39 per cent of tenants and four months for 26 per cent of tenants.

Rental rates were reported most often as the cents per cow per day ($/cow/day) as well as:

- $/acre of the agreement
- $/agreement
- $/animal unit month
- $/average quarter

For the purposes of the analysis rental information was converted to $/cow/day and $/acre of the agreement.

The rental data includes both native and improved pasture. Mixtures of native and improved pasture occurred on individual quarters. Of the 469 quarters linked to SAMA's database 281 included native pasture and 203 were dominantly native pasture.

Soil Zone (linked)	**SAMA Linked**	**Total**
Brown soil zone	57	100
Dark Brown soil zone	128	232
Black Soil zone	196	141
Dark Gray soil zone	57	217
Gray soil zone	26	
Total	464	690

Appendix 6
Cultivated Rental Analysis

Subject: Analysis of cultivated rental data

Background:

Appendix 5 describes the rental data collected for cultivated land in 2005. This appendix analyzes the crop share and cash rents and compares them to both the productivity indexes and to sale prices.

Analysis:

Cash Agreements

The following table demonstrates the distribution of cash rents by soil zone. The Dark Brown and Black soil zones have the best sample.

Soil Zone	SAMA Linked
Brown	78
Dark Brown	444
Black Soil	739
Dark Gray	125
Gray soil	32
Total	1418

The following table shows, for selected soil associations, the relationship between the final rating and the average rent paid. The final rating is the productivity rating adjusted for economic factors such as stones, topography and hazards.

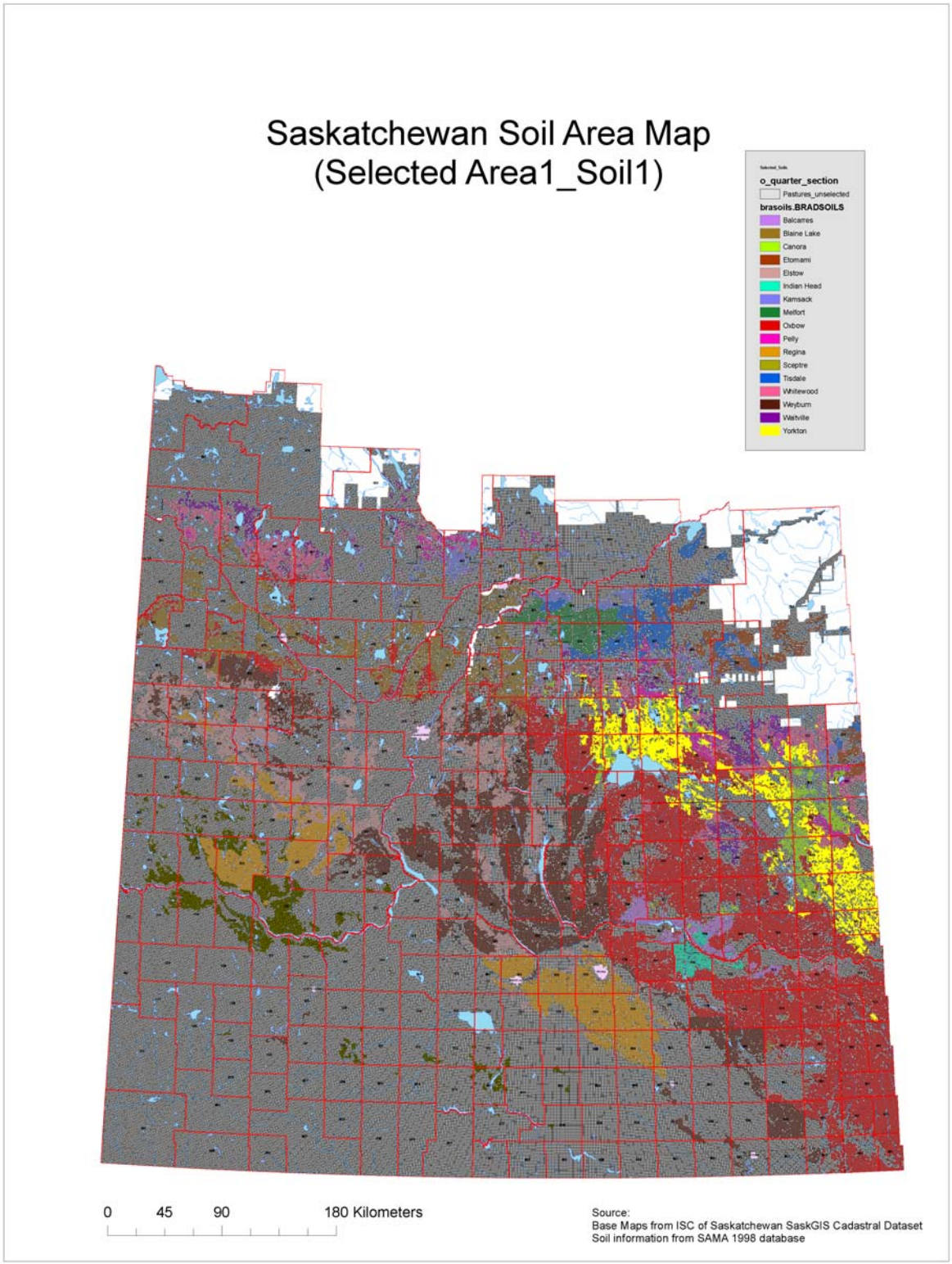
The table illustrates that soils with different productivity have the same or similar rents. Three key areas are identified.

- First, there is a greater discount for the black tills when compared to the dark brown tills. Oxbow and Weyburn soils are the best example as they are both till soils but in two different soil zones, and have significantly different final ratings even though the average rents are the same.
- Second, there is a significant difference in rent paid between a till and a lacustrine soil with similar productivity ratings. The Oxbow till and Elstow lacustrine soils illustrate this, as well the Yorkton till soil versus the Blaine and Regina lacustrine soils.
- Third, both the lacustrine and till soils in the black soil zone south of Humboldt/ Melfort area, rent for less than soils of similar productivity in other parts of the province. This is illustrated by the rents paid for the Yorkton, Balcaress, Indian Head, and Oxbow soils.

While the rental sample sizes are relatively small when compared to the sales data available, the rents show similar results.

Soil Zone	**Assoc.**	**Deposit**	**Final Rating (FR)**	**Rent ($/acre)**	**No.**	**PMI ($/FR)**	**No.**
Black	Melfort (MR)	Lacustrine	96	40	9	6.2	205
	Blaine (BB)	Lacustrine	80	30	41	7.0	337
	Yorkton (YK)	Till	77	25	43	4.9	478
	Balcaress (BA)	Lacustrine	86	27	21	5.8	72
Dark Brown	Regina (RA)	Lacustrine	78	30	13	7.9	653
	Elstow EW)	Lacustrine	68	25	25	6.8	513
Black	Oxbow (OX)	Till	64	20	149	5.0	2348
Dark Brown	Weyburn (WR)	Till	55	20	87	5.7	1303
Brown	Sceptre (SC)	Lacustrine	69	26.5	16	7.5	338

The following figure shows the distribution of the soils, listed in the previous table, in the province.


Saskatchewan Soil Area Map
(Selected Area1_Soil1)
o_quarter_section
Pastures_unselected
brasoils.BRADSOILS
Balcarres
Blaine Lake
Canora
Etomami
Elstow
Indian Head
Kamsack
Melfort
Onbow
Pelly
Regina
Sceptre
Tisdale
Whitewood
Weyburn
Wishville
Yorkton
0 45 90 180 Kilometers
Source:
Base Maps from ISC of Saskatchewan SaskGIS Cadastral Dataset
Soil information from SAMA 1998 database

Crop Share Agreements

The typical crop share arrangement is 33 % crop share with 25 % second.

Landlord Crop Share (%)	**Frequency**
20	5 %
25	24 % (277)
33	55 % (632)
Other	16 %

The following table illustrates that soils with the same productivity will have different rents in different soil zones. The percentage of crop share paid to the landlord decreases from the southwest to the north and east of the province (Brown to Black soil zones). This demonstrates that for similar productivity land, there will be a different rent. The most rent is paid in the Brown soil zone, second in the Dark Brown soil zone and the lowest in the Black, Dark Gray, Gray Wooded soil zones. A 33 % crop share is dominant in the Brown soil zone while it is split evenly in the Black, Dark Gray, Gray Wooded soil zones between 25 % and 33 % crop share.

Landlord Crop Share (%)	**Soil Zone**					
	Brown (%)	**Count**	**Dark Brown (%)**	**Count**	**Black / Dark Gray / Gray Wooded (%)**	**Count**
25	12	27	26	70	51	277
33	88	200	74	198	49	632
Average	33		31		29	

Approximately 25 % of landlords pay some portion of the input costs and do this typically when in a 33 % crop share agreement. The following table lists the types of input costs that are shared and how often they are shared.

Type of Inputs Shared	**Number that Share (%)**
Fertilizer	20
Chemicals	18
Seed	8
Drying/Harvest	4/3
Other	9

The following table illustrates the frequency that input costs are shared by soil zone. The highest occurrence is in the Black/Dark Gray/Gray Wooded soil zones. The higher percentage of input costs shared in the Black/Dark Gray/Gray Wooded soil zones also demonstrates that soils with the same productivity will have different rents in different soil zones.

Soil Zone	Frequency Input Costs Shared (%)
Brown	18
Dark Brown	17
Black/Dark Gray/Gray Wooded	25

Appendix 7
Pasture Analysis

Subject: Analysis of pasture data

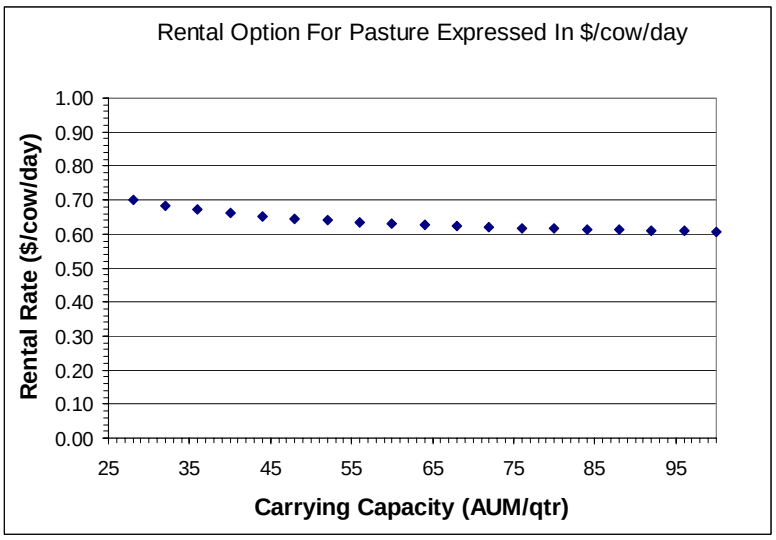
Background:

Appendix 5 describes the rental data collected for pasture land in 2005. This appendix analyzes the relationship demonstrated by pasture rents. It also recommends:

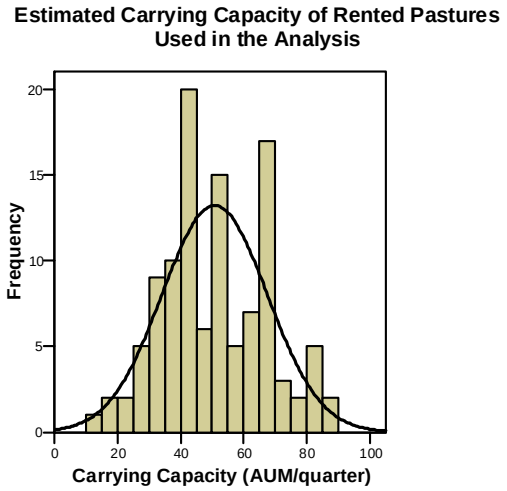
- A method to modify the pasture model based on the pasture rental relationships, and;
- The addition of an indexing system that will permit the use of a single base year factor.

Analysis:

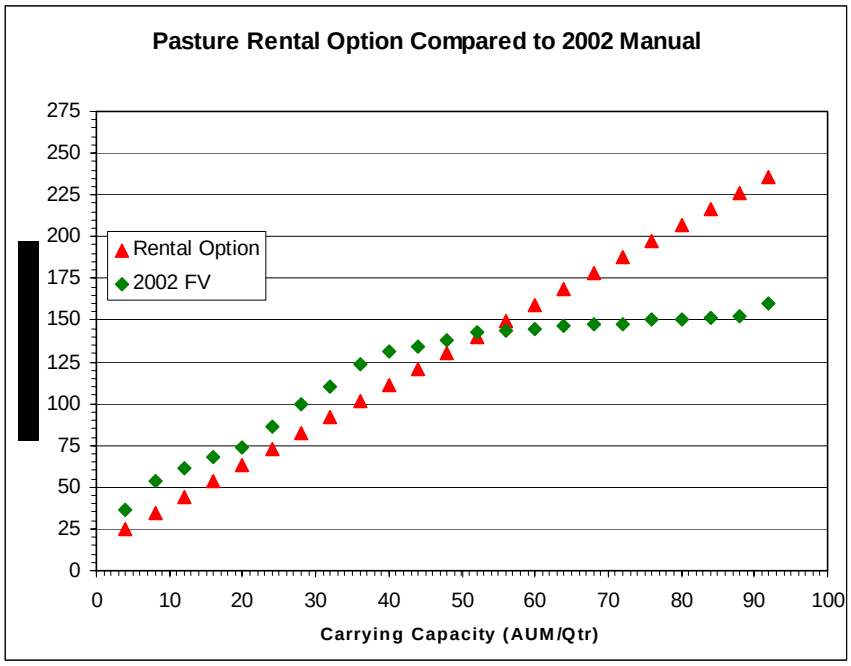
The following figure shows a fairly uniform rental rate between 25 and 90 animal unit months (AUM). Rates do decrease to some degree as the carrying capacity increases. As with the sales database, the rental sample is relatively small. Therefore, caution should be taken in the conclusions made from the analysis.



