



## **CANADIAN GRAIN COMMISSION**

# **Review of Maximum Shrinkage Allowances at Primary Elevators**

**Discussion Paper**

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**Canada**

## EXECUTIVE SUMMARY

Shrinkage is defined in the *Canada Grain Act* as “the loss in weight of grain that occurs in the handling or treating of grain.” Such gross weight loss is due to several factors, including loss of grain and dust during handling, transportation, and processing, and loss of moisture during handling, storage, and drying. Establishing maximum shrinkage allowances through regulation is intended to discourage the use of informal and discretionary measures to compensate for shrinkage losses.

The Canadian Grain Commission (CGC) has analyzed data from primary elevator weigh-over reports and determined that there is a large degree of variability in the losses and gains experienced between elevators (i.e., elevator “A” lost, while elevator “B” gained). In addition, there appears to be a large degree of variability in the losses and gains experienced at individual elevators (i.e., elevator “A” had a loss one year and a gain the next) over the nine year study period (1990/91 through 1998/99). The analysis showed no obvious differences in the magnitude of gains and losses experienced by different grain handling companies (i.e., grain company “X” did not experience greater losses than grain company “Y”).

It should also be noted that for this review, the only data available for analysis consisted of the primary elevator weigh-over results. There are many external factors that could be affecting the weigh-over results that cannot be isolated due to data limitations (i.e., cleaning and blending activities, differences in reporting weigh-over information, inconsistent operating practices, scale problems). In order to determine what portion of loss in an elevator operation is attributable to shrinkage, it would be necessary to isolate and calculate the impact of the factors mentioned above. This is not possible and therefore, it is not statistically possible to accurately derive shrinkage allowance levels.

This paper includes 3 options with discussion points for each option. These options include:

- 1) Status quo – retain maximum shrinkage allowances at primary elevators through regulation.
- 2) Deregulation – eliminate the maximum shrinkage allowances for primary elevators.
- 3) Set all primary elevator maximum shrinkage allowances, including tough and damp, to zero.

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## REVIEW OF MAXIMUM SHRINKAGE ALLOWANCES AT PRIMARY ELEVATORS

### Issue

Shrinkage is defined in the *Canada Grain Act* (the Act) as “the loss in weight of grain that occurs in the handling or treating of grain.” Such gross weight loss is due to several factors, including loss of grain and dust during handling, transportation, and processing, and loss of moisture during handling, storage, and drying.

Paragraph 116(1)(f) of the Act states “the Commission may, with the approval of the Governor in Council, make regulations fixing the maximum shrinkage allowance that may be made on the delivery of grain to an elevator.” Schedule X of the *Canada Grain Regulations* (the Regulations) establishes the maximum shrinkage allowances for primary elevators. Schedule XI of the Regulations establishes the maximum shrinkage allowances for terminal elevators (these are currently set at zero for all grains).

The CGC is not required to set maximum shrinkage allowances. For example, there are no maximum shrinkage allowances prescribed in the Regulations for grain delivered to transfer elevators, grain dealers or process elevators. If the CGC has not prescribed a maximum shrinkage allowance for a particular grain or licence class, licensees can deduct whatever shrinkage allowance they see fit subject to “good business practices.”

The CGC is currently reviewing maximum shrinkage allowances at primary elevators. This review is being done for the following reasons:

- the CGC has received several requests and recommendations from producers and the grain industry for a review of primary elevator shrinkage allowances,
- there have been many improvements in grain handling technology and significant changes in the primary elevator grain handling infrastructure over the past 10 years, and
- all regulations should be examined periodically to ensure they are still relevant.

Maximum shrinkage allowances were last reviewed by the CGC in 1993. No changes were made to primary elevator maximum shrinkage allowances at that time.

### Scope of the Review

This review includes an analysis of primary elevator weigh-over data submitted to the CGC from licensed primary elevator companies. The analysis was completed to aid in the discussion of options available to the CGC and to investigate the relationship between gross weight loss and shrinkage allowances. In addition to the data analysis, the CGC is consulting with producers and the grain industry on maximum shrinkage allowances at primary elevators. The CGC has set up a virtual consultation site on the CGC Internet ([www.cgc.ca](http://www.cgc.ca)). Interested parties are invited to provide comments and take part in “on-line discussions” about shrinkage. Instructions to participate can be found at the site.

The CGC is inviting written submissions on this discussion paper. Organizations wishing to meet directly with staff from the CGC to discuss primary elevator shrinkage allowances should contact Paul Graham at (204) 983-2749 or [pgraham@cgc.ca](mailto:pgraham@cgc.ca) to arrange a meeting time.

## **Background**

Shrinkage is generally considered to be an inevitable consequence of handling grain. The Regulations establish maximum shrinkage allowances that limit the amount that primary elevator operators can deduct for shrinkage when they buy grain. The shrinkage allowances prescribed in the Regulations are maximum allowances. Elevator operators may deduct less than the maximums found in the Regulations. In other words, shrinkage deductions are negotiable between the owner of the grain and operator of the primary elevator facility. However, the typical practice for primary elevators has been to deduct the maximum shrinkage allowance.

