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Evaluation of Changes in Grade Specifications for Dockage in Wheat

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TABLE OF CONTENTS

LIST OF TABLES

APPENDIX TABLES

LIST OF FIGURES

ABSTRACT

Dockage levels in U.S. wheat exports have been a continuing concern. Recent proposals have focused on changes in U.S. grain standards that would include dockage limits. In this report, dockage trends and practices were documented and effects of prospective changes evaluated. Results indicate the marketing system is currently working effectively with costs of extra cleaning being borne partly by buyers, elevators, and to some extent farmers. Suggested mandates would increase cleaning and result in increased costs (ultimately discounts to growers) and potentially in shifts in grades purchased. Proposed changes in grain standards are also a departure from the generally followed approach to regulation in the United States. In this case, a regulation is being imposed on a problem that is resolvable within the marketing system through contractual relations between buyers and sellers. In addition, past changes in factor limits have been applied for all wheat and have not differentiated by destination (e.g., domestic or export).

Keywords: Wheat, Grades, Classification, Dockage, Cleaning, Wheat Exports, Premiums, and Discounts.

HIGHLIGHTS

The marketing system with regard to quality valuation and dockage in particular has been working fairly effectively. This is a result of more educated and commercial buyers, and competition among exporting firms. Dockage is being removed where/how in the system it is most efficient and levels of dockage in export shipments are declining. This is most apparent in exports of No. 1 HRS and HRW and for exports shipped from PNW port locations. Levels of dockage vary substantially across importers and, as a result, the additional cost of dockage removal is being absorbed mostly by those willing to pay those additional costs (i.e., it is a U.S. form of discrimination).

Elevators in the U.S. HRS region are now adjusting to tighter dockage specifications by adding cleaners with greater capacity and cleaning most of their receipts. This is being done mostly in the interior, but also at the point of export. No doubt this is evolving toward a pricing structure in which the added cost of cleaning is being absorbed partly by buyers specifying cleaned wheat, and partly by elevators (in terms of investment costs) and to a limited extent (presently) by growers in the form of explicit discounts. U.S. cleaning margins still are far short of those in Canada. The primary reasons for this are: 1) the explicit margin applied in Canada (6.7 ¢/bu); 2) the reclaim process; and 3) lower cleaning costs due to lower fixed costs at country positions.

Any proposal (whether through standards or commercially) regulating dockage would have the impact of requiring greater cleaning than done currently. This would have two important impacts. One is that costs to the system would increase, resulting ultimately in discounts to growers due to it being imposed for sales to importers not demanding cleaner wheat (i.e., not willing to pay the additional cost of cleaned wheat). Second, there is a risk that some buyers would shift grades purchased so as to incur lower costs. Associated with this would be the reduction in other grade factors commensurate with the lower grades.

The conventional approach to policy changes in U.S. grade standards has been fairly clear. For easily measurable characteristics (e.g., protein, dockage, etc.) provide accurate testing and allow the market to resolve tradeable levels which are potentially unique to each market/customer. For others that are not easily measurable (e.g., food safety items, end-use performance measures, feed wheat, etc.), develop regulations on acceptable limits. Ultimately, these have the impact of reducing search costs (search, testing, ... etc.) within the marketing system.

Imposing factor limits on dockage is a radical departure from the above generally followed approach to regulation. In this case, a regulation is being imposed on a problem easily resolvable within the marketing system through contractual relations between buyers and sellers. This is in contrast to the numerous other issues related to wheat quality that are avoided, even though their resolution is not easy within the marketing system. In addition, past changes in factor limits have been applied for all wheat and have not differentiated by destination (e.g., domestic or export).

Given the trends in the market, the proposed regulations appear to be replicating what the market already appears to be converging toward. Thus, the policy could expedite the process, and would be non-discriminatory, meaning its cost would be borne/shared more broadly. In the larger scheme, the additional costs of these regulations would not be that great. The primary reason for this is that in the United States, particularly the HRS producing region, has already been making a transition toward cleaner wheats being exported.

An issue of importance in the United States is reclaim technology. This process is a substantive regulation which is relaxed in Canada and has the impact of ultimately reducing cleaning costs. While it is not exactly clear on how this is administered in the United States, the presumption is that U.S. regulations do not favor similar treatment. Survey results for elevator managers in North Dakota and Montana indicate 80% of elevators who sold wheat lost in cleaning as screenings. Further, survey results suggest more wheat may be lost in cleaning than previously thought. Regardless of the outcome of this process, this should be revisited.

Much of the motive of these policy changes is due in part to pricing practices with respect to quality from Canada. However, it would be naive to think that even if the United States exactly replicated the Canadian standards/system for cleaning that the United States would gain market share. Rather, it would be more likely that the ruinous nature of price competition would continue, with the exception that one dimension of differentiation would be removed.

Evaluation of Changes in Grade Specifications for Dockage in Wheat

William W. Wilson and Bruce L. Dahl[*]

INTRODUCTION

Dockage levels in U.S. wheat exports have been a continuing area of discussion in recent years. Concerns over quality consistency of U.S. wheats have been voiced in export markets and in many cases focus on cleanliness (Mercier, and Stevens and Rowan). Extensive study was conducted in the early 1990s on cleaning of U.S. exports by commodity (Wilson, et al.). In recent years, many importers (Japan and Korea, among others) are requiring increasingly more stringent limits on dockage levels in U.S. wheat exports. Recently, USDA proposed varying programs to support development of cleaning capabilities at export facilities. All of these factors have resulted in a debate as to inclusion of dockage as a grade determining factor in U.S. grain standards.

The United States does not utilize dockage as a grade determining factor. Rather, it depends on specifications for dockage within it's marketing system as a mechanism for controlling/reducing the amount of dockage in exports. In contrast, competitors (Canada and Australia) rely on regulations to clean wheat (Wilson, Johnson and Dahl). Currently, alternative proposals are being advanced in an effort to reduce the amount of dockage in U.S. exports of wheat. An alternative proposed is to apply factor limits for dockage in U.S. wheat exports. These would limit dockage to a maximum of .3% for No. 1, .5% for No. 2, .7% for No. 3 and 1.0% for No. 4 (U.S. Wheat Associates, 2000).[1]

In this report, several aspects of alternative policies toward dockage are examined. First, dockage at various levels within the U.S. wheat marketing system and over time are documented. Second, dockage practices of competitor countries will be summarized. Third, cost analysis of alternative policies will be examined. Finally, impacts of alternative polices will be identified and explored.

Dockage in the U.S. Wheat Marketing System

Dockage levels are reported at different levels within the marketing system by different agencies and organizations for the various wheat classes. These vary from farm level quality surveys for Northern Regional Production (ND, SD, MN, MT) and all wheat production by U.S. Wheat Associates to export quality surveys. Further, data from grain inspections have been used to document levels of dockage for shipments out of Kansas and for export shipments (USDA-GIPSA). These different levels provide an overview of how dockage changes (is removed/blended) throughout the marketing system.

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[1] An additional proposal was to utilize the Export Enhancement Program (EEP) to provide financial incentives to exports to provide cleaner wheat for exports.

Harvest (Farm Level) Quality

Production quality surveys for ND, SD, MN, and MT indicate that dockage levels have varied by state through time for both Durum and Hard Red Spring (HRS) wheats (Figures 1-2).

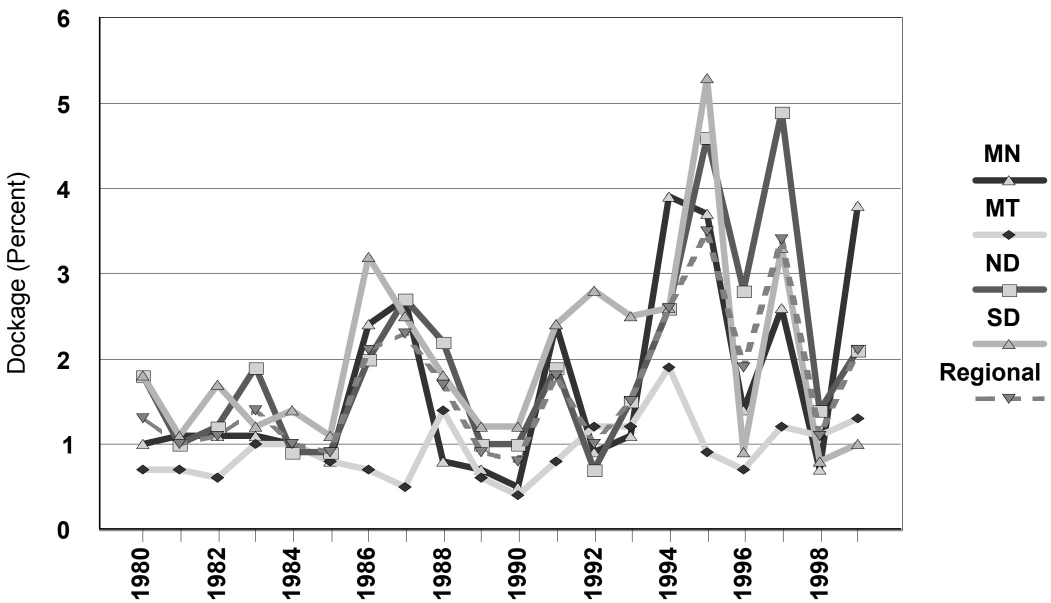

Figure 1. Average Dockage Levels for Northern Regional HRS Production, by State and Region, 1980-1999.

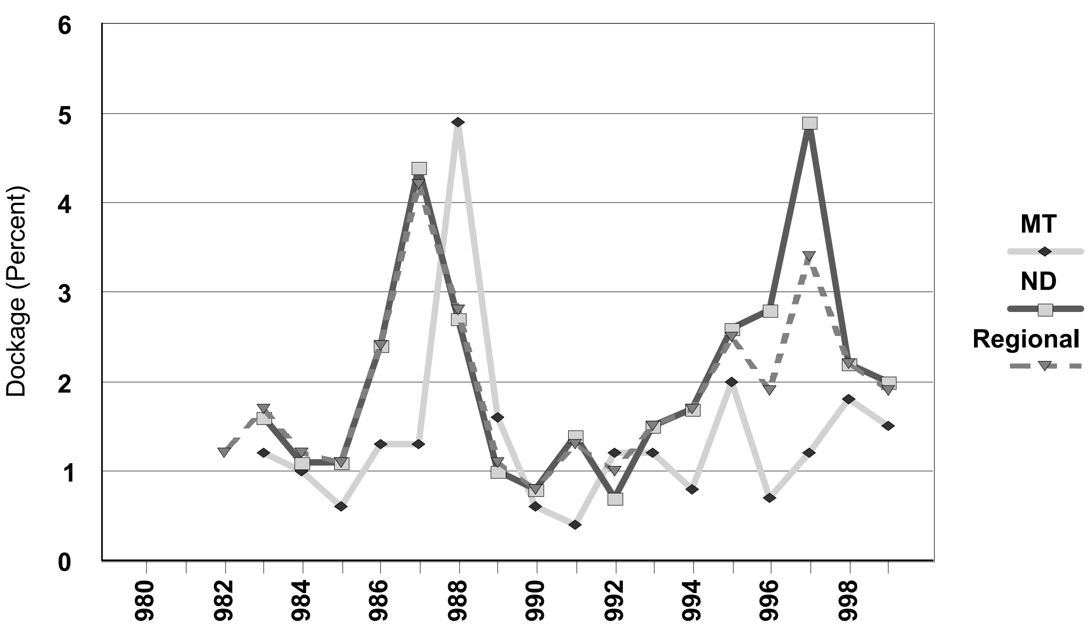

Figure 2. Average Dockage Levels for Northern Regional Durum Production, by State and Region, 1982-1999.

For HRS, dockage levels averaged less than 2% in the early 1980s and there has been an increase in the levels and the variability of dockage since 1993. Dockage levels for the region were largest in 1995 averaging 3.5%. Montana generally has the lowest dockage levels in the four state region for HRS, while South Dakota generally has the highest dockage levels. In the late 1990s, both North Dakota (1996-98) and Minnesota (1999) had the highest level of dockage.

Dockage levels for Durum were largest in two periods, 1987 to 1988 and 1995 to 1998 (Figure 2). During 1987 dockage levels for North Dakota exceeded 4%, while in 1988 dockage levels for Montana were near 5%. In the later period (1995-1998) dockage levels for North Dakota exceeded 2% and have been .5% to 3% higher than in Montana. Other than these two periods, dockage levels for Durum have averaged less than 2%.

U.S. Wheat Associates (various years) also reports harvest quality for farm production for the wheat classes. Dockage levels are reported for each class and also for segregations within specific classes are indicated for prospective destinations for HRS and Hard Red Winter (HRW). For example, in HRS, dockage levels are reported for low, medium, and high protein segregations and also presented based on whether traditional production is destined for the Pacific North West (PNW) or Gulf/Great Lakes areas. Dockage levels from 1993 to 1999 are lowest for HRW (Figure 3). Dockage levels for HRS and Durum are in most cases similar to those for the regional quality survey noted above. However, these deviate in some years.

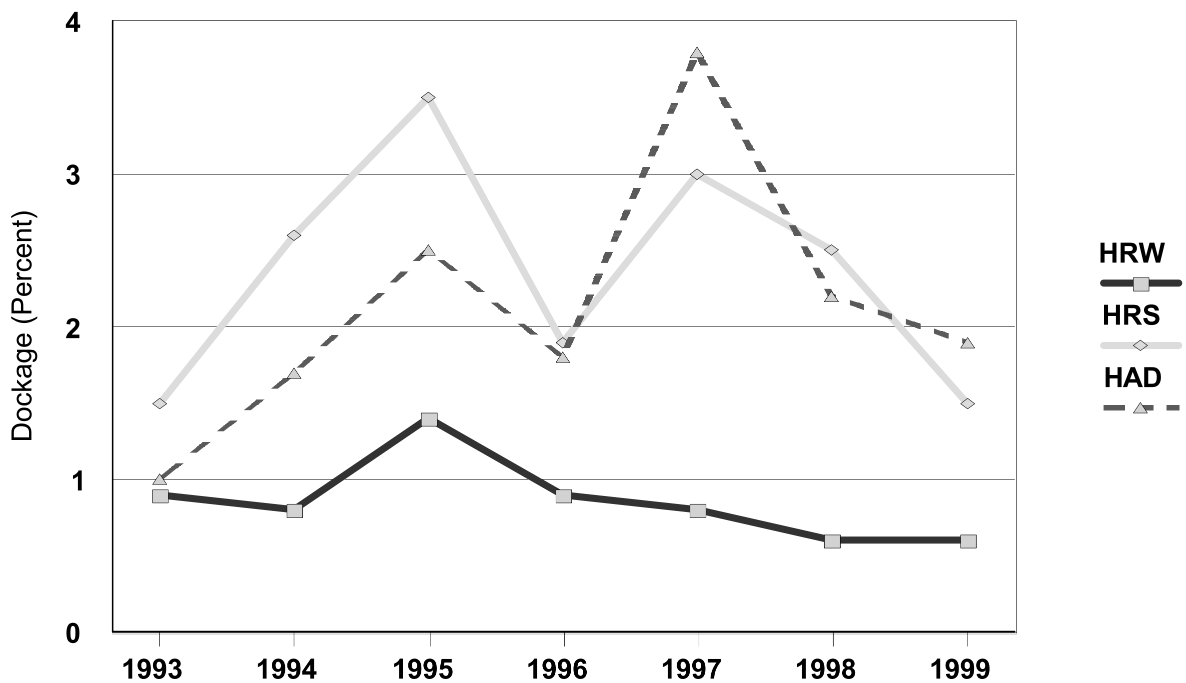

Figure 3. Harvest Quality of Wheat Production by Class: U.S. Wheat Associates.

Intermediate Shipment Quality

The state of Kansas documents dockage levels of wheat for outbound destinations. This occurs as the state of Kansas operates the agency responsible for grain inspection within Kansas.[2] These data represent intermediate shipments from country elevators to port and domestic processors outside of Kansas. This data taken in combination with harvest level surveys suggests the potential extent of cleaning at local elevators. Intermediate shipment data are summarized by origin within the state, dockage level, and for all outbound shipments.

Average dockage levels for intermediate shipments increased in 1995 and 1996, most likely reflecting the high dockage in HRW production that occurred in 1995 (Figure 4). However, average levels have since declined. The proportion of shipments in the lower dockage level categories have also increased from 1997 to 1999 (Figure 5).

Dockage for North Dakota elevator shipments were elicited through annual surveys conducted from 1986 to 1991 (Figure 6). These provide an indication of the level of country elevator cleaning during that time. Data were gathered on what levels local elevators considered farm deliveries clean (no further cleaning needed) and to what level of dockage they cleaned wheat when dockage exceeded what they considered clean. These values were collected for both harvest and post harvest time periods.

Surveys from 1986 to 1991 indicated elevator managers cleaned to tighter specifications in post harvest periods, averaging .7 to .84% dockage when they cleaned versus .8% to 1.1 during harvest periods. Managers over the same period considered wheat cleaned when dockage was less than 1.4% to 2.1% after harvest period. Levels of dockage considered clean show a decline from 1986 to 1991. However, the levels of dockage to which elevators cleaned to were fairly constant from 1986 to 1991.

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[2] Similar data are not available for North Dakota as grain inspections are conducted by several different firms.

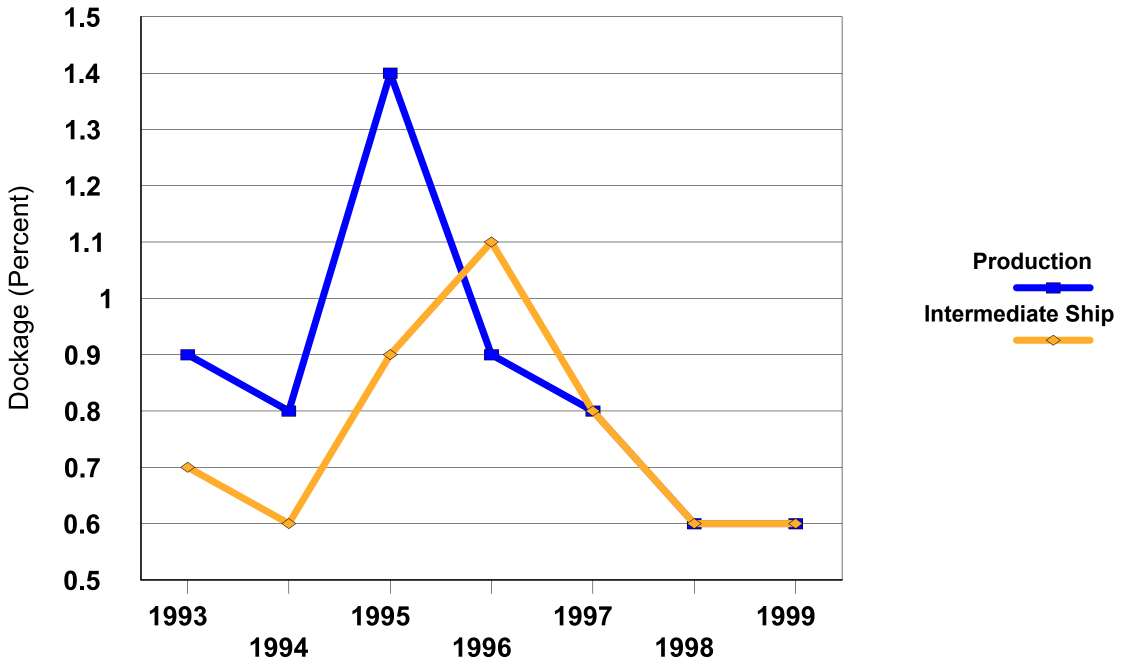

Figure 4. Dockage Level for Production and Intermediate Shipments of HRW from Kansas to Outside Destinations (Export Ports and Domestic Processors).

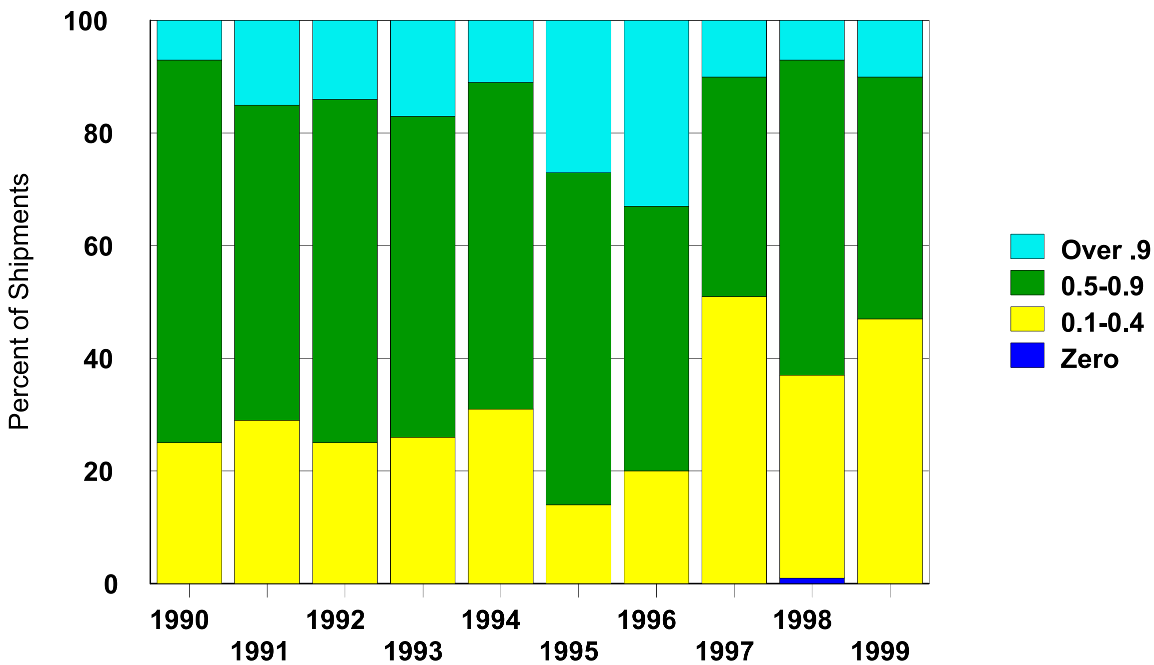

Figure 5. Percent of Intermediate Shipments of HRW from Kansas by Dockage Level.

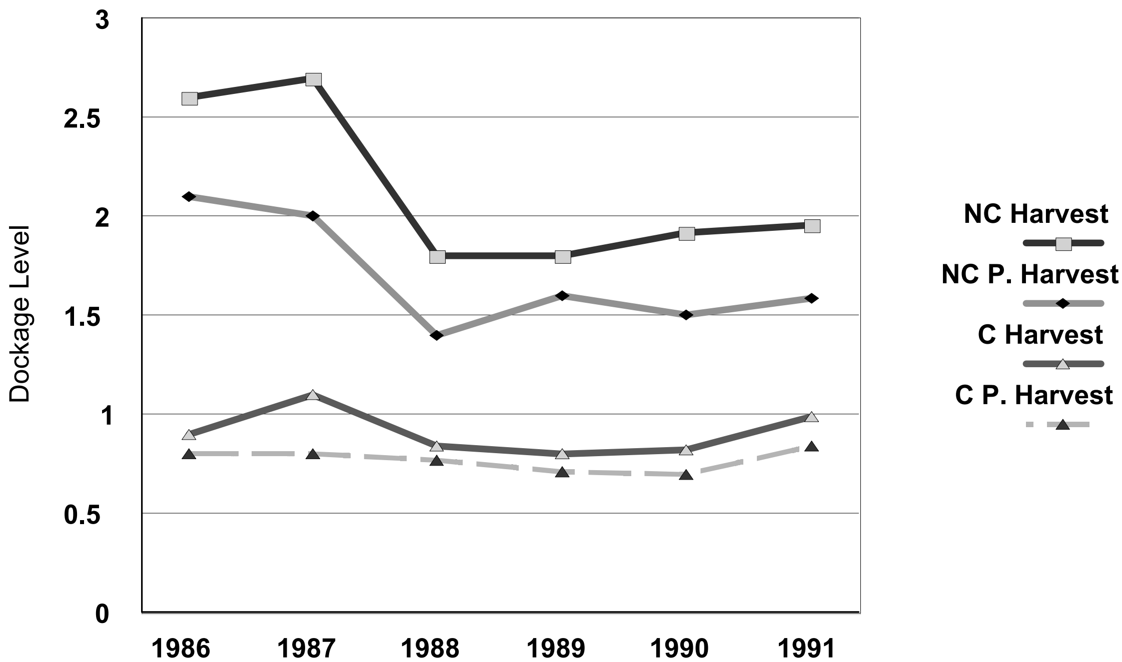

Figure 6. Average Levels Considered Clean (NC) and Dockage Levels Cleaning to (C) for Harvest and Post-Harvest Periods From Surveys of North Dakota Elevator Managers, 1986-1991.

