

Commodity Spotlight



U.S.-Canada Wheat Trade: The Intersection of Geography & Economics

The U.S. is among the world's largest wheat producers and is the world's largest wheat exporter. Production includes wheat of all classes, and the quality and characteristics generally reflect requirements of U.S. millers. Despite virtual self-sufficiency in wheat types and quantities, the U.S. imports some wheat, all from Canada, and some wheat products. The geography of wheat production and use in North America and basic economics indicate that some Canadian wheat production is well placed to supply U.S. use centers.

The current low market prices for U.S. wheat have once again raised questions about the rationale for U.S. imports and concerns about their impacts, and about the role of U.S. and Canadian policies and institutions. Trade liberalization has made some trade inevitable. However, most Canadian wheat production is far enough north and west from the bulk of U.S. production and use centers to limit economic advantages of significant U.S. imports from Canada under normal circumstances.

A convergence of events in the early 1990's led to a dramatic runup in U.S.

wheat imports. Trade liberalization agreements expanded the potential for trade, U.S. export subsidies and elimination of internal Canadian transport subsidies for exported grain increased the economic incentive for Canadian exports to the U.S. rather than to other foreign markets, and bad weather generated unusually large trade in feed wheat. The early 1990's runup in U.S. wheat imports appears to have been an isolated occurrence that has run its course.

U.S. total imports of wheat and products increased almost fivefold after 1989, peaking at nearly 3 million tons in 1993/94; the increase was predominantly hard red spring (HRS) for breadmaking and durum for pasta. (In 1993/94 and 1994/95, significant quantities of wheat were graded as feed in Canada and exported to the U.S.) This rapid import growth coincided with implementation of trade agreements beginning with the Canada-U.S. Trade Agreement in 1989 and followed by the North American Free Trade Agreement (NAFTA) in 1993 and the Uruguay Round Agreement (URA) of the General Agreement on Tariffs and Trade (GATT) in 1995. A tariff of \$7.70 per metric ton on grain imported into the

U.S. and other quantitative restrictions were finally eliminated in 1998. The trade liberalization process paused temporarily from September 1994 to September 1995 with the imposition of a U.S. tariff-rate quota (TRQ) on wheat, although it is not clear that the TRQ significantly affected trade.

U.S. exports to Canada also have increased dramatically in percentage terms but remain relatively small. Nonetheless, U.S.-Canadian trade in wheat remains less than fully liberalized; requirements for end-use certificates in both directions, for example, are still an issue.

Extraordinary weather events and crop conditions also significantly boosted imports from 1992/93 to 1994/95, particularly during the spike in 1993/94. This prompted concerns that imports would continue to rise. But since 1996/97, total U.S. wheat and product imports have stabilized at roughly 2.5 million tons and are forecast near 3 million in USDA's long-term projections.

...geography and market economics, not governments, are the most fundamental determinants of current U.S.-Canada wheat trade.

U.S.-Canada wheat trade has been affected by government institutions and policies. Most important have been the U.S. Export Enhancement Program (EEP) which provided subsidies to exporters, and the Canadian Western Grain Transportation Act (WGTA) which provided transport subsidies for Canadian grain delivered to Thunder Bay or the west coast, a disincentive to export to the U.S. (AO August 1994). The WGTA subsidy was eliminated in August 1995. The Canadian Wheat Board (CWB), its pooling system determining grower returns, and differences in Canadian regulatory policies that affect varietal licensing, marketing services, and transportation costs continue to influence Canadian wheat marketing and exports (AO June 1997).

Commodity Spotlight

The consistency of CWB actions with free trade principles has been questioned by U.S. producers, while Canadians have attributed significant trade impacts to the EEP. Nonetheless, geography and market economics, not governments, are the most fundamental determinants of current U.S.-Canada wheat trade.