There are currently no maximum shrinkage allowances prescribed in the Regulations for grain delivered to transfer elevators, grain dealers or process elevators. Shrinkage deductions are negotiable in the contracts between the owner of the grain and the facility. Due to the lack of regulated shrinkage allowances, there is nothing to restrict these facilities from deducting whatever shrinkage allowance they see fit. However, industry practice indicates that grain dealers and process elevators are deducting the same maximum shrinkage allowances as primary elevator companies.

Shrinkage allowances are intended to compensate primary elevator operators for the loss in gross weight that may occur during grain handling, transportation, and storage. Loss in weight may occur each time that the grain is handled. Grain is weighed as it is received at a primary elevator. Primary elevator operators are responsible for all loss in weight from the time they receive the grain to the time the car/truck unload weight is determined at the point of unload (usually at a terminal or transfer elevator). This includes losses in weight that may occur during transit and during handling at the terminal/transfer elevator before the grain is weighed at unload.

At a primary elevator, shrinkage is deducted from the scale weight of grain when it is delivered by producers. The scale weight of grain delivered by producers less the shrinkage allowance equals the accountable gross weight. For example, if a producer delivers 100.00 tonnes of dry wheat to a primary elevator, the accountable gross weight on their elevator receipt will total 99.90 tonnes (100.00 less 1/10%) and the maximum shrinkage allowed would be 0.10 tonnes. In other words, the shrinkage allowance represents the gross weight that an elevator operator may lose during handling, except for losses attributable to railway operations.

Maximum shrinkage allowances for deliveries of grain to primary elevators are prescribed in Schedule X of the Regulations. The following table shows the current maximum shrinkage allowances for primary elevators.

**Table 1: Current Maximum Shrinkage Allowances in Schedule X to the Canada Grain Regulations.**

<b>Maximum Shrinkage Allowances at Primary Elevators</b>		
<b>Grain</b>	<b>Straight Grades (percentage of scale weight)</b>	<b>Tough or Damp (percentage of scale weight)</b>
1. Wheat, oats, barley, rye	0.10	0.20
2. Flaxseed, solin, canola, rapeseed	0.35	0.52
3. Other grains	1.00	1.00

### **Establishing Shrinkage Allowances**

Maximum shrinkage allowances have traditionally been set by the CGC at levels such that most elevators should experience actual gross weight losses that are consistent with the maximum shrinkage allowances. Tough and damp grain tends to lose additional weight in handling as a result of weight loss attributable to moisture loss. Therefore shrinkage allowances are higher for tough and damp grains.

Primary elevator operators are required to submit weigh-over reports to the CGC not less than once every three years as outlined in paragraph 60(1)(a) of the Regulations. A weigh-over is defined in the Act as “the weighing and inspection of all grain of any grade in an elevator for the purpose of determining the amount in stock of grain of that grade in the elevator.” Primary elevator weigh-over reports include information on the total weight of grain received after the shrinkage deduction has been removed and the total weight of grain shipped from a primary elevator over a period of time. If elevators consistently report higher shipment weights than inward weights, they may be experiencing less shrinkage than they are charging producers for.

According to paragraph 32(a) of the Regulations, primary elevator licensees are required to post Schedule X of the Regulations outlining the maximum shrinkage allowances that may be deducted. In addition to this, according to paragraph 32(d) of the Regulations, licensees must affix a poster setting out the shrinkage allowance that may be deducted from the grain delivered (the actual deductions can be less than the maximums established by the CGC). If required, the CGC may investigate shrinkage deductions pursuant to paragraph 91(1)(b) of the Act.

### **History of Shrinkage Allowances at Primary Elevators**

Informal shrinkage allowances have been in effect since the earliest days of the grain industry. The first formal shrinkage allowances were instituted in 1912 at the time of the inception of the Board of Grain Commissioners (the Board). Formal shrinkage allowances were established to:

- a) recognize that actual losses do occur during the handling of grain, and
- b) prevent agents from taking excessive shrinkage deductions.

The first formal shrinkage allowances were applied only to grain that was specially binned at primary elevators. In 1923/24, the Board established shrinkage allowances for all grain receipts at primary elevators. Maximum shrinkage allowances were adjusted numerous times over the next 50 years (both upwards and downwards). In 1975, an Industry Committee on Shrinkage Allowances was established. The committee concluded that shrinkage allowances should protect elevators only against gross weight losses and that allowances should not be set at levels high enough to compensate for the losses incurred by inefficient elevators.

Shrinkage allowances were reviewed again in 1986, 1989, and 1993. The 1989 analysis indicated that primary elevator shrinkage allowances were higher than necessary to adequately protect grain handlers from gross weight losses. Effective August 1, 1990, the primary elevator maximum shrinkage allowances were reduced to levels closer to the actual rates of loss. Maximum allowances for straight grades were reduced to 0.10 percent from 0.25 percent of scale weight for wheat, oats and barley; to 0.10 percent from 0.50 percent for rye; and to 0.35 percent from 1.00 percent for flaxseed, rapeseed and canola. The maximum shrinkage allowances for tough or damp grades were reduced to 0.20 percent from 0.50 percent of scale weight for wheat, oats and barley; to 0.20 percent from 1.00 percent for rye; and to 0.52 percent from 1.50 percent for flaxseed, rapeseed and canola.

