

World Agriculture & Trade



Panama Canal Commission

Squeezing Grain Through the Panama Canal

El Niño continues to leave its mark on U.S. agriculture, this time on the transport of commodities through the Panama Canal, a critical link between the Atlantic and Pacific Oceans for U.S. agricultural exports to Asia. Panama has suffered the driest rainy season (May-December) in the 83-year history of the canal, with rainfall 35 percent below normal in 1997. The Gatun and Madden Lakes, which provide fresh water to the canal, are 60 percent below normal. Water levels are now too low for large vessels to transit the canal fully loaded.

To maintain water flows in the three sets of locks that raise and lower vessels across the isthmus, the Panama Canal Commission (PCC)—the joint U.S.-Panamanian agency that runs the canal—is implementing water conservation measures and restricting vessel draft (the depth a ship is immersed in the water). The result is to effectively limit the amount of cargo loaded on some ships passing through the canal. Forty ocean-going vessels transit the 51-mile Panama Canal lock system every day (taking about 8 hours per transit through the locks). A vessel requires about 52 million gallons of water for passage through the locks.

Bulk U.S. agricultural exports transported through the canal (primarily corn, soybean, wheat, sorghum, and meals) are now being transported in smaller volumes, which normally raises shipping costs. But because of excess capacity in the global charter vessel market and reduced demand for shipping, ocean freight rates are below year-earlier levels. The major effect is on the ability of U.S. exporters to supply full loads to foreign buyers. If draft restrictions continue through the spring and into summer as scheduled, shipping grain and other commodities will become more challenging for U.S. exporters, vessel operators, and importers of U.S. goods.

An emergency water conservation plan was put in place for the canal in October 1997 to help delay draft restrictions. Foremost, hydroelectric power generation was suspended at the Gatun plant and the Madden Dam plant. Other water-saving measures include using tandem ship and short-chamber lockages (reduces effective chamber size), minimizing hydraulic assists (used to pull ships out of the chamber), and cross-spilling from opposite chambers (water from one chamber is used to raise a ship in an adjacent chamber).

The actions resulted in water savings equivalent to 60 lockages (i.e., full

passage through all 3 sets of locks) per month or over 3 billion gallons per month. However, the drought persisted into 1998 and forced PCC to implement draft restrictions on March 12, 1998, the first time in 14 years. The PCC expects the restrictions to continue through October 1998. Fortunately, these draft restrictions are occurring during the canal's slow season, April to September.

Under normal operating conditions, the maximum allowable draft is 39.5 feet. Beginning March 12, vessels were limited to a 39-foot draft. The PCC announces each new restriction (in 6-inch increments) at least 2-3 weeks in advance of the effective date to give shipping companies ample time to alter vessel loadings.

Panamax vessels, which carry most U.S. grain, are affected first, since they are the largest vessels capable of transiting the canal at a draft of 39.5 feet. Even though 30 percent of the vessels transiting the canal in fiscal year 1997 (beginning October) were this size, only about 8 percent of the ships transited the canal with drafts exceeding 39 feet. The PCC estimates that 17 percent of the 8,850 vessels expected to transit throughout the draft restriction period will be affected by the restrictions.

Each 6-inch draft restriction displaces approximately 1,000 metric tons of cargo per Panamax (approximately 740 feet in length), or about 2 percent of the ship's capacity (55,000 tons). The PCC estimated that the first draft restriction of 39 feet displaced 700 tons of cargo per ship. A second restriction of 38.5 feet (implemented on March 18) displaced an additional 1,030 tons per ship. When the draft restrictions reach 34 feet in mid-May (expected to be the final restriction), total displacement will be approximately 20 percent of the ship's capacity.

To meet draft restrictions and still maximize carrying capacity, vessel operators have a number of options. Many dry bulk vessels have design characteristics that give the vessels more buoyancy for better draft flexibility. For those vessels, the operator can apply with the PCC for a 6-inch deeper draft through the canal. If such a waiver is not possible, the vessel operator can maximize the use of cargo

World Agriculture & Trade

capacity by sailing through the canal with less fuel. Once through the canal, the ship can top off its fuel and complete the voyage.

Other options include adjusting ballast—tanks that hold seawater, used mainly to stabilize a vessel carrying little or no cargo—to lower the bow and raise the stern or vice-versa during transit through the canal, sailing with less cargo through the canal and topping off at a port on the other side of the canal, or using smaller charter vessels that are less affected by draft restrictions. Depending on the severity and length of the drought, vessel operators have the option to sail around the Cape of Good Hope in South Africa and through the Indian Ocean. This lengthens the normal 30-day trip between the Gulf of Mexico to Asian ports to about 50 days.