Geography of the North American Hard Wheat Sector

Production. Wheat is grown in the U.S. from the southeastern coast to the Pacific Northwest (PNW). Hard wheats of high quality are grown on the Great Plains of North America on a remarkable scale, accounting for two-thirds of U.S. production and the bulk of Canadian production. Hard red winter (HRW) wheat is produced in the southern Great Plains, centered on Kansas but extending into Nebraska, Colorado, central and western Oklahoma, and the Texas panhandle. HRS and durum wheats, the classes accounting for most of the growth in U.S. wheat imports, are produced in the northern Great Plains, centered in North Dakota but extending into South Dakota, Minnesota, and along the Montana-Canadian border. Canadian HRS and durum wheat production extends northwest from the Red River Valley to the mountains of western Alberta.

Milling, processing, and exports. In the U.S. and Canada, wheat is milled and processed primarily near large population centers. Major milling centers and markets also are located on the eastern edge of Great Plains production regions. Kansas City for HRW wheat and Minneapolis for HRS and durum wheat are key markets and distribution centers.

Almost half of all U.S. wheat (including products) is exported, including more than half of HRS. U.S. durum exports account for half of production in some years, although imports also have been important, estimated at roughly one-third of domestic use. Texas Gulf Coast ports account for more than 70 percent of U.S. HRW exports, while the PNW accounts for the rest and for over half of U.S. HRS exports. The remainder of HRS exports are shipped through the Great Lakes or down the Mississippi River.

Three-quarters of Canada's HRS exports are shipped from the West Coast (Vancouver or Prince Rupert). The rest is shipped via the Great Lakes or, in recent years, to Minneapolis. The vast majority of U.S. and Canadian durum exports are shipped through the Great Lakes or New Orleans, because the foreign buyers are

principally in North Africa, South America, and Europe.

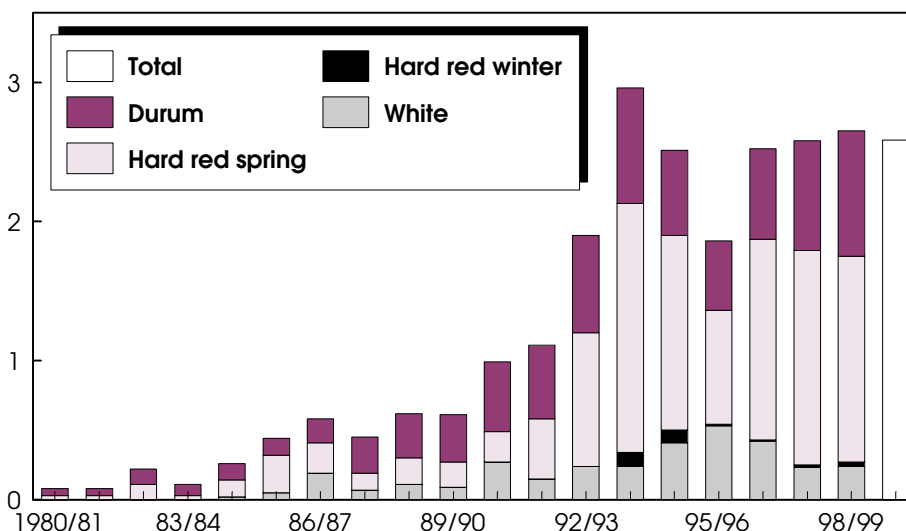
Major marketing zones. For U.S. HRW and HRS wheats, the marketing system is a virtual tug-of-war between export demand at port terminals and domestic demand at interior use centers. U.S. HRW supplies flow in three principal directions, creating three principal marketing zones—the PNW, the Texas Gulf, and Kansas City and U.S. domestic use centers to the east.

For U.S. HRW and HRS wheats, the marketing system is a virtual tug-of-war between export demand at port terminals and domestic demand at interior use centers.

U.S. and Canadian HRS wheat supplies flow basically in two directions, creating two principal marketing zones—west to the PNW or east to North American use centers and for export through the Great Lakes or via the Mississippi River. Minneapolis is the dominant U.S. internal market for HRS wheat, with significant supplies flowing through or near Minneapolis bound for export or eastern use centers. Essentially all durum wheat flows eastward, with some supplies diverted down the Mississippi for export. Almost all U.S. durum passes through Minneapolis because of its well-developed market.