In 1993, as part of the follow-up to the Grains and Oilseeds Regulatory Review initiative, the CGC agreed to undertake another review of maximum shrinkage allowances. The CGC consulted with elevator operators, producer groups, and the three prairie provincial governments. Elevator operators favoured the status quo while most others favoured lower maximum shrinkage allowances. Some respondents supported complete deregulation. The CGC analyzed primary and terminal elevator weigh-over data to determine the relationship between gross weight losses and shrinkage allowances. The primary elevator data set indicated that, on average, actual gross weight losses were less than the shrinkage allowances deducted from farmers. However, the Western Grain Elevator Association (WGEA) questioned whether the data set was accurately measuring shrinkage and hired a consultant to conduct an independent study of the weigh-over data. The WGEA study concluded that there were large, unexplainable variations in weight losses from elevator to elevator.

The 1993 CGC study suggested that because shrinkage allowances were applied across the board, and because actual shrinkage was quite variable from elevator to elevator, many producers were being assessed more shrinkage than was warranted. It was suggested that lowering the maximums would bring the weight deductions closer to actual weight losses, on average. However, as the WGEA study pointed out, the variability in the results showed that a number of elevators would experience weight losses greater than the allowable shrinkage allowances. The CGC ultimately decided not to lower shrinkage allowances for primary elevators at that time.

### **Shrinkage in Other Countries and/or Industries**

Shrinkage is a phenomenon that occurs during the handling of grain as well as during the handling of other commodities. As part of this review, the CGC investigated how other countries and other industries handle shrinkage deductions to determine if there are similarities in the regulation of shrinkage and/or in who absorbs the cost of

shrinkage. Table 2 includes information on how shrinkage is handled in the U.S. grain industry, the Australian grain industry, the Canadian livestock industry, the Canadian fertilizer industry, and the grocery industry. The table provides a brief description of how shrinkage is regulated in these industries and who absorbs the cost associated with shrinkage.

**Table 2: Shrinkage Deductions in Other Countries/Industries.**

<b>Country/Industry</b>	<b>Details</b>
United States Grain Industry	<ul style="list-style-type: none"> <li>• shrinkage deductions are not regulated by government</li> <li>• deductions are established by the industry and vary depending on the commodity</li> <li>• deductions may be quantity based or monetary based</li> <li>• the buyer or the seller may absorb the costs associated with shrinkage (this is not consistent throughout the industry)</li> </ul>
Australian Grain Industry – Bulk Handlers	<ul style="list-style-type: none"> <li>• shrinkage deductions are not regulated by government</li> <li>• in general, the buyer of the grain absorbs the costs associated with shrinkage loss (not the producer)</li> <li>• shrinkage deductions vary between bulk handlers</li> <li>• shrinkage deductions can vary from year to year and by commodity</li> </ul>
Canadian Livestock Industry	<ul style="list-style-type: none"> <li>• shrinkage is not regulated by government</li> <li>• shrinkage deductions do not have to be posted and companies can charge different rates to different producers (i.e. rates vary depending on producer reputation for delivery weight, distance to market, differences in classes or breed, conditions and handling during transportation)</li> <li>• producers absorb the costs associated with shrinkage</li> <li>• shrinkage is used as a competitive tool to attract livestock to facilities</li> <li>• producers are generally told what the shrinkage factor is ahead of delivery and can negotiate if they feel the deduction is too high</li> </ul>
Canadian Fertilizer Industry	<ul style="list-style-type: none"> <li>• shrinkage deductions are established by the industry and are not regulated</li> <li>• generally, fertilizer is weighed at the point of production as it is loaded into rail cars. It is unloaded at a warehouse and not weighed again until it leaves the warehouse. Warehouse operators can experience up to 0.5% shrinkage (this is absorbed by the fertilizer company). Any shrinkage over 0.5% is the responsibility of the warehouse operator</li> <li>• shrinkage is not deducted on direct customer deliveries because these deliveries are purchased on the basis of the load weight of the product (not the unload weight). Therefore the buyer is responsible for any losses due to shrinkage</li> </ul>
Grocery Industry	<ul style="list-style-type: none"> <li>• shrinkage is not regulated and is considered to be a</li> </ul>

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- cost of doing business
  - shrinkage is absorbed by the store owner and passed on to the buyer through higher prices
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It appears that shrinkage is largely self-regulated in the American and the Australian grain industries as well as in other industries. There is very little input from government in establishing maximum shrinkage allowances or in establishing the basis on which shrinkage should be deducted. The examples cited above show that there is also no consistency in who absorbs the costs associated with shrinkage. In some cases, the handler and/or buyer of the product appear to absorb the cost associated with shrinkage (i.e., Australian grain industry, grocery industry). These costs may be passed back to producers indirectly through lower prices or some other means. In other cases, it appears the costs are absorbed directly by producers (Canadian livestock industry, fertilizer industry, and Canadian grain industry).

## **ANALYSIS OF THE PRIMARY ELEVATOR WEIGH-OVER DATA**

This section includes an overview of the methodology used to analyze the primary elevator weigh-over data and a summary of the results. For further information and an in-depth discussion on the data, methodology, and results please see Appendix 1.

### **Methodology**

The data set used for this analysis consists of nine years of primary elevator weigh-over records from crop years 1990/91 through 1998/99. While weigh-over information is reported for wheat, durum wheat, oats, barley, and rye, these grains are grouped together for the purpose of this analysis and referred to as “cereals”. This is done because blending may occur between cereal grains which makes it difficult to determine separate gross weight losses for each individual cereal. Weigh-over data for flaxseed, canola, mustard, peas, lentils, sunflowers, and corn were also examined. However, the weigh-over data for corn, lentils, mustard, and sunflower are limited and therefore the results are not included in this analysis.