Export Quality

Dockage levels for export shipments are taken from two sources. First U.S. Wheat Associates conducts an annual survey of cargo quality for export shipments. Second, Grain Inspection Packers and Stockyards Administration (GIPSA) maintains data on grain characteristics for wheat inspected for export. This data contains information on maximum, minimum, and average dockage levels for individual shipments along with other grade characteristics. The difference between these two data sources lies in the number of observations they contain and characteristics evaluated. The U.S. Wheat survey data contains samples obtained from selected export shipments and includes values for grade and end-use characteristics, whereas, the GIPSA data contains observations for all export inspections and focuses on mainly grade factors and contract items (dockage, moisture, protein).

Using data from U.S. Wheat Associates (various years), average dockage levels for HRS and HRW have shown declines from highs in 1993 and 1994/95, respectively (Figure 7). However, dockage levels from 1994 on for HRS and Hard Amber Durum (HAD) are relatively unchanged. Dockage levels in the 1998 marketing year averaged .8% for HRS, .7% for HAD, and .5% for HRW.

Dockage levels from GIPSA data (Export Grain Inspection System - EGIS) are more revealing because they represent all export inspections rather than a survey and more parameters for dockage are collected (high, low, and average of sublot measurements for individual shipments). Average dockage levels for Durum, HRS, and HRW are lower in 1997-1999 than in prior years (Figure 8). Exports of HRS show a marked decline from .85% in the 1991/92 to .60% in 1999/00. Exports of HRW indicate a shift downward in 1997/98 from prior levels while dockage levels of durum exports fluctuated throughout the 1990s, but were the lowest in 1998/99 and 1999/00. Taken together, these data suggest average dockage levels are declining in exports of these classes of U.S. wheats, but has been more pronounced for HRS.

Dockage levels were compared for exports of Durum, HRS, and HRW by grade (Figure 9). Results for Durum indicate dockage levels have been fairly constant for grades No. 1, No. 2 or better (2ob), and No. 3 or better (3ob) during the 1990s. For HRS, there is again a marked decline in dockage levels during the 1990s for both No. 1 and No. 2ob. For HRW, the level of dockage varies for No. 1 but does not indicate a trend in movement. However, dockage levels for No. 2ob HRW display the shift toward lower dockage levels from 1997/98 on. This again appears as more of a downward shift in dockage levels in HRW rather than the downward trend that is more apparent in exports of HRS.

Dockage also varies by port area where exports are shipped (Figure 10). Exports of Durum, HRS and HRW all have lower dockage levels for exports shipped from the U.S. West Coast than from either Great Lakes or Gulf ports. Further, exports of all three classes appear to indicate a decline in levels of dockage in exports from West Coast ports since the 1996/97 marketing year.

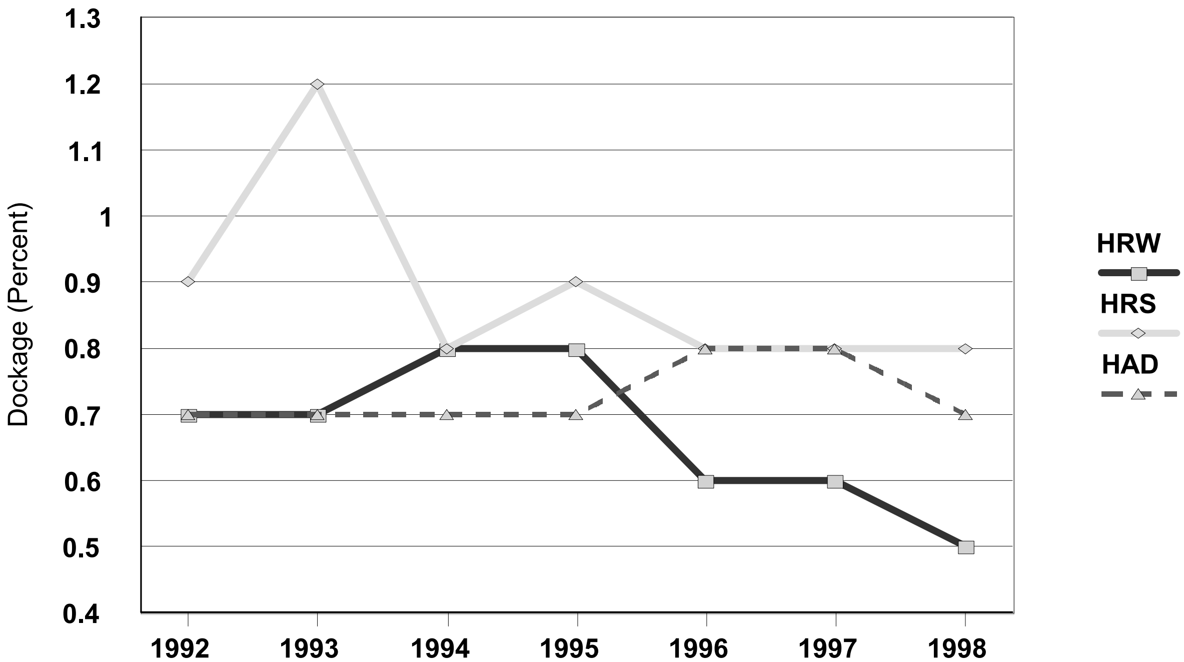

Figure 7. Average Dockage Level for Wheat by Class: Export Cargo Quality Survey, U.S. Wheat.

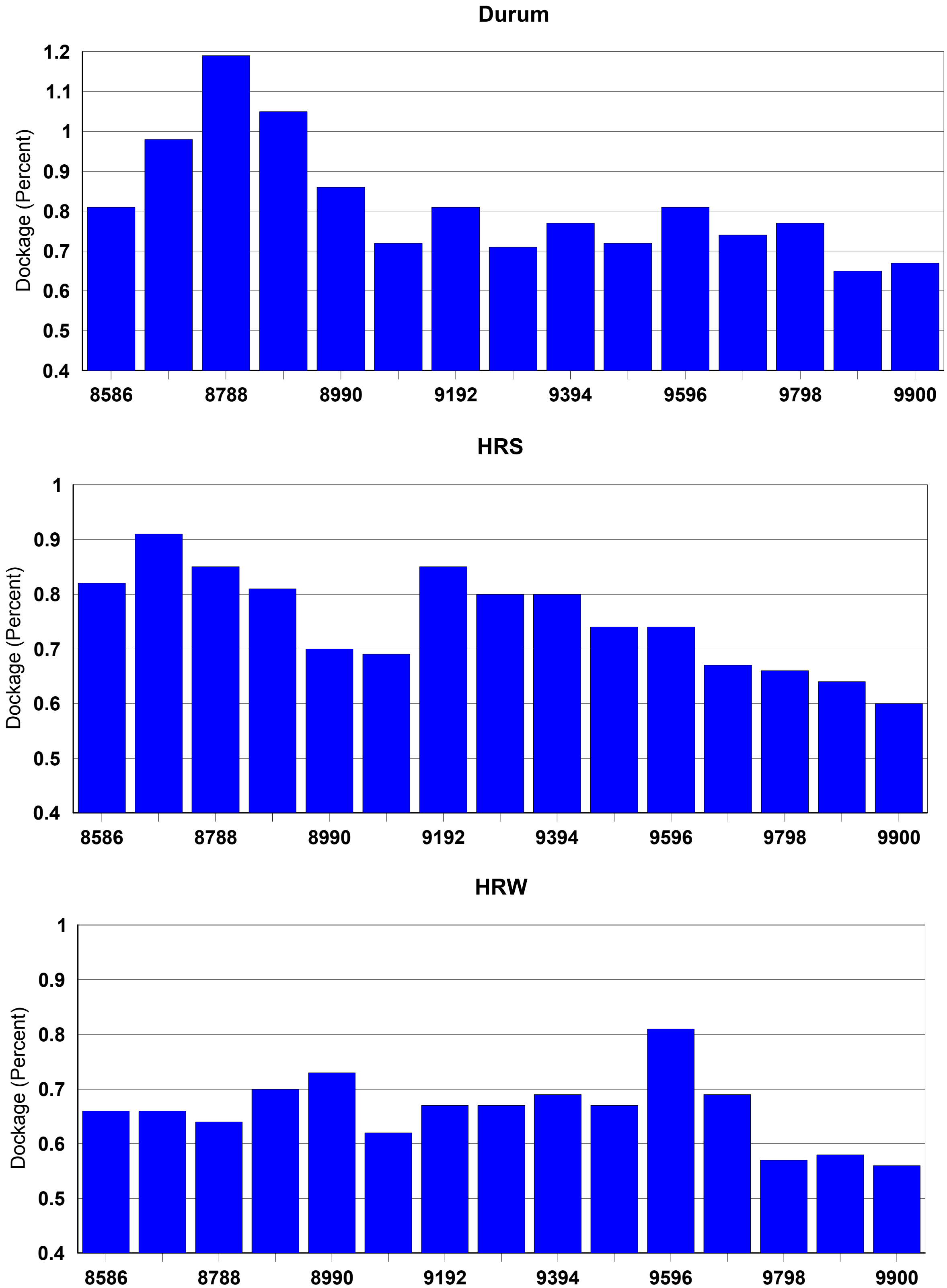

Figure 8. Average Dockage Levels for U.S. Wheat Exports by Class.

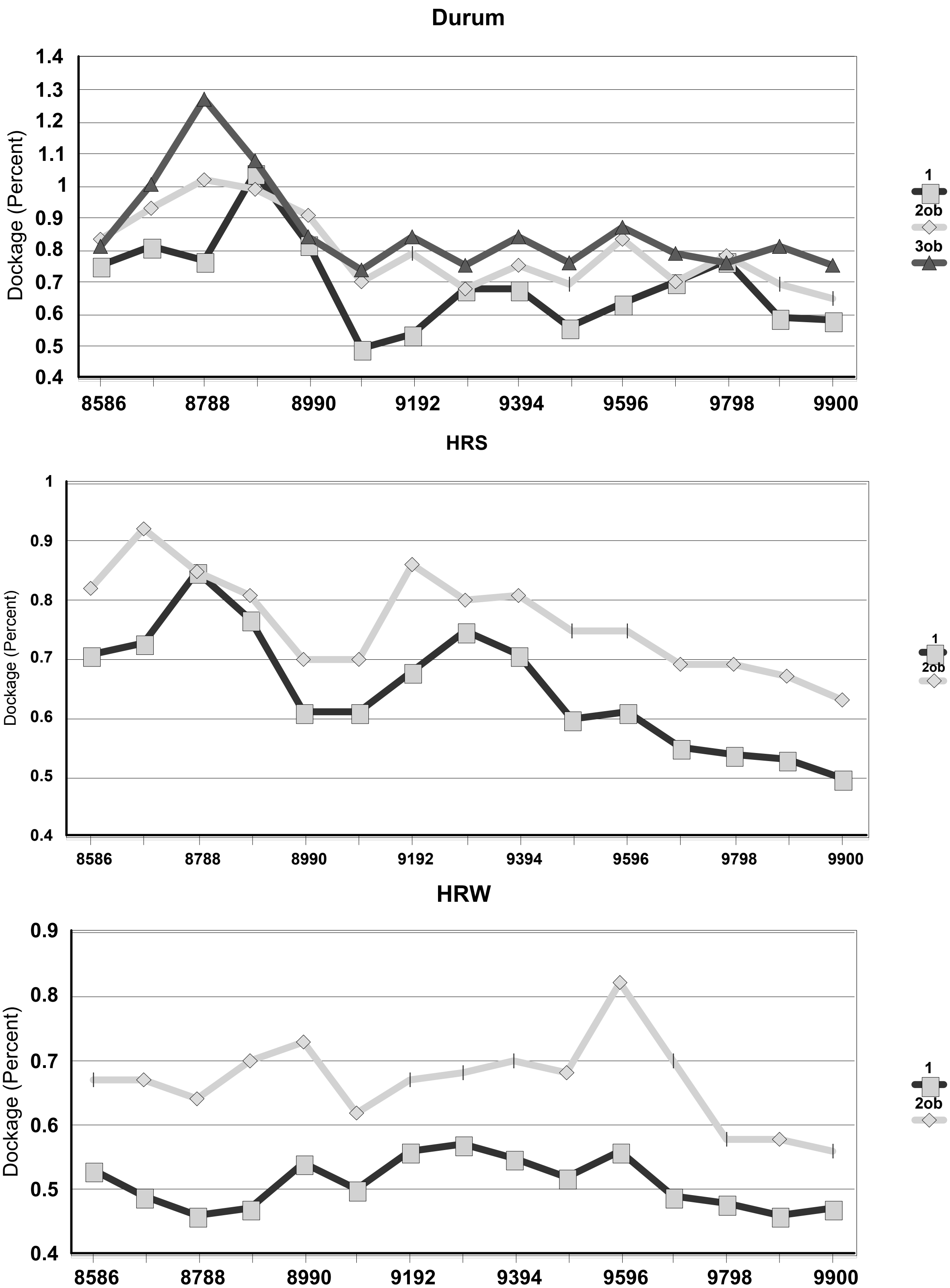

Figure 9. Average Dockage Levels for U.S. Wheat Exports, by Class and Grade.

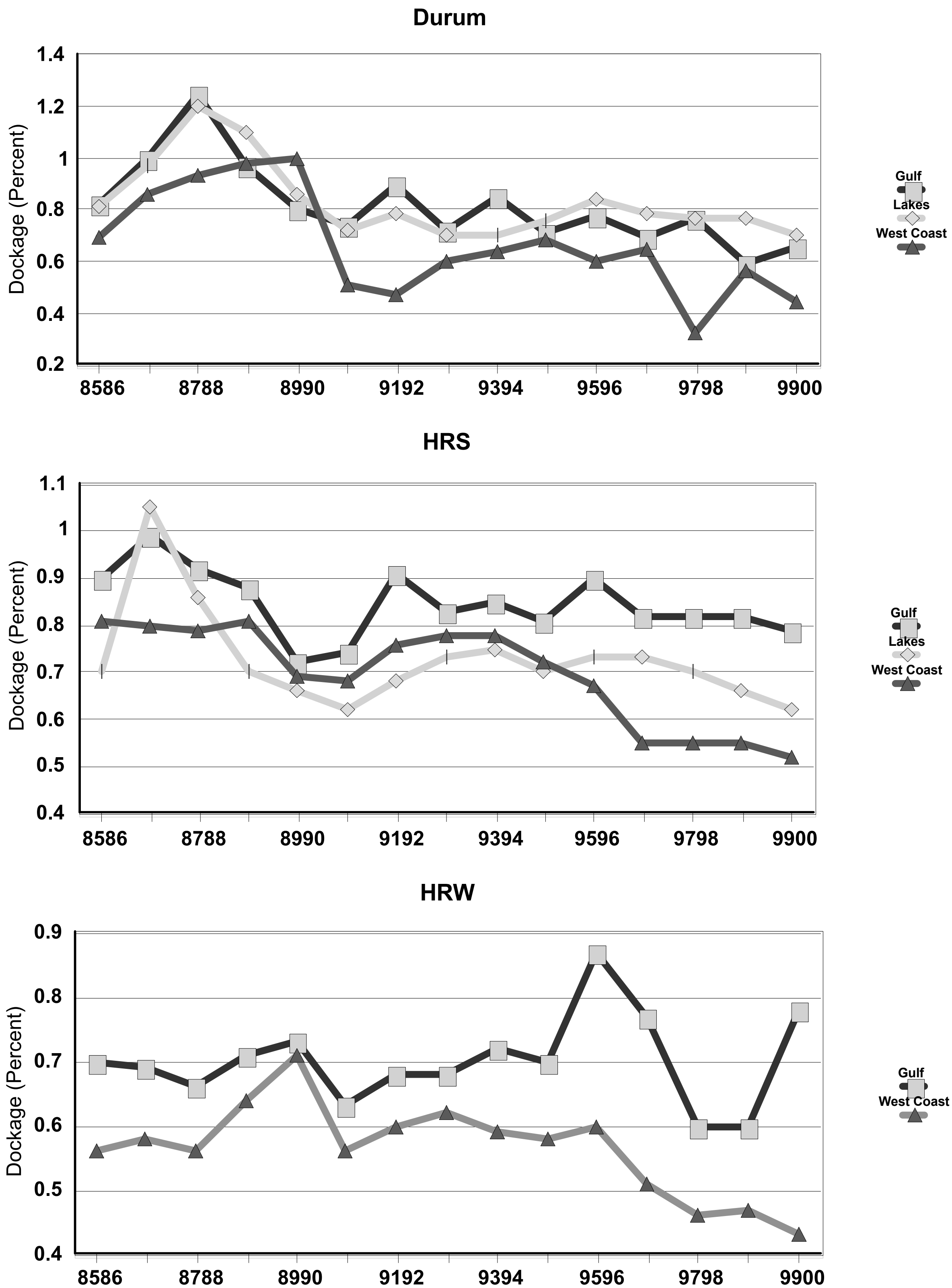

Figure 10. Average Dockage Levels for U.S. Wheat Exports by Port Area.

These results suggest a number of interesting observations. First, the average level of dockage in U.S. exports of hard wheats declined during the 1990s. This decline is more pronounced and notable for HRS and Durum than in HRW. Second, dockage levels are lesser in No. 1's than No. 2ob. Third, dockage in export shipments have declined more in the West Coast, for all classes, particularly during the past 4 years with average dockage levels now in the .5% level.

Dockage at Different Locations in the Marketing System

Dockage levels for exports by class were compared to dockage levels for production. This provides an estimate of the amount of dockage removed within the marketing system for each class. Results indicate a large deviation in dockage levels between production and export positions for HRS and Durum wheats (Figure 11). The amount of dockage removed in many years is twice as high as the final level of dockage in exports. This represents a significant level of cleaning prior to export. In contrast, the difference between production and export levels for dockage in HRW was not higher than the level of dockage in exports from 1993 to 1999. Further, only in 1995/96 was dockage removed higher than .5% for HRW. For Durum and HRS, the amount of dockage removed was typically from 1 to 3%.

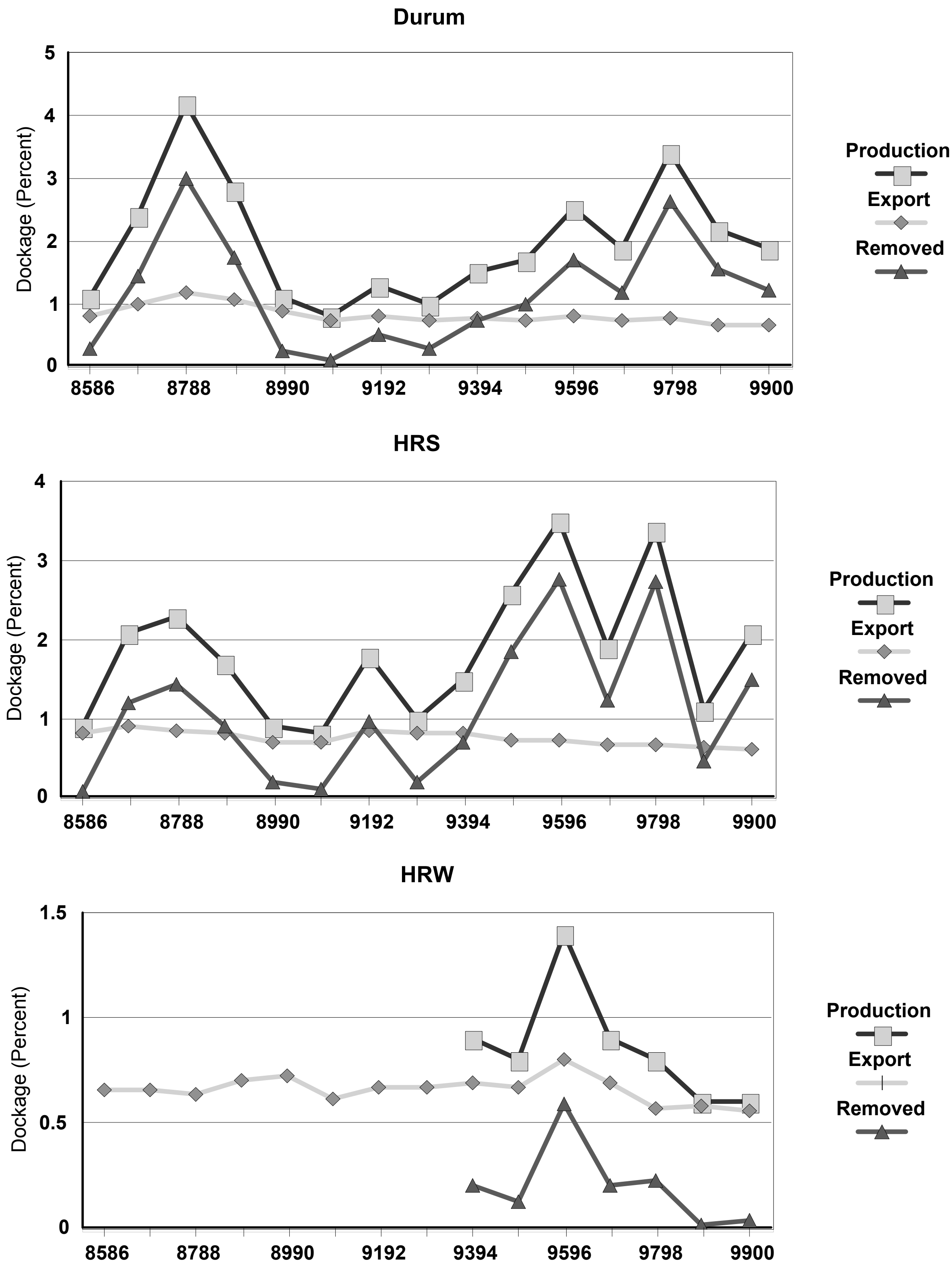

Figure 11. Average Dockage Levels for Farm Production, Export, and Estimated Amount Removed Within the Marketing System, by Class.

Dockage for Selected Importing Countries

Dockage levels were examined for importing countries in two ways. First, exports for all wheat were examined for specific importing countries over time. Then, average dockage levels were estimated for countries importing wheat in 1998/99 to 1999/00 by class. This later comparison reveals differences in dockage across importers and is done over a two year period as data for 1999/00 does not cover the complete marketing year.

Dockage levels were examined for all U.S. wheat exports to selected importing countries. Dockage levels for exports to South Korea, Taiwan, Japan, and Bangladesh from 1997/98 on have shown a marked drop in dockage levels from earlier periods (Figure 12). Dockage levels for both Taiwan and Japan declined from highs in 1992/93 (.65% and .71%, respectively) to lows near 0.4% in 1999/00 for both countries. Dockage for exports to South Korea have shown a similar decline from a high of .75% in the early 1990s to lows near .5% in 1999/00. Other importing countries (Algeria, Pakistan, Egypt, etc.) have also shown lower dockage levels since 1997/98. U.S. exports to Columbia, Mexico, Peru, and Venezuela have had dockage levels near lows (.6% to .7%) from 1997/98 on, yet these dockage levels are still within the range of dockage experienced from 1985/86 to 1996/97 (Figure 13). Thus, the trend toward lower dockage appears more country and/or region specific.

Dockage levels by class for 1998/99 to 1999/00 for individual importing countries show a wide range of average dockage levels (Figure 14). For Durum, dockage levels range from a low of .39% for El Salvador to a high of .86% for Turkey. Five countries had average dockage levels of .5% or lower (El Salvador, Kuwait, Taiwan, Botswana, and Ecuador) while Italy, a major importer of Durum, averaged .6%.