U.S. Wheat Imports Have Levelled Off

Million metric tons



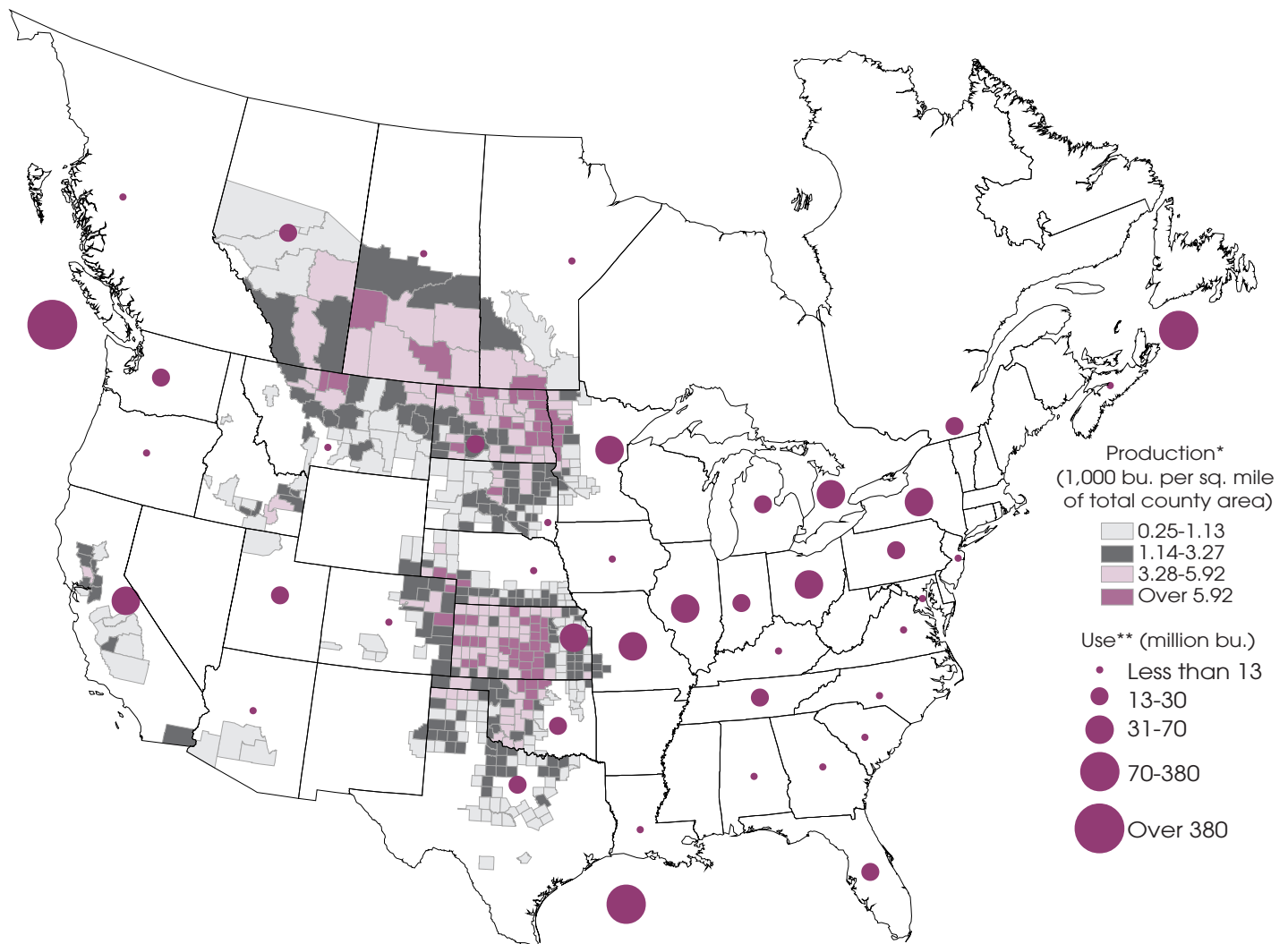
Includes wheat products. 1 metric ton=36.74 bushels. 1999/2000 projected.
Economic Research Service, USDA

Marketing Is Private in U.S., More Regulated in Canada

Wheat marketing systems in the U.S. and Canada have not evolved in the same way. Both countries have numerous regulations, policies, and programs that affect the sector. In the U.S. there is a greater focus on private markets, while in Canada there is a greater focus on regulations related to quality assurance and the grain handling and marketing system. Each have their advocates and opponents in both countries.

