

**A Review of
The Canadian Wheat Board
Benchmarking Methodology**

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A Review of
Dr. Richard Gray's
CWB Benchmarking Methodology

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Executive Summary

In 2000, the Canadian Wheat Board (CWB) commissioned Dr. Richard Gray of the University of Saskatchewan to develop a procedure for “benchmarking” the performance of the Canadian Wheat Board (CWB). Gray defined his goal as the creation of “meaningful benchmarks that will measure the performance of the CWB relative to a market where multiple sellers exist.” In his final report, he defined “performance” as “net farmgate prices received by Canadian farmers under single desk selling versus the net farmgate prices Canadian farmers would have received under identical conditions if the CWB did not exist.” The U.S. marketing, transportation and handling system was assumed to provide the appropriate benchmarks against which to measure CWB performance.

The general concept of comparing Canadian grain marketing to U.S. grain marketing – particularly in the Northern Plains – is accepted as a relevant comparison. The issue becomes one of ensuring that proper prices are used and any adjustments made are relevant.

Gray’s methodology appears flawed in several respects. Overall, the conclusion that emerges is that Gray’s recommended benchmarking procedure is ill conceived and was not thoroughly researched. Use of this procedure to assess CWB performance would provide flawed results showing a greater benefit of the CWB system than what we feel more appropriate procedures would.

The first two benchmarks that Gray proposes are closely related. The first benchmark compares street prices. The second benchmark, which Gray calls “Logistics and Basis Performance,” involves comparing Canadian basis costs to American.

Dr. Gray’s selection of what should be included in the basis calculation for CWB grains in Canada is inconsistent and possibly arbitrary. For example, among others, Gray suggests including “blending rents” (we assume to mean grade gains) as part of the basis. However, Gray does not include weight gains (reduced dockage) or benefits derived from bundling of grain purchasing/handling with input sales and/or financing.

Gray has also made a major error by completely excluding storage and carrying (interest) costs, in both terminal and country positions, from his determination of CWB basis costs. In addition, he missed other line items in the pool accounts, such as additional freight (to terminals, movement to eastern port position, and freight rate changes), drying and the cost allocation of CWB hopper cars. He does not make it clear whether interest revenue is included as part of CWB administration or not.

Gray suggests adjustments to U.S. street prices and PNW port prices that in our opinion are not reasonable, given the nature of how grain is transacted. He is assuming that grain transactions take place below posted bid prices; it is our experience and that of others in the trade that we interviewed, that this simply is not a reasonable adjustment to make.

The methodology does not identify, or fully assess the ramifications of the CWB's interest income nor does it cover the issue of the government policy that provides the CWB with relief of bad debt costs. Gray also applies certain costs to the U.S. calculations that should also apply to Canadian prices, such as market development costs and industry "check offs".

In determining U.S. basis and elevation charges, Gray used improper discounts (example, single-car or 25-car rates instead of 52 or 104-car rates). In addition, whereas Gray did not include storage and carrying costs in the Canadian calculations, he assumed he was being consistent by not factoring these costs in his U.S. calculation. However, Gray did not understand that these costs are implied in the variable basis levels seen in the U.S. and are therefore included.

The third benchmark has many of the same errors and omissions as the first two. Firstly, Gray is unclear as to the U.S. port prices to be used; although he writes "FOB" prices, in many places what he describes are "track prices". In addition, Gray is silent on how grain is priced as it moves through the terminals in the PNW, what a true FOB value is, and how the terminals earn revenue; these are all very important aspects of the value and/or price of grain in the PNW and should be clearly described in order to properly compare it to Canadian prices.

This benchmark is further damaged by the suggestion that the CWB deliberately "shorts" the high quality market by diverting a proportion of high quality wheat away from the quality sensitive market, thus reducing the available volume of the high quality product and forcing up its price. Since the CWB actions support high quality wheat prices in Canada, Gray (and the CWB) surmises that U.S. prices are also supported. The theory continues that in the absence of the CWB, this price support would disappear and U.S. prices would drop. Therefore, U.S. prices (port and street prices, it is assumed) should be reduced accordingly. We conclude that there is no theoretical or actual evidence that supports this theory.

Gray's benchmark misses an important aspect of marketing performance. The time that sales are made throughout the crop year can have a dramatic impact on the ultimate performance of any marketing organization. Any measure of CWB performance should include a benchmark addressing how well the CWB marketed grain relative to the market values experienced – or presented to the CWB – during a particular crop year.

Measuring marketing performance for any organization should include a measure of total returns, not isolated to unit price. In other words, volumes sold relative the tonnage available should also be benchmarked. Measurements that could be developed include

benchmarks relating CWB sales volumes to total available stocks (carry in plus production), analysis of the CWB's share of the global wheat market (total market, high quality market, and others), or a combination of these or others.

The major conclusion that flows from the analyses in this report is that applying Gray's methodology would significantly overvalue the Canadian Wheat Board's performance, and hence, if the procedures were to be used as an indicator of the benefits of single desk selling to farmers, these benefits would also be overstated. Gray's methodology contains a number of errors and omissions that would give rise to this overvaluation, some of which can be quantified, and some that cannot.

The net return to the farmer is the key measurement of CWB performance, and the quantifiable overstatement of the benefit to the farmer through the use of Gray's benchmark is substantial and material. In the event that the CWB used Gray's methodology in determining its published benchmarks, it can be argued that the quantifiable errors and omissions in the benchmark would more than negate the claimed benefits calculated by the CWB. However, it is unknown how the CWB employed Gray's benchmark methodology.

A Review of Dr. Richard Gray's CWB Benchmarking Methodology

1. Introduction

In 2000, the Canadian Wheat Board (CWB) commissioned Dr. Richard Gray of the University of Saskatchewan to develop a procedure for “benchmarking” the performance of the Canadian Wheat Board (CWB). To begin this work, Dr. Gray had four papers prepared, one by himself, and the other three respectively by Dr. Dave Buschena of Montana State University, Dr. Troy Schmitz of Arizona State University and Dr. Jim Vercammen of the University of British Columbia. These reports laid out various approaches that could be taken towards the benchmarking task.

In his own initial paper, Gray defined his goal as the creation of “meaningful benchmarks that will measure the performance of the CWB relative to a market where multiple sellers exist.”¹ In his final report, he defined “performance” as “net farmgate prices received by Canadian farmers under single desk selling versus the net farmgate prices Canadian farmers would have received under identical conditions if the CWB did not exist.”²

Gray distributed his initial paper with the other three to industry and farm groups for their critical evaluation, and on December 10, 2000, conducted a one-day seminar with academics, consultants, farmers and industry representatives to provide feedback on the four discussion papers. Gray developed his benchmarking proposals from the four initial papers, taking into account the input he received – written and verbal – from these consultations.

Gray completed his work over the following five months, delivering his final report to the CWB on June 5, 2001. His report consisted of two documents. The first was a 22 page report which described the process he had followed in developing his proposed benchmarks, and gave a qualitative description of the benchmarks he was recommending to be applied by the CWB. The second was a 17 page Appendix describing the proposed benchmarking procedures in more detail. For purposes of this analysis, the Appendix is the more substantive document, containing tables that show the data that is to be collected, and the calculations that are to be performed on the data, in order to implement the proposed benchmarking procedures. A description of Gray's recommended process follows.

¹ Richard Gray, “Report 1: An Introduction and Overview of a Proposed CWB Benchmark Process,” 2000, p. 2.

² Richard Gray, “Benchmarks to Measure CWB Performance – Recommendations,” June 2001, p. 1.

1.1 Gray's Recommended Benchmarking Procedures

Gray's primary recommendation was that the CWB develop three forms of performance benchmark: i) CWB marketing performance benchmarks, ii) Grain handling and transportation benchmarks, and iii) farm level performance benchmarks.³

For each of these benchmarks, Canadian grain prices and costs would be compared with corresponding American grain prices and costs, in the following manner:

1. To benchmark marketing performance, the "adjusted U.S. port price" would be compared with the "CWB fob port price received."
2. To benchmark grain handling and transportation costs, "Canadian seasonal elevator to port basis charges" would be compared with U.S. seasonal basis charges."
3. An overall benchmark (corresponding to the "farm level performance" measurement) would be established by comparing a "Canadian Street price" with an "adjusted US Street price."⁴

The American marketing, transportation and handling system was assumed to provide the appropriate benchmarks against which to measure CWB performance because of the likelihood that "our grain marketing system would develop in nature similar to the US, if the CWB were eliminated."⁵ In other words, U.S. market prices (with adjustments) were generally regarded as reasonable proxies for the Canadian market without the CWB.

Recommendations 1 and 2 defined the three benchmarks, together with the basic approach to be taken for each, as described above. Gray then went on to make eight additional recommendations, fleshing out the proposed benchmarking procedures and adding further detail. The first seven of these added recommendations are as follows:

- that the benchmarking procedures include performance measures other than price (recommendations 3, 7 and 8);
- that the local elevator bid prices be taken as farm gate prices (in other words that farm to elevator transportation costs be ignored) (recommendation 4);
- that adjustments be made in the eastern prairies to reflect the proximity of the Minneapolis market (recommendation 5);
- that monthly series of basis charges be developed (recommendation 6);
- that prices be adjusted for carrying costs (recommendation 9).

³ Gray, "Recommendations," p. 13.

⁴ *Ibid.*, p. 14.

⁵ *Ibid.*, p. 14.

In describing these additional recommendations in the body of the report, Gray does not fully explain how each is to be implemented. Some (but not complete) detail is added in the Appendix.

The last recommendation was that US benchmark prices should be adjusted to reflect the impact of CWB sales strategies, which are stated to include the diversion of high quality supplies into low quality markets (in order to support the high quality markets). Gray suggests this CWB strategy supports US as well as Canadian prices and therefore, US prices should be adjusted lower to reflect a “non-CWB” environment.⁶ This recommendation is addressed in more detail in Section 3.2 below.

1.2 Comparison with Earlier Studies

Gray’s study is the most recent in a series of reports, spanning several years, each of which attempted to compare how well the CWB performed relative to American marketers, and how the final prices paid to Canadian farmers compared with prices received by their American counterparts. The three studies that have received the most attention are: a study commissioned by the Canadian Wheat Board done by Professors Daryl Kraft, Hartley Furtan and Ed Tyrchniewicz in January 1996 (*Performance Evaluation of the Canadian Wheat Board*), a study by Professors Al Loyns and Colin Carter in March, 1996 (*The Economics of Single Desk Selling of Western Canadian Grain*) and a third by the Organisation for Western Economic Cooperation (OWEC) in January, 1999 (*Grain Handling and Transportation Systems: A Canada-United States Comparison*). The studies differed in their approach and findings.

The study by Kraft *et al* looked at prices at port position, and compared prices received by the CWB at west coast ports (Vancouver and Prince Rupert) with quoted prices at U.S. ports in the Pacific Northwest (Seattle, Portland, etc) at comparable points in time. The study found that CWB prices exceeded American prices by C\$13.35 per tonne.

Both the Carter-Loyns study and the OWEC study looked at prices received by farmers on delivery into a country elevator. Both studies found that Canadian prices were lower than American. In summary, Carter-Loyns found that the “measurable costs of the single desk...could be as high as \$20 per tonne in any year for wheat.”⁷ The OWEC study measured price differences in farm prices, measured on delivery into country elevators, between selected points in Saskatchewan, North Dakota and Montana. The study reported on price differences for three time periods ranging from one to one year (1995-

⁶ All these recommendations are found in *ibid.*, pp. 13 - 18.

⁷ Carter-Loyns, p. 7

96) to 12 years (1984-85 to 1995-96) and found that Canadian farmers received between C\$7.31 to C\$36.28 per tonne less for their wheat than their American counterparts.⁸

Considering both port and street prices, the Gray benchmarking study attempts to follow both previous approaches, comparing Canadian to American prices at both locations. These studies however, including Gray's, failed to consider the impact of timing of sales within a crop year and its implications to marketing performance; selling at the lower prices within the range of prices within a crop year could easily wipe out any premiums captured relative to the US market on any given day. This is considered to be a major flaw in Gray's benchmark exercise and is addressed in detail in Section 3.3 below.

1.3 Initial Comments

The general concept of comparing Canadian grain marketing to U.S. grain marketing – particularly in the Northern Plains – used by Gray, is accepted as a relevant comparison. The issue becomes one of ensuring that proper prices are used and any adjustments made are relevant. Moreover, the proper determination or estimation of relevant costs is critical.