The following figure shows that the number of rents is lower for carrying capacities greater than 70 AUM/qtr. Therefore, the results for carrying capacities greater than 70 AUM/qtr are relatively less reliable.



The straight line (Rental Option) in the following figure demonstrates that the results of the rental survey would suggest a closer relationship between the assessment and productivity than the current assessments (2002FV). The rental rate has been converted into a dollar value per acre in order to make the comparison.



The following tables compare the rental rate and value for a number of carrying capacities. The capitalization rate of 6.55 % results in the same provincial assessment for pasture as there is today. Higher carrying capacities (greater than 44 AUM) increase significantly (approximately 48 %).

Carrying Capacity	**Rental Rate**		**Rental Value**	
	$/acre	**$/Cow/Day**	**$/acre**	**$/Qtr**
32	6.03	0.68	92	14,720
44 (Average)	7.91	0.65	121	19,360
56 (Brown-Loamy)	9.80	0.64	149	23,840
60	10.43	0.63	159	25,440
72 (Dark Brown-Loamy)	12.32	0.62	188	30,080
88 (Black-Loamy)	14.83	0.61	226	36,160
112	18.61	0.60	283	45,280

Carrying Capacity	**Assessment ($/acre)**		**Change (%)**
	2002	**Option**	
32	110	92	-16
44 (Average)	134	121	-10
56 (Brown-Loamy)	144	149	3
60	145	159	10
72 (Dark Brown-Loamy)	148	188	27
88 (Black-Loamy)	152	226	48
Overall			0

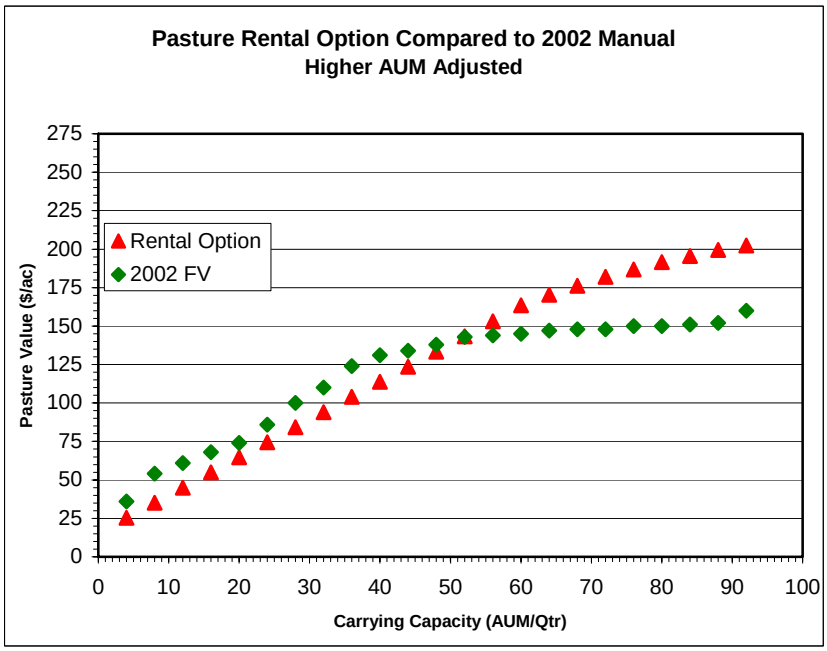
A lower value for the higher carrying capacity pasture is needed in order to maintain a reasonable relationship between pasture and cultivated land. The following table illustrates the relationship between cultivated and pasture land. It shows that in the Black soil zone pasture values will be higher than cultivated land. The issue occurs in the higher carrying capacity pasture found in both native and improved Black pasture and improved Dark Brown pasture.

	Range Site or Soil Assoc.	Carrying Capacity or Final Rating	$/acre	Acres	$/quarter
Pasture	**Black Loamy Native**	88 AUM	226	160	**$36,160**
	Improved	114 AUM	288	160	**$46,080**
Cult.	**Oxbow Loam**	40	232	130	$30,160
		45	261	130	$33,930
		50	290	130	$37,700
		60	348	130	$45,240
	Ave	65	377	130	$49,010
Pasture	**Dark Brown Loamy Native**	72 AUM	188	160	$30,080
	Improved	94 AUM	240	160	**$38,400**
Cult.	**Weyburn Loam**	35	203	145	$29,435
		40	232	145	$33,640
		45	261	145	$37,845
	Ave	50	290	145	$42,050
Pasture	**Brown Loamy Native**	56 AUM	166	160	$26,560
	Improved	73 AUM	190	160	$30,400
Cult.	**Ardill Loam**	30	174	150	$26,100
		35	203	150	$30,450
		40	232	150	$34,800
	Ave	45	261	150	$39,150

There are a number of reasons why the value relationship changes at higher carrying capacities. One explanation is higher costs of production that could occur for the following reasons:

- The land is used more intensively resulting in greater costs associated with providing items such as fencing and water
- Control of bush
- Maintaining improved pasture (improved pasture will be rated at the higher carrying capacities)
- Shorter grazing period in the Black soil zone which results in higher costs to winter cattle.

The following figure illustrates a model with an adjustment included for carrying capacities greater than 56 AUM (Brown Loamy range site).



The following tables compares the assessments, with the recommended adjustment, for a number of carrying capacities. The increase for higher carrying capacities (greater than 44 AUM) is less than for the previous option while the decreases for lower carrying capacities are reduced slightly.

Carrying Capacity	Assessment ($/acre)		Change (%)
	2002	Recommended Option	
32	110	94	-15%
44 (Average)	134	124	-7%
56 (Brown-Loamy)	144	153	6%
60	145	163	12%
72 (Dark Brown-Loamy)	148	182	23%
88 (Black-Loamy)	152	199	31%
Overall			0

The following table shows an improved relationship between cultivated and pasture land for the Black soil zone pasture and the Dark Brown improved pasture. There is now a similar relationship to that in the native and improved Brown and native Dark Brown pasture.

	Range Site or Soil Assoc.	Carrying Capacity or Final Rating	$/acre	Acres	$/quarter
Pasture	**Black Loamy Native**	88 AUM	199	160	**$31,840**
	Improved	114 AUM	214	160	$34,240
Cult.	**Oxbow Loam**	40	232	130	**$30,160**
		45	261	130	$33,930
		50	290	130	$37,700
		60	348	130	$45,240
	Ave	65	377	130	$49,010
Pasture	**Dark Brown Loamy Native**	72 AUM	182	160	**$29,120**
	Improved	94 Aum	203	160	$32,480
Cult.	**Weyburn Loam**	35	203	145	**$29,435**
		40	232	145	$33,640
		45	261	145	$37,845
	Ave	50	290	145	$42,050
Pasture	**Brown Loamy Native**	56 AUM	166	160	**$26,560**
	Improved	73 AUM	183	160	$29,280
Cult.	**Ardill Loam**	30	174	150	**$26,100**
		35	203	150	$30,450
		40	232	150	$34,800
	Ave	45	261	150	$39,150

Pasture Rating

A rating system has been developed that permits a similar calculation procedure to be used for pasture as is used for cultivated land. A rating has been assigned to each carrying capacity. The rating can be multiplied by a single base year factor to determine the assessment. The calculation procedure is as follows:

- Determine the carrying capacity
- Select the rating for the carrying capacity
- Multiply the rating by the provincial factor

The following table includes a recommended rating for each carrying capacity and a value calculated by multiplying the rating by a provincial factor of 5.0. The values are within a few dollars of the values for the recommended option discussed previously. The provincial factor reflects the 2002 base year province-wide selling price and will be updated to the 2006 base year. The calculation for a 56 AUM pasture would be as follows:

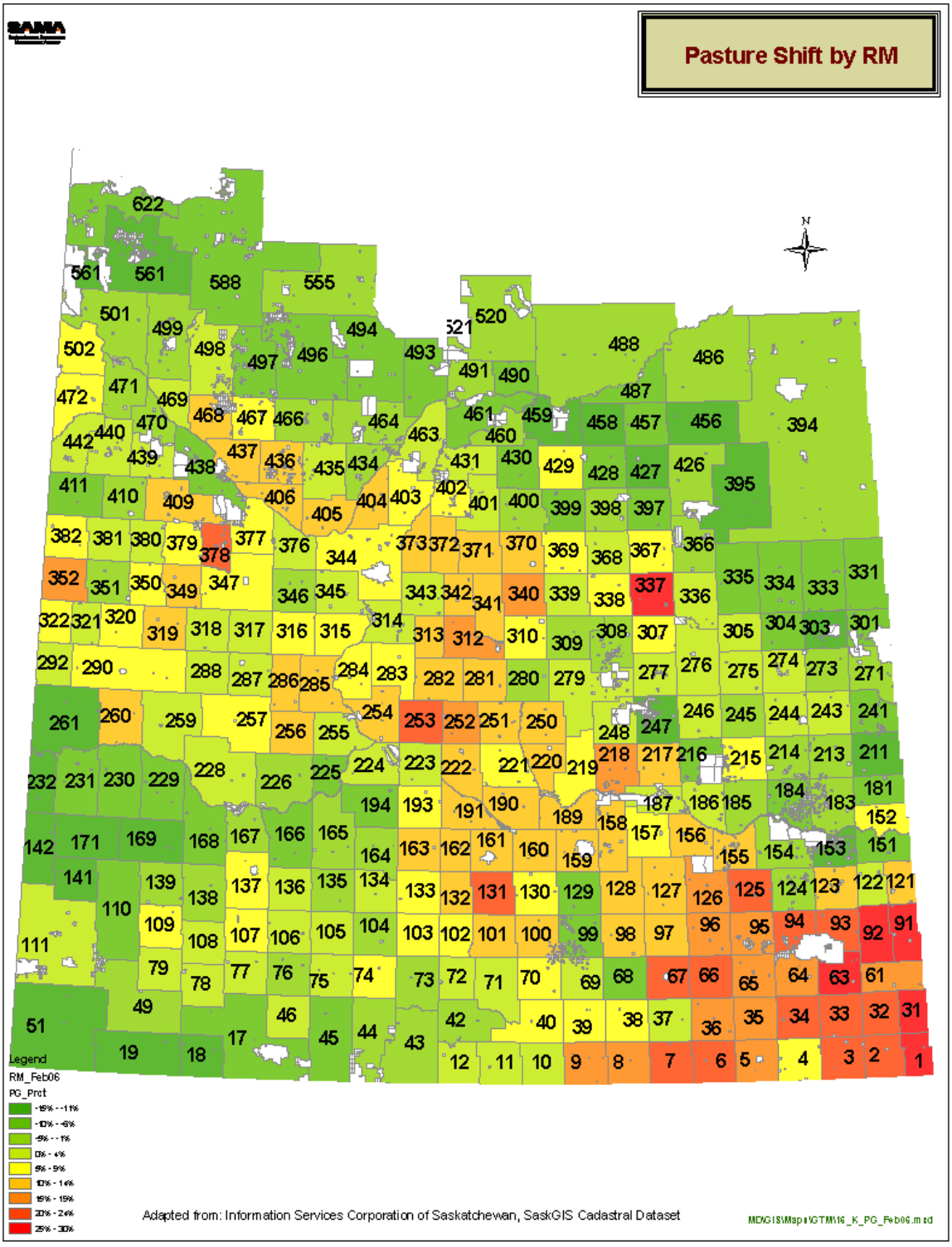
31 point rating x 5.0 base year factor = $155/acre

99% of the pasture acres are at 92 AUM or less.

Carrying Capacity	Rating	Value ($/acre)	Carrying Capacity	Rating	Value ($/acre)
4	5	25	64	34	170
8	7	35	68	35	175
12	9	45	72	36	180
16	11	55	76	37	185
20	13	65	80	38	190
24	15	75	84	39	195
28	17	85	88	40	200
32	19	95	92	41	205
36	21	105	96	42	210
40	23	115	100	43	215
44	25	125	104	44	220
48	27	135	108	44	220
52	29	145	112	45	225
56	31	155	116	45	225
60	33	165			

Table 1 shows the detailed assessment shift by municipality for pasture only and for pasture as a percentage of the total agricultural land assessment.