The U.S. wheat marketing system, including transport services, is a private commercial process with government

Much of Canada's Hard Wheat Production Is Well Positioned for Export Through the Pacific Northwest



*Total hard wheat production averaged 1,568 million bushels for U.S. and 877 million bushels for Canada annually in the mid-1990's.

**Domestic mill use of hard wheat for U.S. and Canada averaged 751 million bushels annually in the mid-1990's (dots on each state and province represent mill use). Total exports for U.S. and Canada (excluding bilateral trade) averaged 1,330 million bushels annually in the mid-1990's (dots "offshore" denote exports other than U.S.-Canada trade).

Canadian data are from Agriculture and Agri-Food Canada.

Economic Research Service, USDA

intervention limited to the establishment of standards and provision of inspection services. With a view to maximizing profits, local elevator operators and traders make the decisions that allocate U.S. production to various domestic use and export centers, although prices available in major markets leave many local elevator operators with only one practical choice. Wheat is sold to the destination providing the greatest net return, given all costs of movement. Decisions, therefore, depend

not only on prices in alternative major markets but also on costs of movement, which are significant given the large distances in North America. Distance alone, however, is not necessarily an effective indicator of movement costs because transport rates and terminal charges may vary by direction and destination.

Central to the marketing process is the relationship among prices for wheat of a particular class, grade, or other character-

istic in the major use and export centers—Minneapolis, Kansas City, the PNW, and the Gulf Coast. Any array of prices among those major markets results in a geographical pattern of catchment basins, i.e., production regions predominantly supplying specific marketing zones. As each major use center attempts to attract supplies adequate to meet demand at its geographic location, the market establishes an array of prices that attract the quantities consistent with demand in the

Commodity Spotlight

various locations. Where catchment basins meet, local traders can achieve nearly equivalent net returns from sale to more than one location. For example, two U.S. HRS wheat catchment basins meet in central North Dakota, one supplying the PNW marketing zone to the west and the other supplying the marketing zone to the east. At this point, the incentive to transport wheat is the same for either direction.

Changes in the array of prices in major markets cause catchment basins to shrink or enlarge as the net return calculation changes for some traders, shifting sale of some supplies from one destination to another. The relationship among major market prices shifts continuously, fueled by changing information and expectations of supply, demand, and marketing costs. The array of prices among major markets, and the catchment basins that supply each market, may vary dramatically from year to year, reflecting changes in domestic production or in demand for exports.

The change in price relationships between markets required to generate any shift in marketing supplies depends upon transportation costs and density of supplies at the edges of catchment basins.

For example, given the density of HRS production in central North Dakota, where east and west catchment basins commonly meet, a distance of 50 miles represents about 36 million bushels or 1 million tons of wheat, roughly equivalent to the largest-ever annual change in U.S. imports. Because the density is so great in central North Dakota, the associated change in PNW-Minneapolis price differential that could reverse the flow of 1 million tons of wheat would be 4 to 14 cents per bushel, with roughly 7 cents per bushel being typical. The large range in price impacts reflects the considerable variation in U.S. transport rates over time and across regions.

The Canadian government has policies and programs that more directly affect wheat marketing in Canada. The CWB is a state trading agency that has single-desk selling authority (a monopoly position) for wheat exports and domestic sales for food. It makes most of the marketing decisions left to private traders in the U.S. Terminal and other marketing costs are set by the industry but tend to be subject to less competitive pressures than in the U.S. (In addition, western Canadian rail rates for grain and products moving to non U.S.