Although his general approach is acceptable, Gray's methodology, as is addressed in the subsequent sections of this report, appears flawed in several respects. Some of those flaws can be quantified and appear to contribute to an overstatement of the CWB system over a non-CWB system (using the US system as a proxy for the non-CWB system, as discussed above). Some of the flaws cannot be quantified but present a *prima facie* case that they too would cause a significant overstatement of the relative performance of the CWB system.

Overall, the conclusion that emerges from our evaluation is that Gray's recommended benchmarking procedure is ill conceived and has not been thoroughly researched or thought through. Use of this procedure – as presented – to assess CWB performance, would provide flawed results showing a greater benefit of the CWB system than what we feel more appropriate procedures would.

Considering Gray's specific recommendations, we have taken the following approaches:

- Recommendation 1: “*The CWB develop three forms of performance benchmark: i) CWB marketing performance benchmarks, ii) Grain handling and transportation benchmarks, and iii) farm level performance benchmarks.*”

We consider this to be a reasonable approach and do not take issue with it.

⁸ OWEC, p. vii. The larger figures were for a single year; the lower for the 12 year period, with values for the third time frame (1992 to 1996) lying between these extremes.

- Recommendation 2: *“The benchmarks should be based on price levels and charges within the U.S. system. Each performance benchmark would use the Canadian – US comparisons as follows:*
 - i. *Direct CWB marketing performance benchmark = adjusted fob port price versus CWB fob port price received.*
 - ii. *Grain handling and transport performance benchmarks = Canadian seasonal elevator to port basis charges would be the primary focus with comparisons to US seasonal basis charges.*
 - iii. *Overall performance benchmark = Canadian street price versus adjusted US street price.”*

We agree with this approach in principle. However, the key to this approach is to ensure (1) proper prices are used for comparisons and (2) any adjustments made are warranted and reasonable, based on evidence and logic.

- Recommendation 3: *“The benchmarks should also include performance measures other than price.”*

Although Gray suggests non-price benchmarks be determined and even cites an example – the effect the increase in the number of days of demurrage would have on long term customer demand – he does not address this further anywhere in his methodology. Therefore, we consider this issue to be moot and did not assess this factor further.

- Recommendation 4: *“Use the U.S. local elevator stated bid prices as the U.S. farm price unless there is empirical evidence to the contrary. If evidence to the contrary is found, then appropriate adjustments should be made.”*

Gray’s approach is to discount the street price to reflect what he calls “tradable” prices. We do not see any reason to discount street prices and address this in more detail in Section 2.1.3 below.

- Recommendation 5: *“US prices for the Eastern catchment area, should be adjusted to reflect the rail cost of closer distance to the Minneapolis market.”*

We assume that Gray is suggesting that US street price should be adjusted to reflect the fact that these points are closer to the Minneapolis market than the Canadian points being compared to. We feel this adjustment is unnecessary since the street prices will reflect this already. However, since Gray does not explain this further in his Appendix, we do not address this point elsewhere in this report.

- Recommendation 6: *“Establish a series of monthly average basis charges including port services in both Canada and the US from the specified delivery locations. In the US calculate these seasonal elevation charges as the difference between (1) the port cash price less the freight rate and (2) the elevator’s bid price to farmers. In Canada collect and report an average of all of the service charges and premiums paid to farmers based on cash tickets. Grain company blending revenue or grading premiums paid to producers would be estimated on an annual basis from the initial payments and port delivery grades.”*

Generally speaking we agree with the approach to compare basis charges. However, we do not agree with Gray on the details of his approach: detailed discussions are found in Section 2 of this report.

- Recommendation 7: *“As part of the Benchmarking exercise the CWB should publish a number of non-price indicators of the grain handling and transportation performance such as car turn around time, system throughput, shipment size, demurrage paid, despatch earned, and level of service complaints.”*

We do not disagree with this concept, however, it is not considered an integral part of the benchmarking exercise. Further, since Gray does not address this further, we do not as well.

- Recommendation 8: *“As part of the Benchmarking exercise the CWB should publish a number of non-price indicators of the level of service provided to farmers, including the frequency of use of all CWB marketing options, the average and variability in the timing of producer deliveries, and measures of producer satisfaction.”*

See comments regarding Recommendation 7 above.

- Recommendation 9: *“Prices used in the port price comparison should be adjusted for an appropriate cost of carry component for any period greater than 60 days forward. Differences in U.S. futures markets for specific dates could be used as a proxy of the commercial cost of carry relevant to the CWB contracts and deliveries.”*

Generally speaking, this appears to be reasonable. However, since Gray does not deal with this in any more detail, we cannot comment on the actual recommended execution.

- Recommendation 10: *“The US benchmark prices should be adjusted to reflect the impact the CWB sales may have on transportation premiums as well as grade and protein premiums for HRS wheat.”*

This is addressed in detail in Gray's Appendix. We take issue with the theory and approach to this component of the benchmark and address it in Section 3 of this report.

In addition to addressing Gray's benchmarking methodology on the basis of his recommendations, we also note a couple of errors of omission.

Firstly, it is our view that a comprehensive CWB performance benchmarking exercise must include a means to measure marketing performance relative to market opportunities. In other words, how did the Canadian wheat farmer fare relative to the prices experienced by the market during a given crop year. This relates to the timing of sales, or more precisely, the ability of the CWB to sell at the most opportune times of the crop year with respect to price. Comparing aggregate CWB sales levels (pool prices) with weighted average U.S. farmer marketings in a given crop year would provide a good measure of this. Gray does not address this issue at all. We address this in detail in Section 3 of this report.

Secondly, Gray does not address the issue of total returns to farmers, rather he simply looks at price. It is our view that farmers are ultimately interested in total returns and that both price and volume of sales should be measured.

2. Benchmarks One and Two

The first two benchmarks that Gray proposes are closely related. The first benchmark compares street prices – the prices received by Canadian farmers upon delivery of grain into a country elevator are compared with the corresponding prices received by American farmers at local US elevators. Canadian street prices for wheat can be constructed by deducting from the CWB’s “initial payment” at port, all the charges borne by farmers that are related to the costs (freight, handling, etc.) incurred in moving the grain from a country position to port. The costs incurred between the delivery of the grain into the country elevator and its arrival at an instore position at port are often referred to as “basis costs.” The second benchmark, which Gray calls “Logistics and Basis Performance,” involves comparing Canadian basis costs to American. Clearly the data required for Benchmark One is almost identical to that required for Benchmark Two. Because of the nearly identical nature of the information and approach, both Benchmarking procedures are discussed in this Section.

2.1 Benchmark One: Street Price Performance

The first of Dr. Gray’s proposed benchmarking procedures is to be applied at the county elevator level. The benchmark against which Gray proposes to measure the performance of the Canadian system is the street price available to American farmers for each U.S. grade of wheat that is comparable to a corresponding Canadian grade. For example, the realized price to a Canadian farmer at the primary elevator driveway for Number 1 Canada Red Spring Wheat with 13.5% protein (1 CWRS 13.5) would be compared (approximately) with the “benchmark” price at the U.S. country elevator driveway of Number 1 Dark Northern Spring wheat with a protein content of 14% (1 DNS 14). (Although the US grade has a higher stated protein content, protein levels on a dry matter basis are comparable.)

Gray further proposes that prices be compared across a wide range of grades. However, since as Gray points out, street prices are not usually quoted for a wide a range of grades (as they are at port position), he recommends using the port position price spreads between grades, and adding or subtracting these spreads from the street prices for which quotes are available to get street prices by grade.

The U.S. benchmark prices are to be compared with an equivalent set of street prices at comparable Canadian country points. In order to achieve this geographic equivalency, Gray recommends that price comparisons be made at three pairs of points, each containing one Canadian and one American country delivery point. The three matched pairs are:

- Glenboro, Manitoba and Bisbee, North Dakota
- Moose Jaw, Saskatchewan and Wolf Point, Montana

- Medicine Hat, Alberta and Rudyard, Montana

2.1.1 U.S. Street Price Determination

The proposed U.S. benchmark prices are available from several sources; Gray suggests using street prices as reported by DTN or Reuters. (Similar prices are also available from United States Department of Agriculture (USDA) however Gray does not refer to this as a possible source.) These prices quoted by elevator companies are the offerings available to farmers “on the street” for grain delivered to the country elevator. Unlike the CWB prices, which remain fairly constant throughout a crop year, U.S. grain prices change on a daily basis depending on prevailing market forces and the particular sales and inventory position of the operator of the elevator. Typically, country elevators will have sold (or will be intending to sell in the near future) wheat to a grain dealer, terminal elevator operator or miller; they must attract grain from farmers to meet those sales.

In addition, Gray’s U.S. street price benchmark includes an “adjustment” to the elevator bid price to reflect what he refers to as “tradable” prices. This adjustment is discussed in detail in Section 2.1.3 below.

2.1.2 Canadian Street Price Determination

Street prices for CWB grains are not quoted by Canadian grain companies in the same fashion as street prices are quoted in the U.S. by American grain companies and coops. However, there is a well established and widely used process for determining a Canadian street price for CWB grains. In essence, this technique involves starting with the CWB’s initial payment (which is an instore price in Vancouver and/or points in the lower St. Lawrence Seaway) and deducting from that price the prevailing tariffs for handling, cleaning, transportation and other charges (such as trucking premiums) as deducted from the farmer’s payment by the grain company, and finally adding any interim and final payments which the CWB pays directly to farmers. The result of this calculation is taken to represent the net return to the farmer for each grade and type of CWB grain, as it is delivered into a primary elevator.

Gray applies this time honoured technique:

“Street prices should be the sum of all CWB payments (initial, interim, adjustment, and final payments) received in the proximity of the three benchmark locations. These payments should be net of the actual basis charges deducted from CWB instore pooled payments as contained in table 1A.”⁹

⁹ Gray, “Recommendations”, p. 4.

The results of these calculations are then compared with the U.S. street prices. The individual line items in Gray’s Table 1A are presented in Appendix A to this report.

Gray’s approach appears to be reasonable, however there are concerns with its lack of clarity. Grain handling charges are paid by either the farmer directly (through deductions by the elevator operator) or by the CWB. All costs paid by the CWB are included (netted out) in the CWB payments and so do not need to be addressed further in this approach. All costs paid directly by the farmer are not included in the CWB payments; these are the items that need to be considered and deducted from the CWB payments to achieve the net street price. They include items such as rail freight, cleaning, country elevation and others.

Gray suggests, “These payments should be net of the actual basis charges deducted from CWB instore pooled payments as contained in table 1A”. However, his Table 1A contains items that should not be deducted and he fails to make clear which items should be deducted. Table 2.1 below is a synopsis of the items in Table 1A indicating which are included in CWB payments and those that are not included in CWB payments (and should be deducted to calculate a street price).

Table 2.1 CWB Cost Items

Line Item	Included in CWB payments	Not included in CWB payments
Port and Rail Demurrage	●	
Port Despatch	●	
Rail Freight Charges		●
Cleaning Charges		●
Primary Elevation Charges		●
Terminal Elevator Charges	●	
Trucking Premiums Paid		●
Blending Rents Earned		●*
Dockage Charges/(payments)		●*
CWB Administration	●	

* These items could either be deducted from, or added to, farm payments.

Missing from this list is a number of items that are paid for by the CWB: storage and carrying charges, additional freight, and drying. It is assumed that interest revenue earned by the CWB would be included in CWB Administration. Also missing are items that are not paid by the CWB (not included in CWB payments) and so should be considered in Gray’s determination of street price. These items are discussed in more detail in Section 2.1.4 below.

Since Gray's report only presents the procedure, and applies no numbers, the assessment carried out for purposes of this report is qualitative in nature, and addresses the technique rather than the figures. An assessment of the methodology proposed by Gray reveals the following flaws in his procedure.

2.1.3 The Adjustments to the U.S. Street Price

As indicated in Section 1, Gray recommends adjusting the U.S. street prices to reflect "tradable" prices. In his Appendix, Gray states:

As I outlined in my recommendations, a discount could be applied to the elevator bid prices to calculate tradable prices, given evidence that bid prices are not regularly traded.¹⁰

Although he does not provide the basis for this adjustment in his report, in discussions with the author of this report Gray indicated the CWB had indicated that a discount should be applied. His inclusion of this discount in the benchmark determination was solely on the basis of the CWB's suggestion.