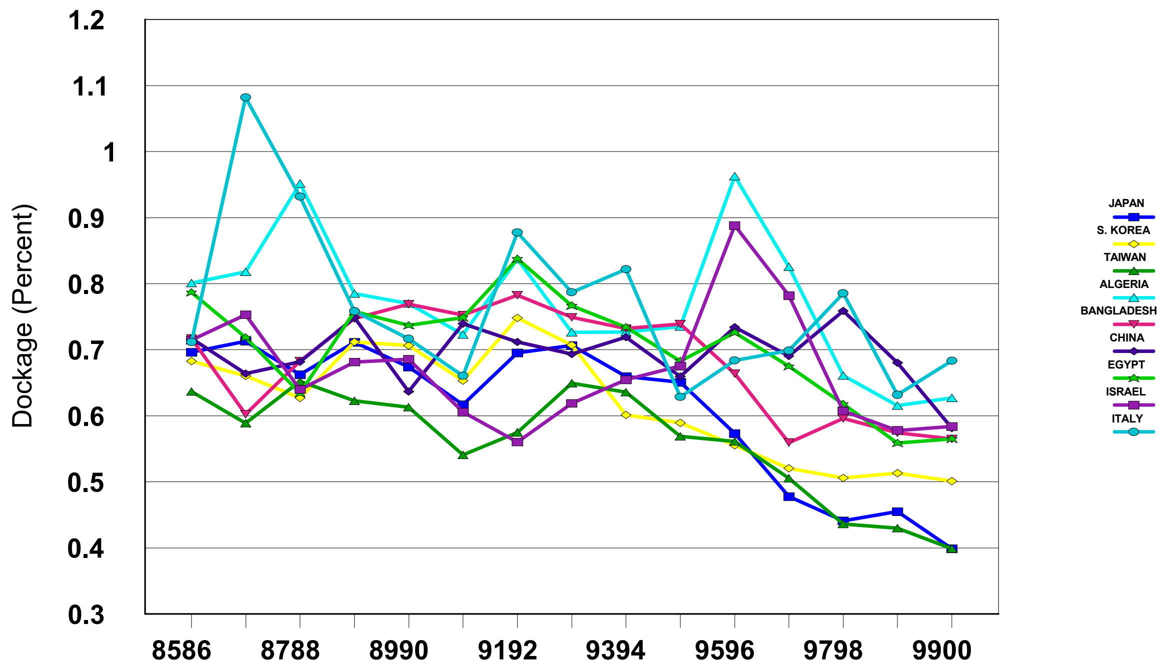

Figure 12. Average Dockage Levels for All U.S. Wheat Exports to Selected Importing Countries.

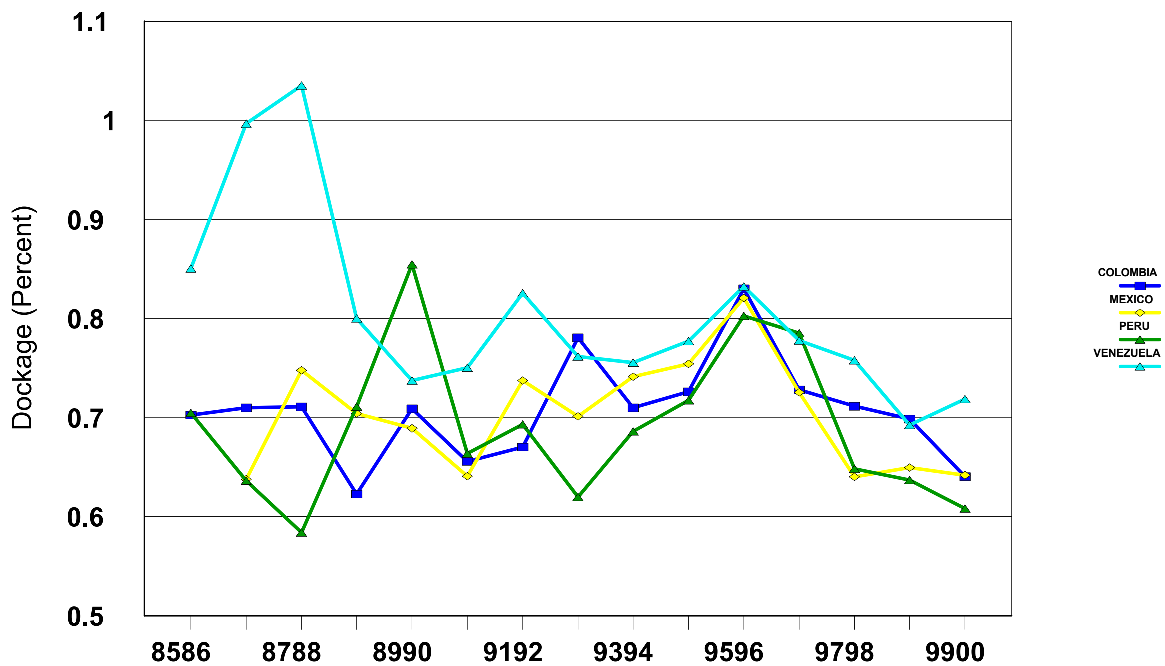

Figure 13. Average Dockage Levels for All U.S. Wheat Exports to Selected Importing Countries

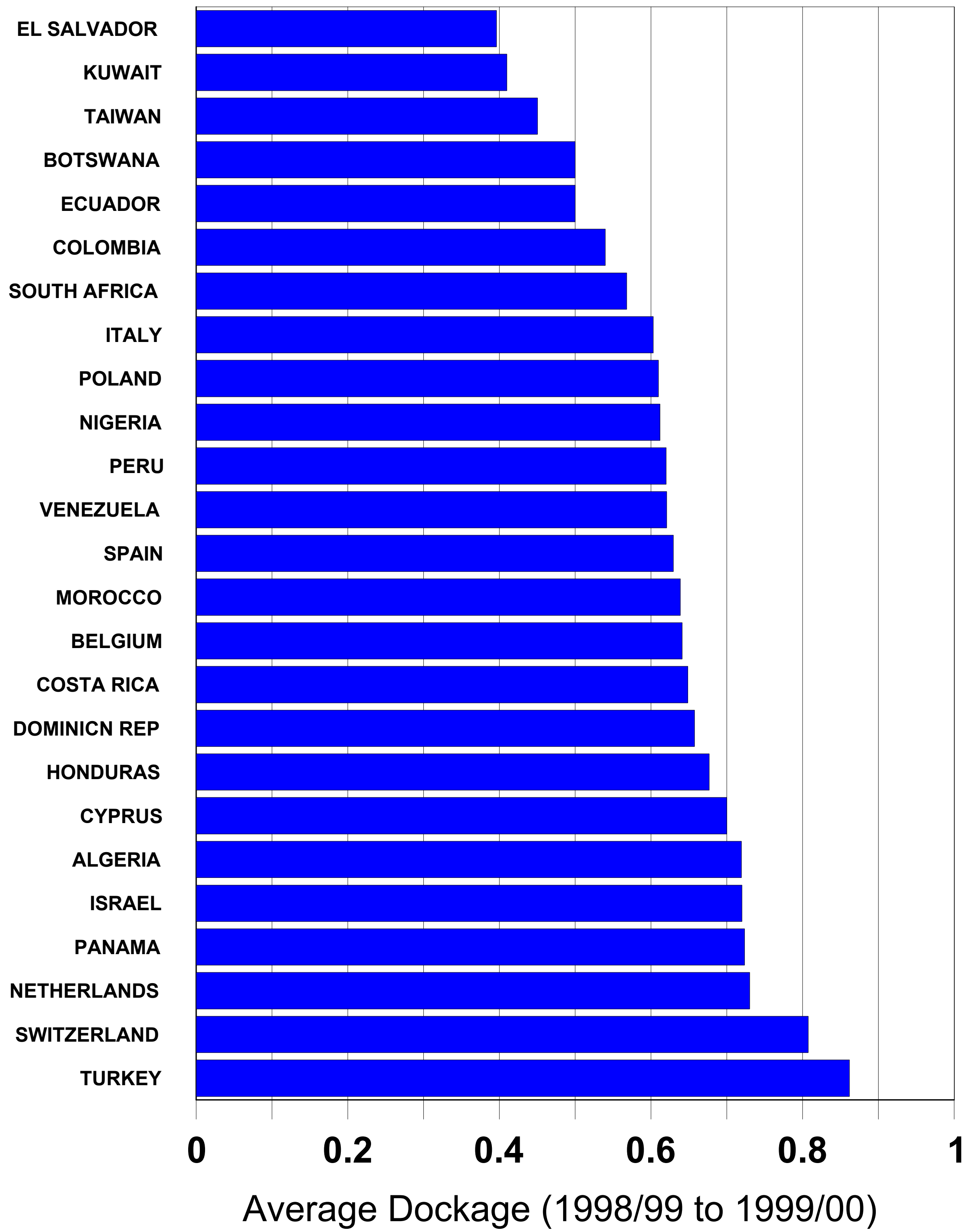

Figure 14. Average Dockage Levels for Durum Exports, by Importing Country, 1998/99 to 1999/00.

For HRS, dockage ranged from a low of .39% in Kuwait to a high of nearly 1.0% for Rwanda (Figure 15). Only 16 importing countries averaged dockage of .6% or lower. These included Kuwait, Sweden, Malta, Norway, Taiwan, Japan, Indonesia, Germany, Belgium, Mongolia, Vietnam, South Korea, UK, Malaysia, Switzerland, and Thailand. These low dockage importing countries are largely East Asian and European countries.

For HRW, average dockage levels ranged from a low of .39% for Taiwan to a high of .87% for Malaysia (Figure 16). Fourteen countries imported HRW that averaged .5% or less dockage. These include Taiwan, Ghana, Japan, United Arab Emirates, Kenya, Cape Verde, Norway, Vietnam, Yemen, Brazil, Indonesia, Albania, South Korea, and Lebanon. This is a more varied group than for the other classes, but does include many East Asian countries.

Comparisons across the wheat classes indicate that there is a large dispersion in dockage levels across importing countries. Most countries import Durum and HRW with dockage between .5% and .7% and HRS with dockage between .6% and .85%. Countries with the lowest dockage levels tend to be East Asian and European Union countries although there are selected others in each of the classes which imported low dockage wheat in the last two crop years.[3]

[3] It is noted that some developed countries do import with higher dockage levels. It is evident that every country has a unique set of circumstances governing their demand for clean wheats. These are likely determined by tariffs, local values of milling by-products, and shipping costs.

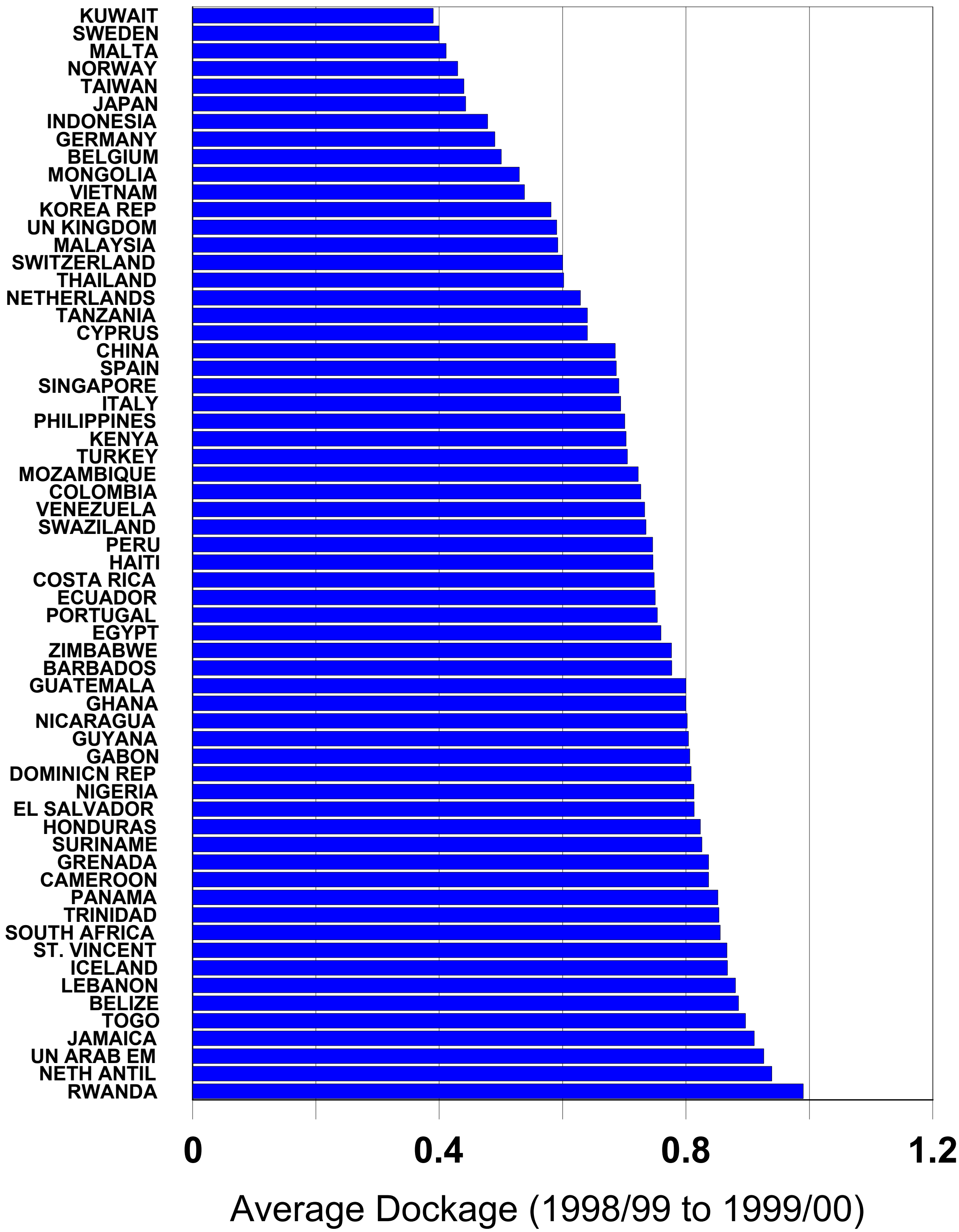

Figure 15. Average Dockage Level for HRS Exports, by Importing Country, 1998/99 to 1999/00.

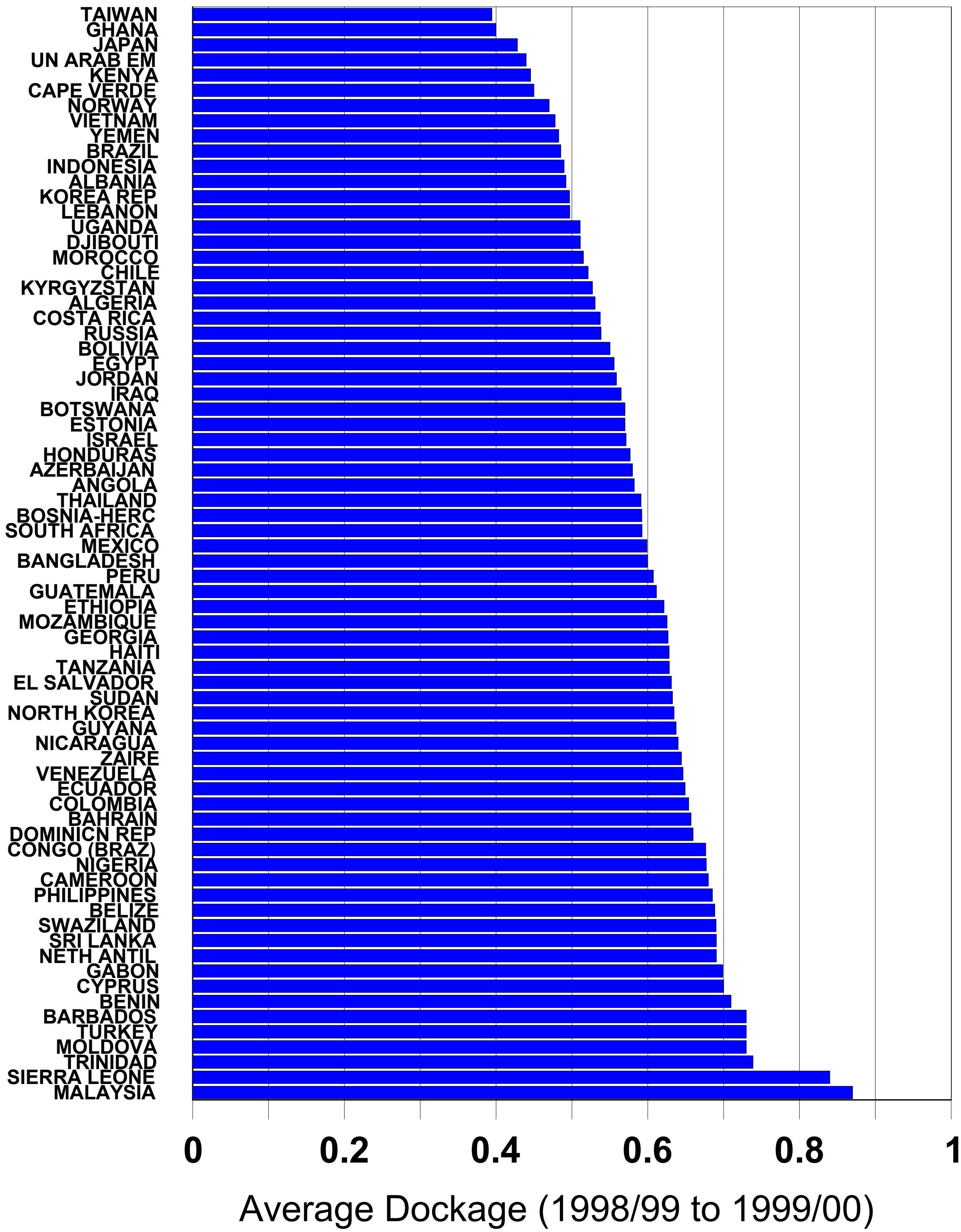

Figure 16. Average Dockage Levels for HRW Exports, by Importing Country, 1998/99 to 1999/00.

Cluster Analysis of U.S. Hard Wheat Exports

A cluster analysis was conducted to identify (group) countries that import like qualities of U.S. hard wheats (Durum, HRS, HRW) over the period 1997/98 to 1999/00. A clustering algorithm was used to group countries by class that imported like qualities of wheat using characteristics for dockage, test weight, total defects, and protein level and whether protein was specified or not.

Clustering algorithms indicated 3 segments of buyers for Durum, 4 segments for HRS, and 6 for HRW. For HRS, the highest quality segment (segment 1) had the lowest dockage (.47%), highest test weight, protein, and lowest damaged kernels, total defects, shrunken and broken kernels, etc. (Table 1). Importing countries in this cluster include largely Japan, Taiwan, Belgium, and Sweden, along with others (Table 2). This segment imported on average 71 million bushels over the period 1997/98 to 1999/00 which amounts to about 32% of HRS exports. Other segments for HRS accounted for the remainder of exports and had higher dockage levels. This included segment 3 with average dockage of .64% which comprised 29% of exports, and segments 2 and 4 with average dockage of .81% (30% of exports) and .80% (9% of exports), respectively.

Clustering of HRW indicated 6 segments. These segments had varying levels of average dockage ranging from a low of .44% for segment 1 to .70% for segment 6. Two pair of segments (segments 2 and 5 and segments 3 and 4) had similar dockage levels (.61-.62% for segments 2 and 5 and .56% and .51% for segments 3 and 4) yet, one would tend to specify protein and the other would not. Those importing countries in the highest quality (lowest dockage) segment (segment 1) included many East Asian countries (Japan, South Korea, Taiwan, Indonesia, etc.). The countries in the high quality segment imported 17% of HRW exports on average. Those in the highest HRW dockage segment included many African and Central and South American countries (Table 2).

Clustering for Durum indicated 3 segments. Each segment had high levels of dockage compared to the other classes (especially HRW). Average dockage levels ranged from .60% for segment 1 to a high of .80% for segment 3. The lowest dockage level segment (segment 1) accounted for about 40% of Durum exports from 1997/98 to 1999/00 and included countries like Taiwan, Italy, Turkey, and Morocco, among others (Table 2). The highest dockage segment included Algeria, Tunisia, the Netherlands, and Switzerland.

Comparing results across hard wheat classes reveals a number of aspects. First, there are distinct groups of countries importing different quality levels with different levels of dockage. Of those segments importing the lowest dockage, these include many East Asian and European countries. These high quality segments have tended to import less than 1/3 of hard wheat exports on average for HRS and HRW. Further, dockage levels for Durum segments are higher than for the other classes.

Table 1. Average Segment Volume and Levels for Characteristics, by Class and Segment, 1997-1999

	Bu (000) Expected	Dockage	Test Weight	Damaged Kernels	Foreign Material	Moisture	Shrunken & Broken	Total Defects	Protein	Protein Specified
	Average	Percent	lbs/bu	Percent	Percent	Percent	Percent	Percent	Percent	Percent
HRS										
1	71346	.47	61	0.46	.17	11.5	1.63	2.27	14.11	99
2	66933	.81	60	1.89	.23	12.7	1.69	3.80	14.06	88
3	65181	.64	60	0.86	.19	12.0	1.71	2.75	14.04	99
4	19743	.80	60	1.87	.24	12.7	1.70	3.81	14.04	67
HRW										
1	67823	.44	61	0.29	.18	11.1	1.54	2.01	11.89	96
2	116069	.61	61	1.03	.23	11.4	1.70	2.97	11.62	91
3	110151	.56	61	0.90	.21	11.9	1.55	2.66	11.60	98
4	54664	.51	61	0.80	.19	11.9	1.40	2.39	11.48	23
5	22452	.62	60	1.13	.25	12.0	1.64	3.02	11.68	40
6	32826	.70	60	1.16	.26	11.9	1.77	3.20	11.80	95
Durum										
1	15042	.60	61	1.07	.25	10.4	1.45	2.77	13.78	72
2	15850	.69	60	1.74	.33	12.2	1.89	3.95	13.40	10
3	6882	.80	59	4.05	.56	12.7	2.30	6.92	-na-	0

Table 2. Countries Importing Wheat In the Highest/Lowest Quality Importing Segments, by Class 1997-1999.

Highest Quality Segments		
HRW (Seg. 1)	HRS (Seg. 1)	DUR (Seg. 1)
Bangladesh, Brazil, Taiwan, Ghana, Indonesia, Japan, Kenya, South Korea, Morocco, Thailand, Vietnam	Belgium, Taiwan, Indonesia, Japan, Kuwait, Malaysia, Mongolia, Norway, Singapore, Sweden, United Arab Emirates, Vietnam	Taiwan, Columbia, Costa Rica, Ecuador, El Salvador, Germany, Italy, Kuwait, Morocco, Nigeria, Peru, South Africa, Spain, Turkey
Lowest Quality Segments		
HRW (Seg. 6)	HRS (Seg. 4)	DUR (Seg. 3)
Barbados, Belize, Benin, Bolivia, Bosnia, Cameroon, Cape Verde, Chile, Columbia, Congo, Cyprus, Dominican Republic, Ecuador, El Salvador, Gabon, Guatemala, Honduras, Lebanon, Malaysia, Mozambique, Neth. Antilies, Nicaragua, Nigeria, Sierra Leone, Sri Lanka, Trinidad, Venezuela, Zaire	China, Colombia, Dominican Republic, Ghana, Grenada, Guyana, Iceland, Italy, Lebanon, Malta, Mexico, Portugal, South Africa, Spain, Turkey	Algeria, Netherlands, Switzerland, Tunisia

Competitor Practices

Canada and Australia treat dockage differently in their systems than does the United States. Canada requires exports to be commercially clean, in essence dockage removed. Therefore, their exports are exceptionally clean. In contrast, Australia does little cleaning once the wheat enters the handling system and has different specifications for what would be considered dockage than does the United States or Canada. This section describes in more detail how dockage is handled in each country. Then recent changes in U.S. dockage specifications are summarized.

Canada

The economics of cleaning grains in Canada have been examined recently (Prairie Horizons, Ltd. and JRG Consulting Group, and Wilson, Johnson, and Dahl). Prairie Horizons, Ltd. and JRG Consulting Group examined aspects of cleaning on the Prairies of Canada as part of a review of transportation policies in Canada. This included an extensive review of the cleaning industry in Canada and a comparison of costs between export and Prairie locations.

Grades and standards in Canada are established by the Canadian Grain Act and administered by the Canadian Grain Commission (CGC). Grains in Canada can be subject to three sets of quality standards. These include: primary grade determinants, export grain determinants, and "commercially clean." Primary grade determinants apply when producers deliver grains to local/regional elevators and for shipment from local shippers to terminals. Export grade determinants and "commercially clean" apply to grains for export. An exception is some exports to the United States where only primary standards or buyer specifications may apply. *Commercially clean* applies to grains that have dockage removed. If grain has not been cleaned it is considered "not commercially clean," and cannot be exported without permission by the CGC.