The following shows the pasture shift within each municipality. RMs with higher carrying capacity pasture will see a significant increase. There are 5 % increments between the categories.



The following shows the shift to the total agricultural land assessment for each municipality. There are only a few RMs that change more than plus or minus 5 %.

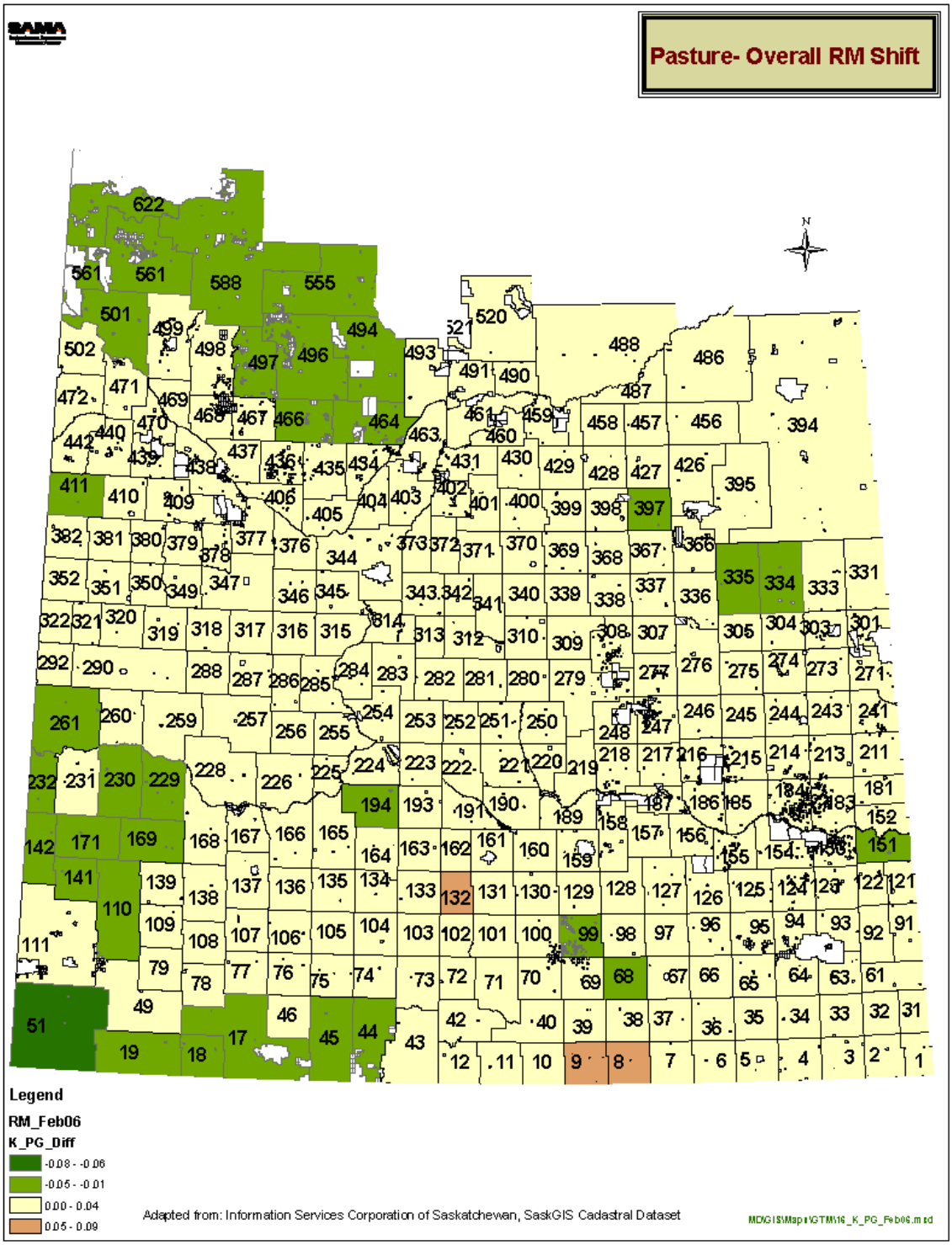


Table 1: Impact of pasture recommendations

RM	PG Only %	K and PG %	RM	PG Only %	K and PG %	RM	PG Only %	K and PG %
1	24	1	71	1	0	132	14	7
2	19	2	72	1	0	133	9	2
3	23	3	73	-2	0	134	1	0
4	7	2	74	5	0	135	-3	0
5	18	3	75	1	0	136	0	0
6	21	1	76	-3	0	137	5	1
7	22	1	77	1	0	138	-2	0
8	17	6	78	1	0	139	-3	-1
9	15	7	79	0	0	141	-14	-4
10	1	0	91	28	3	142	-14	-1
11	3	1	92	24	3	151	-10	-1
12	1	0	93	23	2	152	5	1
17	-10	-6	94	20	3	153	-12	-1
18	-14	-2	95	17	2	154	-4	0
19	-14	-4	96	18	0	155	12	1
31	25	0	97	9	1	156	12	0
32	22	2	98	12	0	157	4	0
33	21	1	99	-10	-1	158	12	0
34	22	0	100	10	1	159	12	0
35	17	0	101	11	4	160	10	0
36	18	2	102	4	0	161	13	0
37	2	0	103	5	0	162	13	2
38	5	1	104	-2	0	163	13	4
39	5	1	105	3	0	164	-2	-1
40	6	2	106	2	0	165	-3	-1
42	-3	0	107	5	0	166	-9	-1
43	-1	0	108	2	0	167	-4	0
44	-4	-1	109	4	1	168	-7	-1
45	-8	-3	110	-7	-4	169	-12	-3
46	-1	0	111	2	1	171	-14	-3
49	-3	-1	121	9	0	181	-11	0
51	-15	-8	122	3	0	183	-4	0
61	19	1	123	9	1	184	-10	0
63	26	2	124	-6	0	185	-1	0
64	14	3	125	21	1	186	1	0
65	16	1	126	15	1	187	0	0
66	22	0	127	10	0	189	9	1
67	21	1	128	11	0	190	11	1
68	-11	-2	129	-8	0	191	11	0
69	3	0	130	8	0	193	8	1
70	5	1	131	20	2	194	-10	-1

RM	PG Only %	K and PG %	RM	PG Only %	K and PG %	RM	PG Only %	K and PG %
211	-12	0	276	0	0	340	14	1
213	-2	0	277	1	0	341	11	0
214	-4	0	278	-14	0	342	11	0
215	7	0	279	-1	0	343	1	0
216	-11	0	280	-5	-1	344	5	0
217	12	1	281	13	1	345	2	0
218	18	1	282	12	1	346	-2	0
219	9	0	283	6	0	347	8	1
220	13	0	284	8	1	349	10	1
221	8	0	285	12	1	350	6	1
222	12	1	286	13	0	351	-4	0
223	2	0	287	-1	0	352	14	2
224	2	0	288	-1	0	366	-2	0
225	-6	0	290	7	0	367	6	0
226	-2	-1	292	-1	0	368	2	0
228	-1	0	301	-9	-1	369	8	0
229	-10	-1	303	-12	0	370	13	0
230	-10	-2	304	-10	0	371	11	0
231	-6	0	305	-1	0	372	9	0
232	-15	-3	307	5	0	373	12	1
241	-9	-1	308	-4	0	376	-1	0
243	-1	0	309	-2	0	377	7	2
244	3	0	310	9	1	378	21	3
245	-2	0	312	17	1	379	5	0
246	0	0	313	12	0	380	2	0
247	-14	0	314	-1	0	381	0	0
248	2	0	315	8	3	382	6	0
250	12	1	316	9	1	394	-2	0
251	12	0	317	2	0	395	-11	-1
252	15	1	318	0	0	397	-7	-1
253	23	1	319	9	0	398	-5	0
254	14	0	320	6	1	399	-8	-1
255	3	0	321	3	0	400	-2	0
256	11	2	322	7	3	401	0	0
257	5	1	331	-9	-1	402	9	1
259	0	0	333	-8	-1	403	7	0
260	10	1	334	-7	-1	404	12	0
261	-11	-2	335	-9	-3	405	13	2
271	-3	0	336	1	0	406	12	1
273	-5	0	337	25	1	409	12	1
274	3	0	338	8	0	410	-4	0
275	-1	0	339	2	0	411	-7	-2

RM	PG Only %	K and PG %	RM	PG Only %	K and PG %	RM	PG Only %	K and PG %
426	-2	0	458	-12	0	490	-7	0
427	-13	0	459	-13	0	491	-3	0
428	-9	0	460	-3	0	493	-6	-1
429	5	0	461	-7	0	494	-8	-1
430	-6	0	463	3	1	496	-9	-3
431	0	0	464	-6	-1	497	-10	-2
434	-2	0	466	-5	-2	498	0	0
435	3	0	467	6	1	499	-3	0
436	10	0	468	13	1	501	-5	-1
437	12	0	469	1	0	502	9	1
438	-7	-1	470	-2	-1	520	-5	-1
439	3	0	471	-5	0	555	-5	-2
440	4	1	472	8	0	561	-12	-6
442	0	0	486	-6	0	588	-10	-3
456	-14	0	487	-9	0	622	-9	-4
457	-10	0	488	-6	0			

Appendix 8
Cost of Production Adjustments

Subject: Options for cost of production adjustments

Background:

One of the key areas of concern expressed by property owners, with the current agricultural model, is a lack of recognition of variations in cost of production.

The following four options to adjust for cost of production are discussed and a are recommended:

- Trucking Cost Adjustment
- Freight Cost Adjustment
- Modify Current Economic Factors
- Modify Rego A-depth Factor

For the first two options, a crop share income model was developed and used to estimate the variation in cost of production across the province.

Analysis:

Crop Share Income Model

The model will consider the following information:

- Crops grown
- Quantity and quality of crop grown
- Crop price received
- Costs for elevation, cleaning, freight to export, and farm to elevator trucking

The current productivity rating varies with yield and does not consider the quality of the crop, the types of crops grown or the price received for the various crops. The crop share income model can be used to estimates the impact of variations in climate and cost of production that cannot be accounted for in the productivity rating.

The key objectives of the model are:

- To compare freight costs across the province
- To compare trucking costs across the province
- To use crop share analysis to compare income and expenses across the province
    - To compare freight and trucking costs to income

The data has been collected and includes the following:

- Board and non-board grain prices for several years
- Volume of each grain handled at all elevators in the province for several years
    - Does not include grain that does is not sold through a licensed elevator
- Elevation and cleaning tariffs by company
- Freight rates for board and non-board grains by location in the province
- "Trucking premiums" available at elevators
- Trucking cost formula
- Typical crop share arrangements

The crop share rental formula is being used as it represents the portion of the gross income that is assigned to the land and is an appraisal method used to determine land value. The balance of the gross income is the business income for the lessee, which is not assessed. Variations in freight, trucking and other items can be compared to the crop share rental to determine how significantly they influence the value of the land.

The following steps were used to develop the model:

- Calculate the crop price received at each elevator/station in the province
- Calculate the average freight costs at each station in the province
- Compare trucking costs between elevators in various areas

Average Crop Price by Elevator and Station

The following formulas were used to calculate the weighted average price received at each elevator and station in the province:

Board Grain Model:
Max Price = Avg. CWB Price – Elevation – Cleaning – Freight Consideration Rate for shipping point + Rail Incentive

Non-Board Grain Model:
Max Price = Avg. In-store Saskatchewan Price – (Shipping from Saskatoon to port – Shipping from Station to port) + Rail Incentive

Average Price (5 year)

- Non-Board:
    - Oats, Rye, Flax, Canola
        - SAF In-store Saskatoon price
    - Lentils, peas, Mustard, Sunflower, Canary Seed
        - SAF Saskatchewan price
- Board (5 year)
    - Wheat, Durum and Feed Barley
    - Source: CWB grain prices by crop and quality
        - In-store Vancouver or Thunder Bay
        - Price by quality for Wheat

Quality Adjustment for Wheat:

- Other crops do not vary significantly in quality due to location in the province
- Source: SAF wheat percentage by crop district
    - Collected from SAF Crop Report
- 10 or more year average of quality percentages for wheat by Crop District
    - Data to 1978 available and was used to determine a typical quality by Crop District
- Adjust total quantity of wheat by elevator using quality percentages from the Crop District in which the elevator is located
- Assign wheat price by quality

Elevation and Cleaning Tariff

- Source: CGC maximum tariff rates by company
- Applied by company

Rail Freight

Board - Freight Consideration Rate

- CWB handled grains (Wheat, durum and feed barley)
- Source: CWB file by station for 2004/05

Non-Board

- Shipping from Saskatoon to Port: CWB rate to Vancouver or Thunder Bay
- Shipping from Station to Port: CWB rate to Vancouver or Thunder Bay
- Use the following Ports:
    - Vancouver: rye, canola, wheat, barley, lentils, peas, mustard, sunflower, canary seed
    - Thunder Bay: flax, oats

Rail Incentive ("trucking premium")

- Incentive as follows:
    - 50 car: $4/tonne (CN and CP)
    - 100 car
        - CP: $7/tonne
        - CN: $6/tonne

The following table lists the 5-year average grain price for the crops considered in the model. The price before and after adjustments for transportation and handling is listed.