The investigations carried out for this study revealed no evidence that the U.S. quoted street prices differed substantially from transaction, or "tradable" prices. In fact, the experience of many in the grain trade in the Northern Plains (including the experience of one of the authors contributing to this report) is contrary to the CWB's notion of discounts to street prices. Street prices are also called bid prices and as such, are the first indication of price in a negotiation. At times, the elevator will not sway from the bid price; at other times, for a variety of reasons, the elevator may transact at higher prices. The only reason a discount or lower price will be applied is that the grain has a degrading factor that then makes the grain a lower grade than what the bid represented.

We conclude that there is no known evidence suggesting the reported prices are not the best estimate of actual transaction prices, and therefore no justification for Gray's deduction from street prices. In fact, empirical evidence supported by experience of many grain merchandiser in the Northern Plains, indicates that under certain circumstances, grain buyers will at times be willing to pay a premium to the street price. These situations include, for example, premiums paid to farmers for large volumes or when trying to entice a new customer to deliver. It is our view that any discount to street prices is unfounded in practice and, in fact, a slight premium is more likely applicable to U.S. net prices to farmers.¹¹

¹⁰ Richard Gray, "Benchmarks to Measure CWB Performance – Recommendations; Appendix A: Calculations of the Annual CWB Performance Benchmarks," June, 2001, p. 4. (Henceforth referred to as "Appendix.")

¹¹ In applying the benchmark, the CWB has taken Gray's recommendation and simply states:

2.1.4 Issues Regarding “Basis Costs”

As noted earlier, the long-established method for determining a net return to farmers for CWB grains starts with the CWB payments (initial, interim, adjustment and final) from which are deducted all the direct costs paid directly by the farmer in moving the grain from country to terminal; the result of this calculation is also considered the street price.

A careful examination of Gray’s application of this method shows that he has applied the technique inconsistently and has made errors. Applying his benchmark methodology risks understating the net basis costs which would overstate Canadian farmer returns. The inconsistencies and errors are discussed below.

2.1.4(a) *Inconsistencies*

In order to understand the flaws in Gray’s procedure it is helpful to review the historical development of the traditional procedure and to compare the circumstances under which it was originally applied with the circumstances that prevail today in both the Canadian and U.S. systems.

The old technique was developed at a time when (1) rail rates were relatively very low and frozen by statute, (2) handling tariffs were regulated (and substantially static over a crop year), and (3) most grain elevator operators engaged principally in only the handling of grain. Under these circumstances, the costs of the various activities involved in getting grain from the country to the terminal were virtually identical to posted tariffs. In addition, since rail freight rates were very low and did not include incentives to ship grain in large blocks, there was minimal opportunity for elevator operators to compete for grain through lower costs (higher net prices) to farmers. Over the past few decades however, these circumstances have change, and the simple assumptions underlying the traditional procedure are no longer valid.

This can be illustrated by two representative examples. The first is freight charges. With freight charges no longer legislated, rates have generally increased and incentives for shipping in large blocks of railcars have been established; different shipments from the same elevator are often made at different freight rates. However, the freight deductions from the farmer will normally be the single car rate. At the same time, companies may

The U.S. prices available are price indications, not actual transaction prices. To [compare CWB and U.S.] prices, U.S. country elevator and port prices were adjusted by six cents and two and one-half cents per bushel (U.S. currency) respectively, based on the CWB’s historical experience.¹¹

The CWB provided no evidence and refuses to release any details on its employment of the benchmark methodology so no further comment on the grounds for its opinion is possible. Noting the US\$0.06 per bushel “discount” applied by the CWB, and the more likely scenario of a premium, in our view the CWB’s reported benchmark is overstated by over C\$3.50 per tonne.

return some of their freight savings (from multi-car incentives) to farmers in various ways, the most common of which are the payment of “trucking premiums” (simply a means of providing a higher net price to the farmer) and the use of commercial trucking to pick up grain on the farm (saving the farmer his cost of hauling grain in his own truck). Similarly, grade promotions (buying a #2 CWRS as a #1 CWRS, or buying 13% protein wheat as if it had a protein content of 13.5% or 14.0%) are other ways in which elevator operators compete to attract the additional grain volumes needed to satisfy the larger shipments needed to obtain multi-car shipping incentives.

How much freight, therefore, does the farmer actually pay? Gray mentions and includes trucking premiums in his calculation of basis in his Table 1A. At the same time he mentions, but excludes from his Table, grade promotions. The linkage between freight savings on the one hand, and trucking premiums and grade promotions on the other, is tenuous and inexact. Although the companies, to some extent, may pay both benefits out of their incentive rate savings, it is impossible to determine exactly how much of the freight incentives end up in the elevator operators’ accounts, and how much in the farmers’.

The second example is the country elevator handling tariff. Where tariffs are tightly regulated, and the system is centrally administered, the prescribed tariff will be the farmer’s cost and may be included in the calculation of basis costs in the traditional way. But as the system becomes more commercial, the published tariffs become less and less indicative of costs borne by the farmer. The irrelevance of published handling tariffs is well illustrated by Gray’s calculation of basis costs in the American system. Because there are no published handling tariffs in the U.S., Gray proposes that U.S. handling costs be calculated as a residual figure, determined by deducting freight from the difference between port and street prices. While he appreciates the irrelevancy of handling tariffs in the U.S system, he does not recognize that the Canadian system is developing the same commercial character as its U.S. counterpart, and that published Canadian handling tariffs are becoming, like the published freight rates, a less reliable indicator of how much the farmer pays for these services.

In one way, Gray has recognized that the traditional approach does not tell the full story. He recognizes that, in both the traditional approach and a commercial system, all the costs that are incurred in moving a tonne of grain from the farmer’s truck to the hold of a vessel must, in one way or another, come out of the price of the grain. The cost elements listed in his Table 1A reflect that, but he also suggests that certain grain company revenue items should also be included in basis costs, such as what he calls “blending rents” (more commonly called “grade gains”). The rationale for including these revenues as part of the total basis cost calculation is that grain companies at times pass these on to farmers directly as indicated in the example above. As grade gains are passed on to the farmer they provide a higher price directly to farmers, ultimately reducing the basis just as trucking premiums do. Looking at in this way, Gray implicitly makes the argument that

the grade gains are in fact part of the basis and that is why Gray's Table 1A includes blending rents (grade gains) as part of the cost/benefit to the farmer.

However, it is precisely in going beyond that traditional approach that Gray introduces his inconsistencies. For example:

1. If grade gains ("blending rents") should be added to basis, weight gains should as well. These are not identified in his Table 1A.
2. Since Gray points out that trucking premiums, paying for commercial trucking costs from the farm, and grade promotions increase the effective street price, it is argued that under-docking premiums should also be included. Taking only 1% dockage in grain that actually has 2% dockage is another competitive tool that increases returns for farmers, and which, to some extent offsets weight gains. Gray identifies grade gains passed back to farmers ("negative blending rents"¹²) but not under-docking premiums. (However, he does refer to the unusual cases where the grain companies pay for screenings.)
3. If trucking premiums are included in basis calculations, then if a farmer gets a better price for farm supplies under package deals involving grain deliveries, should not the value of these returns also be added to farmer returns?

It is our view that Dr. Gray's selection of what should be included in the basis calculation for CWB grains in Canada is inconsistent and possibly arbitrary. Moreover, he is inconsistent in what he actually carries into Table 1A. Some items that he does identify in the text are in the table; others are excluded. These inconsistencies undermine the validity of the benchmarking proposals.

2.1.4(b) Errors

In addition to the above inconsistencies, Gray has also made a major error insofar as he has completely excluded storage and carrying (interest) costs, in both terminal and country positions, from his determination of basis costs. These costs are paid by the CWB to the grain companies, and as such are major elements of basis cost, paid by the CWB and ultimately borne by the farmer.

In discussions with Dr. Gray, he suggested that he did not include storage and carrying costs in Table 1A because he could not determine corresponding figures for the American system. As discussed above, in a fully commercial system these costs are not individually identified but are reflected/included in the street price basis. Since these costs are included (netted out) in the CWB payments they are not missed in the street price calculation, however, they are missed from the basis calculation. Further, Gray's

¹² Gray's term "negative blending rents" is misleading. Although the grain companies strive to earn grade gains in aggregate over a fiscal year, at times they will choose selectively to pass on grade gains directly to farmers as a marketing tool to promote deliveries to their elevators. These grade gains will be offered to farmers when grain companies are able to promote the grain in question. Therefore, grade gains passed on are not costing the companies "out-of-pocket", and thus are not "negative".

calculation of U.S. basis levels implicitly include storage and carrying costs as these charges are imbedded in the street price bids. What Gray has done is include the cost of storage and carrying charges in the U.S. calculations but omitted them from the Canadian calculations.

The CWB Annual Report for 2000/01 provides country and terminal storage and carrying costs per tonne totalling C\$3.83 (which includes country carrying (financing) costs at C\$1.06, country storage at C\$1.91 and terminal storage at C\$0.86).

Another material error is the omission of other line items in the pool accounts. These items all relate to the activities of the CWB in marketing grain on behalf of farmers and all these costs need to be included in any calculation of CWB performance or assessment of relative returns. Specifically these charges are additional freight (to terminals, movement to eastern port position, and freight rate changes), drying and the cost allocation of CWB hopper cars. These are all costs incurred by the CWB and in 2000-01, these amounted to C\$1.60, C\$0.02, and \$0.17 respectively, for a total of C\$1.79 per tonne¹³.

2.1.4(c) Conclusions

The overall conclusion that emerges from this assessment is that the employment of Gray's benchmarking methodology risks obtaining results that will be wrong and misleading, based on the inconsistencies and omission listed above.

2.1.5 CWB Interest Income

The criticisms of the traditional accounting approach to determining street price, as they are advanced under the preceding heading, apply with equal force to the costs incurred by the CWB (and hence have an impact on the CWB payments), but there are fewer ambiguities as to what should be in and what should be out of the calculation of farmer returns.

There are two significant flaws in the procedure that Gray recommends. They are:

- The methodology does not identify, or fully assess the ramifications of the CWB's interest income.
- The government policy that provides the CWB with the interest income also relieves it of a major cost which it would incur without this policy, which is actually independent of the CWB's status as a single desk seller.

2.1.5(a) The Ramifications of the Interest Income Policies

The reason that the CWB is able to earn interest income is that it charges its customers commercial interest rates on its accounts receivable, but pays a very low rate on its own

¹³ The Canadian Wheat Board, 2000-01 Annual Report, p. 39.

debt which is guaranteed by the federal government. The bulk of the interest earnings come from sales for which the CWB has been unable to collect the outstanding balance – i.e., sales on which the buyer has either defaulted or has extended its payment schedules.

When a buyer does not pay within the year that the sale is made, the CWB's practice is to borrow an amount equal to the outstanding receivable, and to pay that amount into the pool accounts. Thus, if the CWB were to make a sale for \$1 million, and the customer does not pay, the CWB will borrow \$1 million, and both the receivables and payables on its balance sheet will rise accordingly.

Until the account is paid, therefore, the CWB will charge interest at a commercial rate but will pay interest on the corresponding loan at the government guaranteed rate. To illustrate, suppose the CWB pays a rate of 6% interest, but charges the customer 8%, so that there is a 2% difference between the two rates. If the outstanding receivable carries over the year-end with no payment from the customer, the CWB will borrow a further \$80,000 (the year's interest charges), distribute the \$80,000 into the pool accounts, and once more increase the figures on the balance sheet. The interest earnings from this unpaid account, then, would be the \$20,000 difference between the interest charged and the interest paid.

CWB receivables were reported to be \$7.1 billion on July 31, 2001¹⁴. In the 2000-01 crop year, net interest earned from these receivables was reported to be \$75.22 million, which increased the net price received by farmers for wheat by \$4.18 per tonne.

What is questionable about this from the point of view of the benchmarking exercise is whether or not these interest earnings should be included in CWB revenues as part of assessing CWB marketing performance. Arguably, they should not as this interest is not a function of CWB marketing performance. Rather it is a function of government policy. If it were not for the current government policy to provide this backstop to the CWB, the CWB would not generate this revenue as it is independent of the CWB's marketing activity.