In Canada, cleaning grain is the removal of dockage from grain. Each of the three standards consider dockage as having been removed. Any allowable material left after dockage is removed and is considered foreign material. "Dockage is defined by the Canada Grain Act as the material that must be removed from grain in order to assign a grade, using approved cleaning equipment and proscribed procedures" (Prairie Horizons, Ltd. and JRG Consulting Group). Dockage limits on higher quality wheat and barley exports is zero. Effectively, with foreign material limits which allow up to .1% attrition as a component of foreign material, dockage can approach .1%. Dockage in Canada is not a grading factor because dockage is considered removed before assigning a grade.

Primary standards do not require grain to be commercially clean. They do allow total foreign material of .75% for No. 1, 1.5% for No. 2, and 3.5% for No. 3 CWRS. Export standards have tighter specifications for total foreign material. Export standards allow total foreign material of .4% for No. 1, .75% for No. 2, and 1.25% for No. 3. These restrictions on foreign material are similar to current U.S. standards.

To clean grain to these tight export standards, wheat has to be overcleaned (acceptable wheat kernels are removed along with dockage). This results in a loss of about 1 % of the volume of grain cleaned. The acceptable wheat kernels lost in this process are termed house grains and can be recaptured within a reclaim process. These can then be used in blending in elevators and reintroduced into wheat lots. However, there are restrictions on the amount and grade to which these house grains can be reintroduced. This reclaim process allows Canadian firms to reduce the amount of wheat lost when cleaning and in some cases they can reclaim more grain (grain from unthreshed heads is released and recovered in reclaim process) than was lost. This reclaim process has been unique to the cleaning process in Canada for many years and represents a significant distinction between the cleaning process as it currently exists in the United States and Canada.

Cleaning in Canada is traditionally facilitated by the combined effects of a number of factors. First, regulations on grade factor limits impose requirements which dictate cleaning. Second, growers are uniformly charged deductions for cleaning which in turn are paid to handlers. For wheat, this charge has been $C3.40/MT (6.7 U.S. cents/bu). This is charged irrespective of the amount of dockage in the sample and irrespective of whether the extent of it is cleaned. Third, cleaning in Canada has been concentrated at the ports due in part to low rail costs and economies in cleaning. Finally, Canada allows technology to “reclaim” wheat lost in cleaning, which may be reintroduced into wheat. Effects of the cleaning margin collected from farmers and impacts of reclaimed wheat and sales of dockage provide a positive payoff to handlers for cleaning grains in Canada. Estimated payoffs for cleaning wheat at Canadian export and Prairie elevators indicate a payoff of 8.3 cents per bushel for Prairie and 7.8 cents per bushel for export elevators in Canada (Table 3). Figures 17-20 illustrate a number of important financial relationships in Canadian grain cleaning and are taken from Prairie Horizons, Ltd. and JRG Consulting Group.

Recent changes in Canada are impacting cleaning practices. During the 1990s, rail rates for grains increased and there has been increased demand for feed-stuffs on the Prairies. In addition, there has been rapid adoption of large scale elevators on the Prairies (High Through Put Elevators or HTPE) which have been constructed with the ability to clean grain. All of these factors have provided incentives for cleaning on the Prairies rather than at port terminals.

Table 3. Estimated Wheat Cleaning Costs for Canadian Country and Export Elevators (US ¢/bu)

	Country	Export
Fixed Costs	0.5	0.5
Variable Costs		
Variable Costs of Operation	1.0	2.1
Wheat Loss	3.6	4.3
Total Variable Costs	4.6	6.4
Variable Revenue		
Reclaimed Wheat and Feed	2.9	4.6
Screenings	2.4	3.4
Producer Paid Cleaning Fee	6.7	6.7
Wheat Transportation Savings	1.5	0.0
Total Additional Revenue	13.5	14.7
Net Cleaning Margin	8.3	7.8

* Source: Prairie Horizons, Ltd. and JRG Consulting Group

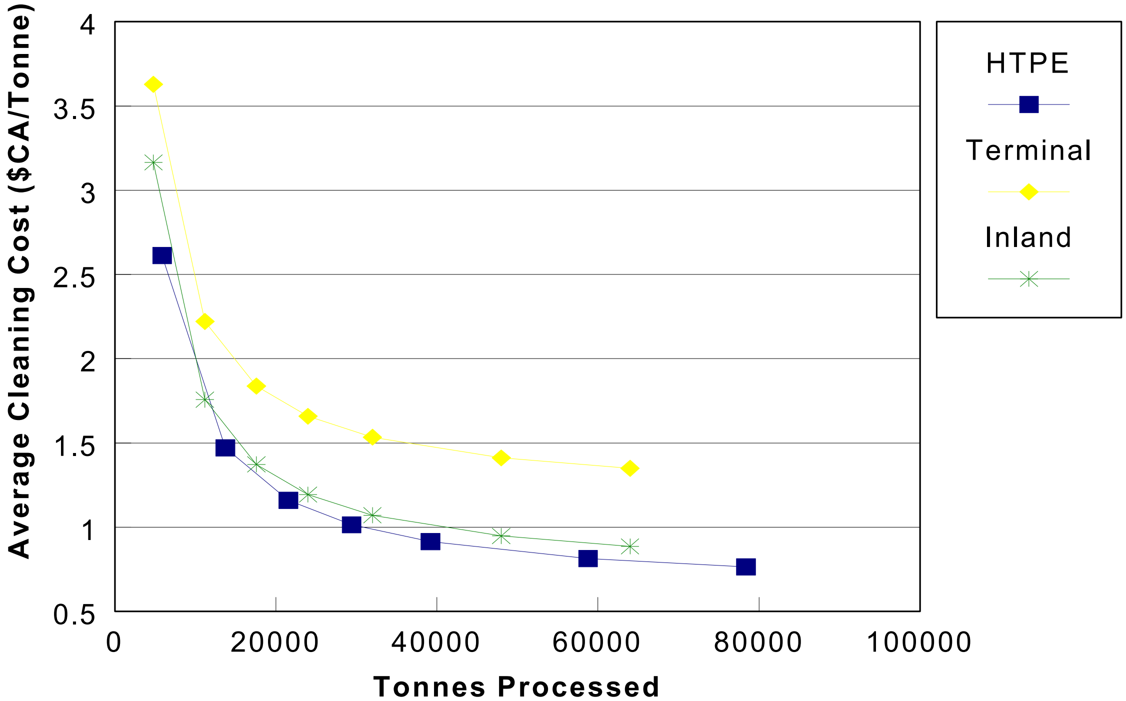

Figure 17. Average Wheat Cleaning Cost for Inland Primary and Terminal Elevators, Sensitivity of Tonnes Processed.

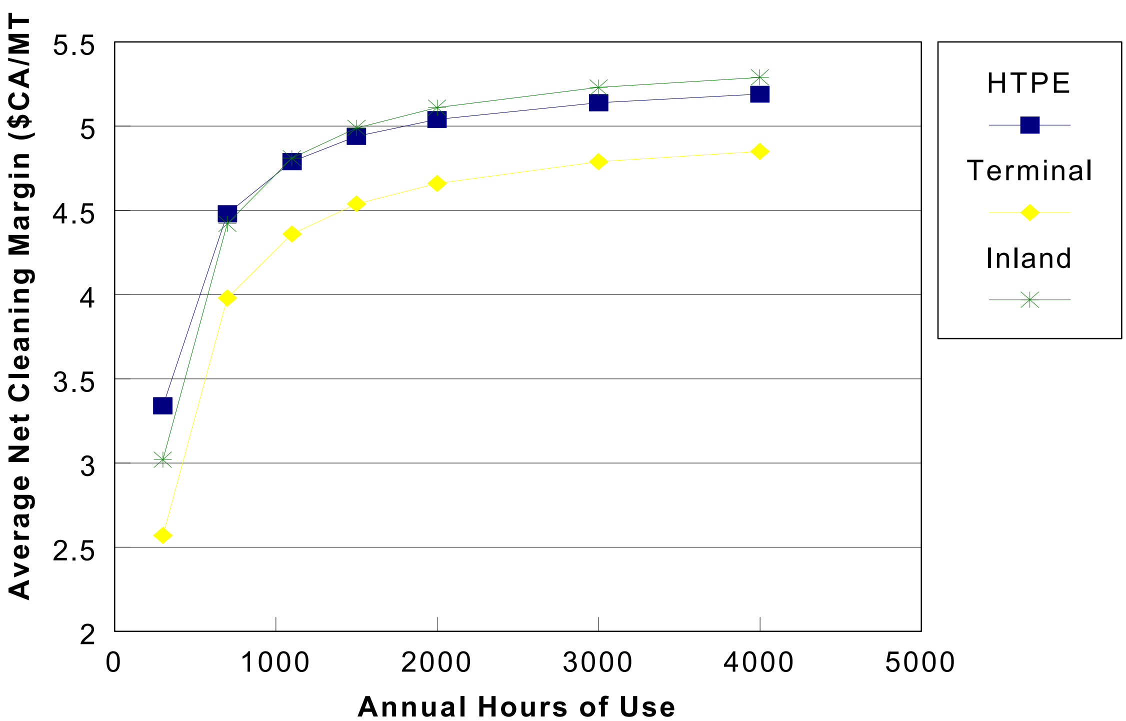

Figure 18. Average Wheat Net Cleaning Margin for Inland, HTPE, and Terminal Elevators, Sensitivity of Annual Usage.

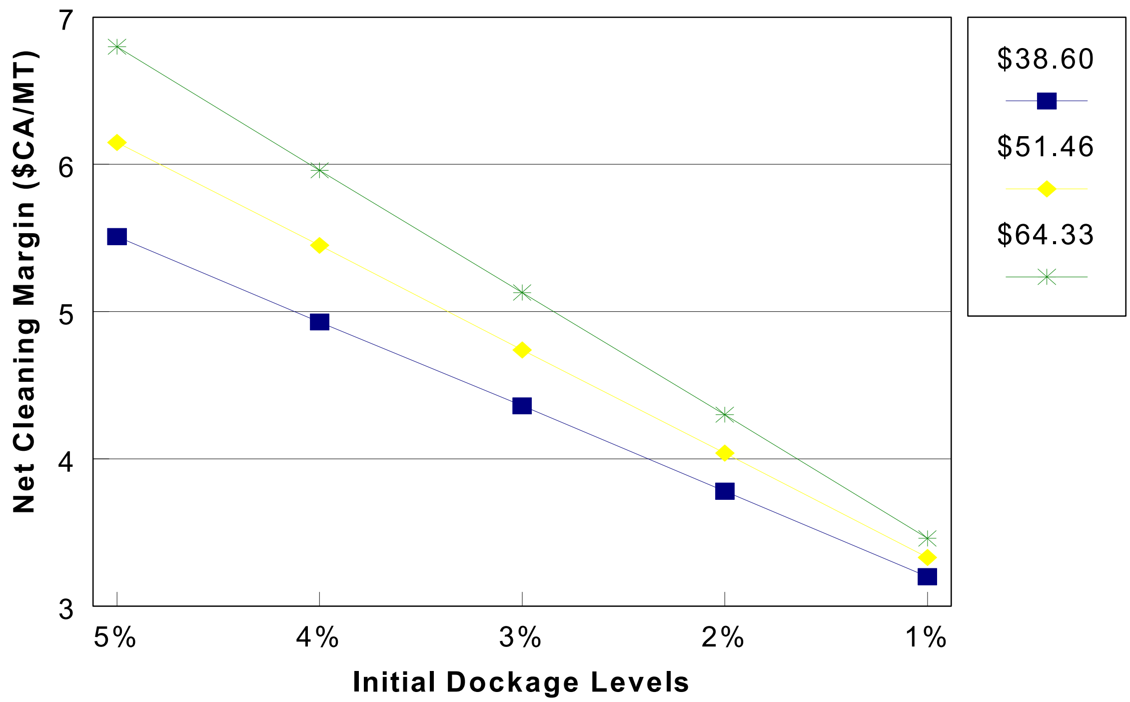

Figure 19. Sensitivity of Wheat Net Cleaning Margin For Specified Initial Dockage Levels and Screenings Values (HTPE Elevator: Moose Jaw, Saskatchewan).

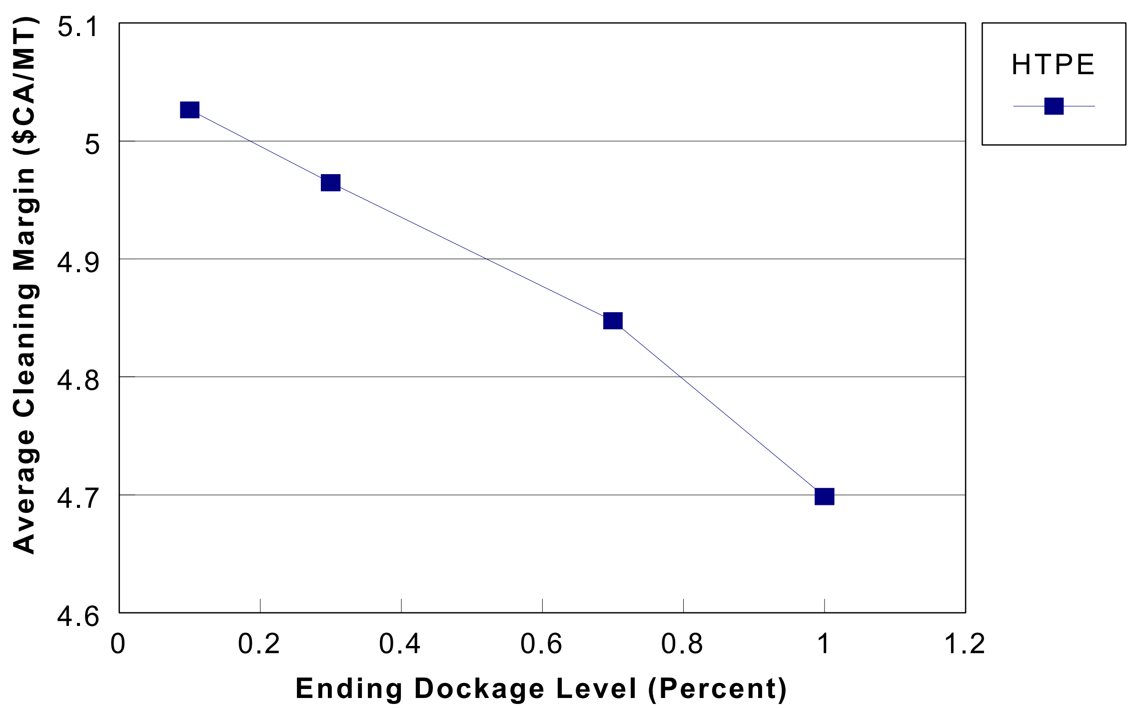

Figure 20. Sensitivity of Average Wheat Cleaning Margin To Ending Dockage Level, HTPE Elevator, Beginning Dockage = 3 Percent.

Economics of Inland Cleaning

Changes are occurring in grain cleaning in Canada. Currently, 66 inland elevator locations (called HTPE) can clean grain down to the export standard. Another 54 with that capability are planned or under construction in January of 1999. All new HTPEs being built will not have grain cleaners installed, but will be flexible enough to incorporate a cleaning operation if needed. The cleaning operation at the new HTPE locations is not designed to clean all grain received, but rather the major grain being delivered at the point, or in each season of the year.

The profitability of cleaning in various locations is affected by the value of screenings, the freight cost (on the dockage component), the spread between the value of grain and dockage, the cost of labor, and the utilization rate of grain cleaning equipment. Some of the analytical findings for the study by Prairie Horizons, Ltd. and JRG Consulting Group include:

- The capital cost for a typical inland cleaning operation in a HTPE ranges between $1.5 and $2.0 million. This cost is significantly higher than in the United States, where the lower (dockage) standard results in grain companies having to invest less than $0.5 million in grain cleaning equipment.

- To meet the export standards, grain must be overcleaned resulting in significant (host) grain loss. Grain companies have invested in reclaim equipment that enables them to recapture the lost grains and capture grains and oilseeds contained within the assessed dockage. These "house grains" are blended into clean grain and receive corresponding market values. If these grains were not captured, they would be valued at the lower screenings price.

- Two factors drive the grain companies decision to invest in inland grain cleaning. They are the savings on freight paid on the dockage shipped (the shipping grain company directly pays the freight on the dockage in the grain), and an increase in the marketing options available to an elevator with grain cleaning capability.

- Grain cleaning is profitable at terminal locations, inland terminal locations, and at the HTPE locations on the Prairies. Inland cleaning is marginally more profitable than at port due to lower labor costs (higher wages at port and more labor required for the sophisticated reclaiming equipment), and when the freight savings on dockage is considered.

Australia

Australia does not have a term in their grain handling system that is comparable to dockage as used in either the United States or Canada. Instead they take the approach that quality problems introduced by high dockage should be controlled by not allowing it into the system. To accomplish this, the Australian system through the Australian Wheat Board (AWB) and other marketing agencies maintains a rigid set of delivery specifications which are enforced by the storage and handling organizations within each state. These delivery specifications use two indicators to control for what would be termed dockage in other systems. These indicators for wheat are screenings (grain material which passes through a 2mm screen) and foreign material (other material).

Examples of current delivery specifications for Australia are contained in Appendix III. Standards require less than 5% total screenings[4] for Australian Hard No.1, Standard White (ASW), Premium White (APW), Noodle Wheat (ASWN), and Soft Wheat (SFT1). Limits of 3% are applied on the same grades for unmillable material above the screen and a limit of 1% for small seeds. Additional limits are imposed on specific types of foreign material by type.

Screenings and foreign material are measured when farmers deliver grain into the marketing system. Grain exceeding limits are downgraded or required to be taken away and cleaned before being accepted. Since cleaning facilities in Australia are limited, farmers typically accept lower grades for grain or blend production prior to delivery so that levels of screenings and foreign material are within limits. Farmer blending can occur when wheat would fail to meet specifications and depends on the year and inter-grade price spreads. Farmer cleaning is more prevalent for barley (in order to upgrade feed to malting quality) and oats than for wheat. Further, price spreads are rarely sufficient to induce cleaning in wheat. As such, little cleaning of wheat occurs in Australia and there does not exist a formal regulatory framework to deal with cleaning beyond delivery specifications. Despite the lack of cleaning, the favourable weather conditions typically enjoyed in Australia in the grain growing regions result in their wheat and barley being recognized for their cleanliness.

Cleaning Costs and Practices in the United States

The United States has recently announced changes that impact cleaning in the United States. USDA Secretary Glickman announced in June 2000 that the Commodity Credit Corporation (CCC) would require future purchases for U.S. foreign food assistance programs contain a maximum of .8% dockage, down from the 1.0% required prior to the change (U.S. Wheat Associates - Wheat Letter, June 23, 2000). Proposed changes have been advanced for including dockage in grade specifications for exports. Those specifications advanced are maximum limits of .3% dockage for No. 1, .5% for No. 2, .7% for No. 3, and 1.0% for No. 4; although another alternative could be just adding requirements of .3% and .5% for grades 1 and 2, respectively, and not adding specifications on lower grades.

To evaluate the additional cleaning costs associated with cleaning wheat to levels required with alternative dockage specifications, a wheat cleaning model based on Scherping et al. was constructed. The model used relationships from Scherping et al. and specific parameters were updated from a telephone survey of selected elevator managers. The model estimates cleaning costs based on relationships between working capacity and wheat loss of the cleaner for levels of beginning and ending dockage.

Specific cost parameters updated included wheat and screenings values, opportunity costs, electricity rates, labor rates, and equipment costs for specific cleaners utilized. Opportunity costs were estimated as the prime rate as of August 2000 (Federal Reserve Bank of St. Louis). Equipment costs were updated from the manufacturer.

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[4] The definition of screenings in the Australian system is different than as used in the United States.

Current Cleaning Practices and Costs[5]

Several (6) local elevators were contacted by phone to gather information on current dockage handling practices. These managers indicated varied responses based on whether wheat was being sold into the domestic or export markets. All managers indicated that they were not applying dockage discounts to farmers other than deducting dockage weight from grain delivered, although some of them were considering this in the future. Most were subject to dockage discounts on shipments to customers. These ranged from 3 to 6 cents/bushel with most applied for shipments for each .5% exceeding 1.0% dockage, although a couple managers indicated they were subject to discounts for dockage exceeding .3% for export markets. Most managers indicated either equal or less stringent dockage requirements for domestic markets than for exports. Dockage in outbound shipments ranged from .3% to .7% for export markets and .5% to .8% for domestic markets.

Cleaning capability varied widely. Many elevators had large capacity cleaners (10,000 bu/hr), while others had lesser capacity (less than 1,000 bu/hr). These lower capacity cleaners tended to be in those elevators that primarily served domestic markets. Estimated cleaning costs varied from 2 to 4 cents/bu. Half of the managers contacted would have to modify their grain handling system (add additional cleaners, etc.) if they had to meet dockage requirements of .3% for No. 1 HRS.

Screenings values varied substantially by location. Screenings values averaged $14.20/ton across managers contacted and ranged from a low of $5/ton to a high of $20/ton. Labor rates averaged $9.10/hour.

These updated parameters were incorporated into a wheat cleaning model based on Scherping et al. This model utilizes relationships between cleaning capacity and rated capacity for specific cleaners when cleaning between various initial dockage and final dockage levels. It also uses estimates of wheat lost based on initial and final dockage levels and equipment requirements per hour of operation. From these relationships, total costs are estimated, then average cleaning costs are derived based on annual volume cleaned for two cleaners, one representing those installed at country elevators and one representing those at export elevators. Since volumes handled are higher for U.S. export elevators than for country elevators, the lower average fixed costs for export elevators are largely due to additional volumes handled.

Results indicate negative cleaning margins for both country and export elevators with the degree of added costs increasing as ending dockage levels declined (Table 4). Actual cleaning costs are higher at country elevators largely due to higher fixed costs. Yet, country elevators are able to capture transportation savings not realizable by export elevators.

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[5] Note: in a later section results for a more extensive survey are reported.

Table 4. Estimated Wheat Cleaning Costs for U.S. Country and Export Elevators (US ¢/bu), (Initial Dockage=3.0%)

	Country			Export		
Ending Dockage Level	1.0	.7	.4	1.0	.7	.4
Average Fixed Costs	3.0	3.4	4.0	0.5	0.7	0.9
Average Variable Costs						
Variable Costs of Operation	1.0	1.1	1.3	0.9	1.1	1.5
Wheat Loss	0.3	1.1	1.9	0.4	1.5	2.7
Total Variable Costs	1.2	2.2	3.2	1.3	2.6	4.2
Average Variable Revenue						
Reclaimed Wheat and Feed	0.0	0.0	0.0	0.0	0.0	0.0
Screenings	0.9	1.2	1.3	0.9	1.2	1.4
Producer Paid Cleaning Fee	-NA-	-NA-	-NA-	-NA-	-NA-	-NA-
Wheat Transportation Savings	2.4	3.1	3.8	0.0	0.0	0.0
Total Additional Revenue	3.3	4.3	5.2	0.9	1.2	1.4
Net Cleaning Margin	-0.9	-1.3	-1.9	-0.9	-2.2	-3.7

The average cleaning costs (prior to dockage sales and transportation savings) are higher for country elevators than for export terminals. Average cleaning costs increase as ending dockage levels decrease from just over 4 cents/bu when cleaning to 1% dockage to 8.5 cents/bu wheat cleaning down to .1% dockage (Figure 21). However, when dockage sales and transportation savings are considered, the net cleaning margin is greater for country elevators than for export terminals (Figure 22).

Net cleaning margins and their factors were compared for country and export elevators in Canada and the United States. Net cleaning margins are positive in Canada and negative in the United States (Table 5). The difference in net margins across countries reflects the producer paid cleaning fee by Canadian growers, differences due to reclaim (net of wheat loss and value of reclaimed wheat and feed is higher in Canada), and higher screenings values in Canada. Differences are mitigated to some extent by country elevators in the United States being able to capture higher transportation savings than country elevators in Canada.