Crop	5 Year Average Price	Adjusted Price
	($/tonne)	($/tonne)
Wheat (1CWRS)	$215	$156-172
Durum	$250	$196-212
Barley	$164	$98-116
Oats	$129	$122-140
Rye	$105	$100-115
Canola	$322	$318-331
Flax	$347	$339-355
Peas	$186	$182-196
Canary Seed	$437	$433-446
Mustard	$433	$429-442
Lentils	$448	$442-456

Trucking Cost Adjustment

Purpose: To compare trucking costs in different locations in the province and develop an adjustment for areas with higher than typical trucking costs.

In some areas of the province grain must be hauled a considerable distance to the nearest elevator when compared to the majority of the province.

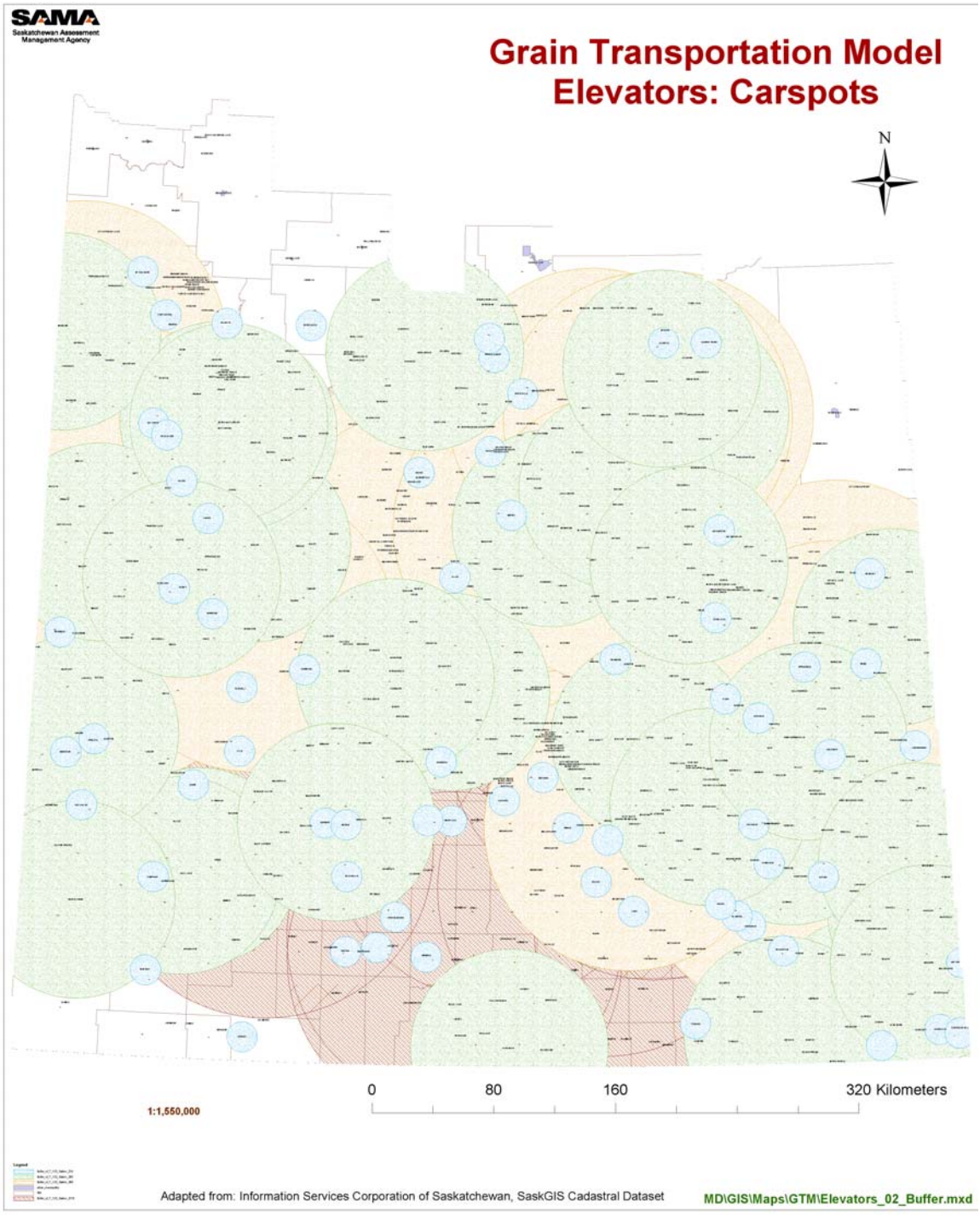
Trucking incentives between $4 and $7 are offered by grain companies and significantly reduce the cost of grain delivery for the majority of the province. A typical trucking cost includes a base amount plus a rate per kilometre. For the following table, it is assumed that everyone pays the base amount and that the variable to be measured is the rate per kilometre. Using this assumption, the cost to transport grain is reduced to $0 for distances between 65 and 110 kilometres for 50 and 100 car spot elevators.

Distance (km)	Trucking Cost ($/tonne)			
	< 50 car spot	100 car spot		50 car spot
		CN	CP	CN/CP
		6	7	4
1	0.06	0.00	0.00	0.00
10	0.64	0.00	0.00	0.00
15	0.96	0.00	0.00	0.00
16	1.02	0.00	0.00	0.00
20	1.28	0.00	0.00	0.00
30	1.92	0.00	0.00	0.00
32	2.05	0.00	0.00	0.00
35	2.24	0.00	0.00	0.00
40	2.56	0.00	0.00	0.00
50	3.20	0.00	0.00	0.00
60	3.84	0.00	0.00	0.00
65	**4.16**	0.00	0.00	**0.16**
70	4.48	0.00	0.00	0.48
75	4.80	0.00	0.00	0.80
80	5.12	0.00	0.00	1.12
90	5.76	0.00	0.00	1.76
95	**6.08**	**0.08**	0.00	2.08
100	6.40	0.40	0.00	2.40
105	6.72	0.72	0.00	2.72
110	**7.04**	1.04	**0.04**	3.04
120	7.68	1.68	0.68	3.68
125	8.00	2.00	1.00	4.00
140	8.96	2.96	1.96	4.96
150	9.60	3.60	2.60	5.60
175	11.20	5.20	4.20	7.20
200	12.80	6.80	5.80	8.80

The following figure shows the area of the province that would experience higher than average trucking costs. They are the areas that are outside the elevator circles of influence. Three areas identified where trucking costs would be higher than normal include:

- Southwest corner south of the Cypress Bench
- Meadow Lake
- Hudson Bay

The figure shows a consistent overlap of the drawing areas for 50 and 100 car spot elevators. Table 1 at the end of this Appendix lists the distance used for each station in the province.


SAMA
Saskatchewan Assessment Management Agency
Grain Transportation Model
Elevators: Carspots
N
0
80
160
320 Kilometers
1:1,550,000
Adapted from: Information Services Corporation of Saskatchewan, SaskGIS Cadastral Dataset
MD\GIS\Maps\GTM\Elevators_02_Buffer.mxd

A crop share income model has been developed to estimate the impact of the increased trucking costs on the income for the area being studied. The model takes into account the types of crops and prices received net of freight costs. An estimate of the impact, expressed as a percentage, on the net income can be calculated by comparing the added trucking costs to the net income. A cost of production adjustment, expressed as a percentage, could be applied to the Final Rating for areas experiencing higher than normal trucking costs.

The following is an example of the calculation of an adjustment for the Hudson Bay area. The closest elevator is a 100 car spot located on the CP line therefore adjustments would be made for distances greater than 110 kilometres. The typical average price is $180 per tonne for the crops delivered to elevators in the area.

Total distance = 140 km
30 km = $1.96/$180
= 0.0109 or 1.1 %

Total distance = 180 km
70 km = $5.80/$180
= 0.0322 or 3.2 %

Distance to the nearest elevator would need to be added to SAMA's database, at a minimum, for the properties outside of the 65 to 110 kilometre distance from the nearest elevator. SAMA staff would need to calculate this distance. SAMA's GIS is being used to assist with the calculation.

SAMA's CAMA system would need to be modified to add a data field and to change the calculation formula.

Freight Cost Adjustment

Purpose: To compare actual freight rates in different locations in the province and develop an adjustment for areas with higher than typical freight rates.

The 1965 base year assessment system had an adjustment called the Practical Land Classification (PLC). It included an adjustment for varying freight rates across the province. An analysis has been completed to determine if it is possible to add a freight cost adjustment to the cultivated land formula.

The following formula was used to calculate the average freight costs for each station:

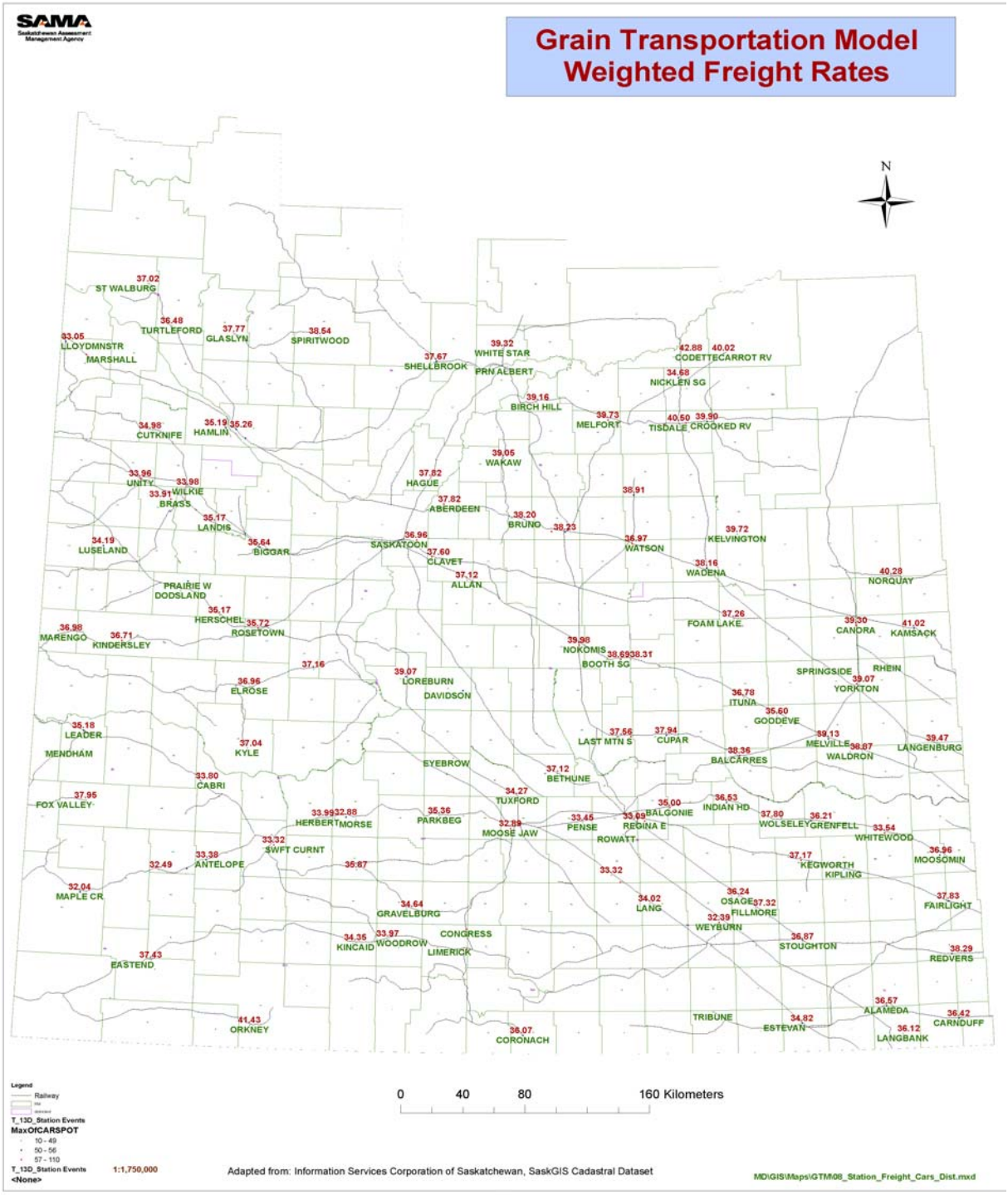
> Average Freight Cost = (Board Grain Rate x (Volume of Board Grains/Total Volume Handled)) + (Non-Board Grain Rate x (Volume of Non-Board Grains/Total Volume Handled))
>
> Board Grain Rate
> - Freight Consideration Rate used
>
> Non-Board Grain Rate
> - Non Board Grain Rate = Freight Rate portion to Thunder Bay + Freight Rate portion to Vancouver
> - Freight Rate portion to Thunder Bay = Freight Rate to Thunder Bay for Station x (Volume Shipped to Thunder Bay of Flax and Oats / Total Volume of Non-Board Grain handled)
> - Freight Rate portion to Vancouver = Freight Rate to Vancouver x (Volume Shipped to Vancouver / Total Volume of Non-Board Grain handled)
> - Use Freight rate for crop destination
>   - Vancouver: rye, canola, wheat, barley, lentils, peas, mustard, sunflower, canary seed
>   - Thunder Bay: flax, oats
>
> Volume:
> - Source: CGC quantity by crop by elevator
> - 5 year average

Analysis:

Both the relative freight costs by location and the relationship between the freight and the average price received for all crops at a station has been analyzed.