In fiscal 1997, more than 13,500 vessels transported 189 million tons of cargo through the canal. Vessel transits going from the Pacific Ocean to the Atlantic Ocean (northbound movements) made up 49 percent of total transits and 39 percent of the cargo weight, while transits from the Atlantic to the Pacific (southbound movements) made up 51 percent of total transits and 61 percent of the cargo weight. U.S. agricultural exports transiting the canal totaled 38 million tons in 1996. Corn was 57 percent of the total, with soybeans, wheat, and sorghum accounting for another 36 percent.

U.S. grain continues to pass through the canal, but the volume per ship is less. Normally, shipping costs are redistributed across the loaded volume. For example, the 35.5-foot draft restriction effective April 19 roughly translates into \$2.50 per ton (assuming a rate of \$17.50 per ton from the U.S. Gulf to Japan) for a typical Panamax ship carrying grain.

Bulk Shipping

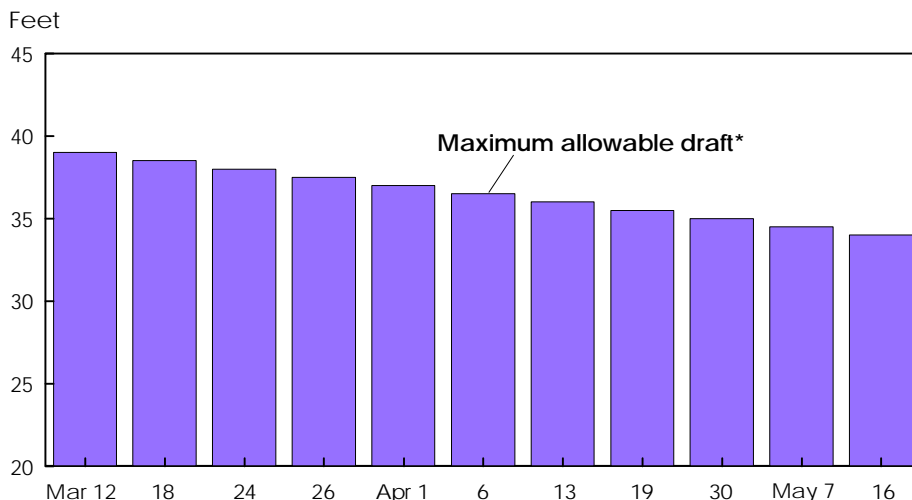
Bulk vessels transport numerous liquid and dry bulk commodities and products. Dry bulk is divided into two groups: major bulks (iron ore, metallurgical coal, steam coal, bauxite and alumina, phosphate rock, and grain, including soybeans but not rice) and minor bulks (steel products, forest products, cement, fertilizers, manganese, scrap, coke, pig iron, sugar,

soybean meal, and rice). In 1995, major agriculture-related products accounted for 13 percent of the 3.7 billion tons transported in the world's seaborne trade lanes. Bulk vessels are not necessarily dedicated to specific commodities and can be cleaned between uses.

Transport of bulk products occurs through a bulk vessel charter arrangement to haul a specific commodity from a specific origin to a specific destination at an agreed-upon rate and time. Many contracts for a charter