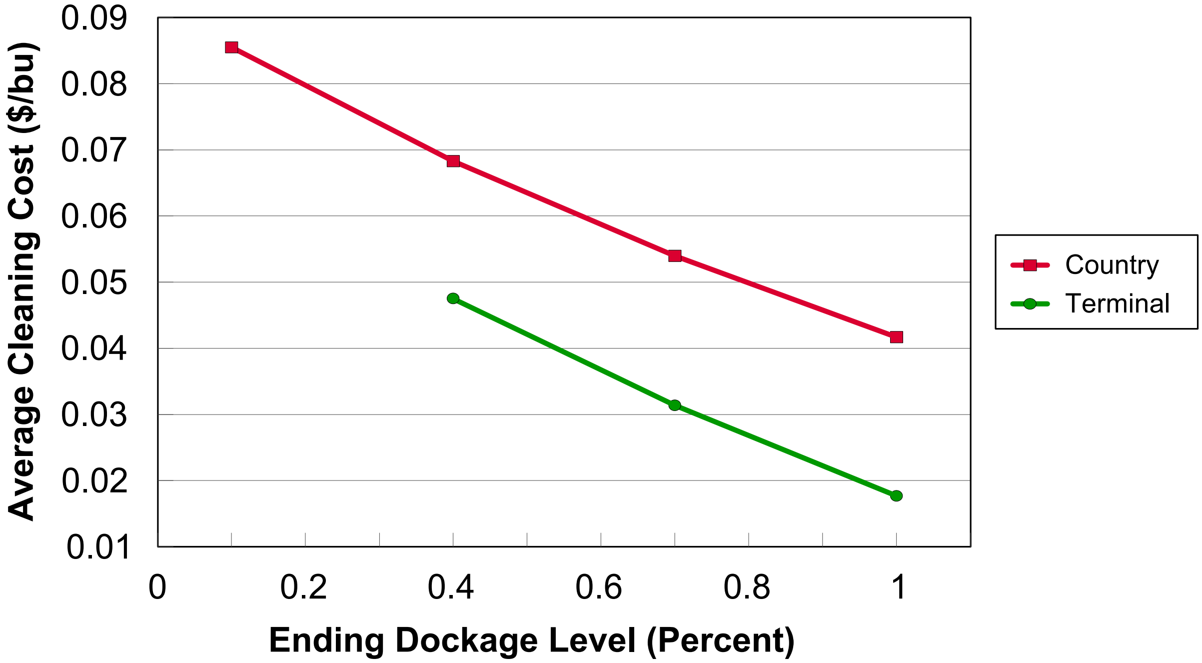


Figure 21. Estimated Average Cleaning Cost (Cost of Operation) for U.S. Country and Terminal Elevators by Ending Dockage Level.

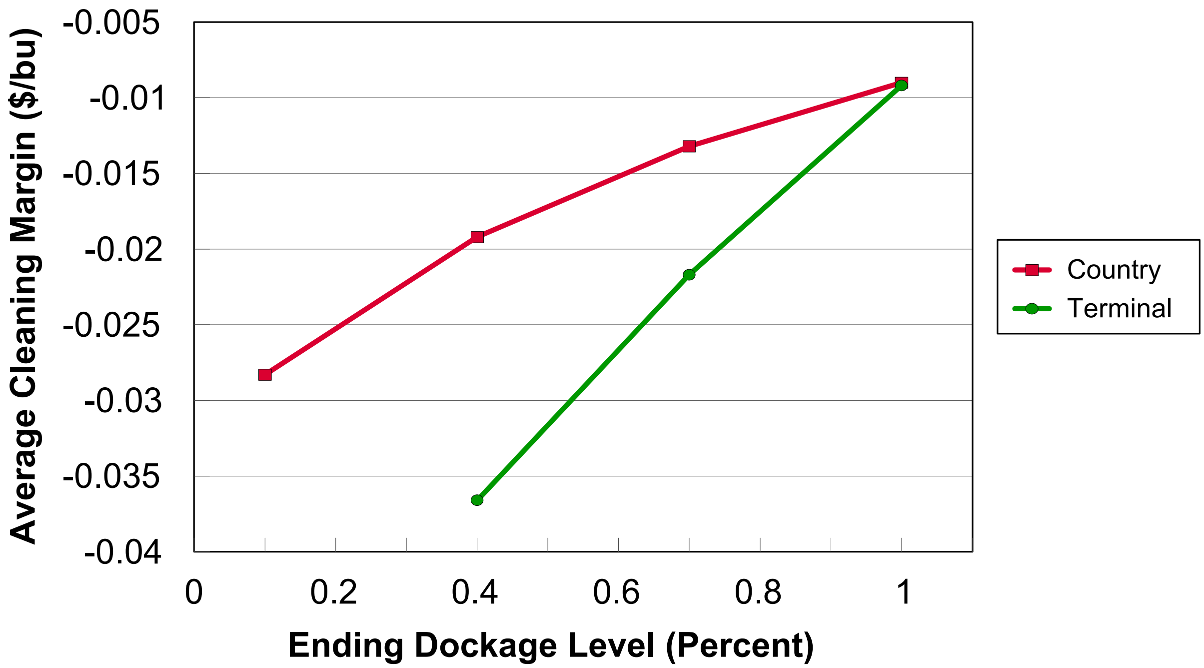


Figure 22. Estimated Net Cleaning Margin for Wheat for U.S. Country and Terminal Elevators by Ending Dockage Level.

Table 5. Estimated Wheat Cleaning Costs and Returns for Canadian and U.S. Elevators (US ¢/bu)**

	Country		Export	
	Canada*	**U.S.**	**Canada***	**U.S.**
Average Fixed Costs	0.5	4.0	0.5	0.9
Average Variable Costs				
Variable Costs of Operation	1.0	1.3	2.1	1.5
Wheat Loss	3.6	1.9	4.3	2.7
Total Variable Costs	4.6	3.2	6.4	4.2
Average Variable Revenue				
Reclaimed Wheat and Feed	2.9	0.0	4.6	0.0
Screenings	2.4	1.3	3.4	1.4
Producer Paid Cleaning Fee	6.7	-NA-	6.7	-NA-
Wheat Transportation Savings	1.5	3.8	0.0	0.0
Total Additional Revenue	13.5	5.2	14.7	1.4
Net Cleaning Margin	8.3	-1.9	7.8	-3.7

*Source: Prairie Horizons, Ltd. and JRG Consulting Group for Canada

**Initial Dockage for both countries=3.0%, final dockage level =.4% for United States and .1% for Canada.

Dockage Survey for North Dakota Wheat Commission

A survey of elevator managers in North Dakota and Montana was conducted to refine information on current dockage practices and views on effects of changes on their operations. Lists of North Dakota elevator managers were obtained from the North Dakota Wheat Commission (NDWC) and Montana elevators were obtained from the BNSF Elevator Directory. Surveys were sent out to 450 elevators from which 62 usable replies were obtained, a response rate of 13.7%. Of the responses, 54 were from North Dakota and 8 from Montana. A copy of the survey is contained in Appendix V.

Ownership and Plant Characteristics

Managers were asked about their current facility. Of the respondents, 48.4% were locally owned cooperatives, 22.6% were locally owned private elevators, 11.3% were Harvest States line elevators, and 11.3% were line elevators of private firms (Table 6).

Table 6. Type of Ownership for Facility

Type	**Locally Owned Cooperative**	**Harvest States Line Elevator**	**Locally Owned Private Elevator**	**Line Elevator of a Private Company**	**Other**
Percent	48.4%	11.3%	22.6%	11.3%	6.5%

Plant characteristics varied by firm. On average, firms were 14 miles from the nearest competitor (Table 7). This varied from one tenth of a mile to 80 miles. Average loading capacity for railcars was 33 cars and ranged from 0 to 110 cars. Storage capacity averaged 835,327 bushels with capacities for individual firms ranging from 88,000 bushels to 4.5 million bushels. Average grain handled in 1999/2000 was 3.135 million bushels. Average volume shipped was 1.641 million bushels of HRS, 539 thousand bushels of Durum, 481 thousand bushels of Barley, and 792 thousand bushels of other grains.

Table 7. Plant Characteristics of Respondents for NDWC Dockage Survey, 2001				
	Average	Standard Deviation	Minimum	Maximum
Distance to Nearest Competitor (Miles)	14	15	1/10th	80
Loading Capacity (Railcars/day)	33	27	0	110
Number of Bins	39	23	8	103
Storage Capacity (1000 Bushels)	836	759	88	4,500
Grain Handled 1999/2000 (1000 Bushels)	3,135	2,875	125	17,000
Wheat	1,641	2,311	20	15,000
Durum	539	768	0	3,000
Barley	481	585	0	2,000
Other	792	983	0	4,743

Current Shipping and Cleaning Practices

Managers were asked about markets where grain was shipped and dockage levels in these shipments. Shipping patterns varied by firm, where shipments were mostly to Domestic and West Coast markets. On average, firms shipped 59% of wheat to Domestic markets, 20% to the West Coast, 16% to Duluth, and 5% to the U.S. Gulf. Individual firms varied, ranging from 0% to 100% of shipments going to Domestic and West Coast markets, 0% to 80% to Duluth, and 0% to 30% to the U.S. Gulf.

Dockage levels varied by market (Table 8). Dockage levels to the West Coast were the lowest and also had the lowest variability between firms (STD is lowest). Dockage levels for the Duluth and U.S. Gulf markets were highest and Domestic and U.S. Gulf had the highest variability (greatest STD).

Table 8. Percent of Grain Shipped and Average Level of Dockage, by Market				
Percent Grain Shipped to Each Market				
	Avg		Low	High
Domestic	59		0	100
West Coast	20		0	100
Lakes/Duluth	16		0	80
U.S. Gulf	5		0	30
Dockage Level of Grain for Shipment				
	Avg	STD	Low	High
Domestic	.72	.38	.2	2.0
West Coast	.68	.29	.2	1.5
Lakes/Duluth	.73	.34	.2	1.5
U.S. Gulf	.78	.38	.3	1.5

Managers indicated different cleaning practices and dockage levels contained in farmer deliveries. Managers from North Dakota indicated they cleaned 87% while those from Montana averaged only 36%. Dockage levels in farmer deliveries were higher at 3.0% in North Dakota than in Montana at 0.9%.

Cleaning practices of managers differ from harvest to post harvest periods (Table 9). Managers indicated that wheat was considered clean when dockage was higher during harvest periods than post harvest periods. Further, the levels of dockage considered clean were higher for Montana than for North Dakota. Montana managers considered wheat clean post harvest when dockage was 1.0%, while North Dakota managers indicated 0.9% dockage was clean.

Table 9. Cleaning Characteristics of Individual Firms			
	All	**North Dakota**	**Montana**
Percent Wheat that is Cleaned before Shipment	80%	87%	36%
Average Dockage Level Delivered by Farmers	2.7	3.0	0.9
Percent Dockage Considered Clean: Harvest	1.2	1.2	1.4
Percent Dockage Considered Clean: Post Harvest	0.9	0.9	1.0

Managers were asked about current costs/prices for cleaning. Prices for screenings ranged from $10 to $35/ton and averaged $19.58/ton (Table 10). Labor rates for cleaning ranged from $7 to $16.50/hr and averaged $9.82/hr. Electricity costs ranged from 1 to 16 cents/kilowatt hr, averaging 7.0 cents/kilowatt hr.

Managers were asked to estimate what it would cost them to clean to different dockage levels. Managers indicated that to clean to .7% dockage would cost 7.0 c/b, yet some firms felt it would cost them nothing (would make money on dockage that would offset costs) to 40 c/b. As dockage limits declined (become more restrictive), managers' estimates of cleaning costs increased. Cleaning to 0.5% dockage would cost 8.4 c/b and cleaning to .3% would cost 10.4 c/b on average (Figure 23, Table 10). Managers indicated that the lowest dockage level they could reliably clean to was on average .6% dockage. Individual firms ranged from .1% to 1.2% dockage level. Of the firms responding, 14% felt they could reliably clean to .3%, 51% could clean to .5%, 71% could clean to .7%, and 98% could clean to 1% (Figure 24).

Table 10. Cleaning Costs

	Average	Minimum	Maximum
Wheat Screenings ($/ton)	19.58	10.00	35.00
Labor ($/hr)	9.82	7.00	16.50
Electricity (cents/kilowatt hr)	7.0	1.0	16.0
Estimated Cleaning Cost to Clean to			
0.7% dockage	7.0 c/b	0 c/b	40 c/b
0.5% dockage	8.4 c/b	0 c/b	40 c/b
0.3% dockage	10.4 c/b	0 c/b	45 c/b
Lowest Reliable Level at Which You Can Clean	0.6	0.1	1.2

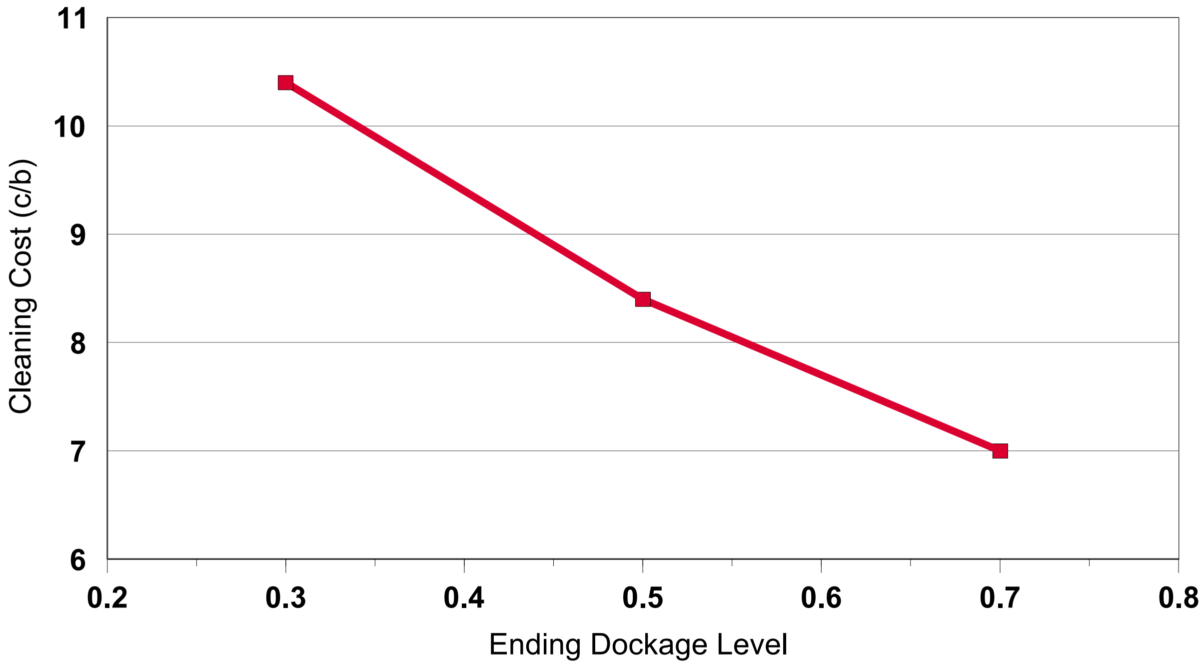


Figure 23. Managers' Estimates of Cleaning Cost by Ending Dockage Level.

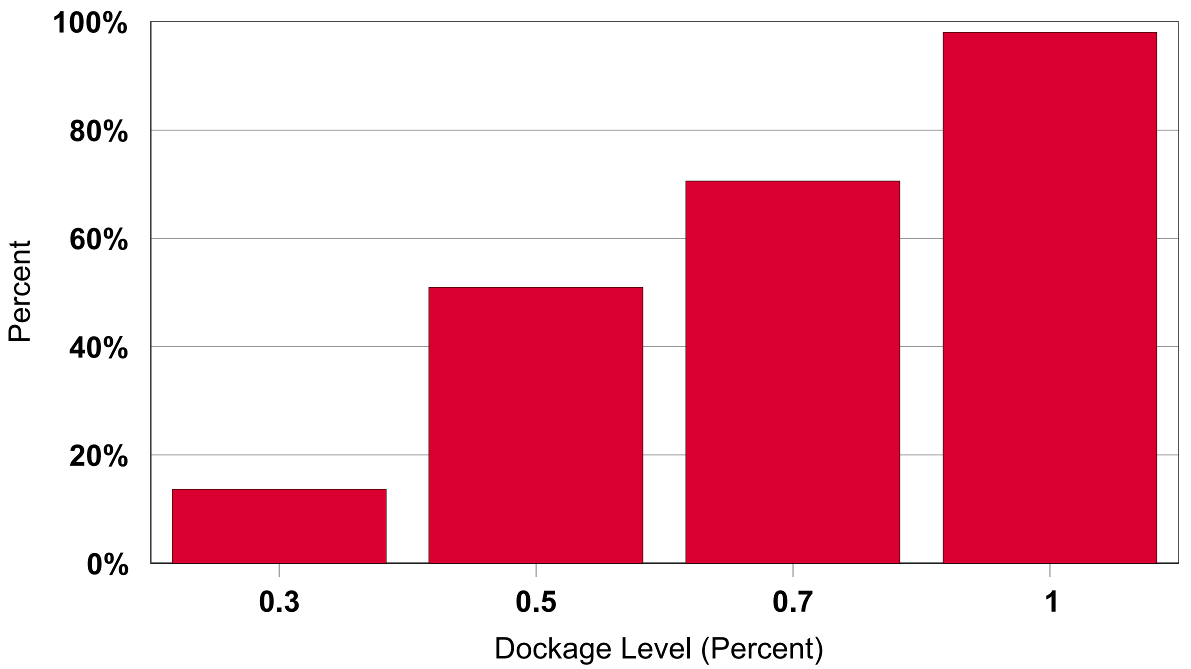


Figure 24. Percent of Firms Able to Reliably Clean to Specific Dockage Levels.

Managers were asked about cleaners installed at their facility (type, age, and capacity of cleaners and what crops were cleaned). Many firms indicated they had more than one cleaner. The average size of cleaners was 2,070 bu/hr and ranged from 75 bu/hr to 20,000 bu/hr (Table 11). However, not all cleaners were utilized for cleaning wheat. The capacity of those cleaners used to clean wheat were aggregated by firm to estimate a wheat cleaning capacity for each firm. Average capacity per firm for cleaning wheat was 3,475 bu/hr. Since this is higher than the average cleaner capacity, it suggests that more than one cleaner is being utilized on average.

The year cleaners were installed was compared to the capacity of cleaners (Figure 25). Of the firms responding, up to the mid 1980s, no cleaners were installed that exceeded 2,000 bu/hr. Since the mid 1980s, most of the cleaners installed have capacity exceeding 2,000 bu/hr with a number of firms installing cleaners with capacity exceeding 8,000 bu/hr. This relationship shows a trend toward the addition of larger capacity cleaners.

Table 11. Average Size of Cleaners and Wheat Cleaning Capacity

	Mean	STD	Min	Max
Average Size of Individual Cleaners for all Commodities	2,070	3,102	75	20,000
Capacity of Wheat Cleaning at Facility (can contain more than one cleaner)	3,475	4,085	160	20,800

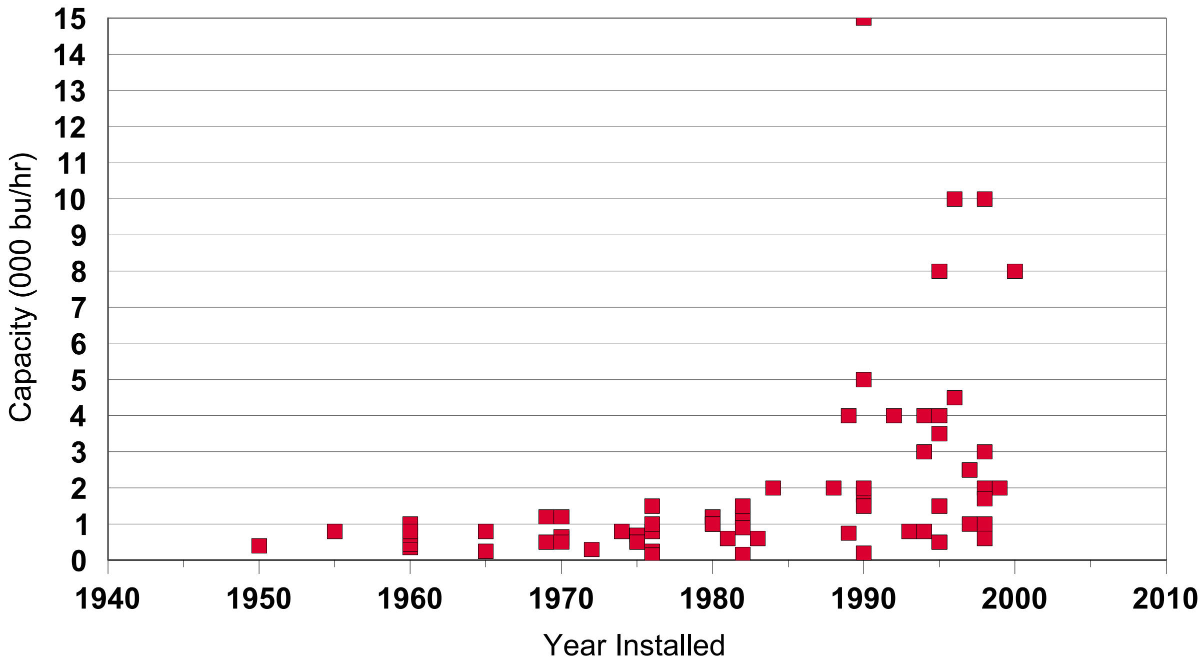


Figure 25. Relationship Between Year Cleaner Installed and Cleaning Capacity.

Wheat Loss

Managers were asked if sound wheat was removed when cleaning. Forty managers (69%) indicated there was, eighteen (31%) indicated no (Table 12). Managers were then asked how they handled this lost wheat. Of the forty managers, 80% indicated that it was sold in dockage, 5% indicated that it was reclaimed in the same operation and binned separately, 5% indicated that it was reclaimed in a separate operation and returned to wheat stream, and 10% indicated that it was reclaimed in a separate operation and binned separately.

Table 12. Treatment of Sound Wheat in Dockage

	Number	Percent
Are Sound Kernels removed with dockage		
Yes	40	69%
No	18	31%
How is Sound Wheat Treated ?		
Sold in dockage	32	80%
Reclaimed in same cleaning process and remains in sample	0	0%
Reclaimed in same cleaning process and binned separately	2	5%
Reclaimed in separate operation and added back to original sample	2	5%
Reclaimed in separate operation and binned separately	4	10%

Managers were then asked to estimate the percent of wheat lost when cleaning from three initial dockage levels to three ending dockage levels. Average wheat loss by level are presented below (Table 13). Results for average wheat lost from a beginning dockage level of 1% were similar to the high range of values and .3% to .4% higher than average values reported by Scherping et al. in 1991 (Table 14). Those obtained for the higher beginning dockage levels (5.0% and 3.0%) were even larger than those obtained for by Scherping et al.

Table 13. Average Wheat Loss by Beginning Dockage and Ending Dockage Levels, 2001

Ending Dockage Level	Beginning Dockage Level		
	5.0%	3.0%	1.0%
0.7%	1.3%	1.0%	0.7%
0.5%	1.7%	1.3%	1.1%
0.3%	2.3%	2.0%	1.6%

Table 14. Estimates of Wheat Lost When Cleaning Wheat to Specified Ending Dockage Levels

Ending Dockage Level	Manufacturers	Average of Elev. Managers	High for Elev. Managers
1.0%	0%	.1%	.2%
0.7%	0%	.4%	.8%
0.4%	0%	.7%	1.4%
0.1%	0%	1.0%	2.0%

Source: Scherping, et al. 1992

Managers were asked about prices offered to farmers for HRS and HAD and premiums and discounts applied. Average prices offered farmers was 294 c/b for HRS and 367 c/b for HAD (Table 15). Prices varied between elevators primarily due to location in relation to markets. Average discounts varied by item and between HRS and HAD. In most cases, discounts for HAD were higher than for HRS. For example, wheat with 4% damaged kernels would be discounted on average 14 c/b for HRS and 25 c/b for HAD while wheat with 5% shrunken and broken would be discounted 6 c/b for HRS and 8 c/b for HAD. Dockage was one factor where no discount was reported for HAD, while HRS had an average discount of 1 c/b.