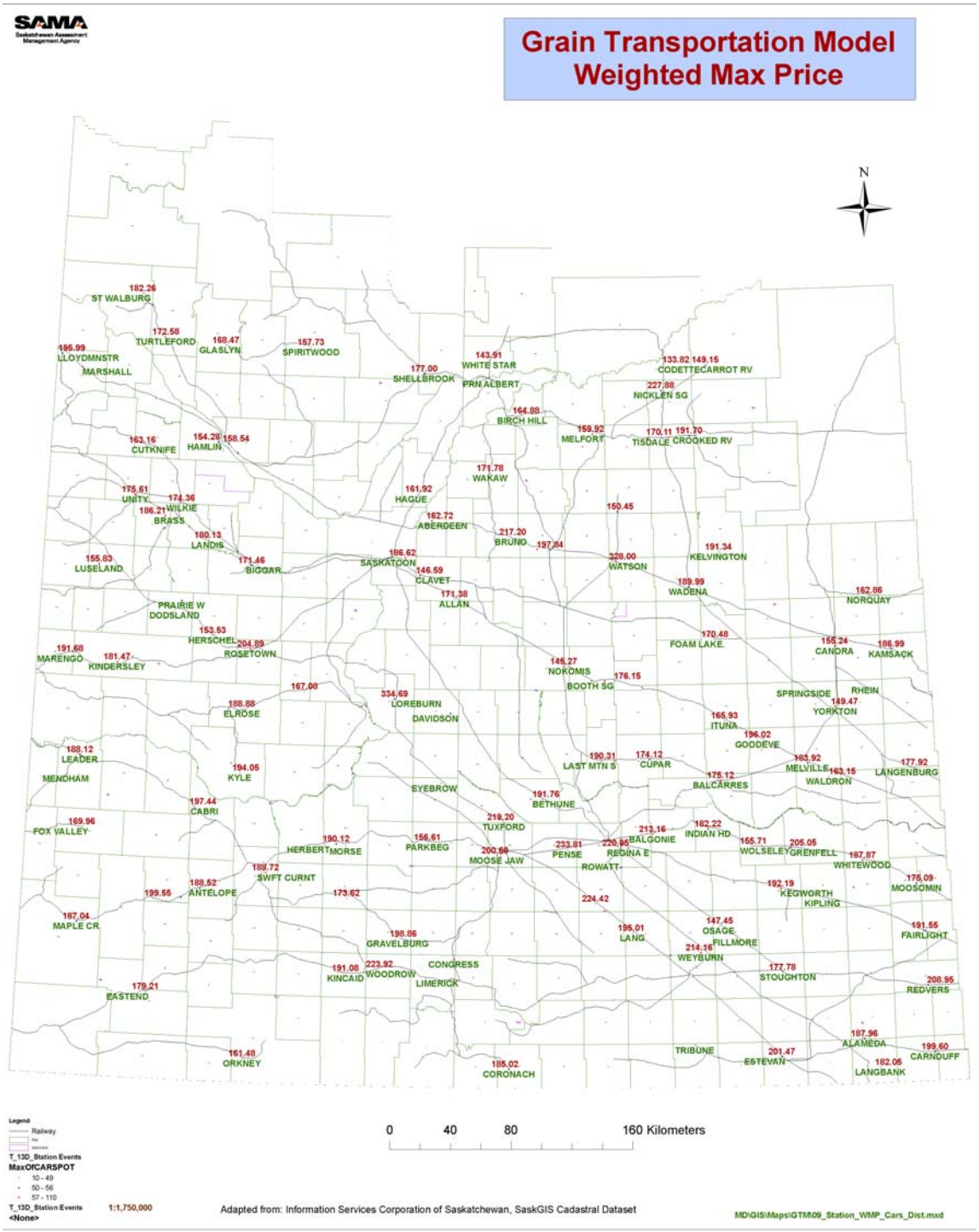
Table 1 at the end of this Appendix lists the freight rates for each station in the province.
The following figure shows the variation in freight rates across the province. The freight rates range typically between $32/tonne and $42/tonne. As expected, the higher freight rates are on the east side of the province since most of the grain is shipped west. Some exceptions could occur. For example,

higher than typical freight rates on the southwest side of the province would reflect increased freight rates to ship crops like durum east.



The following figure shows the variation in the crop price received at each station. The inclusion of the weighted average price permits an analysis of the impact of higher valued crops. A higher freight rate could be offset by a higher price for the crop. For example, Durum is grown in the southwest side of the province, is typically shipped east and therefore has higher freight costs than CWRS wheat. The 5-year average price is approximately $35/tonne higher for durum ($215/tonne for 1CWRS wheat vs $250/tonne for durum).

The highest crop prices occur in the Regina and Rosetown areas, which are located near the Regina soil association. As specialty crops are not typically shipped through elevators, the price shown is a conservative estimate for areas where relatively higher priced specialty crops like lentils are grown (ie. Regina and Rosetown areas). The lowest prices are typically found in the Black, Dark Gray, Gray Wooded soil zones.


SAMA
Saskatchewan Assessment Management Agency
Grain Transportation Model
Weighted Max Price
N
182.26 ST WALBURG
172.58 TURTLEFORD
168.47 GLASLYN
157.73 SPIRITWOOD
195.99 LLOYDMNSTR
MARSHALL
177.00 SHELLBROOK
143.91 WHITE STAR
PRN ALBERT
133.82 149.15 CODETTECARROT RV
227.88 NICKLEN SG
164.88 BIRCH HILL
159.92 MELFORT
170.11 191.70 TISDALE CROOKED RV
163.16 CUTKNIFE
154.28 158.54 HAMLIN
171.78 WAKAW
175.61 UNITY
174.36 WILKIE
186.21 BRASS
161.92 HAGUE
162.72 ABERDEEN
150.45
180.13 LANDIS
217.20 BRUNO
197.84
191.34 KELVINGTON
155.83 LUSELAND
171.46 BIGGAR
196.62 SASKATOON
328.00 WATSON
146.59 CLAVET
171.38 ALLAN
189.99 WADENA
162.86 NORQUAY
PRAIRIE W DODSLAND
153.53 HERSCHEL
204.89 ROSETOWN
170.48 FOAM LAKE
155.24 CANORA
186.99 KAMSACK
191.68 MARENGO
181.47 KINDERSLEY
145.27 NOKOMIS
176.15 BOOTH SG
167.08
334.69 LOREBURN
SPRINGSIDE
RHEIN
149.47 YORKTON
188.88 ELROSE
DAVIDSON
165.93 ITUNA
196.02 GOODEVE
188.12 LEADER
MENDHAM
194.05 KYLE
190.31 LAST MTN S
174.12 CUPAR
183.92 MELVILLE
177.92 LANGENBURG
175.12 BALCARRES
163.15 WALDRON
EYEBROW
191.76 BETHUNE
197.44 CABRI
169.96 FOX VALLEY
219.20 TUXFORD
213.16 BALGONIE
182.22 INDIAN HD
190.12 HERBERT
MORSE
156.61 PARKBEG
233.81 PENSE
220.95 REGINA E
155.71 WOLSELEY
205.05 GRENFELL
187.87 WHITEWOOD
200.69 MOOSE JAW
ROWATT
188.72 SWFT CURNT
188.52 ANTELOPE
199.55
173.62
192.19 KEGWORTH
KIPLING
175.09 MOOSOMIN
224.42
187.04 MAPLE CR
198.86 GRAVELBURG
195.01 LANG
147.45 OSAGE
FILLMORE
214.16 WEYBURN
191.55 FAIRLIGHT
191.08 KINCAID
223.92 WOODROW
CONGRESS
LIMERICK
177.78 STOUGHTON
208.95 REDVERS
179.21 EASTEND
187.96 ALAMEDA
199.60 CARNDUFF
TRIBUNE
201.47 ESTEVAN
182.05 LANGBANK
161.48 ORKNEY
185.02 CORONACH
Legend
Railway
T_13D_Station Events
MaxOfCARSPOT
10 - 49
50 - 56
57 - 110
T_13D_Station Events
<None>
1:1,750,000
0 40 80 160 Kilometers
Adapted from: Information Services Corporation of Saskatchewan, SaskGIS Cadastral Dataset
MD\GIS\Maps\GTM\09_Station_WMP_Cars_Dist.mxd

The following table shows the relationship of a range of freight rates to a range of crop prices. Table 1 at the end of this Appendix lists the average freight rate and crop price for each station in the province. The relationship, between the highest and lowest freight rate and range of crop prices in the following table, is typically 3-4 %. The maximum adjustment for freight would be between 3 and 4 percent for freight rates between $32/tonne and $40/tonne. The average price is between $210 and $220, therefore a discount of 4% would be supported.

Price ($/tonne)	Freight		
	$/tonne	%	% Range
190	32	16.8%	0.0%
190	36	18.9%	2.1%
190	40	21.1%	4.2%
215	32	14.9%	0.0%
215	36	16.7%	1.9%
215	40	18.6%	3.7%
240	32	13.3%	0.0%
240	36	15.0%	1.7%
240	40	16.7%	3.3%
265	32	12.1%	0.0%
265	36	13.6%	1.5%
265	40	15.1%	3.0%
Note: Price before freight deducted			

The following is the proposed freight adjustment table using 4% for the $40/tonne freight rate. The comparison of freight rates to crop price suggests a relatively small difference in freight adjustment for different crop prices and as a result a simple model based strictly on the freight rate in an area can be used. The discount is to be assigned by rural municipality based on the typical freight rate in that municipality.

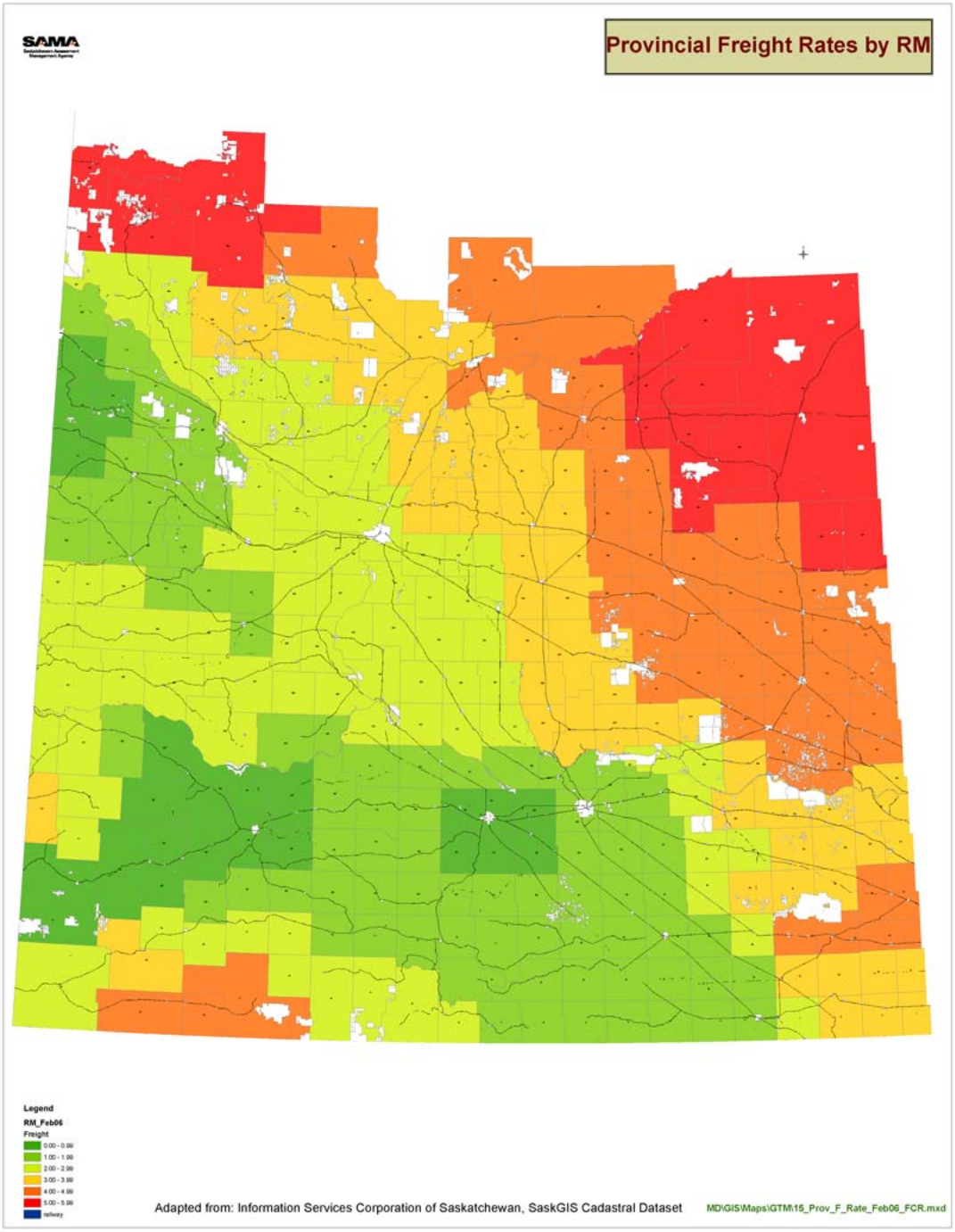
Freight ($/tonne)	Discount (%)
32-34	0
34-36	1
36-38	2
38-40	3
40-42	4
42+	5

A comparison of the freight rate for Board grains (Freight Consideration Rate) to the weighted freight rate for both Board and non-Board grains showed minimal difference. The weighted Board/Non-board freight rate varied between points due to differences in grains handled at elevators in the same location. Information from many sources is required to develop a weighted Board/Non-Board freight rate.