The primary elevator weigh-over reports are used to determine if primary elevator licensees experience overages or shortages. An overage occurs if the shipments plus grain in-store at the time of the weigh-over (cut-off period) is greater than what the elevator received plus had in store at the time of the previous weigh-over. A shortage occurs if the shipments plus grain in-store at the cut-off period is less than what was received and was in store at the time of the previous cut-off period.

The primary elevator receipt data provided in the weigh-over reports indicates receipt weights after the shrinkage allowance has been deducted. The actual tonnes received at an elevator are calculated by adding back the estimated shrinkage tonnes to the weights reported in the weigh-over reports. The shrinkage tonnes are estimated by assuming that primary elevators deduct the maximum straight grade shrinkage allowances (as per Schedule X of the Regulations).

The actual gross weight loss (GWL) during the handling period is estimated using the following formula:



Actual GWL = [actual gross tonnes received at primary elevator + grain in store at the time of the previous weigh-over] – [shipments + grain currently in store].

The actual gross weight loss for each grain is compared to the actual gross tonnes received for the same grain to determine an actual loss percentage using the following formula:

$$\text{Actual Loss Percentage} = [\text{actual GWL (tonnes)} / \text{actual gross tonnes received}] \times 100$$

The actual loss percentage shows the shrinkage allowance that is required during the same period to offset the actual gross weight loss experienced during the handling period.

The weigh-over data set is analyzed by grain group, by individual elevator, by company, and by year over each of the nine years to identify the actual GWL and the actual percentage loss experienced in the primary elevator sector. Individual data points are used when calculating the overall results because an analysis of yearly averages can mask the variation in data.<sup>1</sup>

## Results

The results presented in this discussion paper are based on an analysis of all primary elevator weigh-over records for crop years 1990/91 through 1998/99. The paper includes a brief summary of the results from the statistical analysis. Appendix 1 includes the numerical results from the analysis and an in-depth discussion of the results.

The statistical analysis of the primary elevator weigh-over data set indicates that both weight losses and gains are occurring at primary elevators across western Canada (i.e., elevator “A” lost, while elevator “B” gained). The data set also indicates that individual elevators experience differences in gross weight losses and gains from year to year (i.e., elevator “A” had a loss one year and a gain the next). Some elevators consistently report gains while other elevators consistently report losses. However, the majority of elevators report both gains and losses through the 1990/91 to 1998/99 period. The weigh-over reports also show that the magnitude of the gains and losses varies by elevator with some elevators reporting smaller gains and losses than other elevators.

The data set shows that gross weight losses and gains are not company dependent. In other words, one company does not consistently experience only gains or losses nor does any one company experience gains or losses that differ significantly in magnitude from the gains and losses experienced by other companies. All companies report gains and losses across elevators and across years, and all companies experience a large degree of variability in their gross weight losses and gains especially for cereals and canola.

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<sup>1</sup> The overall results generated in this report are based on an analysis of all weigh-over reports received by the CGC during the study period. In other words, the overall results are not based on an analysis of yearly averages. An overall analysis of yearly averages does not take into account the variation seen in the yearly data.

The actual loss percentage results represent the actual gross weight loss or gain as a percentage of actual (total) elevator receipts. In isolation of all other factors that can impact on weigh-over results, if shrinkage allowances are set properly, the allowances should match the actual loss percentages experienced by the elevators.

Table 3 shows the percentage of primary elevator elevators that reported losses and gains during the 1990/91 through 1998/99 period. For example, in 1990/91, 35.45 percent of primary elevators that filed weigh-over reports with the CGC reported a gross weight loss for cereals while 64.55 percent of elevators reported a gross weight gain. It appears that the number of elevators reporting losses over the past 9 years has increased for cereals, flax, and canola. The number of elevators reporting losses in the handling of peas appears to have remained fairly consistent over the past 9 years with a significant decrease in losses during 1997/98 and 1998/99.

**Table 3: Percentage of Elevators Reporting Losses and Gains By Year By Grain.**

	Cereals		Flax		Canola		Peas	
	Losses (%)	Gains (%)	Losses (%)	Gains (%)	Losses (%)	Gains (%)	Losses (%)	Gains (%)
1990/91	35.45	64.55	41.41	58.59	56.97	43.03	65.67	34.33
1991/92	40.69	59.31	37.99	62.01	59.68	40.32	70.50	29.50
1992/93	43.20	56.80	44.73	55.27	59.41	40.59	62.14	37.86
1993/94	44.40	55.60	52.99	47.01	63.42	36.58	67.63	32.37
1994/95	43.77	56.23	51.67	48.33	65.70	34.30	69.86	30.14
1995/96	48.66	51.34	55.32	44.68	70.32	29.68	68.52	31.48
1996/97	49.94	50.06	50.00	50.00	66.76	33.24	67.97	32.03
1997/98	53.27	46.73	55.00	45.00	67.22	32.78	59.35	40.65
1998/99	50.09	49.91	49.49	50.51	68.57	31.43	55.46	44.54
Overall	45.24	54.76	48.83	51.17	64.14	35.86	64.12	35.88

Overall, the actual loss percentage calculations (See Table 4 Appendix 1) indicate that, if the shrinkage allowance was set at 0.15 percent for canola and 0.31 percent for peas, 50 percent of primary elevators would have experienced a gross weight loss (shortage) and 50 percent of primary elevators would have experienced a gross weight gain (overage) over the past nine years. The data for flax and cereals indicate that half of the primary elevators experienced gross weight gains of more than 0.02 percent while half of the elevators experienced gross weight gains of less than 0.02 percent. Therefore, according to the primary elevator weigh-over data, less than half of the primary elevators would experience a gross weight loss for cereals and flax if the shrinkage allowances for these grains were set to zero.