Table 15. Prices and Price Premiums/Discounts for HRS and HAD (cents/bu)						
	HRS			HAD		
	Mean	Min	Max	Mean	Min	Max
Price	294	240	362	367	310	450
57 lb Test Weight	-4	-25	0			
16% Protein	29	0	50			
12% Protein	-33	-80	-3			
58 lb Test Weight				-15	-100	0
Amber Durum (color)				-41	-130	-10
14.5% Moisture	-7	-18	0	-7	-12	0
Dockage (HRS: no discount=40, yes=8)	-1	-5	0	0	0	0
4% Total Damaged Kernels	-14	-60	0	-25	-150	-8
1% Foreign Material	-5	-30	0	-8	-50	0
5% Shrunken and Broken Kernels	-6	-40	0	-10	-55	0
2% Contrasting Classes	-8	-54	0	-12	-50	0
5% Wheat of Other Classes	-17	-100	0	-42	-240	0
Sprout Damage	-26	-160	0	-59	-275	0
Vomitoxin	-20	-200	0	-46	-260	0

Discounts for sprout damage and vomitoxin were asked for. However, since no specific levels were noted in the survey, many of the managers responded by indicating it varied. Those managers that listed a value indicated discounts for sprout and vomitixin were significant and varied for HRS and HAD. Average discounts for sprout damage were 26 c/b for HRS and 59 c/b for HAD. Discounts for vomitoxin averaged 20 c/b for HRS and 46 c/b for HAD.

Managers were asked about current dockage discount practices they apply to farmers and are applied by buyers. Currently, few managers were applying dockage discounts to farmers (Table 16). No managers were applying dockage discounts to farmers for HAD, but 22% were applying dockage discounts for HRS. Managers indicated 32% would probably initiate dockage discounts to farmers in the future. In contrast, 69% of managers were encountering dockage discounts from buyers.

Table 16. Current/Pending Dockage Discounts		
Country Elevator	**Number**	**Percent**
Have Dockage Discounts		
HRS		
Yes	9	22%
No	41	78%
HAD		
Yes	0	0%
No	28	100%
Plan on Implementing Dockage Discounts		
Yes	19	32%
No	40	68%
Buyers		
Are Buyers Applying Dockage Discounts?		
Yes	40	69%
No	18	31%

Discounts buyers applied to elevator managers varied widely and whether purchased for the domestic or export market (Table 17). These discounts averaged 3 c/b for domestic markets and 4 c/b for exports. Examples of specific dockage discounts being applied include:

Buyers - Export
- 2 c/b for each .1% over .2%
- 1 c/b for each .5% over .5%
- 3 c/b for dockage .3% to .7%, 4 c/b over .7%
- 3 c/b for each 1% over 1%
- 4 c/b from .3% to .7%, 3c/b for each .5% over .7%

Buyers - Domestic
- 1 c/b from 1% to 1.3%, 3 c/b from 1.4% to 1.6%
- 4 c/b from .4% to 1%

Table 17. Current Dockage Demands and Discounts for Buyers			
	Average	**Min**	**Max**
What levels of dockage are buyers asking for?			
Domestic	.8%	.2%	3.0%
Export	.6%	.2%	1.5%
What are discounts buyers are applying? (cents/bu)			
Domestic	-3	0	-10
Export	-4	-2	-10

Finally, managers were asked about prospective changes if grade standards were changed to require cleaning. Managers were asked what changes would have to be made if shipments required dockage levels of .1%, .3%, and .5%. Managers indicated that if requiring the tightest dockage specification, 80% of firms would have to purchase additional cleaning equipment and make extensive modifications (Table 18). If a level of .3% dockage were required, 31% of firms would need to purchase additional cleaning equipment and 46% would have to both add cleaning equipment and make major modifications to the facility. Thus, requiring the lowest dockage limits would impose significant costs on facilities. In contrast, if requiring .5% dockage limits, 37% of firms indicated they wouldn't need to make any changes, while 26% of firms indicated this would require additional handling/elevation, and 24% indicated they would need to add additional cleaning capacity.

Firms also indicated that if .1% or .3% dockage limits were required for shipment, 51% of firms would initiate dockage premiums/discounts to farmers (Table 19). However, only 30% of firms would do so if a .5% dockage limit were initiated.

Survey results suggest a number of important findings. First, of the few Montana firms responding, they did little cleaning at elevators preferring to ship to the PNW and clean dockage there. Whereas, in North Dakota, more cleaning was done locally. This may largely be a response to the dockage farmers are delivering as North Dakota farmers delivered an average dockage of 3.0%, while in Montana, farmers delivered wheat with .9% dockage. Second, there has been a trend toward the addition of larger capacity grain cleaners (much of this occurring in the 1990s). Third, elevator managers indicated that requiring dockage of .1% would result in 80% having to do extensive modifications (adding cleaning capacity and extensive modifications to facility). Requiring dockage of .3%, 31% of facilities would have to add cleaning capacity and 46% would have to both add cleaning capacity and do extensive modifications to the facility. This suggests that adding dockage to the grade specifications would have significant capital costs on facilities. Fourth, elevator managers indicated that requiring dockage of .1% to .3% would result in 51% of firms initiating dockage discounts to farmers. Thus, requiring dockage standards at low levels could potentially pass some of the costs of cleaning onto farmers. Finally, average wheat loss estimated by this survey of elevator managers is higher than that utilized by Scherping et al. for their dockage study and are in fact closer to the high range reported by Scherping et al.

Table 18. Prospective Changes if Required to Clean to Specific Dockage Levels for All Shipments			
Change	Dockage Level		
	.1%	.3%	.5%
No equipment or operation changes	2.0%	5.8%	37.0%
Requires additional elevation or handling	3.9%	11.5%	25.9%
Purchase additional cleaning equipment	9.8%	30.8%	24.1%
Purchase additional cleaning equipment and major modifications to facility	80.4%	46.2%	9.3%
Provide premiums and discounts for dockage*	3.9%	5.8%	3.7%

* Note: Provide premiums and discounts is indicated here only if no other response was indicated. This is evaluated separately later.

Table 19. Provide Premiums/Discount Schedule for Dockage to Farmers if Required to Clean to Specific Dockage Levels for All Shipments			
	Dockage Level		
	.1%	.3%	.5%
Yes	51%	51%	30%
No	49%	49%	70%
Number of responses	51	51	54

Effect of Changes in Grade Standards on Current Exports

The effect of grade changes on exports was evaluated for past exports (1995/96 to 1999/00 marketing years). First, exports were analyzed to determine the amount of grade shift from the existing grade specifications to new dockage specifications. This provides perspective on how prior exports would be re-graded under the new dockage specifications if no additional cleaning was conducted. Second, exports were analyzed to determine the amount of exports that would require further cleaning so that the volume of exports under old specifications would be maintained under the new dockage specifications. This would give perspective on the additional cleaning required to maintain grades and the amount of material that would need to be removed. Actual changes in cleaning due to the new grade specifications should fall between these two estimates as some additional cleaning is expected and not all exporting countries may prefer higher grades and may in fact choose to purchase lower grades which meet specifications for higher grades except for the dockage specification.

Exports from 1995/96 to 1999/00 were classified with new dockage limits added to current grade specifications. These include dockage <=.3 for No. 1, <= .5 for No. 2, <=.7 for No. 3, and <=1.0 for No. 4. Addition of dockage specifications for exports during this time period would dramatically reduce the volume of shipments of higher grades. Examination of where current grades would be classified with the new specifications show large shifts to lower grades (Figure 26). Of the exports grading No. 1 Durum for 1995/96 to 1999/00, only 5% would remain classified as No. 1 under the new dockage specifications, 25% would be classified as No. 2; and 35% would be classified as No. 3. Similar patterns are exhibited in exports of HRS and HRW, although for these classes about 11-12% of exports grading No. 1 would remain classified as No. 1. Lower grades also show significant shifting of current grades to lower grades with new dockage specifications.

Export volumes were compared for 1995/96 to 1999/00 for grades of exports by class under the current FGIS grades and proposed grades with dockage requirements. These are shown by year in Figure 27. This comparison also indicates that if no additional cleaning was done, imposing dockage requirements on grades would result in a large shift in exports from No. 1 and No. 2 toward lower grades. For example: 1) about 30% of the No. 1 Durum would be shifted to each of No. 2, 3, and 4; 2) of the current No. 2 Durum, only about 12% would remain a No. 2, the rest would become 3's and 4's; 3) of the current No. 1 HRS, about 75% would be regraded to a No. 2 and No. 3; and 4) of the Current No. 2 HRS, only about 20% would remain No. 2, the rest would be regraded as No. 3 and No. 4.

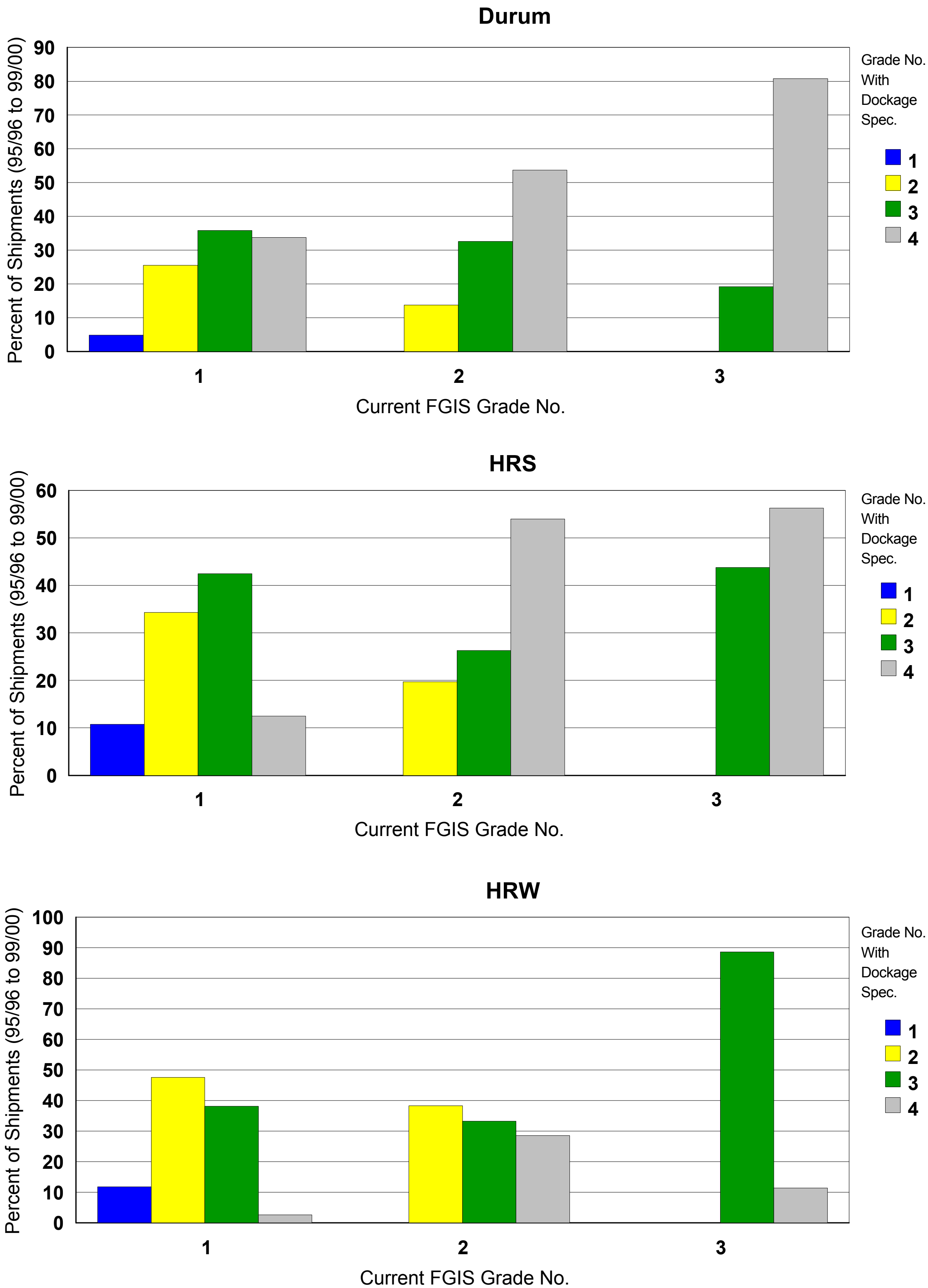


Figure 26. Comparison of Current FGIS Grades with Proposed Grades Including Dockage Requirements, Average of Exports by Class 1995/96 - 1999/00.

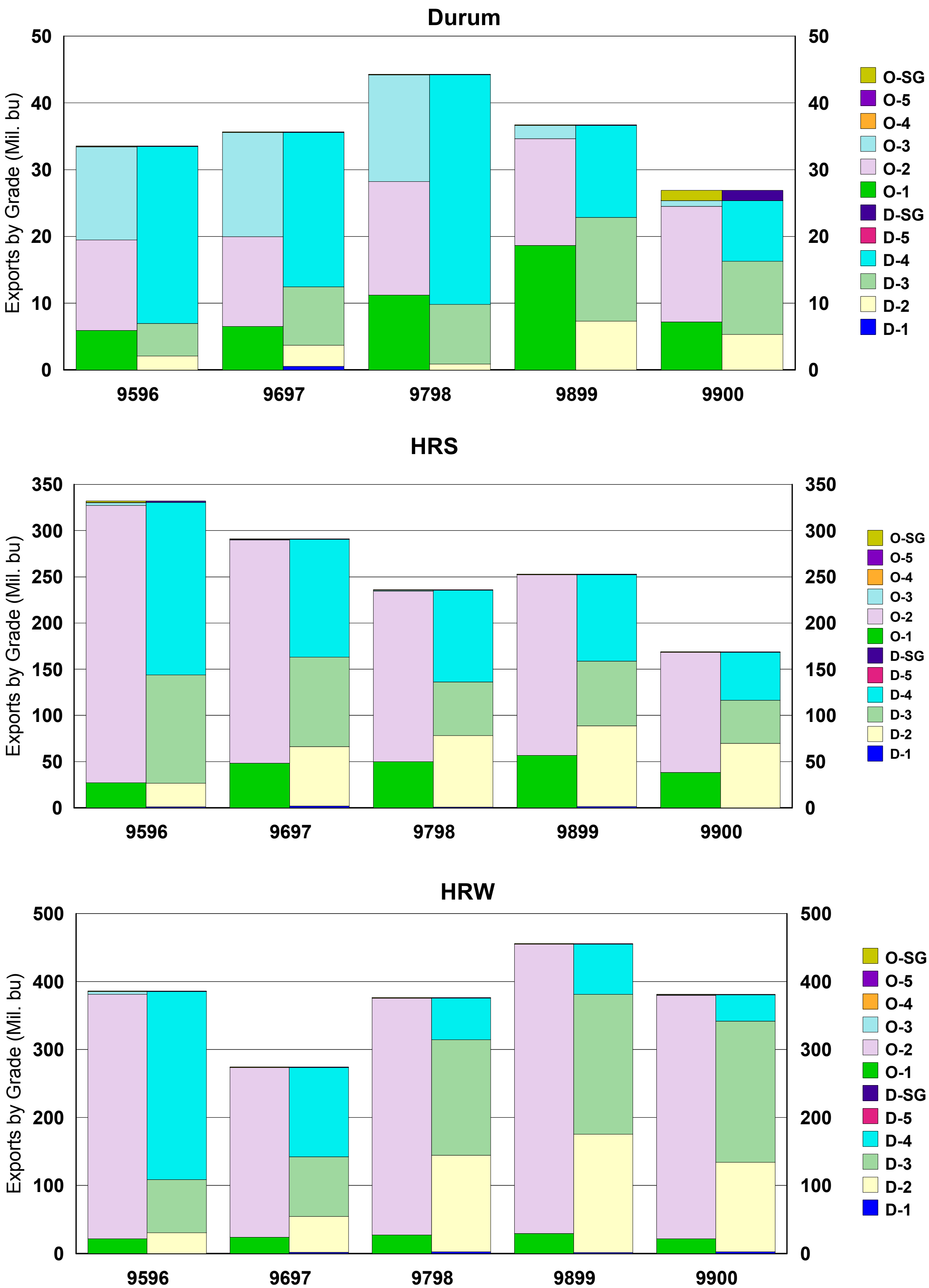
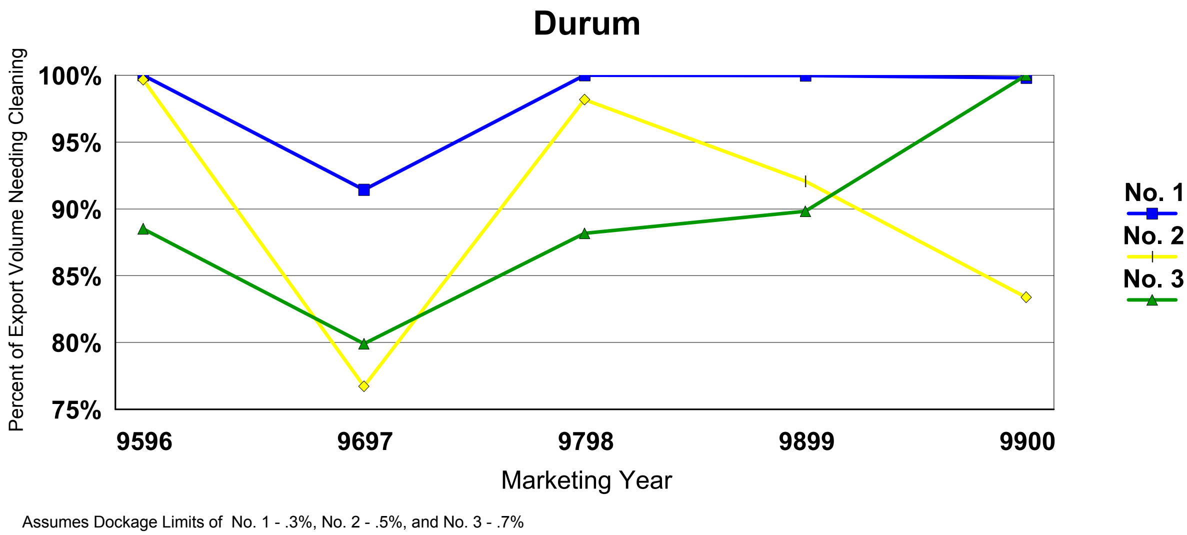


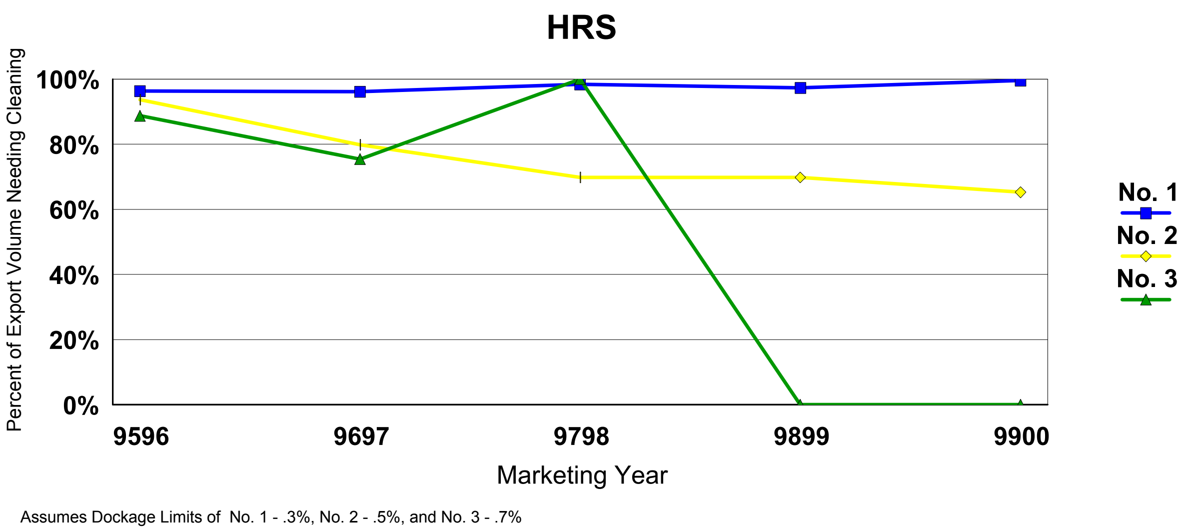
Figure 27. Comparison of Export Volumes by Grade for Current FGIS Grades and Proposed Grades with Dockage Requirements, by Class.

Exports were also examined to determine the percent and quantity by grade that would have to be cleaned to maintain export volumes in their current grades and the amount of material that would have to be removed. These were estimated for 1995/96 to 1999/00 exports (Figure 28). Results by grade for the classes indicate that nearly 100 percent of No. 1 export volumes by class would have required cleaning to be maintained as a No. 1 with the new dockage specifications. Similarly, high percentages of No. 2 Durum, HRS, and HRW would also require additional cleaning to maintain a grade of No. 2. *Note: These percentages are higher than those derived for export shipments (Figure 26) and indicate that those shipments that would maintain their grades appear to be smaller quantities, as such they count more when examining percent of shipments, yet have a smaller contribution when examining export volumes.*

The volume of exports that would require cleaning and the amount of dockage removed to maintain grades for Durum, HRS, and HRW are shown in Figures 29-30 by grade. No. 1 HRS would have required cleaning on about 50 million bushels to maintain grades from 1995/96 to 1999/00. The amount removed would amount to about 100,000 bu. This indicates that dockage would have to be reduced on average by .24% for those No. 1 HRS bushels requiring additional cleaning. For No. 2 HRS, bushels requiring additional cleaning ranged from highs of 280 million bushels in 1995/96 to about 135 million bushels in 1998/99. The decline in bushels requiring additional cleaning from 1995/96 to 1998/99 is due to both a decline in the volume of exports of No. 2 HRS and a decline in the level of dockage in exports of No. 2 HRS which results in fewer bushels exported that would require additional cleaning. The amount of material that would be required to be removed from No. 2 HRS ranged from a high of 757 thousand bushels to a low of 361 thousand bushels in these same years. Similar to No. 1 HRS, this amounts to about a .25-.28% reduction in dockage for those bushels requiring additional cleaning.

For HRW, approximately 30 million bushels of No. 1 would have required cleaning from 1995/96 to 1999/00, while volumes of No. 2 requiring additional cleaning ranged from a high of 330 million bushels in 1995/96 to a low of 210 million bushels in 1996/97. The volume of dockage needing to be removed has declined from 1995/96 to 1998/99 for both No. 1 and No. 2 HRW. Dockage requiring removal from No. 1 declined from 57,000 bushels to 47,000 bushels, while No. 2 declined from 1.2 million bushels to 290,000 bushels. The amount of dockage that would have to be removed declined faster than the amount of bushels requiring additional cleaning for HRW. As such, the average reduction in dockage declined from .26% to .18% for No. 1 and .33% to .12% for No. 2.





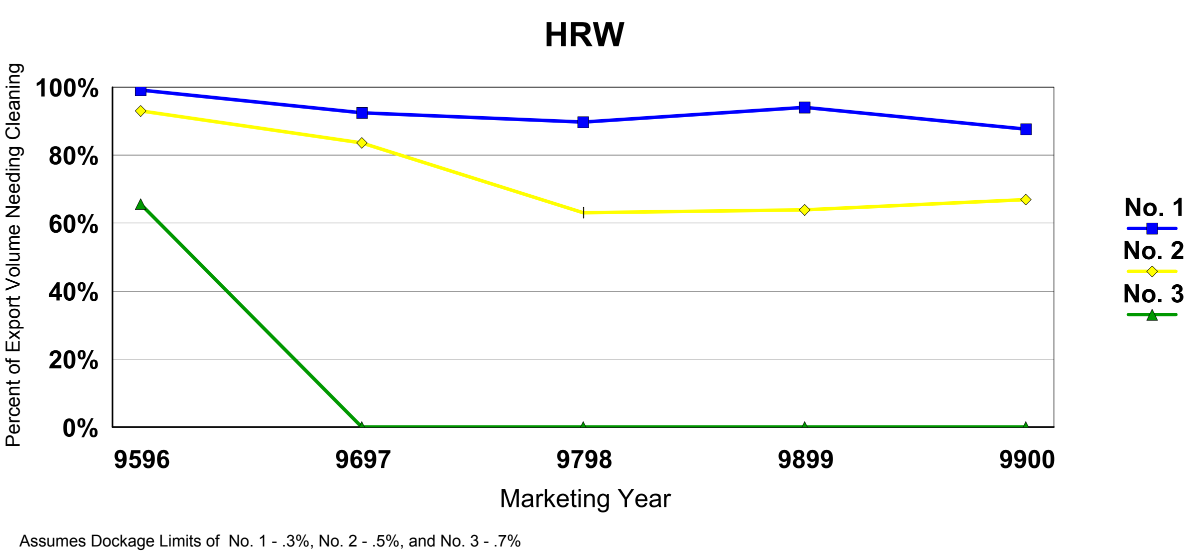


Figure 28. Percent of U.S. Wheat Export Volume Needing Cleaning to Maintain Grades, by Grade and Class.