In addition, the interest policy is independent of the policy to retain the single desk. The government could terminate its policy of guaranteeing CWB debt without disbanding the CWB.¹⁵

Since Gray is silent on this issue and this interest revenue is at times included as part of CWB administration, it is unclear whether this interest revenue is included as part of Gray's basis calculation (and hence street price calculation) or not.

¹⁴ "Of this amount, \$6 billion represented receivables for which payments of principal and interest had been rescheduled over periods ranging from five to 25 years under terms agreed to by the Government of Canada": The Canadian Wheat Board 2000-01 Annual Report, p.30.

¹⁵ The federal government, through Export Development Canada, provides protection to other exporters on sales where payment by the buyer might be in question. However, the level of protection does not provide credit to commercial organizations at government guaranteed rates.

2.1.5(b) *Government Absorbs CWB Bad Debts*

A second component of the government's policy on CWB debt is an undertaking to absorb any losses that are incurred when customers default and the outstanding debts are written off. This part of the policy relieves the CWB of costs that any normal commercial enterprise must bear: the risk of bad debts.

Again, write-offs are part of any business, and they are part of the legitimate cost of any enterprise. The fact that the write-offs are absorbed by government does not remove these costs; they should, therefore, be included as part of the basis costs.

It should be noted that the trend in government policy with respect to CWB financing is to make the enterprise more commercial. In that light, both the interest rate policy and the policy on writing off debt could be phased out over time. In fact, the 1998 revisions to the CWB provided for the creation of a "contingency fund" which would be managed by the CWB and would have the purpose of covering some of the commercial risks that the CWB now takes.

It was beyond the scope of this study to pursue this matter further so as to determine the size of the write-offs over recent years, and to calculate the amount by which basis costs should be increased to account for the government's contribution.

2.1.6 **Port Spreads Applied to Street Prices**

Benchmark One should be applied to different grades of wheat. Thus, to apply the benchmark properly, the net producer returns for 1 CWRS 13.5 should be compared with 1 DNS 14, and the returns for 2 CWRS compared with 1 hard red winter (1 HRW) and so on. (As noted earlier, these particular grade comparisons are approximate, and some minor adjustments would be expected to be made to allow for these slight differences.)

Gray was of the view that street price spreads between grades were not available. Accordingly, he said, "elevator price series for various wheat classifications should be calculated by applying the FOB price spread at port position between the relevant class, grade or protein."¹⁶

However, street price grade spreads will not necessarily equal the port price grade spreads, especially in the eastern regions (Bisbee, North Dakota), because of the influence of the domestic milling market, particularly in Minneapolis, and the export market through the Gulf. The demand for various grades and protein levels in the domestic market are not, at any one time, the same as the demands in the export market being served through the PNW, and so the price spreads may differ.

¹⁶ Appendix, p. 4

2.1.7 Miscellaneous Issues

Two other flaws were found throughout Gray's description of Benchmarks 1 and 2, although neither is considered serious.

2.1.7(a) Check-offs

Gray suggests, "state check-offs should also be deducted from U.S. elevator bid prices."¹⁷ These check-offs would be, for example, state wheat commissions and other similar organizations. If these check-offs should be deducted from American prices, then similar check-offs should be deducted on the Canadian side as well. Gray is silent on these.

2.1.7(b) Market Development Costs

Gray identifies several U.S. organizations involved in market development, such as the U.S. Wheat Associates. He concludes, "The difference between Canadian and U.S. government contributions to market development efforts should be incorporated into the adjusted US FOB prices."¹⁸

While this suggestion is neutral and accurate, Gray is less assiduous in identifying Canadian government market development costs. For example, Agriculture and Agri-Food Canada covers one-half of the expenses of the Canadian International Grains Institute. Moreover, the CWB itself invests significant resources to market development. Gray does not mention these or provide any other examples.

2.2 Benchmark Two: Logistics and Basis Performance

As described in Section 1, Gray suggests that three benchmarking procedures be put in place. The second, which he calls a "Logistics and Basis Performance" benchmark, is meant to compare the costs of moving grain from country elevator positions to port destinations.

As indicated earlier, the data collection and calculations needed for Benchmark Two are virtually identical to those required to determine the basis costs for Benchmark One. The only difference between the two procedures is that Gray suggests that Benchmark Two be applied on a monthly, as well as annual basis. Otherwise, the approach to developing Benchmark Two is the same as that used with Benchmark One. The critique of Benchmark One, as presented in the preceding sections of this Section, therefore, applies with equal force to the components of Benchmark Two.

In addition, there are items in the determination of U.S. transportation and logistics costs that are cause for concern.

¹⁷ Appendix, p. 4.

¹⁸ Appendix, p. 12.

2.2.1 U.S. Rail and Elevation Charges

With regard to determining U.S. elevation charges Gray states:

“Elevation charges are difficult to directly obtain. These should be calculated and reported as the difference between the port FOB price less rail freight rate minus the street price...”

He states further:

“The U.S. rail rates for one and 25 car spots should be used as rail freight indicators from the three representative locations.”

It is assumed from the above that Gray is suggesting “rates for one and 25 car spots” should be used in the calculation to estimate elevation charges. As such, Gray demonstrates a lack of understanding and a lack of appropriate detail in his analysis:

1. The U.S. elevator points selected by Gray are all large, multi car loaders. The smallest car spot is 54 and the largest is over 100. The use of any rates other than those that apply to the larger blocks of cars (54 and over) will give misleading results that will indicate higher costs than actually experienced.
2. Depending on the actual approach, this will create extremely small estimates of elevation charges (or even negative charges) or it will suggest lower U.S. street prices than what is true.
3. Although there are single car rates published, these are not used in any grain pricing or merchandising exercise as the vast majority of grain that moves from the selected areas is in much larger blocks; the lower multi car rates are applied.
4. In the U.S., railroads provide rates for 26-car blocks (not 25 as Gray indicated).

2.2.2 Treatment of Storage and Carrying Costs

As indicated above, Gray does not include storage and carrying costs in his determination of CWB costs (basis) in Canada. Further to the error this creates in the Canadian calculations, it should be pointed out that this omission also biases the Canadian results relative to the U.S. This is true because although storage and carrying charges are not explicitly identified in the U.S. as they are on CWB grains, these costs are clearly included in cash basis levels. Although Gray appears to understand the seasonal nature of basis levels in the U.S., he fails to make the connection between seasonal prices, inventory levels and carrying charges. This omission prevents accurate and meaningful comparisons between Canadian and US markets.

3. Benchmark Three: Marketing Performance

This Section evaluates the third of Gray's benchmarking procedure, namely the mechanism to measure the CWB's marketing performance at port position. The marketing performance benchmark contains two broad components. The first is a comparison of port prices realized by the CWB, to port prices realized by American grain merchants. It is conceptually useful to think of this comparison in terms of the west coast where the comparisons are more easily conceptualized, although Gray's methodology does deal with eastern destinations as well.

The second component involves Gray's proposition that the CWB deliberately "shorts" the high quality market by diverting a proportion of high quality wheat away from the quality sensitive market, thus reducing the available volume of the high quality product and forcing up its price. According to Gray's hypothesis, the diverted volume is disposed of (at a discount to its inherent value) to price sensitive buyers who would normally purchase lower quality wheat.

It is our view that the procedures proposed by Gray to put these two components of the evaluation into effect are deeply flawed. The flaws exist in both the theories behind the proposed procedures and practicalities of applying them.

There is, in addition to these two components of Gray's approach, another assessment of CWB port price performance that is conspicuous by its absence from Gray's methodology and which suggests that the CWB's performance in the export market is less effective than it should be. This relates to timing of sales.

One of the concepts underlying central desk selling is that a monopoly marketer has a better opportunity to assess market conditions and to sell to the greatest advantage for the farmer. If that is so, then not only should individual CWB sales be made at a higher price than the prevailing U.S. price at the time of the sale, but also the average price the CWB achieves over the year ought to exceed the average price that prevailed in the U.S. market over the year. To be even more precise, the argument is that, since the CWB's returns reflect the weighted average of all sales, then this amount should logically be compared to the weighted average of U.S. farmer marketings. In the last portion of this Section, CWB final prices are compared to the range of prices that prevailed in the U.S. in each of the last few crop years.

3.1 Component One: The Price Comparisons

There are a number of flaws and/or uncertainties in the procedures that Gray uses to compare Canadian and U.S. port prices. These are discussed in detail below.

3.1.1 FOB Prices Versus Track Prices

In referring to the U.S. port price with which he intends to compare Canadian prices, Gray refers to “readily available U.S. port FOB prices.”¹⁹ FOB (“free on board”) usually refers to the price of grain once it has been loaded onto a vessel. However, strictly speaking, FOB prices are generally not “readily available” at U.S. port positions. Prices normally quoted for the PNW ports, and generally available from USDA and other sources are “track” prices – i.e., the prices that terminal elevator operators (exporters) will pay for wheat delivered to their terminals from independent country elevator operators and coops.

Actual FOB prices may differ from track prices, and on any one day may actually be lower or higher than track prices; it could be argued that the average difference between track and FOB is a minor difference at the PNW and not very material in this discussion. However, ancillary port and harbour fees specific to the PNW generate revenue for the terminal operators/exporters (i.e. costs to the importers taking grain from these terminals) and must be considered in any “FOB” price/value comparisons between the PNW and Vancouver (where terminals do not capture the same fees). A proper comparison needs to include all harbour and port fees (in both ports).²⁰

Gray is silent on this issue. Following his approach without consideration of the additional port costs in the PNW will risk the CWB’s reported port price benchmark overstating the claimed benefits of CWB marketing by reflecting a lower than realistic U.S. port price.

3.1.2 Inclusion of U.S. and Canadian Domestic Sales

In determining the average CWB port prices that are to be compared with the U.S. benchmarks, Gray implicitly says that CWB sales into the United States should be included in total CWB returns. His assumption that U.S. sales should be included is indicated by his recommended calculation for converting the realized price at U.S. inland destinations to a port price. It further assumes that Canadian domestic sales are also to be “adjusted to FOB prices at port”²¹.

The inclusion of the CWB’s U.S. and Canadian domestic sales is a significant error in Gray’s procedure; the CWB has indicated that the North American domestic markets are premium markets relative to offshore markets. However, the U.S. benchmark figures to which Gray is comparing CWB prices are almost exclusively established by the export

¹⁹ Appendix, p. 12.

²⁰ Often, terminal operators/ exporters will offer FOB grain at “negative basis levels” – prices below track levels. This is done with the recognition that they will generate revenue from the ancillary port, harbour and other charges mentioned above and the net return will reflect a positive return to the terminal for the throughput.

²¹ Appendix, p. 11.

market. It would be more appropriate to isolate sales in the different markets; for example, CWB West Coast offshore exports should be benchmarked against PNW exports and CWB domestic sales (Canadian domestic and exports to the US) should be benchmarked against a relevant U.S. market (i.e. Minneapolis). Blending domestic CWB sales prices with West Coast sales prices will create erroneous results when comparing to PNW prices; applying Gray's proposed methodology would be expected to overstate CWB returns relative to US returns.

3.1.3 Inclusion of U.S. Credit Subsidies

According to Gray, "US fob prices reflect credit subsidies that are available to the sellers," and "they should be used to adjust the US port prices."²² As noted in the preceding Section, Gray ignores the effect of Canadian government policies that provide credit guarantees to the CWB. Accordingly, not only does Gray's methodology overstate Canadian prices by ignoring Canadian credit policies, it inconsistently discounts American prices due to the corresponding programs.

3.2 Component Two: The "Diversion" Strategy

Gray suggests that the selling strategies of the CWB may include diverting a certain portion of Canada's high quality spring wheat away from the quality markets and disposing of it elsewhere (through blending), thus effectively creating an artificial shortage of high quality wheat. Doing so, he suggests, would force the price of the entire high quality market upwards, thus raising the price, not only for the rest of the Canadian high quality crop, but also the price for American farmers as well.²³

On the premise that the CWB does follow this strategy, he recommended that U.S. benchmark prices be adjusted (lower) to remove its impact.