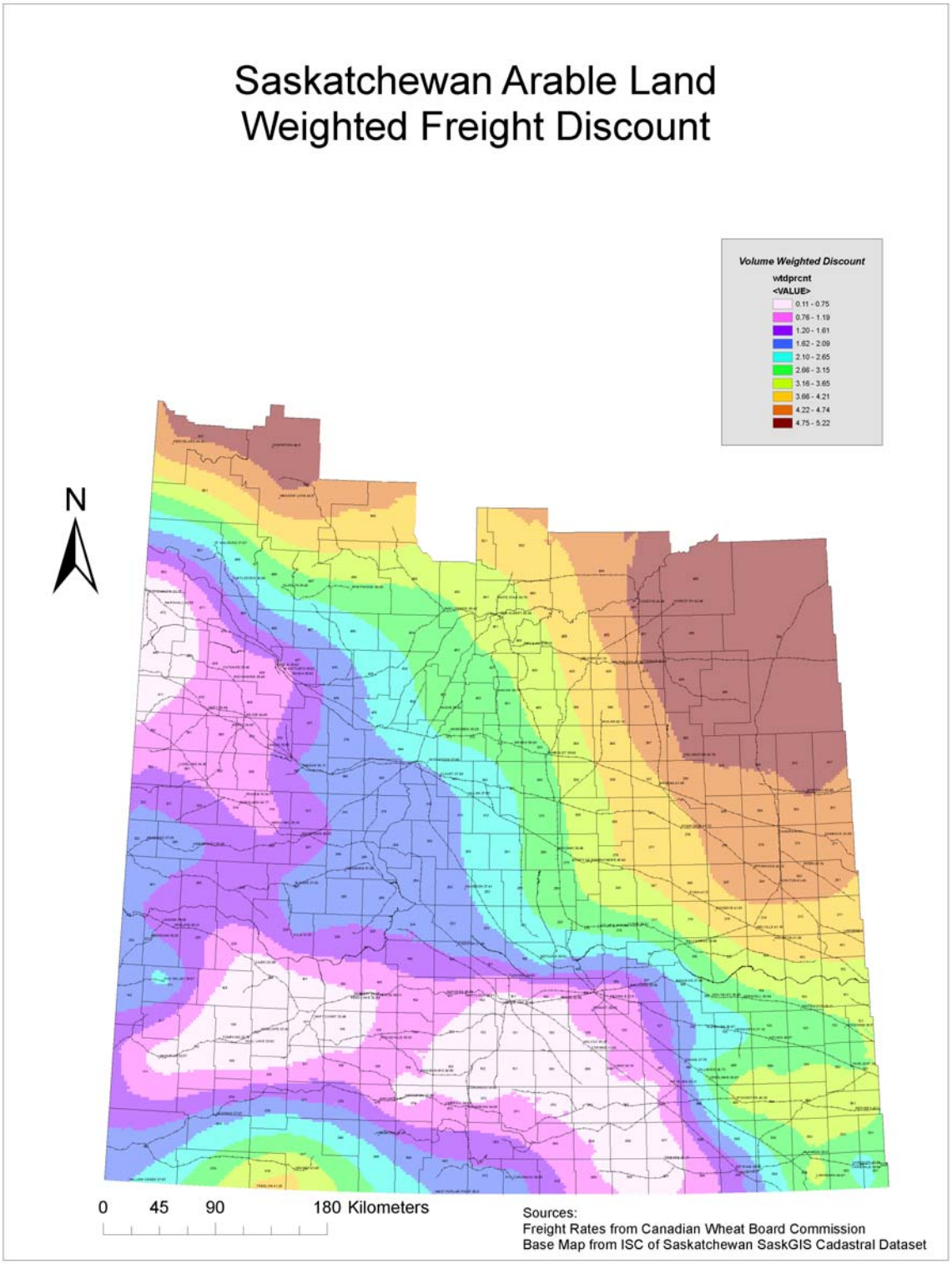
The Board freight consideration rate (FCR) was used to assign the Freight Cost Adjustment as it:

- is readily available and therefore easy to update;
- increases at a logical rate from east to west, and;
- includes an accurate measure of the influence of the freight rate on the crops that are shipped east.

The following figure shows the assignment of the freight cost adjustment by rural municipality.



The following figure shows the FCR for each station and an estimate of the variation in the freight discount across the province. This figure assisted in assigning the adjustment for each municipality.



Current Economic Factors

Are the adjustments for the current economic factors reflective of the increased "costs of production" associated with them?

Some stakeholders have recommended an increase in the deduction given for the current economic factors.

The current economic factors are stones, topography, natural hazards, man-made hazards and tree cover. Natural hazards include items such as waste sloughs, waste knolls, draws, creeks and rivers. Man-made hazards include items such as bush piles, drainage ditches, railroads, and roads. The following table summarizes the current deductions provided:

Description	Range of Points Deducted
Stones	2-30
Topography	2-13
Natural Hazards	1-8
Man-made Hazards	1-8
Tree Cover	15-45

Analysis (see Appendix 6) of the relationship between productivity and both sales and rental data suggest that:

- Black (includes Dark Gray/Gray Wooded) till soils are over-assessed compared to Dark Brown and Brown till soils.
- Till soils in general are over-assessed compared to sand and lacustrine soils.
- Till soils are characterized by the presence of stones, higher topography and more sloughs than sand and lacustrine soils.

Till soils by definition have significant economic adjustments for stones and topography when compared to other soil types. Black soils in general have higher deductions for natural hazards (sloughs).

The current deductions are expressed as points. When the 1965 manual was introduced in the mid-70's, percentage deductions were initially used for all factors. Two of the economic factors, miles to market and practical land classification, continued as percentage deductions.

As the productivity index increases, the use of percentages would deduct more points for a similar level of economic factors. This would:

- Reduce the difference in final rating for Black tills in comparison to Brown and Dark Brown tills;
- Increase the difference in final ratings between till and lacustrine soils, and;
- Better reflect the relationship suggested by both sales and rental data.

A higher deduction for higher productivity soils would suggest a higher cost of production due to differences caused by such things as the number of times equipment must be used on the land. This

results in greater costs associated with farming around natural and man-made hazards, stones, and topography.

The ALRC recommends a deduction of 2 percent for each current point deduction. This would result in a similar deduction for the average soil in the province (55 points final rating) as would be given using the current point deductions.

55 FR x 2 % = 1.1 points (current deduction 1 point)
55 FR x 4 % = 2.2 points (current deduction 2 points)

The cultivated agricultural land calculation would be modified as follows:

Productivity Rating (PR)	60
x Stones	0.96
x Topography	0.98
x Natural Hazards	0.96
x Man-made Hazards	
x Tree Cover	
Final Rating (FR)	54
x Provincial Factor ($/FR)	5.8
Fair Value ($/acre)	313

Analysis of varying options suggests that a deduction between 2 and 3 percent could be used. A percentage higher than 2 percent would bring the final rating for all till and lacustrine soils closer to the relationship suggested by both sales and rental data. However, it would also impact other soil types negatively.

Description	**Range of Points Deducted**	**2 % Recommended**		**3 % Option**	
		%	Ave. Pts	%	Ave. Pts
Stones	2-30	4-60	2-30	6-90	3-45
Topography	2-13	4-26	2-13	6-39	3-20
Natural Hazards	1-8	2-16	1-8	3-24	1.5-12
Man-made Hazards	1-8	2-16	1-8	3-24	1.5-12
Tree Cover	15-45	30-90	15-45	45-99	22.5-49

Note: Tree cover deduction is used rarely.

When applying economic factors on the current point system, the appraiser needs to ensure the total points deducted does not result in a negative value. The use of percentages will address this administrative issue.

The following table provides an example of the impact of three percentage options. The 2 percent option has minimal impact for the Brown and Dark Brown tills but does provide a higher discount for the Black till. It reduces the difference in final rating for Black tills in comparison to Brown and Dark Brown tills but does not significantly reduce the difference between till and lacustrine soils in the Brown and Dark Brown soil zones. The 2.5 and 3 percent options will meet both criteria.

	Ardill (Brown Till)				Weyburn (Dark Brown Till)				Oxbow (Black Till)			
	Current Typical	2%	2.5%	3%	Current Typical	2%	2.5%	3%	Current Typical	2%	2.5%	3%
PR	52.6				59				71			
Stones	1.2	1.2	1.5	1.8	3.2	3.8	4.7	5.7	2.1	3.0	3.8	4.6
Topo	2.9	3.0	3.8	4.6	2.7	3.2	4.0	4.8	3.1	4.5	5.6	6.7
Hazards	1.8	1.9	2.4	2.8	2.1	2.5	3.1	3.7	3.4	4.8	6.0	7.2
FR	47	46	45	43	51	50	47	45	62	59	56	53
Total Points	6	6	8	9	8	9	12	14	9	12	15	18
Difference												
Points		0	2	3		1	4	6		4	7	10
%		5%	31%	58%		18%	47%	77%		42%	78%	113%

Note: PR (Productivity Rating), Topo (Topography), FR (Final Rating)

The provincial factor will change when the final rating is changed, as an increase in the cost of production adjustments will lower the average final rating.

Original calculation: $330/acre / 57 = 5.8 provincial factor
Calculation (lower FR): $330/acre / 55 = 6.0 provincial factor

The following table shows, for the current method and two options, the difference in the final ratings, value ($/acre), and for the provincial factor. The table demonstrates that:

- The final rating drops significantly for till soils and remains relatively unchanged for lacustrine soils;
- The final rating drops more for the Black till soil (Oxbow) than the Dark Brown till soil (Weyburn), and;
- The provincial factor will increase due to the decrease in the final rating for till soils.

1991-2002 Sales		Current		2 % Recommended		3 % Option	
Soil Zone	**Assoc.**	**Final Rating (FR)**	**Value ($/acre)**	**Final Rating (FR)**	**Value ($/acre)**	**Final Rating (FR)**	**Value ($/acre)**
Black	Melfort (Lac.)	96	566	96	586	95	618
	Balcaress (Lac.)	86	507	85	519	84	546
	Yorkton (Till)	77	454	72	439	68	442
	Oxbow (Till)	64	378	60	366	53	345
Dark Brown	Regina (Lac.)	78	460	75	458	75	488
	Weyburn (Till)	55	325	52	317	48	312
Brown	Sceptre (Lac.)	69	407	67	409	66	429
Provincial Factor		5.9		6.1		6.5	

Modify Rego A-depth Rating

The Sutherland and Regina soils are both heavy lacustrine soils. The Sutherland is a less desirable soil, as it is more variable and slightly lower in texture than the Regina soil. It also has a distinct a-depth and therefore is typically given a 5+ a-depth rating (1.05 factor) which is higher than the factor (1.00) assigned to Regina. This has resulted, for the current system, in the same average assessment of $446 for the typical Regina and Sutherland soils even though the productivity rating, prior to application of the a-depth factor, is higher for the Regina soil. Applying the 1.05 for the Rego a-depth results in a reasonable difference in the assessments between the Regina and Sutherland soils of $27 per acre ($460 vs $487).

A method is also needed to recognize the economic advantage for the Brown and Dark Brown Heavy Lacustrine soils. Sale prices, cash rents and crop share rents suggest a higher value is required for these soils than is suggested by the productivity ratings (based on long-term yield). These soils are typically rated at a Rego a-depth.

The following table compares the current a-depth adjustments to the 1965 level adjustments. They were revised based on crop yield data with the introduction of the 1994 base year manual. The yields for the soils with Rego a-depths were not high enough to justify a factor greater than 1.00. At the same time, the maximum a-depth bonus was reduced from 1.10 to 1.05 to better match the yields.