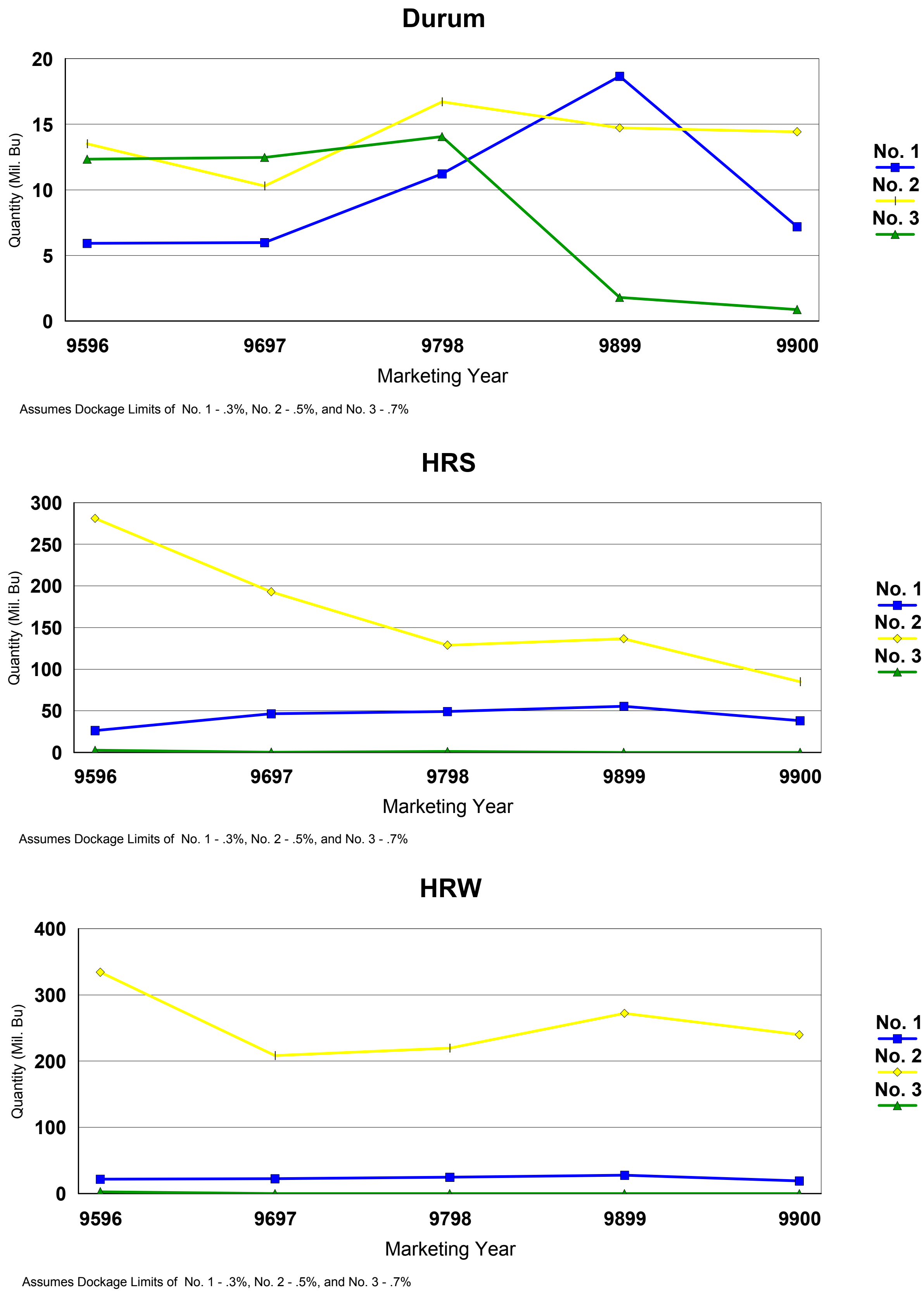
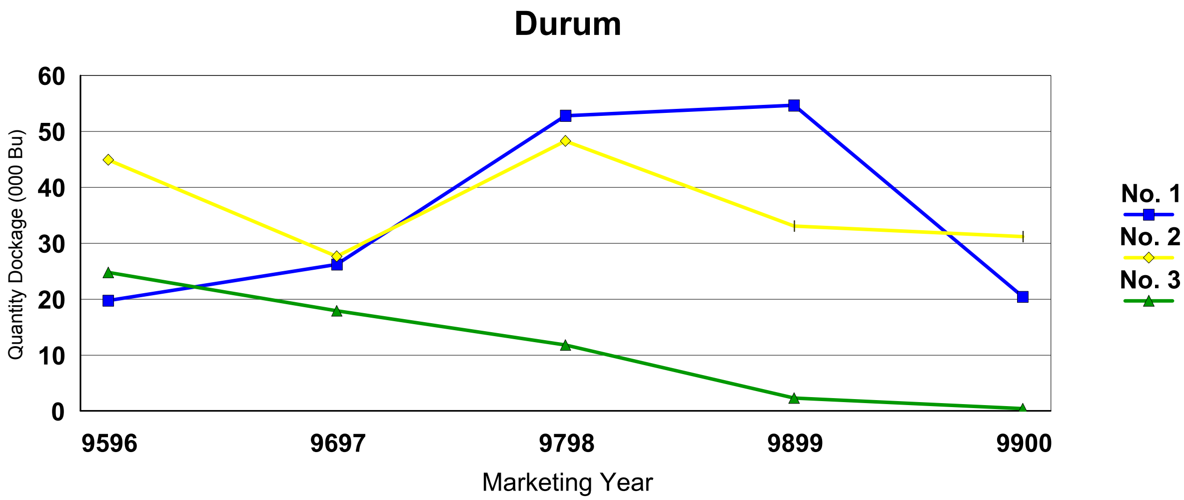
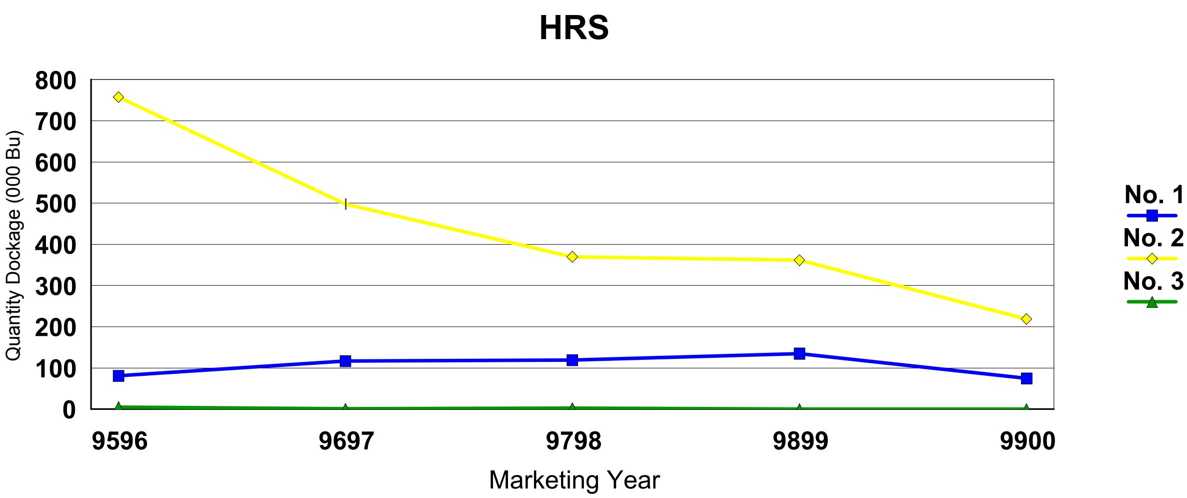


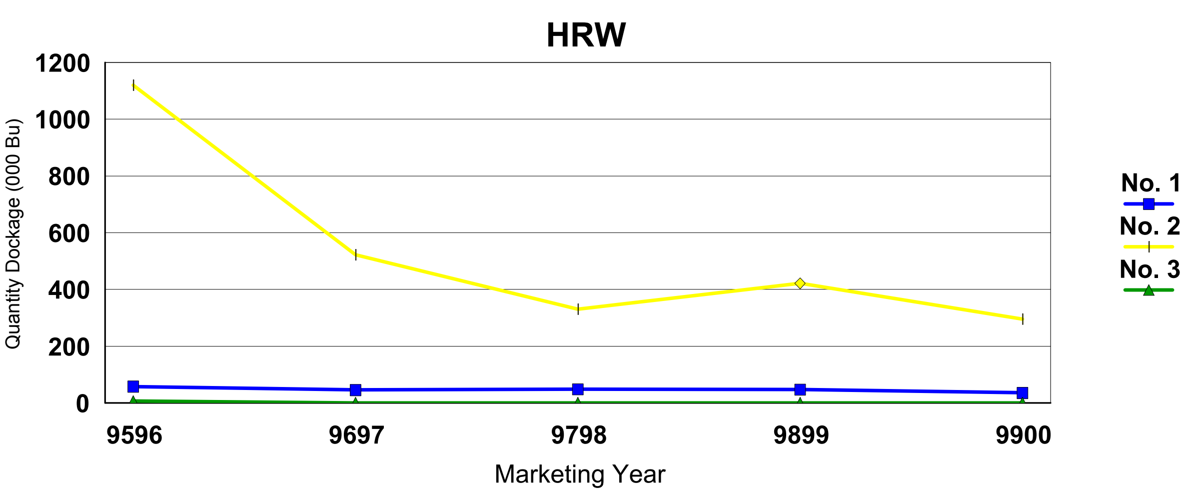
Figure 29. Quantity of U.S. Wheat Exports Needing Additional Cleaning to Maintain Grades, by Grade and Class.



Assumes Dockage Limits of No. 1 - .3%, No. 2 - .5%, and No. 3 - .7%



Assumes Dockage Limits of No. 1 - .3%, No. 2 - .5%, and No. 3 - .7%



Assumes Dockage Limits of No. 1 - .3%, No. 2 - .5%, and No. 3 - .7%

Figure 30. Quantity of Dockage in U.S. Wheat Exports Needed to be Removed to Maintain Grades, by Grade and Class.

Impacts of proposed changes were estimated assuming additional cleaning would be required on all bushels to maintain grades for 1998/99. This would require additional cleaning on 191.9 million bushels of HRS, 299.8 bushels of HRW, and 35.1 million bushels of Durum (Table 20). If this additional cleaning were to occur at facilities already cleaning, then the extra cost of cleaning would be comparable to the observed difference in costs when reducing the ending dockage level. For example, if the initial dockage level were 1.0% and ending dockage was .7% and .4%, the difference in estimated cleaning costs is about 1.44 cents/bu and 1.99 cents/bu for .4% to .1%. If we assume that the cost of additional cleaning were 2 cents/bu per .3% decline in average dockage levels and given the average dockage reduction required to maintain grades (Table 20, column 3), the total additional cost of cleaning wheat would be $3.3 million for HRS, $3.1 million for HRW, and $600,000 for Durum. Costs per bushel across grades and classes would range from 0.9 to 2.0 cents/bu. If additional cleaning were required at facilities not currently cleaning, then costs would be higher and should approach those estimated for cleaning at export elevators.

Table 20. Estimated Impacts of Additional Cleaning Required to Maintain Exports by Grade with New Dockage Specifications for 1998/99.

	Quantity Requiring Additional Cleaning (Mil. bu.)	Dockage to be Removed (000 bu)	Average dockage reduction (Percent)	Average cost of dockage reduction * (cents/bu)	Cost of additional cleaning ($000)	Total additional cleaning cost to maintain grades (Mil. $)
HRS						3.3
No. 1	55.4	134.9	.24	1.6	900	
No. 2	136.5	361.2	.26	1.8	2409	
HRW						3.1
No. 1	27.8	46.9	.17	1.1	312	
No. 2	272.0	421.0	.15	1.0	2808	
Durum						0.6
No. 1	18.6	54.7	.29	2.0	364	
No. 2	14.7	33.1	.22	1.5	221	
No. 3	1.8	2.3	.13	0.9	16	
Total						7.0

*Assumes dockage reduction of .3% increases costs by 2 cents/bu (when cleaning from 1% initial dockage, reducing ending dockage from .7% to .4% increases cleaning costs by 1.44 cents/bu and reducing the ending dockage from .4% to .1% increases cleaning costs by 1.99 cents/bu). This 2 cents per bushel is adjusted based on the average volume of dockage needing to be removed to arrive at an average cost per bushel.

Review of Studies

This section discusses issues related to the economics of grades and standards. Previous studies related to grades and standards have focused on three major areas. These areas include grades and standards in the U.S. grain industry, the economics of generic grades and standards, and the economics of minimum specifications.

Analysis of U.S. Grades/Standards for Grains

Hill has contributed much of the published economic research on grade specifications for grains and oilseeds. He notes that many of the problems associated with grades and standards have existed for decades, and many of the changes that have been made have later been reversed. In part, this has reflected confusion about the economic purposes of grades and standards.

Grades and standards are essential to the efficient operation of competitive markets handling generic commodities. Grades communicate information about value and encourage price competition. Grades and standards serve four basic purposes: 1) they permit buying and selling by description rather than inspection; 2) they permit commingling of grain into a few categories with uniform characteristics, which facilitates marketing; 3) they describe characteristics of grain so that buyers and sellers can estimate value for marketing and processing; and 4) they provide tools for the market to communicate preferences and generate incentives for quality improvement (Hill, p. 123, 1993).

Hill (1991) suggests that there are a number of forces which provide impetus for changes in grades. These include changes in crop quality from year to year, changes in the uses for crops, changes in harvesting technology, improvement in measurement technology, and foreign complaints. He argues that most legislative proposals for changing grades are motivated by one or more fallacies, including: 1) changing grades and standards will alter average quality in the market channel; 2) changes in grades will recapture lost market shares; and 3) complaints by foreign buyers could be resolved if we would change our grades. Hill argues that grades describe quality, whereas the market determines the value to place on quality characteristics. As such, changes in grades would not affect the value of the crop, but could at best provide an incentive for participants to change in the future.

Specific objectives for wheat grade standards were spelled out in the 1986 Grain Quality Improvement Act. Under this act, the purpose for grades and standards is: 1) to define uniform and accepted descriptive terms to facilitate trade; 2) to provide information to aid in determining grain storability; 3) to offer end users the best possible information from which to determine end-product yield and quality; and 4) to create the tools for the market to establish quality improvement incentives.

U.S. grades and standards for wheat include three distinct categories of information: grade factors, non-grade factors, and informational factors. Grade factors are grain characteristics used in the determination of numerical grades and must be included on inspection certificates. Hill argues these factors "should be those which are considered defects in the grain where less is always preferred to more, and where zero is most desirable." Non-grade factors are those that are required to be measured on every official inspection, but do not determine grade.

Hill argues that non-grade factors should be those that "are important to a majority of users but where the exact level may differ with time, location, and use." Third are informational factors for which the GIPSA has established standards and measurement technology, but which are only measured upon request of the buyer or seller. Informational factors may be required by few users, but standardized methodology and equipment increase the reliability of information and are in the public interest (Hill, p. 139-140, 1998).

Hill reviews changes in grades and standards from an economic perspective. He argues that trade is facilitated by small numbers of grades determined by a minimum number of clearly defined factors. However, factors must also be readily measured and objectively determined by technology that gives repeatable results throughout the marketing chain. Grades and factors must also be acceptable to and used by most participants in the market. Trade is facilitated by stability in grades and factors over time. Hill argues that optimal grade standards are a "means of communication about value in the market place with an inherently economic purpose." Optimal grade standards should be structured to increase communication and market efficiency (Hill, p. 246, 1980). Three alternative approaches are advanced for determining if there is sufficient economic justification for considering factors as grade determining. First, is the grade factor common in most exporting countries? Second, is its use preferred by domestic and foreign buyers? Third, do results of research relate this characteristic to the value of the commodity?

Economics of Grades

Bowbrick discusses the role of grades and brands. He indicates that the purpose of grades and brands is to reduce the information and search costs (time, travel, information collecting, and information processing costs) of buyers. Grades package information succinctly and can represent a way of processing information so that consumers are given some interpretation along with essential facts. Grades can reduce search costs by reducing variability (variance over time as well as between and within lots) between firms/locations and by facilitating price/quality comparisons.

Economic theory offers some insight into search costs. Briefly, buyers seeking an optimal combination of price and quality compare the cost of searching (i.e., gaining information) against expected gains. Bowbrick indicates that grades are a way of reducing the amount of required information so that buyers can make a purchasing decision at low cost—rather than making the best possible choice after a great deal of search. Grades convey information about a product in a compact way.

The more grades there are, the greater the chance that a grade will closely match an individual's preferences (Bowbrick, p. 108). However, when calculating the optimum number of grades, it is important to take into account the impact on search, production, distribution costs, as well as the impact on demand.[6]

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[6] A shift in the way grades are sorted will change supply and demand functions for products (unless both the old and new specifications are irrelevant). As such, if *ex ante* data are used to predict what will happen, no matter how complete the data, changes would just be a guess (Bowbrick, p. 107).

The usefulness of information contained in grades depends on whether quality is readily observable, measurable, or hidden. Bowbrick indicates that when quality is hidden (not measurable, or not measurable in a timely manner), even if there is a large number of grades, the amount of useful information communicated to consumers is small. He goes on to argue that "the more a label (grade) is meant to describe, the less adequate a simple vertical grading scheme is and the more likely a parallel system with many possible grades will be needed" (Bowbrick, p. 145). He suggests that the number of grades should be reduced if: 1) grades are similar, 2) buyers have similar tastes and preferences, or 3) price spreads allow buyers to become indifferent among grades. The tradeoff between search costs and satisfaction for customers is a major factor controlling the optimal number of grades.

Minimum Specifications

Phlips indicates that in a perfect market, information on quality would be contained in prices, with highest quality getting highest prices. In cases of asymmetrical information (favoring the seller), the availability of lower quality products has the effect of better quality products being driven out of the market.[7] He indicates that better quality producers could take a longer term perspective and not allow this to happen. It is in the long-term interests of the higher quality sellers to either maintain higher values for the average quality of the market by weeding out or limiting lesser-quality products, or certifying or branding higher quality products. For producers of higher quality wheats, it should be in the sellers' interests to maintain high average quality in the long run or to provide information to alter buyers' assessment of quality.

Bowbrick advances the following cases as examples where minimum standards may provide benefits. First, when the cost of failure is large, minimum standards could be used to control failure costs. Second, if there is a high probability that less serious costs may occur due to failure, minimum standards could be used to reduce costs. Third, when defective items are not easily distinguished by buyers, minimum standards could be used to eliminate or reduce the trade volume of defective items. Fourth, when producers of defective items cannot be identified by buyers, buyers will be unable to "punish" producers for selling substandard products. Fifth, in the absence of identifying and punishing producers, it pays for producers to slacken standards. Sixth, costs are born by all consumers (risk and search costs are high), and seventh, costs are borne by all producers even when only one or two are producing defective items.

Summary and Conclusions

The market for dockage, though complicated, is and has been working. This is a joint product of more educated and commercially competitive buyer, and competition among exporting firms. Dockage is being removed where/how in the system it is most efficient and levels of dockage in export shipments are declining. This is most apparent in exports of No. 1 HRS and HRW and for exports shipped from PNW port locations. Levels of dockage vary substantially across importers, as would be expected, and as a result the additional cost of dockage removal is being absorbed mostly by those willing to pay those additional costs (i.e., it is

[7] One of the most noted of these is Akerlof's "The Market for 'Lemons': Quality Uncertainty, and the Market Mechanism."

a U.S. form of discrimination).

Elevators in the U.S. HRS region now have/are adjusting to tighter dockage specifications by adding higher capacity cleaners and cleaning most of their receipts. This is being done mostly in the interior, but also at the point of export. No doubt this is evolving toward a pricing structure in which the added cost of cleaning is being absorbed partly by buyers specifying cleaned wheat, and partly by elevators (in terms of investment costs) and to a limited extent (presently) by growers in the form of explicit discounts. U.S. cleaning margins still are far short of those in Canada. The primary reasons for this are: 1) the explicit margin applied in Canada (6.7 ¢/bu); 2) the reclaim process; and 3) lower cleaning costs due to lower fixed costs at country positions.

Any proposal (whether through standards or commercially) regulating dockage would have the impact of requiring greater cleaning than done currently. This would have two important impacts. One is that costs to the system would increase, resulting ultimately in discounts to growers due to it being imposed for sales to importers not demanding cleaner wheat (i.e., not willing to pay the additional cost of cleaned wheat). Second, there is a risk that some buyers would shift grades purchased so as to incur lower costs. Associated with this would be the reduction in other grade factors commensurate with the lower grades.

The conventional approach to policy changes in U.S. grade standards has been fairly clear. For easily measurable characteristics (e.g., protein, dockage, etc.), provide accurate testing and allow the market to resolve tradeable levels, potentially unique to each market/customer. For others that are not easily measurable (e.g., food safety items, end-use performance measures, feed wheat, etc.), develop regulations on acceptable limits. Ultimately, these have the impact of reducing search costs (search, testing, ... etc.) within the marketing system.

Imposing factor limits on dockage is a radical departure from the above generally followed policies. Thus, a regulation would be imposed on a problem easily resolvable within the marketing system through contractual relations between buyers and sellers. This is in contrast to the numerous other issues related to wheat quality that are avoided, even though their resolution is not easy within the marketing system. In addition, past changes in factor limits have been applied for all wheat and have not differentiated by destination (e.g., domestic or export).

Given the trends in the market, the proposed regulations appear to be replicating what the market already appears to be converging toward. The policy will expedite the process and would be non-discriminatory, meaning its cost would be borne/shared more broadly. In the larger scheme, the additional costs of these regulations would not be that great. The primary reason for this is that the United States, particularly the HRS producing region, has already been making a transition toward cleaner wheats being exported.

In addition to the above considerations, below is a summary of the major policy considerations for and against the proposed policy on including factor limits on dockage in the grade standards for U.S. wheat exports. These are listed in approximate order of importance.

Table 21. Summary of Arguments For and Against Policy Changes for Dockage

For the Policy Change	Against the Policy Change
• Nullify concern of (some) buyers making it easier than resolving issues through contract mechanisms.	• Costs: Additional costs would be imposed on the system and largely borne by growers.
• Economies of size and utilization and removal of uncertainties ultimately would reduce costs and dis-incentives for investing.	• Risk of grade shifting (i.e., to lower grades) by buyers not willing to pay the price differential.
• Cleaning to remove dockage ultimately provides other improvements in quality (uniformity, etc.).	• U.S. No 3 could become the dumping ground in regions with high dockage and/or in years with high dockage.
	• Cleaning/blending to a factor limit, as opposed to a contract limit. However, presumably buyers could specify a limit tighter than the factor limit.
	• Past changes in grade factors have been applied system wide, not for exports only. If this were to happen, impacts would increase dramatically.

Another issue of importance in the United States is reclaim technology. This process is a substantive regulation which is relaxed in Canada and has the impact of ultimately reducing cleaning costs. While it is not exactly clear on how this is administered in the United States, the presumption is that U.S. regulations do not favor similar treatment. Survey results for elevator managers in North Dakota and Montana indicate 80% of elevators sold wheat lost in cleaning as screenings. Further, survey results suggest more wheat may be lost in cleaning than previously thought. Regardless of the outcome of this process, this should be explored further.

Much of the motive of these policy changes is due in part to pricing practices with respect to quality from Canada. However, it would be naive to think that even if the United States exactly replicated the Canadian standards/system for cleaning that the United States would gain market share. Rather, it would be more likely that the ruinous nature of price competition would continue, with the exception that one dimension of differentiation would be removed.