Overall, the analysis indicates that there is a high degree of variability in the gains and losses reported in the primary elevator weigh-over reports. This indicates that there is a high degree of variability in the actual gains and losses experienced at different elevators across western Canada.

## Conclusions

The primary elevator weigh-over data set indicates that elevators experience both weight gains and weight losses after straight grade shrinkage allowances have been taken into account. In addition, the data set shows that there is considerable variation in the gains and losses experienced between elevators as well as at individual elevators on a year to year basis. The majority of elevators experienced both gains and losses throughout the nine year study period.

The variation in gains and losses could be due to numerous factors including, but not limited to, the following:

- differences in efficiencies between primary elevator facilities,
- primary elevator facilities may have upgraded from “traditional” facilities to high throughput facilities during the study period,
- primary elevator facilities may have added cleaning equipment and may be cleaning significant quantities of grain which will affect weigh-over statistics,
- blending activities may be occurring which may affect the weigh-over statistics
- different operating practices,
- possible scale problems at primary elevators,
- possible differences in scale calibrations and monitoring between primary and terminal elevators could affect gains and losses reported by primary companies at the time of weigh-over reporting, and
- there may be variations or errors in how elevator managers are completing the weigh-over reports that could affect the statistics.

All of the above factors impact on weigh-over results and contribute to the gain and loss statistics. The fact that the impact of these variables cannot be isolated and captured in the analysis and/or primary elevator weigh-over data makes it impossible to set shrinkage allowances on the basis of weigh-over results.

## OPTIONS

The following options with respect to primary elevator shrinkage allowances have been identified by the CGC for discussion purposes. Each option includes a brief explanation and some discussion points. The CGC welcomes comments on any of the following options or on any other options that you feel may be feasible.

- 1) Status quo - retain primary elevator shrinkage allowance maximums in the Regulations.
  - This option recognizes that shrinkage occurs at primary elevators and compensates primary elevator operators for the loss in weight of grain that occurs from the time they receive the grain from producers to the time that it is unloaded at a terminal elevator (or other destination).
  - Shrinkage deductions remain visible to producers and are not hidden in handling tariffs.
  - Some producers feel that elevator operators “exploit” the maximum shrinkage allowances and deduct the maximums regardless of what their actual losses are.

- Shrinkage allowances have traditionally been established for an entire elevator class. Because primary elevators may be experiencing different levels of shrinkage depending on their type of facility and/or operations, primary elevator operators may be deducting more or less than they need to cover actual weight losses when they deduct the maximum shrinkage allowances.
  - The primary elevator weigh-over data set indicates that there is a large degree of variability in the gains and losses that primary elevators experience. It appears that setting maximum shrinkage allowances applicable to all primary elevators using the primary elevator weigh-over data to determine actual weight loss may no longer be appropriate due to changes that have occurred in recent years in the primary elevator sector.
  - The weigh-over data set indicates that the current maximums may be set at levels higher than necessary to cover “average” weight losses. However, it is important to note that the “average” weight loss indicated by the analysis of the reported weigh-over data is made up of both weight gains and losses. There is a large degree of variability in the weight loss/gain information that is ignored when looking at “averages”.
  - There has been tremendous growth in the production of pulses and specialty crops in western Canada over the past 10 years. Currently, these grains fall into the “other grains” category in Schedule X to the Regulations. All grains in this category have a maximum shrinkage allowance of 1.0 percent. Comments received suggest that the “other grains” category is too broad and that grains in this category should not be grouped with respect to maximum shrinkage allowances.
  - The CGC currently regulates maximum shrinkage allowances at primary elevators. In contrast, the CGC has not established maximum shrinkage allowances for licensed grain dealers nor process elevators.
- 2) Deregulate shrinkage at primary elevators and allow primary elevator licensees to establish their own shrinkage deductions, with no maximums established in the Regulations.
- This option could result in four possible outcomes:
    - a) primary elevator companies may eliminate shrinkage deductions in response to producer demands,
    - b) competition between primary elevators may drive shrinkage deductions to levels which are lower than the current maximums,
    - c) competition may keep shrinkage deductions at levels close to the current maximums, or
    - d) deregulation may result in shrinkage deductions which are higher than the current maximums.
  - This option allows primary elevator operators to adjust their shrinkage deductions based on actual operating experience. For example, high throughput facilities may experience different levels of shrinkage than “traditional” primary elevator facilities. This option also gives operators the flexibility to establish different levels of shrinkage for different grains based on actual experience.
  - The onus would be on producers to ensure that they are informed about shrinkage deductions before delivery. Producers could factor shrinkage deductions into their choice of delivery location.