Soil Zone	1965 Manual		Current Manual	
	A-depth Description	**Factor**	**A-depth Description**	**Factor**
Dark Brown	Deep Rego	1.10	Rego	1.00
	Rego	1.05		
	7+ inches	1.10		
	6-7 inches	1.05	5+ inches	1.05
(Average)	5-6 inches	1.00	3-5 inches	1.00
Brown	Rego	1.10	Rego	1.00
	6+ inches	1.10		
	5-6 inches	1.05	5+ inches	1.05
(Average)	4-5 inches	1.00	3-5 inches	1.00

The factor of 1.05 is recommended to be reinstated to the soils with the Rego profile (see the following table). It improves the comparability between the Regina and Sutherland soils, and recognizes the economic advantage for the heavy lacustrine soils.

Soil Zone	A-depth Description	Factor	
		Option 1	Option 2
Brown/ Dark Brown (Average)	Rego	1.05	1.10
	5+ inches	1.05	1.05
	3-5 inches	1.00	1.00

Table 1: Listing by station of average crop price, distance for trucking incentives, average freight rates and freight discount

Station	Crop District	Ave. Price ($/tonne)	Total Carspots	Largest Carspot	Distance Trucking Incentive (km)	Railway	FCR	Freight Discount (%)
ABERDEEN	8B	163	110	100	95	CN	38.29	3.00
ALAMEDA	1A	188	50	50	65	CP	39.01	3.00
ALLAN	6A	171	25	25	10	CN	37.80	2.00
ANTELOPE	3BN	189	50	50	65	CP	33.42	0.00
ANTLER	1A	209	10	10	0	NOT	39.02	3.00
ASSINIBOIA	3AS	334	110	100	110	CP	34.08	1.00
BALCARRES	5A	175	100	100	95	CN	38.96	3.00
BALGONIE	2B	213	200	100	110	CP	35.56	1.00
BETHUNE	6A	192	10	10	0	CN	38.52	3.00
BIGGAR	7B	171	50	50	65	CN	36.11	2.00
BIRCH HILL	8B	165	10	10	0	CN	39.77	3.00
BOOTH SG	6A	194	100	100	95	CN	39.93	3.00
BRADA	9A	172	50	50	65	CN	35.63	1.00
BRASS	7B	186	100	100	110	CP	34.40	1.00
BRUNO	8B	217	10	10	0	CN	39.09	3.00
CABRI	3BN	197	10	10	0	CP	33.84	0.00
CANORA	5B	155	150	100	95	CN	41.91	4.00
CARIEVALE	1A	173	10	10	0	CP	36.54	2.00
CARNDUFF	1A	200	60	50	65	CP	37.53	2.00
CARROT RV	8A	149	75	25	0	CN	42.48	5.00
CLAVET	6A	147	100	100	95	CN	37.65	2.00
CODETTE	8A	134	10	10	0	CP	44.80	5.00
CONGRESS	3AS	201	100	100	110	CP	33.56	0.00
CORINNE	2B	195	100	100	110	CP	31.92	0.00
CORONACH	3AS	185	50	50	65	CP	36.05	2.00
CREELMAN	2A	167	10	10	0	CP	38.63	3.00
CROOKED RV	5B	192	50	50	65	CN	42.49	5.00
CUPAR	5A	174	50	50	65	CP	39.01	3.00
CUTKNIFE	9B	163	10	10	0	CP	35.46	1.00
DAVIDSON	6B	184	110	50	65	CN	37.41	2.00
DINSMORE	6B	167	25	25	0	CN	37.26	2.00
DODSLAND	7A	115	10	10	0	CP	34.77	1.00
EASTEND	4A	179	10	10	0	CP	37.67	2.00
ELROSE	3BN	189	10	10	0	CN	37.03	2.00
ESTEVAN	1A	201	50	50	65	CP	35.55	1.00
EYEBROW	3AN	206	25	25	0	CP	37.20	2.00
FAIRLIGHT	1B	192	50	50	65	CN	39.02	3.00
FILLMORE	2A	215	10	10	0	CP	38.73	3.00
FOAM LAKE	5B	170	50	25	0	CP	41.72	4.00

Station	Crop District	Ave. Price ($/tonne)	Total Carspots	Largest Carspot	Distance Trucking Incentive (km)	Railway	FCR	Freight Discount (%)
FOX VALLEY	4B	170	10	10	0	CP	38.01	3.00
GAINSBORO	1A	161	10	10	0	CP	38.50	3.00
GLASLYN	9B	168	10	10	0	CN	38.42	3.00
GLENAVON	1B	187	25	25	0	CN	36.57	2.00
GOODEVE	5A	196	10	10	0	CN	41.51	4.00
GRAVELBURG	3AN	199	25	25	0	CP	34.58	1.00
GRENFELL	1B	205	75	50	65	CP	38.84	3.00
GULL LAKE	4B	185	50	50	65	CP	33.42	0.00
HAGUE	6B	162	10	10	0	CN	38.42	3.00
HAMLIN	9A	154	100	50	65	CN	35.63	1.00
HERBERT	3BN	171	20	20	0	CP	34.05	1.00
HERSCHEL	7A	154	25	25	0	CP	35.33	1.00
HODGEVILLE	3BN	174	25	25	0	CP	35.91	1.00
HUMBOLDT	8B	198	60	50	65	CN	39.64	3.00
INDIAN HD	2B	182	60	50	65	CP	37.89	2.00
ITUNA	5A	166	35	25	0	CN	41.70	4.00
KAMSACK	5B	187	75	50	65	CN	41.52	4.00
KEGWORTH	1B	192	100	100	95	CN	37.16	2.00
KELVINGTON	5B	191	25	25	0	CP	43.76	5.00
KINCAID	3BS	191	25	25	0	CP	34.47	1.00
KINDERSLEY	7A	181	200	100	95	CN	36.88	2.00
KIPLING	1B	174	25	25	0	CN	39.87	3.00
KYLE	3BN	194	10	10	0	CN	37.07	2.00
LANDIS	7B	180	25	25	0	CN	35.60	1.00
LANG	2A	195	10	10	0	CP	34.19	1.00
LANGBANK	1A	182	25	25	0	CN	40.41	4.00
LANGENBURG	5A	178	50	25	0	CP	40.51	4.00
LAST MTN S	6A	190	100	100	110	CP	39.34	3.00
LEADER	4B	188	50	50	65	CP	35.26	1.00
LIMERICK	3AS	170	25	25	0	CP	34.99	1.00
LLOYDMNSTR	9B	196	50	50	65	CP	33.75	0.00
LUSELAND	7B	156	79	56	65	CP	34.38	1.00
MAPLE CR	4A	187	50	50	65	CP	32.07	0.00
MARENGO	7A	192	25	25	0	CN	37.20	2.00
MARSHALL	9B	160	100	100	95	CN	33.59	0.00
MELFORT	8B	160	160	100	95	CN	41.10	4.00
MELVILLE	5A	184	50	50	65	CN	41.15	4.00
MENDHAM	4B	173	10	10	0	CP	36.26	2.00
MOOSE JAW	2B	201	250	100	110	CP	32.66	0.00
MOOSOMIN	1B	175	50	50	65	CP	38.57	3.00
MORSE	3BN	171	25	25	0	CP	35.01	1.00
MORTLACH	2B	154	10	10	0	CP	34.81	1.00

Station	Crop District	Ave. Price ($/tonne)	Total Carspots	Largest Carspot	Distance Trucking Incentive (km)	Railway	FCR	Freight Discount (%)
N BATTLEFD	9A	159	50	50	65	CN	35.63	1.00
NAICAM	8A	150	75	50	65	CP	40.19	4.00
NOKOMIS	6A	145	100	100	110	CP	39.98	3.00
NORQUAY	5B	163	25	25	0	CN	42.48	5.00
ORKNEY	3BS	161	10	10	0	CP	41.45	4.00
OSAGE	2A	147	10	10	0	CP	37.75	2.00
PARKBEG	3AN	157	10	10	0	CP	35.36	1.00
PENSE	2B	234	10	10	0	CP	32.86	0.00
PRAIRIE W	7A	168	56	56	65	CP	34.77	1.00
PRELATE	4B	191	10	10	0	CP	35.21	1.00
PRN ALBERT	9A	190	10	10	0	CN	40.92	4.00
RAYMORE	6A	176	25	25	0	CN	40.40	4.00
REDVERS	1A	209	50	50	65	CP	40.21	4.00
REED LAKE	3BN	190	50	50	65	CP	32.92	0.00
REGINA E	2B	221	100	100	95	CN	32.50	0.00
RHEIN	5A	165	35	25	0	CN	42.74	5.00
ROCKHAVEN	9B	189	25	25	0	CP	35.46	1.00
ROSETOWN	7A	205	175	100	95	CN	35.91	1.00
ROWATT	2B	203	35	25	0	CN	36.65	2.00
SASKATOON	6B	187	175	100	110	CP2	37.80	2.00
SHELLBROOK	9A	177	50	50	65	OTH	38.42	3.00
SPIRITWOOD	9A	158	10	10	0	CN	39.09	3.00
SPRINGSIDE	5A	184	25	25	0	CP	42.02	5.00
ST WALBURG	9B	182	25	25	0	CN	37.67	2.00
STOUGHTON	1A	178	10	10	0	CP	40.20	4.00
SWFT CURNT	3BN	189	250	100	110	CP	33.48	0.00
TISDALE	8A	170	200	100	95	CN	42.01	5.00
TOMPKINS	4B	200	10	10	0	CP	32.75	0.00
TRIBUNE	3AS	215	10	10	0	CP	32.17	0.00
TURTLEFORD	9B	173	10	10	0	CN	36.99	2.00
TUXFORD	2B	219	10	10	0	CP	34.53	1.00
UNITY	7B	176	225	100	95	CN	34.44	1.00
VALPARAISO	8A	155	100	100	95	CN	41.80	4.00
WADENA	5B	190	85	50	65	CP	41.95	4.00
WAKAW	8B	172	25	25	0	CN	39.78	3.00
WALDRON	5A	163	25	25	0	CN	41.09	4.00
WEYBURN	2A	214	300	100	110	CP	32.21	0.00
WHITE STAR	9A	144	25	25	0	CN	39.78	3.00
WHITEWOOD	1B	188	100	100	110	CP	39.11	3.00
WILCOX	2B	224	20	10	0	CP	35.25	1.00
WILKIE	7B	174	25	25	0	CP	34.45	1.00
WOLSELEY	1B	156	10	10	0	CP	38.98	3.00

Station	Crop District	Ave. Price ($/tonne)	Total Carspots	Largest Carspot	Distance Trucking Incentive (km)	Railway	FCR	Freight Discount (%)
WOODROW	3AS	224	10	10	0	CP	33.98	0.00
YORKTON	5A	149	225	100	95	CN	41.49	4.00

Appendix 9
Cultivated Impact Analysis

Subject: Impact of Cultivated Land Recommendations

Background:

A sample of the complete cultivated land database has been recalculated using the recommended changes to the cultivated land rates and procedures. This Appendix describes the impact of the following recommendations for change:

- The three recommendations to adjust the productivity index, described in Appendix 3, including:
  - Lowering climate ratings in RMs on the forest fringe
  - Lowering the texture ratings for heavier textures in the Dark Gray/Gray Wooded soil zones
  - Lowering the profile rating for Dark Gray, DG12
- The four recommendations to adjust for cost of production, described in Appendix 8, including:
  - Trucking Cost Adjustment
  - Freight Cost Adjustment
  - Modify Current Economic Factors (2 % option)
  - Modify Rego A-depth as an Economic Factor (Option 1: Rego at 1.05)

Prior to final approval of the recommendations, the complete cultivated land database will be recalculated using the revised rates and calculation procedures.

Analysis:

The recommended changes reduce the average final rating in the province and therefore the provincial factor increases from 5.9 to 6.2. The total provincial cultivated agricultural land assessment does not change. This analysis used 2002 sales and therefore does not include the change in value between the 2002 and 2006 base dates.

Average increases and decreases by rural municipality and by soil association range between a reduction of 10 percent and an increase of 11 percent. The following tables and figures further describe the impact of the recommendations.

The following table shows the change in the current to proposed assessment by major soil type.