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Appendix I
Grade Specifications for U.S. Wheat

Appendix Table A1. U.S. Grades and Grade Requirements for All Classes of Wheat (except mixed wheat)

Grading Factors	Grades U.S. Nos.				
	1	2	3	4	5
Minimum pound limits of:					
Test weight per bushel					
Hard Red Spring wheat or White Club wheat	58.0	57.0	55.0	53.0	50.0
All other classes or subclasses	60.0	58.0	56.0	54.0	51.0
Maximum percent limits of:					
Defects:					
Damaged kernels					
Heat (part of total)	0.2	0.2	0.5	1.0	3.0
Total	2.0	4.0	7.0	10.0	15.0
Foreign material	0.4	0.7	1.3	3.0	5.0
Shrunken and broken kernels	3.0	5.0	8.0	12.0	20.0
Total 1/	3.0	5.0	8.0	12.0	20.0
Wheat of other classes: 2/					
Contrasting classes	1.0	2.0	3.0	10.0	10.0
Total 3/	3.0	5.0	10.0	10.0	10.0
Stones	0.1	0.1	0.1	0.1	0.1
Maximum count limits of:					
Other material:					
Animal filth	1e+08	1e+08	1e+08	1e+08	1.1e+08
Castor beans					
Crotalaria seeds					
Glass					
Stones					
Unknown foreign substances					
Total 4/					
Insect-damaged kernels in 100 grams					

U.S. Sample Grade is Wheat that:
(a) Does not meet the requirements for U.S. Nos. 1, 2, 3, 4, or 5; or
(b) Has a musty, sour, or commercially objectionable foreign odor (except smut or garlic odor) or
(c) Is heating or of distinctly low quality.

1/ Includes damaged kernels (total, foreign material, shrunken and broken kernels.
2/ Unclassed wheat or any grade may contain not more than 10.0 percent of wheat of other classes.
3/ Includes contrasting classes.
4/ Includes any combination of animal filth, castor beans, crotalaria seeds, glass, stones, or unknown foreign substance.

Appendix II
Grade Specifications for Canada

Appendix Table A2.1 Grades of Feed Wheat (Canadian Western, Canadian Eastern)

	Standard of Quality			Maximum Limits of		
				Foreign Material		
Grade Name	Minimum Test Weight (kg/hL)	Variety	Degree of Soundness	Matter Other Than Cereal Grains	Total Including Cereal Grains	Amber Durum
Canada Western Feed	65	Any type or variety of wheat excluding amber Durum	Excluded from other grades of wheat on account of lightweight or damaged kernels, but will be reasonably sweet	1.0%	10.0%	10.0%
Canada Eastern Feed	65	Any type of variety of wheat excluding amber Durum	Excluded from other grades of wheat on account of lightweight or damaged kernels, but will be reasonably sweet	1.0%	10.0%	10.0%

Source: Canadian Grain Commission, 1999.

Appendix Table A2.2 Grades of Canadian Western Red Spring Wheat

	Standard of Quality				**Maximum Limits of**			
					Foreign Material		Wheats of Other Classes or Varieties	
Grade Name	Minimum Test Weight (kg/hL)	Variety	Minimum Hard Vitreous Kernels (Per-centage by Weight)	Degree of Soundness	Matter Other Than Cereal Grains	Total Including Cereal Grains	Contrasting Classes	Total Including Contrasting Classes
No. 1 Canada Western Red Spring	75	Any variety of red spring wheat equal to or better than Neepawa	65.0%	Reasonably well matured, reasonably free from damaged kernels	About 0.2%	About 0.75%	1.0%	3.0%
No. 2 Canada Western Red Spring	72	Any variety of red spring wheat equal to or better than Neepawa	35.0%	Fairly well matured; maybe moderately bleached or frost damaged, but reasonably free from severely damaged kernels	About 0.3%	1.5%	3.0%	6.0%
No. 3 Canada Western Red Spring	69	Any variety of red spring wheat equal to or better than Neepawa	- -	May be frost damaged, immature or weathered, but moderately free from severely damaged kernels	About 0.5%	3.5%	5.0%	10.0%

Source: Canadian Grain Commission, 1999.

Appendix Table A2.3 Grades of Amber Durum (Canada Eastern)

	Standard of Quality				Maximum Limits of			
					Foreign Material		Wheats of Other Classes or Varieties	
Grade Name	Minimum Test Weight (kg/hL)	Variety	Minimum Hard Vitreous Kernels (Percentage by Weight)	Degree of Soundness	Matter Other Than Cereal Grains	Total Including Cereal Grains	Other Classes	Total
No. 1 Canada Eastern Amber Durum	79	Any variety of amber Durum wheat equal to Hercules	80.0%	Reasonably well matured, reasonably free from damaged kernels	About 0.2%	About 0.5%	2.0%	5.0%
No. 2 Canada Eastern Amber Durum	77	Any variety of amber Durum wheat equal to Hercules	60.0%	Reasonably well matured, reasonably free from damaged kernels	About 0.3%	1.5%	3.5%	10.0%
No. 3 Canada Eastern Amber Durum	74	Any variety of amber Durum wheat equal to Hercules	40.0%	Fairly well matured, may be moderately weather or frost damaged but reasonably free of severely damaged kernels	About 0.5%	2.0%	5.0%	15.0%
Canada Eastern Feed Durum	- -	Any variety of amber Durum wheat	- -	Excluded from higher grades on account of light weight or damaged kernels but reasonably sweet	1.0%	10.0%	49.0%	- -

Source: Canadian Grain Commission, 1999.

Appendix Table A2.4 Canadian Red Spring Wheat - Export Grade Determinants

	Commercial Cleanliness					Total Foreign Material											
	Broken Grain Through #5 Sieve	Material through 4.5 R.H. Sieve and Roughage				Seeds and Wild Oats											
		Small Seeds	Rough-age	Attri-tion	Total	Large Seeds	Small Seeds	Wild Oats	Total	Rough-age	Attri-tion	Stones	Total Mineral Matter	Ergot	Sclerotia	Other Cereal Grains	Total Foreign Material
No. 1 CWRS	0.30%	0.05%	0.05%	0.10%	0.10%	0.20%	0.05%	0.05%	0.20%	0.05%	0.10%	0.03%	0.06%	0.01%	0.01%	0.40%	0.40%
No. 2 CWRS	0.30%	0.05%	0.05%	0.10%	0.10%	0.20%	0.05%	0.05%	0.20%	0.05%	0.10%	0.03%	0.10%	0.02%	0.02%	0.75%	0.75%
No. 3 CWRS	0.30%	0.05%	0.05%	0.10%	0.10%	0.20%	0.05%	0.05%	0.20%	0.05%	0.10%	0.06%	0.10%	0.04%	0.04%	1.25%	1.25%
C.W. Feed	0.50%	0.05%	0.10%	0.10%	0.10%	0.50%	0.05%	0.10%	0.50%	0.10%	0.10%	0.10%	0.25%	0.10%	0.10%	5.0%	5.0%

	Wheat of Other Classes		Minimum Hard Vitreous Kernels	Sprouted		Heated and Binburnt	Shrunken and Broken		
Grade Name	Contrasting Classes	Total (including Cont. Classes)		Severely Sprouted	Total (including Severely Sprouted)		Shrunken	Broken	Total
No. 1 CWRS	0.30%	1.5%	65.0%	0.1%	0.5%	0.05% including 1 binburnt kernel per 1000 g	4.0%	5.0%	7.0%
No. 2 CWRS	1.5%	3.0%	35.0%		1.5%	0.4% including 4 binburnt kernels per 1000 g	4.0%	6.0%	8.0%
No. 3 CWRS	2.5%	5.0%	No Minimum		5.0%	1.0% including 6 binburnt kernels per 1000 g	4.0%	7.0%	9.0%
C.W. Feed	No Limit (but not more than 10.0% Amber Durum		No Minimum	No Limit		2.5% including 2.5% binburnt kernels	4.0%	13.0%	15.0%

Appendix III
Receival Standards for Australian Wheat

GENERAL INFORMATION:

- The approval of AWB State Manager is required for any commingling of established grades.
- Red grained wheats will only be received into Australian Winter Wheat or Feed Wheat.
- Segregation of HRD2 and GP2 will only be initiated in seasons where weather damage occurs.
- There shall only be one protein test performed per load.

Segregation Varieties:

HRD1 & HRD2	Banks, Cocamba, Condor, Ouyen and Meering (Silo Group A & B)
APW	Arnhem, Banks, Barunga, Beulah, Carnamah, Cocamba, Condor, Diamondbird, Dollarbird, Frame, Goldmark, Goroke, Halberd, Janz, Kalannie, Kelalac, Leichhardt, Meering, Molineux, Moray, Ouyen, Oxley, Silverstar, Spear, Stilleto, Sunlin, Sunvale, Swift, Tailorbird, Vulcan and Yanac. Hybrid Apollo, Hybrid Gemini, Hybrid Mercury (Silo Group A, B, C & D)
SFT1	Tatiara, Vectis and Wyuna (Silo Group C & D).
WINT	Declic, Lawson, More and Paterson

Source: T J Teague (SA) Pty Ltd.

Appendix Table A3.1 Receival Standards for Australian Wheat, 1998-99

		Aust. Hard No. 1 (HRD1)	Aust. Standard White (ASW)	Aust. Premium White (APW)	Aust. Noodle Wheat (ASWN)	Aust. Soft Wheat (SFT1)	Aust. General Purpose White (GP1)	Feed Wheat (FW)
VARIETY		See Segregation Varieties	See Segregation Varieties	See Segregation Varieties	Rosella	See Segregation Varieties	Refer AWB Varietal List	NO LIMIT
1. MOISTURE CONTENT	MAXIMUM (%)	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
2. PROTEIN expressed on an 11% moisture basis	MINIMUM (%)	11.5%	NO LIMIT	10%	9.5%-11.5%	9.5% or Less	NO LIMIT	NO LIMIT
3. TEST WEIGHT	MINIMUM (kg/hl)	74	74	74	74	74	68 WB	62 WC
4. UNMILLABLE MATERIAL This is the material passing through a 2mm screen and/or material other than wheat kernels remaining above the screen.								
4.1 SCREENING ASSESSMENT Total material passing through the screen and into bottom pan.	MAXIMUM (% by weight or volume)	5%	5%	5%	5%	5%	10% UD	15%
4.2 UNMILLABLE MATERIAL ABOVE THE SCREEN Light material which usually rises to the top, including whiteheads, chaff, backbone, wild radish, milk thistle or other seed pods.	MAXIMUM (% by volume)	3%	3%	3%	3%	3%	5% UA	10% UC
4.3 SMALL FOREIGN SEEDS All seeds which do not have a tolerance in Type 1 - 7(b) that collect in bottom pan of screen. Including Hedge Mustard, Ryegrass, Lesser Canary Grass, Rapeseed, Peppercress, Wild Radish Seeds, Wild Turnip Seeds and Saltbush.	MAXIMUM (% by volume)	1%	1%	1%	1%	1%	2% UF	2%
5. DEFECTIVE GRAINS								
5.1 SPROUTED GRAINS Note: (ES) indicates that only early stages of sprouting are acceptable. (This is not a defect code)	WHERE NO FALLING NUMBER EQUIPMENT IS AVAILABLE							
	Maximum % by Count (300 grain sample)	2% (ES) (6 grains)	1% (ES) (3 grains)	1% (ES) (3 grains)	NIL	NIL	2% (ES) (6 grains)	NO LIMIT
	Site Daily Running Sample Minimum Falling Number (seconds)	300	300	300	300	250	250	Less than 150

		WHERE FALLING NUMBER EQUIPMENT IS AVAILABLE ON SITE						
	Minimum Load by Load Falling Number (seconds)	300	300	300	300	250	250	Less than 150
5.2 STAINED GRAINS 5.2.1 Stained Grains Exposed to wet weather or infected by field fungi	MAXIMUM % BY COUNT (300 grain sample)	5% (15 grains)	5% (15 grains)	5% (15 grains)	5% (15 grains)	5% (15 grains)	15% (45 grains) GC	50% (150 grains) GE
OF WHICH								
5.2.2 Pink Fungai Stained Grains Those which have been affected by certain Fusarium, Eppicoccum or Drechslera spp.	MAXIMUM % BY COUNT (300 grain sample)	2% (6 grains)	2% (6 grains)	2% (6 grains)	2% (6 grains)	2% (6 grains)	5% (15 grains) GF	5% (15 grains)
5.3 DRY GREEN, SAPPY OR FROST DISTORTED	MAXIMUM % BY COUNT (300 grain sample)	1% (3 grains)	1% (3 grains) GG	1% (3 grains)	1% (3 grains)	1% (3 grains)	10% (30 grains) GG	Greater than 20% (60 plus grains) GI
5.4 HEAT DAMAGED, BIN BURNT OR MOULDY	MAXIMUM % BY COUNT (300 grain sample)	NIL	NIL	NIL	NIL	NIL	NIL	NIL
5.5 INFECTED WITH BALL SMUT (STINKING SMUT)	MAXIMUM % BY COUNT (300 grain sample)	NIL	NIL	NIL	NIL	NIL	NIL	NIL
5.6 INSECT DAMAGED	MAXIMUM % BY COUNT (300 grain sample)	1%	1%	1%	1%	1%	2% GJ	4% GK
6. CONTAMINANTS								
6.1 PICKLING COMPOUNDS	MAXIMUM (per half litre)	NIL	NIL	NIL	NIL	NIL	NIL	NIL
6.2 CHEMICALS NOT APPROVED FOR STORED GRAIN	MAXIMUM (per half litre)	NIL	NIL	NIL	NIL	NIL	NIL	NIL
6.3 SEED CONTAMINANTS								
Type 1. Colocynth, Double Gee or Spiny Emex or Three Cornered Jack, Jute, Long Headed Poppy, Mexican Poppy, Field Poppy, Horned Poppy, Wild Poppy, Parthenium Weed and New Zealand Spinach	MAXIMUM INDIVIDUAL SEED BASIS (per half litre)	8	8	8	8	8	8	8
Type 2. Castor Oil Plant, Coriander, Crow Garlic or Wild Garlic, Darling Pea, Opium Poppy, Ragweed, Rattlepods, Starburr and St. John's Wort	MAXIMUM ALL SEEDS (per half litre)	NIL	NIL	NIL	NIL	NIL	NIL	NIL

Type 3.(a) Bathurst Burr, Bulls Head or Caltrop or Cats Heads, Cape Tulip, Cottonseed, Dodder, Noogoora Burr and Thornapple	MAXIMUM ALL SEEDS (per half litre)	2	2	2	2	2	2	2
Type 3.(b) Vetch (Tare) and Vetch (Commercial)	MAXIMUM ALL SEEDS (per half litre)	4	4	4	4	4	4	4
Type 3.(c) Heliotrope (Blue) and Helitrope (Common)	MAXIMUM ALL GRADES (per half litre)	8	8	8	8	8	8	8
Type 4. Bindweed (Field), Cutleaf Mignonette, Darnel (Drake Seed), Hexham Scent or King Island Melilot, Hoary Cress, Mintweed, Nightshades, Paddy Melon, Skeleton Weed and Variegated Thistle	MAXIMUM ALL SEEDS (per half litre)	20	20	20	20	20	20	20
Type 5. Creeping Knapweed or Russian Knapweed, Sesbania Pea, Patterson's Curse or Salvation Jane	MAXIMUM ALL SEEDS (per half litre)	40	40	40	40	40	40	40
Type 6. Colombus Grass, Johnson Grass and Saffron Thistle	MAXIMUM ALL SEEDS (per half litre)	10	10	10	10	10	50 EA	50
Type 7.(a) Chickpeas, Corn, Cowpea, Faba Beans, Lentils, Lupin, Maize, Field Peas, Safflower, Soybean and Sunflower	MAXIMUM ALL SEEDS (per half litre)	1	1	1	1	1	10 EB	100 ED
Type 7.(b) Barley (2 row), Barley (6 row), Australian Bindweed, Black Bindweed, Durum, Black Oats, Sand Oats, Wild Oats, Common Oats, Rice, Rye (Cereal), Sorghum (Grain), Triticale, Turnip Weed and Bifora. And any other seed contaminants not specified in Types 1-7(a)	MAXIMUM ALL SEEDS (per half litre)	50	50	50	50	50	150 EE	400 EG
6.4 ERGOTS 6.4.1 Ryegrass Ergot 6.4.2 Wheat Ergot	MAXIMUM LENGTH OF PIECES (cm)	2	2	2	2	2	2	2
	MAXIMUM NO. OF PIECES (per half litre)	1	1	1	1	1	1	1
6.5 TAINTING AGENTS	MAXIMUM TOLERANCE (per half litre)	NIL	NIL	NIL	NIL	NIL	NIL	NIL
6.6 STICKS AND STONES	MAXIMUM TOLERANCE (per half litre)	NIL	NIL	NIL	NIL	NIL	NIL	NIL
6.7(a) EARTH AND SAND (GRAINS)	MAXIMUM TOLERANCE (per half litre)	20	20	20	20	20	50 EH	50
6.7(b) PEA SIZED PIECES OF EARTH	MAXIMUM TOLERANCE (per half litre)	1	1	1	1	1	3	6

6.8 GRAIN INSECTS 6.8.1 Live Grain Insects	MAXIMUM TOLERANCE (per half litre)	NIL	NIL	NIL	NIL	NIL	NIL	NIL
6.8.2 Dead Grain Insects	MAXIMUM TOLERANCE (per half litre)	5	5	5	5	5	5	5
6.9 EARCOCKLE	NUMBER OF INDIVIDUAL GALLS	10	10	10	10	10	15 El	50 EK
6.10 FIELD INSECTS 6.10.1 Sitona Weevils	MAXIMUM TOLERANCE (per half litre)	10	10	10	10	10	10	10
6.10.2 All others	MAXIMUM TOLERANCE (per half litre)	3	3	3	3	3	3	3
6.11 PEA WEEVIL 6.11.1 Live Pea Weevil	MAXIMUM TOLERANCE (per half litre)	NIL	NIL	NIL	NIL	NIL	NIL	NIL
6.11.2 Dead Pea Weevil	MAXIMUM TOLERANCE (per half litre)	3	3	3	3	3	3	3
6.12 SNAILS Refers to whole or substantially whole (more than half) snail shells	MAXIMUM TOLERANCE (per half litre)	1	1	1	1	1	10 EL	10
6.13 LOOSE SMUT (PIECES)	MAXIMUM TOLERANCE (per half litre)	3	3	3	3	3	3	3

Source: TJ Teague (SA) Pty Ltd.

Appendix IV
Grade Standards for French Wheat

Table A4.1 EU Minimum Intervention Quality Requirements 1997/98		
	Durum	**Soft Wheat**
A. maximum moisture	14.5%	14.5%
B. sound basic grains	88%	88%
C. grains other than sound basic grains	12%	12%
1. broken grains	6%	5%
2. Grains impurities	5%	7%
shrivelled grains		
other cereals	3%	
weevil-damaged		
discolored germs		
grains damaged during drying	0.5%	0.5%
3. patched grains	5%	
including dry rot infested	1.5%	
4. sprouted grains	4%	6%
5. misc. impurities	3%	3%
foreign material (harmful)	0.1%	0.1%
spontan, heat damage	0.05%	0.05%
extraneous matter		
husks		
ergot	0.05%	0.05%
decayed grains		
dead insects		
D. max content of kernels, which have completely or partly lost their translucency	40%	
E. max. content of tannin	--	--
F. minimum weight	78 kg/hl	72 kg/hl
G. protein content [1]	11.5%	
H. falling number (Hagberg)	220	220
I. sedimentation		20

[1] Based on dry matter
Source: Toepfer International, 1997

Appendix Table A4.2 Experimental Classifications for French Wheats, 1999

	E	**1**	**2**	**0.125**	**3b**
Protein	≥12%	11-12.5%	10.5-11.5%	<10.5%	<10.5%
Baking Strength (W)	≥250	160-250	According to contractual specifications	not specified	not specified
Hagberg falling number	≥220	≥220	≥180	not specified	not specified
Test weight (kg/hl)	76	76	76	≥74	<74
Moisture (maximum %)	15	15	15	15	15
Broken kernels	4	4	4	4	4
Sprouted kernels	2	2	2	2	2
Impurities	2	2	2	2	2

Source: ONIC and ITCF, 1999

Appendix V
Survey of North Dakota and Montana Elevator Managers on Dockage Practices, 2001

Grain Marketing Questionnaire
(Spring 2001)

D. Name of firm ___________________________

E. Location of firm ___________________________

F. This elevator is a:
_____ (a) Locally owned cooperative elevator
_____ (b) Harvest States line elevator
_____ (c) Locally owned private elevator
_____ (d) Line elevator of a private company
_____ (e) Other ___________________________

G. Plant Characteristics (Please fill in characteristics for your firm in the table below)

Distance from Nearest Competitor		Miles
Loading Capacity		Rail Cars/day
Storage Capacity		Bushels
Number of Bins		Number
Grain Handled in 1999/2000 (Total)		Bushels
Wheat		Bushels
Durum		Bushels
Barley		Bushels
Other		Bushels

H. Cleaning Capabilities and Practices: Please list the percent of grain you currently ship to each market and the percent of dockage grain that is cleaned for each market you normally sell to.

Market	Percent Grain Shipped to each Market		Dockage level Cleaned to: (Percent i.e., .5%)	
Domestic		%		%
Export (West Coast)		%		%
Export (Lakes/Duluth)		%		%
Export (U.S. Gulf)		%		%

I. What type of grain cleaner do you have? (Please fill in items for each cleaner you have)

Manufacturer	Model	Year Installed	Actual throughput capacity (bu/hr)	Type of grain(s) cleaned

J. What percentage of your wheat is cleaned before shipment? ________ %

K. What is the average level of dockage for wheat delivered by farmers? ________ %

L. At what dockage percentage do you not clean wheat?
Harvest ________ Postharvest _________

M. What would you estimate your cleaning cost to be when cleaning to the following dockage levels?

Dockage level	Cleaning cost
0.7% dockage	_____ cents/bu
0.5% dockage	_____ cents/bu
0.3% dockage	_____ cents/bu

N. What is the average price you receive for wheat screenings? ________ $/ton

O. What do you pay for labor to operate cleaning equipment? _______$/hr

P. What do you pay for electricity on cleaning equipment? _______cents/Kilowatt hr

Q. What levels of dockage (%) and limits are buyers asking for?
Domestic ________________________________
Export ________________________________

R. Are buyers applying dockage discounts to you? _____Yes _____No
If yes, what are these discounts?
Export _______________ Domestic ________________

S. Proposed changes in grades and standards would reduce the amount of dockage allowable in wheat. How low can your cleaning equipment adequately clean wheat (what is the lowest level of dockage you can clean to reliably and efficiently)? _____ % dockage

T. If all wheat was to be shipped at the following dockage levels, what would best describe the changes you would need to make? (Check only one for each dockage level)

0.1%	0.3%	0.5%	
_____	_____	_____	No equipment or operational changes would be necessary
_____	_____	_____	No equipment changes but would require additional elevation or handling
_____	_____	_____	Purchase additional cleaning equipment without major modifications to your facility
_____	_____	_____	Purchase additional cleaning equipment and make major modifications to your facility
_____	_____	_____	Provide discount and premium schedules to provide incentives for delivery of low dockage grain

21. Estimate the amount (percent) of wheat lost when cleaning from initial dockage levels to final dockage levels for your cleaning equipment.

Ending Dockage Level	Initial Dockage Level		
	5.0%	3.0%	1.0%
.7%			
.5%			
.3%			

22. When you clean, is sound wheat kernels removed along with dockage in the process?
Yes____ No_____

If yes, do you try to reclaim this wheat or is it sold in dockage?
_____ sold in dockage
_____ reclaimed in the same cleaning process and remains in wheat lot
_____ reclaimed in the same cleaning process but binned separately
_____ recleaned in separate operation and added back to original wheat lot
_____ recleaned in separate operation and binned separately

23. Are you planning on implementing dockage discounts to farmers in the future?
_____Yes _____ No

24. What are your current board prices, for
#1 Hard Amber Durum (milling) _____$/bu
#1 14% HRS _____$/bu

25. What are your discounts to growers for HRS and Durum which grade the following values?
(Base grade = #1 HRS 14% protein and #1 HAD)

	HRS	Durum		
1. 57 lb. Test weight	_____		_____	
2. 16% Protein		_____		_____
3. 12% Protein		_____		_____
4. 58 lb. Test weight	_____		_____	
5. Amber Durum (color)		_____		_____
6. 14.5% moisture	_____		_____	
7. Dockage	_____		_____	
8. 4% Total damaged kernels	_____		_____	
9. 1% Foreign material		_____		_____
10. 5% Shrunken & broken kernels	_____		_____	
11. 2% Contrasting classes	_____		_____	
12. 5% Wheat of other classes		_____		_____
13. Sprout damage	_____		_____	
14. Vomitoxin		_____		_____

26. If you had to maintain a distinct quality or variety of wheat separate from others, what do you think it would cost you to handle this? ____ cents/bu

27. Would you like a summary of this dockage report? _____ Yes _____ No