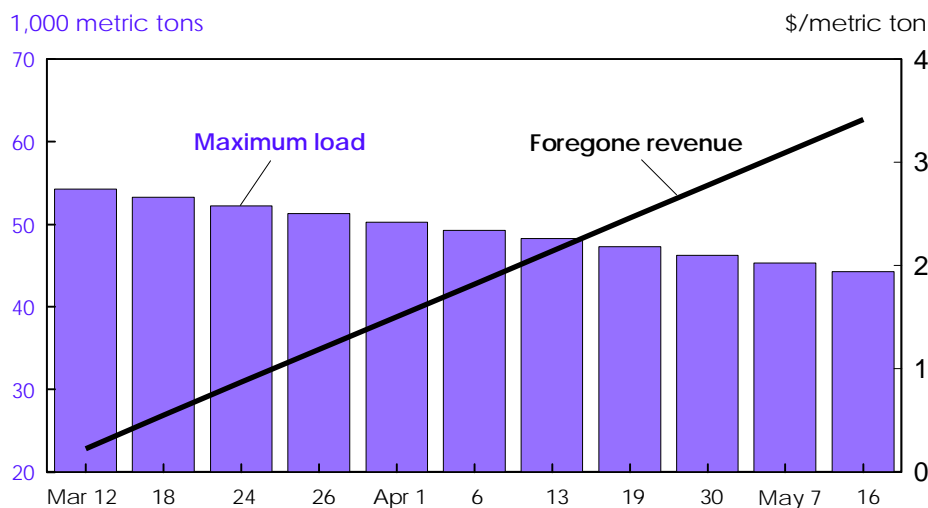
vessel, or "fixtures" as they are called, are arranged to maximize vessel capacity at all times. In some instances, vessel operators will pick up cargo from more than one port to maximize carrying capacity. Once the cargo is loaded, it is transported to its destination and unloaded. The operator will then pick up another shipment from the same port or one nearby and transport to another destination to repeat the cycle. If a cargo is not available for immediate pickup, the ship may sail empty until a shipment can be secured.

As Panama Canal Draft Restrictions Intensify . . .



*The depth a ship is immersed in water.

. . . Maximum Load Declines, Reducing Returns to Shipping



Assumes a Panamax vessel loaded at 55,000 tons of grain and a rate of \$17.50 per ton. Revenue distributed across loaded volume.

World Agriculture & Trade

Vessels transporting bulk commodities are identified by their size within three categories measured in deadweight tonnage (dwt): Handy (10,000-50,000 dwt), Panamax (50,000-70,000 dwt), and Capesize (70,000-300,000 dwt, often subdivided into three further categories depending on the trade route). Bulk grain products, particularly corn and soybeans, move predominantly in Panamax vessels. The Panamax transports a significant volume of product, keeping costs per unit down, while requiring a draft that is universal in major world ports. It also offers excellent flexibility to charter backhaul cargo to minimize repositioning costs and avoid layup.

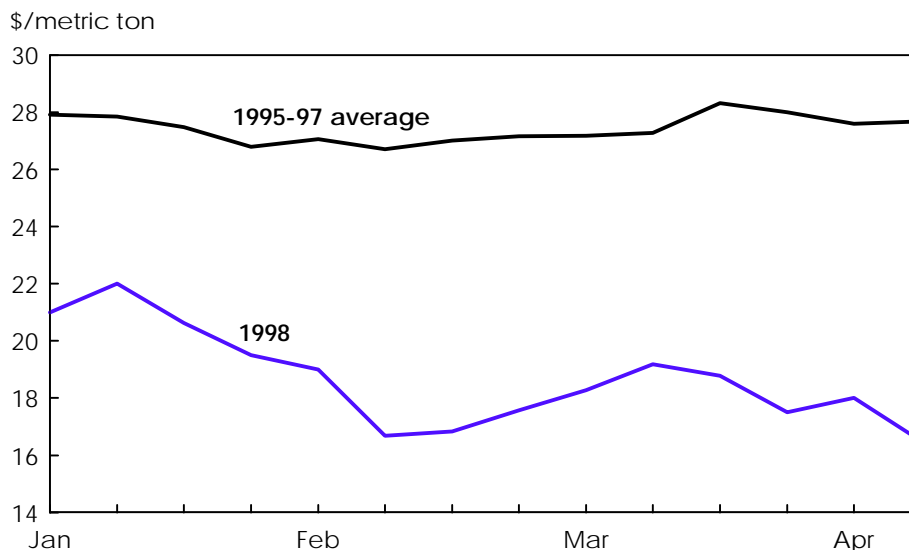
Charter Vessel Rates Sink

In 1996, the bulk charter carrier fleet consisted of more than 5,000 vessels worldwide with total deadweight tonnage of 230.1 million. Today, the vessel capacity has reportedly climbed to 263 million tons. Two economic factors have led to the supply buildup. First, prior to the Asian financial situation in late 1997 and early 1998, vessel owners responded to low ship prices by purchasing new ships to meet growing Asian demand for cargo movements. Second, scrap value for older vessels has plummeted to such low levels that vessel operators are idling vessels rather than scrapping them.

Meanwhile, the Asian financial situation has cooled demand in that region for bulk commodities, including U.S. grain. In Japan, for example, steel production is reportedly forecast down 5 percent in 1998 from a year earlier, which subsequently decreases imports of coal and ore (inputs used for steel production) and reduces automobile exports. As a result, charter vessel contracts in Japan, both origination and destination, were down 30 percent in March 1998 from a year earlier.