Soil Zone	Soil Type	Change (%)
Brown	Sands	6
	Tills	3
	Lacustrine	5
Dark Brown	Sands	3
	Tills	0
	Silt/Loess	3
	Heavy Lacustrine	9
Black	Sands	3
	Tills	-5
	Silt	0
	Heavy Lacustrine	-1
Dark Gray	Sands	-4
	Tills	-9
	Lacustrine	-4
Gray Wooded	Tills	-5
	Lacustrine	-5

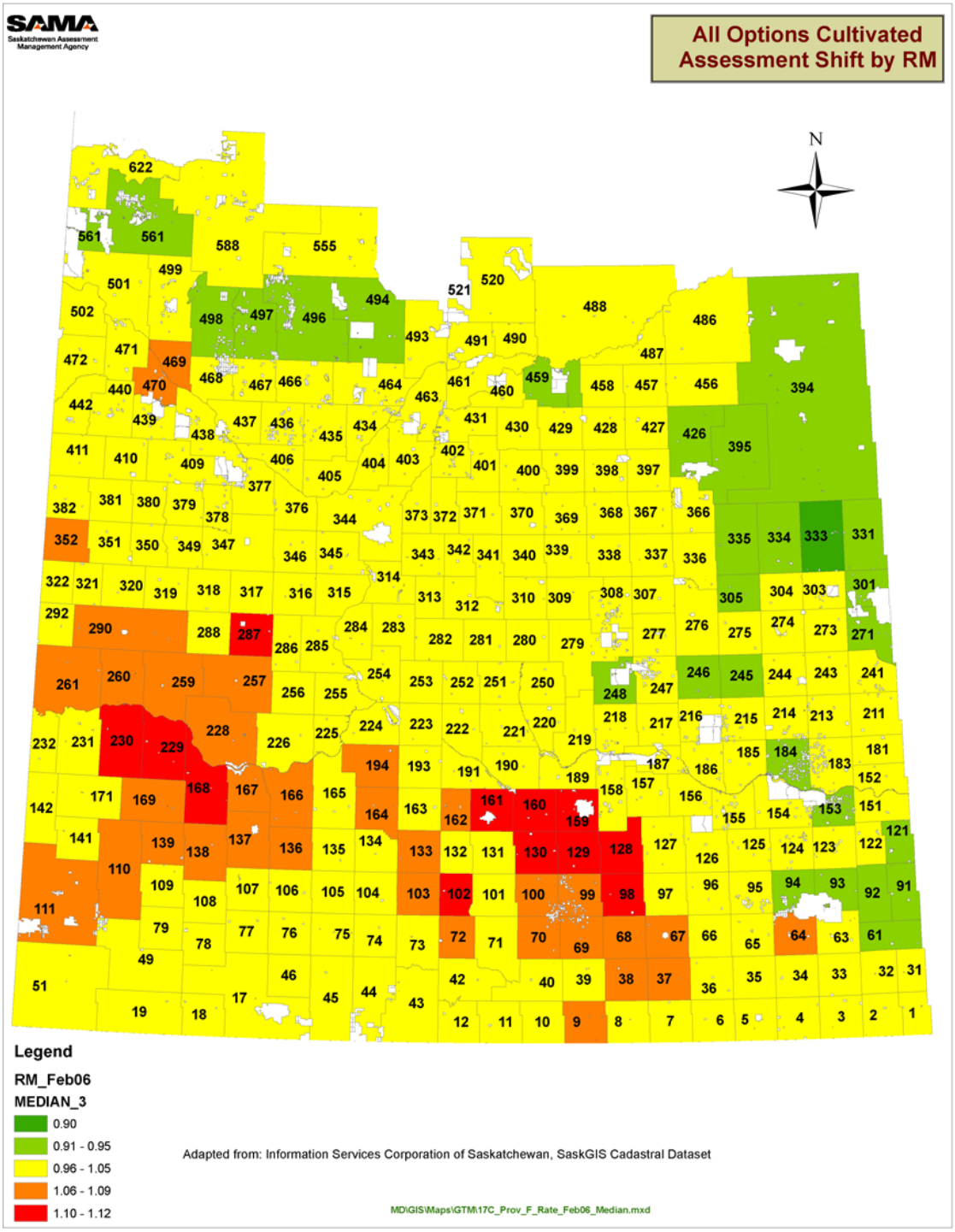
The following table shows the change in the current to proposed final ratings by major soil type.

Soil Zone	Soil Type	Current	Recommended
Brown	Sands	30	30
	Tills	47	46
	Lacustrine	62	62
Dark Brown	Sands	38	38
	Tills	53	51
	Silt/Loess	69	67
	Heavy Lacustrine	75	78
Black	Sands	38	36
	Tills	65	59
	Silt	84	80
	Heavy Lacustrine	94	88
Dark Gray	Sands	47	44
	Tills	67	59
	Lacustrine	90	81
Gray Wooded	Tills	44	40
	Lacustrine	57	51
Provincial Factor		5.9	6.2

The following table shows the impact by soil association on the assessment of the combined options. The current assessment is compared to the proposed assessment.

Soil Zone	Soil Type	Soil Assoc.	Current (Ave. $/acre)	Recommended (Ave. $/acre)	Difference ($/acre)	Difference (%)
Brown	Sand	HT	158	173	15	9%
		BY	223	240	17	8%
	Lacustrine	FX	311	328	17	5%
		WW	376	409	33	9%
		SC	393	430	37	9%
	Till	HR	270	277	7	3%
		AD	282	291	9	3%
Dark Brown	Sand	AQ	211	219	8	4%
		BR	305	317	12	4%
	Lacustrine	EW	417	428	11	3%
		SU	446	463	17	4%
		RA	446	489	43	10%
	Till	AM	294	303	9	3%
		WR	311	316	5	2%
Black	Sand	ME	220	233	13	6%
		HM	405	416	11	3%
	Lacustrine	HH	499	499	0	0%
		MD	499	485	-14	-3%
		BB	505	510	5	1%
		NC	508	510	2	0%
		BA	511	514	3	1%
		IH	522	537	15	3%
		CA	552	549	-3	-1%
		MR	587	578	-9	-2%
	Till	MF	367	354	-13	-4%
		OX	376	360	-16	-4%
		YK	446	431	-15	-3%
Dark Gray	Sand	NT	223	233	10	4%
		SB	308	293	-15	-5%
	Lacustrine	AR	335	321	-14	-4%
		KA	487	459	-28	-6%
		NP	493	486	-7	-1%
		WE	534	525	-9	-2%
		TI	540	513	-27	-5%
	Till	WH	376	342	-34	-9%
		PW	387	372	-15	-4%
		ET	396	358	-38	-10%
		PY	458	436	-22	-5%
Gray Wooded	Sand	SY	217	211	-6	-3%
	Till	LN	226	221	-5	-2%
		WV	264	251	-13	-5%
		MT	270	258	-12	-4%
		ED	299	288	-11	-4%

The following figure shows the change in the current to proposed assessment by rural municipality. Green indicates a decrease and orange/red indicates an increase. The shift ranges between –10% and +11%. Table 2 at the end of this appendix shows the percentage impact by municipality. The following table shows a change of plus or minus 5 percent in the yellow area. The orange area is increasing between 6 and 9 percent and the red area between 10 and 11 percent. The light green area is decreasing between 5 and 9 percent and the dark green 10 percent.



The following table shows the change in the current to proposed assessment by major soil associations.

Soil Assoc.	Count	Change (%)	Soil Assoc.	Count	Change (%)	Soil Assoc.	Count	Change (%)
AD	547	4	KP	96	1	WH	239	-9
AM	139	3	KR	6	-3	WK	83	5
AQ	239	4	KS	10	3	WM	169	4
AR	28	-4	KT	6	2	WR	1,303	1
BA	72	2	KY	7	-5	WS	140	4
BB	337	2	LN	40	-4	WV	117	-4
BG	48	5	LZ	18	-6	WW	73	9
BK	99	3	MA	4	-3	YK	474	-2
BR	118	4	MD	28	-3			
BY	31	6	ME	138	4			
CA	97	0	MF	50	-3			
CD	15	-4	MR	196	-1			
CH	14	10	MT	16	-5			
CM	22	-4	NC	40	0			
CR	45	-3	NP	31	-2			
CY	27	7	NT	37	4			
DO	12	-4	OX	2,347	-4			
EC	21	4	PW	15	-3			
ED	13	-7	PY	28	-5			
EG	43	-1	RA	653	10			
ES	55	2	RM	7	4			
ET	185	-8	RO	6	4			
EW	509	4	RP	12	-5			
FA	195	4	RU	29	6			
FC	24	4	SB	52	-2			
FG	13	7	SC	338	9			
FX	345	5	SN	9	6			
GA	10	-3	ST	16	4			
GB	8	-3	SU	99	4			
HH	7	1	SY	4	-3			
HM	57	3	TG	5	-1			
HR	136	4	TI	209	-3			
HT	60	7	TR	234	6			
HY	35	3	TU	43	4			
IH	34	3	VA	5	5			
KA	105	-5	WA	104	1			
KD	55	3	WC	15	6			
KH	12	5	WE	107	-3			
KN	5	3	WF	12	-3			

Table 2: Comparison by rural municipality of the current assessment to the recommended cost of production and productivity index options

RM	Sample Size	Change (%)	RM	Sample Size	Change (%)	RM	Sample Size	Change (%)
1	31	1	73	10	4	136	43	5
2	26	3	74	23	3	137	34	6
3	6	1	75	30	4	138	17	5
4	20	0	76	50	3	139	37	5
5	34	3	77	19	3	141	9	4
6	56	5	78	18	3	142	24	4
7	42	3	79	16	3	151	4	-2
8	18	5	91	25	-7	152	15	-2
9	8	6	92	31	-6	153	51	-6
10	17	4	93	34	-6	154	37	-4
11	60	4	94	26	-6	155	63	-1
12	95	4	95	32	-1	156	33	1
17	7	2	96	26	3	157	52	-1
18	1	2	97	80	5	158	66	-1
19	4	3	98	101	10	159	34	10
31	44	-4	99	109	6	160	48	11
32	33	-4	100	33	5	161	37	11
33	9	0	101	13	4	162	25	6
34	7	-1	102	6	9	163	3	-1
35	48	1	103	16	5	164	6	5
36	4	5	104	34	5	165	27	5
37	12	5	105	37	3	166	63	5
38	31	6	106	55	5	167	33	5
39	21	3	107	30	5	168	61	9
40	25	5	108	26	3	169	59	5
42	100	4	109	47	5	171	27	4
43	81	4	110	24	6	181	6	-4
44	14	3	111	10	6	183	135	-5
45	14	3	121	23	-7	184	196	-6
46	6	3	122	33	-4	185	55	-2
49	25	2	123	62	-3	186	65	1
51	14	4	124	78	-5	187	19	-2
61	53	-6	125	54	-2	189	40	3
63	19	-5	126	8	-2	190	52	2
64	4	7	127	27	5	191	45	4
65	15	1	128	80	10	193	4	4
66	8	3	129	81	10	194	16	5
67	21	6	130	45	10	211	89	-5
68	44	6	131	36	4	213	42	-3
69	28	7	132	3	4	214	50	-5
70	2	6	133	8	8	215	108	-5
71	68	4	134	17	4	216	62	-3

RM	Sample Size	Change (%)	RM	Sample Size	Change (%)	RM	Sample Size	Change (%)
72	22	8	135	18	4	217	62	-5
218	51	2	285	46	3	366	28	-3
219	52	0	286	55	4	367	78	-1
220	57	0	287	45	9	368	29	-2
221	97	2	288	40	3	369	48	0
222	47	2	290	102	7	370	34	-2
223	10	3	292	13	2	371	10	-1
224	29	4	301	15	-9	372	47	-4
225	33	3	303	52	0	373	40	2
226	24	4	304	43	-3	376	59	4
228	86	8	305	14	-7	377	16	0
229	39	10	307	29	-2	378	41	2
230	59	9	308	62	-3	379	20	3
231	59	4	309	21	0	380	15	4
232	17	4	310	42	3	381	6	1
241	53	-4	312	67	1	382	12	2
243	17	0	313	32	2	394	104	-9
244	36	-1	314	43	4	395	58	-8
245	37	-5	315	59	4	397	11	0
246	112	-6	316	62	4	398	19	0
247	130	-5	317	56	5	399	29	-2
248	57	-5	318	57	5	400	17	-4
250	51	0	319	8	4	401	68	1
251	42	2	320	9	5	402	45	-2
252	54	2	321	5	3	403	114	3
253	35	3	322	1	3	404	73	1
254	64	3	331	76	-7	405	48	4
255	19	4	333	28	-10	406	9	4
256	10	2	334	31	-10	408	36	-1
257	50	9	335	22	-6	409	13	1
259	89	9	336	36	-5	410	23	4
260	30	7	337	57	-1	411	7	3
261	52	8	338	32	0	426	35	-5
271	19	-8	339	96	-3	427	46	-3
273	37	0	340	52	-3	428	72	-1
274	12	0	341	71	-1	429	91	-1
275	49	-4	342	60	0	430	8	0
276	63	-5	343	79	3	431	41	0
277	108	-4	344	42	4	434	82	3
278	18	-6	345	37	4	435	58	-2
279	88	0	346	50	4	436	25	-1
280	35	2	347	59	1	437	2	4
281	68	1	349	15	4	438	20	3
282	93	0	350	33	3	439	2	4

RM	Sample Size	Change (%)	RM	Sample Size	Change (%)	RM	Sample Size	Change (%)
283	49	2	351	7	4	440	14	-1
284	71	4	352	3	6	442	10	0
456	21	-4	469	6	6	496	31	-5
457	59	-4	470	13	7	497	11	-7
458	70	-3	471	17	2	498	33	-8
459	99	-7	472	68	1	499	13	-4
460	47	0	486	59	-3	501	15	-4
461	8	-5	487	83	-2	502	23	-1
463	33	3	488	40	-3	520	6	-3
464	25	3	490	13	-3	555	19	-3
466	18	-1	491	5	-2	561	15	-5
467	5	-1	493	29	-1	588	53	-4
468	17	4	494	38	-6	622	15	-1