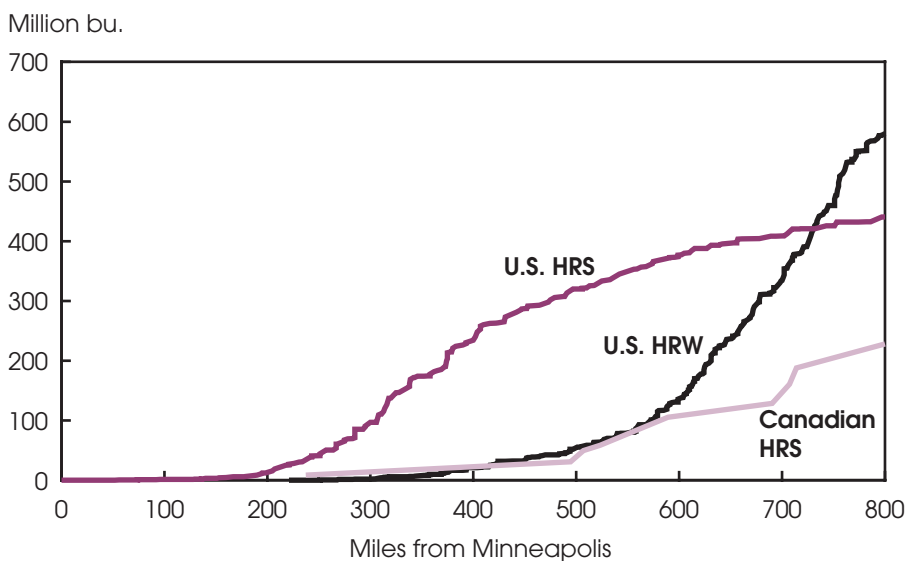
export points are regulated.) The CWB bases prices for domestic use on Minneapolis prices in order for Canadian wheat to remain competitive across an open border. The CWB's mission is to maximize producer returns on sales. For commercial reasons, the CWB, like private grain traders, does not reveal grain sales data. Maximization of producer returns by the CWB would result in marketing behavior very similar to that of private traders.

Wheat marketing systems in the U.S. and Canada have not evolved in the same way.

Unlike private wheat traders in the U.S., the CWB competes for sales without having committed financially to the full acquisition price (only an initial price). This lack of risk exposure does afford some advantage over competitors on individual sales, but the advantage probably is small or negligible in the highly competitive commercial world wheat markets in the longer term. The CWB does not have any control over Canadian production other than the incentive provided by net CWB returns. If the CWB were to repeatedly secure sales by offering wheat at below market prices, returns to Canadian farmers and longer-term production incentives would be reduced. Reduced Canadian production would tend to boost world prices, benefitting U.S. producers.

Farmer-owned co-operatives and those recently transformed into public companies operate most country elevators in Canada and are the major handlers of CWB wheat and barley. The CWB operates through a system of accredited agents in most markets, including the U.S. The growing integration of the North American wheat market has been marked by the emergence of U.S. and other international grain firms as key players in the Canadian marketing, handling, and processing system, owning elevators and acting as CWB agents for sales into the U.S. and other world markets.

Large Supplies of U.S. Hard Wheat Are Grown Relatively Close to Minneapolis Millers/Processors



HRS=hard red spring wheat; HRW=hard red winter wheat.
Mid-1990's annual averages. Canadian data are from Agriculture and Agri-Food Canada.

Geography & Economics ***Limit U.S. Imports***

Underlying the U.S.-Canadian wheat trade is a geographic reality—the great bulk of Canadian wheat production is relatively far from U.S. demand centers. Based on estimates by USDA's Economic Research Service of mill, feed, and seed use by state, total demand of the Minneapolis marketing zone for HRS wheat averaged roughly 325 million bushels annually during 1993-97. That amount of HRS wheat is available from U.S. supplies within roughly 500 miles of Minneapolis, although the qualities required by U.S. millers may require a larger catchment basin in some years. Within the same distance from Minneapolis, Canadian HRS wheat production is still relatively limited and largely dedicated to meeting domestic needs in eastern Canada. Almost 80 percent of Canadian HRS production is more than 700 miles from Minneapolis. U.S. HRW wheat supplies provide another alternative (although generally lower in protein), with production density at least as high as Canadian supplies at 400 miles or more.