For agricultural commodities, U.S. exports have been lackluster in 1997/98, reflecting overall world demand. U.S. bulk commodity exports were \$9 billion in January 1998, down 9 percent from a year earlier. From October 1997 to January 1998, U.S. corn exports were 12.6 million tons, down 34 percent from a year earlier. U.S. corn exports face strong competition from China, Eastern Europe,

Ocean Freight Rates Through the Panama Canal Are Lower in 1998



Rates for grain transport from U.S. Gulf ports to Japan.
Economic Research Service, USDA

and Argentina, as well as dampened demand in Asia. However, not all U.S. grain exports have decreased in 1998—wheat and soybean exports are running ahead of year-earlier levels.

According to the trade publication *Lloyd's List*, world demand for bulk products is forecast to fall to 240 million tons in 1998, or about 9 percent below the capacity of the world fleet. The net result is too many ships chasing too little cargo.

Ocean freight rates for the movement of grain from the U.S. to Japan, a key route used to evaluate global ocean freight rates, have plummeted during the first few months of 1998 and are not expected to increase significantly through spring and summer 1998. Rates from the U.S. Gulf to Japan during the first quarter of 1998 averaged \$18.84 per ton, 25 percent below a year earlier. Some rates have since fallen to \$15.50 per ton. Ocean rates during 1995-97 (first quarters only) averaged \$27.41 per ton. Rates from the Pacific Northwest to Japan, another key route, have also decreased. During the first quarter of 1998, ocean rates averaged \$10.84 per ton, nearly \$5 below the first-quarter average of 1995-97.

Ocean freight rates are critical in the movement of bulk grains. The selection of

a port is based on the location of the importing country, the proximity of stored grain to a specific port region, interior transportation rates, and ocean rates. U.S. exports of corn and soybeans depart largely from the U.S. Gulf, while Pacific Northwest ports move a significant volume of Asian-bound corn and wheat. The Gulf handles about 70 percent of grain and soybean exports. These two port regions offer exporters excellent access to the global market.

About 50 percent of U.S. grain and soybean exports are shipped to Asia, particularly for satisfying feed demand for expanding livestock production. Most import operations coordinate their grain arrivals to receive full loads of grain (i.e., 50,000-55,000 tons) in order to minimize per-unit transport and unloading costs and to maintain buffer stocks. Importers who are unable to receive desired quantities at attractive freight rates from one source will seek others that can meet their demand. However, many Asian importers have found that it is much easier to finance a smaller cargo, due to the current financial crisis, and are seeking cargoes from countries using smaller boats, so smaller loads are not an issue in most cases.

When draft restrictions limit the amount of grain that can be loaded and shipped

through the Panama Canal, shippers incur an “opportunity cost” from foregone revenue of the displaced cargo. To make up for the loss, shippers attempt to pass along the additional cost to the grain exporter by raising ocean freight rates. But this is unlikely under current circumstances, given excess supply in the charter vessel market and reduced demand for shipping grain and other bulk commodities.

With strong competition among vessels to obtain loads, transport rates are lower than year-earlier levels. In fact, ocean freight rates are the lowest in recent history, which implies that draft restrictions at the Panama Canal are having little impact on ocean rates or on the ability of U.S. shippers to export grain.

Without these mitigating factors, the implications of the continued draft restric-

tions could be serious. Importers in general want a consistent volume of grain, and any alterations in U.S. capacity to supply at desired volumes reduces U.S. competitiveness in Asian markets.

An impact is possible if the El Niño-related drought in Panama lingers longer than expected (weather forecasts predict rain to return in May when the rainy season usually begins), further intensifying draft restrictions beyond those currently planned. Also, an impact from the restrictions would surface in the unlikely event that reduced demand for bulk shipping or demand for smaller loads is short-lived.

If ocean rates through the Panama Canal suddenly increase to a level that diverts proportionately more grain shipments through the Pacific Northwest, domestic grain shippers and exporters will be challenged to reposition grain from

domestic supply sources to export positions over a congested rail system (*AO* March 1998), and vessel operators would be challenged to strategically position their vessels at U.S. ports for commodity pickup and delivery.

A return to normal weather will recharge the canal system, particularly the lakes that feed it. Full draft in the canal is not expected before October.

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