- The CGC can decide to re-establish (or set to zero) the maximum shrinkage allowances in the Regulations if competition does not keep shrinkage deductions at a reasonable level. However, currently there does not appear to be consensus between producers and the industry as to what is reasonable.
  - If primary elevator companies eliminate shrinkage deductions or if competition drives deductions to levels lower than actual weight losses, companies may raise tariffs to recover losses.
  - It is expected that grain dealers and process elevators will mirror the actions of primary elevators in order to remain on the same playing field.
- 3) Set all maximum shrinkage allowances, including tough and damp, for primary elevators to zero.
- This is still a form of shrinkage regulation. Elevators would not be able to set shrinkage at the levels required to recoup losses. However, the minimization of these losses is within the control of the primary elevator operator.
  - Setting shrinkage allowances to zero can either reduce revenue at primary elevators or shift the primary elevator revenue source from shrinkage deductions to elevator tariffs.
  - Producers would no longer see a shrinkage deduction when they delivered their grain to a primary elevator.
  - Some producers support this option and feel that elevators should include losses due to shrinkage in their handling tariffs.
  - Some producers feel that once grain is delivered, they should no longer be responsible for the grain and they should not bear the costs of weight losses experienced by the elevator company.
  - It appears that fewer than 50 percent of primary elevators will experience a loss due to shrinkage in cereals and flax if the maximum shrinkage allowances for these grains are set to zero. However, it appears that more than 50 percent of primary elevators will experience a loss due to shrinkage if the shrinkage allowances for canola and peas are set to zero.
  - Continued regulation of primary elevator maximum shrinkage allowances by setting the maximums to zero decreases the flexibility of elevator operators and limits their options with respect to recovering costs associated with shrinkage.
  - If this option is implemented, it will result in demands to bring the shrinkage allowances deducted by grain dealers and process elevators down to zero. If this does not occur through market competition, the Commission could make a regulation imposing zero shrinkage on these facilities.

## APPENDIX 1

### Analysis of the Primary Elevator Weigh-Over Data

This appendix includes an in-depth discussion of the data and methodology used to analyze the primary elevator weigh-over data. In addition, the numerical results from the statistical analysis are presented.

#### DATA

Primary elevator operators are required to submit weigh-over reports to the CGC not less than once every three years as outlined in paragraph 60(1)(a) of the Canada Grain Regulations (the Regulations). The data used for this analysis consists of nine years of primary elevator weigh-over records from crop years 1990/91 through 1998/99. The study period was limited to these nine years due to the fact that shrinkage allowances were revised effective August 1, 1990, and crop year 1998/99 was the last full year of data available in the Canadian Grain Commission (CGC) database system.

The primary elevator weigh-over reports include data on primary elevator gross receipts after shrinkage has been deducted, gross shipments, grain in-store at the time of the last weigh-over, and grain currently in-store for each crop handled. The gross receipt weight is determined by the primary elevator operator at the time of delivery to the elevator using primary elevator weigh scales. The gross shipment weight is determined based on the weight at unload (at terminal, transfer, or process elevators) using the unload facility scales. The primary elevator weigh-over data is used to determine if primary elevators experience overages or shortages. An overage occurs if the shipments plus grain in-store at the time of the weigh-over (cut-off period) is greater than what the elevator received plus had in store at the time of the previous weigh-over period. A shortage occurs if the shipments plus grain in-store at the cut-off period is less than what was received and was in store at the time of the previous cut-off period.

Table 1 provides an example of the information provided in a primary elevator weigh-over report and shows how overages and shortages are calculated. For example, if 50 tonnes more gross weight is shipped and in store at the end of the weigh-over period than the amount the elevator recorded as receipts and had in store at the beginning of the weigh-over period, the elevator will report a gross overage.

**Table 1: Example of the Information Provided in a Primary Elevator Weigh-over Report and the Calculation of Overages and Shortages.**

	Overage Example (Tonnes)	Shortage Example (Tonnes)
In store previous cut-off	100	100
Receipts	200	200
<b>Total</b>	<b>300</b>	<b>300</b>
Shipments	250	150
In store current cut-off	100	100
<b>Total</b>	<b>350</b>	<b>250</b>
Overage	50	-
Shortage	-	50

While weigh-over information is reported for wheat, durum wheat, oats, barley, and rye, these grains are grouped together for the purpose of this analysis and referred to as “cereals.” Blending may occur between these grains, which makes it difficult to determine separate gross weight losses for each individual cereal grain. Weigh-over data on flaxseed, canola, mustard, peas, lentils, sunflowers, and corn was also examined. However, the weigh-over data for corn, lentils, mustard, and sunflower is limited and the results are not included in this report.

## **METHODOLOGY**

The primary elevator receipt data provided in the weigh-over reports indicates receipt weights after the shrinkage allowance has been deducted. The actual tonnes received at an elevator are calculated by adding back the estimated shrinkage tonnes to the weights reported in the weigh-over reports. The shrinkage tonnes are estimated by assuming that primary elevators deduct the maximum shrinkage allowances for straight grades (as per Schedule X of the Regulations).

$$\text{Shrinkage Tonnes} = \frac{\text{actual gross tonnes received at primary elevator} \times \text{maximum shrinkage allowance}}{\text{maximum shrinkage allowance}}$$

This calculation utilizes straight grade shrinkage allowances because the weigh-over data does not contain details on moisture content at delivery. In other words, it is assumed that the grain was dry at delivery.