The methodology which Gray proposes for the evaluation of the diversion strategy is illustrated in Figure 3.1 below. In this diagram, the wheat market is artificially divided into two segments: (1) a high quality segment whose supply and demand (S/D) relationships are illustrated in the curves on the left; and (2) a low quality segment similarly illustrated on the right. By applying some actual figures to the diagram, the methodology is more easily understood, and some of the flaws in the model become more readily apparent. The numbers used in Figure 3.1 are as follows:

- It is assumed that Canada exports 20 mmt of wheat, of which half is high quality (1 and 2 CWRS, high protein) milling wheat, which is included in the left hand curves. The other half (10 mmt) is assumed to be "low quality" (3 CWRS and other) which

²² *Ibid.*, p. 12.

²³ *Ibid.*, p. 12.

essentially competes with U.S. low quality (hard red winter wheat) shipped predominantly out of the Gulf. This 10 mmt is included in the right hand curves.²⁴

- It is further assumed that the U.S. exports 30 mmt of which 10 mmt is the top quality wheat (1 dark northern spring wheat) competing with Canada. Again, this 10 mmt is included in the left hand curves. The 10 mmt of high U.S. milling wheat is exported primarily out of the PNW.
- The market that the CWB seeks to “short” therefore consists of 20 mmt shared 50-50 with the U.S. The vertical line labelled $S_{H,1}$ represents the 20 mmt of high quality wheat that would be available, absent the CWB’s postulated diversion strategy.
- The “low quality” market would then total 30 mmt of wheat, 20 from the U.S. and 10 mmt from Canada. This 30 mmt is represented by the vertical line $S_{L,1}$ in the right hand side of the diagram.
- The respective demand curves for high and low quality wheat are represented by D_H and D_L . The prices at which the 20 and 30 mmt respectively of high and low quality wheat would trade, absent diversion, are represented by $P_{H,1}$ and $P_{L,1}$. For illustration purposes, these are assumed to be C\$160/tonne, and C\$120/tonne.
- It is assumed that the two demand curves, at the points of intersection with the assumed supply, both have an elasticity of demand of -1 . This means that a 1% change in supply would cause a 1% change in price. This seems to be consistent with the assumptions that Gray adopted to illustrate his methodology. (Later, this assumption is relaxed, and the effect of varying demand elasticity in both markets is analyzed.)

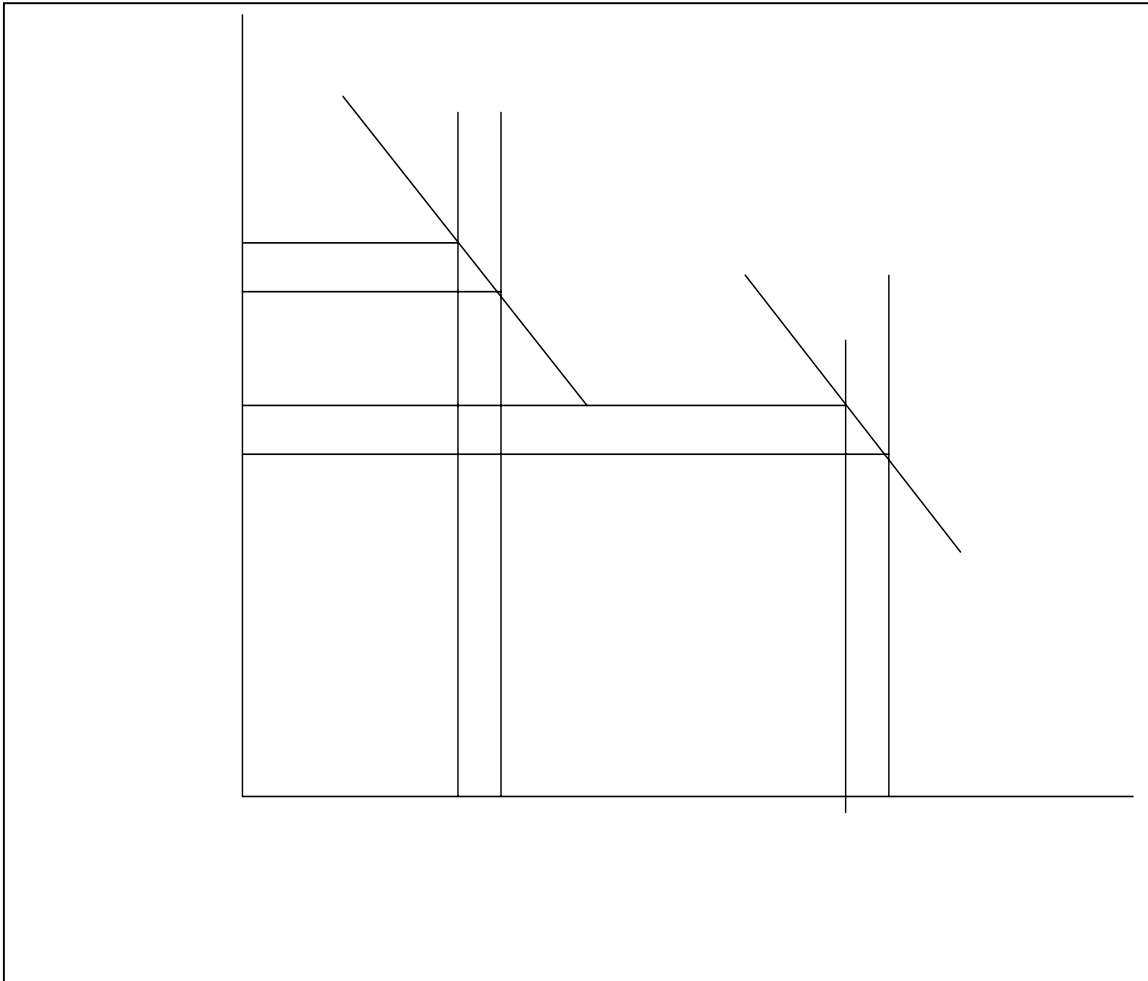
The postulated diversion strategy is illustrated by the two supply lines $S_{H,1}$ and $S_{H,2}$. These two supply curves assume that the CWB has diverted 1 mmt, or 10% of its available supply, away from the high quality market and into the low quality market. The dashed supply lines assume that the quantity sold into the high quality market would drop from 20 to 19 mmt (a 5% drop), thus pushing the price up from $P_{H,1}$ to $P_{H,2}$. Since the price elasticity is assumed to be -1 , the 5% decline in volume would generate a 5% increase in price, i.e., from C\$160/t. to $(1.05 \times 160) = \text{C}\$168/\text{t}$. Correspondingly, supply would rise in the low quality market from 30 to 31 mmt (a 3.3% increase) thus pushing the price down. Again, with a price elasticity of -1 , the percentage decline in price would equal the percentage decline in volume, and price would fall from C\$120 to $(0.967 \times 120) = \text{C}\$116/\text{t}$.

Figure 3.1 Effect of CWB High Quality Diversion Strategy

²⁴ Sparks estimates that the CWRS wheat crop has graded an average of 67% #1 and #2 CWRS, over the last 20 years. This level is quite variable and it is assumed that this amount is not necessarily marketed as such. In addition, the protein breakdown is not available.

$$P_{H,2} = 168$$

$$P_{H,1} = 160$$



It should be noted that although Gray refers to elasticity in the high quality market of -1 , he does not refer to elasticity in the lower quality market. In discussions with Gray, he suggested that the lower quality market is much less price sensitive with an assumed elasticity near zero (in other words, he assumed that the low quality market could absorb the additional quantities being diverted with little or no price reaction).

We have assumed otherwise; a study by the Canadian Wheat Board and the Manitoba Rural Adaptation Council states “It is important to note that export competition on world wheat markets is far more intense for standard quality wheat than for high quality wheat, resulting in greater pressure on prices”²⁵. This clearly indicates the authors believe low quality wheat markets do not have a zero elasticity as Gray has suggested.

The effect of this strategy on the CWB’s sales results would be to have fewer tonnes of high quality wheat sold at a higher price, and more tonnes of low quality wheat sold at a

²⁵ CWB and Manitoba Rural Adaptation Council, Inc., “The Market Competitiveness of Western Canadian Wheat”, January 1999, executive summary p.v.

lower price. The net impact on the net revenues to the CWB (and hence on farmers' income from CWB marketing) depends on how the relative gains and losses balance out.

If demand elasticity is at -1 (as Gray suggests), the effect of the diversion strategy would be totally neutral with respect to market revenue for both U.S. and Canada – i.e., if a one percent change in volume results in 1 percent change in price, the net revenue (volume times price) will not change. Since the CWB does 100% of the diverting, but has only a part share (50% in the example illustrated here) of the market, its share of total market revenue would actually drop, and it must more than offset that loss in revenue by what it picks up through extra sales in the low quality market. This is illustrated by the following calculations, which show the CWB's net revenues under the “non-diversion” and “diversion” strategies:

Non – Diversion:

High quality sales:	10 mmt x \$160/t = \$1.60 billion
Low quality sales:	10 mmt x \$120/t = \$1.20 billion
Total	\$2.80 billion

Diversion:

High quality sales:	9 mmt x \$168/t = \$1.51 billion
Low quality sales:	11 mmt x \$116/t = \$1.28 billion
Total	\$2.79 billion

Gray seems to acknowledge that the impacts of the diversion strategy on both the high and low quality markets must be determined in order to fully evaluate the effects of the strategy:

“For the strategy to be rational the increase in revenue on the remaining CWB sales into the high quality market, must exceed the foregone revenue from selling additional high quality wheat.”²⁶

The phrase “foregone revenue” is assumed to refer to the revenue lost by selling the high quality wheat at a discount. However, Gray does not make further reference to this “foregone revenue,” nor to the impacts of the strategy in the low quality markets, and the rest of his description of the benchmarking procedure does not spell out how this foregone revenue is to be calculated. This omission represents a fundamental weakness in Gray's analysis, as will be shown later in this report.

While the revenue implications in the simple calculations shown above are neutral, Gray's description of the methodology raises a number of questions:

1. Under what circumstances would the postulated strategy yield positive (or negative) results?

²⁶ *Ibid.*, p. 13.

2. Is it possible, in the real world of grain marketing to determine when such circumstances are present, and if so when to adopt (or avoid) the proposed strategy?
3. Are Gray's instructions as to how to determine the gains from the postulated strategy accurate?
4. How does the timing of sales issue (as discussed in Section 3.3 below) impact this strategy?

The examination conducted in this report raises grave doubts or concerns about virtually all of these questions. The flaws in this component of the proposed benchmarking scheme are discussed in more detail below.

3.2.1 The Lack of Reliable Information to Follow the Strategy

In order for the CWB to follow this strategy, it would have to know with mathematical certainty the characteristics of the demand curves that it is facing each year, with each subdivision of wheat, and know exactly where its current available supply (the vertical "S" lines in Figure 3.1) intersects each demand curve. Gray's seems to acknowledge the need for this level of detailed information, pointing out that gains are possible only "if the CWB is fully informed about the market elasticities they face"²⁷. It is the contention of this report that the kind of precise knowledge about the nature and characteristics of the demand curves cannot in fact be known with sufficient accuracy and detail to apply the strategy. Moreover, knowledge of the future price structure (over the rest of the crop year) would be also required. (However, if the CWB could predict future prices with certainty, this skill would be worth much more than any potential gains from diverting high quality wheat into low quality markets!)

The first reason why this is so is that the precise demand curve for any commodity exists only at one very restricted point in time, for very specific conditions. In fact, when economists demonstrate the relationships between prices and volumes by the use of supply and demand curves, they qualify their conclusions with the assumption of "all else being equal." In short, if a demand curve of the sort shown in Figure 3.1 exists at all, and could be constructed using empirical data, it would represent the relationship that would exist only as long as nothing else in the world changed. In the real world, however – and particularly, as explained below – in wheat markets where there are competing and substitutable products available, one does not usually move along a specific demand curve; rather, a change in one variable (in this case the change in supply from $S_{H,1}$ to $S_{H,2}$) actually changes the shape and position of the curve. This is explained more fully below.

Not only will a supply/demand relationship change with a change in price or supply, it also will change over time. This is particularly true for a market that has, at any one

²⁷ *Ibid.*, p. 13.

time, a small number of buyers and sellers whose circumstances can alter on short notice. A buyer who may be unwilling to pay a specified price for a parcel of wheat today, may be more than willing the next day. Similarly, sellers may be willing to drop (or inclined to raise) their prices as time and circumstance alter. These actions do not involve a move along a given demand curve; they involve changes to the curve itself.