Analysis by Agriculture and Agri-Food Canada (AAFC), USDA's counterpart, has provided more complete estimates of CWB incentives for HRS export to Minneapolis, given various price relationships between Minneapolis and Canadian PNW (Vancouver) or Great Lakes markets. These estimates look beyond geography, incorporating transport, terminal, and other movement costs.

Given marketing costs (which are reasonably well known in Canada), a Minneapolis price that is US\$0.25 per bushel below Vancouver's would not justify any shipments into Minneapolis because additional transport costs to Vancouver compared with Minneapolis would be less than US\$0.25 per bushel. A Minneapolis price equal to the Vancouver price would justify exports to Minneapolis from a distance of roughly 700 miles, providing about 73 million bushels (2 million tons) of Nos. 1 & 2 Canadian HRS wheat. To access the very large Canadian HRS supplies in central Saskatchewan beginning about 850 miles from Minneapolis would require a Minneapolis price US\$0.10 above Vancouver's. Before elimination of

WGTA transport subsidies in 1995/96, Minneapolis was even less attractive to the CWB regardless of the price differential.

How consistent are these results with observed trade and prices? Like private firms, the CWB does not make sale prices public. Consequently, U.S. prices at PNW (Portland) and Minneapolis are the only available proxies for estimating CWB receipts. During 1993-97, commonly quoted Minneapolis HRS prices were below U.S. PNW (Portland) prices by about US\$0.35 per bushel on average for all protein levels. Since 1980, equality between PNW and Minneapolis prices has occurred only in 1993 and only for wheat of 15-percent protein. This analysis by AAFC reinforces summary indications provided by geographic observations—the incentive, and thus the potential, for U.S. HRS imports from Canada is very limited or nonexistent.

Underlying the U.S.-Canadian wheat trade is a geographic reality—the great bulk of Canadian wheat production is relatively far from U.S. demand centers.

Observed trade and prices in recent years require the existence of factors that cause CWB unit receipts at Vancouver to be lower than and at Minneapolis to be higher than posted prices. Obvious among the factors affecting CWB exports were EEP subsidies to U.S. exporters. Because the CWB must match effective market prices in order to be competitive in third country sales, the effective price at Vancouver for sales into EEP markets was less than the Portland price by roughly the amount of the EEP bonus (the Portland price excludes any EEP bonus). EEP bonuses for wheat averaged more than 80 cents per bushel from 1986 until they were last used in July 1995. From 1991 through 1993, EEP bonuses were US\$1 or more per bushel, implying very significant discounts at Vancouver compared with quoted prices at Portland, more than enough to make Minneapolis more attrac-

tive than EEP markets. U.S. commitments under the Uruguay Round Agreement limit future use of EEP subsidies for wheat exports.

In addition, commonly quoted Minneapolis prices may understate prices obtainable by the CWB in Minneapolis for wheats that have certain attributes required by U.S. millers. Millers blend numerous wheats together to obtain the types of flour specified by bakers. Although Canadian HRS wheat is not necessarily of higher quality than U.S. HRS wheat, it is widely believed in commercial circles that CWB control over Canadian wheat marketing, along with strict control over planted varieties and quality enforced by the Canadian Grain Commission, enables the CWB to guarantee more precisely quality and other special characteristics of individual shipments. Special wheat characteristics are not reflected in commonly quoted prices, and a guarantee of specification justifies a perhaps significantly higher price (price premium) at Minneapolis for individual shipments. Marginal exports from Vancouver on the other hand, particularly to subsidized markets (generally less quality conscious) during the first half of the 1990's, would rarely command any price premium for "Canadian quality."

Wheat Characteristics ***Affect Markets & Trade***

The significance of special wheat characteristics in marketing and prices may be far greater than can be demonstrated with available data. Wheat is far from a homogeneous commodity. Five major classes are grown in the U.S.—hard red winter, hard red spring, soft red winter, durum, and white (both hard and soft varieties). While each class has a different predominant end use, the classes are also substitutes for each other in many products (AO August 1997).