The actual gross weight loss (GWL) during the handling period is estimated using the following formula:

$$\text{Actual GWL} = [\text{actual gross tonnes received at primary elevator} + \text{grain in store at the time of the previous weigh-over}] - [\text{shipments} + \text{grain currently in store}]$$

The actual gross weight loss for each grain is compared to the actual gross tonnes received for the same grain to determine an actual loss percentage using the following formula:

$$\text{Actual Loss Percentage} = \frac{[\text{actual GWL (tonnes)} / \text{actual gross tonnes received}] \times 100}{1}$$

The actual loss percentage shows the shrinkage allowance that is required during the same period to offset the actual gross weight loss experienced during the handling period.

The weigh-over data is analyzed by grain group (cereals formed one group and all other grains are treated as single groups respectively), by individual elevator, by company, and by year over each of the nine years to identify the actual GWL and the actual percentage loss experienced in the primary elevator sector. Individual data points are used when calculating the results because an analysis of yearly averages can mask the variation in data.

## RESULTS

### Actual Gross Weight Loss

Table 2 provides a summary of the actual gross weight loss statistics in tonnes per elevator over the nine year period. This data shows that over the nine year period there is an average gross weight loss for cereals, flax, canola, and peas (based on the weighted average mean). It is important to note that the mean is made up of both gains and losses. The median indicates that 50 percent of elevators reported a weight gain in cereals of more than 4.49 tonnes per elevator, 50 percent of elevators reported a weight gain in flax of more than 0.03 tonnes per elevator, 50 percent of elevators reported a weight loss in canola of more than 2.56 tonnes per elevator, and 50 percent of elevators reported a weight loss in peas of more than 0.62 tonnes per elevator.

The weigh-over data indicate that there are both weight losses and gains occurring at primary elevators. The standard deviations indicate that there is a large degree of variability in gross weight losses and gains especially for cereals and canola. While some primary elevators consistently report gains and other elevators consistently report losses, the majority of elevators report both gains and losses during 1990/91 through 1998/99 period. The weigh-over reports also show that the magnitude of the gains and losses varies by elevator with some elevators reporting smaller gains and losses than other elevators. It appears that high throughput elevators experience greater losses than “traditional” primary elevators. This could be due to cleaning activities and the removal of screenings from the grain.

**Table 2: Summary of Actual Gross Weight Loss or Gain by Crop (all years).**

Crop (number of data points)	Mean (tonnes/elevator)	Median (tonnes/elevator)	Standard Deviation (tonnes/elevator)
Cereals (7674 data points)	-12.42	+4.49	291.46
Flax (5424 data points)	-1.09	+0.03	29.99
Canola (6620 data points)	-44.80	-2.56	754.04
Peas (2740 data points)	-2.67	-0.62	23.95

Note: Negative numbers represent weight losses. Positive numbers represent weight gains. The mean is a weighted average and is calculated so that each elevator’s gain/loss performance is multiplied by its total receipts to assess its “relative” importance. The median is identified by listing the gains and losses in order from the most positive to the most negative. The median is the middle of the list. The standard deviation measures how widely the values are dispersed from the average. The number of data points is the number of primary elevator weigh-over reports that included information on the specific crop during crop years 1990/91 through 1998/99.

The data show that gross weight loss is not grain company dependent. In other words, one company does not consistently experience only gains or losses, nor does any one company experience gains or losses that differ significantly in their magnitude from the gains and losses experienced by any other company. All companies report gains and losses across elevators and there is a large degree of variability in the gains and losses experienced.



## Actual Loss Percentage

The actual loss percentage results show the actual gross weight loss or gain as a percentage of actual elevator receipts. In isolation of all other factors that can impact on weigh-over results, if shrinkage allowances are set properly, the allowances should match the actual loss percentages experienced by elevators.

Table 3 shows the percentage of elevators that reported losses and gains during the 1990/91 through 1998/99 period. For example, in 1990/91, 35.45 percent of elevators that filed weigh-over reports with the CGC reported a gross weight loss for cereals while 64.55 percent of elevators reported a gross weight gain. It appears that the number of elevators reporting losses over the past 9 years has increased for cereals, flax, and canola. The number of elevators reporting losses in the handling of peas appears to have remained fairly consistent over the past 9 years with a significant decrease in losses during 1997/98 and 1998/99.