Moreover, in calibrating economic models, it is usual to find widely scattered empirical measurements. Curves that are regressed through these scattered results are only approximate “fits” to the data. Statistical calculations (so-called “r-squared tests for example) are made to determine how reliably the mathematically determined curve will predict the value of one variable (in this case, price) if the other (in this case supply) is altered. This means that, even if it were practically possible to calibrate a demand curve, its predictive potential for any given action (diversion of high quality wheat), such as that contemplated, is relatively small.

3.2.2 Interactions Between Competing and Substitutable Commodities Change the Demand Curves

As noted under the preceding heading, if the CWB were to divert wheat from one market to a second as illustrated in the above example, the price effect caused by the shift in supply would induce secondary effects which are not shown on the diagram. To illustrate, Figure 3.1 assumes that the total quantity of wheat to clear the entire market, low and high quality combined is 50 mmt. The diagram also shows that this volume, divided between the two markets in the ratio of 20/30, will clear at prices $P_{H,1}$ and $P_{L,1}$. What it does not address is where buyers might go when they are driven from the high quality market by the price increase from $P_{H,1}$ to $P_{H,2}$. In fact, where at least some of them go first is to the low quality market to purchase wheat that is competitive and substitutable. The buyers thus displaced are not included in the right hand demand curve. They become new buyers in right hand curve, willing to buy lower quality since the high quality wheat is now priced out of their range.

The fact that demand curves for low and high quality wheat actually change position and shape can be inferred from price behaviour in the real wheat market. In fact, the interactions between markets, especially where commodities are competitive and substitutable, is so complex as to defy attempts to measure the characteristics of the supply and demand curves and to use them as predictive tools in the way that Gray suggests.

3.2.3 Alterations in the Supply and Demand Relations Over Time

The preceding discussion also illustrates that supply and demand changes over time. Throughout the world and throughout the calendar, wheat is either being planted (seeded)

or harvested somewhere in the world, complicating the task of monitoring the balance between supply and demand on an ongoing basis. See Table 3.1 below.

Table 3.1 Seeding and Harvesting Seasons

	Seeding	Harvesting
January		Australia, Argentina
February		
March	Europe (south)	
April	Canada, US (spring), Europe, FSU, South Africa, Brazil	Mexico
May	Canada, US, Australia, Brazil, FSU, South Africa	Mexico
June	Australia, Brazil, Argentina, South Africa	US (winter), Mexico, China, Middle East, Europe (south)
July		US (winter), Europe, FSU
August		US (winter), Middle East, Europe, FSU
September	Middle East, US (winter), China, FSU	Canada, US (spring), FSU
October	Middle East, FSU, Europe, China	Brazil
November		Brazil, Australia
December	Mexico	Brazil, Australia, Argentina

With each adjustment to world supply, the demand curves that must be fully known by the CWB in order to follow the postulated strategy change in ways that cannot be predicted. Thus, if a decision is made in September to sell some 1 CWRS at a discount, the price relationships on which the decision is made could change dramatically by January, and the anticipated gains turned to loss.

3.2.4 Lack of Market Knowledge of Buyers

This flaw to the concept has three components. The first is this: that for the low and high quality markets to react in the manner illustrated in Figure 3.1, information must be conveyed to buyers and sellers that the supply situation has changed, with less high quality wheat available and correspondingly more low quality. However, practically, there is no way for this information to be conveyed to buyers and sellers. The CWB is not going to advertise to anyone that it has given away high quality grain – not the least reason being that it would validate U.S. accusations of dumping. And while buyers and sellers are continually examining the market, they have no way of monitoring stocks by grade with the kind of precision that would be necessary to see a substantial amount of

high quality wheat disappear from Canada's available supply, nor to see an increase of stocks of low quality appear.

The second flaw in this concept is that the CWB would face conflicting demands in the information it would wish to disseminate. On the one hand, it would not want anyone to know that it had dumped 1 mmt of 1 or 2 CWRS at 3 CWRS or feed prices. But it would want the market to know about the shifting in supply in order to ensure that high quality price would rise. It could not, however, simultaneously satisfy both demands.

The third is that, if the CWB had some way of conveying the information that it followed this practice, the market would react in all years to the expectation that the CWB might divert, and thus the effect of an actual diversion would be vitiated. The only effect would be to dispose of high quality wheat at a discount, with the corresponding loss to the pool accounts.

3.2.5 The Circumstances Under Which the Strategy Might be Effective

As noted earlier Gray recommends that, for analysis purposes, demand elasticity should be set at -1 , and goes on to claim that:

*“Blending would be optimized on the margin when a one percent reduction in quantity brings about a one percent increase in the premium, i.e., when the point on the demand curve is reached where the elasticity was equal to minus one.”*²⁸

This claim is simply incorrect. As argued earlier, when demand elasticity is equal to minus one, the revenue impact of a change in price or supply is neutral.

As noted earlier, Gray appears to acknowledge that the overall revenue impacts of the diversion strategy requires an examination of the impacts in both the high and low quality markets. Are there circumstances under which the strategy might be effective, and if so, would the effects be large enough to offset the risks of price changes due to other market developments? And how, using Gray's approach, would the diversion tactic affect both the high and low quality markets? To address these questions, an analysis was carried out assuming a range of demand elasticities in the two markets.

Setting aside the objections to Gray's methodology outlined above, and operating under the false assumption that “all other things would indeed remain equal,” the effect of diverting tonnage, as illustrated in Figure 3.1, would be not only to raise the price in the high quality market, but to lower the price in the low quality market. Table B1 (found in Appendix B) shows the effect of the volume shift on total CWB revenues from wheat sales, using projected volumes of “high” and “standard” quality wheat trade as projected

²⁸ *Ibid.*, p. 13.

by the Canadian Wheat Board and the Manitoba Rural Adaptation Council²⁹. The table shows the effects under four separate assumptions as to elasticities of demand, and over a broad range of diversion strategies. Although Gray refers to an elasticity of -1 in the high quality market, he does not comment on his assumption regarding the lower quality market.

The higher diversions are clearly unrealistic, but are shown because they illustrate (a) just how large the postulated diversions would have to be for the strategy to have any significant effect, and (b) that the entire theory that Gray proposes yields highly unlikely results. The four cases examined are:

- Case 1: elasticity equal to minus one in both markets. This appears to be Gray's assumption, although he is silent as to the elasticity in the low quality market.
- Case 2: elasticity in the high quality market of -2 and in the low quality market of -0.5 . This, in fact, is the circumstance under which the strategy might make some sense. Clearly, the best circumstances in which to follow this strategy are those where the diversion will have a sharp upward effect on the high quality market, but only a mildly depressing effect on the low quality market.
- Case 3: this case adopts Gray's assumption of an elasticity of minus one in the high quality market, but assumes zero elasticity in the low quality. This in fact would be the case if the low quality market were so large as to absorb the diversion without any impact on price.
- Case 4: the last case combines the elasticity of -2 in the high quality market, and zero elasticity in the low quality market. This would be the most desirable case.

The effect on net CWB sales revenue is shown in the last column of the table. These figures show that both the concept and the methodology proposed to evaluate it are flawed. The conclusions that flow from a careful analysis of the figures are as follows:

- In all cases, the CWB loses net revenue in the high quality market, because the effect of the lower volume outweighs the effect of the higher price. To varying degrees, the loss is made up by selling more wheat in the low quality market. Clearly, therefore, Gray's proposed procedures are flawed by ignoring the impact of the diversion strategy in the low quality market (or by his assumption that there would be no price impact on the low quality markets).
- The results shown in Table B1 could never in fact be realized. If indeed the markets behaved as shown in Figure 3.1 and the tables, then the price spread between the high and low quality markets would widen as indicated. While spreads indeed do widen under certain circumstances, the price spreads shown in the table are impossibly wide and would never happen in practice. For example, under the fourth set of elasticity

²⁹ "The Market Competitiveness of Western Canadian Wheat", January 1999, executive summary p.iv.

assumptions – the only one that shows significant positive results – the theoretical, calculated spread between the two markets would have to widen to approximately \$100/tonne to achieve a 10% increase in net CWB sales returns.

- Even setting aside the highly improbable wide spreads, the calculations indicate that the strategy, if pursued, and if properly measured by proposed methodology, would not be very successful. Only when (1) the elasticity in the high quality market is high (-2 or greater), and in the low quality market is near zero, (2) if over a third of the high quality wheat is sold at a discount, and (3) the spreads are wider than would ever occur in reality, does the technique begin to show significant returns. In short, only when impossible conditions are postulated do the net returns to the CWB show a significant (10%) increase.

3.2.6 The Proposed Method to Test the Diversion Strategy

Gray proposes a six step process for what he calls “the estimation process” – i.e., the procedures for testing whether or not the CWB is following the postulated strategy, and for estimating the effects on CWB net sales returns. Appendix C contains the six steps verbatim as Gray described them. The procedure has several major flaws as follows:

1. It is not clear what is meant in step 2 by the words “base premium.” It is also not clear why they are to be determined since, whatever they are, they are not referred to again.
2. It is not clear what is meant in step 3 by the “scarcity premium.” This step defines them with the terms Pa, Pb, etc. However, Pa is shown Figure 1A in Gray’s Appendix simply as the price at which grades “a” (the top milling grades) of wheat sell. Pa therefore is not a premium but a price. Step 2 therefore seems to refer simply to the realized prices for each grade of wheat, which Gray assumes, trade at a premium because of the diversion strategy. This interpretation, however, is inference only.
3. The biggest and most significant flaws in Gray’s argument lies in Step 4 where he says that the quantity of diverted wheat may be determined by identifying instances where a sale is “priced against a lower grade than that specified in the Canada/U.S. street price comparison.” Specifically:
 - It is not clear exactly what this statement means. Logically, the intent of the analysis must be to identify sales that have been priced under market value – which would seem to imply finding sales of high quality of wheat that have been priced at that of a lower grade. However, it not clear what the specified indicator (“the Canada/U.S. street price comparison”) actually means or how it is an indicator of these under-market-value sales.

- Secondly, this does nothing to clarify the confusion referred to earlier between the time of sale and the time of execution. If the postulated “give-away” of high quality wheat were effected through blending, the sales figures would not indicate the strategy being put into effect; it would only be indicated by comparing the grade of the shipment (presumably on the Certificate Final) as against the sales specifications.
 - Thirdly, Gray’s indicator is purely inferential. It ignores other possibilities for a sale to have been made under market price. Other possible reasons for giving a customer a “bargain” price might exist, for example: volume discounts; trade-offs against demurrage and freight rates; the need to clear excess stocks from either country or terminal positions; a miscalculation of the direction of anticipated price changes; market development. It is assumed that if the CWB follows this strategy then it would or should know which sales were executed to affect the strategy and inferences from price information should be unnecessary.
4. Following the procedure laid out in step 3 would place into a presumed diversion strategy any and all sales that, in retrospect, could have been made at a higher price. Such a process would inevitably lead to an overestimation of the diverted volume. Plugging this overestimation into the mathematical formula would then yield an overestimation of the price effect (which grows in direct proportion to the size of the assumed diversion, D_a).
 5. As noted earlier, the procedure ignores the impact of the diverted volume on prices in the lower quality markets.

Overall, the proposed procedure contains too many flaws to be a reliable determination of the effect of the postulated strategy, even assuming away the problems described earlier in respect of the diversion strategy.

4. Omissions

As indicated in the introduction of this report, there are components of a comprehensive process aimed at benchmarking CWB performance that have not been included in Gray's benchmarking methodology. These are (1) measurements of how well the CWB performed in terms of price relative to the market prices in a crop year and (2) a measurement of CWB performance relative to the amount of wheat sold (not just price). These are discussed below.

4.1 Timing of Sales / Sales Levels Versus Market Opportunities

Gray's analysis of CWB performance as measured by the benchmark that he devised misses an important aspect of marketing performance. The time sales are made throughout the crop year can have a dramatic impact on the ultimate performance of any marketing organization. Agricultural market prices change over time reflecting the current view of supply and demand balances and in fact, can be quite volatile. Any measure of CWB performance should include a benchmark addressing how well the CWB marketed grain relative to the market values experienced – or presented to the CWB – during a particular crop year.