Commonly quoted prices are by grade, class, and protein percentage. Grade reflects a variety of conditions affecting milling yields and costs of processing. While class indicates a range of wheat characteristics, special characteristics important to millers, which can command large price premiums, are lost in averages of published market prices. A good exam-

Commodity Spotlight

ple is Canadian Western Extra Strong comprised mainly of the variety Glenlea (a HRS wheat). U.S. millers are importing 200,000-300,000 tons of this type of wheat for blending because its high gluten strength allows for a flour blend with stronger dough properties, especially important in the rapidly growing frozen dough market.

Wheats with a varying protein content or special characteristic may command differing relative prices among markets, so catchment basins for each wheat will be different. Some traders, particularly near the edges of catchment basins, may send some grades and types of wheat in one direction and other grades and types in another.

In recent years, some U.S. processors have maintained that adequate supplies of sufficient quality durum require imports from Canada in some years. According to U.S. Wheat Associates quality estimates, U.S. production of Nos. 1 and 2 durum wheat fell dramatically in 1993 to less than half of U.S. durum used for food, and supplies of higher grade U.S. durum remained below food use requirements through 1997/98.

The largest annual increases in U.S. wheat imports resulted from wheat quality issues. In 1992/93, when Canadian HRS wheat quality was among the worst on record, with 39 percent graded as feed due to early frost, roughly 1 million tons of feed wheat was exported to the U.S. where the feed market was relatively strong. In the following year, the Cana-

dian hard spring wheat crop was attacked by fusarium fungus which was brought on by extremely wet conditions throughout the growing season, causing another 1 million tons of high-protein spring wheat to be graded as feed because Canadian regulations allowed only 0.25 per cent of fusarium-damaged kernels for Nos. 2 or 3 (above feed quality). Because this feed wheat would fetch a lower price in the domestic market, much of it was exported to the U.S. and may have been converted to food use after cleaning and blending not allowed under Canadian regulations at the time. Canadian tolerances for fusarium were subsequently raised, and blending is now allowed.

World Trade Conditions Overshadow Imports

Changes in U.S. production and in world trade have presented significant shocks to the U.S. wheat sector. A rough indicator of shocks to U.S. production is the deviation of actual from average yields (using harvested areas). During 1993-97, yield fluctuations accounted for a production swing of almost 2.8 million metric tons (mmt) below average in 1995/96 (4.4 percent) and almost 3.5 mmt above average in 1997/98 (5.4 percent). In 1998/99, production was more than 9 mmt (15 percent) above the 1993-97 average.

The largest shocks to the U.S. wheat sector by far have occurred in world trade. Year-to-year changes in world trade volume have averaged nearly 8 mmt since 1980. In three of those years, trade volume varied by more than 20 mmt.

Although changes in U.S. production and world trade refer to total wheat, the changes in U.S. wheat imports (mostly HRS and durum) have been much smaller than those changes. Increases in U.S. wheat imports were relatively large during 2 years—800,000 metric tons in 1992/93 and more than 1 million in 1993/94. However, the volume of U.S. wheat imports or the change in volume significantly overstates associated shocks to U.S. markets, because Canadian wheat shipped to the U.S. is no longer available to third countries. As third countries seek alternative sources, demand for U.S. exports increases, partially offsetting the impact of imports.

Since 1993/94, U.S. wheat and wheat product imports have stabilized at around 2.5 million metric tons, and USDA forecasts indicate very limited increases in the future. With the U.S. exporting half of its production and Canada exporting nearly 80 percent, world trade will continue to be the major source of shocks to the North American wheat sector, and North American wheat prices will continue to depend chiefly on world supply and demand. Special grain characteristics necessary to produce a growing variety of wheat products will continue to affect purchase decisions of millers and traders, including the sourcing of wheat supplies. **AO**

*Gene Hasha (202) 694-5193;
Robert J. MacGregor, Agriculture
and Agri-Food Canada (613) 759-7441
ghasha@econ.ag.gov
macgrbo@em.agr.ca*

World trade topics

- * *The evolution of tariff bargaining*
- * *Asian ag policies and South Korea's protectionism*
- * *NAFTA's record to date*

...in upcoming issues of Agricultural Outlook