**Table 3: Percentage of Elevators Reporting Losses and Gains By Year By Grain.**

	Cereals		Flax		Canola		Peas	
	Losses (%)	Gains (%)	Losses (%)	Gains (%)	Losses (%)	Gains (%)	Losses (%)	Gains (%)
1990/91	35.45	64.55	41.41	58.59	56.97	43.03	65.67	34.33
1991/92	40.69	59.31	37.99	62.01	59.68	40.32	70.50	29.50
1992/93	43.20	56.80	44.73	55.27	59.41	40.59	62.14	37.86
1993/94	44.40	55.60	52.99	47.01	63.42	36.58	67.63	32.37
1994/95	43.77	56.23	51.67	48.33	65.70	34.30	69.86	30.14
1995/96	48.66	51.34	55.32	44.68	70.32	29.68	68.52	31.48
1996/97	49.94	50.06	50.00	50.00	66.76	33.24	67.97	32.03
1997/98	53.27	46.73	55.00	45.00	67.22	32.78	59.35	40.65
1998/99	50.09	49.91	49.49	50.51	68.57	31.43	55.46	44.54
Overall	45.24	54.76	48.83	51.17	64.14	35.86	64.12	35.88

Table 4 shows the median value (the midpoint of a data set) for the actual percentage loss/gain data over each of the nine years. The actual loss percentage shows the shrinkage allowance that would be required to offset the actual gross weight loss experienced during the handling period. For example, in 1990/91 the median value for cereals was 0.06 percent gross weight gain. This indicates that half of the reporting elevators had gains of more than 0.06 percent while half of the reporting elevators had weight gains of less than 0.06 percent.

The table shows that overall, if the shrinkage allowance was set at 0.15 percent for canola and 0.31 percent for peas, 50 percent of primary elevators would have experienced a gross weight loss (shortage) and 50 percent of primary elevators would have experienced a gross weight gain (overage) over the past nine years. The results for flax and cereals indicate that half of the primary elevators experienced weight gains of more than 0.02 percent while half of the elevators experienced weight gains of less than 0.02 percent. Therefore, according to the primary elevator weigh-over data, less than half of the primary elevators would experience a gross weight loss for cereals and flax if the shrinkage allowances for these grains were set to zero.

**Table 4: Median – Actual Loss/Gain Percentage**

	Cereals (percent)	Flax (percent)	Canola (percent)	Peas (percent)
1990/91	+0.06	+0.18	-0.06	-0.61
1991/92	+0.03	+0.19	-0.09	-0.87
1992/93	+0.03	+0.07	-0.12	-0.26
1993/94	+0.03	-0.06	-0.14	-0.27
1994/95	+0.03	-0.03	-0.16	-0.35
1995/96	+0.01	-0.08	-0.21	-0.39
1996/97	0.00	-0.00	-0.18	-0.42
1997/98	0.02	-0.08	-0.17	-0.27
1998/99	0.00	+0.01	-0.18	-0.08
Overall Median	+0.02	+0.02	-0.15	-0.31

Note: Negative numbers represent percentage losses. Positive numbers represent percentage gains. The median is the middle value of a set of numbers arranged in order of magnitude. In other words, half of the values in the data set are greater than the median and half of the values in the data set are less than the median.

Frequency distributions are used to distribute the data into classes or categories to determine the number of observations belonging to each class. Table 5 shows the range of data where the upper and lower 10 percent of observations have been removed. Approximately 80 percent of the data points fall within these ranges. In other words, 80 percent of elevators experience gains and losses within this range. For example, for cereals approximately 80 percent of elevators reported gains of less than 0.35 percent and losses of less than 0.30 percent over the nine year study period.

**Table 5: Range where the Upper and Lower 10 Percent of Observations are Eliminated.**

	Cereals (percent)	Flax (percent)	Canola (percent)	Peas (percent)
1990/91	+0.35 to -0.20	+2.5 to -2.5	+0.75 to -1.0	+2.5 to -5.0
1991/92	+0.30 to -0.20	+2.5 to -2.5	+0.75 to -1.0	+2.5 to -10.0
1992/93	+0.35 to -0.25	+2.5 to -2.5	+0.75 to -1.0	+2.5 to -2.5
1993/94	+0.40 to -0.25	+1.0 to -2.5	+0.75 to -1.0	+1.0 to -2.5
1994/95	+0.40 to -0.25	+1.0 to -2.5	+0.50 to -1.0	+1.0 to -2.5
1995/96	+0.40 to -0.35	+1.0 to -2.5	+0.50 to -1.0	+1.0 to -2.5
1996/97	+0.40 to -0.40	+2.5 to -2.5	+0.50 to -1.0	+1.0 to -2.5
1997/98	+0.40 to -0.40	+1.0 to -1.0	+0.45 to -0.75	+2.5 to -2.5
1998/99	+0.40 to -0.75	+1.0 to -2.5	+0.50 to -1.0	+2.5 to -2.5
Over All Crop Years	+0.35 to -0.30	+2.5 to -2.5	+0.75 to -1.0	+2.5 to -2.5

Note: Negative numbers represent percentage losses. Positive numbers represent percentage gains.

Overall, the primary elevator weigh-over data indicates that there is a high degree of variability in the actual gains and losses experienced at different elevators (after shrinkage allowances have been taken into account). The variation in gains and losses could be due to numerous factors, including but not limited to the following:

- differences in efficiencies between primary elevator facilities,
- primary elevators may have upgraded from “traditional” primary elevators to high throughput facilities during the study period,

- primary elevators may have added cleaning equipment and could be cleaning significant amounts of grain which will affect the weigh-over statistics,
- blending activities may be occurring which may affect the weigh-over statistics,
- different operating practices,
- possible scale problems at primary elevators,
- differences in scale calibrations between primary and terminal elevators that could affect losses and gains, and
- variations in how elevator managers are completing the weigh-over reports.

These factors, as well as others, have an immeasurable impact on weigh-over data. Due to this, it is impossible to use weigh-over data as a basis for recommending optimal maximum shrinkage allowances for primary elevators.