4.1.1 Price Ranges

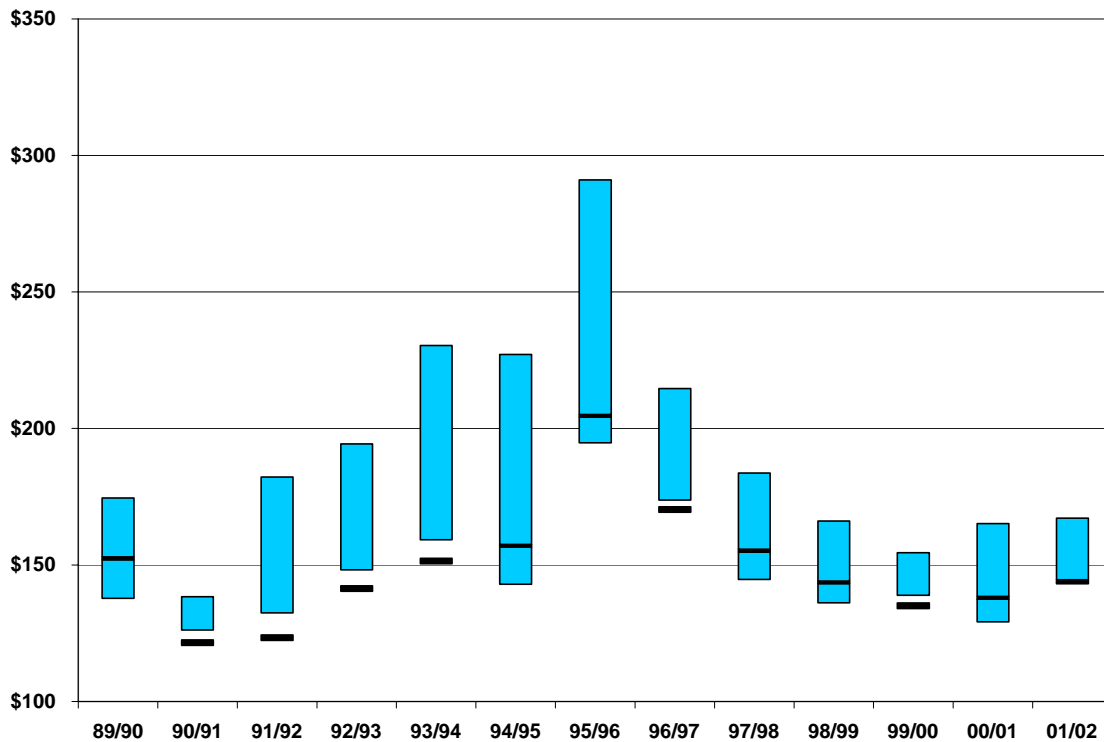
Figure 4.1 below shows the annual cash price ranges of #1 DNS 14%, basis track Portland from 1989/90 to 2001/02, expressed as blue bars. According to the USDA data, the price ranges range from a low of US\$14.15/t in 1990/91 to a high of US\$96.27/t in 95/96. These prices are provided by USDA, and although they are not actual transaction prices, it is well understood that these are reasonably representative of actual cash transactions.

The notable exception to this is the period in this data set from 1989/90 to 1994/95, a period when the US was using the Export Enhancement Program (EEP) to subsidize export sales. It is understood that U.S. export sales that were subsidized with EEP were effectively below the USDA reported prices as they included the export subsidy at varying levels, depending on the sale. In the same time period, CWB sales, needing to be competitive, would be executed at levels competitive to the EEP net sales levels, and hence low relative to the track prices used for this comparison. After 1995, the price comparisons here are without EEP and are reflective of a more competitive era; therefore the price relationships presented here are reasonable comparisons.

The CWB prices used in this analysis are annual pool (achieved sales) prices for #1 CWRS 13.5 reported by the CWB (found on the CWB website). These prices are then

converted to US dollars using the most favourable exchange rate for the year³⁰. The CWB sales prices are indicated in the chart by the small black bands.

Figure 4.1: CWB Annual Average Instore Sales vs Annual Track PNW Market Ranges (US\$ per tonne)



It should be noted that in this comparison, CWB instore prices are being compared to PNW track prices as they are the most readily, publicly available. Although comparing FOB Vancouver to FOB PNW may provide a more meaningful comparison (as it would include all costs and reflect the relative costs of the two grain handling systems, including terminal handling), any potential difference in costs between the two ports is considered to be insignificant in this broad overview.

³⁰ This approach provides a positive bias to the CWB prices. There is no way of knowing with certainty the foreign exchange levels that were used by the CWB when making any sales, therefore, this analysis converted sale prices in Canadian dollars, provided by the CWB, to US dollar equivalents using the most beneficial rate possible for each crop year. Converting from Canadian to US funds, this means using the strongest Canadian dollar levels for the year, providing the highest possible US price for Canadian wheat sales. Using annual average rates, the US dollar equivalent for Canadian dollar (CWB) prices would be about US\$10 per tonne lower than those expressed in the chart.

4.1.2 Weighted Average Prices

Gray argues that the most appropriate comparison in this benchmarking exercise would be to compare CWB prices – which are weighted average prices – to U.S. weighted average prices³¹. Table 4.1 below provides USDA simple and weighted average prices of all wheat marketings (all classes of wheat combined in one figure) for each crop year since 1990-91. Generally speaking, the weighted average prices are typically only slightly below the simple average prices that USDA also generates; in two years the weighted average marketing was above the simple average for those years.

Table 4.1 Average Wheat Prices (US\$ bushel)

Crop Year	Simple Average	Weighted Average	Diff
90-91	\$ 2.56	\$ 2.61	\$ 0.05
91-92	\$ 3.21	\$ 3.00	\$ (0.21)
92-93	\$ 3.25	\$ 3.24	\$ (0.01)
93-94	\$ 3.33	\$ 3.26	\$ (0.07)
94-95	\$ 3.52	\$ 3.45	\$ (0.07)
95-96	\$ 4.76	\$ 4.55	\$ (0.21)
96-97	\$ 4.28	\$ 4.30	\$ 0.02
97-98	\$ 3.39	\$ 3.38	\$ (0.01)
98-99	\$ 2.67	\$ 2.65	\$ (0.02)
99-00	\$ 2.53	\$ 2.48	\$ (0.05)
00-01	\$ 2.70	\$ 2.62	\$ (0.08)
01-02	\$ 2.82	\$ 2.78	\$ (0.04)

Source: USDA

Applying this relationship (between weighted average and simple average) to the PNW track prices provides a sense of weighted average marketings on the basis of PNW prices. A comparison of average #1 DNS 14 prices, basis track PNW (adjusted to reflect the weightings of farm marketings) to CWB #1 CWRS 13.5 instore prices is presented in Table 4.2 below³². Even using this metric, the CWB results are below the weighted average selling price in the U.S.

³¹ Appendix, p. 5.

³² Only those years since the elimination of EEP are presented.

Table 4.2 Weighted Average Wheat Price Comparison (US\$/t)

Crop Year	PNW Wtd Avg	CWB Price	Diff
96-97	\$ 187.38	\$ 169.80	\$ (17.58)
97-98	\$ 168.58	\$ 155.27	\$ (13.31)
98-99	\$ 153.96	\$ 143.66	\$ (10.30)
99-00	\$ 148.73	\$ 134.55	\$ (14.18)
00-01	\$ 155.44	\$ 138.02	\$ (17.42)
01-02	\$ 151.43	\$ 144.10	\$ (7.33)

It should be noted that the CWB prices used in this exercise include results from all sales, including eastern offshore exports, domestic sales, sales to the US and other exports made via the US (sales to Mexico, and destinations in the Caribbean shipped through the US Gulf ports). For this reason, it might be argued that the CWB final price is not a good representative of west coast sales values.

However, according to the CWB, domestic and US markets are “premium” markets. If this is the case, inclusion of these sales supports the CWB prices used. Conversely, removal of these sales from the average reported price levels would be expected to lower the CWB average prices as provided. Also, assuming the CWB commands a premium price in the domestic market is not to say that the CWB’s timing in this market is any better or worse than its overall performance vis a vis timing of sales.

The purpose of this exercise is simply to reinforce the issue of timing of sales. It is acknowledged that CWB prices include sales to markets other than the west coast and this is not a preferred comparison. Moreover, the manner in which prices for different grades are pooled could also skew the results. The most appropriate measure would be to compare actual sales made at the West Coast and compare these to the range of prices presented at the West Coast. Similarly, sales made elsewhere should be compared to market prices in those markets. Notwithstanding, the results of this exercise clearly demonstrate the importance of benchmarking CWB sales to market prices.

4.1.3 Observations

The observations here are three-fold. First, this analysis clearly shows the price risk with which the CWB is faced in any given year due to timing of sales only. On average, the market price of DNS on the west coast has fluctuated annually an average of US\$40.54 per tonne (C\$63.34 per tonne at prevailing exchange rates). The CWB’s sales performance is clearly at risk and any premiums over the US market prices that the CWB

may capture (as it has reported) may easily be lost due to poor timing (i.e., selling at the bottom end of that range).

The results of this analysis indicate that on the basis of FOB West Coast, average CWB sales prices for #1 CWRS 13.5 have been below the average of the U.S. equivalent market. Even though this may be expected during EEP years (as discussed above), the data clearly shows that the CWB sales levels in the non-EEP years following 1995 are still in the bottom portions of the annual ranges.

Secondly, the data suggests that CWB marketing performance is below the weighted average selling of U.S. farmers when considering the price range of the crop year.

Finally, this issue of performance related to timing of sales is conspicuously absent from Gray's benchmark. In that regard, Gray's benchmark can be considered to be incomplete.

4.2 Benchmarking Volumes Sold as Well as Price

As suggested above, measuring marketing performance for any organization should include a measure of total returns, not isolated to unit price. In other words, volumes sold relative the tonnage available should also be benchmarked. Measurements that could be developed include benchmarks relating CWB sales volumes to total available stocks (carry in plus production), analysis of the CWB's share of the global wheat market (total market, high quality market, and others), or a combination of these or others.

Although it is beyond the scope of this analysis to provide alternative benchmarking methodologies, these are presented only as indication that there are reasonable means to perform this measurement.

5. Conclusion

The major conclusion that flows from the analyses in this report is that applying Gray's methodology would significantly overvalue the Canadian Wheat Board's performance, and hence, if the procedures were to be used as an indicator of the benefits of single desk selling to farmers, these benefits would also be overstated. Gray's methodology contains a number of errors and omissions that would give rise to this overvaluation, some of which can be quantified, and some that cannot. The following summarizes the major sources of error:

- There is no justification for the downward adjustments in U.S. port or street prices described in Section 2 of this report.
- Gray incorrectly excluded country elevator storage and carrying costs and terminal storage costs. The 2000-01 CWB Annual Report records these costs as follows:
 - Country \$2.97 per tonne
 - Terminal \$0.86 per tonne
- The CWB's interest income is not generated by the performance of the CWB. It arises from a government policy that is independent of the policy to retain the CWB's monopoly. Moreover, there are indications that this policy may be terminated, regardless of the CWB's monopoly status. In effect, the government guarantee for the CWB's borrowings constitute a quasi-monopoly whose impact should be deducted from Gray's measurement of CWB performance. The interest income which Gray's methodology would include in farmer returns was, in 2000-01, a total of C\$4.18 per tonne in the wheat pool.
- A second component of the government policies that allow the CWB to earn interest income also protects it from the effects of default by its customers. When bad debts are written off, the costs are absorbed by the federal government. As with the interest rate earnings, the benefits of this policy are independent of the policy to protect the single desk, and are just as potentially vulnerable.
- Gray incorrectly excluded additional freight charges and grain drying from charges that should be included in the CWB "basis" determination; these are line items in the pool account and, like storage and carrying costs, should be included in CWB basis costs. In 2000-01, these amounted to \$1.62 per tonne in the wheat pool.
- Gray's methodology includes returns from both Canadian domestic sales and U.S. export sales in CWB returns, and compares the result with U.S. PNW port prices, which largely reflect only the export market. North American markets are acknowledged to be premium markets; by including these sales, the total CWB returns are assumed to be inflated (relatively) by these North American premiums. Removing these sales from the benchmarking procedures would reduce the measured benefits in Gray's methodology.

- Gray's postulated strategy of diverting grain away from the high quality market in order to force prices higher cannot work. There are two reasons for this:
 - First: The calculations performed in Section 3 show that only if: (1) demand elasticity in the high quality market is high, (2) prices in the low quality market are unaffected by the diverted volume, and (3) a large percentage (about one-third) of the available high quality wheat is diverted would Gray's proposed methodology show a significant increase in total CWB returns.
 - Second: Even this theoretical increase could not, in practice, be realized because the price spreads between grades and classes of wheat that Gray's proposed methodology yields could not occur in a real market. These spreads, therefore, would have to narrow.
- This analysis has shown that the marketplace for wheat provides an ever-changing price landscape in which to market. Like all exporters in the global marketplace, the CWB is presented with a range of prices and a range of demand at different price levels. To measure marketing performance, achieved sales levels must be compared to the range of possible prices during the time frame being monitored. Gray's exclusion of this factor in his benchmark is a serious omission.
- The volume of grain sold is an important measure of marketing performance. Unfortunately, Gray did not consider this in his methodology.

In addition to the major conclusions summarized above, the analyses carried out in this report have uncovered a number of less significant flaws in the benchmarking process. These are as follows:

- Gray is inconsistent and arbitrary in what he has included and excluded from his street price calculations. He has missed certain items that, using his own analytical approach, should be included and excluded other costs that should form part of the basis. (Section 2.2)
- Gray claims that street price spreads by grade of wheat are not available and that port spreads should be used as a surrogate. Applying the port spreads to street prices may generate errors because of the impacts of arbitrage between various markets and the impact on country elevator price. (Section 2.4)
- Gray is inconsistent in deducting check-offs from U.S. street prices but not from Canadian prices. He alludes to selected market development costs that should be deducted from U.S. street prices, but fails to deal with corresponding costs in Canada. (Section 2.5)

- He is unclear as to the use of track or FOB prices in his discussion of port prices. Moreover, he appears unfamiliar with the manner in which wheat is traded through the PNW ports. (Section 3)
- He includes certain market development costs in the U.S (notably expenditures by the U.S. Wheat Associates) but ignores Agriculture Canada's contribution to CIGI's budget.

The net return to the farmer is the key measurement of CWB performance, and the quantifiable overstatement of the alleged benefit to the farmer through the use of Gray's benchmark is substantial and material. In the event that the CWB used Gray's methodology in determining its published benchmarks, it can be argued that the quantifiable errors and omissions in the benchmark would more than negate the claimed benefits calculated by the CWB. However, it is unknown how the CWB employed Gray's benchmark methodology.

Appendix A

Table 1A- Annual CWB Benchmarks

Benchmark 1: Street Price Performance (CND\$/tn)		Area average
S1	Average Canadian Street price (final pool return)	
Base Grade of #1 CWRS 13.5		
		Area average
S2	Equivalent U.S. Street Price	
S3	Estimated non-CWB market street price	
Benchmark 3:		
B1	Street Price Comparison (S1-S3)	

Table 1A – Annual CWB Benchmarks (Continued)

Benchmark 2: Logistics and Basis Performance (CND\$/tn)

U.S. Equivalent Basis Charges (\$ per tonne shipped)	Bisbee N. Dakota	Wolf Point Montana	Rudyard Montana	CWB area Average
L1	Rail Freight Deducted*			
L2	Elevation and Handling Charges			
L3	U.S. Street to port basis charges			

Canadian Basis Charges (\$ per tonne shipped)	Glenboro Manitoba	Moose Jaw Sask.	Medicine Hat Alberta	CWB area Average
L4	Port and Rail Demurrage			
L5	Port Despatch			
L6	Rail freight rate deduction (\$/t)			
L7	Cleaning Charges			
L8	Primary Elevation Charges			
L9	Terminal Elevation Charges			
L10	Trucking Premiums Paid			
L11	Blending Rents Earned			
L12	Dockage charges/(payments)			
L13	CWB administration			
L14	Total Cdn. Street to Port Basis Charges			
L15	Farm gate to Elevator costs			
L16	Average farm- elevator trucking distance (km)			
L17	Estimated farm to elevator delivery cost \$/tn			

Benchmark 2:

B2	Total Cdn. Farmgate basis charges (L14+L15)			
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Benchmark 3: Marketing Performance (CND\$/tn)

P1	Realized CWB Net port price	
P2	Equivalent U.S. average port price	
P3	Adjustments to US port price	
P4	Estimated non-CWB market net FOB port prices	

Benchmark 3:

B3	Marketing Performance Comparison (P3-P11)	
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Appendix B

TABLE B1 Analysis of Returns under Varying Elasticities

Case 1 Elasticities: -1 in both markets

High quality market

CWB Sales	US/AUS Sales	Total Sales	Supply reduction (ratio)	Price	Total revenue	CWB Revenue
(mmt)	(mmt)	(mmt)		\$/t	\$ m.	\$ m.
5.467	6.2	11.7		160.00	1,869	875
4.967	6.2	11.2	0.043	166.85	1,865	829
4.467	6.2	10.7	0.045	174.31	1,861	779
3.967	6.2	10.2	0.047	182.47	1,857	724
3.467	6.2	9.7	0.049	191.44	1,853	664
2.967	6.2	9.2	0.052	201.33	1,848	597
2.467	6.2	8.7	0.054	212.29	1,842	524
1.967	6.2	8.2	0.058	224.52	1,836	442

Low quality market

CWB Sales	All other Sales	Total Sales	Supply increase (ratio)	Price	Total revenue	CWB Revenue
(mmt)	(mmt)	(mmt)		\$/t	\$ m.	\$ m.
11.8	102.2	114.0		120.00	13,680	1,417
12.3	101.7	114.0	0.000	119.47	13,620	1,471
12.8	101.2	114.0	0.000	118.95	13,560	1,524
13.3	100.7	114.0	0.000	118.43	13,501	1,576
13.8	100.2	114.0	0.000	117.91	13,442	1,628
14.3	99.7	114.0	0.000	117.39	13,383	1,680
14.8	99.2	114.0	0.000	116.88	13,324	1,731
15.3	98.7	114.0	0.000	116.36	13,265	1,782

Total CWB returns
\$ m.
2,292
2,300
2,303
2,300
2,292
2,277
2,255
2,223

Case 2 Elasticities: -2 in high quality market; -0.5 in low quality market

High quality market

CWB Sales	US/AUS Sales	Total Sales	Supply reduction (ratio)	Price	Total revenue	CWB Revenue
(mmt)	(mmt)	(mmt)		\$/t	\$ m.	\$ m.
5.467	6.2	11.7		160.00	1,869	875
4.967	6.2	11.2	0.043	173.70	1,942	863
4.467	6.2	10.7	0.045	189.24	2,021	845
3.967	6.2	10.2	0.047	206.96	2,107	821
3.467	6.2	9.7	0.049	227.29	2,200	788
2.967	6.2	9.2	0.052	250.77	2,302	744
2.467	6.2	8.7	0.054	278.09	2,414	686
1.967	6.2	8.2	0.058	310.14	2,537	610

Low quality market

CWB Sales	All other Sales	Total Sales	Supply increase (ratio)	Price	Total revenue	CWB Revenue
(mmt)	(mmt)	(mmt)		\$/t	\$ m.	\$ m.
11.8	102.2	114.0		120.00	13,680	1,417
12.3	101.7	114.0	0.000	119.47	13,620	1,471
12.8	101.2	114.0	0.000	118.95	13,560	1,524
13.3	100.7	114.0	0.000	118.43	13,501	1,576
13.8	100.2	114.0	0.000	117.91	13,442	1,628
14.3	99.7	114.0	0.000	117.39	13,383	1,680
14.8	99.2	114.0	0.000	116.88	13,324	1,731
15.3	98.7	114.0	0.000	116.36	13,265	1,782

Total CWB returns
\$ m.
2,292
2,334
2,369
2,397
2,416
2,424
2,417
2,392

TABLE B1 (continued) - Analysis of Returns under Varying Elasticities

Case 3 Elasticities: -1 in high quality market; 0 in low quality market

High quality market

CWB Sales (mmt)	US/AUS Sales (mmt)	Total Sales (mmt)	Supply reduction (ratio)	Price \$/t	Total revenue \$ m.	CWB Revenue \$ m.
5.467	6.2	11.7		160.00	1,869	875
4.967	6.2	11.2	0.043	166.85	1,865	829
4.467	6.2	10.7	0.045	174.31	1,861	779
3.967	6.2	10.2	0.047	182.47	1,857	724
3.467	6.2	9.7	0.049	191.44	1,853	664
2.967	6.2	9.2	0.052	201.33	1,848	597
2.467	6.2	8.7	0.054	212.29	1,842	524
1.967	6.2	8.2	0.058	224.52	1,836	442

Low quality market

CWB Sales (mmt)	All other Sales (mmt)	Total Sales (mmt)	Supply increase (ratio)	Price \$/t	Total revenue \$ m.	CWB Revenue \$ m.
11.8	102.2	114.0		120.00	13,680	1,417
12.3	101.7	114.0	0.000	120.00	13,680	1,477
12.8	101.2	114.0	0.000	120.00	13,680	1,537
13.3	100.7	114.0	0.000	120.00	13,680	1,597
13.8	100.2	114.0	0.000	120.00	13,680	1,657
14.3	99.7	114.0	0.000	120.00	13,680	1,717
14.8	99.2	114.0	0.000	120.00	13,680	1,777
15.3	98.7	114.0	0.000	120.00	13,680	1,837

Total CWB returns \$ m.
2,292
2,306
2,316
2,321
2,321
2,315
2,301
2,279

Case 4 Elasticities: -2 in high quality market; 0 in low quality market

High quality market

CWB Sales (mmt)	US/AUS Sales (mmt)	Total Sales (mmt)	Supply reduction (ratio)	Price \$/t	Total revenue \$ m.	CWB Revenue \$ m.
5.467	6.2	11.7		160.00	1,869	875
4.967	6.2	11.2	0.043	173.70	1,942	863
4.467	6.2	10.7	0.045	189.24	2,021	845
3.967	6.2	10.2	0.047	206.96	2,107	821
3.467	6.2	9.7	0.049	227.29	2,200	788
2.967	6.2	9.2	0.052	250.77	2,302	744
2.467	6.2	8.7	0.054	278.09	2,414	686
1.967	6.2	8.2	0.058	310.14	2,537	610

Low quality market

CWB Sales (mmt)	All other Sales (mmt)	Total Sales (mmt)	Supply increase (ratio)	Price \$/t	Total revenue \$ m.	CWB Revenue \$ m.
11.8	102.2	114.0		120.00	13,680	1,417
12.3	101.7	114.0	0.000	120.00	13,680	1,477
12.8	101.2	114.0	0.000	120.00	13,680	1,537
13.3	100.7	114.0	0.000	120.00	13,680	1,597
13.8	100.2	114.0	0.000	120.00	13,680	1,657
14.3	99.7	114.0	0.000	120.00	13,680	1,717
14.8	99.2	114.0	0.000	120.00	13,680	1,777
15.3	98.7	114.0	0.000	120.00	13,680	1,837

Total CWB returns \$ m.
2,292
2,340
2,383
2,418
2,445
2,461
2,463
2,447

Appendix C

**Excerpt from Appendix to
“Benchmarks to Measure CWB Performance – Recommendations”
by Richard Gray**

Six Steps to Test the Diversion Strategy

1. Divide the quality of market into segments, for example:
 - a) DNS #1 or #2 14% or better,
 - b) DNS #1 or #2 13.5 to 13.9%
 - c) DNS #1 or #2 13 to 13.4%
 - d) HRW #1 or #2 11.6 to 12.9%
2. Determine the base premiums over some base grade (eg. HRW 11.5) for each of these qualities by taking an average of the lowest three years in the last fifteen years, for example.
3. Calculate the scarcity premium, Pa, Pb, Pc and the quantity the CWB sold into each of these market segments, Qa, Qb, Qc and Qd.
4. From CWB sales records, determine the net amount that the CWB moved into or out of (referred to as diversion in Figure A1) each market segment Da, Db, Dc and Dd. This would be indicated if a particular sale was priced against a lower grade than that specified in the Canada/U.S. street price comparison.
5. Calculate the price impacts, Ka, Kb, Kc, and Kd using an excess demand elasticity equal to minus one at the quantity the CWB sold into each market segment. $Ka = Da \times Pa / (Qa + Da)$.
6. Apply an adjustment of Ka, Kb, Kc, and Kd to the U.S. benchmark prices in the respective market segments.